

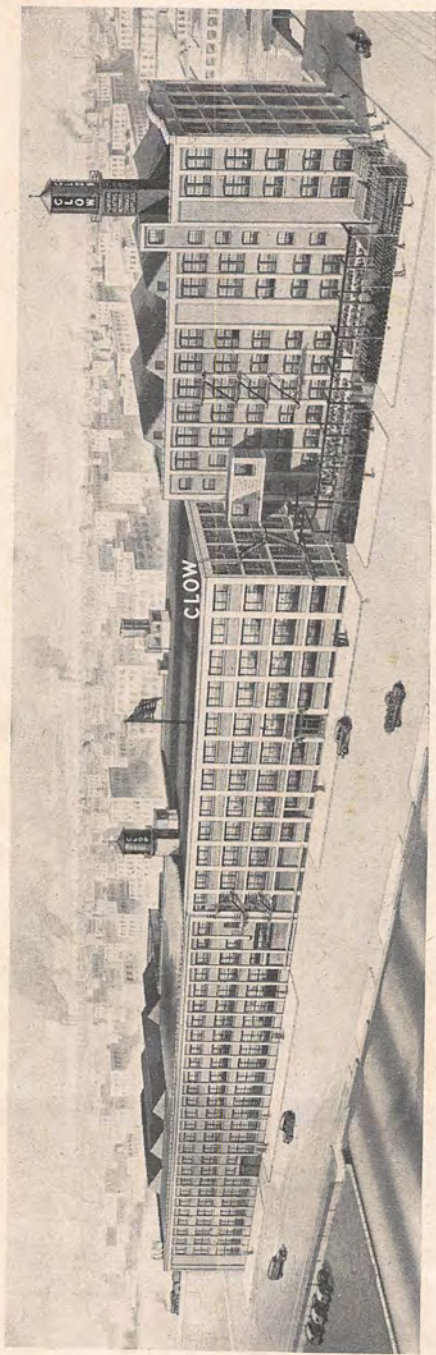
No. 36

# PIPE ECONOMY



CAST IRON PIPE  
AND FITTINGS  
STEEL AND  
RIBBON IRON  
WATER WORKS  
SUPPLIES, ETC.

**JAMES B. CLOW & SONS**



General Offices and Chicago Warehouse

#### **For Municipal Water and Sewage Systems**

To meet the emergency needs of towns and contractors within the Chicago Area, the following products are carried in stock for immediate delivery by truck from this plant: cast iron pipe, fittings and pipe line specials—in sizes 12-inch and smaller; waterworks valves and valve boxes; water service goosenecks, lead and copper service pipe, corporation stops, curb stops and boxes; Eddy fire hydrants; street and roadway castings and a complete assortment of pipe line tools and allied products.

#### **For New Construction and Maintenance**

As a wholesale distributor of pipe line products for all purposes in and around buildings of every kind—small or large, the Chicago Warehouse is kept well stocked to meet the needs of the piping trades and maintenance men. Stocks include steel, wrought iron, brass pipe, and copper tubing; cast iron, malleable and brass screwed fittings; cast iron flanged fittings and flanges; brass and iron valves for all service requirements; and a complete assortment of pipe line accessories and tools.



# PIPE ECONOMY

## CATALOG No 56



General Offices

## JAMES B. CLOW & SONS INC.

201-299 North Talman Avenue  
CHICAGO 80, ILLINOIS

### EDDY VALVE COMPANY

(Subsidiary)  
WATERFORD, N.Y.

### IOWA VALVE COMPANY

(Subsidiary)  
OSKALOOSA, IOWA

#### SALES OFFICES

BIRMINGHAM 2  
COLUMBUS 12  
HOUSTON 6  
NASHVILLE  
PITTSBURGH 28

CHICAGO 80  
DALLAS 6  
KANSAS CITY 5  
NEW YORK 6  
ST. LOUIS 24  
WEST DES MOINES 10

CLEVELAND 14  
DETROIT 2  
MINNEAPOLIS 2  
OSHKOSH  
SOUTH BEND 1

#### EDDY VALVE COMPANY

See Page 121

#### IOWA VALVE COMPANY

See Page 225

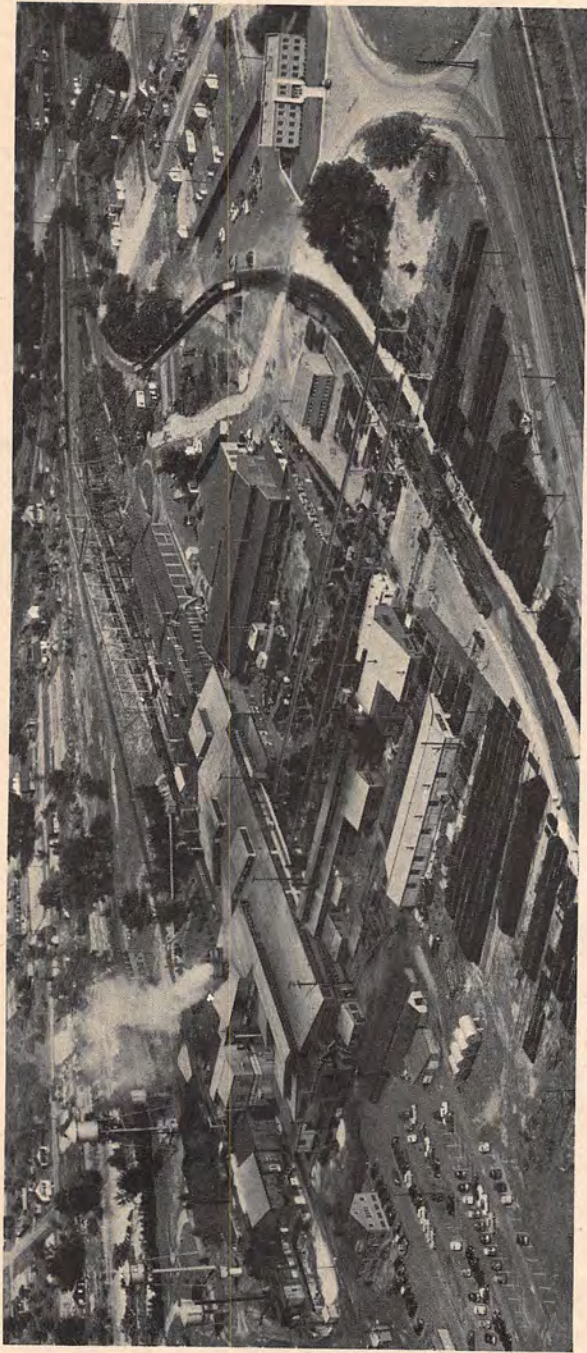
#### WORKS

BIRMINGHAM  
OSKALOOSA

CHICAGO  
NEWCOMERTOWN

COSHOCTON  
WATERFORD





Coshocton, Ohio, Works

Often referred to as the "Northern Works" of the company, this plant occupies seventy-five acres of ground in the Muskingum River valley, about one mile to the south of the City of Coshocton, Ohio. The plant is ideally located (on the Pennsylvania and the Nickel Plate Railroads) to service the needs of municipal water departments and contractors throughout the

middle western and northern states. Also, overnight deliveries by trucks from this plant to our Chicago warehouse make it possible to maintain ample stocks of pipe line products, in sizes 12-inch and smaller, for emergency pick-ups or for prompt delivery by motor trucks which run on regular schedules within the Chicago Metropolitan Area—including all suburban towns.



# COMPLETE and PRACTICAL REFERENCE BOOK

*for*  
*Engineers, Buyers and Users*

*of*

**Cast Iron Pipe and Foundry Products**

**Including**

Bell and Spigot Joint Pipe and Fittings

Mechanical Joint Pipe and Fittings

Flanged Joint Pipe and Fittings

Ball and Socket Joint Pipe

Roll-On-Rubber-Gasket Joint Pipe

Plain End Pipe

Threaded End I. P. S. Cast Iron Pipe

Cast Iron Pipe Line Specials for

Water, Gas and Sewage

•

Eddy Valves and Hydrants

Iowa Valves and Hydrants

•

Water Service Stops, Boxes and Supplies

Manholes, Gratings and Drains

Miscellaneous Castings for Buildings

Pipe Line Tools

•

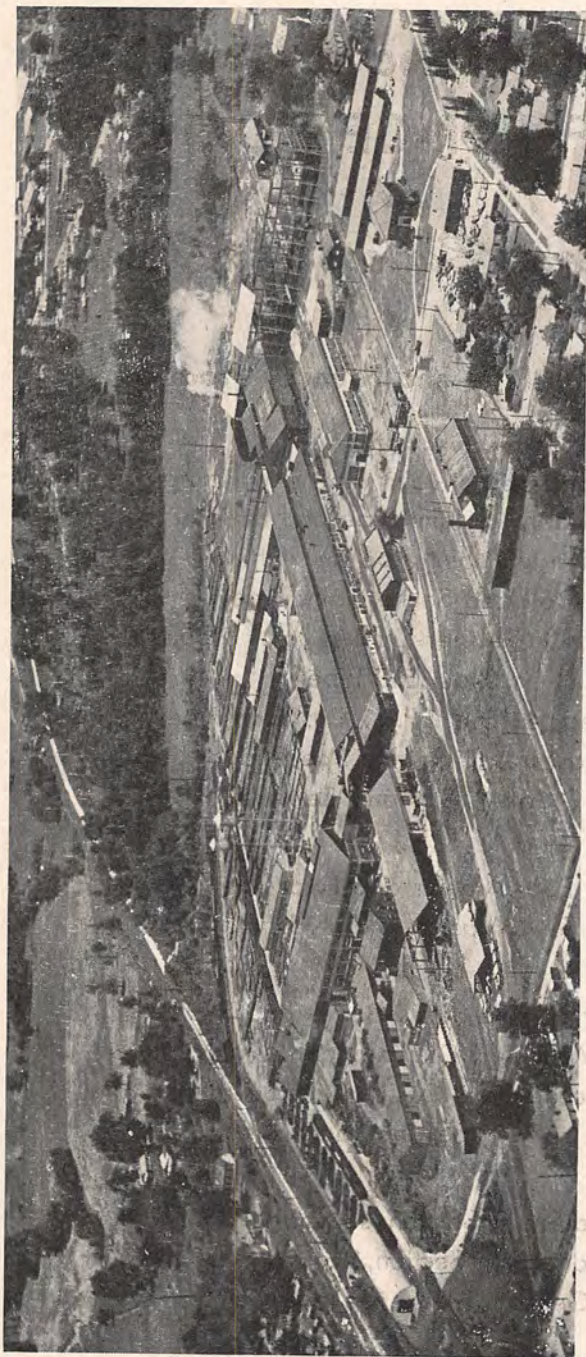
Addenda Section, see page 257

Information Section, see page 283

General Index, see page 305

*Everything for the municipal water supply system*





### Birmingham, Alabama, Works

Our Birmingham Works occupies thirty acres of approximately one hundred twenty acres of company owned valley land at Tarrant, a suburb of Birmingham, and is ideally located for manufacturing cast iron pipe and fittings. In the surrounding highlands are huge deposits of iron ore and coal, and limestone is plentiful in the lowlands. Thus, three of the principle raw ma-

terials required to produce our pig iron are readily available. Cast iron pipe, in sizes 3 through 24 inches, all made centrifugally by the deLavaud process, accounts for a large percentage of the products produced by the National Division. Fittings produced include bell and spigot, mechanical joint, flanged, and many pipe line specials.



# CONDITIONS OF SALE

## Acceptance

Our quotations are based on acceptance within 30 days from the date shown unless otherwise agreed in writing and are contingent upon approval of our Credit Department.

## Shipments

We shall not be responsible for delays caused by strikes, embargoes, fires, accidents, or any other causes beyond our control.

## Responsibility for Loss or Damage

Our responsibility ends when goods are delivered in good condition to and received for by the carrier.

## Returns

Material cannot be returned without our consent.

## Guarantee

We agree to furnish new merchandise in exchange for any merchandise sold that is found to be defective in manufacture. We assume no further liability of any kind such as for labor costs, expenses, or any type of damages direct or indirect resulting from the use of the merchandise claimed defective.

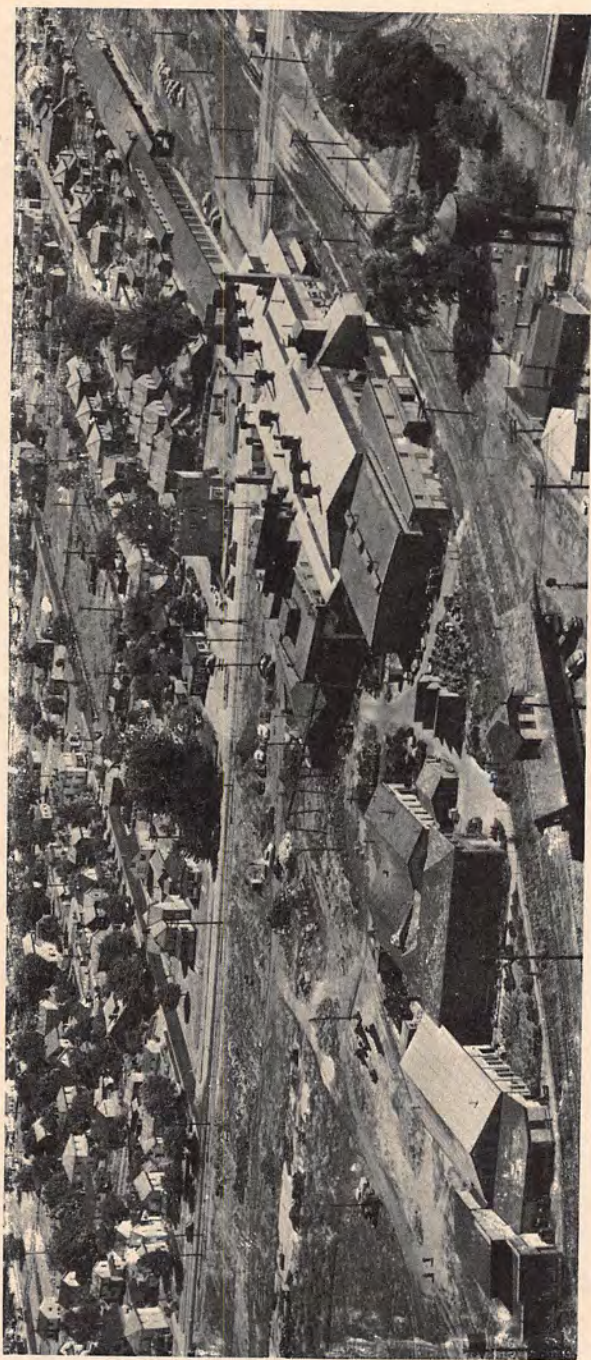
## CHANGES IN STANDARDS

The constant advancement of our industry will, from time to time, permit us to make improvements in the product. The details of illustrations, specifications and measurements shown in this catalog are correct as of the date of publication. We reserve the right, however, to make any changes which in our opinion will improve the product and will make every effort to furnish any material ordered from this catalog in accordance with the standards current at the time the order is filled.

## EMERGENCY STOCKS

In addition to very complete stocks carried on hand at the main plants of the company—Birmingham, Ala. and Coshocton, Ohio; adequate stocks of pipe, fittings, and specials are maintained at Chicago, Illinois, Dallas, Texas, and Oskaloosa, Iowa.





#### Newcomerstown, Ohio, Works

Early in the year 1895 the first company-owned foundry, located at New Philadelphia, Ohio, was completely destroyed by fire. It was then decided to establish a new plant eighteen miles to the southwest at Newcomerstown, a junction point on the Pennsylvania's main line west of Pittsburgh—considered to be an ideal location for making rail shipments in all directions.

In the beginning, this plant produced the company's full line of sand cast pipe and fittings. Today, operations at the Newcomerstown plant are almost entirely concerned with the production of the well-known Clow Gasteam Radiators—the radiators that make their own steam heat with gas. For illustrations and descriptions of this product, see pages 222 and 223.



**GENERAL INFORMATION ABOUT CAST IRON PIPE**

WHEREVER it is necessary to use pipe—underground or above ground—to convey water, gas, low pressure air, low pressure steam, or products of a corrosive nature—cast iron pipe should be used if permanent construction is of any consideration. The real length of life of cast iron pipe is unknown. The oldest installation on record is still in service at Versailles, France, having been manufactured and installed there about 1664.

In this country the oldest record of cast iron pipe in our possession is that of the installation at Philadelphia in 1804 and at New York in 1833, both of which are still in successful operation. As this catalog goes to press, the records show there are more than sixty cities listed as members of the CIPRA Cast Iron Pipe Century Club—whose membership is limited to cities wherein cast iron pipe was originally installed more than one hundred years ago and is still in service in their water and/or gas distribution systems.

**Metallurgy of Cast Iron Pipe**

Cast iron is essentially an alloy of iron, carbon, and silicon—containing appropriate controlled amounts of manganese, phosphorus, and sulphur. Most cast iron is made by melting pig iron with selected scrap. In gray cast iron, which is the type used for pipe and fittings, a major part of the carbon content occurs as free carbon or graphite in the form of flakes interspersed throughout the mass of metal. The engineering properties specific to gray cast iron are principally due to the presence of these free carbon graphite flakes.

The excellent corrosion resistance of cast iron pipe in underground service is well known. Cast iron is not rustproof, but when rust forms on cast iron it is tightly adherent and helps to protect the metal beneath. Graphite is noncorrodible and the appreciable volume of this component, together with relatively inert iron phosphides, causes gray cast iron to be more resistant to corrosion than the purer forms of iron.

In severely corrosive conditions where the metallic content of a cast iron pipe is severely reduced by corrosion, the corrosion products of cast iron form an interlocking mat of graphite, phosphides and iron oxides which is strong and dense enough to enable the pipe to continue to serve indefinitely as an effective conduit under ordinary pressures.

Machinability of any metal structure is important, particularly where it must be drilled, tapped, or cut with ordinary tools. At a given hardness level cast iron is more easily machined than most other metals because the graphite flakes break up the chips and lubricate the cutting tool.

**Cast Iron and Corrosion**

The various investigations of soil corrosion on underground structures have brought out some interesting facts on the corrosion of cast iron as compared with other ferrous metals.

First, the fact that the rate of corrosion slows up as time progresses, so that the time to corrode through the wall varies as the square of the thickness—in other words, a wall twice as thick will last four times as long—shows why the extra thickness in the walls of cast iron pipe gives years of greater life even in the most corrosive soils.

And, secondly, the products of the corrosion of cast iron are really iron ore which has existed in the ground for ages. These corrosion products form an unusually strong, tough protective coating, which effectively prevents continuing corrosion. However, as with all protective coatings, breaks in the self-formed coating occur through pipe movement and, of course, corrosion will again become active, slow down as a new coating of corrosion products forms and finally again cease altogether.

However, the long periods through which the corrosion is dormant add many further years to the useful life of cast iron pipe.

**Tuberculation**

We have previously discussed the corrosion of cast iron pipe from the soil acids, but there exist waters in certain parts of the country which affect the inner surface of the pipe causing a corrosion, commonly called tuberculation.

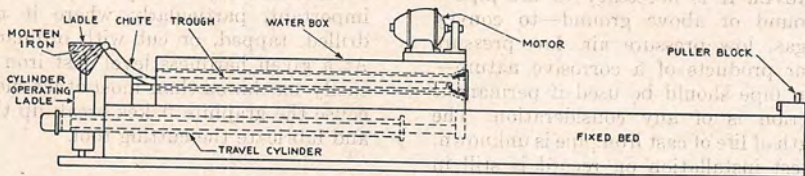
Fortunately this type of corrosion can be predicted by a simple study of the water itself and the inner wall of the pipe can be protected against it.

In these communities there exist in the water certain iron absorbing bacteria. Although they can live in waters free from iron, they are generally found in waters

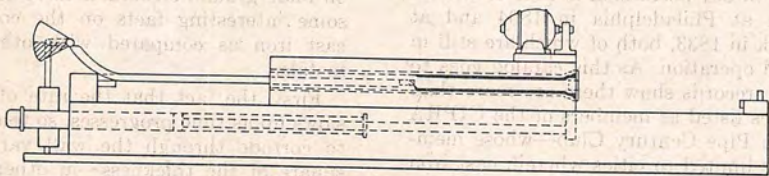
*Continued on page 11*



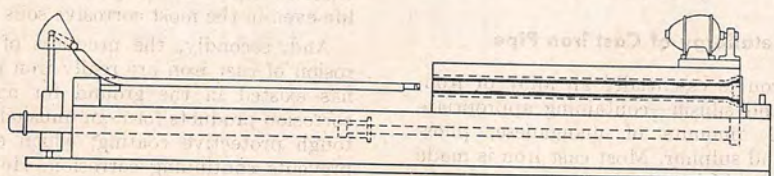
## HOW CLOW PIPE CASTING MACHINES OPERATE



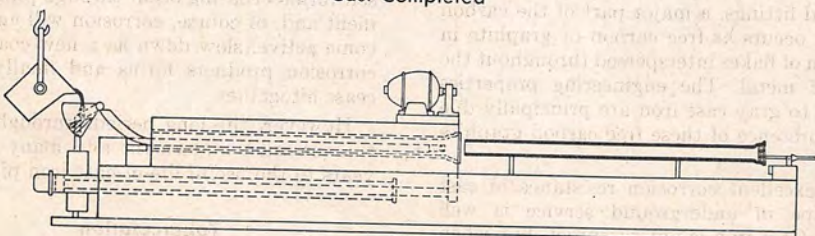
Head Core in Place—Ready to Start Cast



Cast Half Complete



Cast Completed



Pipe Removed From Mold—Refilling Pouring Ladle

Clow Super-deLavaud cast iron pipe is centrifugally cast in water-cooled steel molds without chill. It is a superior pipe with a dense close-grained metal structure free from blowholes, sand and slag inclusions. Due to the centrifugal method of casting, the pipe wall thickness is made uniform from end to end and inside and outside diameters are true circles. Clow Super-deLavaud pipe is a tough pipe with unusually high tensile strength. The pipe can be easily cut with sledge and chisel, and drilling and tapping it for branch lines forms perfect threads for strong connections.



**GENERAL INFORMATION ABOUT CAST IRON PIPE**

*Continued from page 9*

carrying soluble compounds of iron. These bacteria absorb the compounds transforming them into insoluble compounds and attach themselves to any bare iron on the inside of the pipe—thus beginning the formation of a tubercle. Others attach themselves to the skeleton and so the tubercle increases in size—simply a pile of ironized skeletons, which though not damaging to the water nor the pipe itself does somewhat restrict the flow of water through the pipe.

Where this condition is found, it may be remedied in several ways.

The water may be treated to remove the bacteria before passing into the general distribution system. This procedure is the eventual answer because it not only produces a purer water and protects the piping of the distribution system, but also protects the interior piping in each home in the community. Or the pipes of the distribution system may be given complete protection with a heavy smooth lining of bitumen or of cement—either of which so effectively covers the inner surface of the pipe that there are no foundations on which the tubercles may accumulate. Even if the first plan is used, it is essential that the piping carrying the raw water to the treatment plant be so protected.

Clow plants are equipped to furnish cast iron pipe and fittings with cement linings in accordance with modern engineering practice. However, the ordinary tar-coated product, as made by our company, is satisfactory for the majority of cast iron pipe line installations in this country.

**Centrifugal Casting of Cast Iron Pipe**

(See diagrams on opposite page)

Clow Super-deLavaud cast iron pipe, in sizes three inches and larger, is cast centrifugally in water cooled metal molds, a method that has been used commercially in this country since 1922. The machine in which the pipe is cast consists essentially of a cylindrical metal mold mounted on rollers in a water jacket so that it can be rotated at comparatively high speeds. The water jacket is mounted on wheels so that the entire assembly can be moved by means of a hydraulic cylinder in the direction of the longitudinal axis of the mold on a fixed bed inclined slightly to the horizontal. The molten iron is fed into the mold through a trough similarly inclined. The trough has a spout on its lower end which is curved toward the side-wall of the mold. Pre-analyzed molten iron is

supplied to the trough by a small casting ladle of sufficient capacity to make one pipe. In casting, the ladle is tilted at a uniform rate by an electrically operated tilting mechanism thus maintaining a constant uniform pouring rate. In making bell and spigot pipe or mechanical joint pipe, it is necessary to insert a sand core into the bell end of the mold to form the inside contour of the pipe bell. This is done when the mold or machine is at the lower end of the fixed bed. Following that operation the machine is moved to the upper portion of the fixed bed.

When the machine is at the extreme upper end of the fixed bed, it is ready for casting, at which time the stationary trough extends into the barrel of the mold for nearly its full length. After the casting ladle has been filled by a transfer ladle from the cupola, the machine operator, stationed at the bell end of the machine, by means of push-button control, brings the mold up to speed and actuates the mechanism controlling the tilting of the ladle. In a few seconds the iron has filled the bell space and the operator presses a button to start the revolving water-jacketed mold longitudinally down the bed of the machine. The stream of iron discharged from the spout flows tangentially onto the surface of the mold, where it is held in place by centrifugal force and forms a homogeneous pipe with a perfectly cylindrical bore. The hydraulic cylinder is supplied with a regulated amount of water at a constant pressure which results in uniform longitudinal movement of the mold. Since the pouring rate of the casting ladle and the amount of water supplied to the hydraulic cylinder can be regulated easily and accurately, the wall thickness of the pipe produced is held within desired tolerances without difficulty.

After the pipe is completely cast, the mold is kept rotating at its original speed until the pipe has cooled to approximately 1500° F. The pipe is then taken from the machine, transferred to and travels through a closely regulated heat treating furnace where it reaches a maximum temperature of 1720° F. and is slowly cooled below 1200° F. before leaving the furnace.

Following removal of each pipe from the casting machine, the mold is cleaned and is then ready for the casting of another pipe. The entire casting operation requires from 1½ to 8 minutes depending upon the diameter and the length of the pipe.





CAST IRON PIPE AND FITTINGS

EVOLUTION OF SPECIFICATIONS

PRIOR to 1902, there were no standard specifications for cast iron pipe in this country. Before that time, pipe was furnished to individual consumer specifications, or to manufacturer's specifications.

The first widely accepted specifications were those adopted by the American Waterworks Association in 1908. These covered pit cast water pipe, and fittings, and were preceded by specifications of the New England Waterworks Association in 1902, and by those of the American Society for Testing Materials in 1904.

Separate specifications for pit cast iron pipe and fittings for gas were adopted by the American Gas Institute in 1911, and were revised and reissued by the American Gas Association in 1929.

In 1927, Federal Specifications FS-537 were issued covering cast iron water pipe, centrifugally cast. These specifications were superseded by Federal Specifications WW-P-421 in 1931.

In 1926, Committee A21 of the American Standards Association was formed to prepare new standard specifications for cast iron pipe under the sponsorship of the AGA, ASTM, AWWA, and NEWWA. Participating in this work were representatives of sponsors, consumers, producers, and consulting engineers. This Committee studied the factors influencing the design of cast iron pipe, evaluating the best available knowledge of ground stresses, the actual up-to-date record of pipe service experience, and advances made in manufacturing processes and metallurgy.

The result of this comprehensive, scientific study was the issue in 1939 of ASA A21.1, "Manual for the Computation of Strength and Thickness of Cast Iron Pipe." This manual recognizes in pipe design the effect of trench loads, water hammer, corrosion, and safety factors, as well as internal pressure, and represents the best knowledge that could be applied to cast iron pipe design. Specification ASA A21.1 is the basis for the several specifications which in 1952 and 1953 were issued by the American Standards

Association and adopted by its sponsoring bodies.

Our cast iron pipe and fittings conforms to the following ASA specifications, adopted in 1953:

ASA A21.4 (AWWA C104-53)  
Cement Linings for Cast Iron Pipe

ASA A21.6 (AWWA C106-53)  
Pipe cast in metal molds for water

ASA A21.7  
Pipe cast in metal molds for gas

ASA A21.10 (AWWA C-110-53)  
Short bodied fittings for water or gas

ASA A21.11 (AWWA C111-53)  
Mechanical Joint for

Cast Iron Pressure Pipe and Fittings.

In 1953 the AWWA approved specification AWWA C100 for Bell and Spigot fittings, which replaced the 1908 AWWA specifications as it related to fittings. Unless customer order specifically calls for AWWA C100, long body pattern, we furnish B&S Fittings 12" and smaller to ASA A21.10, short body pattern; however, in 14" and larger we regularly furnish AWWA C100 long body pattern.

In 1955, the Federal Specifications Board issued a revised WW-P-421 specification, with the designation WW-P-421a. Weights, thicknesses and dimensions of pipe in this specification conform to the appropriate provisions of ASA specifications.

For information, selected parts of previous specifications have been reproduced in the Addenda Section of this catalog and complete copies of such pipe specifications will be furnished on request. It is our policy, however, in the absence of customer specifications to the contrary, to furnish cast iron pipe and fittings in conformance with the provisions of the ASA specifications, wherever applicable. Because the ASA specifications have been adopted by the AGA, ASTM, AWWA, and NEWWA, we believe there will be universal use of these ASA specifications, and have so edited this latest edition of "Pipe Economy."

INSIST ON THIS MARK



For protection against inferior products, the "Quality Check" mark has been adopted by members of the Cast Iron Pipe Research Association. This mark appears on all pipe made by James B. Clow & Sons, Inc., and signifies that the Research Association, of which our company is a member, certifies the product to be of the very highest quality.

The "Q" Check mark has nothing to do with the different types of cast iron pipe joints, or the different specifications under which the cast iron pipe is produced. It is authorized for use only on such cast iron pipe manufactured under any specification that the Cast Iron Pipe Research Association can approve as to quality.

Pipe manufactured by James B. Clow & Sons, Inc. bears this mark of approval.



# Check PIPE AGAINST THESE 10 REQUIREMENTS

Before experimenting with any materials for underground mains—

Check them against these

## TEN POINTS OF PROTECTION

**Long Life:** Has it long life? How long? In evaluating bids, the service life of Super-deLavaud cast iron pipe is universally figured at a minimum of 100 years.

**Internal Pressure:** The average of many hydrostatic pressure tests on Super-deLavaud 6-inch Class 150 cast iron pipe shows this pipe withstands more than 2500 pounds internal pressure per square inch.

**Tensile Strength:** Routine specimens cut from Super-deLavaud 6-inch Class 150 cast iron pipe shows tensile strength ranging from 25,000 to 30,000 pounds per square inch.

**Toughness:** Under 50 pounds hydrostatic pressure and the repeated impact of a 50 pound hammer, Super-deLavaud 6-inch Class 150 cast iron pipe resists failure until the hammer is dropped from a height of three feet—starting at six inches and increased by two inches in height after each blow.

**Beam Load:** Under beam stress tests, Super-deLavaud 6-inch Class 150 cast iron pipe bears up under a load of 18,000 pounds and deflects approximately one and three-quarter inches before breaking.

**External Pressure:** In regulation compression tests on a 12-inch long section, Super-deLavaud 6-inch Class 150 cast iron pipe withstands a crushing weight of 15,000 pounds.

**Imperviousness:** The walls of Super-deLavaud cast iron pipe are impervious to leakage, seepage or sweating of water, gas or chemicals under internal hydrostatic pressure tests.

**Tight Joints:** For ordinary pressures—cast iron bell and spigot pipe, and for high pressures—cast iron mechanical joint pipe, have stood the test of time and are known to remain tight and dependable in service.

**Tapping:** Super-deLavaud cast iron pipe taps cleanly with strong, tough threads, and loses little in structural strength. No other material withstands tapping so well.

**Flow Capacity:** Under normal conditions, the flow capacity of cast iron pipe remains practically unimpaired for centuries. For the limited areas where active water is encountered, cement-lined or Enameline cast iron pipe is available. Under such conditions, no other material offers the combined long life and sustained flow capacity of lined Super-deLavaud cast iron pipe.

**Note:** Check each point only if you know the material in question meets the requirements with adequate margin of safety. If in doubt, find out before installing.

*Some materials meet some and others meet others but only*

# CAST IRON PIPE MEETS THEM ALL

standard for underground mains

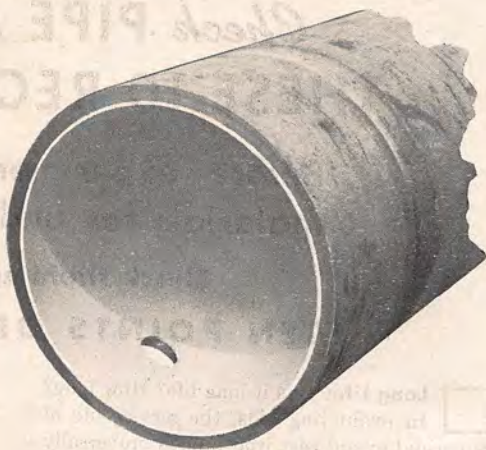




**CEMENT-MORTAR LINED**

**CAST IRON PIPE  
AND FITTINGS  
FOR WATER**

Photograph of a cement lined cast iron pipe that has been cut and tapped, showing how the cement lining does not spall off in either operation.



In certain sections of our country, water distribution systems carry a soft water which may attack the inside surface of cast iron pipe and fittings, and thus cause a type of corrosion known as tuberculation. Fortunately, waters which so affect cast iron pipe lines are comparatively few, and where they do exist, cement mortar lined piping is recommended. Clow plants produce this product with two thicknesses of the lining in accordance with the following specifications: "Standard" thickness conforms with ASA A21.4 and AWWA C104 specifications, and "Enameline" thickness meets requirements of the "Half Thickness" lining covered by Federal Specification WW-P-421a. Except for the difference in thickness, the lining operation is the same and is briefly described below.

A mixture of Portland cement and sand, graded and mixed with water according to the specification is fed through a tube and discharged at a uniform rate upon the inner wall of the revolving pipe. A trowel on the discharge end of the tube spreads the cement upon the wall as the pipe revolves and as the tube moves endways, thus distributing the cement uniformly over the inside of the pipe. The thickness of the lining is gauged by the volume of cement discharged from the tube, and the travel speed of the tube.

The rotational speed of the pipe is high enough to generate considerable centrifugal force which, combined with the vibration of the pipe, thoroughly compacts the lining, drives out any entrained air, and removes excess water to the inner surface where it drains away, leaving a dense lining with a smooth finish.

Immediately following the lining operation, a bituminous seal coat is sprayed on the lining surface. The seal coat adheres tightly to the damp cement lining and by preventing the loss of moisture, insures the proper cure of the cement mortar. After curing, the pipe is ready for use. It can be tapped and cut in the same manner as unlined pipe.

The single caution necessary is in loading or unloading pipe where grappling hooks are inserted inside the pipe. Such hooks may injure the lining, and should have a somewhat broad rounded surface that spreads the bearing to more than two square inches of the cement surface. An additional precaution is to cover the hook ends with pieces of rubber tubing.

Fittings are cement-lined by hand, the mixture being applied with brushes to the same thickness as in pipe. We offer a full line of cement-lined fittings for use with the cement-lined pipe.

Although the lining actually affects a slight reduction in the inside diameter of the pipe, the increase in the flow coefficient is sufficient to more than offset this reduction in diameter; that is, lined piping will carry as much water as new unlined cast iron pipe without extra pumping cost and with no increase in friction loss.

**Thicknesses and Weights of Linings**

Nom. Size Inches	Standard-Cement		Enameline	
	Thick-ness	Weight Per Ft.	Thick-ness	Weight Per Ft.
3	1/8"	1.3 lbs.	1/16"	0.6 lbs.
4	1/8"	1.5	1/16"	0.8
6	1/8"	2.5	1/16"	1.3
8	1/8"	3.3	1/16"	1.6
10	1/8"	4.0	1/16"	2.0
12	1/8"	4.8	1/16"	2.4
14	3/16"	9.0	3/32"	4.5
16	3/16"	10.3	3/32"	5.1
18	3/16"	11.5	3/32"	5.8
20	3/16"	12.8	3/32"	6.4
24	3/16"	15.3	3/32"	7.6

Copies of ASA and AWWA specifications mentioned above, are available on request.



JAMES B. CLOW & SONS  
CLOW SUPER-DELAUVAUD CAST IRON PIPE  
TYPES OF JOINTS AVAILABLE

## PIPE

# CLOW

## SUPER-deLAUVAUD CAST IRON PIPE

*Centrifugally Cast in Metal Molds*

STANDARD BELL AND SPIGOT JOINT PIPE

For Water or Other Liquids

Pages 17, 18 and 19

"C-N" MECHANICAL Standardized JOINT PIPE

For Water—Pages 20 and 21

For Gas—Page 23

BALL AND SOCKET JOINT PIPE

For River Crossings

Pages 24 and 25

ROLL-ON-RUBBER-GASKET JOINT PIPE

Page 27

FLANGED JOINT PIPE WITH SCREW-ON FLANGES

Regularly Furnished with ASA Class 125 Flanges

Page 28

SHORT LENGTH C. I. PIPE

To Meet Any Requirement

Page 29

I.P.S. CAST IRON PIPE

Not for Underground Use

Pages 30 and 31

TWO-INCH CAST IRON PRESSURE PIPE AND FITTINGS

Pages 32, 33 and 34

### IMPORTANT NOTES

**Dimensional data and weights**, appearing in tables on pages 17 thru 23 and on page 27 are for pipe laid without blocks, on flat bottom trench, with tamped backfill, under five feet of cover. For other conditions, see Tables 6.2 and 6.4—pages 258 thru 261, and, also, ASA Manual A21.1 for the "Computation of Strength and Thickness of Cast Iron Pipe"—available on request.

#### F-122 and F-132 Mechanical Joint Pipe

The laying length of Mechanical joint pipe furnished will be 18-feet plus 1½ to 3½ inches, depending upon size, and *invoice will cover actual footage shipped.*

#### F-162 Flanged Joint Pipe

Unless order specifically calls for Class 250 flanged joint pipe to be fitted with ASA Class 250 flanges, we will always ship pipe with ASA Class 125 flanges.

#### Complete Specifications

Where mentioned, in connection with our catalog tables of dimensions and weights for cast iron pipe, complete American Standard Association and/or American Water Works Association specifications are available on request.





**CLOW SUPER-deLAVAUD CAST IRON PIPE**

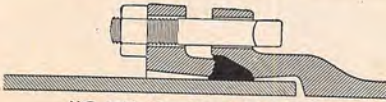
**TYPES OF JOINTS AVAILABLE**



**Standard Water Bell**

This is the open bell type of cast iron pipe joint—with self-centering shoulder in bell—designed, primarily, for calked lead make-up in combination with jute, rubber ring, or other approved types of jointing materials.

Jointing materials for bell and spigot joints are furnished only when so ordered. See page 206 for such materials.



**"C-N" Mechanical Joint**

A time-saving, easy-to-install mechanical joint cast iron pipe used extensively for underground water, sewage, and gas distribution systems, and for piping—inside and outside of buildings—for conveying liquid and semi-solid products. Only a ratchet wrench needed.

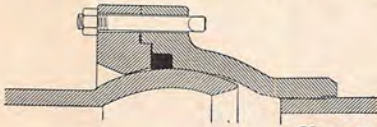
"C-N" Joint cast iron pipe and fittings are always shipped complete with joint accessories.



**Clow Locked Joint**

This is the "C-N" Mechanical Joint pipe with a "locked" joint—the spigot end being grooved where it sets in contact with the gasket—to resist the finished joint from pulling apart in pipe lines that may be subjected to severe lateral thrust.

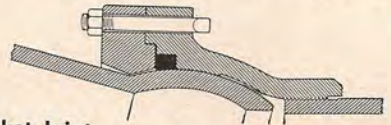
Recommended for installations on bridges, trestles, in tunnels, and other similar piping jobs.



**Clow Ball and Socket Joint**

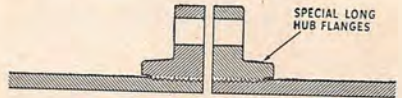
Structurally, an "all metal" joint, largely cast iron—Clow designed especially for submerged piping and for pipe lines installed through hilly terrain. This joint provides for full 15-degree free-turning deflection with no reduction in internal opening area at any degree of deflection.

Clow ball and socket cast iron pipe is made in 6, 8, 10, 12, 14, 16, 18, 20, and 24-inch sizes. For pressure ratings and other details, see pages 24 and 25.



**Roll-on-Rubber-Gasket Joint**

Cast iron pipe with Roll-On-Rubber-Gasket joints can be easily, quickly, and economically installed by average workmen. The joint is assembled by means of either a special pulling harness or a hydraulic power tool—depending upon size of pipe to be laid. We will loan such tools for a reasonable length of time.



**Flanged Joint**

Cast iron flanged pipe is widely used for exposed pipe line work inside and outside of buildings for conducting water, sewage, sludge, and other fluids—corrosive to steel, but not to cast iron; and, also, for low-pressure air, low-pressure steam, gas, and oils. Bolts, nuts, and gaskets are furnished only when so ordered.



**Sleeve-Type Coupling Joint**

Dresser couplings are available for use on Clow Super-de Lavaud centrifugally cast plain end water and gas pipe. The No. 38, with steel middle ring, is recommended for above ground installations; and the No. 53, with cast iron middle ring, for underground piping. Furnished complete with malleable iron followers, cadmium-plated steel bolts, and rubber gaskets.



**Threaded I.P.S. Joint\***

Cast iron I.P.S. pipe is available with outside diameters the same as wrought steel pipe. This pipe can be cut, threaded, and completely installed on the job with the ordinary tools of the piping trades; and makes up with regular screwed, drainage, and soil fittings. Recommended for downspouts, waste and vent lines. See pages 30 and 31 for details.

\*Also made with integral hub for soil pipe fittings.





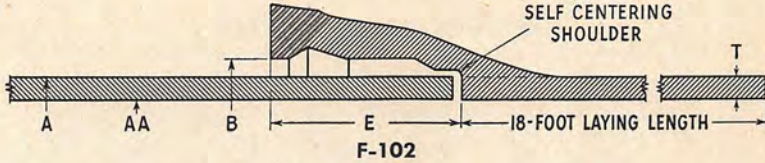
## STANDARD BELL AND SPIGOT CAST IRON PIPE

Meets the Requirements of Specifications

American Standard Association A21.6

American Water Works Association C106

Federal Specification WW-P-421a for Type I Pipe



### FOR WATER OR OTHER LIQUIDS

For pipe laid without blocks, on flat-bottom trench, with tamped backfill, under 5 feet of cover.  
For other conditions, refer to ASA Tables 6.2 and 6.4—pages 258 thru 261.

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds			
	ASA Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Bell I.D.	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length*	
								Per Foot	Per Length
<b>Class 50</b>									
<b>50 Lb. Pressure</b>									
<b>115 Ft. Head</b>									
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	22	.44	11.10	10.22	11.90	54	46.0	49.0	880
12	22	.48	13.20	12.24	14.00	66	59.8	63.4	1140
14	21	.48	15.30	14.34	16.10	78	69.7	74.1	1335
16	22	.54	17.40	16.32	18.40	96	89.2	94.5	1700
18	21	.54	19.50	18.42	20.50	114	100.4	106.7	1920
20	21	.57	21.60	20.46	22.60	133	117.5	124.9	2250
24	21	.63	25.80	24.54	26.80	179	155.4	165.3	2975
<b>Class 100</b>									
<b>100 Lb. Pressure</b>									
<b>231 Ft. Head</b>									
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	22	.44	11.10	10.22	11.90	54	46.0	49.0	880
12	22	.48	13.20	12.24	14.00	66	59.8	63.4	1140
14	22	.51	15.30	14.28	16.10	78	73.9	78.2	1410
16	22	.54	17.40	16.32	18.40	96	89.2	94.5	1700
18	22	.58	19.50	18.34	20.50	114	107.6	113.9	2050
20	22	.62	21.60	20.36	22.60	133	127.5	134.9	2430
24	22	.68	25.80	24.44	26.80	179	167.4	177.3	3190
<b>Class 150</b>									
<b>150 Lb. Pressure</b>									
<b>346 Ft. Head</b>									
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	22	.44	11.10	10.22	11.90	54	46.0	49.0	880
12	22	.48	13.20	12.24	14.00	66	59.8	63.4	1140
14	22	.51	15.65	14.63	16.45	80	75.7	80.2	1445
16	22	.54	17.80	16.72	18.80	98	91.4	96.9	1745
18	22	.58	19.92	18.76	20.92	116	109.9	116.3	2095
20	22	.62	22.06	20.82	23.06	136	130.3	137.9	2480
24	23	.73	26.32	24.86	27.32	182	183.1	193.2	3480

Dimension E

Continued →

Depth of Bells: 3.30" on sizes 3" & 4"; 3.88" on 6"; 4.38" on 8", 10" & 12"; 4.50" on larger sizes.  
\*Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.

For pipe made to Federal Specification WW-P-421, see pages 262 and 263.





# JAMES B. CLOW & SONS

Inc.



## STANDARD BELL AND SPIGOT CAST IRON PIPE

Meets the Requirements of Specifications

American Standard Association A21.6 American Water Works Association C106

Federal Specification WW-P-421a for Type I Pipe

F-102 Concluded

### FOR WATER OR OTHER LIQUID

For pipe laid without blocks, on flat bottom trench, with tamped backfill, under 5 feet of cover.

For other conditions, refer to ASA Tables 6.2 and 6.4—pages 258 thru 261.

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds			
	ASA Thick. Class	T In Inches	A Pipe O.D	AA Pipe I.D.	B Bell I.D.	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length* Per Foot Per Length	
<b>Class 200</b>									
			<b>200 Lb. Pressure</b>			<b>462 Ft. Head</b>			
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	22	.44	11.10	10.22	11.90	54	46.0	49.0	880
12	22	.48	13.20	12.24	14.00	66	59.8	63.4	1140
14	23	.55	15.65	14.55	16.45	80	81.4	85.8	1545
16	23	.58	17.80	16.64	18.80	98	97.9	103.3	1860
18	23	.63	19.92	18.66	20.92	116	119.1	125.5	2260
20	23	.67	22.06	20.72	23.06	136	140.5	148.1	2665
24	24	.79	26.32	24.74	27.32	182	197.7	207.8	3740
<b>Class 250</b>									
			<b>250 Lb. Pressure</b>			<b>577 Ft. Head</b>			
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	22	.44	11.10	10.22	11.90	54	46.0	49.0	880
12	23	.52	13.20	12.16	14.00	66	64.6	68.3	1230
14	24	.59	15.65	14.47	16.45	80	87.1	91.6	1650
16	24	.63	17.80	16.54	18.80	98	106.0	111.5	2005
18	24	.68	19.92	18.56	20.92	116	128.2	134.8	2425
20	24	.72	22.06	20.62	23.06	136	150.6	158.1	2845
24	24	.79	26.32	24.74	27.32	182	197.7	207.8	3740
<b>Class 300</b>									
			<b>300 Lb. Pressure</b>			<b>693 Ft. Head</b>			
3	22	.32	3.96	3.32	4.76	11	11.4	12.0	215
4	22	.35	4.80	4.10	5.60	14	15.3	16.1	290
6	22	.38	6.90	6.14	7.70	25	24.3	25.6	460
8	22	.41	9.05	8.23	9.85	41	34.7	36.9	665
10	23	.48	11.10	10.14	11.90	54	50.0	53.0	955
12	23	.52	13.20	12.16	14.00	66	64.6	68.3	1230
14	24	.59	15.65	14.47	16.45	80	87.1	91.6	1650
16	25	.68	17.80	16.44	18.80	98	114.1	119.5	2150
18	25	.73	19.92	18.46	20.92	116	137.3	143.7	2585
20	25	.78	22.06	20.50	23.06	136	162.7	170.3	3065
24	25	.85	26.32	24.62	27.32	182	212.2	222.3	4000

\* Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.



### MAXIMUM SIZE TAP IN ASA CLASS 22 CAST IRON PIPE

The following table gives the recommended maximum size of tapping permissible in the barrel of Class 150 Super-deLavaud cast iron pipe. Larger size threaded connections can be made with our F-1280 Pipe Saddle. Any size branch up to same size as main can be easily and quickly made by using our F-1290 Cutting-in Tee.

Pipe size . . . . . Inches	3	4	6	8	10	12	14	16	18	20	24
Tap size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2	2	2 1/2	2 1/2	3	4

For pipe made to Federal Specification WW-P-421, see pages 262 and 263.

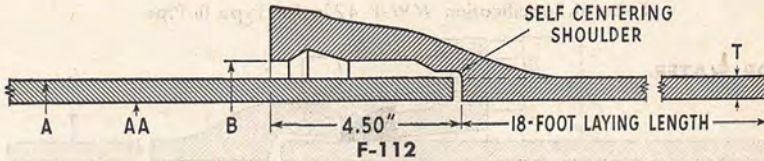




## CLASS 150 "B" DIAMETER BELL AND SPIGOT CAST IRON PIPE

Meets the Requirements of Specifications

American Standard Association A 21.6      American Water Works Association C106  
Federal Specification WW-P-421a for Type I Pipe



This "B" Diameter pipe will meet the requirements of engineers who specify Class 150 thickness pipe for use with Class "B" fittings, bearing in mind that working pressures should not exceed the pressure rating of the fittings used.

### FOR WATER OR OTHER LIQUIDS

For pipe laid without blocks, on flat-bottom trench, with tamped backfill, under 5 feet of cover.  
For other conditions, refer to ASA Tables 6.2 and 6.4—pages 258 thru 261.

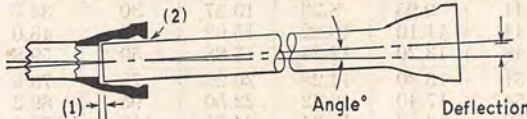
Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds			
	ASA Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Bell I.D.	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length Per Foot	Per Length
14	22	.51	15.30	14.28	16.10	78	73.9	78.2	1410
16	22	.54	17.40	16.32	18.40	96	89.2	94.5	1700
18	22	.58	19.50	18.34	20.50	114	107.6	113.9	2050
20	22	.62	21.60	20.36	22.60	133	127.5	134.9	2430
24	23	.73	25.80	24.34	26.80	179	179.4	189.4	3410

### JOINT MATERIALS REQUIRED FOR BELL AND SPIGOT JOINTS

Pipe size.....Inches	3	4	6	8	10	12	14	16	18	20	24
Pig lead.....Pounds	6.50	8.00	11.25	14.50	17.50	20.50	24.00	33.00	37.00	40.50	52.50
Jute.....Pounds	.18	.21	.31	.44	.53	.61	.81	.94	1.00	1.25	1.50

Note: For detailed information about available Joint Materials, see page 206.

### MAXIMUM DEFLECTIONS OF CAST IRON BELL AND SPIGOT PIPE



#### Limiting Factors\*

(1) Joint opening not to exceed 0.75". (2) Calking space at face of bell not less than 0.25" wide.

Size Of Pipe Inches	Joint Opening Maximum Inches	Based On 18-Ft. Length		Approx. Radius In Feet Of Curve Produced By Succession Of Joints	Approx. Number Of 18-Foot Pipe Required For A 90° Bend
		Angle Degrees	Deflection Inches		
3	.43	5°-53'	22.2	168	15
4	.41	4°-25'	16.7	234	21
6	.58	4°-25'	16.7	234	21
8	.65	3°-51'	14.6	268	24
10	.75	3°-42'	14.0	279	25
12	.75	3°-8'	11.9	327	29
14	.75	2°-39'	10.1	387	34
16	.75	2°-21'	8.8	440	39
18	.75	2°-7'	8.0	489	43
20	.75	1°-55'	7.2	540	48
24	.75	1°-35'	6.0	648	57

\* From AWWA Specification C600-49T for the "Installation of Cast Iron Water Mains."





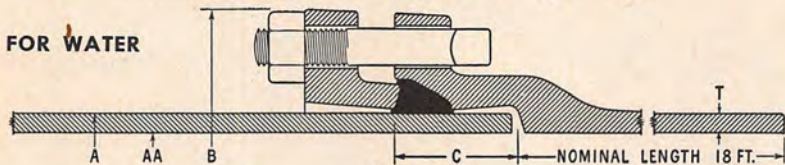
## "C-N" MECHANICAL JOINT CAST IRON PIPE

Meets the Requirements of Specifications

ASA A21.11 and AWWA C111 Standardized Joint in Combination with

ASA A21.6 and AWWA C106 Pipe Barrel for Water

Federal Specification WW-P-421a for Type III Pipe



F-122

### FOR WATER OR OTHER LIQUIDS

For pipe laid without blocks, on flat bottom trench, with tamped backfill, under 5 feet of cover  
For other conditions, refer to ASA Tables 6.2 and 6.4—pages 258 thru 261.

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds			
	ASA Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Gland O.D.	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length*	
								Per Foot	Per Length
<b>Class 50</b>			<b>50 Lb. Pressure</b>			<b>115 Ft. Head</b>			
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655
10	22	.44	11.10	10.22	15.62	40	46.0	48.2	870
12	22	.48	13.20	12.24	17.88	50	59.8	62.6	1125
14	21	.48	15.30	14.34	20.25	78	69.7	74.1	1335
16	22	.54	17.40	16.32	22.50	95	89.2	94.5	1700
18	21	.54	19.50	18.42	24.75	113	100.4	106.7	1920
20	21	.57	21.60	20.46	27.00	134	117.5	124.9	2250
24	21	.63	25.80	24.54	31.50	177	155.4	165.2	2975
<b>Class 100</b>			<b>100 Lb. Pressure</b>			<b>231 Ft. Head</b>			
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655
10	22	.44	11.10	10.22	15.62	40	46.0	48.2	870
12	22	.48	13.20	12.24	17.88	50	59.8	62.6	1125
14	22	.51	15.30	14.28	20.25	78	73.9	78.2	1410
16	22	.54	17.40	16.32	22.50	95	89.2	94.5	1700
18	22	.58	19.50	18.34	24.75	113	107.6	113.9	2050
20	22	.62	21.60	20.36	27.00	134	127.5	134.9	2430
24	22	.68	25.80	24.44	31.50	177	167.4	177.2	3190
<b>Class 150</b>			<b>150 Lb. Pressure</b>			<b>346 Ft. Head</b>			
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655
10	22	.44	11.10	10.22	15.62	40	46.0	48.2	870
12	22	.48	13.20	12.24	17.88	50	59.8	62.6	1125
14	22	.51	15.30	14.28	20.25	78	73.9	78.2	1410
16	22	.54	17.40	16.32	22.50	95	89.2	94.5	1700
18	22	.58	19.50	18.34	24.75	113	107.6	113.9	2050
20	22	.62	21.60	20.36	27.00	134	127.5	134.9	2430
24	23	.73	25.80	24.34	31.50	177	179.4	189.2	3405

Dimension C

Continued →

Depth of Bell: 2.50" on sizes 3" thru 12" and 3.50" on sizes 14" thru 24".

\* Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.

For Joint Accessories for Mechanical Joint Pipe and Fittings, see following page

For pipe made to Federal Specification WW-P-421, see page 264





## "C-N" MECHANICAL JOINT CAST IRON PIPE

Meets the Requirements of Specifications  
 ASA A21.11 and AWWA C111 Standardized Joint in Combination With  
 ASA A21.6 and AWWA C106 Pipe Barrel for Water  
 Federal Specification WW-P-421a for Type III Pipe

F-122 Concluded

### FOR WATER OR OTHER LIQUIDS

For pipe laid without blocks, on flat bottom trench with tamped backfill, under 5 feet of cover.  
 For other conditions, refer to ASA Tables 6.2 and 6.4—pages 258 thru 261.

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds				
	A.S.A. Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Gland O.D.	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length*		
								Per Foot	Per Length	
<b>Class 200                      200 Lb. Pressure                      462 Ft. Head</b>										
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215	
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290	
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460	
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655	
10	22	.44	11.10	10.22	15.62	40	46.0	48.2	870	
12	22	.48	13.20	12.24	17.88	50	59.8	62.6	1125	
14	23	.55	15.30	14.20	20.25	78	79.5	83.8	1510	
16	23	.58	17.40	16.24	22.50	95	95.6	100.9	1815	
18	23	.63	19.50	18.24	24.75	113	116.5	122.8	2210	
20	23	.67	21.60	20.26	27.00	134	137.5	144.9	2610	
24	24	.79	25.80	24.22	31.50	177	193.7	203.5	3665	
<b>Class 250                      250 Lb. Pressure                      577 Ft. Head</b>										
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215	
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290	
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460	
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655	
10	22	.44	11.10	10.22	15.62	40	46.0	48.2	870	
12	23	.52	13.20	12.16	17.88	50	64.6	67.4	1215	
14	24	.59	15.30	14.12	20.25	78	85.1	89.4	1610	
16	24	.63	17.40	16.14	22.50	95	103.6	108.9	1960	
18	24	.68	19.50	18.14	24.75	113	125.4	131.7	2370	
20	24	.72	21.60	20.16	27.00	134	147.4	154.8	2785	
24	24	.79	25.80	24.22	31.50	177	193.7	203.5	3665	
<b>Class 300                      300 Lb. Pressure                      693 Ft. Head</b>										
3	22	.32	3.96	3.32	7.69	11	11.4	12.0	215	
4	22	.35	4.80	4.10	9.12	16	15.3	16.2	290	
6	22	.38	6.90	6.14	11.12	22	24.3	25.5	460	
8	22	.41	9.05	8.23	13.37	30	34.7	36.4	655	
10	23	.48	11.10	10.14	15.62	40	50.0	52.2	940	
12	23	.52	13.20	12.16	17.88	50	64.6	67.4	1215	
14	24	.59	15.30	14.12	20.25	78	85.1	89.4	1610	
16	25	.68	17.40	16.04	22.50	95	111.4	116.7	2100	
18	25	.73	19.50	18.04	24.75	113	134.3	140.6	2530	
20	25	.78	21.60	20.04	27.00	134	159.2	166.6	3000	
24	25	.85	25.80	24.10	31.50	177	207.9	217.7	3920	

\* Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.

### JOINT ACCESSORIES FOR MECHANICAL JOINT PIPE AND FITTINGS

Weight Includes Gland, Gasket, and the Bolts Required to Complete ONE Joint Assembly

For pipe sizes.....Inches	3	4	6	8	10	12
Number and size of bolts included.....	4-5/8x3	4-3/4x3 1/2	6-3/4x3 1/2	6-3/4x4	8-3/4x4	8-3/4x4
Accessories-weight...Pounds	7	10	16	25	30	40
For pipe sizes.....Inches	14	16	18	20	24	.....
Number and size of bolts included.....	10-3/4x4	12-3/4x4 1/2	12-3/4x4 1/2	14-3/4x4 1/2	16-3/4x5	.....
Accessories-weight...Pounds	45	55	65	85	105	.....

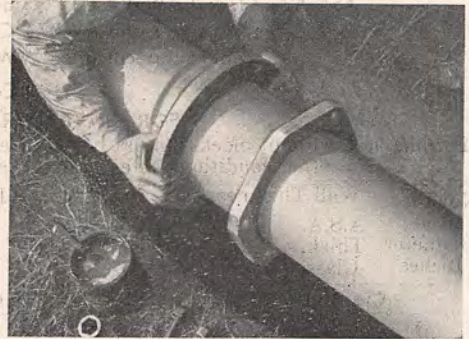
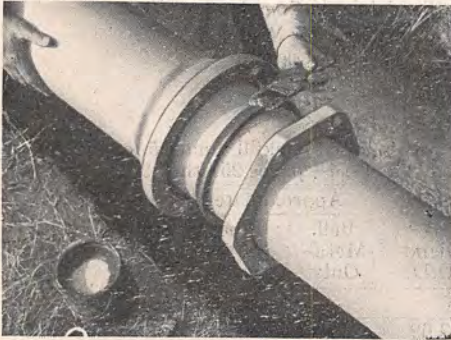
Accessories: For specifications and illustrations, see page 62



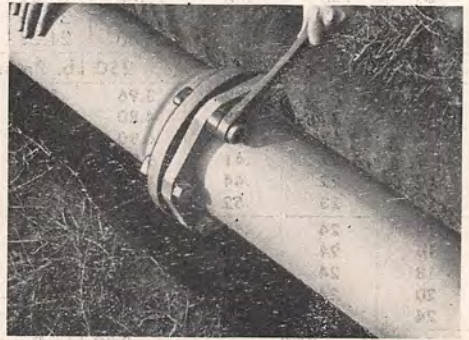
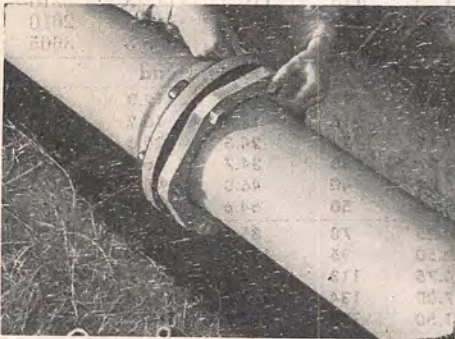


## "C-N" MECHANICAL JOINT CAST IRON PIPE

### HOW THE PIPE IS INSTALLED



The inside of the "C-N" bell and the spigot end of pipe must be cleaned thoroughly of all foreign matter—using a wire brush if necessary. These surfaces (also the gasket) should then be brushed over with soapy water. With gland and gasket on spigot end of pipe, "seat" the spigot end in the bell. Press gasket firmly and evenly into the bell. Move gland into position for bolting, insert all bolts and make all nuts finger-tight. Keep spigot end centrally located within the bell.



When tightening bolts, it is important that the gland be brought up evenly at all points around the bell flange. This can readily be accomplished by partially tightening the bottom bolt first, then the top one, and the remaining bolts—alternately from side to side. Repeat the cycle until all bolts have been made uniformly tight. For best wrench obtainable for this work, see F-4967.

**Overstressing of bolts to compensate for poor installation practice is to be avoided.**

#### Maximum Deflections of F-122, F-132 and F-152 Cast Iron Pipe

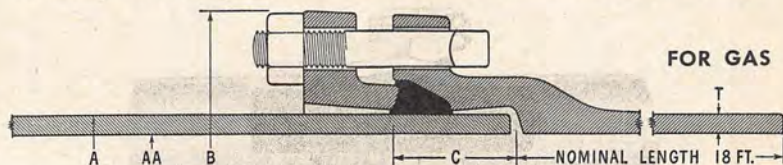
Size of Pipe Inches	Based on 18-Ft. Length		Approx. Radius in Feet of Curve Produced by Succession of Joints	Approx. Number of 18-Foot Pipe Required for a 90° Bend
	Angle Degrees	Deflection Inches		
3	8°-18'	31.0	125	11
4	8°-18'	31.0	125	11
6	7°- 7'	27.0	145	13
8	5°-21'	20.0	195	17
10	5°-21'	20.0	195	17
12	5°-21'	20.0	195	17
14	3°-35'	13.5	285	25
16	3°-35'	13.5	285	25
18	3°- 0'	11.0	340	30
20	3°- 0'	11.0	340	30
24	2°-23'	9.0	450	39





## "C-N" MECHANICAL JOINT CAST IRON PIPE

Combines ASA Specifications A21.7 for Gas Pipe Barrel and A21.11 for Joint



F-132  
FOR GAS

For pipe laid without blocks, on flat bottom trench, with tamped backfill, under 5 feet of cover

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approx. Weight—18-Ft. Length—Lbs.*			
	ASA Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Gland O.D.	Class 10-10 Lbs. psi		Class 50-50 Lbs. psi	
						Per Foot	Per Length	Per Foot	Per Length
4	22	.35	4.80	4.10	9.12	16.2	290	16.2	290
4†	23	.38	4.80	4.04	9.12	17.4	315	17.4	315
6	22	.38	6.90	6.14	11.12	25.5	460	25.5	460
6†	23	.41	6.90	6.08	11.12	27.3	490	27.3	490
8	22	.41	9.05	8.23	13.37	36.4	655	36.4	655
10	22	.44	11.10	10.22	15.62	48.2	870	48.2	870
12	22	.48	13.20	12.24	17.88	62.6	1125	62.6	1125
16	21	.50	17.40	16.40	22.50	88.1	1585	88.1	1585
20	21	.57	21.60	20.46	27.00	124.9	2250	124.9	2250
24	21	.63	25.80	24.54	31.50	165.2	2975	165.2	2975

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approx. Weight—18-Ft. Length—Lbs.*			
	ASA Thick. Class	T In Inches	A Pipe O.D.	AA Pipe I.D.	B Gland O.D.	Class 100-100 Lbs. psi		Class 150-150 Lbs. psi	
						Per Foot	Per Length	Per Foot	Per Length
4	22	.35	4.80	4.10	9.12	16.2	290	16.2	290
4†	23	.38	4.80	4.04	9.12	17.4	315	17.4	315
6	22	.38	6.90	6.14	11.12	25.5	460	25.5	460
6†	23	.41	6.90	6.08	11.12	27.3	490	27.3	490
8	22	.41	9.05	8.23	13.37	36.4	655	36.4	655
10	22	.44	11.10	10.22	15.62	48.2	870	48.2	870
12	22	.48	13.20	12.24	17.88	62.6	1125	62.6	1125
16	22	.54	17.40	16.40	22.50	94.5	1700	....	....
20	22	.62	21.60	20.46	27.00	134.9	2430	....	....
24	22	.68	25.80	24.54	31.50	177.2	3190	....	....

### Dimension C

Depth of Bell: 2.50" on sizes 3" thru 12" and 3.50" on sizes 16" thru 24"

\* Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.

### † Note

Four and six inch pipe with the heavier wall offer an added factor of safety for pipe installed in areas of dense population and heavy traffic. Orders must specify when wanted.

For Joint Accessories for Mechanical Joint Pipe and Fittings, see page 21.

### Gaskets

Unless otherwise specified when ordering, all Clow Mechanical Joint Cast Iron Pipe will be furnished with plain rubber gaskets which meet all requirements of ASA Specifications A21.11 for design, physical properties, and prescribed tests.

Gaskets for special services can also be furnished. These include rubber gaskets tipped with duck, Thiokol, lead, or armored coil—with or without duck back reinforcement. Neoprene gaskets can be furnished for oil or other special service. Write for information.

Joint Accessories: For illustrations and details, see page 62.

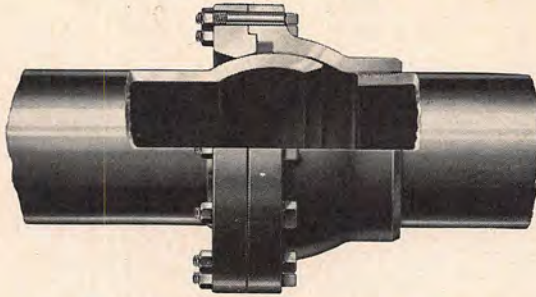
For maximum deflection of joint, see page 22. For maximum size of service taps, see page 18.





### CLOW F-142 CAST IRON RIVER-CROSSING PIPE

Ball and Spherical Bell Joint



The River-Crossing Pipe that Simplifies Installation and Assures Bottle-Tight Joints

- Full 15-degree free-turning deflection.
- Absolutely no reduction in the full internal opening area at any deflection through 15-degrees, thus, no abnormal pressure-drops at deflected joints.
- No split parts and fewer parts—each joint consisting only of one complete pipe, one solid follower ring,\* one solid ring gasket, and the bolts and nuts.†
- Easier to make up than a standard 125# flanged joint. Lower labor installation cost because of ease of joint make-up, and longer laying lengths—approximately 18'6" long.
- Rubber gasket is symmetrical in cross section, and cannot be installed the wrong way.

- The assembled joint is structurally "all metal" and largely cast iron. Rubber gasket serves as a seal only, not a structural member.
- Follower ring is bolted tightly to the bell so the normal deflecting of a made-up joint through 15-degrees does not add stresses to any one or a few bolts as it does in other types of river-crossing pipe joints.
- The full 100% effective strength of each of the bolts is available all of the time against the working pres-

sure of the pipe line. All bolts may be tightened to the same degree against a positive stop with a ratchet wrench.

- The thread connection of each pipe is properly made up and tested at the factory. Metal thickness of the pipe at the thread is built up so that full class thickness of the centrifugally cast pipe is supplied below the root of the threads.
- The ball and all internal bell surfaces are machined smooth to close tolerances.
- High quality, individually gauged, rubber gaskets are used. The quality of each joint in a pipe line is uniform as each gasket is compressed to a predetermined degree and no farther. The gasket is very closely confined, there being practically no area in which it can "flow."

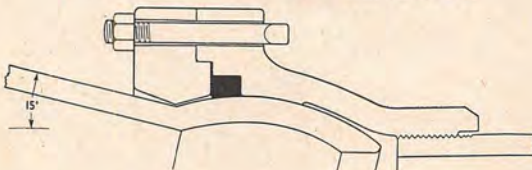
- Laid lengths on any given order need not all be 18'6", but may vary to suit different conditions. In many cases, where a great amount of curvature is required in a line, it may be advisable to provide 6 foot, 12 foot, or other special lengths to obtain the proper number of joints to suit required curvature.

\* Unless otherwise specified, follower rings will be furnished cast iron for 6 and 8-inch pipe for maximum working pressures of 250 pounds, and for 10 and 12-inch pipe for pressures of 100 pounds or less. Steel follower rings are regularly furnished for 10 and 12-inch pipe for pressures from 100 to 250 pounds, and for 16-inch and larger pipe for pressures to 175 pounds.

† Cadmium-plated steel bolts and nuts are regularly furnished—unless otherwise ordered.

‡ Weights for 10-inch and 12-inch Class 25 pipe, as shown in last column of table on page 25, are for accessories with cast iron follower rings. Steel follower rings will reduce these weights for the 10-inch size to 85 pounds and for the 12-inch size to 115 pounds. Weights shown for the 12-inch size Class 26 pipe and for all sizes of pipe above twelve inches include steel follower rings.

#### FULL 15° FREE TURNING DEFLECTION

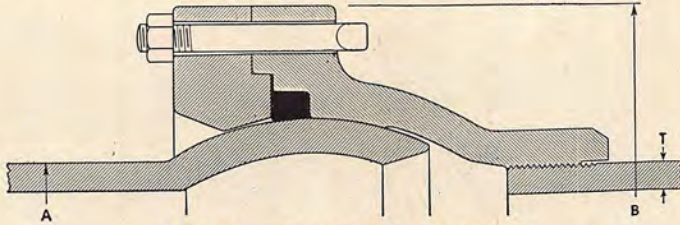


No restriction of the pipe waterway takes place in this Clow joint when set to its full 15° deflection position. No other river-crossing pipe joint made permits full capacity flow of line contents.





**CLOW CAST IRON RIVER-CROSSING PIPE**



**F-142 DIMENSIONS AND WEIGHTS**

Nominal Inside Diameter Inches	ASA Thickness Class Number	Maximum Working Pressure Pounds	Dimensions—Inches			Number and Size of Bolts Inches	Weight—Pounds	
			T Thick-ness	A Pipe O.D.	B Bell O.D.		Barrel* With Ball and Bell	Follower Ring, Bolts and Gasket
6	25	250	.48	7.10	14.75	12- 3/4x5	685	65
8	25	250	.52	9.30	17.50	12- 3/4x5	970	85
10	25	250	.56	11.40	19.50	16- 3/4x5	1325	95‡
12	25	200	.60	13.50	22.75	16- 7/8x5 1/2	1670	140‡
12	26	250	.65	13.50	22.75	16- 7/8x5 1/2	1775	115
14	25	100	.64	15.65	26.00	16-1 x6	2135	186
14	26	150	.69	15.65	26.00	16-1 x6	2255	186
14	27	175	.75	15.65	26.00	16-1 x6	2405	186
16	25	100	.68	17.80	29.00	18-1 x6	2600	255
16	26	150	.73	17.80	29.00	18-1 x6	2740	255
16	27	175	.79	17.80	29.00	18-1 x6	2930	255
18	24	50	.68	19.92	31.75	18-1 1/8x6 1/2	3025	305
18	25	100	.73	19.92	31.75	18-1 1/8x6 1/2	3185	305
18	26	150	.79	19.92	31.75	18-1 1/8x6 1/2	3400	305
18	27	175	.85	19.92	31.75	18-1 1/8x6 1/2	3610	305
20	24	50	.72	22.06	34.50	22-1 1/8x7	3590	410
20	25	100	.78	22.06	34.50	22-1 1/8x7	3825	410
20	26	150	.84	22.06	34.50	22-1 1/8x7	4035	410
20	27	175	.91	22.06	34.50	22-1 1/8x7	4305	410
24	24	50	.79	26.32	40.00	30-1 1/8x8	4840	650
24	25	100	.85	26.32	40.00	30-1 1/8x8	5125	650
24	26	150	.92	26.32	40.00	30-1 1/8x8	5410	650
24	27	175	.99	26.32	40.00	30-1 1/8x8	5735	650

\*Weights shown are for full length pipe (18'6") with ball on one end and spherical bell on the other end. Weights for follower ring, bolts, and gasket are additional—see above table and, also, the (‡) copy on facing page.

**Standard Practice**

While Clow river-crossing pipe is regularly furnished in 18'6" (plus or minus 2 inches) laying lengths, we reserve the right to furnish a limited percentage of shorter lengths, but we will always ship a footage of pipe not less than the total feet ordered. We reserve the right to furnish a total footage greater than the footage ordered to allow the use of full length pipe without cutting.

**End of the Run Pipe**

We recommend for each total sum of pipe that one ball and plain end pipe and one spherical bell and plain end pipe be ordered for connecting to sleeves or fittings as described below. A follower ring is always furnished with the ball and plain end pipe, and the bolts and gasket are always furnished with the spherical bell and plain end pipe.

**Short Length Pipe**

If any pieces of pipe are required to a definite laying length—shorter than nominal full length pipe, this must be specifically stated when order is placed with us.

**Caution**

Because of its greater outside diameter, the plain (cut) end of Clow river-crossing pipe will not socket in the bell on "C-N" mechanical joint pipe and fittings. However, the plain ends of these pipes can be joined together by our F-146 Mechanical Joint Transition Sleeve—which has been especially designed for that use.

For making calked connections, regular standard AWWA Class "D" sleeves and calking bell fittings can be used to connect plain ends of river-crossing pipe to plain ends of "C-N" or bell and spigot pipe.



**F-146**





**ROLL-ON-RUBBER-GASKET JOINT CAST IRON PIPE**

**HOW THE PIPE IS INSTALLED**



It is important that the spigot end of the one pipe and the inside of the bell of the other pipe, as well as the rubber gasket, be wiped clean and dry before starting to assemble the joint.

With the gasket already started on the small end of the cone, the cone is placed in the spigot end of the pipe and the gasket then rolled onto the pipe end with the palms of the hands.



Showing the joint being assembled by means of a hydraulic rig. Our "Manual Pulling Harness", a lever and chain rig, is generally used with the smaller size pipe, but a mechanical jack and chain rig is recommended for pipe in sizes 8 inches and larger.\*



Set jute firmly against gasket with calking iron. In cold climates, a 1/4-inch lead strip can be calked into bell—for electrical thawing. Lead strips furnished only when ordered.

Having made certain that the jute packing has been forced under and behind restriction ring (see page 27), pack the bell with bituminous compound to complete the joint.

\* We loan the tools (for a reasonable length of time) for assembling joints on the job.

**Joint Compound and Jute Furnished For Each Pipe Joint**

Pipe size . . . . . Inches	3	4	6	8	10	12	14	16	18	20	24
Joint compound . . . . . Pounds	.38	.50	.75	1.00	1.25	1.50	2.00	2.50	3.00	3.50	4.25
Braided jute†, length . . . Inches	14	16	23	30	36	43	50	57	64	70	84

† Is square braided jute: 3/8" for pipe 3 thru 12 inches, 9/16" for 14 thru 18, and 5/8" for 20 and 24.



## ROLL-ON-RUBBER-GASKET JOINT CAST IRON PIPE

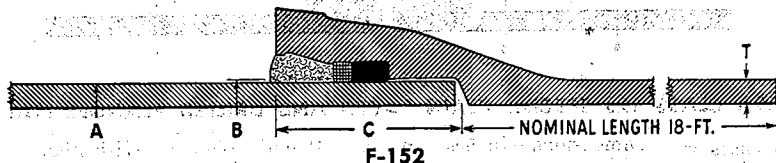
Federal Specification WW-P-421a for Type II Pipe for Water for  
 Sizes 12-inch and Smaller

Sizes 14-inch and Larger have

ASA Specification A21.6 "B" Diameter Pipe Barrel

FOR WATER

FOR SEWAGE



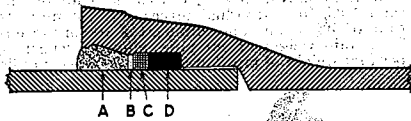
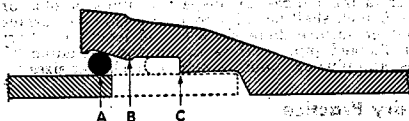
### FOR WATER OR OTHER LIQUIDS

For pipe laid without blocks, on flat bottom trench, with tamped backfill, under 5 feet of cover

Nominal Inside Diameter Inches	Wall Thickness		Dimensions—Inches			Approximate Weight—Pounds			
	ASA Thick. Class	T In Inches	A Pipe O.D.	B Bell I.D.	C Bell Depth	Bell Metal Only	Pipe Barrel Per Ft.	18-Foot Length*	
								Per Foot	Per Length
<b>Class 200      200 Lb. Pressure      462 Ft. Head</b>									
3	22	.32	3.96	4.05	3.50	11	11.4	12.0	215
4	22	.35	4.80	4.89	4.00	14	15.3	16.1	290
6	22	.38	6.90	6.99	4.00	25	24.3	25.6	460
8	22	.41	9.05	9.14	4.00	41	34.7	36.9	665
10	22	.44	11.10	11.20	4.00	54	46.0	49.0	880
12	22	.48	13.20	13.30	4.25	66	59.8	63.4	1140
<b>Class 50      50-lb. Pressure      115-ft. Head</b>									
14	21	.48	15.30	15.44	4.75	78	69.7	74.1	1335
16	22	.54	17.40	17.54	4.75	96	89.2	94.5	1700
18	21	.54	19.50	19.64	4.75	114	100.4	106.7	1920
20	21	.57	21.60	21.74	4.75	133	117.5	124.9	2250
24	21	.63	25.80	25.94	4.75	179	155.4	165.3	2975
<b>Class 100      100-lb. Pressure      231-ft. Head</b>									
14	22	.51	15.30	15.44	4.75	78	73.9	78.2	1410
16	22	.54	17.40	17.54	4.75	96	89.2	94.5	1700
18	22	.58	19.50	19.64	4.75	114	107.6	113.9	2050
20	22	.62	21.60	21.74	4.75	133	127.5	134.9	2430
24	22	.68	25.80	25.94	4.75	179	167.4	177.3	3190
<b>Class 150      150-lb. Pressure      346-ft. Head</b>									
14	22	.51	15.30	15.44	4.75	78	73.9	78.2	1410
16	22	.54	17.40	17.54	4.75	96	89.2	94.5	1700
18	22	.58	19.50	19.64	4.75	114	107.6	113.9	2050
20	22	.62	21.60	21.74	4.75	133	127.5	134.9	2430
24	23	.73	25.80	25.94	4.75	179	179.4	189.4	3410

\* Including bell. Calculated weight of full length pipe is rounded off to nearest five pounds.

See page 22 for deflection data.



When starting to make up joint, the rubber gasket (A) is placed on spigot end of pipe as shown. Dotted lines show spigot end pulled into bell with gasket, under compression, rolled to its seat (C). Braided jute is then wedged behind restriction ring (B) to hold and confine the gasket under compression.

Shows the joint completed with bituminous compound (A), braided jute (C), and rubber gasket (D) in final positions. When pipe is laid in cold climates and thawing is sometimes necessary, call in 1/2" cold lead strips (B) to permit current to pass through joints. Lead strips are available at an extra cost.

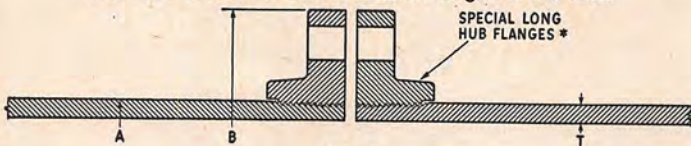
Bituminous compound, braided jute, and rubber gaskets are regularly furnished with this pipe. "C-N" Mechanical Joint fittings are recommended for use with this pipe. See pages 62 thru 76.





**FLANGED JOINT CAST IRON PIPE**  
**FOR WATER, SEWAGE, OIL, AND OTHER LIQUIDS**

*This Pipe Cannot be Threaded and Flanged in the Field*



**F-162**

**WITH ASA CLASS 125 SPECIAL PLAIN FACED AND DRILLED FLANGES MADE ON\***

Nominal Inside Diameter Inches	Class or Max. Working Pressure	Dimensions—Inches			Weight—Pounds		Weight—With Flanges—Pounds			
		T Thickness	A Pipe O.D.	B Flange O.D.	One Flange Only	Pipe Barrel Per Ft.	12 Foot Length		18 Foot Length	
							Per Foot	Per Length	Per Foot	Per Length
3	150	.38	3.96	7.50	7	13.3	14.6	175	14.1	255
3	250	.38	3.96	7.50	7	13.3	14.6	175	14.1	255
4	150	.38	4.80	9.00	13	16.5	18.8	225	18.1	325
4	250	.38	4.80	9.00	13	16.5	18.8	225	18.1	325
6	150	.38	6.90	11.00	17	24.3	27.1	325	26.1	470
6	250	.38	6.90	11.00	17	24.3	27.1	325	26.1	470
8	150	.41	9.05	13.50	27	34.7	39.2	470	37.8	680
8	250	.41	9.05	13.50	27	34.7	39.2	470	37.8	680
10	150	.44	11.10	16.00	38	46.0	52.5	630	50.3	905
10	250	.44	11.10	16.00	38	46.0	52.5	630	50.3	905
12	150	.48	13.20	19.00	58	59.8	69.6	835	66.1	1190
12	250	.52	13.20	19.00	58	64.6	74.2	890	71.1	1280
14	150	.51	15.30	21.00	72	73.9	85.8	1030	81.9	1475
14	250	.59	15.30	21.00	72	85.1	97.1	1165	93.1	1675
16	150	.54	17.40	23.50	90	89.2	104.2	1250	99.2	1785
16	250	.63	17.40	23.50	90	103.6	118.8	1425	113.6	2045
18	150	.58	19.50	25.00	90	107.6	122.5	1470	117.5	2115
18	250	.68	19.50	25.00	90	125.4	140.4	1685	135.3	2435
20	150	.62	21.60	27.50	115	127.5	146.7	1760	140.3	2525
20	250	.72	21.60	27.50	115	147.4	166.7	2000	160.3	2885
24	150	.73	25.80	32.00	160	179.4	206.2	2475	197.2	3550
24	250	.79	25.80	32.00	160	193.7	220.4	2645	211.4	3805

*Pipe, as listed above, can also be used for low pressure steam, air, and gas service.*

\* Unless Class 250 flanges are specifically ordered, both Class 150 and 250 weight pipe will always be fitted with ASA Class 125 flanges plain faced and drilled per template on page 101.

**Pipe Wall Thickness**

The thicknesses shown in the above table are ASA Standard for centrifugally cast pipe for pipe laid without blocks, on flat bottom trench, with tamped backfill, and under 5 feet of cover except where such indicated thickness is less than .38 inches, in which case, .38 inches is shown in the table as recommended minimum thickness for cast iron pipe to be threaded for pressure service.

**Weights Are Approximate**

Weights shown are subject to a variation of not more than 10% for individual pieces and not more than a total of 5% on any one shipment of 100 or more pieces. To obtain weight of cut pipe, multiply length by the per foot weight of pipe barrel and add weight of flanges.

**Face to Face Measurements**

After facing flanges, an inspection limit of plus or minus  $\frac{1}{16}$  inch shall be allowed on all contact surface to contact surface dimensions of full length or short length flanged pipe in sizes up to and including 10 inches; and plus or minus  $\frac{1}{8}$  inch on the larger sizes.

**Foundry Practice**

Flanged joint cast iron pipe is made up by threading plain end pipe, screwing on specially designed *long hub flanges*—power tightened, and *refacing* across both face of flange and end of pipe. Due to the *refacing* of flange and pipe ends, the gasket actually seats on the machined ends of the adjoining pipes and, thus, threads are not affected by line pressure nor corrosive action of line contents. The long hub of the flange is counter-bored to cover all pipe threads to protect them against outside corrosion.



For drilling template for Class 250 flanges, see page 101.

Pipe can be furnished with greater wall thickness than shown in above table. Write for information



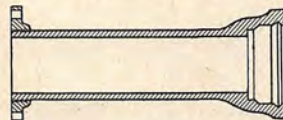


## SHORT LENGTH CAST IRON PIPE MADE TO ORDER TO MEET JOB REQUIREMENTS

For Additional Information, see Page 28



Flange and Flange

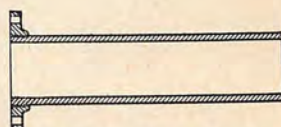


Flange and AWWA Bell

### When Ordering

The following information is important to properly fill an order for this product: Size and Class (maximum working pressure) of pipe line, *laying* length of the pieces ordered, and the type of end connections required. ASA Class 125 flanges are regularly furnished faced and drilled unless otherwise *specifically* ordered.

See \* beneath table below.



Flange and Plain End



Flange and MJ Bell

### SIZES AND WEIGHTS

Nom. Inside Diam. Inches	O.D. Of Pipe Inches	Min. Thick. Of Pipe—Inches		Approximate Weight—Pounds						MJ Joint Accessories Per Set
				Pipe—Per Foot		Flanges—Each*		Type Of Bell		
		Class 150	Class 250	Class 150	Class 250	Class 125	Class 250	Calking Each	MJ Each	
3	3.96	.38	.38	13.3	13.3	7	12	11	11	7
4	4.80	.38	.38	16.5	16.5	13	20	14	16	10
6	6.90	.38	.38	24.3	24.3	17	34	25	22	16
8	9.05	.41	.41	34.7	34.7	27	50	41	30	25
10	11.10	.44	.44	46.0	46.0	38	70	54	40	30
12	13.20	.48	.52	59.8	64.6	58	102	66	50	40
14	15.30	.51	.59	73.9	85.1	72	130	78	78	45
16	17.40	.54	.63	89.2	103.6	90	162	96	95	55
18	19.50	.58	.68	107.6	125.4	90	200	114	113	65
20	21.60	.62	.72	127.5	147.4	115	245	133	134	85
24	25.80	.73	.79	179.4	193.7	160	370	179	177	105

\* Unless Class 250 flanges are specifically ordered, both Class 150 and 250 weight pipe will always be fitted with ASA Class 125 flanges plain faced and drilled per template on page 101.

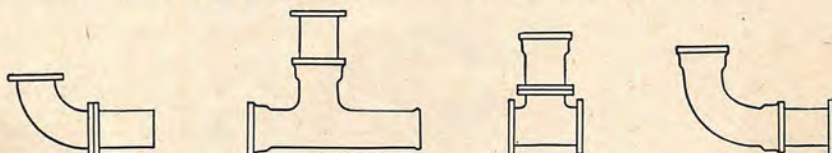
### To Estimate Weights of Short Length Pipe

Multiply the weight per foot of pipe barrel by the *laying* length of the piece wanted and add the weights of the end connections required. For the total weight of pipe with a mechanical joint bell, the weight of joint accessories must also be added.

### Quick Shipments to Meet Emergencies

Short lengths of cast iron pipe are often required when installing a pipe system. Frequently the exact requirements cannot be determined until the work has progressed to the point where the pipe must be secured quickly, or there is a serious delay in the completion of the job. We can make prompt shipment from Chicago, Coshocton or Birmingham to meet just such emergencies.

### Use Short Length Pipe and Stock Fittings Instead of Special Fittings



Occasionally, it is necessary that two or more converging pipe lines, having different end connections, be joined together. Very often, this can be accomplished with regular stock fittings and short lengths of pipe with required end connections—the quickest and cheapest way to do the job.





Inc.

Super-deLavaud

## I.P.S. CAST IRON PIPE WITH SAME O.D. AS STEEL PIPE

Furnished Tar Coated Inside and Outside Unless Otherwise Ordered



F-238 Plain End



F-240 Threaded

**Not Recommended for Underground Installation**

This pipe can be cut, threaded, fitted and installed on the job with the ordinary tools of the piping trades. Pipe takes regular stock sizes of cast iron screwed fittings and flanges.

### Sizes, Dimensions and Weights

Weights of 18-foot random length pipe are rounded off to nearest five pounds.

Nominal Pipe Size Inches	Wall Thickness		Dimensions		Approximate Weight	
	ASA Class	In Inches	O.D. Inches	I.D. Inches	Per Foot Threaded	18-Foot Length
3	23	.35*	3.50	2.80	10.8	195
4	22	.35	4.50	3.80	14.2	255
5	..	.37	5.56	4.82	18.8	340
6	22	.38	6.62	5.86	23.2	420
8	22	.41	8.62	7.80	33.0	595
10	22	.44	10.75	9.87	44.5	800

\* Considered standard wall thickness required for threading pipe in the field.

### Clow Super-deLavaud Cast Iron Pipe

Clow Super-deLavaud cast iron pipe with steel pipe outside diameters is centrifugally cast in metal molds to produce a pipe of superior quality with a dense close-grained metal structure free from blow-holes, sand or slag inclusions. The casting machines exercise positive control over the outside diameter of the pipe while the wall thickness and inside diameter can be readily varied to meet any specification. Also, due to the centrifugal method of casting, the pipe wall thickness is made uniform and the inside and outside diameters are true circles—absolutely concentric. Cutting, threading and installing this pipe can be readily accomplished with ordinary pipe line tools—see page 181.

*This pipe can be furnished with wall thickness greater than shown in above table*

### Specifications and Recommendations

This pipe is regularly furnished in 18-foot random lengths in 3, 4, 5, 6, 8 and 10-inch sizes, tar coated inside and outside, with threaded ends. The pipe is tested to 500 pounds hydrostatic pressure before shipment. Untarred pipe and/or plain end pipe will be furnished only when specifically ordered.

Wherever used, *cast iron* pipe assures long life and trouble free service because of its high resistance to corrosion. This pipe, particularly, has proven its worth in replacing rusted out pipe lines in and about water and sewage treatment plants and pumping stations. It is in steady demand for down-spout, waste and vent piping on new construction of all types of public buildings.



F-246  
Tapped Coupling

### COUPLINGS

It is always best (even when ordering pipe) to state the number of couplings wanted.



F-248†  
Sleeve Coupling

### F-246 Tapped Couplings for Threaded Pipe

For pipe size.....Inches	3	4	5	6	8	10
Diameter, overall.....Inches	4 <sup>5</sup> / <sub>8</sub>	5 <sup>13</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>4</sub>	10 <sup>5</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>8</sub>
Length, overall.....Inches	4 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	4 <sup>3</sup> / <sub>4</sub>	5	5 <sup>5</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>8</sub>
Approximate weight, each.....Pounds	7	11	16 <sup>1</sup> / <sub>2</sub>	24	42	66

### F-248 Sleeve Couplings for Plain End Pipe†

Diameter, overall.....Inches	7 <sup>3</sup> / <sub>8</sub>	8 <sup>3</sup> / <sub>4</sub>	9 <sup>5</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>	12 <sup>7</sup> / <sub>16</sub>	14 <sup>5</sup> / <sub>8</sub>
Length, maximum.....Inches	10	10	10 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>8</sub>
Number and size of bolts.....	4- <sup>5</sup> / <sub>8</sub> x8	4- <sup>5</sup> / <sub>8</sub> x8	4- <sup>5</sup> / <sub>8</sub> x8	6- <sup>5</sup> / <sub>8</sub> x8	6- <sup>5</sup> / <sub>8</sub> x8	8- <sup>5</sup> / <sub>8</sub> x8
Approximate weight, each.....Pounds	15	19	20	25	31	41

† Regularly furnished with plain rubber gasket. Follower rings, middle ring, and bolts are steel.





**I.P.S. CAST IRON PIPE WITH INTEGRAL CALKING HUB  
FOR USE WITH SOIL PIPE FITTINGS OR WITH DRAINAGE FITTINGS**



**F-250**

Calking Hub on One End—Other End Plain

Pipe Barrel Has Same Outside Diameter As Steel Pipe

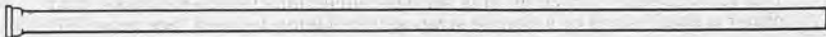
This pipe is not to be confused with standard bell and spigot water-main pipe shown on Pages 17, 18, and 19. However, like all Clow pipe, this pipe is also centrifugally cast in metal molds to produce pipe of superior quality with a close-grained metal structure—completely free of blow-holes, sand or slag inclusions. The pipe is made only in the 4, 6, and 8-inch sizes, in 18-foot lengths (approximate), and is tar-coated inside and outside before shipment. The inside shape and dimensions of the calking hub are the same as extra heavy pattern soil pipe and fitting hubs, and the outside diameter of the pipe barrel is the same as that of ordinary steel pipe. Thus, this pipe can be readily fabricated on the job in combination with soil pipe fittings and/or with screwed drainage fittings—with the ordinary tools of the piping trades.

*Note:* Refer to the tool section of this catalog for a complete line of pipe cutting and threading tools. When ordering threading dies, specify "for use on cast iron pipe"—when such is the case.

This pipe is particularly ideal for long runs of sewer lines—suspended or underground. Because of its extra long length, the savings in cost of joint materials and the calking time for labor are considerable. For example, in every straight run of 35 feet of pipe, this longer length pipe will require only one calked joint while the more common five-foot length soil pipe will require six calked joints.

Orders for this pipe must specify the *exact number of pieces* (full 18-foot random lengths) of pipe wanted. As already mentioned elsewhere, this pipe can be completely fabricated right on the job. However, if you wish to take advantage of our machine shop facilities, the pipe you have ordered can be cut into either two or three sections—approximately 9-foot or 6-foot long—before shipment to the job. Also, these short length pipes can be furnished threaded on one end only or on both ends—and the threaded end (or ends) of these pipes can be fitted with the F-253 Tapped Hub Adapter made on tight in our shops—to speed up installation on the job.\*

**Your Pipe Can Be Furnished**



Full Length



Cut in Half



Cut in Three Pieces

**DIMENSIONS AND WEIGHTS**

Nominal pipe size	Inches	4	6	8
Outside diameter of pipe barrel	Inches	4.50	6.62	8.62
Standard wall thickness	Inches	.35	.38	.41
Approximate weight, per foot†	Pounds	14.6	23.7	34.0

† Based on 18-Foot (laid length) pipe including weight of the calking hub.

**\* Clow Pipe Shop Service Available**

We recommend the facilities of our pipe shops to furnish you with this cast iron pipe cut to exact laying lengths—with plain, threaded, or hub ends, and with fittings made on (or loose)—complete in every detail for time-saving installation on the job.



**F-253 Tapped  
Hub Adapter**



**F-257 Double  
Hub Connector**

**Send plans and specifications for our estimate.**





## TWO-INCH CAST IRON PRESSURE PIPE

Centrifugally Cast in Full Lengths



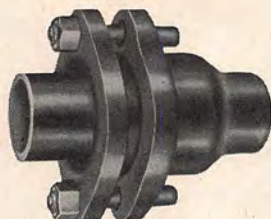
**F-261 Type "A" Pipe**  
Open Bell and Plain Ends

Open bell and plain end pipe joints are made up on the job much the same way as larger sizes of watermain. Cuts can be made at any point in the pipe barrel and the cut ends will socket in the bell of the pipe or in the 2-inch fitting bells—either calking type or mechanical joint. Calked joints require 2½ pounds of lead and 2 ounces of jute per joint.

**F-263 Type "D" Pipe**  
Mechanical Joint

Mechanical joint pipe provides considerable flexibility and, also, for the free longitudinal movement of pipe at the joint to compensate for expansion and contraction. The pipe is shipped complete with all joint accessories and joints can be easily and quickly made up "bottle-tight" with ratchet wrenches. No lead melting or calking required.

Regularly furnished with plain rubber gaskets.



**F-263**

### FULL LENGTH PIPE

Figure.....Number	F-261 Type "A" Pipe	F-263 Type "D" Pipe
Laying length.....	18' 0"	18' 0"
Approx. weight, per length.....Pounds	110	115*

\*Includes weight of one gland, two bolts, and one gasket.

### Making Service Connections

It is recommended, when making service connections to two-inch pipe, that either a single strap or a double strap service clamp be used. See page 187.

### SHORT LENGTH ADAPTERS

**F-274**

2" Open Bell Joint—2½" Male Thread

**F-276**

2" Mechanical Joint—2½" Male Thread

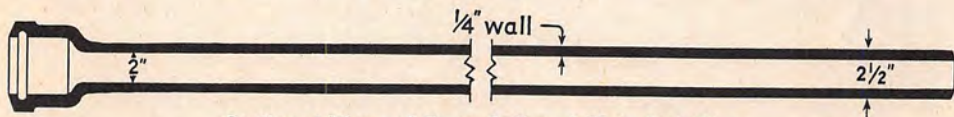
**Note.** Short length adapter (exchangers) pieces with other combinations of joint styles can be furnished. The two illustrated here can be used in conjunction with our F-1280 Tapped Saddle for running 2-inch pipe branch lines from mains already installed. When ordering saddles for this purpose, specify 2½-inch tapping.



**F-274**



**F-276**



**Sectional View of Open Bell and Plain End Pipe**

The barrel portion of two-inch cast iron pressure pipe is the same for both open bell and mechanical joint pipe. The pipe is centrifugally cast in full one-piece lengths.

### Note

The F-261 and F-263 cast iron pressure pipe can also be furnished in 2¼-inch size.

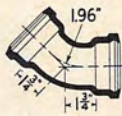


## TWO-INCH CAST IRON PRESSURE FITTINGS

### OPEN BELL—FOR WATER



**F-281 90° Bend**  
Wgt. 16 Lbs.



**F-283 45° Bend**  
Wgt. 15 Lbs.

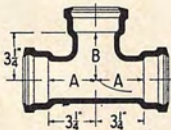


**F-285 22 1/2° Bend**  
Wgt. 15 Lbs.



**F-288 11 1/4° Bend**  
Wgt. 15 Lbs.

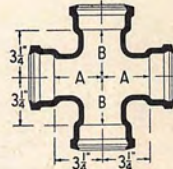
*All weights are approximate*



**F-294 Tee**  
Wgt. 25 Lbs.

Dimensions on illustrations are for 2-inch straight size fittings.

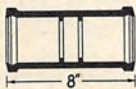
For reducing tees and crosses see table below.



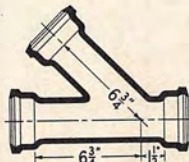
**F-296 Cross**  
Wgt. 32 Lbs.

### REDUCING TEES AND CROSSES

Nominal Diameter Inches	Dimensions Inches		Approx. Weight Pounds		Nominal Diameter Inches	Dimensions Inches		Approx. Weight Pounds	
	A	B	Tees	Crosses		A	B	Tees	Crosses
3 x 2	4.00	4.00	58	66	6 x 2	5.25	5.25	108	115
4 x 2	4.75	4.75	76	83	8 x 2	5.25	6.25	160	170



**F-305 Sleeve**  
Wgt. 14 Lbs.



**F-308 Y Branch**  
Wgt. 25 Lbs.



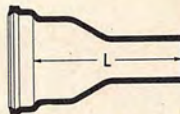
**F-314 Cap**  
Wgt. 12 Lbs.



**F-316 Plug**  
Wgt. 3 Lbs.



**F-322 Reducer**  
Small End Bell



**F-324 Reducer**  
Large End Bell

### DIMENSIONS AND WEIGHTS

Nominal Diameter.....Inches	3 x 2	4 x 2	6 x 2	8 x 2
<b>F-322</b> Laying length L.....Inches	14.00	15.00	17.00	19.00
<b>F-324</b> Laying length L.....Inches	10.00	11.00	13.00	15.00
<b>F-322</b> Approx. weight.....Pounds	24	30	44	57
<b>F-324</b> Approx. weight.....Pounds	29	37	53	70

#### Note

Open Bell and Mechanical Joint fittings can also be furnished for use with 2 1/4-inch pipe.  
Fittings shown above are for use with Two-Inch Cast Iron Pressure Pipe, see page 32.

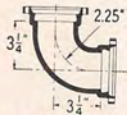




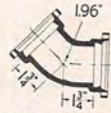
## TWO-INCH CAST IRON PRESSURE PIPE FITTINGS

MECHANICAL JOINT—FOR WATER OR GAS

Shipped complete with joint accessories



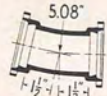
**F-329 90° Bend**  
Wgt. 21 Lbs.



**F-332 45° Bend**  
Wgt. 20 Lbs.



**F-334 22½° Bend**  
Wgt. 20 Lbs.

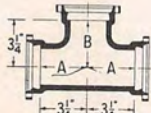


**F-338 11¼° Bend**  
Wgt. 20 Lbs.

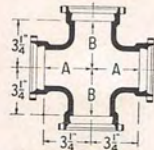
All weights are approximate\*

Dimensions on illustrations are for 2-inch straight size fittings.

For reducing tees and crosses see table below.



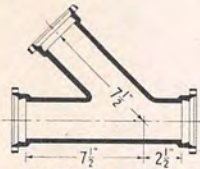
**F-340 Tee**  
Wgt. 33 Lbs.



**F-344 Cross**  
Wgt. 42 Lbs.

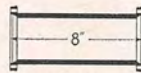
### REDUCING TEES AND CROSSES

Nominal Diameter Inches	Dimensions Inches		Approx. Weight Pounds		Nominal Diameter Inches	Dimensions Inches		Approx. Weight Pounds	
	A	B	Tees	Crosses		A	B	Tees	Crosses
3 x 2	4.00	4.00	57	67	6 x 2	5.25	5.25	119	128
4 x 2	4.75	4.75	81	90	8 x 2	5.25	6.25	152	164

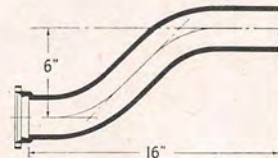


**F-352 Y Branch**  
Wgt. 40 Lbs.

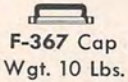
**Note**  
Mechanical Joint and Open Bell fittings can also be furnished for use with 2¼-inch pipe.



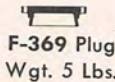
**F-358 Sleeve**  
Wgt. 18 Lbs.



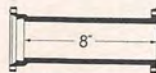
**F-362 Offset**  
Wgt. 23 Lbs.



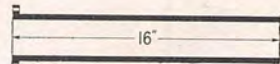
**F-367 Cap**  
Wgt. 10 Lbs.



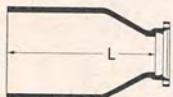
**F-369 Plug**  
Wgt. 5 Lbs.



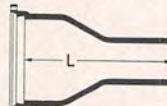
**F-373 Adapter**  
MJ to Flg.—Wgt. 18 Lbs.



**F-376 Adapter**  
Flg. to PE—Wgt. 12 Lbs.



**F-380 Reducer**  
Small End MJ



**F-382 Reducer**  
Large End MJ



**F-384 Reducer**  
MJ and MJ

### DIMENSIONS AND WEIGHTS

Nominal Diameter.....Inches	3 x 2	4 x 2	6 x 2	8 x 2
<b>F-380</b> Laying length L.....Inches	14.00	15.00	17.00	19.00
<b>F-382</b> Laying length L.....Inches	10.00	11.00	13.00	15.00
<b>F-384</b> Laying length L.....Inches	6.00	7.00	9.00	11.00
<b>F-380</b> Approx. weight.....Pounds	26	33	46	66
<b>F-382</b> Approx. weight.....Pounds	27	38	57	83
<b>F-384</b> Approx. weight.....Pounds	34	45	64	90

\* All weights are for fittings complete with accessories for MJ bells.

Fittings shown above are for use with Two-Inch Cast Iron Pressure Pipe, see page 32.



## FITTINGS

# CLOW

## **CAST IRON FITTINGS FOR WATER**

### **BELL AND SPIGOT JOINT FITTINGS**

For Water or Other Liquids

Pages 38 thru 54

### **FLANGED JOINT FITTINGS FOR WATER**

Long Body Pattern

Pages 55 thru 60

### **"C-N" MECHANICAL JOINT FITTINGS**

For Water or Gas

Pages 62 thru 75

### **SPECIALS**

Pages 77 thru 96

### **FLANGED JOINT FITTINGS FOR STEAM AND WATER**

Class 125, Pages 97 thru 118



### **INFORMATIVE DATA**

Determining the Length of Pipe in an Offset Connection

Making Offsets with Bends

Page 61

When Using a Ratchet Wrench between Bolted Joints

Page 74

Maximum Safe Deflection in Cast Iron Pipe Joints

Pages 19, 22, and 24

Use Pipe Joint Symbols on Drawings

Page 36

Instead of Ordering Special Castings—see page 54

### **NOTE**

Since the advent of specifications (ASA A21.10 and AWWA C110) for "Short Body Bell and Spigot Fittings, 3 through 12 inches, 250 (psi) Water Pressure," it is anticipated that these fittings will become the "standard" for all newly-planned installations of cast iron bell and spigot pipe and fittings in sizes 3, 4, 6, 8, 10 and 12 inches. Bell and spigot fittings in sizes 14 inches and larger will continue to be the AWWA long body patterns.

Therefore, the tables of dimensions and weights for bell and spigot fittings, appearing on the following pages, have been arranged to conform with this practice. However, for those who may have need for these data, dimensions and weights for the AWWA long body fittings, sizes 12-inch and smaller, and 30-inch and larger will be found on pages 265 thru 281 in rear of book.

### **Complete Specifications**

Where mentioned, in connection with our catalog tables of dimensions and weights for cast iron fittings, complete American Standard Association and/or American Water Works Association specifications are available on request.





## WHEN ORDERING OR REQUESTING QUOTATIONS

### INCLUDE AS COMPLETE INFORMATION AS POSSIBLE

**Figure Numbers:** Wherever possible designate pipe, fittings and other material by Pipe Economy Figure Numbers. Use of Figure Numbers avoids all confusion as to what is wanted, and will help us to submit quotations and fill orders accurately and promptly.

**Destination and Method of Shipment:** Freight is an important part of the cost of material, and it is important that we know if quantities to be quoted are carload or less than carload, and we must know the destination. If shipment is wanted by truck we should be so advised. We should be advised also if partial shipments must be made comprising less than carload, or less than truckload quantities.

**Length of Pipe:** Give the number of feet of each pipe size required: Bell & Spigot and "C-N" Mechanical Joint pipe are made in nominal 18-foot lengths but, actually, the pipe measures from 1 to 3 inches over 18 feet and this actual length is used in computing footage and for pricing. State type of joint: Bell and Spigot, "C-N" Mechanical Joint, Flanged, etc. Advise if pipe is for water or gas: unless otherwise specified, pipe and fittings for water or sewage will be furnished tar-coated; pipe and fittings for gas will be furnished uncoated.

**Class of Pipe:** When ordering to ASA specifications, it is best to refer to Class 22, Class 23, etc.; when ordering Federal Specifications WW-P-421a (new) or WW-P-421 (old) pipe, mention Federal Specification number and Class 150 or Class 250, etc. In sizes 14-inch and larger, specify if B. & S. pipe is to be used with Class B or Class D fittings.

**Cut Pipe:** If shorter than nominal 18-foot length B. & S. or "C-N" Mechanical Joint pipe is required, give exact *laying* length. This pipe will be furnished laying length unless specifically ordered overall length. While the standard laying length for Flanged, F. & P E., or F. & B. pipe is 18'0", we can furnish any shorter lengths as required.

**Bell and Spigot Fittings:** Unless orders for fittings specify requirements by catalog Figure Number, or give detailed description, we will ship B. & S. and B. & B. fittings as follows:

Sizes 3 thru 12 inches

Short body—ASA A21.10 & AWWA C110

Sizes 14-inch and larger

AWWA specifications C100

Always specify whether calking fittings 14" and larger are to be furnished Class B or Class D.

**"C-N" Mechanical Joint Fittings:** Mechanical Joint fittings are always furnished to standardized dimensions as shown in this catalog.

**Flanged Fittings:** Unless otherwise specified we will furnish ASA Class 125 flanged fittings. Be sure to order by Figure Number if AWWA flanged, or ASA Class 250 flanged fittings are wanted.

**Special Fittings:** Wherever possible in the layout, it is best to eliminate special fittings and to use standard fittings. This can very often be done by using either all bell, bell and spigot, or standard flanged fittings in conjunction with F-1320 F. & B. Pipe, or F-1300 F. & PE. Pipe. All requirements for special castings should be accompanied by a sketch.

**Flanges:** Unless otherwise specified, all flanges will be faced and drilled to American Standard Class 125 template. Flanges ordered tapped for studs, unless specified otherwise, will be tapped to American Standard Class 125 template. Note that in American Standard drilling, bolt holes straddle the centerline. Where special drilling is required, furnish sketch specifying bolt circle, and number and size of bolt holes.

**Tapped Pipe and Fittings:** Unless otherwise specified, tapped pipe and fittings will be tapped for W. I. Pipe, and tapped directly into the body of the pipe or fittings. If the size of tap requires a boss, the boss will be cast on or welded on at our option. Taps are located on the centerline straddling bolt holes unless specified otherwise.

### Symbols for Pipe Line Drawings



Bell and Spigot Joint



"C-N" Mechanical Joint



Ball and Bell Joint



Roll-On Joint



Flanged Joint



Screwed Joint

The symbols shown for bell and spigot, flanged, and screwed joints are approved by the American Standards Association and have been reproduced from a publication entitled "American Standard Graphical Symbols." The

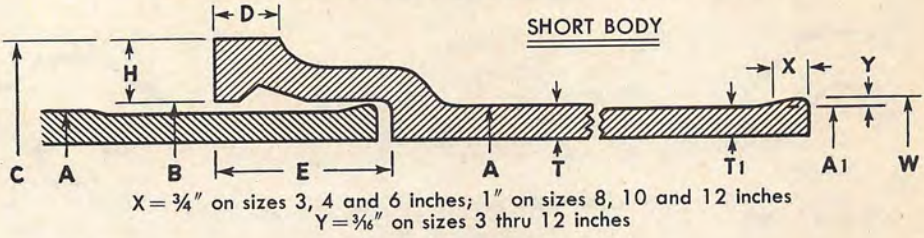
symbols shown for "C-N" mechanical joint and the ball and bell joint are approved by the Cast Iron Pipe Research Association as additions to other pipe joint symbols now in use on drawings.





Inc.

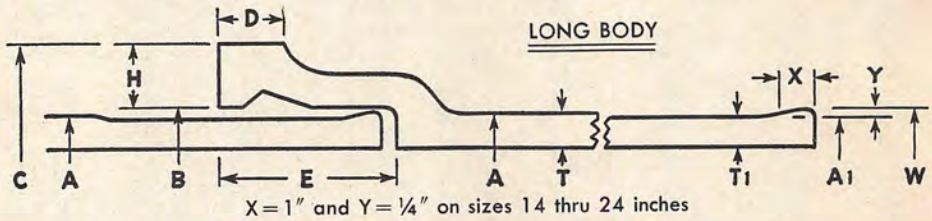
**DIMENSIONS  
BELLS AND SPIGOTS FOR STANDARD FITTINGS**



**FOR SHORT BODY FITTINGS\***

Fitting Size Inches	Class	Dimensions—Inches									
		A	A <sup>1</sup>	B	C	D	E	H	T	T <sup>1</sup>	W
3	250	3.96	3.96	4.66	7.26	1.25	3.50	1.30	.48	.48	4.34
4	250	5.00	4.90	5.70	8.30	1.50	4.00	1.30	.52	.47	5.28
6	250	7.10	7.00	7.80	10.60	1.50	4.00	1.40	.55	.50	7.38
8	250	9.30	9.18	10.00	13.00	1.50	4.00	1.50	.60	.54	9.56
10	250	11.40	11.25	12.10	15.30	1.50	4.00	1.60	.68	.60	11.63
12	250	13.50	13.35	14.20	17.60	1.50	4.00	1.70	.75	.68	13.73

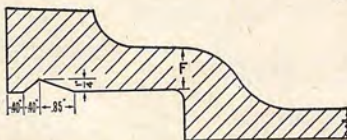
\* ASA A21.10 (AWWA C110) standard which have AWWA Class D metal thickness.



**FOR AWWA STANDARD FITTINGS†**

Fitting Size Inches	Class	Dimensions—Inches									
		A	A <sup>1</sup>	B	C	D	E	H	T	T <sup>1</sup>	W
14	B	15.30	15.30	16.10	19.50	1.50	4.00	1.70	.66	.66	15.80
14	D	15.65	15.65	16.45	20.05	1.50	4.00	1.80	.82	.82	16.15
16	B	17.40	17.40	18.40	22.00	1.75	4.00	1.80	.70	.70	17.90
16	D	17.80	17.80	18.80	22.60	1.75	4.00	1.90	.89	.89	18.30
18	B	19.50	19.50	20.50	24.30	1.75	4.00	1.90	.75	.75	20.00
18	D	19.92	19.92	20.92	25.12	1.75	4.00	2.10	.96	.96	20.42
20	B	21.60	21.60	22.60	26.60	1.75	4.00	2.00	.80	.80	22.10
20	D	22.06	22.06	23.06	27.66	1.75	4.00	2.30	1.03	1.03	22.56
24	B	25.80	25.80	26.80	31.00	2.00	4.00	2.10	.89	.89	26.30
24	D	26.32	26.32	27.32	32.32	2.00	4.00	2.50	1.16	1.16	26.82

† AWWA Specification C100



**DIMENSION "F" IN INCHES**

**Short Body Fittings**

Size . . . . . Inches	3	4	6	8	10	12
Class 250 . . . . . Inches	.65	.65	.70	.75	.80	.85

**Long Body Fittings**

Size . . . . . Inches	14	16	18	20	24	..
Class B . . . . . Inches	.85	.90	.95	1.00	1.05	..
Class D . . . . . Inches	.90	1.00	1.05	1.15	1.25	..

Dimensional data shown in figures in the above illustration apply to bells for all sizes of cast iron fittings 3 through 24 inches. Dimensions for "F" are given for these sizes in the table at right.

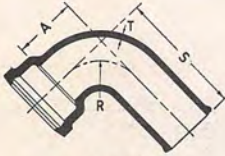
For AWWA fittings, 30 inches and larger, see pages 265 thru 281.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS

### BENDS—FOR WATER



**F-402**  
(90°) Quarter Bend  
Bell and Spigot

**Note**  
Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.



**F-406**  
(90°) Quarter Bend  
Bell and Bell

### DIMENSIONS AND WEIGHTS F-402 and F-406

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight Pounds	
			T	A	S	R	B&S	B&B
<b>ASA A21.10</b>			<b>SHORT BODY</b>				<b>AWWA C110</b>	
3	..	250	.48	5.50	13.50	4.00	45	55
4	..	250	.52	6.50	14.50	4.50	60	70
6	..	250	.55	8.00	16.00	6.00	95	110
8	..	250	.60	9.00	17.00	7.00	150	165
10	..	250	.68	11.00	19.00	9.00	210	230
12	..	250	.75	12.00	20.00	10.00	285	305
			<b>LONG BODY</b>				<b>AWWA C100</b>	
14	B	86	.66	18.00	30.00	18.00	410	400
14	D	173	.82	18.00	30.00	18.00	495	470
16	B	86	.70	24.00	36.00	24.00	590	590
16	D	173	.89	24.00	36.00	24.00	740	720
18	B	86	.75	24.00	36.00	24.00	705	700
18	D	173	.96	24.00	36.00	24.00	895	870
20	B	86	.80	24.00	36.00	24.00	835	825
20	D	173	1.03	24.00	36.00	24.00	1070	1045
24	B	86	.89	30.00	42.00	30.00	1275	1255
24	D	173	1.16	30.00	42.00	30.00	1665	1625



**F-417**  
(45°) Eighth Bend  
Bell and Spigot

For Other Sizes of  
AWWA Long Body Fittings  
See pages 265 thru 281.



**F-421**  
(45°) Eighth Bend  
Bell and Bell

### F-417 and F-421

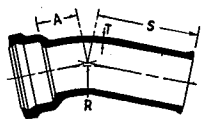
Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight Pounds	
			T	A	S	R	B&S	B&B
<b>ASA A21.10</b>			<b>SHORT BODY</b>				<b>AWWA C110</b>	
3	..	250	.48	3.00	11.00	3.62	40	50
4	..	250	.52	4.00	12.00	4.81	55	65
6	..	250	.55	5.00	13.00	7.25	85	100
8	..	250	.60	5.50	13.50	8.44	130	145
10	..	250	.68	6.50	14.50	10.88	180	200
12	..	250	.75	7.50	15.50	13.25	250	270
			<b>LONG BODY</b>				<b>AWWA C100</b>	
14	B	86	.66	14.91	20.91	36.00	365	400
14	D	173	.82	14.91	20.91	36.00	440	475
16	B	86	.70	14.91	20.91	36.00	445	500
16	D	173	.89	14.91	20.91	36.00	550	605
18	B	86	.75	14.91	20.91	36.00	555	590
18	D	173	.96	14.91	20.91	36.00	665	730
20	B	86	.80	19.88	25.88	48.00	755	825
20	D	173	1.03	19.88	25.88	48.00	965	1045
24	B	86	.89	24.85	30.85	60.00	1165	1255
24	D	173	1.16	24.85	30.85	60.00	1520	1625





## BELL AND SPIGOT JOINT CAST IRON FITTINGS

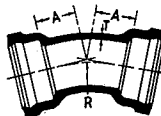
### BENDS—FOR WATER



**F-432**  
(22 1/2°) Sixteenth Bend  
Bell and Spigot

**Note**

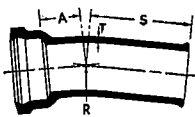
Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.



**F-436**  
(22 1/2°) Sixteenth Bend  
Bell and Bell

### DIMENSIONS AND WEIGHTS F-432 and F-436

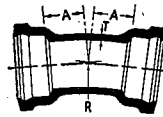
Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight Pounds	
			T	A	S	R	B&S	B&B
<b>ASA A21.10</b>			<b>SHORT BODY</b>				<b>AWWA C110</b>	
3	..	250	.48	3.00	11.00	7.56	40	50
4	..	250	.52	4.00	12.00	10.06	55	65
6	..	250	.55	5.00	13.00	15.06	85	100
8	..	250	.60	5.50	13.50	17.63	130	145
10	..	250	.68	6.50	14.50	22.62	180	200
12	..	250	.75	7.50	15.50	27.62	250	270
			<b>LONG BODY</b>				<b>AWWA C100</b>	
14	B	86	.66	14.32	14.32	72.00	315	400
14	D	173	.82	14.32	14.32	72.00	380	475
16	B	86	.70	14.32	14.32	72.00	385	500
16	D	173	.89	14.32	14.32	72.00	480	605
18	B	86	.75	14.32	14.32	72.00	460	590
18	D	173	.96	14.32	14.32	72.00	580	730
20	B	86	.80	19.10	19.10	96.00	670	825
20	D	173	1.03	19.10	19.10	96.00	860	1045
24	B	86	.89	23.87	23.87	120.00	1055	1255
24	D	173	1.16	23.87	23.87	120.00	1375	1625



**F-447**  
(11 1/4°) Thirty-second Bend  
Bell and Spigot

For 5 1/8° Bends  
See page 270.

For 2-inch Fittings  
See pages 32 thru 34



**F-451**  
(11 1/4°) Thirty-second Bend  
Bell and Bell

### F-447 and F-451

<b>ASA A21.10</b>			<b>SHORT BODY</b>				<b>AWWA C110</b>	
3	..	250	.48	3.00	11.00	15.25	40	50
4	..	250	.52	4.00	12.00	20.31	55	65
6	..	250	.55	5.00	13.00	30.50	85	100
8	..	250	.60	5.50	13.50	35.50	130	145
10	..	250	.68	6.50	14.50	45.69	180	200
12	..	250	.75	7.50	15.50	55.81	250	270
			<b>LONG BODY</b>				<b>AWWA C100</b>	
14	B	86	.66	17.73	17.73	180.00	375	455
14	D	173	.82	17.73	17.73	180.00	450	545
16	B	86	.70	17.73	17.73	180.00	455	565
16	D	173	.89	17.73	17.73	180.00	565	695
18	B	86	.75	17.73	17.73	180.00	540	670
18	D	173	.96	17.73	17.73	180.00	685	835
20	B	86	.80	23.64	23.64	240.00	800	955
20	D	173	1.03	23.64	23.64	240.00	1030	1215
24	B	86	.89	23.64	23.64	240.00	1060	1255
24	D	173	1.16	23.64	23.64	240.00	1375	1620





# JAMES B. CLOW & SONS

Inc.

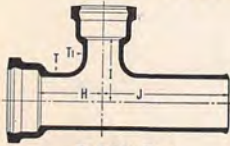


## BELL AND SPIGOT JOINT CAST IRON FITTINGS

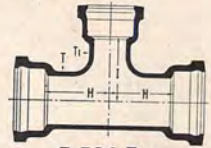
### TEES—FOR WATER

Note

Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.



**F-502 Tee**  
Bell, Spigot and Bell



**F-506 Tee**  
All Bell Ends

### DIMENSIONS AND WEIGHTS F-502 and F-506

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
Run	Branch			T	T <sup>1</sup>	H	J	I	F-502	F-506
<b>ASA A21.10</b>										
<b>SHORT BODY</b>										
<b>AWWA C110</b>										
3	3	...	250	.48	.48	5.50	5.50	13.50	70	80
4	3	...	250	.52	.48	6.50	6.50	14.50	90	100
4	4	...	250	.52	.52	6.50	6.50	14.50	95	105
6	3	...	250	.55	.48	8.00	8.00	16.00	125	140
6	4	...	250	.55	.52	8.00	8.00	16.00	135	150
6	6	...	250	.55	.55	8.00	8.00	16.00	145	160
8	3	...	250	.60	.48	9.00	9.00	17.00	185	200
8	4	...	250	.60	.52	9.00	9.00	17.00	195	210
8	6	...	250	.60	.55	9.00	9.00	17.00	205	220
8	8	...	250	.60	.60	9.00	9.00	17.00	225	240
10	3	...	250	.68	.48	11.00	11.00	19.00	260	280
10	4	...	250	.68	.52	11.00	11.00	19.00	270	290
10	6	...	250	.68	.55	11.00	11.00	19.00	280	300
10	8	...	250	.68	.60	11.00	11.00	19.00	300	320
10	10	...	250	.80	.80	11.00	11.00	19.00	350	370
12	3	...	250	.75	.48	12.00	12.00	20.00	345	365
12	4	...	250	.75	.52	12.00	12.00	20.00	355	375
12	6	...	250	.75	.55	12.00	12.00	20.00	365	385
12	8	...	250	.75	.60	12.00	12.00	20.00	385	405
12	10	...	250	.87	.80	12.00	12.00	20.00	440	460
12	12	...	250	.87	.87	12.00	12.00	20.00	465	485
<b>LONG BODY</b>										
<b>AWWA C100</b>										
14	4	B	86	.66	.52	16.00	16.00	28.00	495	485
14	4	D	173	.82	.52	16.00	16.00	28.00	595	570
14	6	B	86	.66	.55	16.00	16.00	28.00	515	505
14	6	D	173	.82	.55	16.00	16.00	28.00	610	585
14	8	B	86	.66	.60	16.00	16.00	28.00	540	525
14	8	D	173	.82	.60	16.00	16.00	28.00	635	610
14	10	B	86	.66	.68	16.00	16.00	28.00	560	555
14	10	D	173	.82	.68	16.00	16.00	28.00	655	630
14	12	B	86	.66	.75	16.00	16.00	28.00	590	580
14	12	D	173	.82	.75	16.00	16.00	28.00	680	655
14	14	B	86	.66	.66	16.00	16.00	28.00	600	590
14	14	D	173	.82	.82	16.00	16.00	28.00	725	695
16	4	B	86	.70	.52	17.00	17.00	29.00	620	615
16	4	D	173	.89	.52	17.00	17.00	29.00	765	740
16	6	B	86	.70	.55	17.00	17.00	29.00	635	630
16	6	D	173	.89	.55	17.00	17.00	29.00	775	755
16	8	B	86	.70	.60	17.00	17.00	29.00	660	655
16	8	D	173	.89	.60	17.00	17.00	29.00	800	775
16	10	B	86	.70	.68	17.00	17.00	29.00	685	680
16	10	D	173	.89	.68	17.00	17.00	29.00	825	800
16	12	B	86	.70	.75	17.00	17.00	29.00	710	710
16	12	D	173	.89	.75	17.00	17.00	29.00	850	825
16	14	B	86	.70	.66	17.00	17.00	29.00	720	715
16	14	D	173	.89	.82	17.00	17.00	29.00	885	860
16	16	B	86	.70	.70	17.00	17.00	29.00	760	755
16	16	D	173	.89	.89	17.00	17.00	29.00	935	915

For 2-inch fittings, see pages 32 thru 34.

Continued on the next page.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS

### TEES—FOR WATER

#### F-502 and F-506

(Continued from preceding page)

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
				T	T'	H	J	I	F-502	F-506
Run	Branch									
<b>LONG BODY</b>										
<b>AWWA C100</b>										
18	4	B	86	.75	.52	18.00	30.00	18.00	755	745
18	4	D	173	.96	.52	18.00	30.00	18.00	945	915
18	6	B	86	.75	.55	18.00	30.00	18.00	770	765
18	6	D	173	.96	.55	18.00	30.00	18.00	955	925
18	8	B	86	.75	.60	18.00	30.00	18.00	795	785
18	8	D	173	.96	.60	18.00	30.00	18.00	980	950
18	10	B	86	.75	.68	18.00	30.00	18.00	820	810
18	10	D	173	.96	.68	18.00	30.00	18.00	1005	975
18	12	B	86	.75	.75	18.00	30.00	18.00	845	835
18	12	D	173	.96	.75	18.00	30.00	18.00	1030	1000
18	14	B	86	.75	.66	18.00	30.00	18.00	850	845
18	14	D	173	.96	.82	18.00	30.00	18.00	1055	1025
18	16	B	86	.75	.70	18.00	30.00	18.00	885	880
18	16	D	173	.96	.89	18.00	30.00	18.00	1105	1075
18	18	B	86	.75	.75	18.00	30.00	18.00	925	915
18	18	D	173	.96	.96	18.00	30.00	18.00	1155	1125
20	4	B	86	.80	.52	19.00	31.00	19.00	910	900
20	4	D	173	1.03	.52	19.00	31.00	19.00	1160	1130
20	6	B	86	.80	.55	19.00	31.00	19.00	930	915
20	6	D	173	1.03	.55	19.00	31.00	19.00	1175	1145
20	8	B	86	.80	.60	19.00	31.00	19.00	950	940
20	8	D	173	1.03	.60	19.00	31.00	19.00	1195	1165
20	10	B	86	.80	.68	19.00	31.00	19.00	970	965
20	10	D	173	1.03	.68	19.00	31.00	19.00	1215	1185
20	12	B	86	.80	.75	19.00	31.00	19.00	1000	990
20	12	D	173	1.03	.75	19.00	31.00	19.00	1240	1210
20	14	B	86	.80	.66	19.00	31.00	19.00	1010	995
20	14	D	173	1.03	.82	19.00	31.00	19.00	1270	1240
20	16	B	86	.80	.70	19.00	31.00	19.00	1040	1030
20	16	D	173	1.03	.89	19.00	31.00	19.00	1315	1290
20	18	B	86	.80	.75	19.00	31.00	19.00	1075	1065
20	18	D	173	1.03	.96	19.00	31.00	19.00	1360	1330
20	20	B	86	.80	.80	19.00	31.00	19.00	1115	1105
20	20	D	173	1.03	1.03	19.00	31.00	19.00	1420	1390
24	6	B	86	.89	.55	21.00	33.00	21.00	1280	1260
24	6	D	173	1.16	.55	21.00	33.00	21.00	1655	1615
24	8	B	86	.89	.60	21.00	33.00	21.00	1305	1280
24	8	D	173	1.16	.60	21.00	33.00	21.00	1675	1630
24	10	B	86	.89	.68	21.00	33.00	21.00	1325	1305
24	10	D	173	1.16	.68	21.00	33.00	21.00	1695	1650
24	12	B	86	.89	.75	21.00	33.00	21.00	1350	1330
24	12	D	173	1.16	.75	21.00	33.00	21.00	1715	1675
24	14	B	86	.89	.66	21.00	33.00	21.00	1355	1335
24	14	D	173	1.16	.82	21.00	33.00	21.00	1745	1700
24	16	B	86	.89	.70	21.00	33.00	21.00	1390	1370
24	16	D	173	1.16	.89	21.00	33.00	21.00	1785	1745
24	18	B	86	.89	.75	21.00	33.00	21.00	1420	1395
24	18	D	173	1.16	.96	21.00	33.00	21.00	1825	1780
24	20	B	86	.89	.80	21.00	33.00	21.00	1455	1430
24	20	D	173	1.16	1.03	21.00	33.00	21.00	1880	1835
24	24	B	86	.89	.89	21.00	33.00	21.00	1530	1505
24	24	D	173	1.16	1.16	21.00	33.00	21.00	1985	1945

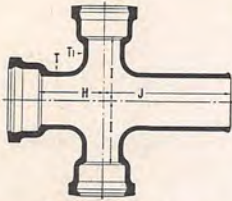
For other sizes of AWWA LONG BODY FITTINGS see pages 265 thru 281.





**BELL AND SPIGOT JOINT CAST IRON FITTINGS**

**CROSSES—FOR WATER**

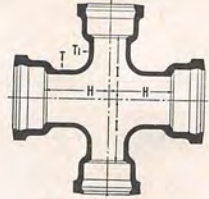


**F-522 Cross**  
Bell, Spigot, Bell and Bell

**Note**

Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.

For details of bells and spigots see page 37



**F-526 Cross**  
All Bell Ends

**DIMENSIONS AND WEIGHTS**

**F-522 and F-526**

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
Run	Branch			T	T <sup>1</sup>	H	J	I	F-522	F-526

**ASA A21.10**

**SHORT BODY**

**AWWA C110**

3	3	...	250	.48	.48	5.50	13.50	5.50	95	105
4	3	...	250	.52	.48	6.50	14.50	6.50	115	125
4	4	...	250	.52	.52	6.50	14.50	6.50	130	140
6	3	...	250	.55	.48	8.00	16.00	8.00	150	165
6	4	...	250	.55	.52	8.00	16.00	8.00	165	180
6	6	...	250	.55	.55	8.00	16.00	8.00	195	210
8	3	...	250	.60	.48	9.00	17.00	9.00	210	225
8	4	...	250	.60	.52	9.00	17.00	9.00	225	240
8	6	...	250	.60	.55	9.00	17.00	9.00	250	265
8	8	...	250	.60	.60	9.00	17.00	9.00	290	305
10	3	...	250	.68	.48	11.00	19.00	11.00	285	305
10	4	...	250	.68	.52	11.00	19.00	11.00	300	320
10	6	...	250	.68	.55	11.00	19.00	11.00	330	350
10	8	...	250	.68	.60	11.00	19.00	11.00	370	390
10	10	...	250	.80	.80	11.00	19.00	11.00	445	465
12	3	...	250	.75	.48	12.00	20.00	12.00	370	390
12	4	...	250	.75	.52	12.00	20.00	12.00	385	405
12	6	...	250	.75	.55	12.00	20.00	12.00	415	435
12	8	...	250	.75	.60	12.00	20.00	12.00	455	475
12	10	...	250	.87	.80	12.00	20.00	12.00	535	555
12	12	...	250	.87	.87	12.00	20.00	12.00	580	600

**LONG BODY**

**AWWA C100**

14	4	B	86	.66	.52	16.00	28.00	16.00	535	525
14	4	D	173	.82	.52	16.00	28.00	16.00	635	610
14	6	B	86	.66	.55	16.00	28.00	16.00	570	560
14	6	D	173	.82	.55	16.00	28.00	16.00	665	640
14	8	B	86	.66	.60	16.00	28.00	16.00	620	610
14	8	D	173	.82	.60	16.00	28.00	16.00	710	685
14	10	B	86	.66	.68	16.00	28.00	16.00	670	660
14	10	D	173	.82	.68	16.00	28.00	16.00	760	730
14	12	B	86	.66	.75	16.00	28.00	16.00	730	720
14	12	D	173	.82	.75	16.00	28.00	16.00	810	785
14	14	B	86	.66	.66	16.00	28.00	16.00	745	740
14	14	D	173	.82	.82	16.00	28.00	16.00	890	860
16	4	B	86	.70	.52	17.00	29.00	17.00	660	655
16	4	D	173	.89	.52	17.00	29.00	17.00	800	780
16	6	B	86	.70	.55	17.00	29.00	17.00	690	690
16	6	D	173	.89	.55	17.00	29.00	17.00	830	805
16	8	B	86	.70	.60	17.00	29.00	17.00	740	735
16	8	D	173	.89	.60	17.00	29.00	17.00	875	855
16	10	B	86	.70	.68	17.00	29.00	17.00	790	785
16	10	D	173	.89	.68	17.00	29.00	17.00	925	900

For 2-inch fittings, see pages 32 thru 34.

Continued on next page





## BELL AND SPIGOT JOINT CAST IRON FITTINGS CROSSES—FOR WATER

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
				T	T <sup>1</sup>	H	J	I	F-522	F-526
Run	Branch									
<b>LONG BODY</b>										
<b>AWWA C100</b>										
16	12	B	86	.70	.75	17.00	29.00	17.00	845	840
16	12	D	173	.89	.75	17.00	29.00	17.00	975	950
16	14	B	86	.70	.66	17.00	29.00	17.00	860	860
16	14	D	173	.89	.82	17.00	29.00	17.00	1045	1020
16	16	B	86	.70	.70	17.00	29.00	17.00	940	940
16	16	D	173	.89	.89	17.00	29.00	17.00	1150	1125
18	4	B	86	.75	.52	18.00	30.00	18.00	795	785
18	4	D	173	.96	.52	18.00	30.00	18.00	985	955
18	6	B	86	.75	.55	18.00	30.00	18.00	830	820
18	6	D	173	.96	.55	18.00	30.00	18.00	1010	980
18	8	B	86	.75	.60	18.00	30.00	18.00	870	865
18	8	D	173	.96	.60	18.00	30.00	18.00	1055	1025
18	10	B	86	.75	.68	18.00	30.00	18.00	920	915
18	10	D	173	.96	.68	18.00	30.00	18.00	1100	1070
18	12	B	86	.75	.75	18.00	30.00	18.00	975	965
18	12	D	173	.96	.75	18.00	30.00	18.00	1150	1125
18	14	B	86	.75	.66	18.00	30.00	18.00	990	985
18	14	D	173	.96	.82	18.00	30.00	18.00	1210	1180
18	16	B	86	.75	.70	18.00	30.00	18.00	1060	1050
18	16	D	173	.96	.89	18.00	30.00	18.00	1305	1275
18	18	B	86	.75	.75	18.00	30.00	18.00	1135	1130
18	18	D	173	.96	.96	18.00	30.00	18.00	1405	1375
20	4	B	86	.80	.52	19.00	31.00	19.00	950	940
20	4	D	173	1.03	.52	19.00	31.00	19.00	1195	1170
20	6	B	86	.80	.55	19.00	31.00	19.00	985	975
20	6	D	173	1.03	.55	19.00	31.00	19.00	1225	1200
20	8	B	86	.80	.60	19.00	31.00	19.00	1030	1020
20	8	D	173	1.03	.60	19.00	31.00	19.00	1265	1240
20	10	B	86	.80	.68	19.00	31.00	19.00	1075	1065
20	10	D	173	1.03	.68	19.00	31.00	19.00	1310	1280
20	12	B	86	.80	.75	19.00	31.00	19.00	1125	1115
20	12	D	173	1.03	.75	19.00	31.00	19.00	1355	1330
20	14	B	86	.80	.66	19.00	31.00	19.00	1145	1130
20	14	D	173	1.03	.82	19.00	31.00	19.00	1420	1390
20	16	B	86	.80	.70	19.00	31.00	19.00	1215	1200
20	16	D	173	1.03	.89	19.00	31.00	19.00	1515	1485
20	18	B	86	.80	.75	19.00	31.00	19.00	1280	1265
20	18	D	173	1.03	.96	19.00	31.00	19.00	1600	1570
20	20	B	86	.80	.80	19.00	31.00	19.00	1360	1350
20	20	D	173	1.03	1.03	19.00	31.00	19.00	1720	1690
24	6	B	86	.89	.55	21.00	33.00	21.00	1335	1315
24	6	D	173	1.16	.55	21.00	33.00	21.00	1705	1665
24	8	B	86	.89	.60	21.00	33.00	21.00	1380	1355
24	8	D	173	1.16	.60	21.00	33.00	21.00	1745	1705
24	10	B	86	.89	.68	21.00	33.00	21.00	1430	1410
24	10	D	173	1.16	.68	21.00	33.00	21.00	1785	1745
24	12	B	86	.89	.75	21.00	33.00	21.00	1475	1450
24	12	D	173	1.16	.75	21.00	33.00	21.00	1825	1785
24	14	B	86	.89	.66	21.00	33.00	21.00	1485	1460
24	14	D	173	1.16	.82	21.00	33.00	21.00	1885	1845
24	16	B	86	.89	.70	21.00	33.00	21.00	1550	1530
24	16	D	173	1.16	.89	21.00	33.00	21.00	1975	1930
24	18	B	86	.89	.75	21.00	33.00	21.00	1610	1585
24	18	D	173	1.16	.96	21.00	33.00	21.00	2045	2005
24	20	B	86	.89	.80	21.00	33.00	21.00	1685	1660
24	20	D	173	1.16	1.03	21.00	33.00	21.00	2155	2110
24	24	B	86	.89	.89	21.00	33.00	21.00	1840	1815
24	24	D	173	1.16	1.16	21.00	33.00	21.00	2370	2325

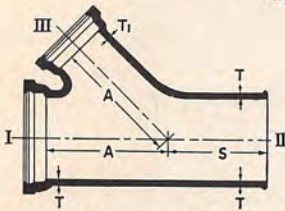
For other sizes of AWWA LONG BODY FITTINGS see pages 265 thru 281.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS TYPE 2 45° "Y" BRANCHES—FOR WATER

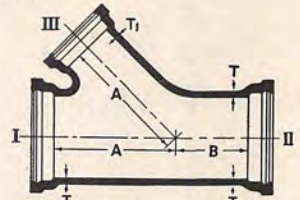
American Water Works Association Standard  
Specification C100



**F-535** 45° Type 2 "Y" Branch  
Bell, Spigot and Bell

**Note**  
When ordering these fittings, give size of openings in the order indicated by the numerals I, II and III.

### DIMENSIONS AND WEIGHTS F-535 and F-540



**F-540** 45° Type 2 "Y" Branch  
All Bell Ends

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
Run	Branch			T	T <sup>1</sup>	A	B	S	F-535	F-540
<b>LONG BODY</b>										
<b>AWWA C100</b>										
3	3	D	173	.48	.48	9.50	7.00	10.50	80	95
4	4	D	173	.52	.52	10.50	7.50	11.50	110	125
6	4	D	173	.55	.52	13.00	9.00	13.00	160	185
6	6	D	173	.55	.55	13.00	9.00	13.00	175	200
8	4	D	173	.60	.52	16.00	10.00	14.00	235	270
8	6	D	173	.60	.55	16.00	10.00	14.00	255	285
8	8	D	173	.60	.60	16.00	10.00	14.00	275	310
10	6	D	173	.68	.55	18.50	11.50	15.50	355	390
10	8	D	173	.68	.60	18.50	11.50	15.50	380	420
10	10	D	173	.68	.68	18.50	11.50	15.50	400	445
12	6	D	173	.75	.55	21.50	11.50	15.50	470	515
12	8	D	173	.75	.60	21.50	11.50	15.50	500	545
12	10	D	173	.75	.68	21.50	11.50	15.50	525	570
12	12	D	173	.75	.75	21.50	11.50	15.50	555	605
14	6	B	86	.66	.55	24.00	12.00	16.00	525	580
14	6	D	173	.82	.55	24.00	12.00	16.00	615	670
14	8	B	86	.66	.60	24.00	12.00	16.00	555	610
14	8	D	173	.82	.60	24.00	12.00	16.00	645	700
14	10	B	86	.66	.68	24.00	12.00	16.00	590	640
14	10	D	173	.82	.68	24.00	12.00	16.00	675	730
14	12	B	86	.66	.75	24.00	12.00	16.00	620	675
14	12	D	173	.82	.75	24.00	12.00	16.00	710	765
14	14	B	86	.66	.66	24.00	12.00	16.00	625	680
14	14	D	173	.82	.82	24.00	12.00	16.00	750	800
16	8	B	86	.70	.60	31.00	13.50	17.50	820	890
16	8	D	173	.89	.60	31.00	13.50	17.50	995	1070
16	10	B	86	.70	.68	31.00	13.50	17.50	860	935
16	10	D	173	.89	.68	31.00	13.50	17.50	1035	1110
16	12	B	86	.70	.75	31.00	13.50	17.50	905	980
16	12	D	173	.89	.75	31.00	13.50	17.50	1080	1155
16	14	B	86	.70	.66	31.00	13.50	17.50	915	990
16	14	D	173	.89	.82	31.00	13.50	17.50	1130	1205
16	16	B	86	.70	.70	31.00	13.50	17.50	965	1040
16	16	D	173	.89	.89	31.00	13.50	17.50	1205	1285
18	10	B	86	.75	.68	34.00	14.00	18.00	1065	1150
18	10	D	173	.96	.68	34.00	14.00	18.00	1310	1400
18	12	B	86	.75	.75	34.00	14.00	18.00	1110	1195
18	12	D	173	.96	.75	34.00	14.00	18.00	1355	1445
18	14	B	86	.75	.66	34.00	14.00	18.00	1120	1205
18	14	D	173	.96	.82	34.00	14.00	18.00	1415	1500
18	16	B	86	.75	.70	34.00	14.00	18.00	1185	1270
18	16	D	173	.96	.89	34.00	14.00	18.00	1495	1585
18	18	B	86	.75	.75	34.00	14.00	18.00	1225	1305
18	18	D	173	.96	.96	34.00	14.00	18.00	1565	1655
20	12	B	86	.80	.75	37.00	14.75	18.75	1355	1455
20	12	D	173	1.03	.75	37.00	14.75	18.75	1650	1770



## BELL AND SPIGOT JOINT CAST IRON FITTINGS

### TYPE 2 45° "Y" BRANCHES—FOR WATER

American Water Works Association Standard

Specification C100

### DIMENSIONS AND WEIGHTS

F-535 and F-540

(Continued from preceding page)

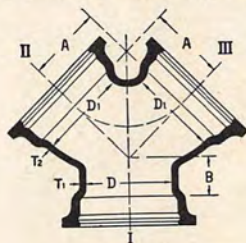
Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches					Approximate Weight—Pounds	
				T	T <sup>1</sup>	A	B	S	F-535	F-540
Run	Branch									
<b>LONG BODY</b>										
<b>AWWA C100</b>										
20	14	B	86	.80	.66	37.00	14.75	18.75	1365	1465
20	14	D	173	1.03	.82	37.00	14.75	18.75	1715	1830
20	16	B	86	.80	.70	37.00	14.75	18.75	1430	1530
20	16	D	173	1.03	.89	37.00	14.75	18.75	1805	1920
20	18	B	86	.80	.75	37.00	14.75	18.75	1485	1585
20	18	D	173	1.03	.96	37.00	14.75	18.75	1880	1995
20	20	B	86	.80	.80	37.00	14.75	18.75	1530	1630
20	20	D	173	1.03	1.03	37.00	14.75	18.75	1935	2055

**Note**

Should a "Y" branch larger than 20 x 20 inches be required, please consult us for our recommendations. Larger size fittings of this type may be reinforced with ribs or bolts. Practices vary and weights of such fittings depend upon the producer's design.

### TRUE "Y" BRANCHES—FOR WATER

Manufacturers Standard for 173 psi Water Pressure



**F-550**

**True "Y" Bell Ends—Class D**

When ordering reducing fittings, give size of openings in the order indicated by the numerals I, II and III.

Larger sizes will be made to order only. Detailed information and prices will be furnished on request.

Nominal Diameter Inches		Dimensions—Inches				Approx. Weight Pounds
D	D <sup>1</sup>	T <sup>1</sup>	T <sup>2</sup>	A	B	
3	3	.48	.48	5.50	3.00	80
4	3	.52	.48	5.50	3.00	80
4	4	.52	.52	6.50	3.00	100
6	4	.55	.52	6.50	3.50	110
6	6	.55	.55	8.00	3.50	150
8	6	.60	.55	8.00	4.50	165
8	8	.60	.60	9.00	4.50	215
10	8	.68	.60	9.00	5.00	235
10	10	.68	.68	11.00	5.00	310
12	10	.75	.68	11.00	5.50	325
12	12	.75	.75	12.00	5.50	395

**IMPORTANT**

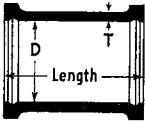
When ordering or requesting prices for tees, crosses and "Y" branches, reducing on the run or with different types of joint connections on a single fitting, a simple sketch of the fitting is required. Such fittings must be made to order.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS

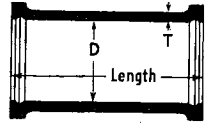
American Water Works Association Standard  
Specification C100



**F-554 Solid Sleeve—Short**

### SOLID SLEEVES—FOR WATER

If no choice is indicated we will ship the F-554 short pattern sleeve.



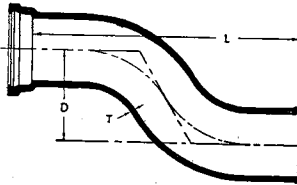
**F-558 Solid Sleeve—Long**

### DIMENSIONS AND WEIGHTS F-554 and F-558

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions Inches		F-554 SHORT		F-558 LONG	
			T	D	Length Inches	Weight Pounds	Length Inches	Weight Pounds
3	D	173	.65	4.76	10	35	15	50
4	D	173	.65	5.80	10	45	15	65
6	D	173	.70	7.90	10	65	15	90
8	D	173	.75	10.10	12	100	15	120
10	D	173	.80	12.20	12	130	18	180
12	D	173	.85	14.30	14	185	18	225
14	B	86	.85	16.20	15	215	18	255
14	D	173	.90	16.50	15	235	18	275
16	B	86	.90	18.50	15	270	24	400
16	D	173	1.00	18.90	15	300	24	445
18	B	86	.95	20.60	15	320	24	470
18	D	173	1.05	21.00	15	360	24	530
20	B	86	1.00	22.70	15	370	24	540
20	D	173	1.15	23.10	15	435	24	640
24	B	86	1.05	26.90	15	470	24	685
24	D	173	1.25	27.40	15	575	24	840

### OFFSETS—FOR WATER

Bell and Bell offsets are available in same sizes as listed below\*.



For mechanical joint offsets, see page 70; for flanged, page 59.

### F-562 Offset—Bell and Spigot

Nominal Diameter Inches	Class	Dimensions Inches			Approx. Weight Pounds	Nominal Diameter Inches	Class	Dimensions Inches			Approx. Weight Pounds
		T	D	L				T	D	L	
3	D	.48	6	27.00	60	12	D	.75	6	34.00	350
3	D	.48	12	30.00	70	12	D	.75	12	45.00	450
3	D	.48	18	38.00	80	12	D	.75	18	56.00	550
4	D	.52	6	27.00	80	14	B	.66	6	35.00	375
4	D	.52	12	30.00	90	14	B	.66	12	46.00	475
4	D	.52	18	38.00	110	14	B	.66	18	57.00	580
6	D	.55	6	28.00	120	14	D	.82	6	35.00	455
6	D	.55	12	34.00	145	14	D	.82	12	46.00	580
6	D	.55	18	41.00	175	14	D	.82	18	57.00	710
8	D	.60	6	29.00	180	16	B	.70	6	35.00	460
8	D	.60	12	36.00	220	16	B	.70	12	48.00	600
8	D	.60	18	43.00	260	16	B	.70	18	58.00	710
10	D	.68	6	30.00	245	16	D	.89	6	35.00	570
10	D	.68	12	38.00	305	16	D	.89	12	48.00	750
10	D	.68	18	46.00	365	16	D	.89	18	58.00	895

\* Laying length of Bell and Bell offsets will be 8 inches less than shown above.  
For other sizes of AWWA LONG BODY FITTINGS see pages 265 thru 281.  
For making offsets on the job, see page 61.



## BELL AND SPIGOT JOINT CAST IRON FITTINGS

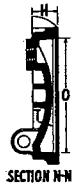
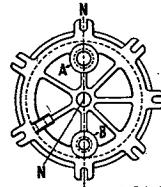
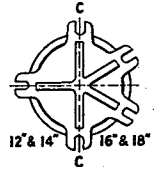
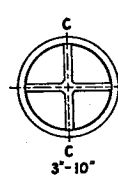
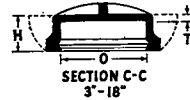
### CAPS AND PLUGS—FOR WATER

American Water Works Association Standard  
Specification C100

#### DIMENSIONS AND WEIGHTS

**F-566 Standard Caps**

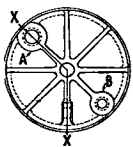
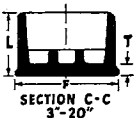
For Pipe Size Inches	Class	Dimensions Inches			Number Of Lugs	Weight—Pounds	
		T	O	H		With Lugs	No Lugs
3	D	.60	4.66	4.60	0	...	20
4	D	.60	5.70	4.60	0	...	25
6	D	.65	7.80	4.65	0	...	40
8	D	.75	10.00	4.75	0	...	60
10	D	.75	12.10	4.75	0	...	85
12	D	.75	14.20	4.75	4	140	110
14	B	.90	16.10	4.90	4	165	135
14	D	.90	16.45	4.90	4	180	150
16	B	1.00	18.40	5.00	6	230	185
16	D	1.00	18.80	5.00	6	245	200
18	B	1.00	20.50	5.00	6	280	230
18	D	1.00	20.92	5.00	6	300	250
20	B	1.00	22.60	5.00	6	330	280
20	D	1.00	23.06	5.00	6	360	310
24	B	1.05	26.80	5.25	6	440	390
24	D	1.05	27.32	5.25	6	490	440



#### Bosses A and B

Tap bosses are cast on large sizes of caps and plugs *only* when so ordered, in which case, the "A" boss will be tapped for 3-inch pipe and the "B" boss for 2-inch pipe—unless tap size is specifically mentioned.

For other sizes of AWWA CAPS AND PLUGS see page 280.



**F-568 Standard Plugs**

For Pipe Size Inches	Class	Dimensions Inches			Number Of Ribs	Approx. Weight Pounds
		T	F	L		
3	D	.50	4.34	5.50	0	7
4	D	.50	5.28	5.50	0	8
6	D	.60	7.38	5.50	0	14
8	D	.60	9.65	5.50	2	25
10	D	.70	11.70	6.00	2	40
12	D	.75	13.80	6.00	2	50
14	B	.70	15.80	6.00	2	60
14	D	.75	16.15	6.00	2	65
16	B	.70	17.90	6.50	3	90
16	D	.80	18.30	6.50	3	95
18	B	.75	20.00	6.50	3	110
18	D	.85	20.42	6.50	3	120
20	B	.85	22.10	6.50	3	150
20	D	1.00	22.56	6.50	3	155
24	B	.89	26.30	8.00	4	375
24	D	1.16	26.82	8.00	4	470

For tapped caps and plugs, see page 86.

For test caps and plugs, see page 79.

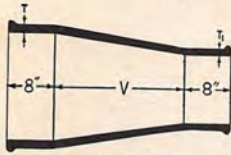




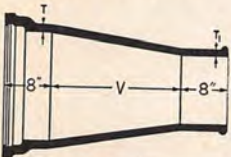
Inc.

## BELL AND SPIGOT JOINT CAST IRON FITTINGS

### REDUCERS—FOR WATER



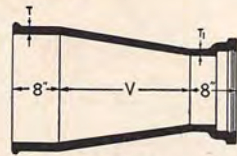
**F-574 Reducer  
Spigot and Spigot**



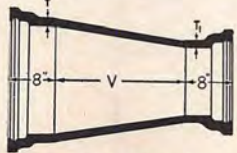
**F-586 Reducer  
Large End Bell**

**Note**  
Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.

**WHEN ORDERING\***  
Order reducers wanted by Fig. No., followed by size and description, thus: F-576, 8 x 6", Small End Bell.



**F-576 Reducer  
Small End Bell\***



**F-588 Reducer  
Bell and Bell**

### DIMENSIONS AND WEIGHTS

#### F-574 thru F-588

Nom. Diam. Inches		Class	Dimensions Inches			Laying Length Inches				Approximate Weight Pounds			
Large End	Small End		T	T <sup>1</sup>	V	F-574	F-576	F-586	F-588	F-574	F-576	F-586	F-588

#### ASA A21.10

#### SHORT BODY

#### AWWA C110

4	3	250	.52	.48	...	23.00	15.00	15.00	7.00	35	45	45	55
4	3	250	.55	.48	...	25.00	17.00	17.00	9.00	55	60	65	75
6	4	250	.55	.52	...	25.00	17.00	17.00	9.00	55	65	70	80
8	3	250	.60	.48	...	27.00	19.00	19.00	11.00	75	85	90	100
8	4	250	.60	.52	...	27.00	19.00	19.00	11.00	80	95	100	110
8	6	250	.60	.55	...	27.00	19.00	19.00	11.00	95	110	110	125
10	3	250	.68	.48	...	28.00	20.00	20.00	12.00	95	105	115	125
10	4	250	.68	.52	...	28.00	20.00	20.00	12.00	105	115	125	135
10	6	250	.68	.55	...	28.00	20.00	20.00	12.00	120	130	135	150
10	8	250	.68	.60	...	28.00	20.00	20.00	12.00	135	150	155	170
12	3	250	.75	.48	...	30.00	22.00	22.00	14.00	125	130	145	160
12	4	250	.75	.52	...	30.00	22.00	22.00	14.00	135	145	155	165
12	6	250	.75	.55	...	30.00	22.00	22.00	14.00	155	165	170	185
12	8	250	.75	.60	...	30.00	22.00	22.00	14.00	175	190	195	210
12	10	250	.75	.68	...	30.00	22.00	22.00	14.00	200	215	215	235

#### LONG BODY

#### AWWA C100

14	6	B	.66	.55	20	36.00	32.00	32.00	28.00	195	220	250	270
14	6	D	.82	.55	20	36.00	32.00	32.00	28.00	225	250	280	305
14	8	B	.66	.60	20	36.00	32.00	32.00	28.00	220	250	270	305
14	8	D	.82	.60	20	36.00	32.00	32.00	28.00	250	285	305	340
14	10	B	.66	.68	20	36.00	32.00	32.00	28.00	250	290	305	345
14	10	D	.82	.68	20	36.00	32.00	32.00	28.00	285	325	340	380
14	12	B	.66	.75	20	36.00	32.00	32.00	28.00	280	330	335	385
14	12	D	.82	.75	20	36.00	32.00	32.00	28.00	320	365	370	420
16	6	B	.70	.55	20	36.00	32.00	32.00	28.00	220	245	295	320
16	6	D	.89	.55	20	36.00	32.00	32.00	28.00	265	290	340	365
16	8	B	.70	.60	20	36.00	32.00	32.00	28.00	250	280	320	355
16	8	D	.89	.60	20	36.00	32.00	32.00	28.00	290	325	370	400
16	10	B	.70	.68	20	36.00	32.00	32.00	28.00	280	320	350	395
16	10	D	.89	.68	20	36.00	32.00	32.00	28.00	325	365	400	440
16	12	B	.70	.75	20	36.00	32.00	32.00	28.00	310	360	385	435
16	12	D	.89	.75	20	36.00	32.00	32.00	28.00	360	405	435	485
16	14	B	.70	.66	20	36.00	32.00	32.00	28.00	320	370	390	445
16	14	D	.89	.82	20	36.00	32.00	32.00	28.00	405	460	480	535
18	8	B	.75	.60	20	36.00	32.00	32.00	28.00	280	315	365	400
18	8	D	.96	.60	20	36.00	32.00	32.00	28.00	335	370	430	460

\* Unless otherwise ordered, we will always ship the F-576 Reducer.

Continued on next page.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS

### REDUCERS—FOR WATER

Unless otherwise ordered we will always ship the F-576 Reducer.

#### DIMENSIONS AND WEIGHTS

F-574 thru F-588

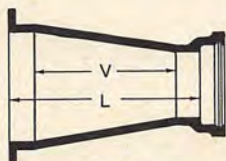
(Continued from preceding page)

Nom. Diam. Inches		Class	Dimensions Inches			Laying Length Inches				Approximate Weight Pounds							
			T	T <sup>1</sup>	V	F-574	F-576	F-586	F-588	F-574	F-576	F-586	F-588				
Large End	Small End																
<b>LONG BODY</b>														<b>AWWA C100</b>			
18	10	B	.75	.68	20	36.00	32.00	32.00	28.00	310	355	395	440				
18	10	D	.96	.68	20	36.00	32.00	32.00	28.00	370	410	460	500				
18	12	B	.75	.75	20	36.00	32.00	32.00	28.00	345	395	430	480				
18	12	D	.96	.75	20	36.00	32.00	32.00	28.00	405	450	495	545				
18	14	B	.75	.66	20	36.00	32.00	32.00	28.00	350	405	435	490				
18	14	D	.96	.82	20	36.00	32.00	32.00	28.00	450	505	540	595				
18	16	B	.75	.70	20	36.00	32.00	32.00	28.00	385	455	470	540				
18	16	D	.96	.89	20	36.00	32.00	32.00	28.00	495	570	585	660				
20	10	B	.80	.68	26	42.00	38.00	38.00	34.00	405	445	505	545				
20	10	D	1.03	.68	26	42.00	38.00	38.00	34.00	485	525	600	640				
20	12	B	.80	.75	26	42.00	38.00	38.00	34.00	450	495	545	595				
20	12	D	1.03	.75	26	42.00	38.00	38.00	34.00	525	575	645	690				
20	14	B	.80	.66	26	42.00	38.00	38.00	34.00	455	505	550	605				
20	14	D	1.03	.82	26	42.00	38.00	38.00	34.00	580	635	695	750				
20	16	B	.80	.70	26	42.00	38.00	38.00	34.00	490	565	590	660				
20	16	D	1.03	.89	26	42.00	38.00	38.00	34.00	630	710	750	825				
20	18	B	.80	.75	26	42.00	38.00	38.00	34.00	530	615	630	715				
20	18	D	1.03	.96	26	42.00	38.00	38.00	34.00	690	780	805	895				
24	14	B	.89	.66	26	42.00	38.00	38.00	34.00	545	595	665	720				
24	14	D	1.16	.82	26	42.00	38.00	38.00	34.00	700	755	855	910				
24	16	B	.89	.70	26	42.00	38.00	38.00	34.00	580	655	705	780				
24	16	D	1.16	.89	26	42.00	38.00	38.00	34.00	755	835	910	985				
24	18	B	.89	.75	26	42.00	38.00	38.00	34.00	625	710	745	830				
24	18	D	1.16	.96	26	42.00	38.00	38.00	34.00	815	905	965	1060				
24	20	B	.89	.80	26	42.00	38.00	38.00	34.00	670	770	795	895				
24	20	D	1.16	1.03	26	42.00	38.00	38.00	34.00	875	990	1030	1145				

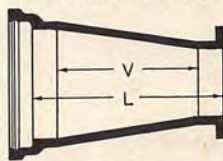
For other sizes of AWWA LONG BODY FITTINGS see pages 265 thru 281.

### SPECIAL REDUCERS—FOR WATER

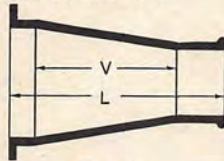
Made To Order At Additional Cost



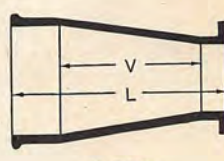
**F-591**  
Flange and Bell



**F-593**  
Bell and Flange



**F-595**  
Flange and Spigot



**F-597**  
Spigot and Flange

Dimension "V" is the same as shown for regular reducers.

#### LAYING LENGTHS (L) OF SPECIAL REDUCERS

**F-591 Flange and Bell Reducers and F-593 Bell and Flange Reducers**  
Have same laying lengths as F-588

**F-595 Flange and Spigot Reducers**  
Have same laying lengths as F-586

**F-597 Spigot and Flange Reducers**  
Have same laying lengths as F-576

#### Note

For matters of economy and speed in making shipments, we recommend a combination of two or more standard fittings rather than the manufacture of "special" castings. Where exact close dimensions are not important, there are stock fittings which, when joined together, will give the required combination of joints needed to solve most piping problems.

*Eccentric Reducers can also be furnished—made to order at additional cost.*



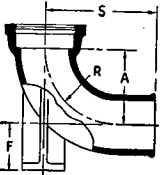


## BELL AND SPIGOT JOINT CAST IRON FITTINGS

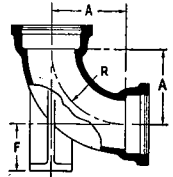
### BASE BENDS—FOR WATER

**Note**

Unless specifically ordered otherwise, fittings in sizes 12 inches and smaller will be furnished in **SHORT BODY** and larger sizes in **LONG BODY**—exactly as listed in the following tables.



**F-606 Base Bend**  
Bell and Spigot



**F-608 Base Bend**  
Bell Ends

### DIMENSIONS AND WEIGHTS F-606 and F-608

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight With Base—Pounds	
			A	F*	S	R	F-606	F-608
<b>SHORT BODY BENDS</b>								
3	...	250	5.50	4.88	13.50	4.00	55	65
4	...	250	6.50	5.50	14.50	4.50	70	80
6	...	250	8.00	7.00	16.00	6.00	115	130
8	...	250	9.00	8.38	17.00	7.00	190	205
10	...	250	11.00	9.75	19.00	9.00	255	275
12	...	250	12.00	11.25	20.00	10.00	350	370

<b>LONG BODY BENDS</b>								
14	B	86	18.00	12.50	30.00	18.00	505	495
14	D	173	18.00	12.50	30.00	18.00	590	565
16	B	86	24.00	13.75	36.00	24.00	700	700
16	D	173	24.00	13.75	36.00	24.00	850	830
18	B	86	24.00	15.00	36.00	24.00	860	855
18	D	173	24.00	15.00	36.00	24.00	1050	1025
20	B	86	24.00	16.00	36.00	24.00	995	985
20	D	173	24.00	16.00	36.00	24.00	1230	1205
24	B	86	30.00	18.50	42.00	30.00	1450	1430
24	D	173	30.00	18.50	42.00	30.00	1840	1800

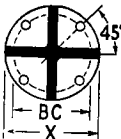
\* Dimensions "F" are for machined bases. For bases not machined, add approximately 1/8 inch.

**Bases will be machined and/or drilled ONLY when so ordered.**

### WEIGHTS OF BASES ONLY

Fitting sizes..... Inches	3	4	6	8	10	12	14	16	18	20	24
For 90° Bends..... Pounds	10	10	20	40	45	65	95	110	155	160	175
For Tees..... Pounds	5	10	15	30	30	45	50	50	75	75	80

† For reducing tees, use the base weight for the size of the largest opening on fitting.



### ROUND BASE



### DIMENSIONS

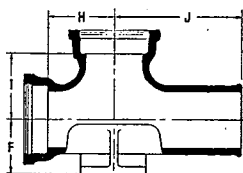
Fitting size..... Inches	3	4	6	8	10	12	14	16	18	20	24
Supporting pipe size.. Inches	1 1/2	2	2 1/2	4	4	6	6	6	8	8	8
Thickness T..... Inches	.56	.62	.69	.94	.94	1.00	1.00	1.00	1.12	1.12	1.12
Thickness U..... Inches	.50	.50	.62	.88	.88	1.00	1.00	1.00	1.12	1.12	1.12
Diameter X..... Inches	5.00	6.00	7.00	9.00	9.00	11.00	11.00	11.00	13.50	13.50	13.50
Number of holes in base ...	4	4	4	4	4	4	4	4	4	4	4
Size of holes..... Inches	5/8	3/4	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8	7/8
Diameter BC..... Inches	3.88	4.75	5.50	7.50	7.50	9.50	9.50	9.50	11.75	11.75	11.75

When bases are ordered drilled other than regular, a template must accompany order.





## BELL AND SPIGOT JOINT CAST IRON FITTINGS



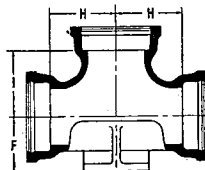
**F-612 Base Tee**  
Bell, Spigot and Bell

### BASE TEES—FOR WATER

**Note**

Base dimensions are the same for both straight tees and tees reducing on branch—determined by size of largest opening.

See page 50 for base dimensions and weights.



**F-614 Base Tee**  
All Bell Ends

### DIMENSIONS AND WEIGHTS

**F-612 and F-614 Straight Sizes\***

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight With Base—Pounds	
			H	J	I	F†	F-612	F-614
<b>SHORT BODY TEES</b>								
3	...	250	5.50	13.50	5.50	4.88	75	85
4	...	250	6.50	14.50	6.50	5.50	105	115
6	...	250	8.00	16.00	8.00	7.00	160	175
8	...	250	9.00	17.00	9.00	8.38	255	270
10	...	250	11.00	19.00	11.00	9.75	380	400
12	...	250	12.00	20.00	12.00	11.25	510	530
<b>LONG BODY TEES</b>								
14	B	86	16.00	28.00	16.00	12.50	650	640
14	D	173	16.00	28.00	16.00	12.50	775	745
16	B	86	17.00	29.00	17.00	13.75	810	805
16	D	173	17.00	29.00	17.00	13.75	985	965
18	B	86	18.00	30.00	18.00	15.00	1000	990
18	D	173	18.00	30.00	18.00	15.00	1230	1200
20	B	86	19.00	31.00	19.00	16.00	1190	1180
20	D	173	19.00	31.00	19.00	16.00	1495	1465
24	B	86	21.00	33.00	21.00	18.50	1610	1585
24	D	173	21.00	33.00	21.00	18.50	2065	2025

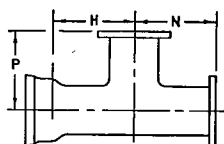
† Dimensions "F" are for machined bases. For bases not machined, add approximately 1/8 inch.

**Bases will be machined and/or drilled ONLY when so ordered.**

### \*BASE TEES REDUCING ON BRANCH

To compute the total weight of tees reducing on the branch, add weight of the Base only (see preceding page) to weight of reducing tee of the size and Class wanted.

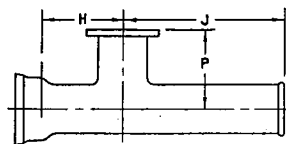
For dimensions and weights of tees, without base, reducing on the branch, see pages 40 and 41.



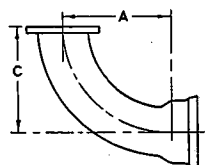
**F-626**

### SPECIAL COMBINATION FITTINGS

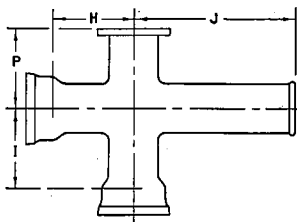
Made to Order Only  
at Additional Cost



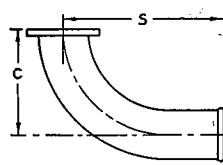
**F-628**



**F-632**



**F-634**



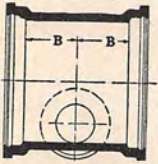
**F-636**

Use standard laying length dimensions (see pages 38 thru 60) whenever possible, and send sketch.

**See page 54 for suggestive use of stock fittings to eliminate need for "specials"**



**BELL AND SPIGOT JOINT CAST IRON FITTINGS  
BLOW-OFF BRANCHES—FOR WATER**

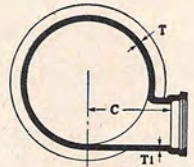


**F-642**

Blow-off Branch

American Water Works Association Standard  
Specification C100

**DIMENSIONS AND WEIGHTS**



**F-642**

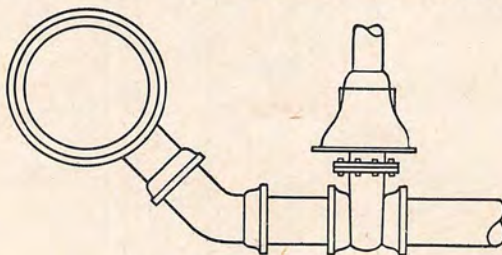
Side Section

**F-642**

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions—Inches				Approx. Weight Pounds
Run	Branch			T	T <sup>1</sup>	B	C	
8	3	D	173	.60	.48	12.00	7.00	225
8	4	D	173	.60	.52	12.00	7.00	230
10	3	D	173	.68	.48	12.00	8.00	290
10	4	D	173	.68	.52	12.00	8.00	300
10	6	D	173	.68	.55	12.00	8.00	310
12	3	D	173	.75	.48	12.00	10.00	365
12	4	D	173	.75	.52	12.00	10.00	370
12	6	D	173	.75	.55	12.00	10.00	385
14	4	B	86	.66	.52	12.00	11.00	415
14	4	D	173	.82	.52	12.00	11.00	480
14	6	B	86	.66	.55	12.00	11.00	425
14	6	D	173	.82	.55	12.00	11.00	495
16	4	B	86	.70	.52	12.00	12.00	510
16	4	D	173	.89	.52	12.00	12.00	605
16	6	B	86	.70	.55	12.00	12.00	525
16	6	D	173	.89	.55	12.00	12.00	620
18	4	B	86	.75	.52	12.00	13.00	600
18	4	D	173	.96	.52	12.00	13.00	730
18	6	B	86	.75	.55	12.00	13.00	615
18	6	D	173	.96	.55	12.00	13.00	740
20	4	B	86	.80	.52	12.00	14.00	700
20	4	D	173	1.03	.52	12.00	14.00	870
20	6	B	86	.80	.55	12.00	14.00	710
20	6	D	173	1.03	.55	12.00	14.00	880
24	6	B	86	.89	.55	12.00	16.00	920
24	6	D	173	1.16	.55	12.00	16.00	1165
24	8	B	86	.89	.60	12.00	16.00	935
24	8	D	173	1.16	.60	12.00	16.00	1175

For other sizes of AWWA LONG BODY FITTINGS see pages 265 thru 281.

**USE REGULAR FITTINGS INSTEAD OF SPECIALS**



Blow-off branches are very special, and their use should be avoided wherever possible. As an alternate, we suggest the use of an all bell regular tee, set with the outlet pointing downward at an angle of 45-degrees, together with a regular 45-degree bell and spigot elbow—as shown above.

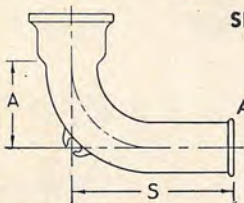




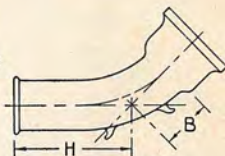
## CAST IRON BENDS WITH LUGS—FOR WATER

### SHORT BODY BELL AND SPIGOT PATTERNS\*

Meet Requirements of  
National Board of Fire Underwriters  
Associated Factory Mutual Fire Insurance Companies  
and  
Factory Insurance Association



**F-730**  
Quarter Bend  
(90°)



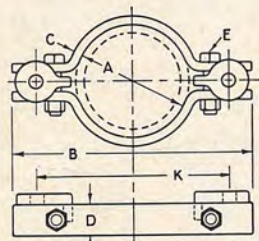
**F-735**  
Eighth Bend  
(45°)

### DIMENSIONS AND WEIGHTS

#### F-730 and F-735

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight—Pounds	
			F-730 90° Bend		F-735 45° Bend		F-730	F-735
			A	S	B	H		
4	D	250	6.50	14.50	4.00	12.00	62	52
6	D	250	8.00	16.00	5.00	13.00	97	87
8	D	250	9.00	17.00	5.50	13.50	142	127
10	D	250	11.00	19.00	6.50	14.50	212	177
12	D	250	12.00	20.00	7.50	15.50	282	247

\* 90° and 45° "C-N" mechanical joint bends can also be furnished with lugs.



**F-740 Socket Clamp**  
For Pipe and Fittings

Two clamp washers are furnished with each socket clamp.

### SOCKET CLAMPS

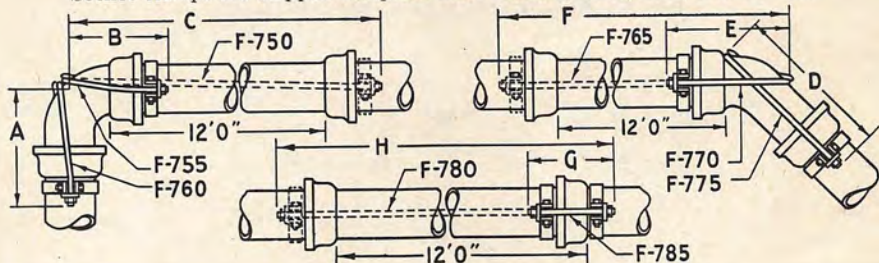
Socket clamps are for use with either straight pipe or quarter and eighth bends.

Bolts E have extra length thread to allow their use either on American Water Works Association Class C or D cast iron pipe, or on Super-deLavaud centrifugally cast iron pipe.

For Pipe or Fitting Size Inches	Dimensions—Inches					
	A	B	C	D	Bolts E	K
4	5	12 $\frac{1}{8}$	$\frac{1}{2}$	2	$\frac{5}{8} \times 3\frac{1}{2}$	10 $\frac{1}{8}$
6	7 $\frac{1}{16}$	14 $\frac{3}{8}$	$\frac{1}{2}$	2	$\frac{5}{8} \times 3\frac{1}{2}$	12 $\frac{1}{16}$
8	9 $\frac{3}{16}$	16 $\frac{5}{8}$	$\frac{1}{2}$	2	$\frac{5}{8} \times 3\frac{1}{2}$	14 $\frac{3}{8}$
10	11 $\frac{3}{8}$	18 $\frac{7}{8}$	$\frac{1}{2}$	2	$\frac{5}{8} \times 3\frac{1}{2}$	16 $\frac{9}{16}$
12	13 $\frac{1}{2}$	21 $\frac{1}{4}$	$\frac{1}{2}$	2	$\frac{5}{8} \times 3\frac{1}{2}$	18 $\frac{3}{16}$

### SOCKET CLAMPS WITH TIE RODS

Illustrations showing application—Order by figure number.  
Socket clamps are shipped complete with washers, bolts, nuts, and tie rods.



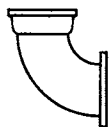
Nominal Diameter Inches	Dimensions—Inches							
	A	B	C†	D	E	F†	G	H†
4	21 $\frac{1}{2}$	16	160	22	18	162	16	160
6	23 $\frac{1}{2}$	18	162	24 $\frac{1}{2}$	20	164	16	160
8	25	20	164	26	24	168	16	160
10	27	22	166	29	25	169	16	160
12	28	23 $\frac{1}{2}$	168	32	27 $\frac{3}{4}$	172	16	160

† Based on 12'0" length pipe. For longer or shorter pipe, add or deduct from figures shown.

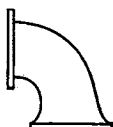


## USE REGULAR STANDARD FITTING COMBINATIONS INSTEAD OF ORDERING SPECIAL CASTINGS

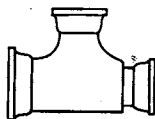
### WHEN THESE FITTINGS ARE REQUIRED



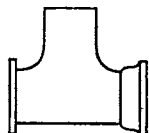
**A**  
Bell and Flange  
90° Bend



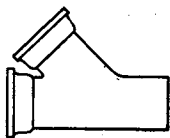
**B**  
Flange and  
Flare 90° Bend



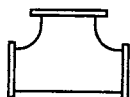
**C**  
All Bell Tee  
Reducing on Run



**D**  
Flange, Bell  
and Spigot Tee



**E**  
Bell, Spigot  
and Bell Wye\*



**F**  
Bull-Head  
Tee



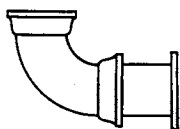
**G**  
Flanged  
Return Bend



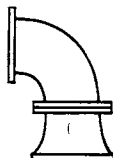
**H**  
Bell and  
Spigot Offset

\* Wye branches are comparatively weak fittings.

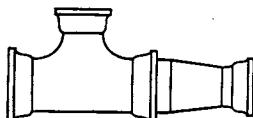
### MAKE THEM ON THE JOB WITH REGULAR FITTINGS



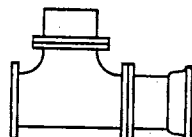
**A**  
F-406 and F-1300



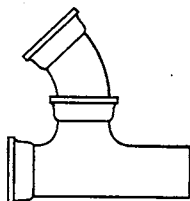
**B**  
F-802 and F-1440



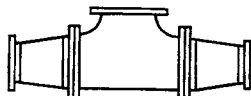
**C**  
F-506 and F-582



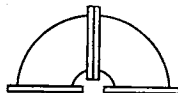
**D**  
F-822, F-1300 & F-1320



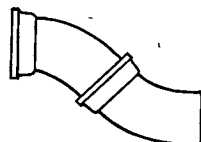
**E**  
F-417 and F-502



**F**  
F-832, F-822 & F-832



**G**  
F-802 and F-802



**H**  
F-417 and F-417

### Regular Fittings Identified by Clow Numbers

The illustrations at top of page show typical examples of fittings with combinations of bell, spigot, and flange connections. Such fittings are special and must be made to order at an additional cost and, also, require extra time to produce. At the bottom of page are shown combinations of our regular fittings which can be used to obtain the same type connections as on the specials. These regular fittings can

usually be shipped promptly from stock and their *installed cost* will be less than the cost of made-to-order specials.

If, because of "fixed" laying length requirements, special castings must be made, inquiries or orders must be accompanied by sketch indicating size, type of connection, and the exact laying dimension from the center lines of the fitting for each opening.





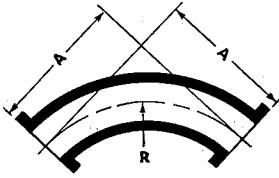
## FLANGED JOINT CAST IRON FITTINGS—FOR WATER

Specifications

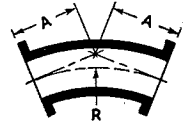
AWWA C100 Body Dimensions and ASA B16.1 Class 125 Flanges

### BENDS

Furnished Faced and Drilled  
Per Template on page 101.



**F-802**  
(90°) Quarter Bend

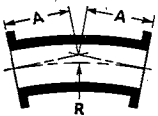


**F-804**  
(45°) Eighth Bend

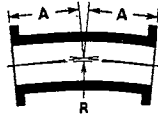
### DIMENSIONS AND WEIGHTS

#### F-802 and F-804

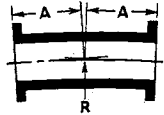
Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches				Approximate Weight Pounds	
			F-802 90°		F-804 45°		F-802	F-804
			A	R	A	R		
6	D	173	16.00	16.00	9.94	24.00	100	80
8	D	173	16.00	16.00	9.94	24.00	145	125
10	D	173	16.00	16.00	9.94	24.00	205	170
12	D	173	16.00	16.00	9.94	24.00	285	240
14	B	86	18.00	18.00	14.91	36.00	330	330
14	D	173	18.00	18.00	14.91	36.00	380	385
16	B	86	24.00	24.00	14.91	36.00	495	405
16	D	173	24.00	24.00	14.91	36.00	590	475
18	B	86	24.00	24.00	14.91	36.00	575	465
18	D	173	24.00	24.00	14.91	36.00	690	550
20	B	86	24.00	24.00	19.88	48.00	690	690
20	D	173	24.00	24.00	19.88	48.00	830	830
24	B	86	30.00	30.00	24.85	60.00	1105	1105
24	D	173	30.00	30.00	24.85	60.00	1350	1350



**F-806**  
(22½°) Sixteenth Bend



**F-809**  
(11¼°) Thirty-second Bend



**F-812**  
(5½°) Sixty-fourth Bend

#### F-806, F-809 and F-812

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches						Approximate Weight Pounds		
			F-806 22½°		F-809 11¼°		F-812 5½°		F-806	F-809	F-812
			A	R	A	R	A	R			
6	D	173	9.55	48.00	11.82	120.00	...	...	80	95	...
8	D	173	9.55	48.00	11.82	120.00	...	...	125	145	...
10	D	173	9.55	48.00	11.82	120.00	...	...	170	195	...
12	D	173	9.55	48.00	11.82	120.00	...	...	240	270	...
14	B	86	14.32	72.00	17.73	120.00	...	...	330	385	...
14	D	173	14.32	72.00	17.73	120.00	...	...	385	455	...
16	B	86	14.32	72.00	17.73	120.00	...	...	405	470	...
16	D	173	14.32	72.00	17.73	120.00	...	...	475	565	...
18	B	86	14.32	72.00	17.73	120.00	...	...	465	545	...
18	D	173	14.32	72.00	17.73	120.00	...	...	550	655	...
20	B	86	19.10	96.00	23.64	240.00	23.58	480.00	690	820	820
20	D	173	19.10	96.00	23.64	240.00	23.58	480.00	830	1000	1000
24	B	86	23.87	120.00	23.64	240.00	23.58	480.00	1105	1105	1105
24	D	173	23.87	120.00	23.64	240.00	23.58	480.00	1350	1345	1345

For American Standard Class 125 flanged fittings for steam, see pages 97 thru 118.



**FLANGED JOINT CAST IRON FITTINGS—FOR WATER**

Specifications

AWWA C100 Body Dimensions and ASA B16.1 Class 125 Flanges



**F-822 Tee**

**TEES AND CROSSES**

Furnished Faced and Drilled  
Per Template on page 101.



**F-824 Cross**

**DIMENSIONS AND WEIGHTS**

**F-822 and F-824**

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions Inches		Approximate Weight—Pounds	
Run	Branch			N	P	F-822	F-824
6	4	D	173	12.00	12.00	120	145
6	6	D	173	12.00	12.00	135	165
8	4	D	173	13.00	13.00	180	205
8	6	D	173	13.00	13.00	185	225
8	8	D	173	13.00	13.00	200	260
10	4	D	173	14.00	14.00	245	270
10	6	D	173	14.00	14.00	260	295
10	8	D	173	14.00	14.00	275	320
10	10	D	173	14.00	14.00	290	360
12	4	D	173	15.00	15.00	345	370
12	6	D	173	15.00	15.00	350	385
12	8	D	173	15.00	15.00	370	420
12	10	D	173	15.00	15.00	395	455
12	12	D	173	15.00	15.00	415	515
14	4	B	86	16.00	16.00	400	425
14	4	D	173	16.00	16.00	460	485
14	6	B	86	16.00	16.00	410	445
14	6	D	173	16.00	16.00	470	500
14	8	B	86	16.00	16.00	425	485
14	8	D	173	16.00	16.00	490	535
14	10	B	86	16.00	16.00	450	520
14	10	D	173	16.00	16.00	500	565
14	12	B	86	16.00	16.00	475	585
14	12	D	173	16.00	16.00	525	625
14	14	B	86	16.00	16.00	485	600
14	14	D	173	16.00	16.00	555	675
16	4	B	86	17.00	17.00	500	525
16	4	D	173	17.00	17.00	595	615
16	6	B	86	17.00	17.00	510	545
16	6	D	173	17.00	17.00	600	625
16	8	B	86	17.00	17.00	530	580
16	8	D	173	17.00	17.00	610	665
16	10	B	86	17.00	17.00	550	620
16	10	D	173	17.00	17.00	630	695
16	12	B	86	17.00	17.00	580	680
16	12	D	173	17.00	17.00	655	745
16	14	B	86	17.00	17.00	580	695
16	14	D	173	17.00	17.00	680	790
16	16	B	86	17.00	17.00	610	745
16	16	D	173	17.00	17.00	715	855
18	4	B	86	18.00	18.00	600	625
18	4	D	173	18.00	18.00	715	740
18	6	B	86	18.00	18.00	610	645
18	6	D	173	18.00	18.00	715	750
18	8	B	86	18.00	18.00	625	675
18	8	D	173	18.00	18.00	735	785
18	10	B	86	18.00	18.00	645	715
18	10	D	173	18.00	18.00	755	815

Continued on next page.



## FLANGED JOINT CAST IRON FITTINGS—FOR WATER

### TEES AND CROSSES

Reducing tees and crosses are regularly furnished reducing on the branch only.  
Fittings reducing on the run will be made to order.

#### F-822 and F-824

(Continued from preceding page)

Nominal Diameter Inches		Class	Working Pressure psi	Dimensions Inches		Approximate Weight—Pounds	
Run	Branch			N	P	F-822	F-824
18	12	B	86	18.00	18.00	670	770
18	12	D	173	18.00	18.00	785	870
18	14	B	86	18.00	18.00	680	785
18	14	D	173	18.00	18.00	795	900
18	16	B	86	18.00	18.00	700	825
18	16	D	173	18.00	18.00	825	955
18	18	B	86	18.00	18.00	720	870
18	18	D	173	18.00	18.00	850	1005
20	6	B	86	19.00	19.00	755	790
20	6	D	173	19.00	19.00	895	930
20	8	B	86	19.00	19.00	780	825
20	8	D	173	19.00	19.00	915	960
20	10	B	86	19.00	19.00	790	855
20	10	D	173	19.00	19.00	925	990
20	12	B	86	19.00	19.00	820	910
20	12	D	173	19.00	19.00	955	1040
20	14	B	86	19.00	19.00	820	920
20	14	D	173	19.00	19.00	970	1075
20	16	B	86	19.00	19.00	845	960
20	16	D	173	19.00	19.00	1000	1130
20	18	B	86	19.00	19.00	860	995
20	18	D	173	19.00	19.00	1015	1165
20	20	B	86	19.00	19.00	890	1070
20	20	D	173	19.00	19.00	1055	1245
24	6	B	86	21.00	21.00	1080	1115
24	6	D	173	21.00	21.00	1305	1335
24	8	B	86	21.00	21.00	1095	1140
24	8	D	173	21.00	21.00	1315	1360
24	10	B	86	21.00	21.00	1115	1185
24	10	D	173	21.00	21.00	1330	1385
24	12	B	86	21.00	21.00	1140	1225
24	12	D	173	21.00	21.00	1355	1430
24	14	B	86	21.00	21.00	1140	1230
24	14	D	173	21.00	21.00	1365	1465
24	16	B	86	21.00	21.00	1165	1280
24	16	D	173	21.00	21.00	1390	1510
24	18	B	86	21.00	21.00	1170	1295
24	18	D	173	21.00	21.00	1400	1535
24	20	B	86	21.00	21.00	1200	1365
24	20	D	173	21.00	21.00	1435	1600
24	24	B	86	21.00	21.00	1270	1500
24	24	D	173	21.00	21.00	1520	1755

For American Standard Class 125 flanged fittings for *steam*, see pages 97 thru 118.

#### LATERALS

There is no recognized *standard* for flanged laterals made to AWWA dimensions. Consequently, these fittings have been omitted from this section of our catalogue. Where flanged laterals are required, we refer you to the ASA Class 125 fittings. See page 110.

Because of the inherent weakness of a lateral's design, we recommend a combination of tees and bends be substituted—wherever possible.



For suggestions for using standard fittings instead of specials, see page 54.

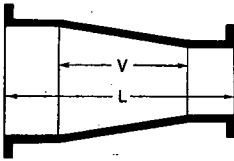


## FLANGED JOINT CAST IRON FITTINGS—FOR WATER

Specifications  
AWWA C100 Body Dimensions and ASA B16.1 Class 125 Flanges

### REDUCERS

#### F-832 DIMENSIONS AND WEIGHTS



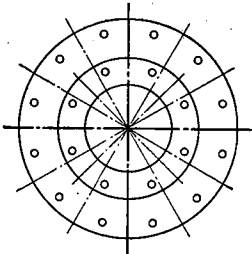
F-832 Reducer

Furnished Faced & Drilled  
Per  
Template on Page 101.

#### CAUTION

On a standard concentric flanged reducer, with a different number of holes in the two flanges, there are only two center lines which are common to the drilling in both flanges.

See below.



When installing, BE SURE reducer is properly lined up, so that drilling in both flanges will match correctly with other fittings and pipe in line.

For  
American Standard  
Class 125  
Flanged Fittings  
For Steam  
see pages 97 thru 118.

Nominal Diameter Inches		Class	Working Pressure psi	Dimension Inches		Approx. Weight Pounds
Large End	Small End			L	V	
6	4	D	173	26.00	18.00	90
8	4	D	173	26.00	18.00	110
8	6	D	173	26.00	18.00	130
10	4	D	173	26.00	18.00	135
10	6	D	173	26.00	18.00	155
10	8	D	173	26.00	18.00	185
12	4	D	173	26.00	18.00	175
12	6	D	173	26.00	18.00	195
12	8	D	173	26.00	18.00	220
12	10	D	173	26.00	18.00	250
14	6	B	86	28.00	20.00	215
14	6	D	173	28.00	20.00	240
14	8	B	86	28.00	20.00	245
14	8	D	173	28.00	20.00	265
14	10	B	86	28.00	20.00	275
14	10	D	173	28.00	20.00	300
14	12	B	86	28.00	20.00	320
14	12	D	173	28.00	20.00	340
16	6	B	86	28.00	20.00	250
16	6	D	173	28.00	20.00	280
16	8	B	86	28.00	20.00	280
16	8	D	173	28.00	20.00	305
16	10	B	86	28.00	20.00	315
16	10	D	173	28.00	20.00	340
16	12	B	86	28.00	20.00	355
16	12	D	173	28.00	20.00	385
16	14	B	86	28.00	20.00	365
16	14	D	173	28.00	20.00	425
18	8	B	86	28.00	20.00	310
18	8	D	173	28.00	20.00	345
18	10	B	86	28.00	20.00	345
18	10	D	173	28.00	20.00	375
18	12	B	86	28.00	20.00	385
18	12	D	173	28.00	20.00	425
18	14	B	86	28.00	20.00	395
18	14	D	173	28.00	20.00	460
18	16	B	86	28.00	20.00	430
18	16	D	173	28.00	20.00	505
20	10	B	86	34.00	26.00	445
20	10	D	173	34.00	26.00	500
20	12	B	86	34.00	26.00	495
20	12	D	173	34.00	26.00	550
20	14	B	86	34.00	26.00	505
20	14	D	173	34.00	26.00	600
20	16	B	86	34.00	26.00	545
20	16	D	173	34.00	26.00	655
20	18	B	86	34.00	26.00	585
20	18	D	173	34.00	26.00	700
24	14	B	86	34.00	26.00	610
24	14	D	173	34.00	26.00	725
24	16	B	86	34.00	26.00	655
24	16	D	173	34.00	26.00	780
24	18	B	86	34.00	26.00	690
24	18	D	173	34.00	26.00	835
24	20	B	86	34.00	26.00	750
24	20	D	173	34.00	26.00	900



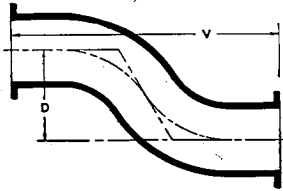


**FLANGED JOINT CAST IRON FITTINGS—FOR WATER**

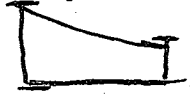
Specifications  
AWWA C100 Body Dimensions and ASA B16.1 Class 125 Flanges

**OFFSETS**

Flange and spigot or flange and bell offsets can also be furnished—made to order.



**F-838 Offset**



For bell and spigot offsets, see page 46; for mechanical joint offsets, see page 70.

**DIMENSIONS AND WEIGHTS**

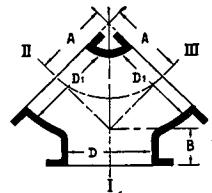
Nominal Diameter Inches	Class	Working Pressure psi	Dimensions Inches		Approx. Weight Pounds	Nominal Diameter Inches	Class	Working Pressure psi	Dimensions Inches		Approx. Weight Pounds
			D	V					D	V	
3	D	173	6	23.50	45	12	D	173	6	30.00	330
3	D	173	12	26.50	55	12	D	173	12	41.00	430
3	D	173	18	34.50	65	12	D	173	18	52.00	530
4	D	173	6	23.00	65	14	B	86	6	31.00	365
4	D	173	12	26.00	75	14	B	86	12	42.00	465
4	D	173	18	34.00	95	14	B	86	18	53.00	570
6	D	173	6	24.00	100	14	D	173	6	31.00	420
6	D	173	12	30.00	125	14	D	173	12	42.00	545
6	D	173	18	37.00	155	14	D	173	18	53.00	675
8	D	173	6	25.00	155	16	B	86	6	31.00	440
8	D	173	12	32.00	195	16	B	86	12	44.00	580
8	D	173	18	39.00	235	16	B	86	18	54.00	690
10	D	173	6	26.00	215	16	D	173	6	31.00	520
10	D	173	12	34.00	275	16	D	173	12	44.00	700
10	D	173	18	42.00	335	16	D	173	18	54.00	845

Regularly furnished with flanges faced and drilled per template on page 101.  
For making offsets on the job, see page 61.

**TRUE "Y" BRANCHES**  
Manufacturer's Standard

**F-844 DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches*		Class	Working Pressure psi	Dimensions Inches		Approx. Weight Pounds
D	D <sub>1</sub>			A	B	
3	3	125	175	5.50	3.00	30
4	3	125	175	5.50	3.00	35
4	4	125	175	6.50	3.00	55
6	3	125	175	5.50	3.50	55
6	4	125	175	6.50	3.50	60
6	6	125	175	8.00	3.50	90
8	4	125	175	6.50	4.50	85
8	6	125	175	8.00	4.50	100
8	8	125	175	9.00	4.50	140
10	6	125	175	8.00	5.00	140
10	8	125	175	9.00	5.00	155
10	10	125	175	11.00	5.00	220
12	6	125	175	8.00	5.50	160
12	8	125	175	9.00	5.50	210
12	10	125	175	11.00	5.50	240
12	12	125	175	12.00	5.50	315



**F-844**  
True "Y"—Class 125

**Note**

When ordering reducing fittings, give size of openings in the order indicated by numerals I, II and III.

\* Larger sizes can be made to order. Detailed information and prices furnished on request.



## FLANGED JOINT CAST IRON FITTINGS—FOR WATER

### Specifications

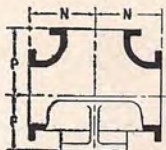
AWWA C100 Body Dimensions and ASA B16.1 Class 125 Flanges



**F-848 Base Bend**

### BASE BENDS AND TEES

Base will be machined and/or drilled ONLY when so ordered.



**F-852 Base Tee**

### DIMENSIONS AND WEIGHTS

F-848 and F-852 Straight Sizes

Nominal Diameter Inches	Class	Working Pressure psi	Dimensions—Inches					Approx. Weight With Base—Lbs.	
			A	R	N	P	F*	F-848	F-852
6	D	173	16.00	16.00	12.00	12.00	7.00	135	150
8	D	173	16.00	16.00	13.00	13.00	8.38	205	230
10	D	173	16.00	16.00	14.00	14.00	9.75	270	320
12	D	173	16.00	16.00	15.00	15.00	11.25	370	460
14	B	86	18.00	18.00	16.00	16.00	12.50	425	535
14	D	173	18.00	18.00	16.00	16.00	12.50	475	605
16	B	86	24.00	24.00	17.00	17.00	13.75	605	660
16	D	173	24.00	24.00	17.00	17.00	13.75	700	765
18	B	86	24.00	24.00	18.00	18.00	15.00	730	795
18	D	173	24.00	24.00	18.00	18.00	15.00	845	925
20	B	86	24.00	24.00	19.00	19.00	16.00	850	965
20	D	173	24.00	24.00	19.00	19.00	16.00	990	1130
24	B	86	30.00	30.00	21.00	21.00	18.50	1280	1350
24	D	173	30.00	30.00	21.00	21.00	18.50	1525	1600

\* Dimensions "F" are for machined base. For bases not machined, add approximately 1/8 inch.

Body flanges are furnished faced and drilled per template on page 101.

### TEES REDUCING ON BRANCH

To compute the total weight of tees reducing on the branch, add weight of Base Only for Tees (see table below) to the weight of reducing tee of the size and Class wanted. For dimensions and weights of tees reducing on the branch—without base, see pages 56 and 57.

### WEIGHTS OF BASES ONLY

Fitting size . . . . . Inches	6	8	10	12	14	16	18	20	24
For 90° Bends . . . . . Pounds	35	60	65	85	95	110	155	160	175
For Tees . . . . . Pounds	15	30	30	45	50	50	75	75	80

### ROUND BASE

#### Note

Base dimensions are the same for both straight tees and tees reducing on branch—determined by size of largest opening.



### DIMENSIONS

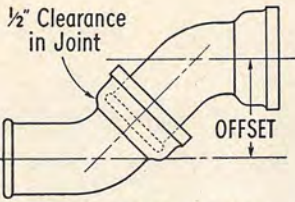
Fitting size . . . . . Inches	6	8	10	12	14	16	18	20	24
Supporting pipe size . . . . . Inches	2 1/2	4	4	6	6	6	8	8	8
Thickness T . . . . . Inches	.69	.94	.94	1.00	1.00	1.00	1.12	1.12	1.12
Thickness U . . . . . Inches	.62	.88	.88	1.00	1.00	1.00	1.12	1.12	1.12
Diameter X . . . . . Inches	7.00	9.00	9.00	11.00	11.00	11.00	13.50	13.50	13.50
Number of holes in base . . . . .	4	4	4	4	4	4	4	4	4
Size of holes . . . . . Inches	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8	7/8
Diameter BC . . . . . Inches	5.50	7.50	7.50	9.50	9.50	9.50	11.75	11.75	11.75

When bases are ordered drilled other than regular, a template must accompany order.

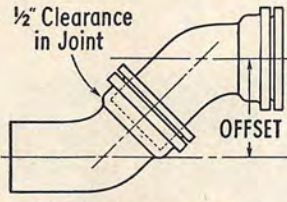




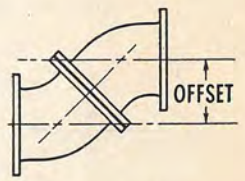
**MAKING OFFSETS ON THE JOB**



Bell and Spigot Joint



"C-N" Mechanical Joint



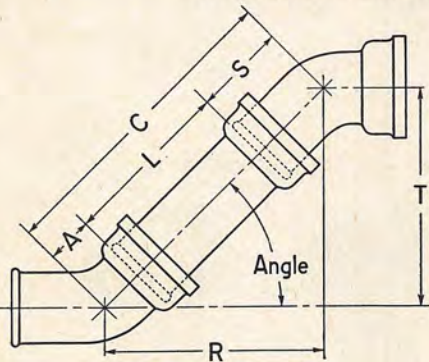
Flanged Joint\*

**Using Two Bends—Offset in Inches**

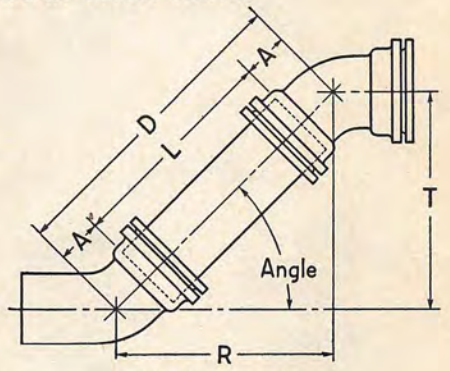
Nominal Diameter Inches	Short Body ASA A21.10 B & S and "C-N"			Long Body AWWA C100 Bell and Spigot			Flanged ASA Class 125			
	90°	45°	22½°	90°	45°	22½°	Short Radius			90°
							90°	45°	22½°	
3	19.50	10.25	5.56	40.50	18.65	9.80	11.00	4.24	2.30	15.50
4	21.50	11.69	6.31	40.50	18.65	9.80	13.00	5.66	3.06	18.00
6	24.50	13.06	7.06	40.50	18.65	9.80	16.00	7.07	3.83	23.00
8	26.50	13.75	7.50	42.50	18.65	9.80	18.00	7.78	4.21	28.00
10	30.50	15.19	8.25	44.50	18.65	9.80	22.00	9.19	4.98	33.00
12	32.50	16.62	9.00	44.50	18.65	9.80	24.00	10.61	5.74	38.00
14	36.50	16.62	8.99	48.50	25.69	11.13	28.00	10.61	5.74	43.00
16	38.50	17.32	9.38	60.50	25.69	11.13	30.00	11.31	6.12	48.00
18	41.50	18.03	9.76	60.50	25.69	11.13	33.00	12.02	6.51	53.00
20	44.50	19.45	10.52	60.50	32.75	14.81	36.00	13.44	7.27	58.00
24	52.50	21.57	11.67	72.50	39.75	18.44	44.00	15.56	8.42	68.00

\* No allowance is made in offset figures for gasket thickness.

**DETERMINING LENGTH OF PIPE IN OFFSET JOINTS**



Bell and Spigot Joint



"C-N" Mechanical Joint

Angle	C Equals	R Equals	L† Equals
45°	T x 1.414	T x 1.000	C-(A+S)
22½°	T x 2.613	T x 2.414	C-(A+S)
11¼°	T x 5.126	T x 5.027	C-(A+S)

Angle	D Equals	R Equals	L† Equals
45°	T x 1.414	T x 1.000	D-2A
22½°	T x 2.613	T x 2.414	D-2A
11¼°	T x 5.126	T x 5.027	D-2A

† Cut the pipe somewhat shorter than theoretical to allow for some slight clearance in the joints.

**Problem**

A 14-inch bell and spigot line is to be offset 14 feet on an angle of 45-degrees using two bell and spigot bends. What is the laying length (L) of pipe required to make the connection between the two bends?

**Solution**

$$C(14'0'' \times 1.414) = 19.796' \quad R(14'0'' \times 1.000) = 14.000' \quad A(14.91') = 1.2425' \quad S(20.91') = 1.7425'$$

$$L(19.796' - 2.985') = 16.811' \text{ or approximately } 16'9\frac{5}{8}' \text{, laying length of connecting pipe.}$$

Note: For dimensions of bends, see pages 38 and 39; 64 and 65; 102 thru 104; and 266 thru 268.

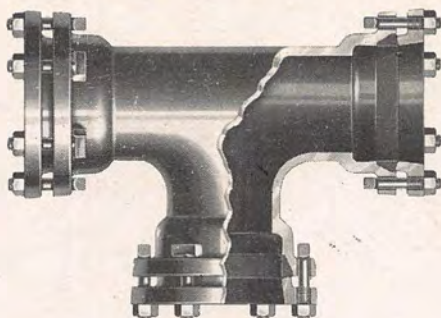




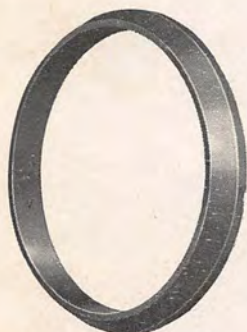
**"C-N" MECHANICAL JOINT ACCESSORIES**

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

For Use With  
F-122 and F-132  
"C-N"  
Mechanical Joint  
Cast Iron Pipe  
Or Any  
Plain End Pipe  
Of Like  
Outside Diameter



"C-N" Fittings  
Are Always  
Shipped Complete  
With  
Joint Accessories  
Unless  
Otherwise Noted  
On  
Following Pages



F-915 "C-N" Gasket  
Illustration Shows Style A



"C-N" Gland



F-918  
"C-N" Mechanical Joint Bolt  
Bolts furnished with "C-N"  
joints are high-strength, heat-  
treated *cast iron* with tee-head  
and hexagon nut.

**Note**  
For ratchet wrenches and in-  
structions for use, see page 72.

**CROSS SECTIONAL VIEWS OF STANDARD "C-N" GASKETS**



Style A



Style B



Style C



Style D

**Style A-Plain Rubber.** For water, sewage, dilute alkalis and acid—for temperatures not exceeding 200 degrees F. This is the standard gasket.

**Style B-Duck-Tipped Rubber** gaskets can be furnished.

**Style C-Lead-Tipped Rubber** gaskets can be furnished for water service where electrical thawing may be required.

**Style D-Armor-Tipped Rubber** gaskets can be furnished for manufactured gas, etc., and for temperatures up to 250 degrees F.

**Other Gaskets Available**

Gaskets tipped with thiokol-impregnated duck, synthetic rubber compounds, and other materials can be furnished for special services. Duck reinforcement can be applied to the back of such gaskets. Neoprene gaskets are available for oil service. Asbestos gaskets can be furnished for operating conditions between 250 and 450 degrees F.

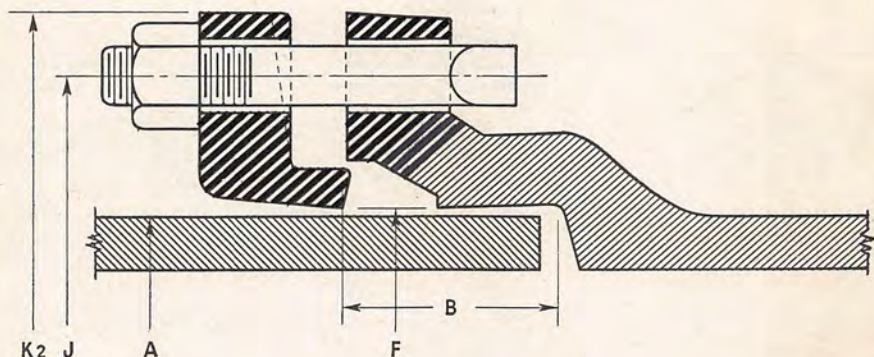
*Style A, Plain Rubber gaskets will always be furnished unless otherwise ordered.*





## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications



"C-N" Mechanical Joint for Pipe and Fittings

### ALL DIMENSIONS ARE IN INCHES

Size	Dimensions					Bolts Per Joint	Accessories Wgt. in Lbs.†
	A	B	F	J	K <sub>2</sub> *		
3	3.96	2.50	4.06	6.19	7.69	4- <sup>5</sup> / <sub>8</sub> x3	7
4	4.80	2.50	4.90	7.50	9.12	4- <sup>3</sup> / <sub>4</sub> x3 1/2	10
6	6.90	2.50	7.00	9.50	11.12	6- <sup>3</sup> / <sub>4</sub> x3 1/2	16
8	9.05	2.50	9.15	11.75	13.37	6- <sup>3</sup> / <sub>4</sub> x4	25
10	11.10	2.50	11.20	14.00	15.62	8- <sup>3</sup> / <sub>4</sub> x4	30
12	13.20	2.50	13.30	16.25	17.88	8- <sup>3</sup> / <sub>4</sub> x4	40
14	15.30	3.50	15.44	18.75	20.25	10- <sup>3</sup> / <sub>4</sub> x4	45
16	17.40	3.50	17.54	21.00	22.50	12- <sup>3</sup> / <sub>4</sub> x4 1/2	55
18	19.50	3.50	19.64	23.25	24.75	12- <sup>3</sup> / <sub>4</sub> x4 1/2	65
20	21.60	3.50	21.74	25.50	27.00	14- <sup>3</sup> / <sub>4</sub> x4 1/2	85
24	25.80	3.50	25.94	30.00	31.50	16- <sup>3</sup> / <sub>4</sub> x5	105

\* K<sub>2</sub> is outside diameter of glands across bolt holes.

† Shows total weight of gland, gasket, and a set of bolts required to complete one joint.

The "C-N" mechanical joint is a bolted joint of the stuffing-box type, as shown in the above illustration. Each joint consists of: (1) a bell cast integrally with the pipe or fitting and provided with an exterior flange having cored or drilled bolt holes and interior annular recesses for the sealing gasket and the plain (spigot) end of the pipe or fitting; (2) a plain (spigot) end of pipe or fitting; (3) a sealing gasket; (4) a separate cast iron follower gland having cored or drilled holes; and (5) cast iron tee-head bolts and hexagon nuts.

The "C-N" mechanical joint is designed to permit normal expansion, contraction, and deflection of the pipe line after installation. For table of joint deflections and recommended practice for making joints see Page 22.

The successful operation of the mechanical joint requires that the plain (spigot) end be centrally located in the bell and that adequate anchorage shall be provided where abrupt changes in direction and dead ends occur.

The rubber gasket seals most effectively (particularly when sealing gas), if the surfaces with which it comes in contact are brushed thoroughly with a wire brush just prior to assembly. This thorough brushing removes all loose rust or foreign material which may be present and provides clean surfaces which should be brushed with soapy water just prior to slipping the gasket over the plain (spigot) end and into the bell. Soapy water brushed over the gasket prior to installation also removes loose dirt and lubricates the gasket as it is forced into its retaining space.

#### Note

Unless specifically ordered otherwise, "C-N" mechanical joint bends, tees, and crosses will always be furnished with MJ BELL on ALL openings. Accessories—gland, gasket, and bolts—are not assembled on pipe and fittings when shipped.



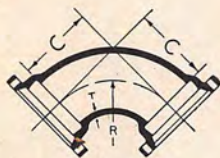


## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

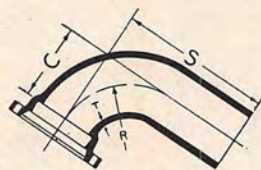
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

### BENDS

For Use with  
F-122 and F-132  
Mechanical Joint Pipe  
or any  
Plain End Pipe of  
Same Outside Diameter



**F-925**  
(90°) Quarter Bend  
MJ and MJ



**F-927**  
(90°) Quarter Bend  
MJ and PE

### DIMENSIONS AND WEIGHTS

#### F-925 and F-927

Nominal Diameter Inches	Class *	Dimensions—Inches				Approximate Weight—Pounds			
						With Joint Accessories		Body Casting Only	
		T	C	S	R	F-925	F-927	F-925	F-927
3	250	.48	5.5	13.5	4.00	50	40	35	35
4	250	.52	6.5	14.5	4.50	75	60	55	50
6	250	.55	8.0	16.0	6.00	115	95	85	80
8	250	.60	9.0	17.0	7.00	175	145	125	120
10	250	.68	11.0	19.0	9.00	250	220	190	190
12	250	.75	12.0	20.0	10.00	335	295	255	255
14	150	.66	14.0	22.0	11.50	430	370	340	325
16	150	.70	15.0	23.0	12.50	540	465	430	410
18	150	.75	16.5	24.5	14.00	675	585	545	520
20	150	.80	18.0	26.0	15.50	850	735	680	650
24	150	.89	22.0	30.0	18.50	1235	1090	1025	985

For Base Bends, see page 73.



**F-930**  
45° Eighth Bend  
MJ and MJ

"C-N" Fittings  
are  
Furnished Complete  
with  
Joint Accessories



**F-932**  
45° Eighth Bend  
MJ and PE

#### F-930 and F-932

Nominal Diameter Inches	Class *	Dimensions—Inches				Approximate Weight—Pounds			
						With Joint Accessories		Body Casting Only	
		T	C	S	R	F-930	F-932	F-930	F-932
3	250	.48	3.0	11.0	3.62	45	35	30	30
4	250	.52	4.0	12.0	4.81	70	55	50	45
6	250	.55	5.0	13.0	7.25	105	85	75	70
8	250	.60	5.5	13.5	8.44	160	130	110	105
10	250	.68	6.5	14.5	10.88	215	185	155	155
12	250	.75	7.5	15.5	13.25	295	255	215	215
14	150	.66	7.5	15.5	12.06	360	300	270	255
16	150	.70	8.0	16.0	13.25	450	375	340	320
18	150	.75	8.5	16.5	14.50	550	460	420	395
20	150	.80	9.5	17.5	16.88	700	585	530	500
24	150	.89	11.0	19.0	18.12	965	820	755	715

\* Indicates maximum working pressure.

#### Note

90° and 45° bends, sizes 3" thru 12", can also be furnished with lugs, see page 53.  
For "C-N" Pipe for water, see page 20.

For "C-N" Pipe for gas, see page 23.





Inc.

## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

### BENDS

For Use with  
F-122 and F-132  
Mechanical Joint Pipe  
or any  
Plain End Pipe of  
Same Outside Diameter



**F-935**  
(22½°) Sixteenth Bend  
MJ and MJ

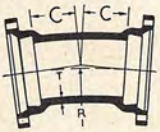


**F-936**  
(22½°) Sixteenth Bend  
MJ and PE

### DIMENSIONS AND WEIGHTS

#### F-935 and F-936

Nominal Diameter Inches	Class *	Dimensions—Inches				Approximate Weight—Pounds			
		T	C	S	R	With Joint Accessories		Body Casting Only	
						F-935	F-936	F-935	F-936
3	250	.48	3.0	11.0	7.56	45	35	30	30
4	250	.52	4.0	12.0	10.06	70	55	50	45
6	250	.55	5.0	13.0	15.06	105	85	75	70
8	250	.60	5.5	13.5	17.62	160	130	110	105
10	250	.68	6.5	14.5	22.62	220	190	160	160
12	250	.75	7.5	15.5	27.62	300	260	220	220
14	150	.66	7.5	15.5	25.12	365	305	275	260
16	150	.70	8.0	16.0	27.62	455	380	345	325
18	150	.75	8.5	16.5	30.19	560	470	430	405
20	150	.80	9.5	17.5	35.19	705	590	535	505
24	150	.89	11.0	19.0	37.69	975	830	765	725



**F-937**  
(11¼°) Thirty-Second Bend  
MJ and MJ

"C-N" Fittings  
are  
Furnished Complete  
with  
Joint Accessories



**F-938**  
(11¼°) Thirty-Second Bend  
MJ and PE

#### F-937 and F-938

Nominal Diameter Inches	Class *	Dimensions—Inches				Approximate Weight—Pounds			
		T	C	S	R	With Joint Accessories		Body Casting Only	
						F-937	F-938	F-937	F-938
3	250	.48	3.0	11.0	15.25	45	35	30	30
4	250	.52	4.0	12.0	20.31	70	55	50	45
6	250	.55	5.0	13.0	30.50	105	85	75	70
8	250	.60	5.5	13.5	35.50	160	130	110	105
10	250	.68	6.5	14.5	45.69	220	190	160	160
12	250	.75	7.5	15.5	55.81	300	260	220	220
14	150	.66	7.5	15.5	50.75	365	305	275	260
16	150	.70	8.0	16.0	55.81	455	380	345	325
18	150	.75	8.5	16.5	60.94	560	470	430	405
20	150	.80	9.5	17.5	71.06	710	595	540	510
24	150	.89	11.0	19.0	76.12	980	835	770	730

\*Indicates maximum working pressure.

#### Note

Unless otherwise ordered, "C-N" fittings will be furnished tar-coated inside and out. Fittings uncoated, and fittings tar-coated outside and cement-lined or Enamelled inside are also available.



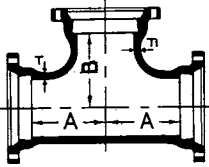
# JAMES B. CLOW & SONS

Inc.



## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

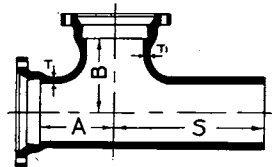
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications



**F-940 Tee**  
MJ, MJ and MJ

### TEES

For Use with  
F-122 and F-132  
Mechanical Joint Pipe  
or any  
Plain End Pipe of  
Same Outside Diameter



**F-942 Tee**  
MJ, PE and MJ

### DIMENSIONS AND WEIGHTS F-940 and F-942

Nominal Diameter Inches		Class *	Dimensions—Inches					Approximate Weight—Pounds			
Run	Branch		T	T <sub>1</sub>	A	B	S	With Joint Accessories		Body Castings Only	
								F-940	F-942	F-940	F-942
3	3	250	.48	.48	5.5	5.5	13.5	75	70	55	55
4	3	250	.52	.48	6.5	6.5	14.5	100	85	75	70
4	4	250	.52	.52	6.5	6.5	14.5	110	95	80	75
6	3	250	.55	.48	8	8	16	150	130	110	105
6	4	250	.55	.52	8	8	16	155	135	115	110
6	6	250	.55	.55	8	8	16	175	150	125	120
8	4	250	.60	.52	9	9	17	225	195	165	160
8	6	250	.60	.55	9	9	17	240	210	175	170
8	8	250	.60	.60	9	9	17	260	230	185	180
10	4	250	.68	.52	11	11	19	305	275	235	235
10	6	250	.68	.55	11	11	19	325	295	250	250
10	8	250	.68	.60	11	11	19	345	315	260	260
10	10	250	.80	.80	11	11	19	400	370	310	310
12	4	250	.75	.52	12	12	20	405	365	315	315
12	6	250	.75	.55	12	12	20	420	380	325	325
12	8	250	.75	.60	12	12	20	445	405	340	340
12	10	250	.87	.80	12	12	20	500	460	390	390
12	12	250	.87	.87	12	12	20	530	490	410	410
14	6	150	.66	.55	14	14	22	540	480	435	420
14	8	150	.66	.60	14	14	22	565	505	450	435
14	10	150	.66	.68	14	14	22	585	525	465	450
14	12	150	.82	.75	14	14	22	670	610	540	525
14	14	150	.82	.82	14	14	22	720	660	585	570
16	6	150	.70	.55	15	15	23	665	590	540	520
16	8	150	.70	.60	15	15	23	685	610	550	530
16	10	150	.70	.68	15	15	23	710	635	570	550
16	12	150	.70	.75	15	15	23	740	665	590	570
16	14	150	.89	.82	15	15	23	865	790	710	690
16	16	150	.89	.89	15	15	23	905	830	740	720
18	6	150	.75	.55	13	15.5	21	735	645	590	565
18	8	150	.75	.60	13	15.5	21	760	670	605	580
18	10	150	.75	.68	13	15.5	21	780	690	620	595
18	12	150	.75	.75	13	15.5	21	810	720	640	615
18	14	150	.75	.66	16.5	16.5	24.5	930	840	755	730
18	16	150	.96	.89	16.5	16.5	24.5	1090	1000	905	880
18	18	150	.96	.96	16.5	16.5	24.5	1140	1050	945	920
20	6	150	.80	.55	14	17	22	910	795	725	695
20	8	150	.80	.60	14	17	22	930	815	735	705
20	10	150	.80	.68	14	17	22	955	840	755	725
20	12	150	.80	.75	14	17	22	985	870	775	745
20	14	150	.80	.66	14	17	22	1010	895	795	765
20	16	150	.80	.70	18	18	26	1170	1055	945	915
20	18	150	1.03	.96	18	18	26	1375	1260	1140	1110
20	20	150	1.03	1.03	18	18	26	1440	1325	1185	1155
24	6	150	.89	.55	15	19	23	1210	1065	985	945
24	8	150	.89	.60	15	19	23	1235	1090	1000	960
24	10	150	.89	.68	15	19	23	1260	1115	1020	980
24	12	150	.89	.75	15	19	23	1280	1135	1030	990
24	14	150	.89	.66	15	19	23	1310	1165	1055	1015
24	16	150	.89	.70	15	19	23	1340	1195	1075	1035
24	18	150	.89	.75	22	22	30	1675	1530	1400	1360
24	20	150	1.16	1.03	22	22	30	2015	1870	1720	1680
24	24	150	1.16	1.16	22	22	30	2130	1985	1815	1775

\* Indicates maximum working pressure.

For BASE tees, see page 74.

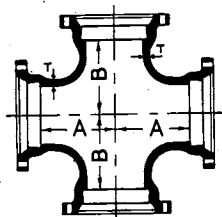




Inc.

## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

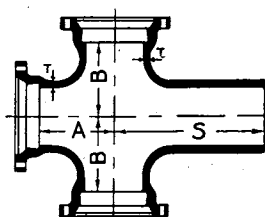
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications



**F-945 Cross**  
MJ, MJ, MJ and MJ

### CROSSES

"C-N" Fittings  
are  
Furnished Complete  
with  
Joint Accessories



**F-947 Cross**  
MJ, PE, MJ and MJ

### DIMENSIONS AND WEIGHTS

F-945 and F-947

Nominal Diameter Inches		Class *	Dimensions—Inches					Approximate Weight—Pounds			
Run	Branch		T	T <sub>1</sub>	A	B	S	With Joint Accessories		Body Castings Only	
							F-945	F-947	F-945	F-947	
3	3	250	.48	.48	5.5	5.5	13.5	100	90	70	70
4	3	250	.52	.48	6.5	6.5	14.5	125	110	90	85
4	4	250	.52	.52	6.5	6.5	14.5	145	130	105	100
6	3	250	.55	.48	8	8	16	170	150	125	120
6	4	250	.55	.52	8	8	16	190	170	140	135
6	6	250	.55	.55	8	8	16	225	205	160	155
8	4	250	.60	.52	9	9	17	255	225	185	180
8	6	250	.60	.55	9	9	17	285	255	205	200
8	8	250	.60	.60	9	9	17	335	305	235	230
10	4	250	.68	.52	11	11	19	340	310	260	260
10	6	250	.68	.55	11	11	19	375	345	285	285
10	8	250	.68	.60	11	11	19	420	390	310	310
10	10	250	.80	.80	11	11	19	500	470	380	380
12	4	250	.75	.52	12	12	20	440	400	340	340
12	6	250	.75	.55	12	12	20	470	430	360	360
12	8	250	.75	.60	12	12	20	515	475	385	385
12	10	250	.87	.80	12	12	20	600	560	460	460
12	12	250	.87	.87	12	12	20	655	615	495	495
14	6	150	.66	.55	14	14	22	595	535	475	460
14	8	150	.66	.60	14	14	22	640	580	500	485
14	10	150	.66	.68	14	14	22	690	630	540	525
14	12	150	.82	.75	14	14	22	800	740	630	615
14	14	150	.82	.82	14	14	22	890	830	710	695
16	6	150	.70	.55	15	15	23	715	640	575	555
16	8	150	.70	.60	15	15	23	765	690	605	585
16	10	150	.70	.68	15	15	23	815	740	645	625
16	12	150	.70	.75	15	15	23	875	800	685	665
16	14	150	.89	.82	15	15	23	1030	955	830	810
16	16	150	.89	.89	15	15	23	1115	1040	895	875
18	6	150	.75	.55	13	15.5	21	785	695	625	600
18	8	150	.75	.60	13	15.5	21	835	745	655	630
18	10	150	.75	.68	13	15.5	21	875	785	685	660
18	12	150	.75	.75	13	15.5	21	935	845	725	700
18	14	150	.75	.66	16.5	16.5	24.5	1090	1000	870	845
18	16	150	.96	.89	16.5	16.5	24.5	1300	1210	1060	1035
18	18	150	.96	.96	16.5	16.5	24.5	1390	1300	1130	1105
20	6	150	.80	.55	14	17	22	960	845	760	730
20	8	150	.80	.60	14	17	22	1010	895	790	760
20	10	150	.80	.68	14	17	22	1050	935	820	790
20	12	150	.80	.75	14	17	22	1110	995	860	830
20	14	150	.80	.66	14	17	22	1165	1050	905	875
20	16	150	.80	.70	18	18	26	1365	1250	1085	1055
20	18	150	1.03	.96	18	18	26	1630	1515	1330	1300
20	20	150	1.03	1.03	18	18	26	1755	1640	1415	1385
24	6	150	.89	.55	15	19	23	1265	1120	1025	985
24	8	150	.89	.60	15	19	23	1305	1160	1045	1005
24	10	150	.89	.68	15	19	23	1355	1210	1085	1045
24	12	150	.89	.75	15	19	23	1400	1255	1110	1070
24	14	150	.89	.66	15	19	23	1455	1310	1155	1115
24	16	150	.89	.70	15	19	23	1520	1375	1200	1160
24	18	150	.89	.75	22	22	30	1930	1785	1590	1550
24	20	150	1.16	1.03	22	22	30	2345	2200	1965	1925
24	24	150	1.16	1.16	22	22	30	2575	2430	2155	2115

For "C-N" pipe for water, see page 20.

For "C-N" pipe for gas, see page 23.

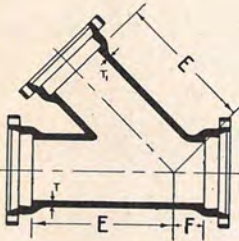


## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

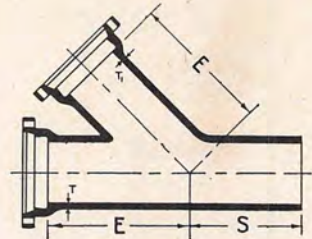
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

### "Y" BRANCHES

For Use with  
F-122 and F-132  
Mechanical Joint Pipe  
or any  
Plain End Pipe of  
Same Outside Diameter



F-950 "Y" Branch  
MJ, MJ and MJ



F-952 "Y" Branch  
MJ, PE and MJ

### DIMENSIONS AND WEIGHTS

#### F-950 and F-952

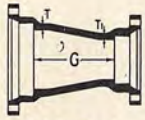
Nominal Diameter Inches		Class *	Dimensions—Inches					Approximate Weight—Pounds			
Run	Branch		T	T <sub>1</sub>	E	F	S	With Joint Accessories		Body Castings Only	
			F-950	F-952	F-950	F-952					
3	3	250	.48	.48	10	3	.11	80	75	60	60
4	3	250	.52	.48	12	3	.11	105	90	80	75
4	4	250	.52	.52	12	3	.11	120	105	90	85
6	3	250	.55	.48	14.5	3.5	11.5	160	140	120	115
6	4	250	.55	.52	14.5	3.5	11.5	170	150	130	125
6	6	250	.55	.55	14.5	3.5	11.5	195	170	145	140
8	3	250	.60	.48	17.5	4.5	12.5	240	210	180	175
8	4	250	.60	.52	17.5	4.5	12.5	250	220	190	185
8	6	250	.60	.55	17.5	4.5	12.5	270	240	205	200
8	8	250	.60	.60	17.5	4.5	12.5	305	275	230	225
10	4	250	.68	.52	20.5	5	13	340	310	270	270
10	6	250	.68	.55	20.5	5	13	360	330	285	285
10	8	250	.68	.60	20.5	5	13	395	365	310	310
10	10	250	.68	.68	20.5	5	13	430	400	340	340
12	4	250	.75	.52	24.5	5.5	13.5	470	430	380	380
12	6	250	.75	.55	24.5	5.5	13.5	495	455	400	400
12	8	250	.75	.60	24.5	5.5	13.5	530	490	425	425
12	10	250	.75	.68	24.5	5.5	13.5	560	520	450	450
12	12	250	.75	.75	24.5	5.5	13.5	610	570	490	490
14	6	150	.82	.55	27	6	14	675	615	570	555
14	8	150	.82	.60	27	6	14	710	650	595	580
14	10	150	.82	.68	27	6	14	745	685	625	610
14	12	150	.82	.75	27	6	14	800	740	670	655
14	14	150	.82	.82	27	6	14	865	805	730	715
16	6	150	.89	.55	30	6.5	14.5	860	785	735	715
16	8	150	.89	.60	30	6.5	14.5	895	820	760	740
16	10	150	.89	.68	30	6.5	14.5	940	865	800	780
16	12	150	.89	.75	30	6.5	14.5	985	910	835	815
16	14	150	.89	.82	30	6.5	14.5	1055	980	900	880
16	16	150	.89	.89	30	6.5	14.5	1125	1050	960	940
18	10	150	.96	.68	32	7	15	1135	1045	975	950
18	12	150	.96	.75	32	7	15	1185	1095	1015	990
18	14	150	.96	.82	32	7	15	1250	1160	1075	1050
18	16	150	.96	.89	32	7	15	1320	1230	1135	1110
18	18	150	.96	.96	32	7	15	1395	1305	1200	1175
20	12	150	1.03	.75	35	8	16	1470	1355	1260	1230
20	14	150	1.03	.82	35	8	16	1535	1420	1320	1290
20	16	150	1.03	.89	35	8	16	1600	1485	1375	1345
20	18	150	1.03	.96	35	8	16	1680	1565	1445	1415
20	20	150	1.03	1.03	35	8	16	1780	1665	1525	1495
24	14	150	1.16	.82	40.5	9	17	2120	1975	1865	1825
24	16	150	1.16	.89	40.5	9	17	2190	2045	1925	1885
24	18	150	1.16	.96	40.5	9	17	2265	2120	1990	1950
24	20	150	1.16	1.03	40.5	9	17	2365	2220	2070	2030
24	24	150	1.16	1.16	40.5	9	17	2560	2415	2245	2205



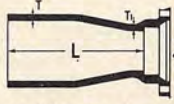
## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

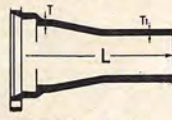
### CONCENTRIC REDUCERS



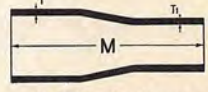
**F-960 Reducer**  
MJ and MJ



**F-965 Reducer**  
Small End MJ



**F-967 Reducer**  
Large End MJ



**F-970 Reducer**  
PE and PE

For use with F-122 and F-132 Mechanical Joint Pipe or any plain end pipe of same outside diameter.

### DIMENSIONS AND WEIGHTS

F-960 thru F-970

Nominal Diameter Inches		Class *	Thickness Inches		Laying Length Inches			Approximate Weight—Pounds										
			T	T <sub>1</sub>	G	L	M	With Joint Accessories				Body Castings Only						
Large End	Small End																	
4	3	250	.52	.48	7	15	23	55	40	50				40	35	40	35	
6	3	250	.55	.48	9	17	25	80	55	70				55	50	55	50	
6	4	250	.55	.52	9	17	25	85	70	75				60	60	60	55	
8	3	250	.60	.48	11	19	27	110	80	100				75	70	75	70	
8	4	250	.60	.52	11	19	27	115	90	105				80	80	80	75	
8	6	250	.60	.55	11	19	27	135	105	115				95	90	90	85	
10	4	250	.68	.52	12	20	28	145	110	130				105	100	100	100	
10	6	250	.68	.55	12	20	28	160	130	145				115	115	115	115	
10	8	250	.68	.60	12	20	28	190	155	160				135	130	130	130	
12	4	250	.75	.52	14	22	30	185	140	170				135	130	130	130	
12	6	250	.75	.55	14	22	30	205	165	185				150	150	145	145	
12	8	250	.75	.60	14	22	30	230	190	205				165	165	165	165	
12	10	250	.75	.68	14	22	30	260	220	225				190	190	185	185	
14	6	150	.66	.55	16	24	32	250	190	230				190	175	185	170	
14	8	150	.66	.60	16	24	32	280	215	250				210	190	205	190	
14	10	150	.66	.68	16	24	32	305	245	275				230	215	230	215	
14	12	150	.66	.75	16	24	32	340	280	300				255	240	255	240	
16	6	150	.70	.55	18	26	34	300	225	285				230	210	230	210	
16	8	150	.70	.60	18	26	34	330	255	305				250	230	250	230	
16	10	150	.70	.68	18	26	34	365	285	330				280	255	275	255	
16	12	150	.70	.75	18	26	34	400	325	360				305	285	305	285	
16	14	150	.70	.66	18	26	34	435	355	370				335	310	315	295	
18	8	150	.75	.60	19	27	35	385	295	360				295	270	295	270	
18	10	150	.75	.68	19	27	35	420	330	385				325	300	320	295	
18	12	150	.75	.75	19	27	35	455	365	415				350	325	350	325	
18	14	150	.75	.66	19	27	35	490	400	430				380	355	365	340	
18	16	150	.75	.70	19	27	35	535	445	460				415	390	395	370	
20	10	150	.80	.68	20	28	36	490	375	460				375	345	375	345	
20	12	150	.80	.75	20	28	36	530	415	490				405	375	405	375	
20	14	150	.80	.66	20	28	36	560	445	500				430	400	415	385	
20	16	150	.80	.70	20	28	36	610	490	530				470	435	445	415	
20	18	150	.80	.75	20	28	36	660	540	570				510	475	485	455	
24	12	150	.89	.75	24	32	40	695	550	655				550	510	550	510	
24	14	150	.89	.66	24	32	40	725	580	665				575	535	560	520	
24	16	150	.89	.70	24	32	40	775	630	700				615	575	595	555	
24	18	150	.89	.75	24	32	40	830	685	740				660	620	635	595	
24	20	150	.89	.80	24	32	40	895	750	780				705	665	675	635	

Accessories are never furnished for plain ends of "C-N" fittings unless specifically ordered.

\* Indicates maximum working pressure.

† Unless ordered otherwise, we will always ship F-965 reducer.

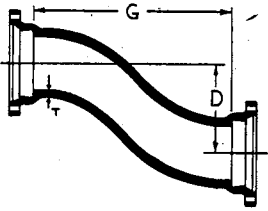
### ECCENTRIC REDUCERS

Eccentric reducers are available in sizes 4 x 3 through 12 x 10 inches. They have the same laying dimensions, metal thicknesses, and weights as shown above for concentric reducers in these same sizes. When ordering, use above figure numbers (to identify the connections wanted), followed by the word **ECCENTRIC**—otherwise *concentric* reducers will be furnished.



## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

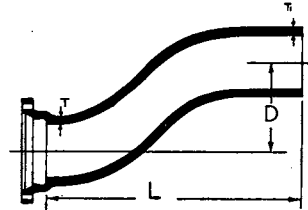
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications



F-982 Offset MJ and MJ

### OFFSETS

For Use with F-122 and F-132 Mechanical Joint Pipe or any Plain End Pipe of Same Outside Diameter



F-984 Offset MJ and PE

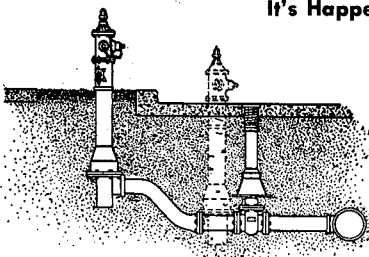
### DIMENSIONS AND WEIGHTS F-982 and F-984

Nominal Diameter Inches	Class *	Dimensions—Inches					Approximate Weight—Pounds			
		T	T <sub>1</sub>	D	G	L	With Joint Accessories		Body Casting Only	
							F-982	F-984	F-982	F-984
3	250	.48	.48	6	19	27	65	55	50	50
3	250	.48	.48	12	22	30	75	65	60	60
3	250	.48	.48	18	30	38	90	80	75	75
4	250	.52	.47	6	19	27	95	80	75	70
4	250	.52	.47	12	22	30	105	90	85	80
4	250	.52	.47	18	30	38	125	110	105	100
6	250	.55	.50	6	20	28	140	120	110	105
6	250	.55	.50	12	26	34	165	145	135	130
6	250	.55	.50	18	33	41	195	175	165	160
8	250	.60	.54	6	21	29	210	180	160	155
8	250	.60	.54	12	28	36	250	220	200	195
8	250	.60	.54	18	35	43	295	265	245	240
10	250	.68	.60	6	22	30	280	250	220	220
10	250	.68	.60	12	30	38	340	310	280	280
10	250	.68	.60	18	38	46	400	370	340	340
12	250	.75	.68	6	26	34	400	360	320	320
12	250	.75	.68	12	37	45	500	460	420	420
12	250	.75	.68	18	48	56	600	560	520	520
14	150	.66	.66	6	27	35	470	410	380	365
14	150	.66	.66	12	38	46	570	510	480	465
14	150	.66	.66	18	49	57	675	615	585	570
16	150	.70	.70	6	27	35	570	495	460	440
16	150	.70	.70	12	40	48	710	635	600	580
16	150	.70	.70	18	50	58	820	745	710	690
18	150	.75	.75	6	28	36	695	605	565	540
18	150	.75	.75	12	40	48	850	760	720	695
18	150	.75	.75	18	51	59	995	905	865	840
20	150	.80	.80	6	28	36	840	725	670	640
20	150	.80	.80	12	40	48	1025	910	855	825
20	150	.80	.80	18	52	60	1210	1095	1040	1010
24	150	.89	.89	6	28	36	1105	960	895	855
24	150	.89	.89	12	40	48	1350	1205	1140	1100
24	150	.89	.89	18	52	60	1595	1450	1385	1345

\* Indicates maximum working pressure.

For making offsets on the job, see page 61.

### It's Happening Throughout The Country



Very often fire hydrants are in the way of street and roadway improvements and must be moved. Then is the time to place them better for easy access and use by firemen and, also, to install auxiliary valves and valve boxes to simplify future inspection and repairs.

Clow "C-N" Offsets and Valves offer the best means for doing this job quickly—with the least disturbance of piping already installed. The sketch shows a hydrant with bell connection moved to new location by using our F-984 Offset and length of plain end pipe—with F-2405 Valve and F-2450 Valve Box added.



## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

**For Use with F-122 and F-132 Mechanical Joint Pipe  
or any Plain End Pipe of Same Outside Diameter**

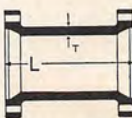
### SOLID SLEEVES

#### F-1012 and F-1014

Nominal Diameter Inches	Class *	Thick- ness T Inches	Overall L Inches		Approximate Weight—Pounds			
					With Joint Accessories		Body Casting Only	
			F-1012	F-1014	F-1012	F-1014	F-1012	F-1014
3	250	.48	7.5	12	40	45	25	30
4	250	.52	7.5	12	55	65	35	45
6	250	.55	7.5	12	75	95	45	65
8	250	.60	7.5	12	115	135	65	85
10	250	.68	7.5	12	145	175	85	115
12	250	.75	7.5	12	190	225	110	145
14	150	.82	9.5	15	255	315	165	225
16	150	.89	9.5	15	310	385	200	275
18	150	.96	9.5	15	370	460	240	330
20	150	1.03	9.5	15	445	550	275	380
24	150	1.16	9.5	15	570	715	360	505



**F-1012**  
Short Sleeve

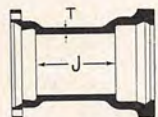


**F-1014**  
Long Sleeve

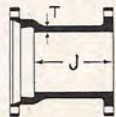
#### Note

F-1012 Short Sleeve will always be furnished unless the long pattern is specifically requested.

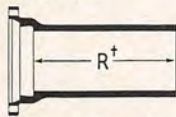
### CONNECTING PIECES



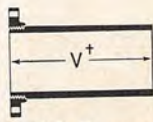
**F-1020** Connector  
MJ and Bell



**F-1025** Connector  
MJ and Flange



**F-1030** Connector  
MJ and PE



**F-1031** Connector  
Flange and PE

#### F-1020 thru F-1031

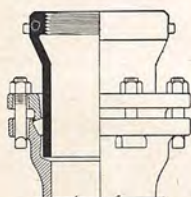
Nominal Diameter Inches	Class *	Dimensions Inches			Approximate Weight—Pounds						F-1031	
					With Joint Accessories			Body Casting Only				
		T	J	R	F-1020	F-1025	F-1030	F-1020	F-1025	F-1030	Length V† Inches	Approx. Weight Pounds
3	250	.48	8	16	45	35	40	40	30	35	16	25
4	250	.52	8	16	65	50	55	55	40	45	16	35
6	250	.55	8	16	95	75	80	80	60	65	16	50
8	250	.60	8	16	140	110	120	115	85	95	16	75
10	250	.68	8	16	180	145	155	150	115	125	18	105
12	250	.75	8	16	230	195	205	190	155	165	18	155
14	150	.66	8	16	275	240	250	230	195	205	18	185
16	150	.70	8	16	345	295	305	290	240	250	20	240
18	150	.75	8	16	405	345	365	340	280	300	20	270
20	150	.80	8	16	490	425	445	405	340	360	24	370
24	150	.89	8	16	635	560	580	530	455	475	24	520

\* Indicates maximum working pressure. † If other than regular, specify laying length wanted.

#### F-1032 Tapped Coupling

For Pipe Size Inches	Tapped I.P.S.† Inches	Overall Length Inches	Approx. Weight Pounds
2	2	7.50	5
3	3	7.50	12
4	4	9.25	20
6	6	9.25	30
8	8	9.25	40

† For smaller size taps, see F-1054 tapped plug.



**F-1032**  
Coupling Section



**F-1032**  
Tapped Coupling





## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

For Use with F-122 and F-132 Mechanical Joint Pipe or any Plain End Pipe of Same Outside Diameter

### PLUGS, CAPS AND GLANDS



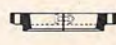
**F-1035**  
Plug



**F-1040**  
Cap



**F-1045**  
Ring Gland



**F-1050†**  
Split Gland



**F-1054‡**  
Tapped Plug

Joint accessories are never furnished with "C-N" Plugs unless specifically ordered.

### F-1035 thru F-1054

Size Inches	Class *	Thick-ness T Inches	Approximate Weight—Pounds					Maximum Size of Tap for F-1054 Plug Inches	
			F-1035	F-1040 Cap		F-1045	F-1050†		F-1054‡
			Solid Plug Only	With Joint Accessories	Body Casting Only	Ring Gland Only	Split Gland Only		Tapped Plug Only
3	250	.75	14	18	13	5	9	Will vary depending upon size of tapping. Use weights shown for F-1035	2½
4	250	.75	20	30	20	6	14		3
6	250	.75	30	45	30	11	18		5
8	250	.75	50	70	45	18	20		6
10	250	.75	65	85	55	20	30		8
12	250	.75	85	115	75	30	35		10
14	150	.82	115	165	120	35	60	2	
16	150	.89	150	210	155	45	70	2½	
18	150	.96	195	255	190	55	85	3	
20	150	1.03	225	325	240	70	100	4	
24	150	1.16	330	450	345	90	130	4	

\* Indicates maximum working pressure.

‡ When ordering, specify size of tapping wanted.

† For replacing regular ring glands found to be broken when pipe line is being tested.

### RATCHET WRENCHES

For Use With Clow "C-N" Mechanical Joint Pipe and Fittings

See F-4967 For Ratchet Wrench Details



Also See Page 213 For Additional Data

For water and gas service, normal range of bolt torques to be applied to standard cast iron bolts in Clow mechanical joints are:

Pipe Size	Bolt Diameter	Range of Torque Foot Pounds§
3"	5/8"	40 to 60
4" thru 24"	3/4"	60 to 90

The following length wrenches will work satisfactorily within ranges of torque specified when used by average (150-lb.) workmen.

Wrench Size	Wrench Length	For Bolt Diameter
No. 1H	8"	5/8"
No. 2H	10"	3/4"

§ A unit of energy, or work, being equal to the work done in raising a one-pound weight against the force of gravity to a height of one foot.

### When Making Up "C-N" Mechanical Joints

When tightening bolts, be sure to draw the gland toward the bell flange evenly, maintaining approximately the same distance between the gland and the face of the flange at all points around the socket. This may be done by partially tightening the bottom bolt first, then the top bolt, next the bolts at either side, and last the remaining bolts. Repeat this cycle until all bolts are within the above range of torques. If effective sealing is not attained at the maximum torque indicated above, the joint should be disassembled and reassembled after thorough cleaning.

**Overstressing of bolts to compensate for poor installation practice is to be avoided.**



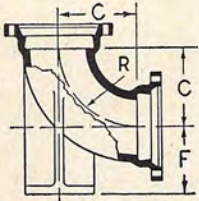


## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

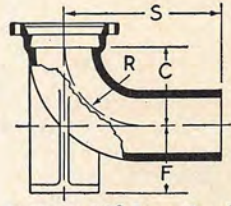
Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

### BASE BENDS

For Use with  
F-122 and F-132  
Mechanical Joint Pipe  
or any  
Plain End Pipe of  
Same Outside Diameter



F-1064 90° Base Bend  
MJ and MJ



F-1068 90° Base Bend  
MJ and PE

### DIMENSIONS AND WEIGHTS

#### F-1064 and F-1068

Nominal Diameter Inches	Class *	Dimensions Inches				Approximate Weight—With Base—Pounds			
		C	F†	S	R	With Joint Accessories		Without Accessories	
						F-1064	F-1068	F-1064	F-1068
3	250	5.5	4.88	13.5	4.0	60	50	45	45
4	250	6.5	5.50	14.5	4.5	85	70	65	60
6	250	8.0	7.00	16.0	6.0	135	115	105	100
8	250	9.0	8.38	17.0	7.0	215	185	165	160
10	250	11.0	9.75	19.0	9.0	295	265	235	235
12	250	12.0	11.25	20.0	10.0	400	360	320	320
14	150	14.0	12.50	22.0	11.5	500	440	410	395
16	150	15.0	13.75	23.0	12.5	615	540	505	485
18	150	16.5	15.00	24.5	14.0	790	700	660	635
20	150	18.0	16.00	26.0	15.5	970	855	800	770
24	150	22.0	18.50	30.0	18.5	1365	1220	1155	1115

\* Indicates maximum working pressure.

† Dimensions "F" are for machined bases. For bases not machined, add approximately 1/8-inch.

**Bases will be machined and/or drilled ONLY when so ordered.**

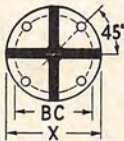
### Weights of Bases Only

Fitting size . . . . . Inches	3	4	6	8	10	12	14	16	18	20	24
For 90° bends † . . . . . Pounds	10	10	20	40	45	65	70	75	115	120	130
For tees § . . . . . Pounds	5	10	15	30	30	45	50	50	75	75	80

† For dimensions and weights of bends, without base, see page 64.

§ For reducing tees, use the base weight for the size of the largest opening on fitting.

### ROUND BASES



### Dimensions

Fitting size . . . . . Inches	3	4	6	8	10	12	14	16	18	20	24
Supporting pipe size . . . Inches	1 1/2	2	2 1/2	4	4	6	6	6	8	8	8
Thickness T . . . . . Inches	.56	.62	.69	.94	.94	1.00	1.00	1.00	1.12	1.12	1.12
Thickness U . . . . . Inches	.50	.50	.62	.88	.88	1.00	1.00	1.00	1.12	1.12	1.12
Diameter X . . . . . Inches	5.00	6.00	7.00	9.00	9.00	11.00	11.00	11.00	13.50	13.50	13.50
Number of holes in base . . .	4	4	4	4	4	4	4	4	4	4	4
Size of holes . . . . . Inches	5/8	3/4	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8	7/8
Diameter BC . . . . . Inches	3.88	4.75	5.50	7.50	7.50	9.50	9.50	9.50	11.75	11.75	11.75

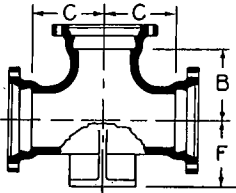
When bases are ordered drilled other than regular, a template must accompany the order.



## "C-N" MECHANICAL JOINT CAST IRON FITTINGS

Meet all Requirements of ASA A21.11 and AWWA C111 Specifications

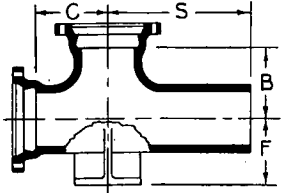
**For Use with F-122 and F-132 Mechanical Joint Pipe  
or any Plain End Pipe of Same Outside Diameter**



**F-1074 Base Tee**  
MJ, MJ and MJ

### BASE TEES

Base dimensions and weights are the same for straight size tees and tees reducing on the run—determined by size of largest opening on fittings. For these data, see the preceding pages.



**F-1078 Base Tee**  
MJ, PE and MJ

### DIMENSIONS AND WEIGHTS

#### F-1074 and F-1078

Nominal Diameter Inches	Class *	Straight Sizes Dimensions—Inches				Approximate Weight—With Base—Pounds			
		C	B	F†	S	With Joint Accessories		With Base—Pounds	
						F-1074	F-1078	F-1074	F-1078
3	250	5.5	5.5	4.88	13.5	80	75	60	60
4	250	6.5	6.5	5.50	14.5	120	105	90	85
6	250	8.0	8.0	7.00	16.0	190	165	140	135
8	250	9.0	9.0	8.38	17.0	290	260	215	210
10	250	11.0	11.0	9.75	19.0	430	400	340	340
12	250	12.0	12.0	11.25	20.0	575	535	455	455
14	150	14.0	14.0	12.50	22.0	770	710	635	620
16	150	15.0	15.0	13.75	23.0	955	880	790	770
18	150	16.5	16.5	15.00	24.5	1215	1125	1020	995
20	150	18.0	18.0	16.00	26.0	1515	1400	1260	1230
24	150	22.0	22.0	18.50	30.0	2210	2065	1895	1855

\* Indicates maximum working pressure.

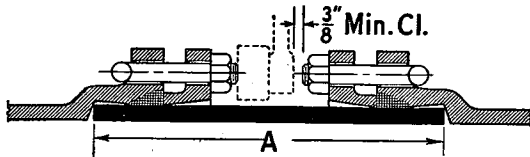
† Dimensions "F" are for *machined* bases. For bases not machined, add approximately 1/8 inch.

**Bases will be machined and/or drilled ONLY when so ordered.**

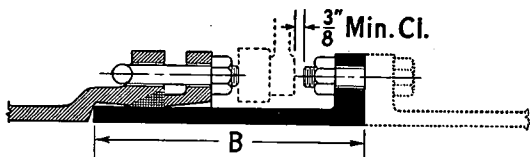
### BASE TEES REDUCING ON BRANCH

To compute the total weight of tees reducing on the branch, add weight of the Base Only (see page 73) to the weight of reducing tee of the size and Class wanted. For dimensions and weights of tees, without base, reducing on the branch, see page 66.

### Clearance Required for Ratchet Wrench between Two Mechanical Joints



"C-N" to "C-N" Joints



"C-N" to Flanged Joints

### Minimum Length of Connectors Which Can Be Used†

Pipe size..... Inches	3	4	6	8	10	12	14	16	18	20	24
"A" = minimum length..... Inches	12.00	12.75	12.75	13.50	13.50	13.25	15.25	16.00	16.00	16.00	16.50
"B" = minimum length..... Inches	9.00	9.75	10.00	10.50	10.75	10.50	11.75	12.50	12.50	12.75	13.50

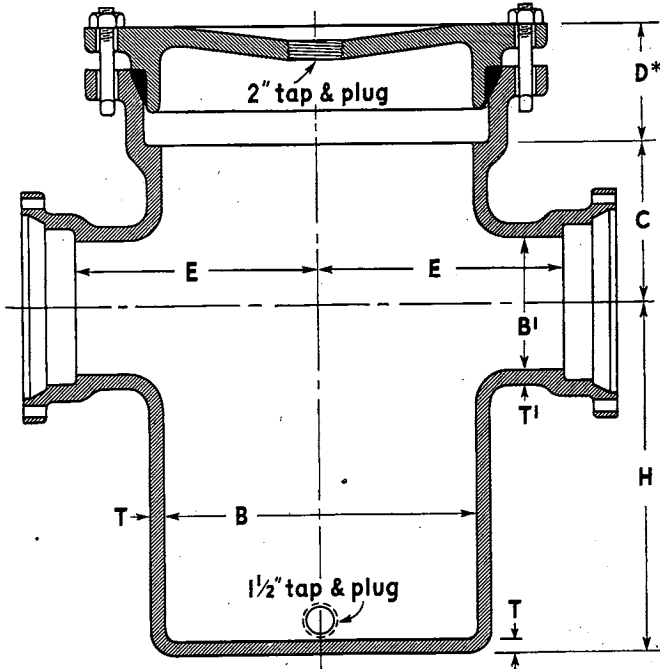
† If open end wrenches are used, overall lengths "A" and "B" may be reduced by 2 1/4 inches.





**"C-N" MECHANICAL JOINT CAST IRON DRIP POTS**

Open Top Pattern



**F-1095**

Gas Drip Pot

\*FOR THE 24-INCH SIZE POT, THE 30-INCH PLUG HAS TWO LIFTING LUGS CAST ON ITS TOP—WHICH INCREASES THE "D" DIMENSION BY 3½ INCHES

**F-1095 DIMENSIONS AND WEIGHTS**

For Pipe Size Inches	Capacity Quarts	Thickness Inches		Dimensions Inches						Size of Top Plug Inches	Approximate Weight—Pounds†	
		T	T'	B	B'	C	D	E	H		With Accessories	Without on Run
4	32	.66	.52	13.98	3.96	6.00	5.56	10.75	14.75	14	455	435
4	64	.66	.52	13.98	3.96	6.00	5.56	10.75	26.75	14	550	530
6	32	.66	.55	13.98	6.00	7.12	5.56	10.75	15.75	14	495	465
6	64	.66	.55	13.98	6.00	7.12	5.56	10.75	27.75	14	590	560
8	64	.66	.60	13.98	8.10	8.25	5.56	10.75	28.75	14	645	595
8	96	.66	.60	13.98	8.10	8.25	5.56	10.75	40.88	14	745	695
10	64	.66	.68	13.98	10.04	9.25	5.56	10.75	29.75	14	705	645
10	96	.66	.68	13.98	10.04	9.25	5.56	10.75	41.88	14	800	740
12	84	.70	.75	16.00	12.00	10.25	5.63	11.75	30.88	16	895	815
12	126	.70	.75	16.00	12.00	10.25	5.63	11.75	42.88	16	1010	930
16	138	.80	.70	20.00	16.00	12.25	5.75	14.38	34.12	20	1395	1285
16	208	.80	.70	20.00	16.00	12.25	5.75	14.38	46.88	20	1570	1460
20	203	.89	.80	24.02	20.00	15.38	5.88	16.50	36.75	24	2045	1875
20	304	.89	.80	24.02	20.00	15.38	5.88	16.50	49.62	24	2280	2110
24	280	1.03	.89	29.94	24.02	17.50	6.56	20.50	36.12	30	3105	2895
24	420	1.03	.89	29.94	24.02	17.50	6.56	20.50	47.62	30	3405	3195

† Weights in both columns include the plug, bolts, nuts, and gasket for the top opening.

**NOTE**

Unless otherwise ordered, drip pots will always be shipped complete with tapped plug, bolts, nuts, and gasket for top opening, and ring glands, bolts, nuts, and gaskets for the run openings.

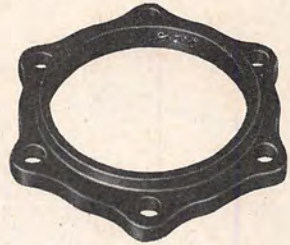


**IDENTIFICATION OF PIPE AND FITTING GLANDS  
BY SHAPE AND DESCRIPTION**

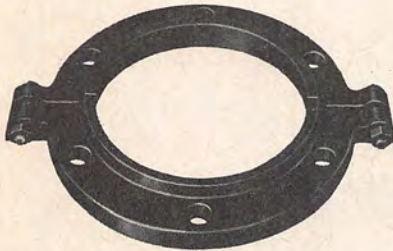
(See NOTE at bottom of page)



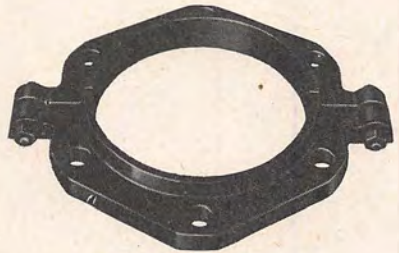
**F-1045 Pipe and Fitting Gland**  
Used with F-122 and F-132 "C-N" pipe and F-925 thru F-1095 fittings, also for "C-N" pipe end of F-146 and F-1212.



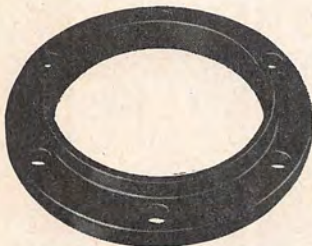
**Serpentine Gland**  
Used only for the wrought pipe end of the F-1212 Transition Sleeve.  
(See copy at left)



**Split Gland**  
Has same application as F-1045 Gland. Is used to replace any F-1045 glands found to be damaged when testing line.



**Split Sleeve Gland**  
Used with F-1200 Straight Split Sleeve and F-1205 Bell Split Sleeve.



**Round Gland\***  
Used with F-1208 Solid Sleeve, with F-1220 Cutting-in Sleeve, and for River Crossing pipe end of F-146.



**Round Gland with Set Screws**  
Used with F-1220 Cutting-in Sleeve and with Cutting-in Valves\* when set screws are required.

\* Round Glands, with or without set screws, are also used with Eddy and Iowa Cutting-in Valves.

**NOTE**

When we make shipment of "C-N" mechanical joint pipe and fittings, the joint accessories (glands, bolts, and gaskets) are not attached to the bells. However, the accessories for Clow mechanical joint specialties are made on (finger-tight) to the body casting at our plants—and should only be removed (if necessary) at the time installation is being made. This will prevent getting several different types of glands mixed up on the job—for they do vary.



**CLOW**

**CAST IRON PIPE LINE SPECIALS**

TEST PLUGS AND TEST CAPS

Page 79

SPLIT SLEEVES—MECHANICAL JOINT

Pages 80 and 81

MECHANICAL JOINT SLEEVES

Page 82

TAPPED TEES AND CROSSES

Mechanical Joint

Page 83

CUTTING-IN SLEEVES

Calked Joint

Page 83

SPLIT SLEEVES AND TEES

Calked Joint

Page 84

TAPPED SADDLES AND CUTTING-IN TEES

Page 85

CONNECTING FITTINGS

Page 86

SLUDGE SHOES AND STRAINERS

Page 87

WALL PIPES

Page 88

WALL SLEEVES

Page 89

FLARE FITTINGS

Page 90

PRESSURE RELIEF VALVES

OVERFLOW RINGS AND STOP PLANK GROOVES

Page 91

MADE TO ORDER FITTINGS

Page 92

CAST IRON PIPE SUPPORTS

Page 93

FLUSH TANKS AND SEWAGE SYPHONS

Pages 94 and 95

DEPTH OF COVER CHART

Page 96





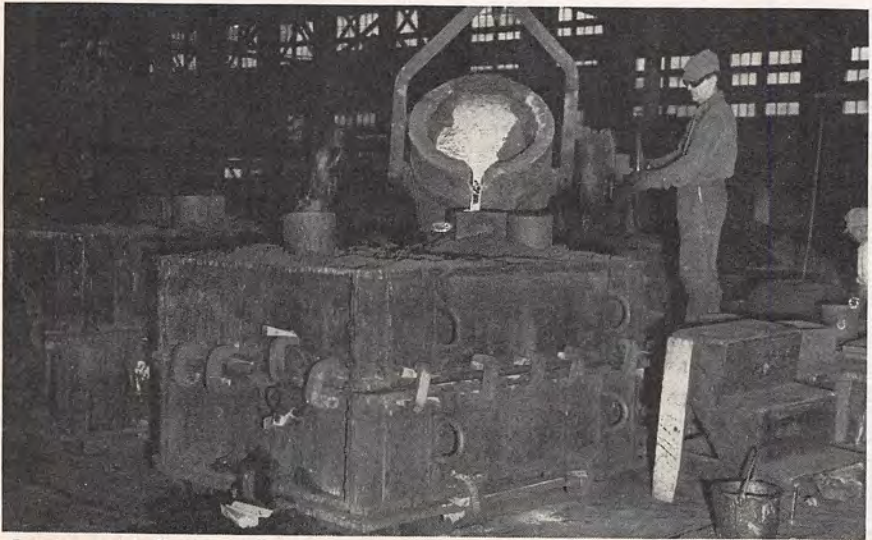
Preparing flask with a mechanical sand slinger.

## SPECIALS

This section of our catalog is identified by the title SPECIALS merely to separate the products shown here from our general line of cast iron pipe and fittings. These products are as readily available as all other products in this catalog—unless indicated otherwise.

Many of these products have originated in the engineering departments of our company. Wherever we have considered it necessary, we have accompanied the illustration and factual data with instructions for best installation practice or comments on the use of the product.

*Please Order by Figure Numbers*



Pouring mold. Flask may hold one or more patterns—depending upon type of fittings.

## Improvements

The constant advancement of our industry will, from time to time, permit us to make improvements in our product. The details of illustrations, specifications, and measurements shown in this catalog are correct as of the date of publication. We reserve the right, however, to make any changes which in our opinion will improve the product and to furnish any material ordered from this catalog in accordance with the standards current at the time the order is filled.

## Your Help Wanted

From users of this catalog, we welcome suggestions which shall tend to improve the make up of future issues of Pipe Economy:



Castings are cleaned in tumbling barrels and all fins are chipped and ground off before shipment.

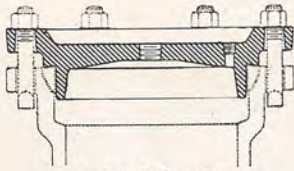




Inc.

## TEST PLUGS AND TEST CAPS

**Easily Installed—Easily Removed—Only A Ratchet Wrench Needed  
No Leading or Calking Required.**



**F-1165 Section**

**Note**

Bolts and Gasket  
For F-1165  
Will be Furnished  
Only  
When So Ordered



**F-1165 "C-N" Test Plug**

**F-1165\*  
For Bell Ends of "C-N" Mechanical Joint Pipe and Fittings**

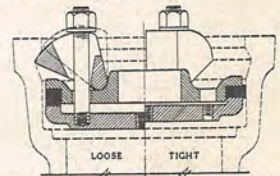
Size..... Inches	3	4	6	8	10	12
Size, vent connection..... Inches	1/4	1/4	1/4	1/4	1/4	1/4
Size, pressure connection..... Inches	3/4	3/4	3/4	3/4	3/4	3/4
Number of bolt holes.....	4	4	6	6	8	8
Approximate weight..... Pounds	14	20	30	50	65	85

\* Sizes 8-inch and smaller have two vent openings—one on and the other straddling the centerline of bolt holes in the plug—so that a vent can be placed at the top of the line being tested. For sizes larger than 12-inch, our F-1054 "C-N" Tapped Plug can be arranged for use as a test plug.



**F-1170 Test Plug**

**F-1170 Test Plug  
For Use In  
Calking Bells  
Only**

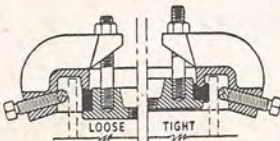


Patent Nos. 2,233,223 and 1,808,411

**F-1170 Section**

**F-1170  
For Calking Bell Ends of Centrifugally Cast or Sand Cast Pipe and Fittings**

Size..... Inches	3	4	6	8	10	12
Maximum test pressure..... Pounds	200	200	200	200	175	175
Size, vent connection..... Inches	1/8	1/4	1/4	1/4	1/4	1/4
Size, pressure connection..... Inches	3/8	3/8	3/4	3/4	3/4	3/4
Number of lugs and bolts.....	2	3	3	4	4	4
Approximate weight..... Pounds	5	10	18	35	48	68



**F-1175 Section**

**How to Install  
Instructions  
Are Sent With  
F-1170 and F-1175  
Plugs and Caps**



**F-1175 Test Cap**

**F-1175†  
For Plain or Beaded Spigot Ends of Pipe and Fittings**

Size..... Inches	3	4	6	8	10	12
Maximum test pressure..... Pounds	200	200	200	200	175	175
Size, vent connection..... Inches	...	...	1/4	1/4	1/4	1/4
Size, pressure connection..... Inches	...	3/4	3/4	3/4	3/4	3/4
Number of bolts.....	†	†	3	4	4	4
Number of set screws.....	3	3	3	4	8	8
Approximate weight..... Pounds	14	18	32	55	66	80

† The 3 and 4-inch sizes are tapped for and fitted with an extra heavy pipe nipple with a running thread and a special lock nut on the exposed end. The lock nut is used to "set" the gasket against the inside wall of pipe. A cap protects the exposed end of the nipple while the fitting is in transit and, also, it may be used to temporarily close the nipple opening—should it be desired to do so.

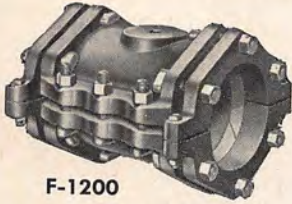
**Note:** Clow Test Plugs and Test Caps are shipped complete. A nipple and brass shut-off stop are furnished for the air release opening and, also, loose screw plugs are furnished for closing all tapped openings—should this be necessary.





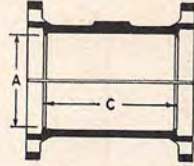
**MECHANICAL JOINT STRAIGHT SPLIT SLEEVES**

No Jute—No Calking—No Lead



**F-1200**

**Straight Split Sleeve**



**Dimensions**

For Pipe Size* Inches	Dimensions—Inches		Overall Length of Body Inches
	Inside Diameter A	Effective Length C	
3	4.03	8.50	11.00
4	5.07	8.50	11.00
6 Short	7.17	8.50	11.00
6 Long	7.17	11.50	14.00
8 Short	9.37	8.50	11.00
8 Long	9.37	14.50	17.00
10 Short	11.47	8.50	11.00
10 Long	11.47	17.00	19.50
12 Short	13.57	8.50	11.00
12 Long	13.57	20.50	23.00
14B	15.47	17.50	20.00
14D	15.82	17.50	20.00
16B	17.57	17.50	20.00
16D	17.97	17.50	20.00

Clow Split Sleeves can be used on either sand cast (old or new) or on centrifugally cast pipe. Short pattern sleeves, sizes 12-inch and smaller, will repair breaks up to 8½ inches long. Sizes 6, 8, 10, and 12-inch are also made in long pattern for breaks up to 11½, 14½, 17, and 20½ inches long, respectively. Sizes 14 and 16-inch will repair breaks up to 17½ inches long. Unless orders for 6, 8, 10, and 12-inch sleeves specifically call for long pattern, the short pattern will always be furnished.

The boss is regularly tapped for ¾" I.P.S. pipe and plugged. However, when so ordered, boss will be tapped any size to a maximum of 2½ inches for the 3-inch size sleeve, and to 3 inches for larger sizes.

\* When ordering 14 and 16-inch sizes, specify O.D. of the pipe on which sleeves are to be used.

**Approximate Weights**

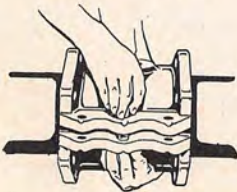
For pipe size . . . . . Inches	3	4	6†	8†	10†	12†	14	16
Weight, complete . . . Pounds	80	105	140 165	180 235	225 320	275 450	560	670

† The weight for short pattern sleeve is shown first, followed by weight for the long pattern.

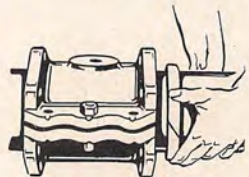
*It is better to have one and not need it than to need one and not have it!*

When an unexpected break occurs in the underground piping of the distribution system, the important job is to repair the damaged pipe and restore water service as quickly as possible. For that very purpose, now is a good time to order a stock of Clow mechanical joint split repair sleeves in sizes to match sizes of pipe installed in the system and, thus, be prepared for any emergency.

Clow repair sleeves are shipped complete and ready for instant use. No lead melting or handling equipment is needed on the job. No lead, no jute, and no calking of joints required. Average workmen with box wrench or ratchet wrench will easily and quickly do a perfect job—regardless of weather conditions or a flooded trench—and make a positive and permanent repair to the underground piping.



**Complete instructions for installing accompany each Split Sleeve**



With side rubber gaskets in place in the grooves in the face of side flanges of the bottom half of sleeve, place the two halves around the pipe and bolt halves together loosely.

The split gaskets are next placed around the pipe at each end of the sleeve, and then pushed to their seat inside the sleeve body. All body bolts are then made tight.

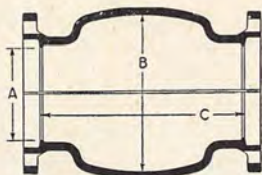
Installing sketches are continued on following page.





MECHANICAL JOINT BELL SPLIT SLEEVES

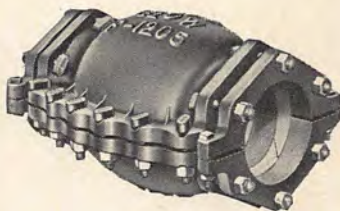
No Jute—No Calking—No Lead



Dimensions

For Pipe Size* Inches	Dimensions—Inches		Overall Length of Body Inches
	Inside Diameter B	Effective Length C	
3	8.25	15.25	17.75
4	9.62	15.25	17.75
6	11.75	15.25	17.75
8	14.25	18.50	21.00
10	16.75	18.50	21.00
12	19.75	18.50	21.00
14 B	21.75	21.50	24.00
14 D	21.75	21.50	24.00
16 B	24.25	21.50	24.00
16 D	24.25	21.50	24.00

Diameter "A" is same as shown for F-1200.



F-1205 Bell Split Sleeve

For repairing or reinforcing the joint of cast iron pipe. Can be used on any type joint—bell and spigot, "C-N" mechanical, flanged (125#), or lug-type. In the latter case, lugs must be removed. For effective length and other dimensions, see table.

Clow split bell sleeves can be used on either sand cast pipe (old or new) or on centrifugally cast pipe. The F-1205 is not regularly furnished with a tapped opening through the body. However, when specifically ordered, we will tap (and plug) this sleeve with 3/4-inch iron pipe size thread before making shipment.

\*When ordering 14 and 16-inch sizes, specify O.D. of the pipe on which sleeves are to be used.

Approximate Weights

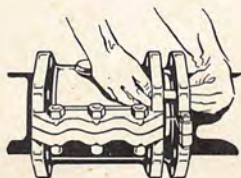
For pipe size . . . . . Inches	3	4	6	8	10	12	14	16
Weight each, complete. . . . Pounds	125	165	210	285	365	440	585	660

Clow split sleeves make a positive and permanent repair to the piping.

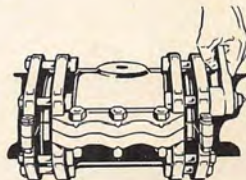
Soon after the F-1205 bell split sleeve was introduced, water works men discovered the manifold utility of this fitting. For instance, the bell sleeve is much longer than the F-1200 (end to end of body flanges) and can be used for repairing a long break in a pipe barrel. Also, in an emergency, the F-1205 sleeve can always serve in place of a straight split sleeve which may not be on hand when needed.

Another important recommended use for the F-1205 bell split sleeve is its application as "standard practice" for reinforcing and safeguarding all joints of cast iron pipe (at time of installation) where pipe lines pass under railroad tracks or highway truck routes, through marshland or under water, and any other locations of pipe lines that will not be easily accessible for repairs in case of emergency.

Only a Ratchet Wrench Needed



Complete instruction for installing accompany each Split Sleeve



The split glands are next bolted together around the pipe—one at each end of sleeve—and then bolted loosely to the end flanges on the body—to be made tight later.

By ratchet or box wrench, gland bolts are tightened a little at a time—moving from one to another in order to apply gland pressure evenly on the end gaskets.

Installing sketches start on the preceding page.



**CAST IRON MECHANICAL JOINT SLEEVES**

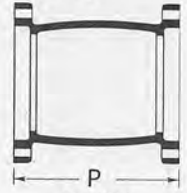
Only a Ratchet Wrench is Needed—No Leading or Calking Necessary



**F-1208**  
Duo-Sleeve\*

**DUO-SLEEVES**

The F-1208 Sleeve is for Use on Plain (cut) Ends of either Centrifugally Cast or Sand Cast Pipe

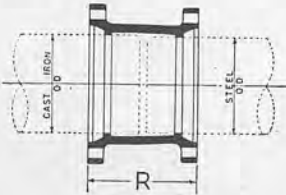


**F-1208**  
Section

**F-1208**

For pipe size . . . . . Inches	3†	4	6	8	10	12
Length "P" overall . . . . . Inches	7½	12	12	12	12	12
Weight, with joint accessories . . . . . Pounds	40	84	114	143	193	254
Weight, body casting only . . . . . Pounds	25	48	68	87	113	144

\*For regular pattern solid sleeves for use with "C-N" pipe, see page 71. †3-inch is same as F-1012.



**F-1212**  
Section

**TRANSITION SLEEVES**

For Connecting Plain (cut) Ends Of Centrifugally Cast Iron Pipe to Wrought Pipe Of Same Nominal Sizes



**F-1212**  
Transition Sleeve

**F-1212**

For pipe size . . . . . Inches	3	4	6	8	10	12
Length "R" overall . . . . . Inches	7½	7½	7½	7½	7½	7½
Weight, with joint accessories . . . . . Pounds	37	56	80	108	140	180
Weight, body casting only . . . . . Pounds	25	35	45	65	85	110

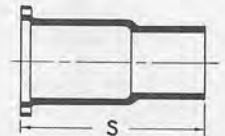


**F-1220**  
Cutting-In Sleeve With Set Screws

**CUTTING-IN SLEEVES**

For Inserting Fittings or Valves into Existing Pipe Lines

See page 83 for Installation Instruction



**F-1220**  
Section

**F-1220†**

For pipe size . . . . . Inches	3	4	6	8	10	12
Length "S" overall . . . . . Inches	20½	20½	20½	20½	20½	20½
Weight, with joint accessories . . . . . Pounds	50	72	98	136	172	233
Weight, body casting only . . . . . Pounds	38	54	75	108	132	178

† The female end of F-1220 will take the plain ends of either centrifugally cast or sand cast pipe, but will not fit over a beaded spigot end on sand cast pipe. The male end seats into bells of fittings or valves—mechanical joint or calking type. The gland is equipped with set screws which will give added strength to the joint and, also, provide a firm contact when electricity is used to thaw out a frozen pipe line.

**Important Note**

In general, the F-1220 Cutting-in Sleeve is used for cutting in regular bell end fittings and valves. If the fittings or valves have "standardized" mechanical joints, two F-1220 sleeves may have to be used to cut them into old cast iron pipe lines—because of the outside diameter of such pipe.





## CAST IRON TAPPED TEES AND CROSSES

No Leading or Calking Necessary

F-1225

Mechanical Joint  
Tapped Tee



F-1228

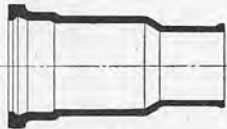
Mechanical Joint  
Tapped Cross

F-1225 and F-1228

For pipe size.....Inches	3	4	6	8	10	12
Laying length.....Inches	12	12	12	12	12	12
Weight, with joint accessories.....Pounds	50	75	115	165	215	275
Weight, body casting only.....Pounds	36	55	80	115	155	195

**Note:** Tapped tees and crosses are regularly furnished tapped for 2-inch pipe. Smaller tappings are usually made with screw bushings to the size ordered. Fittings with larger tappings must be made to order. Maximum size taps are 2 inches for 3-inch, 2½ inches for 4, 6, and 8-inch; and 4 inches for 10 and 12-inch sizes.

## CUTTING-IN SLEEVES



F-1230  
Section

For  
Lead Calked  
Joints



F-1230  
Cutting-in Sleeve

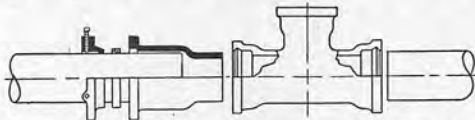
F-1230\*

For pipe size.....Inches	4	6	8	10	12
Length, overall.....Inches	19	19	19	19	19
Approximate Weight.....Pounds	60	90	125	155	205

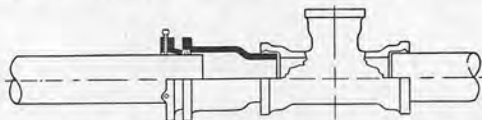
\* Length of pipe to cut out of existing line must equal the overall length (end to end) of fitting or valve being installed *plus 8 inches* for the sleeve.

The female end of F-1230 will take plain ends of either centrifugally cast or sand cast pipe and will fit over a beaded spigot on sand cast pipe. The male spigot end seats into calking bells, but will not enter into "C-N" mechanical joint pipe and fitting bells.

## METHOD OF INSTALLING THE F-1220 CUTTING-IN SLEEVE



From the existing line cut out only a section of pipe equal in length to overall (end to end) of the fitting or valve to be installed, plus 10 inches for the sleeve. Remove gland and gasket from the sleeve and slip them over the cut end of the pipe, and "telescope" the sleeve onto the pipe—as shown above. Lower the fitting or valve into the trench and line it up—ready for making up.



Push fitting or valve "home" against one pipe end and seat the sleeve into the opposite end. Assemble gasket, gland, bolts and nuts on the sleeve joint, and make the set screws tight against the pipe. The calked joints on fitting or valve can be made up in the usual manner to finish the job.



## CAST IRON SPLIT SLEEVES AND SPLIT TEES

Side Flanges Are Machine Faced and Drilled

**F-1250**  
Short Pattern  
Straight  
Split Sleeve



**F-1252**  
Long Pattern  
Straight  
Split Sleeve

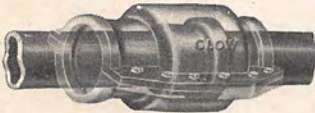
### F-1250 and F-1252

Figure . . . . . Number		F-1250 Short Pattern		F-1252 Long Pattern	
For Pipe Size Inches	Inside Diameter Inches	Length Overall Inches	Approx. Weight Pounds	Length Overall Inches	Approx. Weight Pounds
2	3.38	8	33	12	30
3	4.76	10	55	15	80
4	5.80	10	65	15	100
6	7.90	10	90	15	130
8	10.10	12	135	15	165
10	12.20	12	165	18	245
12	14.30	14	230	18	295
14	16.50	15	300	18	355
16	18.90	15	370	24	575
18	21.00	15	430	24	685
20	23.10	15	505	24	800
24	27.40	15	670	24	1010

### SPLIT BELL SLEEVES



**F-1260**  
Split Bell Sleeve



Showing Application of Split Bell Sleeve

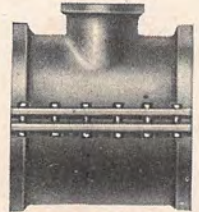
### F-1260

For Pipe Size Inches	Inside Diameter Inches		Length Overall Inches	Approx. Weight Pounds
	Small	Large		
3	4.76	8.50	22	95
4	5.80	9.50	22	170
6	7.90	11.75	22	240
8	10.10	14.25	22	300
10	12.20	16.50	22	400
12	14.30	18.75	22	520
14	16.50	21.00	22	550
16	18.90	23.75	22	660
18	21.00	26.25	22	850
20	23.10	28.75	23	980
24	27.40	33.50	23	1235

### SPLIT TEES

#### F-1270

For Pipe Size Inches	Inside Diameter Inches	Maximum Size of Outlet Inches	Length Overall Inches
3	4.76	3	15
4	5.80	4	15
6	7.90	6	15
8	10.10	6	15
10	12.20	8	18
12	14.30	8	18
14	16.50	8	18
16	18.90	14	24
18	21.00	14	24
20	23.10	14	24
24	27.40	14	24



**F-1270 Split Tee**

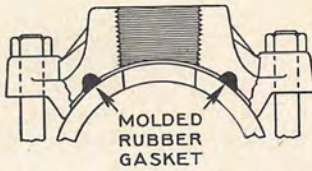
Outlet can be either bell, flange or tapped. State how wanted and give size of outlet.

NOTE: Split Sleeves and Tees are furnished with side gaskets, steel bolts and nuts; and for use on Class "D" cast iron pipe. Will require extra calking materials when used on any smaller O.D. pipe.





## CAST IRON TAPPED SADDLES FOR CAST IRON PIPE



MOLDED RUBBER GASKET



F-1280 Tapped Saddle

Sectional view of the F-1280 tapped saddle showing the molded rubber gasket which completely encircles the tapped opening thus insuring at all times a watertight connection.

### F-1280

For cast iron pipe size . . . . . Inches	3	4	6	8	10
Stock size tapping* . . . . . Inches	1½	2	2	3	3
Approximate weight . . . . . Pounds	6	12	16	32	42
For cast iron pipe size . . . . . Inches	12	14	16	18	20
Stock size tapping* . . . . . Inches	4	4	4	4	4
Approximate weight . . . . . Pounds	46	95	120	150	180

\* Specify tap size wanted when ordering. When saddles are ordered tapped smaller than stock on hand, stock saddles will be furnished bushed to size of tapping specified.

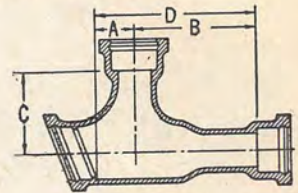
### CUTTING-IN TEES

For use when cutting into a street main for the introduction of extra hydrants, new street mains, or other large service.



F-1290 Cutting-in Tee

For Tapped Branch on Tees Use Our F-1375 Tapped Coupling or F-1380 Tapped Plug

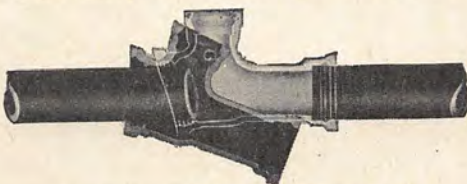


Dimensional View

### F-1290 Class "D" Patterns

For Cast Iron Pipe Size Inches	Dimensions—Inches			Length of Pipe to Cut Out Inches	Approximate Weight Pounds
	A	B	C		
3	3⅞	12⅝	7	16	90
4	4¼	14⅝	9½	18⅞	150
6	4	16¾	10½	20¾	235
8	4¼	19	13⅞	23¼	330
10	5	19½	13⅞	24½	450
12	6¼	23¾	18⅝	30	665
14	6⅞	25⅞	19¼	31¼	840
16	8½	23	20¾	31½	1200

Tees 6-inch and larger with reducing branch (not smaller than 4-inch) also carried in stock.



Application of F-1290 Cutting-in Tee

Cutting-in tees are enlarged back of the bell end, thus, can be easily slipped over the pipe and drawn up into position ready for calking. Only two joints need calking, there is less labor, less excavating, less time for water to be turned off; and a variation of an inch or two in length of the pipe cut out does not matter. The length to cut out of an existing pipe line is cast on the side of fitting.

For Cast Iron Pipe Cutters, see pages 211 and 212.



## CAST IRON CONNECTING FITTINGS



**F-1300**  
Flange and Spigot



**F-1310\***  
Tapped (Special) Flange



**F-1320**  
Flange and Bell

\* The F-1310 flange is tapped (special) for our F-162 cast iron pipe diameters. It can be used to replace a broken or damaged flange on the job. Sizes 14" and larger fit only the "B" O.D. pipe

### F-1300, F-1310 and F-1320

For pipe size . . . . . Inches	2	3	4	6	8	10	12
F-1300, laying length . . . . . Inches	12	16	16	16	16	18	18
Approximate weight . . . . . Pounds	12	25	35	50	75	105	155
F-1310, approx. weight . . . . . Pounds	...	7	13	17	27	38	58
F-1320, laying length . . . . . Inches	10	10	10	10	10	10	10
Approximate weight . . . . . Pounds	12	40	55	75	115	160	195

In sizes 14-inch and larger F-1300† and F-1320 are available for either Class "B" or "D" pipe

For pipe size . . . . . Inches	14		16		18		20		24	
	B	D	B	D	B	D	B	D	B	D
For pipe . . . . . Class	18	18	20	20	20	20	24	24	24	24
F-1300, laying length . . . . . Inches	185	230	240	310	270	360	370	505	520	820
Approximate weight . . . . . Pounds	72	...	90	...	90	...	115	...	160	...
F-1310, approx. weight . . . . . Pounds	10	10	10	10	10	10	10	10	10	10
F-1320, laying length . . . . . Inches	220	245	275	315	315	365	380	450	505	600
Approximate weight . . . . . Pounds										

† F-1300—when ordered Class "B"—the plain end will fit into "C-N" pipe and fitting bells. Flanges furnished faced and drilled unless otherwise ordered. For drilling template, see page 101.

### F-1340 and F-1350



**F-1340**  
Tapped Tee (Bell Ends)

**F-1350**  
Tapped Cross (Bell Ends)

For Pipe Size Inches	Laying Length Inches	Maximum Tap Size Inches†	Approx. Weight Pounds	
			F-1340	F-1350
2	3	1½	20	21
3	12	2	55	57
4	12	2½	75	78
6	12	2½	105	109
8	12	2½	150	155
10	12	4	195	200
12	12	4	245	250



**F-1375**  
Tapped Coupling



**F-1380**  
Tapped Plug



**F-1390**  
Tapped Cap

### F-1375, F-1380 and F-1390

For C.I. Pipe Size Inches	Overall Length Inches			Maximum Tap Size—Inches†			Approximate Weight Pounds		
	F-1375	F-1380	F-1390	F-1375	F-1380	F-1390	F-1375	F-1380	F-1390
2	7.25	3.00	2.50	2	1¼	2	5	3	6
3	7.25	5.50	4.60	3	2	3	12	10	20
4	9.25	6.00	4.60	4	2½	4	20	15	25
6	9.25	6.00	4.65	6	4	4	30	25	40
8	9.25	6.00	4.75	8	4	4	40	40	60
10	...	6.00	4.75	...	4	4	...	55	75
12	...	6.00	4.75	...	4	4	...	70	110

**Note:** Tapped couplings, plugs, and caps are for joining threaded pipe to cast iron pipe and fittings. The coupling is for straight size joints—the plugs and caps for reducing sizes of threaded pipe.

#### † Tappings

When ordering tapped fittings, specify tap size wanted. When fittings are ordered tapped smaller than stock on hand, stock fittings will be furnished *bushed* to the size tapping specified.





**CAST IRON SLUDGE SHOES AND SUCTION STRAINERS**



**F-1404** Flanged End Sludge Shoe

**SLUDGE SHOES**

Clow sludge shoes are extra strong, have maximum sludge opening, and the flare reduces entrance loss to a minimum.



**F-1408** Bell End Sludge Shoe

**F-1404 and F-1408**

For Pipe Size Inches	Dimensions—Inches				Approx. Weight Pounds	
	Laid Height	Diameter at Base	Diameter of Flare	Floor to Bottom of the Flare	<b>F-1404</b>	<b>F-1408</b>
4	12.00	8.00	8.75	6.00	40	55
6	13.00	10.00	11.00	7.00	60	80
8	14.00	12.50	13.50	8.00	85	105
10	15.00	14.50	15.50	8.00	120	155
12	15.00	17.00	18.00	8.00	150	180

For bell dimensions, see page 265.



**F-1412** Suction Strainer Bell End

**SUCTION STRAINERS**

The aggregate area of perforations is greater than the pipe area.



**F-1416** Suction Strainer Flanged End

**F-1412 and F-1416**

For Pipe Size Inches	O.D. of Strainer Inches	Area in Square Inches		Laying Length Inches		Approx. Weight Pounds	
		of Pipe Port	of Perforations	<b>F-1412</b>	<b>F-1416</b>	<b>F-1412</b>	<b>F-1416</b>
4	7.00	12.50	20.00	11.75	11.50	55	40
6	9.00	28.00	38.00	13.00	12.25	90	75
8	13.00	50.00	75.00	16.00	15.00	145	115
10	15.25	78.00	84.00	20.38	20.63	210	175
12	17.25	113.00	126.00	21.63	22.13	295	260

Note: Flanged ends are regularly furnished faced and drilled to Class 125 template—see page 101.

**STRAINER PLUGS**

For calking into the bell ends of cast iron water main fittings.



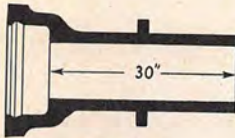
**F-1418** Strainer Plug

**F-1418**

For fitting bells, size . . . . . Inches	3	4	6	8
Overall height . . . . . Inches	3½	4	4	4
Approximate weight . . . . . Pounds	5	8	12	17



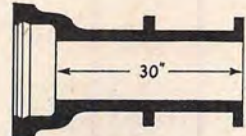
## CAST IRON WALL PIPES



**F-1420**  
Bell and Plain End



**F-1422**  
Bell and Bell



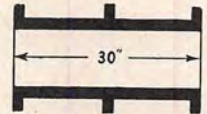
**F-1424**  
Bell and Flange

End flanges are regularly drilled to the Class 125 Standard template\* see page 101

Bell ends are A.W.W.A. Standard  
For dimensions, see page 37



**F-1426**  
Flange and Plain End



**F-1428**  
Flange and Flange

Lengths listed are standard. However, special lengths to meet requirements (within certain limits) can also be furnished. Check with us.  
Wall pipes may be placed in position before the concrete is poured—to insure a water-tight connection between the wall and casting—and the pipe lines can be connected to wall casting at any time after the wall has cured.

\* Wall pipes can be furnished to set flush with the walls or to extend through the wall. When ordered with flanged ends to set flush with walls, we recommend that the flanges be tapped for studs. Where flanged ends extend beyond the wall, flanges will be drilled to Class 125 template unless otherwise ordered. Customer must specify how wanted—tapped or drilled.

*Faces of bells and plain ends will be machined only when so ordered—at an extra charge.*

### Intermediate Wall Collars

The intermediate wall collar will always be located at the center of the *laying length* of the pipe ordered, unless otherwise specified. These collars provide a water-tight job by increasing resistance to water seepage and, also, they provide an anchor in wall. See page 89 for details.

### Dimensions and Weights

Nominal Pipe Size Inches	Class	Dim.—Inches		Approximate Weight—Pounds—for 30" Laying Length†					
		O.D. of Pipe	T Thickness	F-1420 B. & PE.	F-1422 B. & B.	F-1424 B. & F.	F-1426 F. & PE.	F-1428 F. & F.	Per Inch of Barrel
3	D	3.96	.48	65	85	70	50	55	1.36
4	D	5.00	.52	85	110	95	75	85	1.90
6	D	7.10	.55	130	165	140	105	120	2.94
8	D	9.30	.60	185	235	205	155	180	4.26
10	D	11.40	.68	245	315	280	215	245	5.96
12	D	13.50	.75	320	395	365	285	330	7.81
14	B	15.30	.66	355	440	405	320	370	7.89
14	D	15.65	.82	420	515	470	375	425	9.94
16	B	17.40	.70	435	545	500	385	450	9.55
16	D	17.80	.89	525	655	590	460	525	12.30
18	B	19.50	.75	515	645	580	450	520	11.49
18	D	19.92	.96	635	785	695	545	605	14.87
20	B	21.60	.80	600	755	690	535	620	13.59
20	D	22.06	1.03	755	940	835	645	725	17.70
24	B	25.80	.89	790	985	910	715	835	18.11
24	D	26.32	1.16	1010	1255	1115	870	980	23.84
30	B	32.00	1.03	1155	1450	1335	1040	1220	26.06
30	D	32.74	1.37	1535	1945	1695	1280	1440	35.11
36	B	38.30	1.15	1585	2025	1855	1415	1685	34.90
36	D	39.16	1.58	2115	2700	2355	1775	2010	48.51

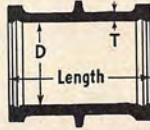
† For longer or shorter pipes, add or deduct per inch weight of barrel metal—see last column above.





## CAST IRON WALL SLEEVES

**F-1430**  
Short Pattern  
Wall Sleeve



**F-1435**  
Long Pattern  
Wall Sleeve

For Passing Pipe Entirely Through Wall

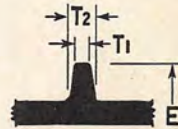
### F-1430 and F-1435

Figure.....		Number		F-1430 Short Pattern		F-1435 Long Pattern	
For Pipe Size Inches	Class	Diameter D Inches	Thickness T Inches	Length Overall* Inches	Approx. Weight Pounds	Length Overall* Inches	Approx. Weight Pounds
3	D	4.76	.65	10	40	15	55
4	D	5.80	.65	10	50	15	70
6	D	7.90	.70	10	70	15	95
8	D	10.10	.75	12	110	15	130
10	D	12.20	.80	12	140	18	190
12	D	14.30	.85	14	200	18	240
14	B	16.20	.85	15	245	18	285
14	D	16.50	.90	15	260	18	300
16	B	18.50	.90	15	305	24	435
16	D	18.90	1.00	15	330	24	475
18	B	20.60	.95	15	355	24	505
18	D	21.00	1.05	15	390	24	560
20	B	22.70	1.00	15	410	24	580
20	D	23.10	1.15	15	470	24	675
24	B	26.90	1.05	15	520	24	735
24	D	27.40	1.25	15	615	24	880

\* Lengths listed are standard. Special lengths can be furnished—check your requirements with us.

Wall collars will always be located on the center line of the laying length of wall pipes and at the center of wall sleeves, unless otherwise specified.

Collars are cast integral on sleeves and on pipe with 3'0" laying length or less— are usually welded on longer length pipe.



### Intermediate Wall Collars

For Pipe or Sleeve Inches	Thickness Inches		For Wall Pipes		For Wall Sleeves	
	T <sub>1</sub>	T <sub>2</sub>	E Inches	Weight Pounds	E Inches	Weight Pounds
3	.50	.75	7.00	4	9.00	6
4	.50	.75	8.00	5	10.00	6
6	.50	.75	10.00	6	12.00	7
8	.50	.75	12.50	9	14.50	10
10	.50	.75	14.50	10	16.50	10
12	.50	.75	16.50	12	19.00	13
14	.75	1.00	19.50	26	22.00	29
16	.75	1.00	21.75	30	24.50	33
18	.75	1.00	23.75	33	26.75	37
20	.75	1.00	25.75	35	29.00	41
24	.75	1.00	30.25	45	33.50	50

### Important Note

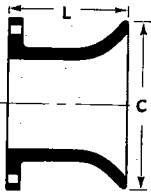
In order that flanged piping (which is to be later joined to a wall casting with flanged end—or ends) be correctly installed, it is necessary that the wall casting be "set in the form" with the bolt holes in flanges straddling the center lines—horizontally or vertically. For absolute accuracy, we recommend checking the alignment by means of a spirit level or plumb line before the wall is poured.



Note: Wall sleeves will be furnished with machined ends *only* when so ordered—at an extra charge.



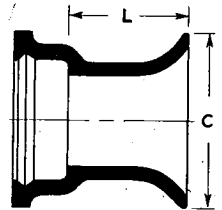
## CAST IRON FLARE FITTINGS



**F-1440**  
Flange and Flare

End flanges are regularly drilled to the Class 125 Standard template see page 101

For dimensions of Standard Bells see page 265

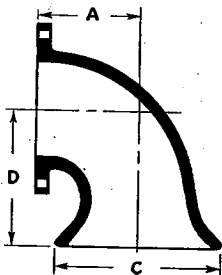


**F-1442**  
Bell and Flare

### F-1440 and F-1442

For pipe size..... Inches	3	4	6	8	10	12
Class.....	D	D	D	D	D	D
Dimension L..... Inches	8	8	8	10	10	12
Dimension C..... Inches	7½	9	11	13½	16	19
F-1440, Weight... Pounds	20	30	40	70	95	155
F-1442, Weight... Pounds	35	45	60	100	130	190
For pipe size..... Inches	14	16	18	20	24	...
Class.....	B	B	B	B	B	...
Dimension L..... Inches	12	16	16	18	18	...
Dimension C..... Inches	21	23½	25	27½	32	...
F-1440, Weight... Pounds	165	240	275	355	480	...
F-1442, Weight... Pounds	200	285	340	420	555	...

In sizes 14-inch and larger, F-1442 can be furnished with Class B or Class D bell. We will furnish with Class B bell unless otherwise ordered. Weights shown are for fittings with Class B bells.

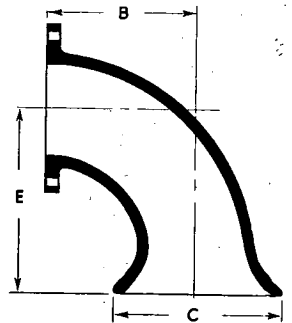


**F-1460**  
Flange and Flare  
Short Radius 90° Bend

### FLANGE AND FLARE 90° BENDS\*

End flanges are regularly drilled to the Class 125 Standard template see page 101

For dimensions of Standard Bells see page 265



**F-1464**  
Flange and Flare  
Long Radius 90° Bend

### F-1460 and F-1464

For Pipe Size Inches	Dimensions—Inches						Approx. Weight Pounds	
	F-1460 Short Radius			F-1464 Long Radius			F-1460	F-1464
	A	D	C	B	E	C		
3	5½	9	7½	7¾	11¼	7½	25	30
4	6½	10	9	9	12½	9	45	50
6	8	11½	11	11½	15	11	65	80
8	9	13½	13½	14	18½	13½	110	145
10	11	16½	16	16½	22	16	180	230
12	12	18½	19	19	25½	19	260	350
14	14	21½	21	21½	29	21	311	405
16	15	23	23½	24	32	23½	395	530
18	16½	25	25	26½	35	25	495	675
20	18	27	27½	29	38	27½	635	865
24	22	32½	32	34	44½	32	1000	1340

\* Can also be furnished with a bell joint instead of flanged, when so ordered.





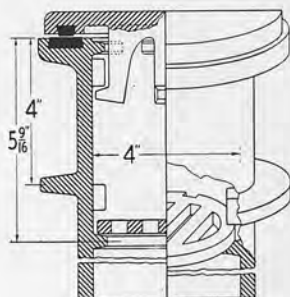
## CAST IRON PRESSURE RELIEF VALVES



**F-1492**  
Pressure Relief Valve

**Body Lengths**  
Minimum is 6 inches  
Maximum is 16 inches

Dimensions shown on  
line illustration  
are "fixed" dimensions



Sectional View

Specify length when ordering

Standard body length.....Inches	6	8	10	12	14	16
Weight, complete.....Pounds	25	27	29	31	35	38

Pressure relief valves are for placing in the bottom of concrete tanks to keep empty tanks from floating when there is an excess of ground-water underneath and around them. When this condition exists, the outside water pressure will raise the cover of the valve and allow the water to enter the tank to equalize pressures inside and outside of tank and, thus, prevent the tank from floating. The valves can be furnished in any body length from 6 inches minimum thru 16 inches maximum.

The Clow Pressure Relief Valves are so constructed that neither the cover or strainer can become separated from the body of the valve, due to ground-water pressure around the tank. However, when necessary, both may be easily removed by turning them to right or left to free them from the locking lugs cast on inside of body. Lead-poured, peened, and machined into grooves on underside of cover and top of body forms a non-corroding lead to lead contact when cover is in closed position

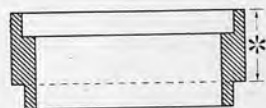


**F-1495**

## CAST IRON OVERFLOW RINGS

For establishing any desired  
overflow water-line in tanks.

Specify \* length when ordering

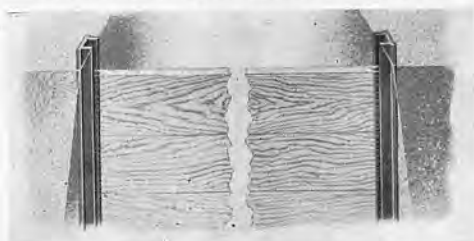


Section

Minimum Laying Length is One Inch

Nominal pipe size.....Inches	4	6	8
Outside diameter.....Inches	4.80	6.90	9.05
Inside diameter.....Inches	3.84	5.88	7.93
Weight, per inch of laying length.....Pounds	1.7	2.6	3.9

## CAST IRON STOP PLANK GROOVES



**F-1510 Stop Plank Grooves**

For plank thickness†.....Inches	1½	2	2½	3	3½
Depth of groove.....Inches	1½	2	2	2½	3
Standard length of sections.....Inches	40	48	36	48	36
Weight, per foot.....Pounds	12	14½	16	19	20

† Can also be furnished for metal plates having thickness of ¾, ½, or ⅜ inches.

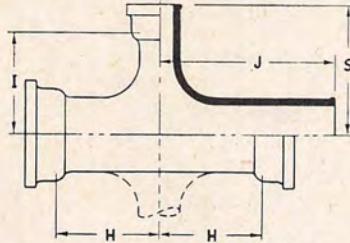


## MADE TO ORDER CAST IRON FITTINGS

There is no recognized standard for the fittings shown on this page. However, we have made them upon request and, therefore, we list them here for whatever help the dimensional data of our pattern equipment may be to those interested.

### AWWA TEES AND CROSSES WITH SPIGOT ON BRANCHES

12-inch and smaller  
Class "D"



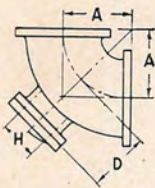
14-inch and larger  
Class "B" or "D"

#### Clow Standard Dimensions

Nominal Pipe Size of Run Inches	Size of Branch Inches	Laying Length Dimensions in Inches			
		H	J	I	S
3	All sizes of spigot branch straight or reducing.	10.00	22.00	10.00	14.00
4		11.00	23.00	11.00	15.00
6		12.00	24.00	12.00	16.00
8		13.00	25.00	13.00	17.00
10		14.00	26.00	14.00	18.00
12		15.00	27.00	15.00	19.00
14		16.00	28.00	16.00	20.00
16		17.00	29.00	17.00	21.00
18		18.00	30.00	18.00	22.00
20		19.00	31.00	19.00	23.00
24		21.00	33.00	21.00	25.00

See page 54 for making combination joints with stock fittings.

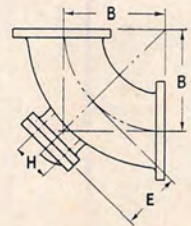
### ASA CLASS 125 FLANGED ELBOWS WITH CLEANOUT



Standard Radius

All Flanges Will be Faced and Drilled to Class 125 Template

Page 101



Long Radius

#### Clow Standard Dimensions

Nominal Pipe Size Inches	Dimensions—Inches					
	Standard Radius Elbow			Long Radius Elbow		
	A	H	D	B	H	E
4	6½	4	3	9	4	2¼/16
6	8	6	3½	11½	6	2¼/4
8	9	8	4½	14	8	2¾/8
10	11	8	5	16½	8	2½/2
12	12	8	5½	19	8	2½/8
14	14	8	6	21½	8	2½/8
16	15	12	6½	24	12	2¾/8
18	16½	12	7	26½	12	3
20	18	12	8	29	12	3¼/8
24	22	12	9	34	12	3½/8

Note: The cleanout cover flange is flat for cleanouts in sizes 4, 6, and 8-inch; is crowned for 12-inch.

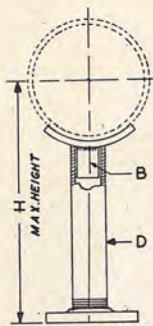


## STEEL SUPPORTS FOR CAST IRON PIPE

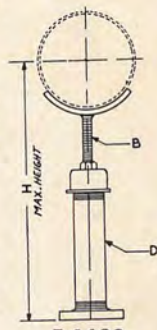
### Note

These pipe supports are made up of the following materials: The saddle is cut to size from heavy plate steel and forged to shape, the supporting column is steel pipe—see tables below, and a Class 125 companion flange forms the base.

For the adjustable support, the shank is solid steel rod, threaded. The F-1608 pipe support is adjustable by means of a heavy steel nut mounted on a reinforced malleable iron cap screwed to top of support column.



**F-1602**



**F-1608**

### F-1602 Non-Adjustable Pipe Supports

Size of Pipe to be Supported—Inches		Dimensions of Materials Used			Size of Supporting Pipe D Inches	Max. Height H Inches	
Size	O.D.	Saddle Inches	Shank B Inches Size	Flange* O.D.—In.			
3	3.96	3/8x2	1 1/4 Rod	2 1/2	7 1/2	1 1/4 Std.	24
4	4.80	3/8x2	1 1/2 Rod	2 1/2	9	1 1/2 Std.	30
6	6.90	3/8x2	1 1/2 Pipe	3	11	2 Std.	36
8	9.05	1/2x2	1 1/2 Pipe	3	13 1/2	2 Std.	36
10	11.10	1/2x3	2 Pipe	3	16	2 1/2 Std.	42
12	13.20	1/2x3	2 Pipe	3	19	2 1/2 Std.	42
14	15.30	1/2x3 1/2	2 1/2 Pipe	3 1/2	21	3 Ex. Hvy.	48
14	15.65	1/2x3 1/2	2 1/2 Pipe	3 1/2	21	3 Ex. Hvy.	48
16	17.40	1/2x3 1/2	2 1/2 Pipe	3 1/2	23 1/2	3 Ex. Hvy.	48
16	17.80	1/2x3 1/2	2 1/2 Pipe	3 1/2	23 1/2	3 Ex. Hvy.	48
18	19.50	1/2x4	2 1/2 Pipe	4	25	3 1/2 Ex. Hvy.	60
18	19.92	1/2x4	2 1/2 Pipe	4	25	3 1/2 Ex. Hvy.	60
20	21.60	1/2x4	2 1/2 Pipe	4	27 1/2	3 1/2 Ex. Hvy.	60
20	22.06	1/2x4	2 1/2 Pipe	4	27 1/2	3 1/2 Ex. Hvy.	60
24	25.80	1/2x5	3 Pipe	4	32	4 Ex. Hvy.	72
24	26.32	1/2x5	3 Pipe	4	32	4 Ex. Hvy.	72

### Specify How Wanted

We will furnish complete pipe supports as shown and described, or ship only the saddles, flanges, and/or adjusting fittings for making up the supports on the job.

### F-1608 Adjustable Pipe Support

Length of threaded shanks will allow up to 4 inches for adjustment.

Size of Pipe to be Supported—Inches		Dimensions of Materials Used			Size of Supporting Pipe D Inches	Max. Height H Inches	
Size	O.D.	Saddle Inches	Shank B Inches Size	Flange* O.D.—In.			
3	3.96	3/8x2	5/8 Rod	6	7 1/2	1 1/4 Std.	24
4	4.80	3/8x2	3/4 Rod	6	9	1 1/2 Std.	30
6	6.90	3/8x2	7/8 Rod	6	11	2 Std.	36
8	9.05	1/2x2	1 Rod	6	13 1/2	2 Std.	36
10	11.10	1/2x3	1 Rod	6	16	2 1/2 Std.	42
12	13.20	1/2x3	1 1/8 Rod	6	19	2 1/2 Std.	42
14	15.30	1/2x3 1/2	1 1/4 Rod	6	21	3 Ex. Hvy.	48
14	15.65	1/2x3 1/2	1 1/4 Rod	6	21	3 Ex. Hvy.	48
16	17.40	1/2x3 1/2	1 1/4 Rod	6	23 1/2	3 Ex. Hvy.	48
16	17.80	1/2x3 1/2	1 1/4 Rod	6	23 1/2	3 Ex. Hvy.	48
18	19.50	1/2x4	1 1/4 Rod	6	25	3 1/2 Ex. Hvy.	60
18	19.92	1/2x4	1 1/4 Rod	6	25	3 1/2 Ex. Hvy.	60
20	21.60	1/2x4	1 1/2 Rod	6	27 1/2	3 1/2 Ex. Hvy.	60
20	22.06	1/2x4	1 1/2 Rod	6	27 1/2	3 1/2 Ex. Hvy.	60
24	25.80	1/2x5	1 1/2 Rod	6	32	4 Ex. Hvy.	72
24	26.32	1/2x5	1 1/2 Rod	6	32	4 Ex. Hvy.	72

\* Base flange will be drilled for anchor bolts, to template furnished, only when so ordered.

### Information Required

Always give the size and the outside diameter of the pipe to be supported and, if pipe supports are ordered complete, give the distance from floor to centerline of the pipe to be supported. Higher supports, spreader supports, or saddles with clamps can be furnished. Send in your details.



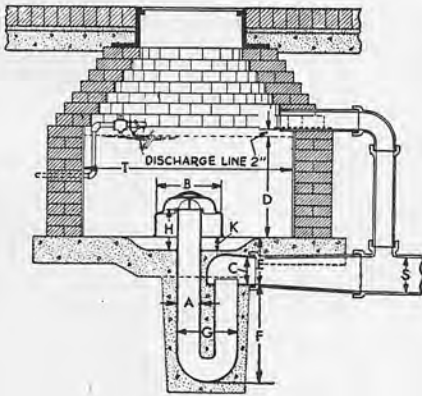
**AUTOMATIC FLUSH TANK SIPHON**

For Sewer Flushing Purposes Only

Where Siphon is Needed

Two conditions make flushing imperative. First, a gradient too flat to induce a flow of cleansing velocity. To carry the solids normally present in sewage, the liquid must move at least twenty and preferably twenty-four inches per second. The fall necessary to produce this velocity is not always available. Lateral sewers often have flat grades, too flat to be self-cleansing, but they may be used with safety by adopting the simple expedient of installing a flush tank at the upper end of the flat section, equipped with a reliable automatic siphon and

regulator. Such a device sometimes makes possible the use of a gravity outfall where without it pumping would be necessary. Second, a volume of sewage so small that the stream, though rapid, is not deep enough to carry the solids. This condition frequently, indeed, usually, is found at the heads of lateral sewers where the entire flow consists of the scant and occasional discharges from only one, two or three houses. Heads of laterals should always be flushed with clean water.



**F-1650**

**Capacity of Flush Tanks**

Diameter of Tank	Using Siphon Size—Inches	Tank Capacity Gallons
3'6"	5	136
4'0"	5	180
4'0"	6	235
4'6"	6	298

**F-1650**

Miller-Standard Design Siphon

This siphon has no moving parts to get out of order, no joints to leak and no small tubes to clog up or choke, and it is universally acknowledged to be the simplest and most durable siphon obtainable.

**Sizes, Dimensions and Weights**

Size	Number	1	2
"A" diameter of siphon	Inches	5	6
"B" diameter of bell	Inches	16 <sup>3</sup> / <sub>8</sub>	20 <sup>1</sup> / <sub>2</sub>
"C" diameter of discharge head	Inches	6	8
"D" drawing depth	Inches	23	30
"E" depth of invert below floor	Inches	11	14
"F" depth of trap	Inches	22 <sup>3</sup> / <sub>4</sub>	29 <sup>5</sup> / <sub>8</sub>
"G" width of trap	Inches	14	16
"H" height above recess	Inches	9 <sup>1</sup> / <sub>2</sub>	11
"K" clearance under bell	Inches	3	4
"T" diameter of tank at discharge line	Inches	48	54
"S" diameter of carrier	Inches	6-8	8-10
Average rate of discharge	Cu. ft. per second	.73	1.06
Approximate weight, each	Pounds	210	300

**F-1660**

P.F.T. Flush Tank Regulator

In the following table we give the approximate discharge in gallons per 24 hours through the different size jets under various water pressures.



**F-1660**

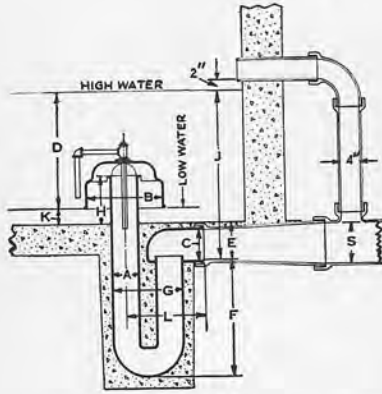
Pressure Per Sq. In.	Jet Number			Pressure Per Sq. In.	Jet Number		
	75	64	57		75	64	57
100	243	575	720	60	188	445	559
90	230	545	684	50	172	406	510
80	217	514	644	40	154	363	456
70	203	481	603	30	133	315	395





**AUTOMATIC SEWAGE SIPHONS**

For the Small Sewage Treatment Plant



**F-1670**  
Miller-Standard Design  
Sewage Siphon

**F-1670**  
Miller-Standard Design  
Sewage Siphon

From the settling tank of the treatment plant, the liquid from the sewage passes over the baffles to the dosing tank, and in this tank should be located a Miller siphon of proper size and drawing depth to intermittently discharge the contents of the dosing tank into the sub-soil tile or whatever secondary type of treatment is used. It is not desirable to permit the sewage to flow directly from the settling tank to the sub-soil tile. If it does, the filtering material surrounding the tile will be constantly saturated in places and, eventually, will become clogged and foul. The intermittent discharge permits the filtering materials to rest after each application of sewage and, thus prolongs the usefulness and efficiency of the system.

The discharge from a dosing tank also completely fills the sub-soil tile, thus insuring that every part of the irrigation field will receive its quota of sewage.

**Sizes, Dimensions and Weights**

Size . . . . .	Number				
		2	4	5	6
Recommended for number of persons using . . . . .		5 to 15	16 to 40	41 to 100	101 to 200
"A" diameter of siphon . . . . .	Inches	3	4	5	6
"B" diameter of bell . . . . .	Inches	10	12	15	19
"C" diameter of discharge head . . . . .	Inches	4	4	6	8
"D" drawing depth . . . . .	Inches	13	17	23	30
"E" depth of invert below floor . . . . .	Inches	4 1/4	5 1/2	7 1/2	10
"F" depth of trap . . . . .	Inches	13	14 1/4	23	30 1/4
"G" width of trap . . . . .	Inches	10	12	14	16
"H" height above floor . . . . .	Inches	7 1/4	11 3/4	9 1/2	11
"J" invert to discharge . . . . .	Inches	20 1/4	25 1/2	33 1/2	44
"K" clearance under bell . . . . .	Inches	3	3	3	4
"L" center of trap to end of discharge ell . . . . .	Inches	8 5/8	11 3/4	15 1/2	17 1/8
"S" diameter of carrier . . . . .	Inches	4	4-6	6-8	8-10
Average rate of discharge . . . . .	G.P.M.	72	165	328	474
Approximate weight, each . . . . .	Pounds	60	150	210	300

**F-1675 P.F.T. Type "D"**  
Spray Nozzles for Filter Beds

Nozzle is made with either 3/4 or 1/8-inch jet and with 1 1/2-inch iron pipe connection. Nozzle jet and cone can be easily removed for cleaning. The cone may be inverted to stop off the nozzle if desired. A special bushing can be furnished to convert nozzle to a half-spray. A wrench for installing the base of nozzle, and pliers for compressing the locking spring can also be furnished. Tools are furnished free of charge on orders for 25 or more nozzles.

*Nozzles are also available in various other types  
See note below.*

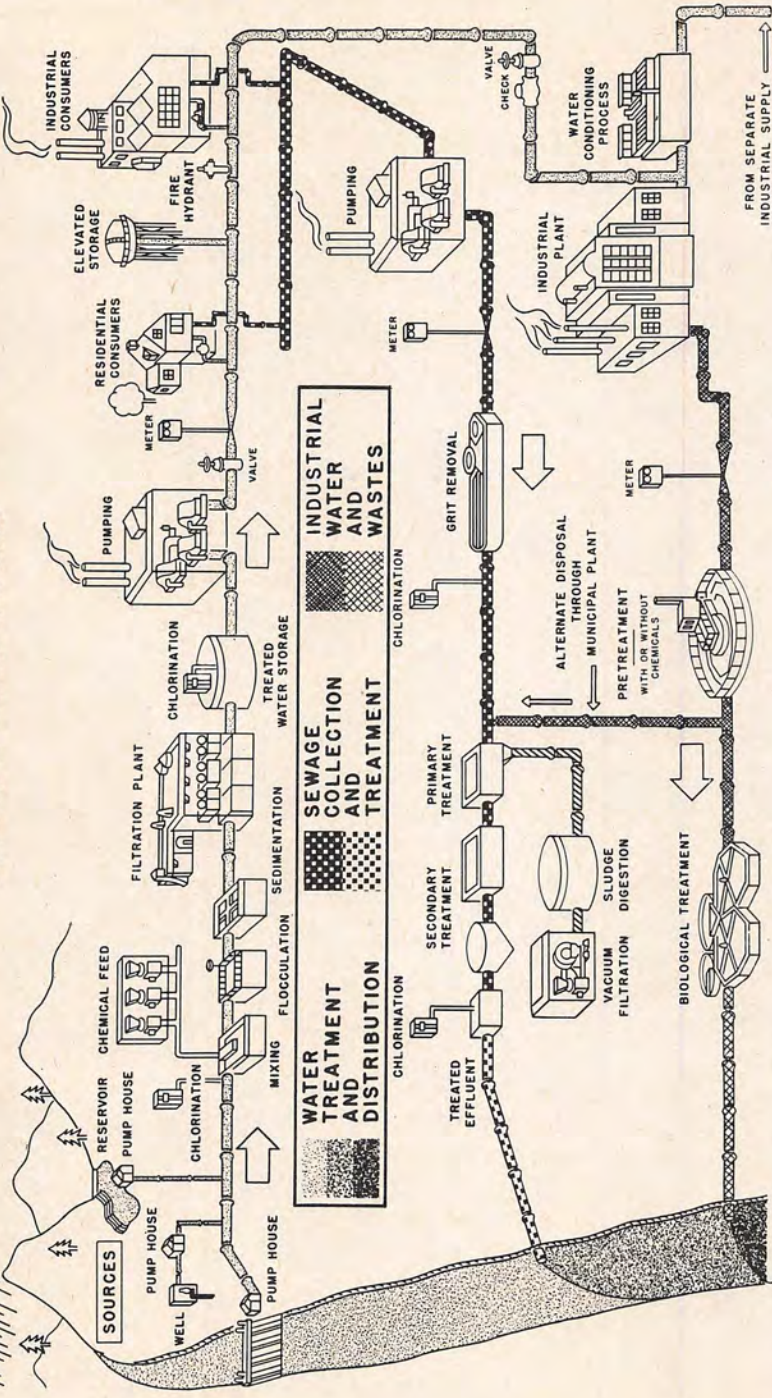
**Note**

Sketches of a distribution system, dosing tank, siphon equipment, and sizes and styles of nozzles will be prepared on receipt of data relative to the size and dimensions of the filter, the heads available and the quantities to be handled in gallons per minute.



**F-1675 Type "D"**  
Full Spray Nozzle

**CLOW-EDDY-IOWA CAST IRON PIPE, FITTINGS, VALVES AND FIRE HYDRANTS**  
 PERFORM AN IMPORTANT FUNCTION IN MOVING WATER FROM ITS SOURCE, TO MAKE IT READILY AVAILABLE  
 FOR ITS USES, AND RETURNING IT TO ITS SOURCE



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## FITTINGS

# CLOW

## CAST IRON FLANGED FITTINGS AND FLANGES

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1-1948

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Flanged Fittings Furnished Faced and Drilled Unless Otherwise Ordered





## EXPLANATORY NOTES CAST IRON FLANGED FITTINGS AND FLANGES

ASA Specification B 16.1 1948

**Pressure Rating.** These flanges and fittings are rated as follows:

For maximum saturated steam service pressures of

- 125 psi (Gage) sizes 1 to 12 in., incl.
- 100 psi (Gage) sizes 14 to 24 in., incl.
- 50 psi (Gage) sizes 30 to 48 in., incl.

For maximum liquid and gas service pressures at 150 F of

- 175 psi (Gage) sizes 1 to 12 in., incl.
- 150 psi (Gage) sizes 14 to 48 in., incl. for flanges only.\*

**Marking.** FITTINGS. The manufacturer's name or trade mark and numerals as shown below to indicate the maximum saturated steam service pressure shall be cast on the exterior surface of all fittings.

For Sizes	Numerals
1 to 12 in., incl.	125
14 to 24 in., incl.	100
30 to 48 in., incl.	50

**FLANGES.** The manufacturer's name or trade mark shall be cast on all loose flanges.

The above marking requirements comply with principles established in MSS Standard Practice SP-25-1936. (Does not apply to fittings shown on pages 55 thru 60.)

**Material.** CASTINGS. The dimensions prescribed in this standard are based upon gray iron castings of high quality produced under regular control of chemical and physical properties by a recognized process. The manufacturer shall be prepared to certify that his product has been so produced and that the chemical and physical properties thereof, as proved by test specimens, are at least equal to the requirements shown herein—taken from the ASTM Specification A 126-1942.

Class A (regular gray iron)

Sulphur	0.12 per cent maximum
Phosphorous	0.75 per cent maximum
Tensile strength	21,000 psi minimum

Class B (higher strength gray iron)

Sulphur	0.12 per cent maximum
Phosphorous	0.75 per cent maximum
Tensile strength	31,000 psi minimum

It is intended that material required by this standard shall be in accordance with the requirements specified herein or the latest edition of ASTM A 126.

Flanges and fittings shall be made of material at least equal to the requirements of Class A iron for sizes 12 in. and smaller and Class B iron for sizes 14 in. and larger.

**BOLTING.** The bolting used with these flanges and fittings shall be made of carbon steel which conforms to the requirements of MSS Standard Practice SP-39-1945 for bolts. †

**Wall Thickness.** It is recognized that some variations are absolutely unavoidable in the making of patterns and castings. Equipment shall be designed to produce wall thicknesses given in the tables. Wall thickness at no point shall be less than 87½ per cent of the thickness given in the tables.

### Center to Face Dimensions

**a SIDE OUTLET FITTINGS.** Side outlet elbows, side outlet tees, and side outlet crosses, shall have all openings on intersecting center lines. Long radius elbows with side outlet shall have the side outlet on the radial center line of the elbow.

**b ELBOWS.** 1 The center to face dimensions for straight size 90 deg elbows, 90 deg long radius elbows, 45 deg elbows, side outlet elbows, and double branch elbows are shown in their respective tables.

2 Reducing 90 deg elbows, reducing 90 deg long radius elbows, reducing side outlet elbows, and reducing double branch elbows shall have same center to face dimensions as straight size fittings corresponding to the size of the larger opening.

3 For 90 deg long radius elbows with side outlet the center to face dimensions of side outlet shall be the same as dimension "A" for a straight size 90 deg elbow corresponding to the size of the larger opening.

4 Special degree elbows ranging from 1 thru 45 deg shall have the same center to face dimensions given for 45 deg elbows and those over 45 deg thru 90 deg shall have the same center to face dimensions given for 90 deg elbows. The angle designation of an elbow is its deflection from straight line flow and is the angle between the flange faces.

**c TEES, CROSSES, AND LATERALS.** 1 The center to face dimensions for straight size tees and crosses, with or without side outlet, and laterals are shown in their respective tables.

2 Reducing tees and crosses, with or without side outlet, and reducing laterals, sizes 16 in. and smaller, shall have the same center to face dimensions as straight size fittings corresponding to the size of the largest opening.

For sizes 18 in. and larger, when the outlet or branch of tees, crosses, and laterals is reduced to certain sizes; *short body pattern* fittings will be furnished. The center to face dimensions for such fittings are shown in bold-face type on pages 107, 109, and 110.

Tees, crosses, and laterals, reducing on the run only, shall have the same center to face dimensions as straight size fittings corresponding to the size of the largest opening.

3 Tees reducing on both runs are generally known as bull head tees and have the same

\* It will be noted that water service ratings as shown for sizes 14 in. and larger in this standard are applicable to flanges only and not to fittings. Water service ratings on fittings 14 in. and larger are withheld in this standard pending receipt of report on research work which is now being conducted by ASA Sectional Committee A21.

† The carbon steel bolts prescribed for the flanges in this standard are based upon using a flat ring gasket which extends to the bolts.

Where cast-iron to cast-iron flanges or cast-iron to steel flanges are used with full-face gaskets, higher strength bolts may properly be used.



## EXPLANATORY NOTES (continued)

center to face dimensions as straight size fittings corresponding to the size of the outlet.

**d TRUE Y's.** Center to face dimensions for True Y's are shown on page 59.

**e REDUCERS AND ECCENTRIC REDUCERS.** The face to face dimensions for all reductions of reducers and eccentric reducers shall be same as shown in tables for larger opening.

**Center to Face Tolerances.** An inspection tolerance of plus or minus  $\frac{1}{32}$  in. shall be allowed on all center to contact surface dimensions for sizes up to and including 10 in. and plus or minus  $\frac{1}{16}$  in. on sizes larger than 10 in. An inspection tolerance of plus or minus  $\frac{1}{16}$  in. shall be allowed on all contact surface to contact surface dimensions for sizes up to and including 10 in. and plus or minus  $\frac{1}{8}$  in. on sizes larger than 10 in. The largest opening in the fitting governs the tolerance to be applied to all openings.

**Thread of Screwed Flanges.** The flanges shall have an American Standard Taper Pipe Thread in accordance with ASA B2.1-1945. The thread shall be concentric with the axis of the flange and variations in alignment shall not exceed  $\frac{1}{16}$  in. per ft.

Threads shall be chamfered approximately to the major diameter of the thread at the back of the flange at an angle of approximately 45 deg with the axis of the thread for the purpose of easy entrance in making a joint and protecting thread. The chamfer shall be concentric with the thread, and shall be included in measurements of the thread length.

The gaging notch of working gage should come flush with bottom of chamfer and maximum allowable thread variations is one turn large or one turn small from the notch.

**Facing.** These cast-iron flanges and flanged fittings shall be plain faced; i.e., without projection or raised face and finished in accordance with MSS SP-6-1947.

**Flange Bolt Holes.** Bolt holes shall be in multiples of four so that fittings may be made to face in any quarter. The bolt holes shall straddle the center line.

For bolts smaller than  $1\frac{3}{4}$  in. diameter, the bolt holes shall be  $\frac{1}{8}$  in. larger than the nominal diameter of the bolt; for bolts  $1\frac{3}{4}$  in. diameter and larger, bolt holes shall be  $\frac{1}{4}$  in. larger than the nominal diameter of the bolt.

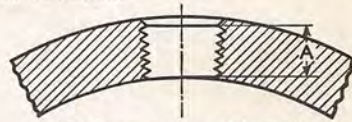
**Spot Facing.** FLANGES. The bolt holes of these cast-iron flanges need not be spot faced for ordinary service except, as follows: In sizes 12 in. and smaller when rough flanges, after facing, are oversize more than  $\frac{1}{8}$  in. in thickness, they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of  $\frac{1}{16}$  in. In sizes 14 to 24 in., inclusive, when rough flanges, after facing, are oversize more than  $\frac{3}{16}$  in. in thickness they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of  $\frac{1}{16}$  in. In sizes 30 in. and larger when rough flanges, after facing, are oversize more than  $\frac{1}{4}$  in. in thickness they shall be spot faced to the specified thickness of flange (minimum) with a plus tolerance of  $\frac{1}{8}$  in.

**FITTINGS.** The bolt holes of the flanges on

these cast-iron fittings need not be spot faced on sizes smaller than 18 in. for ordinary service, except as required for oversize thickness of flanges as indicated above. The bolt holes of all flanges on fittings 18 to 24 in., inclusive, shall be spot faced to the specified thickness of the flange (min.) with a plus tolerance of  $\frac{1}{16}$  in., and of all flanges on fittings sizes 30 thru 48 in. they shall be spot faced to the specified thickness of the flange (minimum) with a plus tolerance of  $\frac{1}{8}$  in.

Where spot (or back) facing of flanges and fittings is necessary, the spot facing diameter shall be in accordance with MSS Standard Practice SP-9-1947.

**Drain Tappings.** Holes may be tapped in the wall of fitting if the metal thickness is sufficient to provide the effective length of thread specified below. Where thread length is insufficient or size of tapping is such that reinforcement of opening is necessary, a boss should be added.



**Minimum Thread Length**

Size of tapping Length "A"	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
	0.41	0.53	0.55	0.68	0.71	0.72	0.76

All dimensions given in inches.

In no case shall the effective length of thread "A" be less than that shown in table above. These lengths are equal to the effective thread lengths of American Standard External Pipe Threads (ASA B2.1-1945).

The method of designating the locations of tapped holes for drains is shown on page 112. Each possible location is designated by a letter so that desired locations for various types of fittings may be definitely specified without use of further sketches or description. For further detail in applying tappings, see MSS Standard Practice SP-28-1945.

**Bolts and Nuts.** Bolts shall have American Standard Regular Unfinished Square Heads or American Standard Heavy Unfinished Hexagonal Heads and nuts shall be American Standard Heavy Unfinished Hexagonal dimensions—as specified in American Standard for Wrench Head Bolts and Nuts and Wrench Openings (ASA B18.2-1941). For bolts  $1\frac{3}{4}$  in. diameter and larger, bolt-studs with a nut on each end are recommended.

Hexagonal nuts for pipe sizes 1 to 48 in. can be conveniently pulled up with open wrenches of minimum design of heads. Hexagonal nuts for pipe sizes 48 to 96 in. can be conveniently pulled up with box wrenches.

All bolts, or bolt-studs if used, and all nuts shall be threaded in accordance with American Standard for Screw Threads (ASA B1.1-1935) Coarse-Thread Series, Class 2 Fit.

**Gaskets.** Ring gaskets shall be in accordance with dimensions shown on page 115.

**Tests.** These fittings shall be designed to withstand, without showing leaks hydrostatic test pressures of twice the rated steam pressure. Hydrostatic tests of cast-iron fittings are not required unless specified by the user.



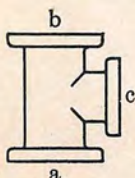


**REDUCING CAST IRON FLANGED FITTINGS**

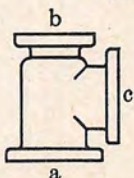
**HOW TO ORDER**

When ordering reducing fittings, give the size of the openings in the order indicated by the sequence of the letters **a**, **b**, **c** and **d**. In designating the size of the openings of side outlet reducing fittings, the size of the side outlet is to be given last.

**REDUCING TEES**



Reducing on Outlet



Reducing on One Run

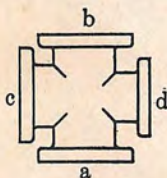


Reducing on One Run & Outlet

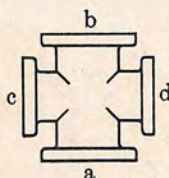


Reducing on Both Runs (Bullhead)

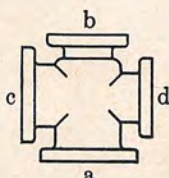
**REDUCING CROSSES**



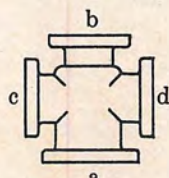
Reducing on One Outlet



Reducing on Both Outlets

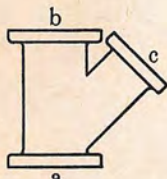


Reducing on One Run and One Outlet

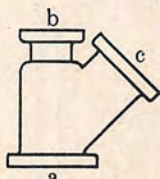


Reducing on One Run and Both Outlets

**REDUCING LATERALS**



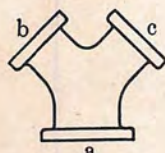
Reducing on Branch



Reducing on One Run

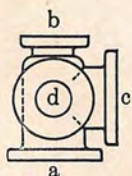


Reducing on One Run and Branch

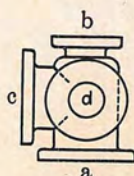


Reducing True Y"

**SIDE OUTLET TEES**

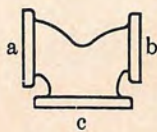


Right Hand



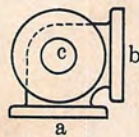
Left Hand

**DOUBLE BRANCH ELBOWS**

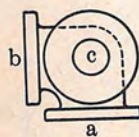


Reducing

**SIDE OUTLET ELBOWS**



Right Hand



Left Hand

**SPECIAL REDUCING FLANGED FITTINGS**

It is not possible to carry in our stock, at all times, a line of reducing flanged fittings sufficiently large to meet all demands promptly. We do aim to carry a complete stock of regular straight sizes and the extensive line of reducing sizes listed as "Stock Sizes" on pages elsewhere in this section. To avoid delay in shipment of reducing flanged fittings **not carried in stock**, specify "Reduce by flanges if necessary"—if adjoining connection is to be made to threaded pipe.

For Reducing Flanges, Class 125, see page 113.





**FLANGES, FLANGED PIPE, FITTINGS AND VALVES**

**TEMPLATES FOR DRILLING**

**AMERICAN STANDARD**

**ASA SPECIFICATION B16.1 FOR CLASS 125\***

Size Inches	Diameter of Flange Inches	Thickness of Flange (Min.) Inches	Diameter of Bolt Circle Inches	Number of Bolts	Diameter of Bolts Inches	Length of Bolts Inches
1	4 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>8</sub>	4	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>4</sub>
1 <sup>1</sup> / <sub>4</sub>	4 <sup>5</sup> / <sub>8</sub>	1 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	4	1 <sup>1</sup> / <sub>2</sub>	2
1 <sup>1</sup> / <sub>2</sub>	5	9 <sup>1</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>8</sub>	4	1 <sup>1</sup> / <sub>2</sub>	2
2	6	5 <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	4	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>4</sub>
2 <sup>1</sup> / <sub>2</sub>	7	1 <sup>1</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>2</sub>	4	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>
3	7 <sup>1</sup> / <sub>2</sub>	3 <sup>4</sup> / <sub>8</sub>	6	4	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>
3 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>16</sub>	7	8	5 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>
4	9	1 <sup>5</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	8	5 <sup>5</sup> / <sub>8</sub>	3
5	10	1 <sup>5</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3
6	11	1	9 <sup>1</sup> / <sub>2</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>
8	13 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	11 <sup>3</sup> / <sub>4</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>
10	16	1 <sup>3</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	12	7 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>
12	19	1 <sup>1</sup> / <sub>4</sub>	17	12	7 <sup>5</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>
14	21	1 <sup>3</sup> / <sub>8</sub>	18 <sup>3</sup> / <sub>4</sub>	12	1	4 <sup>1</sup> / <sub>4</sub>
16	23 <sup>1</sup> / <sub>2</sub>	1 <sup>7</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	16	1	4 <sup>1</sup> / <sub>2</sub>
18	25	1 <sup>7</sup> / <sub>16</sub>	22 <sup>3</sup> / <sub>4</sub>	16	1 <sup>1</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>
20	27 <sup>1</sup> / <sub>2</sub>	1 <sup>11</sup> / <sub>16</sub>	25	20	1 <sup>1</sup> / <sub>8</sub>	5
24	32	1 <sup>7</sup> / <sub>8</sub>	29 <sup>1</sup> / <sub>2</sub>	20	1 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>2</sub>
30	38 <sup>3</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>8</sub>	36	28	1 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>
36	46	2 <sup>3</sup> / <sub>8</sub>	42 <sup>3</sup> / <sub>4</sub>	32	1 <sup>1</sup> / <sub>2</sub>	7
42	53	2 <sup>5</sup> / <sub>8</sub>	49 <sup>1</sup> / <sub>2</sub>	36	1 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>
48	59 <sup>1</sup> / <sub>2</sub>	2 <sup>3</sup> / <sub>4</sub>	56	44	1 <sup>1</sup> / <sub>2</sub>	7 <sup>3</sup> / <sub>4</sub>

\* American Standard Class 125 cast iron flanges have plain face.

**ASA SPECIFICATION B16b FOR CLASS 250†**

Size Inches	Diameter of Flange Inches	Thickness of Flange (Min.) Inches	Diameter of Raised Face Inches	Diameter of Bolt Circle Inches	Number of Bolts	Diameter of Bolts Inches	Length of Bolts Inches
1	4 <sup>7</sup> / <sub>8</sub>	1 <sup>11</sup> / <sub>16</sub>	2 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	4	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>
1 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>8</sub>	4	5 <sup>5</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>
1 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	4	3 <sup>4</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>
2	6 <sup>1</sup> / <sub>2</sub>	7 <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>16</sub>	5	8	5 <sup>5</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>4</sub>
2 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	1	4 <sup>15</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>8</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>
3	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>8</sub>	5 <sup>11</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>
3 <sup>1</sup> / <sub>2</sub>	9	1 <sup>3</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>
4	10	1 <sup>1</sup> / <sub>4</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	8	3 <sup>4</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>
5	11	1 <sup>3</sup> / <sub>8</sub>	8 <sup>5</sup> / <sub>16</sub>	9 <sup>1</sup> / <sub>4</sub>	8	3 <sup>4</sup> / <sub>8</sub>	4
6	12 <sup>1</sup> / <sub>2</sub>	1 <sup>7</sup> / <sub>16</sub>	9 <sup>11</sup> / <sub>16</sub>	10 <sup>5</sup> / <sub>8</sub>	12	3 <sup>4</sup> / <sub>8</sub>	4
8	15	1 <sup>5</sup> / <sub>8</sub>	11 <sup>15</sup> / <sub>16</sub>	13	12	7 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>
10	17 <sup>1</sup> / <sub>2</sub>	1 <sup>7</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>16</sub>	15 <sup>1</sup> / <sub>4</sub>	16	1	5 <sup>3</sup> / <sub>4</sub>
12	20 <sup>1</sup> / <sub>2</sub>	2	16 <sup>7</sup> / <sub>16</sub>	17 <sup>3</sup> / <sub>4</sub>	16	1 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>
14	23	2 <sup>1</sup> / <sub>8</sub>	18 <sup>15</sup> / <sub>16</sub>	20 <sup>1</sup> / <sub>4</sub>	20	1 <sup>1</sup> / <sub>8</sub>	6
16	25 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>4</sub>	21 <sup>1</sup> / <sub>16</sub>	22 <sup>1</sup> / <sub>2</sub>	20	1 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>
18	28	2 <sup>3</sup> / <sub>8</sub>	23 <sup>5</sup> / <sub>16</sub>	24 <sup>3</sup> / <sub>4</sub>	24	1 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>2</sub>
20	30 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	25 <sup>5</sup> / <sub>16</sub>	27	24	1 <sup>1</sup> / <sub>4</sub>	6 <sup>3</sup> / <sub>4</sub>
24	36	2 <sup>3</sup> / <sub>4</sub>	30 <sup>5</sup> / <sub>16</sub>	32	24	1 <sup>1</sup> / <sub>2</sub>	7 <sup>3</sup> / <sub>4</sub>

† American Standard Class 250 cast iron flanges have 1/16-inch raised face.

Note: Drilling templates are in multiples of four, so that fittings may be made to face in any quarter. Bolt holes shall straddle the center line. For Explanatory Notes, see pages 98 and 99.





Inc.

## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1

### ELBOWS

Furnished Faced and Drilled  
Unless Otherwise Ordered

### DIMENSIONS AND WEIGHTS

F-1800 and F-1800-R

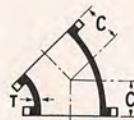


**F-1800** Straight  
90° Elbow



**F-1800-R** Reducing  
90° Elbow

Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds	Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds
	T	T <sub>1</sub>	A			T	T <sub>1</sub>	A	
2	5/16	..	4.50	14	12	13/16	..	12.00	250
2 x 1 1/2	5/16	5/16	4.50	12	12 x 10	13/16	3/4	12.00	220
2 1/2	5/16	..	5.00	19	12 x 8	13/16	5/8	12.00	190
2 1/2 x 2	5/16	5/16	5.00	17	12 x 6	13/16	9/16	12.00	165
3	3/8	..	5.50	24	14	7/8	..	14.00	350
3 x 2 1/2	3/8	5/16	5.50	22	14 x 12	7/8	13/16	14.00	320
3 x 2	3/8	5/16	5.50	19	14 x 10	7/8	3/4	14.00	280
3 1/2	7/16	..	6.00	31	14 x 8	7/8	5/8	14.00	240
4	1/2	..	6.50	41	16	1	..	15.00	470
4 x 3	1/2	3/8	6.50	33	16 x 14	1	7/8	15.00	420
4 x 2 1/2	1/2	5/16	6.50	31	16 x 12	1	13/16	15.00	380
4 x 2	1/2	5/16	6.50	29	16 x 10	1	3/4	15.00	340
5	1/2	..	7.50	52	16 x 8	1	5/8	15.00	300
5 x 4	1/2	1/2	7.50	48	18	1 1/16	..	16.50	580
5 x 3	1/2	3/8	7.50	40	18 x 16	1 1/16	1	16.50	540
5 x 2 1/2	1/2	5/16	7.50	37	18 x 14	1 1/16	7/8	16.50	480
6	9/16	..	8.00	68	18 x 12	1 1/16	13/16	16.50	440
6 x 5	9/16	1/2	8.00	60	18 x 10	1 1/16	3/4	16.50	390
6 x 4	9/16	1/2	8.00	56	20	1 1/8	..	18.00	740
6 x 3	9/16	3/8	8.00	47	20 x 18	1 1/8	1 1/16	18.00	680
8	5/8	..	9.00	110	20 x 16	1 1/8	1	18.00	640
8 x 6	5/8	9/16	9.00	90	20 x 14	1 1/8	7/8	18.00	570
8 x 5	5/8	1/2	9.00	82	20 x 12	1 1/8	13/16	18.00	520
8 x 4	5/8	1/2	9.00	77	24	1 1/4	..	22.00	1160
10	3/4	..	11.00	175	24 x 20	1 1/4	1 1/8	22.00	1010
10 x 8	3/4	5/8	11.00	150	24 x 18	1 1/4	1 1/16	22.00	930
10 x 6	3/4	9/16	11.00	125	24 x 16	1 1/4	1	22.00	880
10 x 5	3/4	1/2	11.00	115	24 x 12	1 1/4	13/16	22.00	740



**F-1808**

Straight 45° Elbows

Nominal pipe size... Inches	2	2 1/2	3	3 1/2	4	5	6	8
Dimension T..... Inches	5/16	5/16	3/8	7/16	1/2	1/2	9/16	5/8
Dimension C..... Inches	2.50	3.00	3.00	3.50	4.00	4.50	5.00	5.50
Approximate weight Pounds	12	17	20	27	36	45	60	94
Nominal pipe size... Inches	10	12	14	16	18	20	24	..
Dimension T..... Inches	3/4	13/16	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension C..... Inches	6.50	7.50	7.50	8.00	8.50	9.50	11.00	..
Approximate weight Pounds	145	220	270	360	420	540	800	..

For Pressure Ratings, see page 98.

For Drilling Template, see page 101

For Dimensions of Fittings larger than 24 inches, see page 117.





**CLASS 125 CAST IRON FLANGED JOINT FITTINGS**

**FOR STEAM, LIQUID AND GAS SERVICE**

ASA Specification B16.1

**ELBOWS**

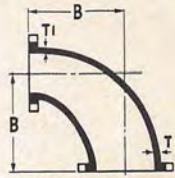
**Furnished Faced and Drilled  
Unless Otherwise Ordered**

**DIMENSIONS AND WEIGHTS**

**F-1804 and F-1804-R**



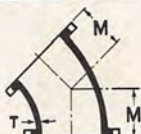
**F-1804 Straight  
90° Long Radius Elbow**



**F-1804-R Reducing  
90° Long Radius Elbow**

Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Inches	Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds
	T	T <sub>1</sub>	B			T	T <sub>1</sub>	B	
2	5/16	..	6.50	16	14	7/8	..	21.50	470
3	3/8	..	7.75	28	14 x 12	7/8	13/16	21.50	425
3 x 2	3/8	5/16	7.75	20	14 x 10	7/8	3/4	21.50	375
4	1/2	..	9.00	48	14 x 8	7/8	5/8	21.50	330
4 x 3	1/2	3/8	9.00	35	16	1	..	24.00	670
4 x 2	1/2	5/16	9.00	35	16 x 14	1	7/8	24.00	590
5	1/2	..	10.25	62	16 x 12	1	13/16	24.00	530
5 x 4	1/2	1/2	10.25	60	16 x 10	1	3/4	24.00	480
5 x 3	1/2	3/8	10.25	45	16 x 8	1	5/8	24.00	420
6	9/16	..	11.50	85	18	1 1/16	..	26.50	840
6 x 5	9/16	1/2	11.50	75	18 x 16	1 1/16	1	26.50	775
6 x 4	9/16	1/2	11.50	70	18 x 14	1 1/16	7/8	26.50	685
6 x 3	9/16	3/8	11.50	55	18 x 12	1 1/16	13/16	26.50	635
8	5/8	..	14.00	145	18 x 10	1 1/16	3/4	26.50	570
8 x 6	5/8	9/16	14.00	120	20	1 1/8	..	29.00	1080
8 x 5	5/8	1/2	14.00	110	20 x 18	1 1/8	1 1/16	29.00	980
8 x 4	5/8	1/2	14.00	100	20 x 16	1 1/8	1	29.00	915
10	3/4	..	16.50	230	20 x 14	1 1/8	7/8	29.00	820
10 x 8	3/4	5/8	16.50	195	20 x 12	1 1/8	9/16	29.00	755
10 x 6	3/4	9/16	16.50	170	24	1 1/4	..	34.00	1640
10 x 4	3/4	1/2	16.50	145	24 x 20	1 1/4	1 1/8	34.00	1430
12	13/16	..	19.00	350	24 x 18	1 1/4	1 1/16	34.00	1325
12 x 10	13/16	3/4	19.00	300	24 x 16	1 1/4	1	34.00	1245
12 x 8	13/16	5/8	19.00	260	24 x 14	1 1/4	7/8	34.00	1130
12 x 6	13/16	9/16	19.00	225	24 x 12	1 1/4	13/16	34.00	1060

**For Pressure Ratings  
See Page 98**



**F-1812**

**Straight 45° Long Radius Elbows**

**For Drilling Template  
See Page 101**

Nominal pipe size..... Inches	3	4	6	8	10	12
Dimension T..... Inches	3/8	1/2	9/16	5/8	3/4	13/16
Dimension M..... Inches	4.50	5.25	6.75	8.00	9.00	9.50
Approximate weight..... Pounds	20	40	65	110	170	240
Nominal pipe size..... Inches	14	16	18	20	24	..
Dimension T..... Inches	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension M..... Inches	10.00	13.00	14.00	15.00	17.00	..
Approximate weight..... Pounds	305	470	570	715	1060	..

**From ASA Specification B16.1**

The angle designation of an elbow is its deflection from straight line flow and is the angle between the flange faces.

For dimensions of fittings larger than 24 inches, see page 117.



## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1

### ELBOWS

#### DIMENSIONS AND WEIGHTS

For Pressure Ratings  
See Page 98



For Drilling Template  
See Page 101

**F-1816**

Straight 22½° Elbows

Nominal pipe size.....Inches	2	3	4	6	8	10
Dimension T.....Inches	5/16	3/8	1/2	9/16	5/8	3/4
Dimension C.....Inches	2.50	3.00	4.00	5.00	5.50	6.50
Approximate weight.....Pounds	10	20	35	55	90	140
Nominal pipe size.....Inches	12	14	16	18	20	24
Dimension T.....Inches	13/16	7/8	1	1 1/16	1 1/8	1 1/4
Dimension C.....Inches	7.50	7.50	8.00	8.50	9.50	11.00
Approximate weight.....Pounds	210	260	345	410	530	785



**F-1820**

Straight Side Outlet Elbows\*

Nominal pipe size.....Inches	3	4	6	8	10	12
Dimension T.....Inches	3/8	1/2	9/16	5/8	3/4	13/16
Dimension A.....Inches	5.50	6.50	8.00	9.00	11.00	12.00
Approximate weight.....Pounds	34	59	96	150	240	340
Nominal pipe size.....Inches	14	16	18	20	24	..
Dimension T.....Inches	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension A.....Inches	14.00	15.00	16.50	18.00	22.00	..
Approximate weight.....Pounds	470	620	760	970	1510	..

\* In certain sizes, we can furnish side outlet elbows with the side outlet smaller than the main openings. When in need of such fittings, please check with us before placing your order.



**F-1822**

Straight Double Branch Elbows

Nominal pipe size.....Inches	3	4	6	8	10	12
Dimension T.....Inches	3/8	1/2	9/16	5/8	3/4	13/16
Dimension A.....Inches	5.50	6.50	8.00	9.00	11.00	12.00
Approximate weight.....Pounds	37	64	105	165	270	380
Nominal pipe size.....Inches	14	16	18	20	24	..
Dimension T.....Inches	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension A.....Inches	14.00	15.00	16.50	18.00	22.00	..
Approximate weight.....Pounds	530	700	860	1100	1730	..

For Dimensions of Fittings Larger than 24 inches, see page 117.

**All Flanged Fittings Furnished Faced and Drilled Unless Otherwise Ordered**



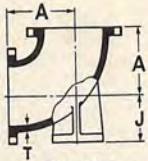


## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

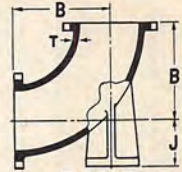
FOR STEAM, LIQUID AND GAS SERVICE  
ASA Specification B16.1

### BASE ELBOWS

### DIMENSIONS AND WEIGHTS



**F-1824**  
Standard Radius



**F-1828**  
Long Radius

Nominal pipe size.....Inches	3	3½	4	5	6	8	10
Dimension T.....Inches	3/8	7/16	1/2	1/2	9/16	5/8	3/4
Dimension A.....Inches	5.50	6.00	6.50	7.50	8.00	9.00	11.00
Dimension J.....Inches	4.88	5.25	5.50	6.25	7.00	8.38	9.75
Approximate weight.....Pounds	34	41	51	72	88	150	220
Nominal pipe size.....Inches	12	14	16	18	20	24	..
Dimension T.....Inches	13/16	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension A.....Inches	12.00	14.00	15.00	16.50	18.00	22.00	..
Dimension J.....Inches	11.25	12.50	13.75	15.00	16.00	18.50	..
Approximate weight.....Pounds	315	420	545	695	860	1290	..

**F-1828**  
Straight Long Radius Base Elbows

Nominal pipe size.....Inches	3	4	6	8	10	12
Dimension T.....Inches	3/8	1/2	9/16	5/8	3/4	13/16
Dimension B.....Inches	7.75	9.00	11.50	14.00	16.50	19.00
Dimension J.....Inches	4.88	5.50	7.00	8.38	9.75	11.25
Approximate weight.....Pounds	48	73	120	205	295	435
Nominal pipe size.....Inches	14	16	18	20	24	..
Dimension T.....Inches	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension B.....Inches	21.50	24.00	26.50	29.00	34.00	..
Dimension J.....Inches	12.50	13.75	15.00	16.00	18.50	..
Approximate weight.....Pounds	565	780	995	1240	1815	..

\* Dimensions "J" are for machined basis. For bases not machined, add approximately 1/4-inch.

### Base Elbows—Reducing Sizes

Starting with the 4 x 3 size, reducing sizes of base elbows are available in same range of sizes as shown on page 102 for standard radius elbows and on page 103 for long radius elbows. Such fittings are regularly furnished with the base under the larger size opening. Elbows with the base under the smaller size opening are very special.

Center-to-face dimensions of reducing elbows (as well as base dimensions) are same as for straight size fittings corresponding to the size of the larger opening—as shown in tables on this page.



### ROUND BASE IS REGULAR

Bases will be machined  
and/or drilled  
ONLY  
when so ordered †



### Dimensions and Weights of Bases

For fitting size.....Inches	3	3½	4	5	6	8	10	12	14	16	18	20	24
Supporting pipe size.....Inches	1½	1½	2	2½	2½	4	4	6	6	6	8	8	8
Thickness T.....Inches	9/16	9/16	5/8	11/16	11/16	15/16	15/16	1	1	1	1 1/8	1 1/8	1 1/8
Thickness U.....Inches	1/2	1/2	1/2	5/8	5/8	7/8	7/8	1	1	1	1 1/8	1 1/8	1 1/8
Diameter X.....Inches	5	5	6	7	7	9	9	11	11	11	13½	13½	13½
Number of holes in base.....	4	4	4	4	4	4	4	4	4	4	4	4	4
Size of holes.....Inches	5/8	5/8	3/4	3/4	3/4	3/4	3/4	7/8	7/8	7/8	7/8	7/8	7/8
Diameter BC.....Inches	3 3/8	3 3/8	4 3/4	5 1/2	5 1/2	7 1/2	7 1/2	9 1/2	9 1/2	9 1/2	11 3/4	11 3/4	11 3/4
Weight of F-1824 base.....Pounds	10	10	10	20	20	40	45	65	70	75	115	120	130
Weight of F-1828 base.....Pounds	20	..	25	..	35	60	65	85	95	110	155	160	175

† When bases are ordered drilled other than regular, a template must accompany the order.



Inc.

## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

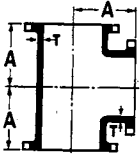
ASA Specification B16.1

### TEES

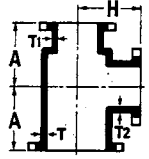
Furnished Faced and Drilled  
Unless Otherwise Ordered

### DIMENSIONS AND WEIGHTS

F-1844 and F-1844-R



**F-1844**  
Straight Tee



**F-1844-R**  
Reducing Tee

Nominal Pipe Size Inches	Dimensions—Inches					Approximate Weight Pounds
	T	T <sub>1</sub>	T <sub>2</sub>	A	H	
2 x 2 x 2	5/16	...	...	4.50	...	21
2 x 2 x 1 1/2	5/16	5/16	5/16	4.50	4.50	19
2 1/2 x 2 1/2 x 2 1/2	5/16	...	...	5.00	...	30
3 x 3 x 3	3/8	...	...	5.50	...	37
3 x 3 x 2 1/2	3/8	3/8	5/16	5.50	5.50	36
3 x 3 x 2	3/8	3/8	5/16	5.50	5.50	33
3 x 3 x 1 1/2	3/8	3/8	5/16	5.50	5.50	31
3 x 2 x 3	3/8	5/16	3/8	5.50	5.50	33
3 1/2 x 3 1/2 x 3 1/2	7/16	...	...	6.00	...	49
4 x 4 x 4	1/2	...	...	6.50	...	64
4 x 4 x 3	1/2	1/2	3/8	6.50	6.50	57
4 x 4 x 2 1/2	1/2	1/2	1/2	6.50	6.50	55
4 x 4 x 2	1/2	1/2	5/16	6.50	6.50	53
4 x 3 x 4	1/2	3/8	1/2	6.50	6.50	57
4 x 3 x 3	1/2	3/8	3/8	6.50	6.50	50
5 x 5 x 5	1/2	...	...	7.50	...	81
5 x 5 x 4	1/2	1/2	1/2	7.50	7.50	78
5 x 5 x 3	1/2	1/2	3/8	7.50	7.50	70
5 x 4 x 5	1/2	1/2	1/2	7.50	7.50	78
5 x 4 x 4	1/2	1/2	1/2	7.50	7.50	75
6 x 6 x 6	9/16	...	...	8.00	...	105
6 x 6 x 5	9/16	5/16	1/2	8.00	8.00	99
6 x 6 x 4	9/16	9/16	1/2	8.00	8.00	96
6 x 6 x 3	9/16	9/16	3/8	8.00	8.00	89
6 x 5 x 6	9/16	1/2	9/16	8.00	8.00	100
6 x 5 x 4	9/16	1/2	1/2	8.00	8.00	92
6 x 4 x 6	9/16	1/2	9/16	8.00	8.00	98
6 x 4 x 4	9/16	1/2	1/2	8.00	8.00	89
6 x 4 x 3	9/16	1/2	3/8	8.00	8.00	82
6 x 3 x 6	9/16	3/8	9/16	8.00	8.00	92
6 x 3 x 4	9/16	3/8	1/2	8.00	8.00	83
8 x 8 x 8	9/8	...	...	9.00	...	165
8 x 8 x 6	5/8	5/8	9/16	9.00	9.00	150
8 x 8 x 5	5/8	5/8	1/2	9.00	9.00	145
8 x 8 x 4	5/8	5/8	1/2	9.00	9.00	145
8 x 6 x 8	5/8	9/16	5/8	9.00	9.00	155
8 x 6 x 6	5/8	9/16	9/16	9.00	9.00	140
8 x 6 x 4	5/8	9/16	1/2	9.00	9.00	130
8 x 4 x 8	5/8	1/2	5/8	9.00	9.00	150
8 x 4 x 6	5/8	1/2	9/16	9.00	9.00	135
10 x 10 x 10	3/4	...	...	11.00	...	270
10 x 10 x 8	3/4	3/4	9/8	11.00	11.00	250
10 x 10 x 6	3/4	3/4	9/16	11.00	11.00	240
10 x 10 x 5	3/4	3/4	1/2	11.00	11.00	230
10 x 10 x 4	3/4	3/4	1/2	11.00	11.00	220
10 x 8 x 10	3/4	5/8	5/4	11.00	11.00	260
10 x 8 x 8	3/4	5/8	5/8	11.00	11.00	240
10 x 8 x 6	3/4	5/8	9/16	11.00	11.00	220
12 x 12 x 12	13/16	...	...	12.00	...	380
12 x 12 x 10	13/16	13/16	3/4	12.00	12.00	360
12 x 12 x 8	13/16	13/16	5/8	12.00	12.00	340
12 x 12 x 6	13/16	13/16	9/16	12.00	12.00	320
12 x 10 x 12	13/16	3/4	13/16	12.00	12.00	370
12 x 10 x 10	13/16	3/4	3/4	12.00	12.00	340
12 x 10 x 8	13/16	3/4	5/8	12.00	12.00	320
12 x 10 x 6	13/16	3/4	9/16	12.00	12.00	310
12 x 8 x 12	13/16	5/8	13/16	12.00	12.00	350
12 x 8 x 10	13/16	5/8	3/4	12.00	12.00	330
12 x 8 x 8	13/16	5/8	5/8	12.00	12.00	310
12 x 8 x 6	13/16	5/8	9/16	12.00	12.00	300





**CLASS 125 CAST IRON FLANGED JOINT FITTINGS**

**TEES**

(Continued from preceding page)

**F-1844**

**Straight Tee**

**F-1844-R**

**Reducing Tee**

Nominal Pipe Size Inches	Dimensions—Inches					Approximate Weight Pounds
	T	T <sub>1</sub>	T <sub>2</sub>	A	H	
12 x 6 x 12	13/16	9/16	13/16	12.00	12.00	340
12 x 6 x 10	13/16	9/16	3/4	12.00	12.00	320
12 x 6 x 8	13/16	9/16	5/8	12.00	12.00	300
12 x 6 x 6	13/16	9/16	9/16	12.00	12.00	280
14 x 14 x 14	7/8	7/8	7/8	14.00	14.00	530
14 x 14 x 12	7/8	7/8	13/16	14.00	14.00	500
14 x 14 x 10	7/8	7/8	3/4	14.00	14.00	480
14 x 14 x 8	7/8	7/8	5/8	14.00	14.00	460
14 x 14 x 6	7/8	7/8	9/16	14.00	14.00	440
14 x 12 x 14	7/8	13/16	7/8	14.00	14.00	510
14 x 12 x 12	7/8	13/16	13/16	14.00	14.00	490
14 x 12 x 10	7/8	13/16	3/4	14.00	14.00	460
14 x 12 x 8	7/8	13/16	5/8	14.00	14.00	440
14 x 10 x 14	7/8	3/4	7/8	14.00	14.00	490
14 x 10 x 12	7/8	3/4	13/16	14.00	14.00	470
14 x 10 x 10	7/8	3/4	3/4	14.00	14.00	450
14 x 10 x 8	7/8	3/4	5/8	14.00	14.00	420
14 x 8 x 14	7/8	5/8	7/8	14.00	14.00	480
14 x 8 x 12	7/8	5/8	13/16	14.00	14.00	460
14 x 8 x 10	7/8	5/8	3/4	14.00	14.00	430
14 x 8 x 8	7/8	5/8	5/8	14.00	14.00	410
16 x 16 x 16	1	1	1	15.00	15.00	700
16 x 16 x 14	1	1	7/8	15.00	15.00	670
16 x 16 x 12	1	1	13/16	15.00	15.00	650
16 x 16 x 10	1	1	3/4	15.00	15.00	620
16 x 16 x 8	1	1	5/8	15.00	15.00	610
16 x 16 x 6	1	1	9/16	15.00	15.00	590
16 x 14 x 16	1	7/8	1	15.00	15.00	680
16 x 14 x 14	1	7/8	7/8	15.00	15.00	650
16 x 14 x 12	1	7/8	13/16	15.00	15.00	630
16 x 14 x 10	1	7/8	3/4	15.00	15.00	600
16 x 14 x 8	1	7/8	5/8	15.00	15.00	580
16 x 14 x 6	1	7/8	9/16	15.00	15.00	565
16 x 12 x 16	1	13/16	1	15.00	15.00	670
16 x 12 x 14	1	13/16	7/8	15.00	15.00	640
16 x 12 x 12	1	13/16	13/16	15.00	15.00	620
16 x 12 x 10	1	13/16	3/4	15.00	15.00	590
16 x 12 x 8	1	13/16	5/8	15.00	15.00	570
16 x 10 x 16	1	1	1	15.00	15.00	650
16 x 10 x 14	1	3/4	7/8	15.00	15.00	620
16 x 10 x 12	1	3/4	13/16	15.00	15.00	600
16 x 10 x 10	1	3/4	3/4	15.00	15.00	570
16 x 10 x 8	1	3/4	5/8	15.00	15.00	550
16 x 8 x 16	1	5/8	1	15.00	15.00	640
16 x 8 x 14	1	5/8	7/8	15.00	15.00	610
16 x 8 x 12	1	5/8	13/16	15.00	15.00	580
16 x 8 x 10	1	5/8	3/4	15.00	15.00	560
16 x 8 x 8	1	5/8	5/8	15.00	15.00	540
18 x 18 x 18	1 1/16	1 1/16	1	16.50	16.50	860
18 x 18 x 16	1 1/16	1 1/16	1	16.50	16.50	860
18 x 18 x 14	1 1/16	1 1/16	7/8	16.50	16.50	820
18 x 18 x 12*	1 1/16	1 1/16	13/16	<b>13.00</b>	<b>15.50</b>	<b>660</b>
18 x 18 x 10*	1 1/16	1 1/16	3/4	<b>13.00</b>	<b>15.50</b>	<b>640</b>
18 x 18 x 8*	1 1/16	1 1/16	5/8	<b>13.00</b>	<b>15.50</b>	<b>620</b>
18 x 18 x 6*	1 1/16	1 1/16	9/16	<b>13.00</b>	<b>15.50</b>	<b>605</b>
20 x 20 x 20	1 1/8	1 1/8	1 1/8	18.00	18.00	1100
20 x 20 x 18	1 1/8	1 1/8	1 1/8	18.00	18.00	1060
20 x 20 x 16	1 1/8	1 1/8	1	18.00	18.00	1040
20 x 20 x 14*	1 1/8	1 1/8	7/8	<b>14.00</b>	<b>17.00</b>	<b>840</b>
20 x 20 x 12*	1 1/8	1 1/8	13/16	<b>14.00</b>	<b>17.00</b>	<b>820</b>
20 x 20 x 10*	1 1/8	1 1/8	3/4	<b>14.00</b>	<b>17.00</b>	<b>790</b>
20 x 20 x 8*	1 1/8	1 1/8	5/8	<b>14.00</b>	<b>17.00</b>	<b>770</b>
24 x 24 x 24	1 3/4	1 3/4	1 3/4	22.00	22.00	1730
24 x 24 x 20	1 3/4	1 3/4	1 1/8	22.00	22.00	1640
24 x 24 x 18	1 3/4	1 3/4	1 1/16	22.00	22.00	1600
24 x 24 x 16*	1 3/4	1 3/4	1	<b>15.00</b>	<b>19.00</b>	<b>1170</b>
24 x 24 x 14*	1 3/4	1 3/4	7/8	<b>15.00</b>	<b>19.00</b>	<b>1140</b>
24 x 24 x 12*	1 3/4	1 3/4	3/4	<b>15.00</b>	<b>19.00</b>	<b>1110</b>
24 x 24 x 10*	1 3/4	1 3/4	5/8	<b>15.00</b>	<b>19.00</b>	<b>1085</b>
24 x 24 x 8*	1 3/4	1 3/4	3/4	<b>15.00</b>	<b>19.00</b>	<b>1065</b>

\* Regularly furnished *short body*. Can be made to order with long body dimensions when required.



## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1

### TEES

#### DIMENSIONS AND WEIGHTS

For Pressure Ratings  
See Page 98

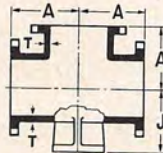


For Drilling Template  
See Page 101

**F-1848**  
Straight Side Outlet Tees\*

Nominal pipe size.....Inches	3	3½	4	5	6	8	10
Dimension T.....Inches	3/8	7/16	1/2	1/2	9/16	5/8	3/4
Dimension A.....Inches	5.50	6.00	6.50	7.50	8.00	9.00	11.00
Approximate weight.....Pounds	48	63	82	105	135	210	330
Nominal pipe size.....Inches	12	14	16	18	20	24	..
Dimension T.....Inches	13/16	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension A.....Inches	12.00	14.00	15.00	16.50	18.00	22.00	..
Approximate weight.....Pounds	470	650	850	1040	1330	2080	..

\* In certain sizes, we can furnish side outlet tees with the side outlet smaller than the main openings. When in need of such fittings, please check with us before placing your order.



**F-1860**  
Straight Bottom Base Tees†

Nominal pipe size.....Inches	3	4	6	8	10	12
Dimension T.....Inches	3/8	1/2	9/16	5/8	3/4	13/16
Dimension A.....Inches	5.50	6.50	8.00	9.00	11.00	12.00
Dimension J.....Inches	4.88	5.50	7.00	8.38	9.75	11.25
Approximate weight.....Pounds	42	74	120	195	300	425
Nominal pipe size.....Inches	14	16	18	20	24	..
Dimension T.....Inches	7/8	1	1 1/16	1 1/8	1 1/4	..
Dimension A.....Inches	14.00	15.00	16.50	18.00	22.00	..
Dimension J.....Inches	12.50	13.75	15.00	16.00	18.50	..
Approximate weight.....Pounds	580	750	935	1175	1810	..

† Dimensions "J" are for machined bases. For bases not machined, add approximately 1/4-inch.

### Base Tees—Reducing Sizes

Starting with the 3 x 3 x 2 size, reducing sizes of base tees are available in same range of sizes as shown on pages 106 and 107. Such fittings are regularly furnished with the base under the outlet—as shown in the illustration. For tees with side base, see page 118.

Center-to-face dimensions of reducing tees (as well as base dimensions) are same as for straight size fittings, corresponding to the size of the larger opening. For dimensions of bases, see page 60.



### ROUND BASE IS REGULAR

Bases will be machined and/or drilled  
ONLY  
when so ordered



When bases are ordered drilled other than regular, a template must accompany the order.

For Anchorage Base Tees, see page 118.





## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1

### CROSSES

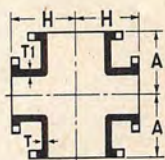
Furnished Faced and Drilled  
Unless Otherwise Ordered

### DIMENSIONS AND WEIGHTS

F-1864 and F-1864-R



**F-1864**  
Straight Cross



**F-1864-R**  
Reducing Cross

Nominal Pipe Size Inches	Dimensions—Inches				Approximate Weight Pounds
	T	T <sup>1</sup>	A	H	
2 x 2 x 2 x 2	5/16	...	4.50	...	28
3 x 3 x 3 x 3	3/8	...	5.50	...	48
3 x 3 x 2 x 2	3/8	5/16	5.50	5.50	40
4 x 4 x 4 x 4	1/2	...	6.50	...	82
4 x 4 x 3 x 3	1/2	3/8	6.50	6.50	68
4 x 4 x 2 x 2	1/2	5/16	6.50	6.50	59
5 x 5 x 5 x 5	1/2	...	7.50	...	105
5 x 5 x 4 x 4	1/2	1/2	7.50	7.50	96
6 x 6 x 6 x 6	9/16	...	8.00	...	135
6 x 6 x 5 x 5	9/16	1/2	8.00	8.00	120
6 x 6 x 4 x 4	9/16	3/8	8.00	8.00	115
6 x 6 x 3 x 3	9/16	1/2	8.00	8.00	100
8 x 8 x 8 x 8	5/8	...	9.00	...	210
8 x 8 x 6 x 6	5/8	5/16	9.00	9.00	190
8 x 8 x 4 x 4	5/8	1/2	9.00	9.00	165
8 x 8 x 3 x 3	5/8	3/8	9.00	9.00	150
10 x 10 x 10 x 10	3/4	...	11.00	...	330
10 x 10 x 8 x 8	3/4	3/8	11.00	11.00	300
10 x 10 x 6 x 6	3/4	5/16	11.00	11.00	270
10 x 10 x 4 x 4	3/4	1/2	11.00	11.00	250
12 x 12 x 12 x 12	13/16	...	12.00	...	470
12 x 12 x 10 x 10	13/16	3/4	12.00	12.00	420
12 x 12 x 8 x 8	13/16	5/8	12.00	12.00	380
12 x 12 x 6 x 6	13/16	3/4	12.00	12.00	350
12 x 12 x 4 x 4	13/16	1/2	12.00	12.00	340
14 x 14 x 14 x 14	7/8	...	14.00	...	650
14 x 14 x 12 x 12	7/8	13/16	14.00	14.00	600
14 x 14 x 10 x 10	7/8	3/4	14.00	14.00	550
14 x 14 x 8 x 8	7/8	5/8	14.00	14.00	500
14 x 14 x 6 x 6	7/8	3/4	14.00	14.00	475
16 x 16 x 16 x 16	1	...	15.00	...	850
16 x 16 x 14 x 14	1	7/8	15.00	15.00	790
16 x 16 x 12 x 12	1	13/16	15.00	15.00	740
16 x 16 x 10 x 10	1	3/4	15.00	15.00	690
16 x 16 x 8 x 8	1	5/8	15.00	15.00	650
16 x 16 x 6 x 6	1	3/4	15.00	15.00	625
18 x 18 x 18 x 18	1 1/16	...	16.50	...	1040
18 x 18 x 16 x 16	1 1/16	1	16.50	16.50	1000
18 x 18 x 14 x 14	1 1/16	7/8	16.50	16.50	930
18 x 18 x 12 x 12*	1 1/16	13/16	13.00	15.50	750
18 x 18 x 10 x 10*	1 1/16	3/4	13.00	15.50	700
18 x 18 x 8 x 8*	1 1/16	5/8	13.00	15.50	675
18 x 18 x 6 x 6*	1 1/16	3/4	13.00	15.50	655
20 x 20 x 20 x 20	1 3/8	...	18.00	...	1330
20 x 20 x 18 x 18	1 3/8	1 1/16	18.00	18.00	1250
20 x 20 x 16 x 16	1 3/8	1	18.00	18.00	1200
20 x 20 x 14 x 14*	1 3/8	7/8	14.00	17.00	960
20 x 20 x 12 x 12*	1 3/8	13/16	14.00	17.00	910
20 x 20 x 10 x 10*	1 3/8	3/4	14.00	17.00	860
20 x 20 x 8 x 8*	1 3/8	5/8	14.00	17.00	835
20 x 20 x 6 x 6*	1 3/8	3/4	14.00	17.00	815
24 x 24 x 24 x 24	1 3/4	...	22.00	...	2080
24 x 24 x 20 x 20	1 3/4	1 3/8	22.00	22.00	1900
24 x 24 x 18 x 18	1 3/4	1 1/16	22.00	22.00	1810
24 x 24 x 16 x 16*	1 3/4	1	15.00	19.00	1310
24 x 24 x 14 x 14*	1 3/4	7/8	15.00	19.00	1250
24 x 24 x 12 x 12*	1 3/4	13/16	15.00	19.00	1210
24 x 24 x 10 x 10*	1 3/4	3/4	15.00	19.00	1175
24 x 24 x 8 x 8*	1 3/4	5/8	15.00	19.00	1155
24 x 24 x 6 x 6*	1 3/4	3/4	15.00	19.00	1130

\* Regularly furnished *short body*. Can be made to order with long body dimensions when required.



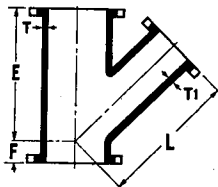
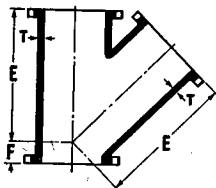
## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE  
ASA Specification B16.1

### LATERALS

For True Y Fittings, see page 59

### DIMENSIONS AND WEIGHTS



**F-1880**

Straight Lateral

**F-1880 and F-1880-R**

**F-1880-R**

Reducing Lateral

Nominal Pipe Size Inches	Dimensions—Inches					Approximate Weight Pounds
	T	T <sub>1</sub>	E	F	L	
2 x 2 x 2	$\frac{5}{16}$	...	8.00	2.50	...	25
3 x 3 x 3	$\frac{3}{8}$	...	10.00	3.00	...	44
3 x 3 x 2	$\frac{3}{8}$	$\frac{5}{16}$	10.00	3.00	10.00	39
4 x 4 x 4	$\frac{1}{2}$	...	12.00	3.00	...	75
4 x 4 x 3	$\frac{1}{2}$	$\frac{3}{8}$	12.00	3.00	12.00	66
4 x 4 x 2	$\frac{1}{2}$	$\frac{5}{16}$	12.00	3.00	12.00	60
5 x 5 x 5	$\frac{1}{2}$	...	13.50	3.50	...	96
5 x 5 x 4	$\frac{1}{2}$	$\frac{1}{2}$	13.50	3.50	13.50	93
6 x 6 x 6	$\frac{9}{16}$	...	14.50	3.50	...	125
6 x 6 x 5	$\frac{9}{16}$	$\frac{1}{2}$	14.50	3.50	14.50	120
6 x 6 x 4	$\frac{9}{16}$	$\frac{1}{2}$	14.50	3.50	14.50	115
6 x 6 x 3	$\frac{9}{16}$	$\frac{3}{8}$	14.50	3.50	14.50	105
8 x 8 x 8	$\frac{5}{8}$	...	17.50	4.50	...	210
8 x 8 x 6	$\frac{5}{8}$	$\frac{9}{16}$	17.50	4.50	17.50	195
8 x 8 x 4	$\frac{5}{8}$	$\frac{1}{2}$	17.50	4.50	17.50	175
8 x 8 x 3	$\frac{5}{8}$	$\frac{3}{8}$	17.50	4.50	17.50	165
10 x 10 x 10	$\frac{3}{4}$	...	20.50	5.00	...	340
10 x 10 x 8	$\frac{3}{4}$	$\frac{5}{8}$	20.50	5.00	20.50	310
10 x 10 x 6	$\frac{3}{4}$	$\frac{9}{16}$	20.50	5.00	20.50	280
10 x 10 x 4	$\frac{3}{4}$	$\frac{1}{2}$	20.50	5.00	20.50	270
12 x 12 x 12	$\frac{13}{16}$	...	24.50	5.50	...	520
12 x 12 x 10	$\frac{13}{16}$	$\frac{3}{4}$	24.50	5.50	24.50	470
12 x 12 x 8	$\frac{13}{16}$	$\frac{5}{8}$	24.50	5.50	24.50	430
12 x 12 x 6	$\frac{13}{16}$	$\frac{9}{16}$	24.50	5.50	24.50	400
12 x 12 x 4	$\frac{13}{16}$	$\frac{1}{2}$	24.50	5.50	24.50	385
14 x 14 x 14	$\frac{7}{8}$	...	27.00	6.00	...	680
14 x 14 x 12	$\frac{7}{8}$	$\frac{13}{16}$	27.00	6.00	27.00	640
14 x 14 x 10	$\frac{7}{8}$	$\frac{3}{4}$	27.00	6.00	27.00	590
14 x 14 x 8	$\frac{7}{8}$	$\frac{5}{8}$	27.00	6.00	27.00	550
14 x 14 x 6	$\frac{7}{8}$	$\frac{9}{16}$	27.00	6.00	27.00	525
16 x 16 x 16	1	...	30.00	6.50	...	950
16 x 16 x 14	1	$\frac{7}{8}$	30.00	6.50	30.00	880
16 x 16 x 12	1	$\frac{13}{16}$	30.00	6.50	30.00	830
16 x 16 x 10	1	$\frac{3}{4}$	30.00	6.50	30.00	790
16 x 16 x 8	1	$\frac{5}{8}$	30.00	6.50	30.00	740
16 x 16 x 6	1	$\frac{9}{16}$	30.00	6.50	30.00	715
18 x 18 x 18	$1\frac{1}{16}$	...	32.00	7.00	...	1150
18 x 18 x 16	$1\frac{1}{16}$	1	32.00	7.00	32.00	1100
18 x 18 x 14	$1\frac{1}{16}$	$\frac{7}{8}$	32.00	7.00	32.00	1030
18 x 18 x 12	$1\frac{1}{16}$	$\frac{13}{16}$	32.00	7.00	32.00	980
18 x 18 x 10	$1\frac{1}{16}$	$\frac{3}{4}$	32.00	7.00	32.00	930
18 x 18 x 8*	$1\frac{1}{16}$	$\frac{5}{8}$	25.00	1.00	27.50	890
18 x 18 x 6*	$1\frac{1}{16}$	$\frac{9}{16}$	25.00	1.00	27.50	860
20 x 20 x 20	$1\frac{1}{8}$	...	35.00	8.00	...	1480
20 x 20 x 18	$1\frac{1}{8}$	$1\frac{1}{16}$	35.00	8.00	35.00	1400
20 x 20 x 16	$1\frac{1}{8}$	1	35.00	8.00	35.00	1350
20 x 20 x 14	$1\frac{1}{8}$	$\frac{7}{8}$	35.00	8.00	35.00	1270
20 x 20 x 12	$1\frac{1}{8}$	$\frac{13}{16}$	35.00	8.00	35.00	1220
20 x 20 x 10*	$1\frac{1}{8}$	$\frac{3}{4}$	27.00	1.00	29.50	840
20 x 20 x 8*	$1\frac{1}{8}$	$\frac{5}{8}$	27.00	1.00	29.50	800
20 x 20 x 6*	$1\frac{1}{8}$	$\frac{9}{16}$	27.00	1.00	29.50	770
24 x 24 x 24	$1\frac{3}{4}$	...	40.50	9.00	...	2080
24 x 24 x 20	$1\frac{3}{4}$	$1\frac{1}{8}$	40.50	9.00	40.50	2040
24 x 24 x 18	$1\frac{3}{4}$	$1\frac{1}{16}$	40.50	9.00	40.50	1950
24 x 24 x 16	$1\frac{3}{4}$	1	40.50	9.00	40.50	1890
24 x 24 x 14	$1\frac{3}{4}$	$\frac{7}{8}$	40.50	9.00	40.50	1810
24 x 24 x 12*	$1\frac{3}{4}$	$\frac{13}{16}$	31.50	.50	34.50	1250
24 x 24 x 10*	$1\frac{3}{4}$	$\frac{3}{4}$	31.50	.50	34.50	1200
24 x 24 x 8*	$1\frac{3}{4}$	$\frac{5}{8}$	31.50	.50	34.50	1180
24 x 24 x 6*	$1\frac{3}{4}$	$\frac{9}{16}$	31.50	.50	34.50	1155

\*Regularly furnished short body. Can be made to order with long body dimensions when required

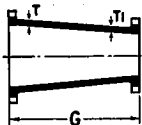




## CLASS 125 CAST IRON FLANGED JOINT FITTINGS

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1



**F-1890-R**

Concentric Reducer

### REDUCERS

Furnished Faced and Drilled  
Unless Otherwise Ordered

### DIMENSIONS AND WEIGHTS

F-1890-R and F-1894-R



**F-1894-R**

Eccentric Reducer

Nominal Pipe Size Inches	Dimensions—Inches			Approximate Weight Pounds	
	T	T <sup>1</sup>	G	F-1890-R	F-1894-R
2½ x 1½	5/16	5/16	5.50	12	...
3 x 2½	3/8	5/16	6.00	19	...
3 x 2	3/8	5/16	6.00	16	16
3 x 1½	3/8	5/16	6.00	14	...
3½ x 3	7/16	3/8	6.50	24	...
4 x 3½	1/2	7/16	7.00	31	...
4 x 3	1/2	3/8	7.00	28	28
4 x 2½	1/2	5/16	7.00	26	...
4 x 2	1/2	5/16	7.00	24	24
5 x 4	1/2	1/2	8.00	39	39
5 x 3	1/2	3/8	8.00	32	32
5 x 2½	1/2	5/16	8.00	31	...
6 x 5	9/16	1/2	9.00	50	50
6 x 4	9/16	1/2	9.00	47	47
6 x 3	9/16	3/8	9.00	39	39
6 x 2½	9/16	5/16	9.00	35	...
6 x 2	9/16	5/16	9.00	30	30
8 x 6	5/8	9/16	11.00	77	77
8 x 5	5/8	1/2	11.00	71	...
8 x 4	5/8	1/2	11.00	66	66
10 x 8	3/4	5/8	12.00	120	120
10 x 6	3/4	9/16	12.00	100	100
10 x 4	3/4	1/2	12.00	95	95
12 x 10	13/16	3/4	14.00	180	180
12 x 8	13/16	5/8	14.00	155	155
12 x 6	13/16	9/16	14.00	140	140
14 x 12	7/8	13/16	16.00	250	250
14 x 10	7/8	3/4	16.00	220	220
14 x 8	7/8	5/8	16.00	200	200
14 x 6	7/8	9/16	16.00	180	180
16 x 14	1	7/8	18.00	340	340
16 x 12	1	13/16	18.00	310	310
16 x 10	1	3/4	18.00	280	280
16 x 8	1	5/8	18.00	250	250
16 x 6	1	9/16	18.00	230	230
18 x 16	1 1/16	1	19.00	430	430
18 x 14	1 1/16	7/8	19.00	380	380
18 x 12	1 1/16	13/16	19.00	350	350
18 x 10	1 1/16	3/4	19.00	320	320
18 x 8	1 1/16	5/8	19.00	300	300
20 x 18	1 1/8	1 1/16	20.00	520	520
20 x 16	1 1/8	1	20.00	490	490
20 x 14	1 1/8	7/8	20.00	450	450
20 x 12	1 1/8	13/16	20.00	410	410
20 x 10	1 1/8	3/4	20.00	380	380
24 x 20	1 3/8	1 1/8	24.00	760	760
24 x 18	1 3/8	1 1/16	24.00	700	700
24 x 16	1 3/8	1	24.00	670	670
24 x 14	1 3/8	7/8	24.00	620	620
24 x 12	1 3/8	13/16	24.00	580	580



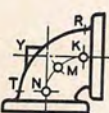
Inc.

## METHOD OF DESIGNATING LOCATION OF TAPPED HOLES AND/OR BOSSES FOR DRAINS IN CAST IRON FLANGED FITTINGS

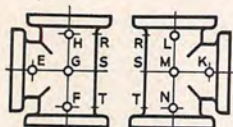
When a cast iron flanged fitting is wanted with a drain connection, identify the fitting by name, size, and Class; give the size of the drain tapping required, and designate its location by means of a letter selected from the correct view of the fitting in question.



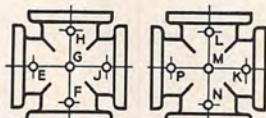
90° Elbow  
Straight Size



90° Elbow



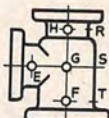
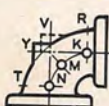
Tee  
Straight Size



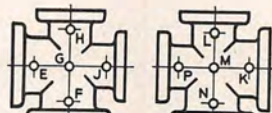
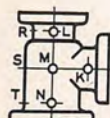
Cross  
Straight Size



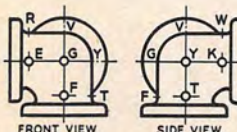
90° Elbow  
Reducing Size



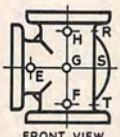
Tee  
Reducing Size



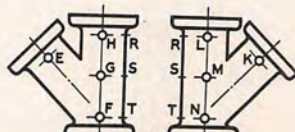
Cross  
Reducing Size



Side Outlet Elbow  
Straight Size



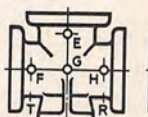
Side Outlet Tee  
Straight Size



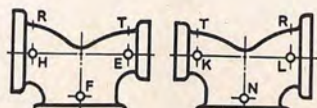
45° Lateral  
Straight Size



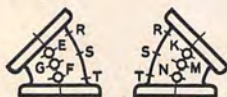
90° Base Elbow



Base Tee

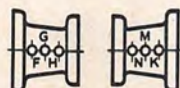


Double Branch Elbow



45° Elbow

Tapping through the wall of fitting is limited to sizes indicated in the table below. Larger size tapped openings will require casting the fitting with an integral boss—the location of which may also be identified by a letter, as explained above. A boss is always required at "V" and "Y" on straight and reducing sizes of 90-degree elbows.



Reducer

### Maximum Size of Tapped Hole in Fitting Without Adding Boss

Size of fitting . . . . . Inches	3-4	6	8	10	12	14-20	24
Size of tapped hole . . . . . Inches	3/8	1/2	3/4	1	1 1/2	2	2 1/2





## CLASS 125 CAST IRON FLANGES FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1

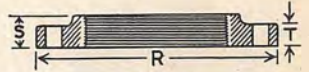


**F-1900**  
Screwed Flange

### DIMENSIONS AND WEIGHTS

### COMPANION FLANGES

F-1900



**F-1900**  
Dimensional View

Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds	Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds
	R	S	T			R	S	T	
1	4 $\frac{1}{4}$	1 $\frac{11}{16}$	7 $\frac{1}{16}$	2	6	11	1 $\frac{9}{16}$	1	22
1 $\frac{1}{4}$	4 $\frac{5}{8}$	1 $\frac{13}{16}$	1 $\frac{1}{2}$	2	8	13 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{1}{8}$	31
1 $\frac{1}{2}$	5	1 $\frac{7}{8}$	1 $\frac{9}{16}$	3	10	16	1 $\frac{15}{16}$	1 $\frac{3}{16}$	45
2	6	1	1 $\frac{5}{8}$	5	12	19	2 $\frac{3}{16}$	1 $\frac{1}{4}$	63
2 $\frac{1}{2}$	7	1 $\frac{1}{8}$	1 $\frac{11}{16}$	7	14	21	2 $\frac{1}{4}$	1 $\frac{3}{8}$	82
3	7 $\frac{1}{2}$	1 $\frac{3}{16}$	1 $\frac{3}{4}$	8	16	23 $\frac{1}{2}$	2 $\frac{1}{2}$	1 $\frac{7}{16}$	105
3 $\frac{1}{2}$	8 $\frac{1}{2}$	1 $\frac{1}{4}$	1 $\frac{13}{16}$	11	18	25	2 $\frac{11}{16}$	1 $\frac{9}{16}$	120
4	9	1 $\frac{5}{16}$	1 $\frac{15}{16}$	14	20	27 $\frac{1}{2}$	2 $\frac{7}{8}$	1 $\frac{11}{16}$	150
5	10	1 $\frac{7}{16}$	1 $\frac{15}{16}$	17	24	32	3 $\frac{1}{4}$	1 $\frac{7}{8}$	220

For pipe sizes 14-inch and larger, flanges are tapped for use with O.D. pipe.

### When Ordering Reducing Flanges

When ordering reducing flanges, give size of pipe tapping first and then the outside diameter of the flange wanted. Example: A flange is required to connect a 6-inch threaded pipe to a 10-inch flanged valve or fitting having 16-inch diameter flanges. Order a 6 x 16 O.D. Reducing Flange. This will avoid confusion caused by orders calling for a 10 x 6 or a 6 x 10 flange. Reducing flanges are regularly furnished to the thickness of and drilled to the template of the regular companion flange of corresponding outside diameter.



**F-1905 Regular**  
Reducing Flange

**American Standard Class 125  
Cast Iron Flanges are Furnished  
With Plain Face and Drilled  
Unless Otherwise Ordered**

### REDUCING FLANGES

F-1905



**F-1910 Eccentric\***  
Reducing Flange

Size Inches	Diameter Bolt Circle Inches	Number and Size of Bolts	Approx. Weight Pounds	Size Inches	Diameter Bolt Circle Inches	Number and Size of Bolts	Approx. Weight Pounds
1 x 5	3 $\frac{7}{8}$	4— $\frac{1}{2}$ x 2	3	3 x 10	8 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3	19
1 x 6	4 $\frac{3}{4}$	4— $\frac{5}{8}$ x 2 $\frac{1}{4}$	5	4 x 10	8 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3	17
1 $\frac{1}{4}$ x 6	4 $\frac{3}{4}$	4— $\frac{5}{8}$ x 2 $\frac{3}{4}$	5	2 x 11	9 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3 $\frac{1}{4}$	25
1 $\frac{1}{2}$ x 6	4 $\frac{3}{4}$	4— $\frac{5}{8}$ x 2 $\frac{3}{4}$	5	2 $\frac{1}{2}$ x 11	9 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3 $\frac{1}{4}$	24
1 $\frac{1}{2}$ x 7	5 $\frac{1}{2}$	4— $\frac{5}{8}$ x 2 $\frac{1}{2}$	7 $\frac{1}{2}$	3 x 11	9 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3 $\frac{1}{4}$	23
2 x 7	5 $\frac{1}{2}$	4— $\frac{5}{8}$ x 2 $\frac{1}{2}$	7	4 x 11	9 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3 $\frac{1}{4}$	22
1 $\frac{1}{2}$ x 7 $\frac{1}{2}$	6	4— $\frac{5}{8}$ x 2 $\frac{1}{2}$	5 $\frac{1}{2}$	5 x 11	9 $\frac{1}{2}$	8— $\frac{3}{4}$ x 3 $\frac{1}{4}$	21
2 x 7 $\frac{1}{2}$	6	4— $\frac{5}{8}$ x 2 $\frac{1}{2}$	9	3 x 13 $\frac{1}{2}$	11 $\frac{3}{4}$	8— $\frac{3}{4}$ x 3 $\frac{1}{2}$	40
2 $\frac{1}{2}$ x 7 $\frac{1}{2}$	6	4— $\frac{5}{8}$ x 2 $\frac{1}{2}$	9	4 x 13 $\frac{1}{2}$	11 $\frac{3}{4}$	8— $\frac{3}{4}$ x 3 $\frac{1}{2}$	38
3 x 8 $\frac{1}{2}$	7	8— $\frac{5}{8}$ x 2 $\frac{3}{4}$	12	5 x 13 $\frac{1}{2}$	11 $\frac{3}{4}$	8— $\frac{3}{4}$ x 3 $\frac{1}{2}$	36
1 $\frac{1}{2}$ x 9	7 $\frac{1}{2}$	8— $\frac{5}{8}$ x 3	16	6 x 13 $\frac{1}{2}$	11 $\frac{3}{4}$	8— $\frac{3}{4}$ x 3 $\frac{1}{2}$	34
2 x 9	7 $\frac{1}{2}$	8— $\frac{5}{8}$ x 3	16	6 x 16	14 $\frac{1}{4}$	12— $\frac{7}{8}$ x 3 $\frac{3}{4}$	56
2 $\frac{1}{2}$ x 9	7 $\frac{1}{2}$	8— $\frac{5}{8}$ x 3	16	8 x 16	14 $\frac{1}{4}$	12— $\frac{7}{8}$ x 3 $\frac{3}{4}$	50
3 x 9	7 $\frac{1}{2}$	8— $\frac{5}{8}$ x 3	15	8 x 19	17	12— $\frac{7}{8}$ x 3 $\frac{3}{4}$	78
3 $\frac{1}{2}$ x 9	7 $\frac{1}{2}$	8— $\frac{5}{8}$ x 3	14	10 x 19	17	12— $\frac{7}{8}$ x 3 $\frac{3}{4}$	75

\* Eccentric reducing flanges are made to order only.



**CLASS 125 CAST IRON BLIND FLANGES**

FOR STEAM, LIQUID AND GAS SERVICE

ASA Specification B16.1



**F-1915 Blind Flange**  
16-Inch O.D. and Smaller



**F-1915 Blind Flange\***  
19-Inch O.D. and Larger

**F-1915 Blind Flanges**

Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds	Nominal Pipe Size Inches	Dimensions Inches			Approx. Weight Pounds
	R	T	V			R	T	V	
1	4 1/4	7/16	3/8	2	6	11	1	15/16	25
1 1/4	4 5/8	1/2	7/16	3	8	13 1/2	1 1/8	1 1/16	42
1 1/2	5	9/16	1/2	3	10	16	1 3/16	1 1/8	63
2	6	5/8	9/16	5	12	19	1 1/4	1 3/16	88
2 1/2	7	11/16	5/8	7	14	21	1 3/8	7/8	115
3	7 1/2	3/4	11/16	9	16	23 1/2	1 7/16	1	160
3 1/2	8 1/2	13/16	3/4	12	18	25	1 9/16	1 1/16	190
4	9	15/16	7/8	16	20	27 1/2	1 11/16	1 1/8	250
5	10	15/16	7/8	20	24	32	1 7/8	1 1/4	370

\* Flanges, 19" O.D. and larger, are dished with inside radius equal to port diameter of pipe size

**American Standard Class 125 cast iron flanges have plain face.**

**MACHINE BOLTS, BOLT-STUDS, AND STUDS**



**F-1925 Machine Bolt †**  
Square Head—Hexagon Nut



**F-1928 Bolt Stud**  
With Two Hexagon Nuts



**F-1932 Stud ‡**  
With One Hexagon Nut

**SIZES, LENGTHS AND WEIGHTS**

For Flanged Fittings Size—Inches	Number of Bolts to the Joint	Diameter of Bolts Inches	Bolts, Bolt-Studs and Studs					
			Length—Inches			Weight—Per 100—Pounds		
			F-1925	F-1928	F-1932	F-1925	F-1928	F-1932
1	4	1/2	1 3/4	...	...	20	...	...
1 1/4	4	1/2	2	...	...	21	...	...
1 1/2	4	1/2	2	...	...	21	...	...
2	4	5/8	2 1/4	...	...	40	...	...
2 1/2	4	5/8	2 1/2	...	...	41	...	...
3	4	5/8	2 1/2	3 1/4	2 1/4	41	47	29
3 1/2	8	5/8	2 3/4	...	...	43	...	...
4	8	5/8	3	3 3/4	2 1/2	45	51	30
5	8	3/4	3	...	...	69	...	...
6	8	3/4	3 1/4	4	3	71	81	51
8	8	3/4	3 1/2	4	3	75	81	51
10	12	7/8	3 3/4	4 3/4	3 1/4	113	127	76
12	12	7/8	3 3/4	4 3/4	3 1/4	113	127	76
14	12	1	4 1/4	5 1/4	3 3/4	163	184	113
16	16	1	4 1/2	5 1/4	3 3/4	168	184	113
18	16	1 1/8	4 3/4	6	4 1/4	230	251	161
20	20	1 1/8	5	6	4 1/4	236	251	161
24	20	1 1/4	5 1/2	6 1/2	4 1/2	325	351	213

† Length of F-1925 Bolts is based on two Class 125 flanges bolted together. If "Filler" is used between flanges, bolt length must be increased by thickness of filler.

‡ The length of the F-1932 Studs is based on the short threaded end being screwed into a tapped hole for a distance approximately equal to the diameter of the stud.

Above bolts meet requirements of the American Standards Association Specification B16.1.





## GASKETS OF SHEET PACKINGS FOR CLASS 125 CAST IRON FLANGED JOINTS



F-1940 Ring Gasket\*

When Ordering Gaskets  
always specify material wanted

Red sheet rubber  
Cloth inserted rubber  
or  
Asbestos composition



F-1950 Full Face Gasket†

Gaskets of sheet packing are regularly furnished 1/16-inch thick.

### F-1940 Ring Gaskets\*

Nominal inside diameter... Inches	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5
Outside diameter... Inches	2 5/8	3	3 3/8	4 1/8	4 7/8	5 3/8	6 3/8	6 7/8	7 3/4
Nominal inside diameter... Inches	6	8	10	12	14	16	18	20	24
Outside diameter... Inches	8 3/4	11	13 3/8	16 1/8	17 3/4	20 1/4	21 5/8	23 7/8	28 1/4

\* Ring gaskets will always be furnished unless order specifically calls for "full face" gaskets.

### F-1950 Full Face Gaskets †

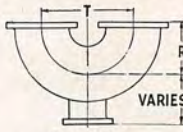
Nominal inside diameter... Inches	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5
Outside diameter... Inches	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10
Nominal inside diameter... Inches	6	8	10	12	14	16	18	20	24
Outside diameter... Inches	11	13 1/2	16	19	21	23 1/2	25	27 1/2	32

† Holes are not punched in full face gaskets unless specifically ordered.

## CLASS 125 CAST IRON FLANGED RETURN BENDS



F-1975 Closed Pattern



See Note



F-1980 Open Pattern

Nominal Pipe Size Inches	Dimensions—Inches		Approx. Weight Pounds
	R	T	
3	4.75	8.00	30
3	7.50	9.50	40
3	5.50	11.00	35
3	6.75	12.00	40
4	6.00	10.00	50
4	6.50	10.00	60
4	6.50	11.00	65
5	6.43	11.00	70
6	7.00	12.00	90
8	8.50	13.75	160
10	10.00	20.00	280

Nominal Pipe Size Inches	Dimensions—Inches		Approx. Weight Pounds
	R	T	
3	6.50	13.00	40
4	7.00	12.00	60
4	7.50	13.00	65
4	12.00	22.00	90
6	7.50	15.00	95
6	8.00	16.00	100
6	9.50	16.00	110
8	9.00	18.00	175
8	10.00	18.00	185
10	11.00	22.00	290
12	16.50	30.00	520

Note: Open and closed pattern return bends can be furnished with straight or reducing back outlet.



F-1984

### F-1984 Ring Closing Piece—Full Size of Flange

Used for closing up between two flanges which do not meet. We can also furnish the "extra length" bolts for making connections. Minimum thickness is 1/4 inch and six inches is the maximum.

### F-1986 Beveled Filling Ring—Full Size of Flange

For closing between two flanges which do not face up properly, or for throwing a line of pipe off center to straight flow. Maximum bevel is 6 degrees with a minimum thickness at small end of 1/4 inch.



F-1986

Furnished Faced and Drilled Unless Otherwise Ordered





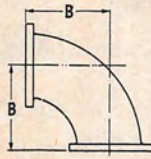
GENERAL DIMENSIONS—STRAIGHT SIZES

CLASS 125 CAST IRON FLANGED FITTINGS

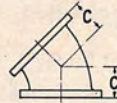
ASA Specification B16.1



F-1800  
90° Elbow



F-1804  
Long Radius  
90° Elbow



F-1808  
45° Elbow



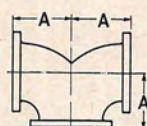
F-1812  
Long Radius  
45° Elbow



F-1816  
22½° Elbow



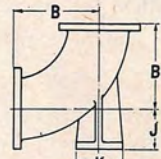
F-1820  
Side Outlet  
Elbow



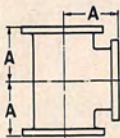
F-1822  
Double Branch  
Elbow



F-1824  
Base  
Elbow



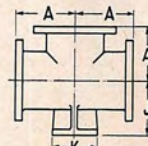
F-1828  
Long Radius  
Base Elbow



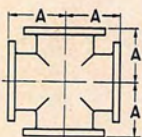
F-1844  
Tee



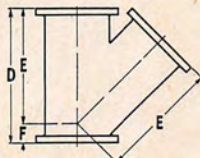
F-1848  
Side Outlet  
Tee



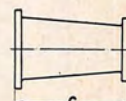
F-1860  
Bottom  
Base Tee



F-1864  
Cross



F-1880  
Lateral



F-1890-R  
Reducer



F-1894-R  
Eccentric  
Reducer

**Bases.** Dimensions of regular bases for base elbows and base tees apply to straight and reducing sizes and to long and short body patterns. Size of base is determined by size of larger opening. See page 118 for anchorage base dimensions.

For Explanatory Notes, see pages 98 and 99.

For Drilling Template, see page 101.

For American Water Works Association flanged fittings for water, see pages 55 thru 60.





## GENERAL DIMENSIONS—STRAIGHT SIZES

### CLASS 125 CAST IRON FLANGED FITTINGS AND FLANGES

ASA Specification B16.1

#### Key to Tables of Dimensions

AA = Face to Face, Tees and Crosses.  
 A = Center to Face, 46° to 90° Ells, Tees,  
 Crosses and True Y's.  
 B = Center to Face, Long Radius Ells.  
 C = Center to Face, 1° to 45° Ells.  
 D = Face to Face, Laterals.  
 E = Center to Face, Laterals.  
 F = Center to Face, Laterals.  
 G = Face to Face, Reducers.

J = Center to Face, Base Flange.\*  
 K = Diameter of Base Flange.\*  
 M = Center to Face, 45° Long Radius Ells.  
 P = Size of Pipe for Supporting Base Ells  
 with Round Base Flange.  
 R = Outside Diameter of Flange.  
 S = Overall of Hub and Threads (Min.)  
 T = Thickness of Flange (Min.)  
 V = Metal Thickness, Blind Flanges (Min.)

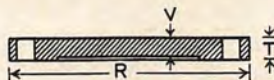
Size of all fittings listed indicates nominal inside diameter of port.

Size Inches	Diam. of Flange	Wall Thick.	Dimensions—Inches												
			AA	A	B	C	D	E	F	G	J*	K*	M	P	
1	4 1/4	5/16	7	3 1/2	5	1 3/4	7 1/2	5 3/4	1 3/4	...	3 1/2	3 1/2	2 1/2	3/4	
1 1/4	4 5/8	5/16	7 1/2	3 3/4	5 1/2	2	8	6 1/4	1 3/4	...	3 5/8	3 1/2	3	3/4	
1 1/2	5	5/16	8	4	6	2 1/4	9	7	2	...	3 3/4	4 1/4	3 1/4	1	
2	6	5/16	9	4 1/2	6 1/2	2 1/2	10 1/2	8	2 1/2	5	4 1/8	4 5/8	3 1/2	1 1/4	
2 1/2	7	5/16	10	5	7	3	12	9 1/2	2 1/2	5 1/2	4 1/2	4 5/8	4	1 1/4	
3	7 1/2	3/8	11	5 1/2	7 3/4	3	13	10	3	6	4 7/8	5	4 1/2	1 1/2	
3 1/2	8 1/2	7/16	12	6	8 1/2	3 1/2	14 1/2	11 1/2	3	6 1/2	5 1/4	5	4 3/4	1 1/2	
4	9	1/2	13	6 1/2	9	4	15	12	3	7	5 1/2	6	5 1/4	2	
5	10	1/2	15	7 1/2	10 1/4	4 1/2	17	13 1/2	3 1/2	8	6 1/4	7	6	2 1/2	
6	11	9/16	16	8	11 1/2	5	18	14 1/2	3 1/2	9	7	7	6 3/4	2 1/2	
8	13 1/2	5/8	18	9	14	5 1/2	22	17 1/2	4 1/2	11	8 3/8	9	8	4	
10	16	3/4	22	11	16 1/2	6 1/2	25 1/2	20 1/2	5	12	9 3/4	9	9	4	
12	19	13/16	24	12	19	7 1/2	30	24 1/2	5 1/2	14	11 1/4	11	9 1/2	6	
14	21	7/8	28	14	21 1/2	7 1/2	33	27	6	16	12 1/2	11	10	6	
16	23 1/2	1	30	15	24	8	36 1/2	30	6 1/2	18	13 3/4	11	13	6	
18	25	1 1/16	33	16 1/2	26 1/2	8 1/2	39	32	7	19	15	13 1/2	14	8	
20	27 1/2	1 1/8	36	18	29	9 1/2	43	35	8	20	16	13 3/2	15	8	
24	32	1 1/4	44	22	34	11	49 1/2	40 1/2	9	24	18 1/2	13 1/2	17	8	
30	38 3/4	1 7/16	50	25	41 1/2	15	59	49	10	30	23	16	24	10	
36	46	1 5/8	56	28	49	18	77	63	14	36	26	19	29	12	
42	53	1 13/16	62	31	56 1/2	21	87	72	15	42	30	23 1/2	35	16	
48	59 1/2	2	68	34	64	24	92	76	16	48	34	25	39	18	

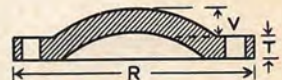
\* Size and center to face dimension of base are determined by size of largest opening of fitting. These bases are intended for supports in compression and are not to be used for anchors or for supports in tension or shear. (For anchorage base dimensions, see page 118). Dimensions shown for "J" are for machined bases. For bases not machined, add approximately 1/4-inch. Drilling of round base flange will match the template of the flange corresponding to the size of the supporting pipe "P" using only four holes in all cases so placed as to miss the ribs. *Bases faced and/or drilled only when so ordered.*



**Companion  
Flange**



**Blind Flange  
10" and Smaller**



**Blind Flange  
12" and Larger**

Size . . . . .	Inches	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8
Dimension	R . . . . . Inches	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2
	S . . . . . Inches	1 1/16	1 3/16	7/8	1	1 1/8	1 3/8	1 1/4	1 5/8	1 7/8	1 9/8	1 3/4
	T . . . . . Inches	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	15/16	1	1 1/8
	V . . . . . Inches	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	15/16	1 1/8
Size . . . . .	Inches	10	12	14	16	18	20	24	30	36	42	48
Dimension	R . . . . . Inches	16	19	21	23 1/2	25	27 1/2	32	38 3/4	46	53	59 1/2
	S . . . . . Inches	1 15/16	2 3/16	2 1/4	2 1/2	2 11/16	2 7/8	3 1/4	3 1/2	4	4 1/2	5 1/4
	T . . . . . Inches	1 3/8	1 1/4	1 5/8	1 7/8	1 9/8	1 11/16	1 3/4	1 7/8	2 1/8	2 3/8	2 5/8
	V . . . . . Inches	1 1/8	1 3/8	1 1/2	1 5/8	1 7/8	1 9/8	1 1 1/8	1 1/4	1 3/4	1 5/8	1 13/16

Companion flanges in sizes 14-inch and larger are tapped for O.D. pipe.  
 Blind flanges, 19 inches O.D. and larger, are dished with inside radius equal to the port diameter.





## GENERAL DIMENSIONS—ANCHORAGE BASES

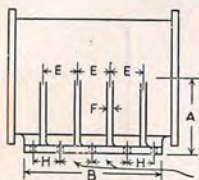
FOR CLASS 125 CAST IRON FLANGED TEES

ASA Specification B16.1

Anchor Base Fittings

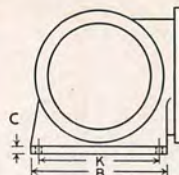
Are

Made To Order Only



Side View

Same Centers as Ribs  
"E" on 10" and Larger



End View

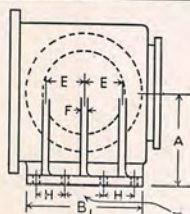
- A = Center to Face of Base Flange.
- B = Square of Base—Straight Sizes.
- B<sup>1</sup> = Length of Base†—Reducing Sizes.
- B<sup>2</sup> = Width of Base†—Reducing Sizes.
- C = Thickness of Base Flange.
- D = Number of Cross Ribs.

### KEY

- E = Centers of Ribs and Inside Bolts.\*
- F = Thickness of Ribs.
- G = Diameter of Anchoring Bolts.†
- H = Longitudinal Centers from End Bolt Hole to Second Bolt Hole.
- K = Transverse Centers of Bolt Holes.
- L = Number of Bolt Holes on Each Side.

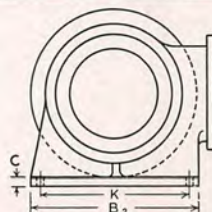
### STRAIGHT SIZES

Fitting Size Inches	Dimensions—Inches									
	A	B	C	D	E*	F	G†	H	K	L
2½	4½	7	11/16	1	...	7/16	5/8	4½	4½	2
3	4 7/8	7½	3/4	1	...	7/16	5/8	5	5	2
3½	5¼	8½	13/16	1	...	7/16	5/8	6	6	2
4	5½	9	15/16	2	4¼	1/2	5/8	3¼	6½	3
5	6¼	10	15/16	2	5	1/2	5/8	3¾	7½	3
6	7	11	1	2	6	9/16	7/8	4¾	8¾	3
8	8¾	13½	1 1/8	2	8	5/8	1	5½	11	3
10	9¾	16	1 3/16	3	4 7/8	3/4	1 1/8	4¼	13 3/8	4
12	11¼	19	1 1/4	3	5 3/4	13/16	1 1/4	4 7/8	15½	4
14	12½	21	1 3/8	3	6¾	7/8	1 1/4	5½	17¾	4
16	13¾	23½	1 7/16	3	7¾	1	1 3/8	6	19¾	4
18	15	25	1 9/16	3	8½	1 1/16	1 3/8	6 5/8	21¾	4
20	16	27½	1 11/16	3	9½	1 1/8	1 1/2	7¼	24	4
24	18½	32	1 7/8	3	11¾	1 1/4	1 5/8	8½	28¾	4
30	22	38¾	2 1/8	4	9¾	1 7/16	1 3/4	7 7/8	34½	5
36	25½	46	2 3/8	4	11¼	1 5/8	1 7/8	9 1/8	40¾	5
42	29¼	53	2 5/8	4	13	1 13/16	2	10¾	46¾	5
48	32¾	59½	2¾	4	14 7/8	2	2¼	11¾	53¼	5



Same Centers as Ribs "E"

### REDUCING SIZES SHORT BODY PATTERN



Reducing fittings, 16 inches and smaller, all reductions, have same base as straight size fittings.

Fitting Size Inches	Size of Outlet or Smaller	Dimensions—Inches										
		A	B <sup>1</sup> †	B <sup>2</sup> †	C	D	E*	F	G†	H	K	L
18	12	15	19	25	1 9/16	3	5¼	1 1/16	1¼	5 1/8	21½	4
20	14	16	21	27½	1 11/16	3	6	1 1/8	1¼	5 3/8	23¼	4
24	16	18½	23½	32	1 7/8	3	7	1 1/4	1 3/8	6¼	28	4
30	20	22	27½	38¾	2 1/8	3	9	1 7/16	1 1/2	7¼	34¾	4
36	24	25½	32	46	2 3/8	3	10¾	1 5/8	1 1/2	8¾	41½	4
42	24	29¼	36½	53	2 5/8	4	8½	1 13/16	1 5/8	7½	48½	5
48	30	32¾	41¾	59½	2¾	4	9¾	2	1 5/8	8¼	53¾	5

\* This dimension denotes centers of ribs on all sizes and, also, centers of inside bolt holes only on bases drilled for more than three bolts on each side—fitting sizes, 10 inches and larger.

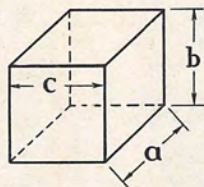
† Bolt holes are drilled 1/8-inch larger than bolts. ‡ Size of base determined by size of largest opening. Bases are faced only when so ordered.

For face to face and center to face dimensions of fittings, see pages 106 and 107—also 116 and 117.



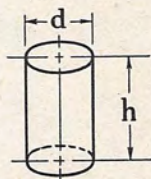


**USEFUL FORMULAS FOR ESTIMATING WEIGHTS OF CAST IRON PIPE, FITTINGS, AND SPECIALS**



**Parallelepipeds**

Volume =  $a \times b \times c$



**Cylinder**

Volume =  $.7854 \times d^2 \times h$

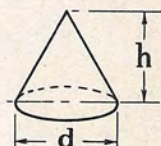


**Circle**

Area =  $3.14 \times r^2$

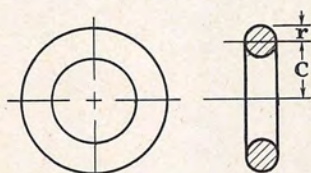
**Sphere**

Volume =  $\frac{3.14 \times D^3}{6}$



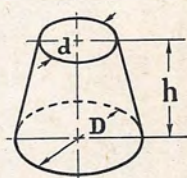
**Cone**

Volume =  $\frac{3.14 \times d^2 \times h}{12}$



**Torus**

Volume =  $2 \times 3.14^2 \times C \times r^2 = 19.72 \times C \times r^2$



**Frustum of Cone**

Volume =  $\frac{h}{3} \times (\text{Area } d + \text{Area } D + \sqrt{\text{Area } d \times \text{Area } D})$



**Circular Ring**

Volume =  $(\text{Area } D - \text{Area } d) \times C$

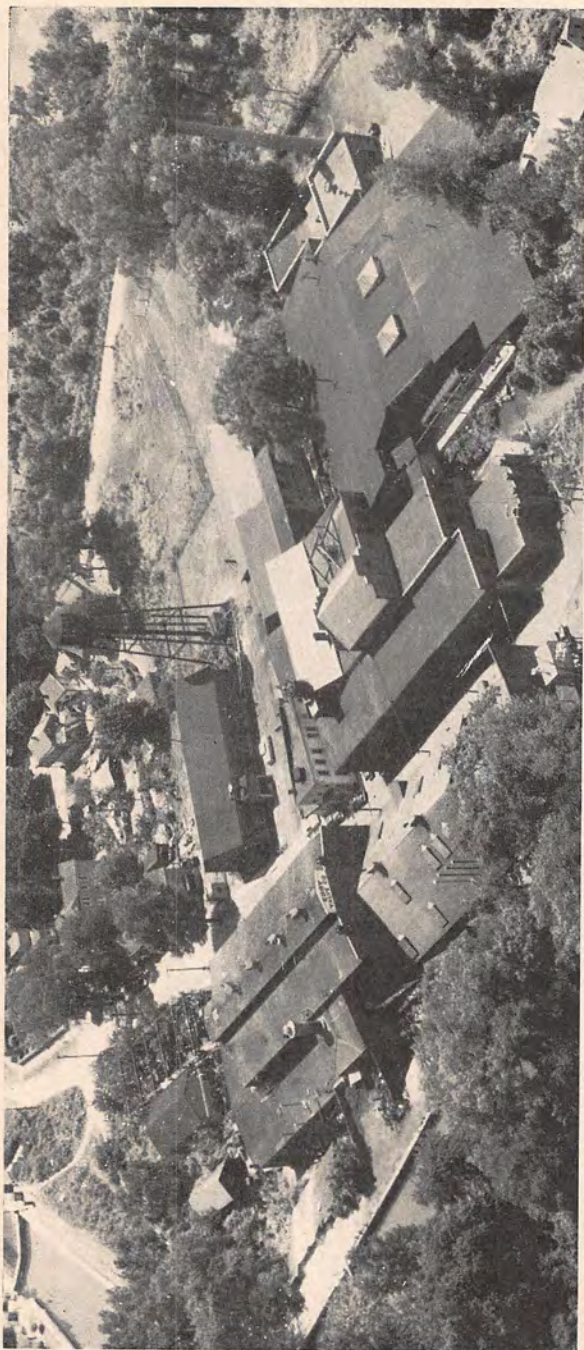


**Pyramid**

Volume =  $\frac{h}{3} \times \text{Base Area}$

**Specific Gravity of Iron = 7.1**

One cubic inch of Iron weights 0.26 Pounds. One cubic foot of Iron weights 450 Pounds.



**Eddy Valve Company, Waterford, N.Y.**

The Eddy Valve Company has been a wholly owned subsidiary of James B. Clow & Sons, Inc., since 1945. Founded in 1849 by George W. Eddy, the company at an early date became well known as a pioneer in the valve industry with the invention and the successful manufacture of the Eddy Taper Seat Gate Valve.

Since that time, Eddy products have been expanded to include fire hydrants, and a complete line of valves and accessories for water, sewage, steam and gas as shown on the following pages. For generations, Eddy products have served municipalities and industrial plants throughout the East and the Middle West.





# EDDY

## VALVES AND FIRE HYDRANTS

for long service

In order to display Eddy products with emphasis on product grouping, and also to maintain established figure numbers appearing in other printed matter, some figure numbers of Eddy products are not in numerical sequence. To facilitate finding product by figure number, the index below has been prepared.

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F-2400..... p. 122	F-2710..... p. 140	F-3016..... p. 155
F-2405..... p. 122	F-2715..... p. 140	F-3024..... p. 152
F-2430..... p. 122	F-2717..... p. 140	F-3028..... p. 152
F-2435..... p. 122	F-2730..... p. 140	F-3044..... p. 153
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F-2465..... p. 128	F-2800..... p. 142	F-3070..... p. 157
F-2475..... p. 128	F-2805..... p. 142	F-3075..... p. 156
F-2480..... p. 128	F-2815..... p. 142	F-3080..... p. 156
F-2484..... p. 128	F-2832..... p. 143	F-3085..... p. 156
F-2490..... p. 128	F-2834..... p. 143	F-3088..... p. 156
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F-2590..... p. 122	F-3000..... p. 154	F-3170..... p. 160
F-2650..... p. 136	F-3002..... p. 154	F-3178..... p. 160
F-2655..... p. 136	F-3004..... p. 154	F-3180..... p. 160
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### EDDY VALVE COMPANY

General Sales Office and Plant

Waterford, New York

Subsidiary of James B. Clow & Sons, Inc.

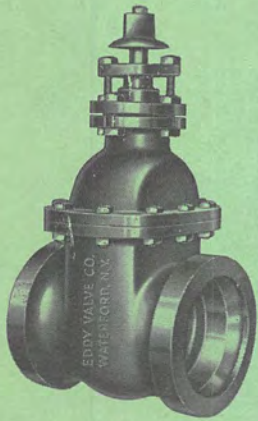


# EDDY VALVE COMPANY

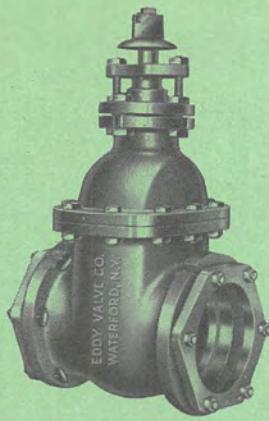


A Subsidiary of James B. Clow & Sons

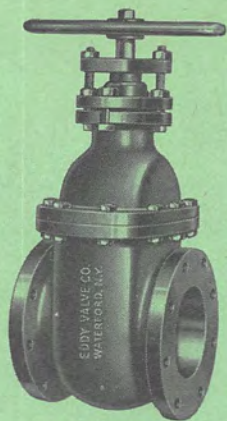
## EDDY AWWA GATE VALVES IRON BODY, BRONZE MOUNTED



**F-2400**  
Hub Ends  
Non-rising Stem



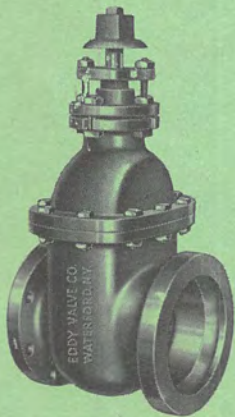
**F-2405**  
Mechanical Joint Ends  
Non-rising Stem



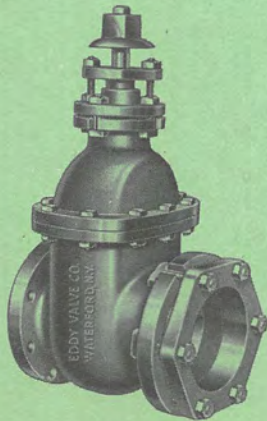
**F-2575**  
Flanged Ends  
Non-rising Stem

### Pressure Ratings

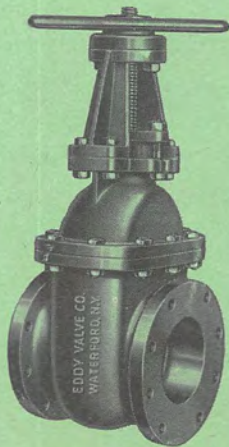
Valve Size Inches	Working Pressure psi		Hydrostatic Test Pressure psi
	Non-Shock Cold Water	Steam	
4 thru 12	200	125	350
14 thru 48	150	100	300



**F-2430**  
Flanged and Hub End  
Joints  
Non-rising Stem



**F-2435**  
Flanged and Mechanical  
Joint Ends  
Non-rising Stem



**F-2590**  
Flanged Ends  
OS & Y  
Rising Stem





# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## EDDY AWWA GATE VALVES

### IRON BODY, BRONZE MOUNTED

**Taper Seat Valves**  
2" thru 14"

**Parallel Seat Valves**  
16" thru 48"

#### DESCRIPTION

Eddy AWWA Double Disc Gate Valves are designed primarily for flow control of water in underground pipe lines. They are made in sizes 2 thru 48 inches and equal or exceed the requirements established by specifications of the American Water Works Association and conform to Federal Specifications WW-V-58, Type II, Class A.

Eddy AWWA Gate Valves are specifically designed for rugged service. Neck, flanges, and hub are extra heavy to withstand pipe strain and ground shifting. Body, cover, gates, and stem are built for extra strength, with clean and simple internal construction, to assure long service and low maintenance in inaccessible locations.

All working parts are bronze or bronze mounted and are standardized and interchangeable.

Eddy Valves work equally well with the pressure on either side of the gates. Efficient design and accurate construction make them exceptionally easy to operate under pressure.

Eddy Valves are designed with a high safety factor well above the rated pressures shown on page 122, although use above these pressures is not recommended.

All valves open to the left unless otherwise specified.

#### CONSTRUCTION

**Body:** Cast iron, bronze mounted. Sturdy proportions provide protection against damage.

**Stem:** Forged bronze of high tensile and torsional strength. Ample diameter and accurately machined threads assure smooth and trouble-free operation.

**Ball:** (Taper seat valves only) High strength cast iron, fully bronze mounted. On 4-inch and larger valves, ball has hooks which engage slots in the gates.

**Gate Nut:** (Parallel seat valves only) Solid bronze. Independent of hooks, gates, and wedges. Stem or stem nut will not bind or spring out of line.

**Wedge Hooks:** (Parallel seat valves only) Two heavy cast iron hooks with bronze faced inclines engage with corresponding bronze faced wedging surfaces on the back of the gates.

**Gates and Gate Rings:** Gates are high strength cast iron. Bronze gate rings are rolled into machined grooves under pressure to make gate and ring one inseparable unit. After fitting, gate rings are accurately machined to provide a water tight surface.

**Seat Rings:** Bronze seat rings are screwed into place and machined to a water tight surface. They can be removed and replaced if necessary.

**Operating Nuts and Handwheels:** All valves except flanged valves and outside screw and yoke valves are supplied with 2-inch square operating nuts unless otherwise specified. Flanged valves and outside screw and yoke valves are normally supplied with handwheels. Direction of opening is indicated by an arrow cast on the operating nut skirt or on the rim of the handwheel.

**Yoke:** Yoke for rising stem, outside screw and yoke valves are of rugged cast iron. On 3-inch and smaller valves they are cast integral with the cover. Careful machining assures accurate stem alignment.

**Rollers, Tracks and Scrapers:** When specified for 16-inch or larger valves, bronze tracks and rollers are provided to overcome friction. Scrapers assure a clean track and easy roller travel. This construction is recommended when valves are to be used in a horizontal position in a horizontal pipe line.

**Slides:** For 16-inch and larger valves, installed in a horizontal position in vertical pipe lines, we recommend the use of bronze slides to assure positive and perfect seating of the gates and to eliminate unusual seat wear.

#### INDEX TO ACCESSORIES

ACCESSORY	PAGE	ACCESSORY	PAGE
By-pass valves	158	Floor stands	147
Chain wheels	160	Gearing	159
Cleanouts	158	Indicator posts	130
Cylinder operation	148	Position indicators	159
Electric motor operation	149	Stem guides	160
Floor boxes	160	Valve boxes	128



## EDDY AWWA TAPER SEAT VALVE

SIZES 2" THRU 14"

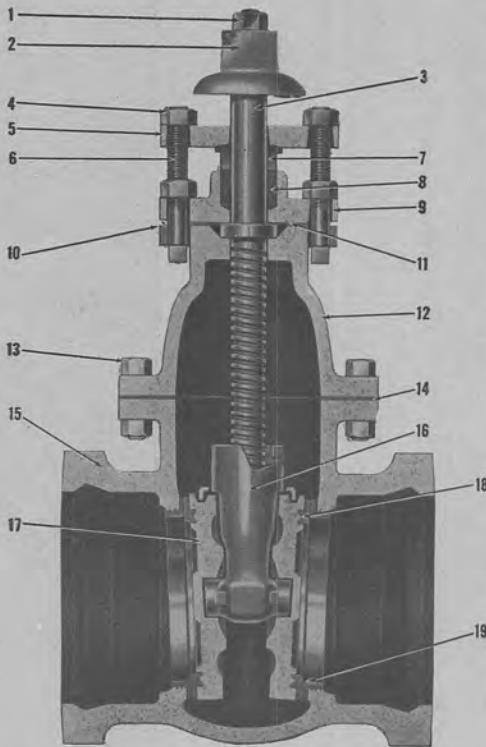
The Eddy AWWA Double Disc, Taper Seat Gate Valve employs the simplest principle of gate valve construction in its size range. It contains only three parts moved by the stem—a ball and two gates. The simplicity of this design is illustrated below.

### OPERATION

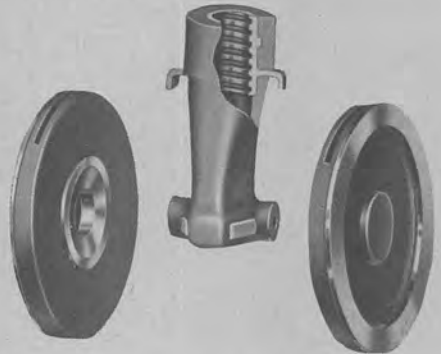
As the stem is turned to open the valve, the ball rises on the stem, and both gates are drawn simultaneously from their seats. Further turning of the stem raises the gates into the full open position, leaving an unobstructed waterway.

In closing, the gates, hung loosely from the trunions on the ball, travel smoothly downward to their seats. The gates are free to turn, and as contact is made with seats the gates seat smoothly and without effort. The entire operation is simple and positive.

Stops cast in the bottom of the body prevent the gates from ever passing their seats. Because the seat rings are tapered, the body itself acts as a wedge.



Sectional View of Taper Seat Valve



Gate Assembly, Taper Seat Valve

All working parts are completely standardized, and completely interchangeable.

### PARTS LIST

KEY	NAME	KEY	NAME
1	Hold down nut: steel	11	Gasket for stuffing box flange
2	Operating nut: cast iron	12	Cover: cast iron
3	Stem: bronze	13	Body and cover bolts and nuts: steel
4	Follower nuts: bronze	14	Gasket for body and cover flange
5	Follower: cast iron	15	Body: cast iron
6	Follower bolts: steel	16	Ball: cast iron—bronze mounted
7	Packing gland: bronze	17	Gates: cast iron
8	Packing for stuffing box	18	Gate rings: bronze
9	Stuffing box: cast iron	19	Seat rings: bronze
10	Stuffing box bolts and nuts: steel		Valve Wrench—see page 129



## EDDY AWWA PARALLEL SEAT VALVE

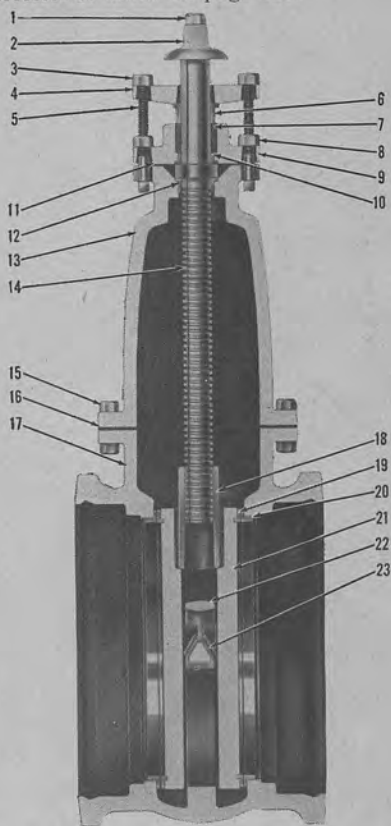
SIZES 16" THRU 48"

The design of the Eddy AWWA Double Disc, Parallel Seat Gate Valve makes for clean and simple internal construction, as shown in the sectional view below. This valve can be furnished with any of the accessories listed on page 123.

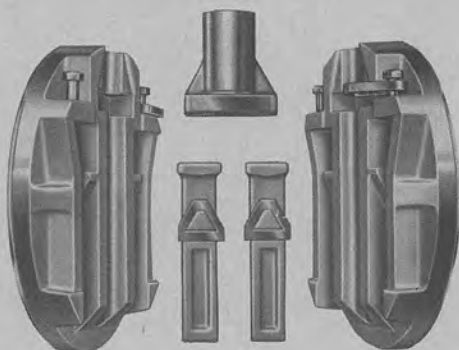
### OPERATION

Turning the stem to open the valve releases the valve wedging mechanism, relieves the wedging pressure on the gates, and opens the valve. Further turning of the stem raises the gates into the full open position.

When the valve is being closed, the gates move freely downward, to a position opposite their seats. As the gates approach the end of their travel, the iron wedge hooks come into contact with stops cast in the bottom of the valve which prevent further downward movement of the hooks and cause the discs to be gradually forced to their seats. The entire operation is performed easily and without sticking.



Sectional View of Parallel Seat Valve



Gate Assembly, Parallel Seat Valve

All working parts are completely standardized, and completely interchangeable.

### PARTS LIST

KEY	NAME	KEY	NAME
1	Hold down nut: steel	13	Cover: cast iron
2	Operating nut: cast iron	14	Stem: bronze
3	Follower nut: bronze	15	Body and cover flange bolts and nuts: steel
4	Follower: cast iron	16	Gasket for body and cover flange
5	Follower bolts: steel	17	Body: cast iron
6	Gland: bronze	18	Gate nut: bronze
7	Packing for stuffing box: flax	19	Gate rings: bronze
8	Stuffing box bolts and nuts: steel	20	Seat rings: bronze
9	Stuffing box: cast iron	21	Gate: cast iron
10	Bushing for stuffing box: bronze	22	Wedge hooks: cast iron
11	Gasket for stuffing box flange	23	Shoes for gate hooks: bronze
12	Bushing for cover: bronze		







# EDDY VALVE COMPANY

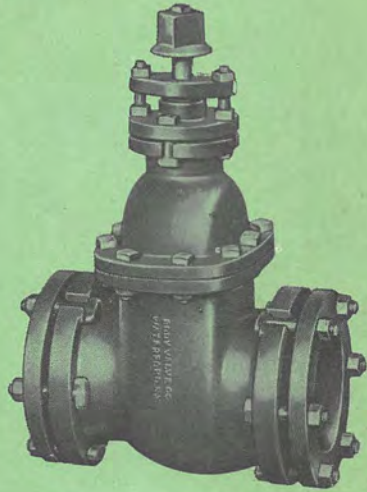


A Subsidiary of James B. Clow & Sons

## EDDY CUTTING-IN VALVE AND SLEEVE

SIZES 3" THRU 12"

For All Classes of Cast Iron Pipe	ASA AWWA WW-P-421 WW-P-421a
--	--------------------------------------



**F-3180**  
Cutting-In Valve



**F-1220**  
Cutting-In Sleeve

Eddy Mechanical Joint Cutting-In Valves and Sleeves offer the fastest, simplest, and most economical method of cutting gate valves into existing water lines.

They are used to replace worn-out valves, or to provide additional valves for zone control of

water flow. They are ideal for installing auxiliary valves on fire hydrants.

The Eddy Mechanical Joint Cutting-In Valve is a standard Double Disc Gate Valve of the AWWA type, furnished complete with cutting-in sleeve and all joint accessories.

### HOW THE VALVE IS INSTALLED

Joints should be installed in 1-2-3 order

1. From the existing line cut out exact length of pipe shown for "A" in table. Remove nuts, bolts, glands and gaskets from bell end joints of gate valve and from large end of sleeve. Slip glands and gaskets over cut ends of pipe and over small end of sleeve. Position sleeve and telescope it over end of the pipe.

2. Lower valve into position between pipe end and spigot end of sleeve. Push valve home and move sleeve along pipe until its spigot is seated in other bell of valve.

3. Tighten nuts gradually. To complete installation, tighten set screws in gland on sleeve against the pipe.

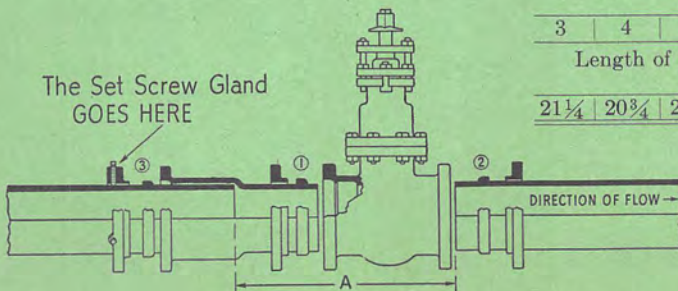
Size of existing cast iron pipe line  
Inches

3	4	6	8	10	12
---	---	---	---	----	----

Length of pipe "A" to cut out  
Inches

21 1/4	20 3/4	23 1/4	24 3/4	25 1/4	25 1/2
--------	--------	--------	--------	--------	--------

The Set Screw Gland  
GOES HERE



"A" = Face to Face of  
Valve Body Flanges  
Plus 10 Inches



# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## VALVE BOXES AND PARTS

Unless  
Otherwise Ordered  
Covers are Marked  
WATER



**F-2450**  
Valve Box  
5 1/4" Shaft Diameter



**F-2455**  
Top Section  
in three lengths  
see table



**F-2460**  
Center Section  
in seven-lengths  
see table



**F-2465**  
No. 6 Base  
for valve sizes  
6" and 8"

### F-2450 VALVE BOX

Unless otherwise specified, we furnish valve box complete with F-2465 Base and F-2490 Cover.

### Dimensions and Weights

Size Number of Box	Extending Length* in inches with No. 6 Base	Top Section		Center Section		Weight of Box Complete with F-2490 Cover, and		
		No.	Length Overall	No.	Length Overall	No. 6 Base	No. 4 Base	No. 160 Base
AAA	17	...	...	...	...	64	55	83
AA	25-30	54	10 1/2	60	11	76	67	95
A	30-38	55	13 1/2	61	16	83	74	102
B	37-45	55	13 1/2	62	23	92	83	111
C	42-50	55	13 1/2	63	28	96	87	115
CC	50-58	55	13 1/2	64	36	106	97	125
D	42-62	56	25 1/2	63	28	116	107	135
DD	50-70	56	25 1/2	64	36	126	117	145
E	62-70	55	13 1/2	65	48	117	108	136
F	62-82	56	25 1/2	65	48	137	128	156
G	74-82	55	13 1/2	66	60	132	123	151
H	74-94	56	25 1/2	66	60	152	143	171

\*No. 4 Base decreases length of valve box by 2 inches; No. 160 Base by 3/4-inch. Lengths longer than 94 inches can be provided by using the F-2475 Extension Section with valve box size H.



**F-2475**  
Extension Section  
Laying Length 14"  
Overall Length 18"



**F-2480**  
No. 4 Base  
for valve size  
4" and smaller



**F-2484**  
No. 160 Oval Base  
for valve size  
10" and larger



**F-2490**  
Cover for Water



**F-2492**  
Cover for Gas



**F-2494**  
Stay-Put Cover



**F-2496**  
Flanged Cover



**F-2498**  
Lock Cover



## VALVE BOX TOP EXTENSIONS



**F-2510**  
14-inch Repair Extension

### F-2510 Repair Extension

The F-2510 Repair Extension has been designed to simplify the raising of valve boxes to a new grade. It can be used where the valve box is not long enough to be raised to a new grade and is particularly useful where the valve box is imbedded in concrete or other hard material as it eliminates the necessity and expense of digging up the valve box to raise it.



Application of F-2510  
Repair Extension

## VALVE WRENCH



**F-2520 Valve Wrench**

For use with valve boxes having  $5\frac{1}{4}$ " inside diameter and larger.

### F-2520 Valve Wrench

For opening and closing valves installed underground or in other inaccessible places. Can be furnished in any length required, with cross bar handle as shown, or with 2-inch square nut top to serve as a stationary rod.

When ordering state length required. We will furnish wrench for 2-inch square valve operating nut unless otherwise specified.

### Directions for Setting Valve Boxes

The illustration to the left shows a valve box properly placed. When setting a Valve Box in its place, the base should rest two or more inches above the flanged joints of the valve dome. The nut of valve should be about on a line with the hub or upper part of the Valve Box base where connected with upright jacket; this will leave ample space all around valve and prevent box touching it in any way.

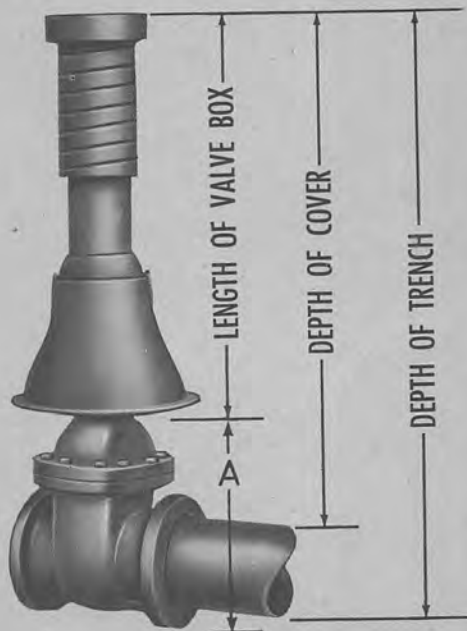
### Directions for Ordering Valve Boxes and Parts

Specify valve boxes by size number as shown on preceding page. Otherwise specify the "Depth of Cover" or the "Depth of Trench."

"Depth of Cover" is measured from the top of the pipe line.

"Depth of Trench" is measured from the bottom of the trench.

When ordering valve box parts always give the figure number of the part, and the size number of the valve box.



Deduct Dimension "A" from Depth of Trench to Determine Length of Box Required.

Size of valve.....Inches	2	3	4	6	8	10	12	14	16
Valve box base.....Number	4	4	4	6	6	160	160	160	160
Dimension "A".....Inches	8	11	13	16	18	21	24	28	28



## INDICATOR POSTS AND VALVES

Approved by The Associated Factory  
Mutual Fire Insurance Companies

Eddy Indicator Post Valves are used for installations, underground or under a floor when it is necessary to tell at a glance whether the valve is in an open or closed position. Indicator posts can be furnished complete with valve, or an adapter can be furnished to convert existing valves.

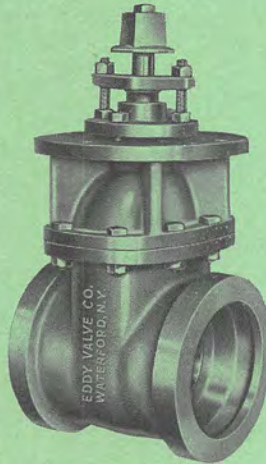
Two large window openings near the top of the valve are fitted with heavy plates of glass. An aluminum target plate, with the words OPEN and SHUT cast on it in large, easy-to-read, raised letters, is located directly behind each window, in such a position that the appropriate word appears in view as the valve is operated.

An angle type operating wrench, padlock, and locking staple can be furnished to permit locking of the wrench to prevent unauthorized operation of the post and to keep the wrench always available.

Stem, indicators, and all working parts are fully protected from moisture or weather damage by complete enclosure. Operating nuts are of bronze. Operating nuts 1 1/4 inches square are furnished, unless otherwise specified.



**F-2530**  
Plain Type  
Indicator Post



Indicator Post Valve

Valves similar to F-2400 or  
F-2405 are regularly furnished.



**F-2532**  
Lock Type  
Indicator Post



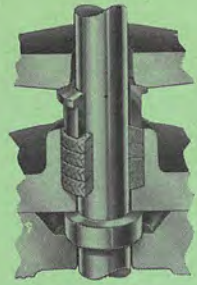
**F-2534**  
Indicator Post Adapter

### F-2534 Adapters

Any Eddy non-rising stem gate valve can be fitted with the F-2534 adapter to adapt it for use with either the plain type or lock type Eddy Indicator Post. The cast iron adapter is equipped with hook bolts for easy installation on existing valves.



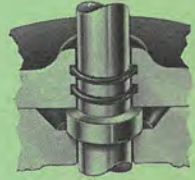
## EDDY VALVE STUFFING BOX CONSTRUCTION



Section Showing  
Standard Stuffing Box

Eddy Valves are available with either the standard stuffing box or the O-Ring stuffing box. Unless otherwise specified, valves are furnished with the standard stuffing box, and are packed with a braided, treated, lubricated flax packing. In sizes 24-inch and smaller the follower is cast iron with a bronze gland; in larger sizes the follower is cast iron and bronze bushed.

When specified, the O-Ring stuffing box can be furnished. This provides an excellent seal and consists of two rings. The top ring is the dirt seal; the lower ring is the pressure seal.



Section Showing  
O-Ring Stuffing Box

### ORDERING INFORMATION

When placing orders or making inquiries for Gate Valves please furnish the following information:

1. **Quantity.**
2. **Size.**
3. **Working pressure:** Refer to tables of pressure ratings.
4. **End type or types:** Valves are furnished with any available combination of end types—see page 122.
  - 4A. **Flanged valves:** Normally furnished with Class 125 Standard flanges with bolt holes straddling center lines.
  - 4B. **Mechanical Joint valves:** Normally furnished with standardized mechanical joints with plain rubber gaskets. Cutting-in type mechanical joints also available for use in existing cast iron pipe lines.
5. **Direction of opening:** Must be specified. Open left (counterclockwise); or open right (clockwise).
6. **Type of stem:** State whether non-rising stem, rising stem with outside screw and yoke, or sliding stem for floor stand operation.
7. **Installation position:** Indicate position in which valve will be installed (vertically, horizontally, or otherwise).
8. **Wrench nut or handwheel:** All flanged valves and all rising stem valves with outside screw and yoke are furnished with handwheels unless otherwise specified. Other valves are furnished with a 2-inch square wrench nut unless otherwise specified.
9. **Gearing:** Either bevel or spur gearing can be furnished when specified—see page 159.
10. **Gear cases:** Extended type gear cases can be furnished when specified—see page 159.
11. **By-passes:** By-pass valves are furnished when specified. State size required and position on main valve—see page 158.
12. **Special accessories:** When anti-friction bearings, roller tracks and scrapers, slides, or fixed and renewable seat rings are required, they must be specified.
13. **Parts:** Always order parts by number—see pages 124 and 125.
14. **Stuffing box:** Whether standard or O-Ring.
15. **Indicator posts and valves:** State depth of trench (distance from surface to bottom of the pipe line); size and shape of operating nut, if other than standard. For valves already in place, state whether valve is equipped with a flange for post support; if so, give flange dimensions. (See page 130 for adapter).





# EDDY VALVE COMPANY



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## EDDY TAPPING VALVES AND SLEEVES IRON BODY, BRONZE MOUNTED

### Directions for using Tapping Valves and Sleeves

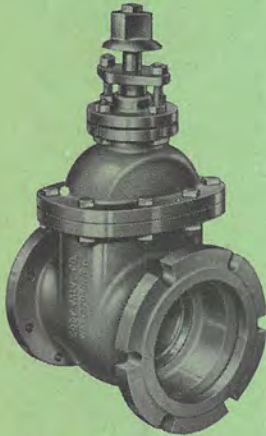
Eddy tapping valves and sleeves, used in connection with a tapping machine, offer the best method of taking off a branch line from the main. The main can be tapped while under pressure, and the tap is made without any interruption of service.

In use, the tapping sleeve is bolted around the main, and the valve bolted to the flange on the sleeve. With the valve open, the tapping machine is bolted on and the tap made. The cutter is then withdrawn, the valve closed, and the machine removed.

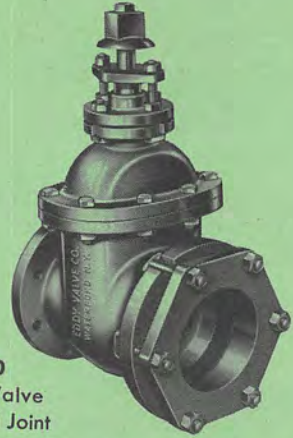
### TAPPING VALVES

#### Pressure Ratings

Valve Size Inches	Working Pressure Water psi	Hydrostatic Test Pressure
2 thru 12	200	300
14 and 16	150	300



**F-2550**  
Tapping Valve  
Calk Type



**F-2560**  
Tapping Valve  
Mechanical Joint

Eddy Tapping Valves are of the same general construction as the Eddy AWWA parallel seat valves and have the same pressure rating. Larger diameter seat rings permit entry of the tapping machine cutters, and the end connections are designed to accommodate the tapping operation.

One end of the F-2550 Calk Type Valve has

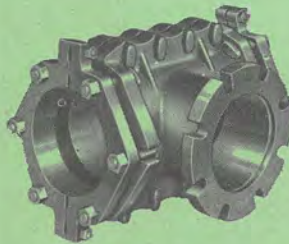
a standard flange for bolting to the flange of the sleeve. The other end has a combined standard Class D hub and flange for bolting to the tapping machine.

The F-2560 Mechanical Joint valve is similar to the Calk Type Valve except the end for bolting to the machine has a mechanical joint which eliminates the need of calking.

### TAPPING SLEEVES AND CROSSES



**F-2552**  
Tapping Sleeve  
Calk Type



**F-2562**  
Tapping Sleeve  
Mechanical Joint



**F-2565** Tapping Cross  
Calk Type  
**F-2567** Mechanical Joint  
(not Shown)

The rugged construction of Eddy Tapping Sleeves and Crosses enables them to withstand the strains that develop when a branch line is tapped into the main while the main is in service.

The tapping sleeve and cross is made in two sections for easy installation without interrupting service. Closely spaced bolts located close to the side gaskets assure a watertight

joint. A bead or jute stop at each end of the sleeve guarantees centering of the sleeve or cross on the pipe and eliminates any excessive strains that might otherwise develop.

The Calk Type and the Mechanical Joint Tapping crosses are made up by combining two front halves of the regular tapping sleeves, and serve to permit tapping on both sides of the main.





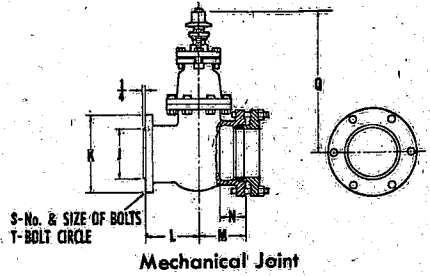
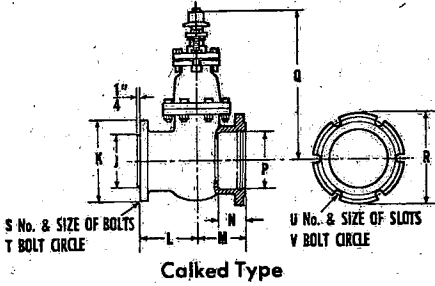
# EDDY VALVE COMPANY

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## EDDY TAPPING VALVES AND SLEEVES

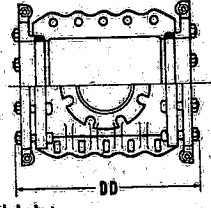
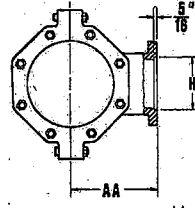
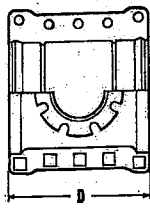
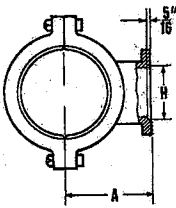
### TAPPING VALVES



### Dimensions—Inches

Size Valve	J	K	L	M	N	P	Q	R	S	T	U	V	Turns to Open
2	2 <sup>21</sup> / <sub>32</sub>	6	3	4 <sup>1</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>	3 <sup>31</sup> / <sub>32</sub>	11	6 <sup>1</sup> / <sub>2</sub>	4- <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	6- <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	16
3	3 <sup>31</sup> / <sub>32</sub>	8 <sup>1</sup> / <sub>2</sub>	5	5 <sup>1</sup> / <sub>4</sub>	3	4 <sup>11</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	4- <sup>3</sup> / <sub>4</sub>	7	6- <sup>7</sup> / <sub>8</sub>	7	12
4	4 <sup>31</sup> / <sub>32</sub>	9	4 <sup>3</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>	3 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>2</sub>	17 <sup>1</sup> / <sub>8</sub>	10 <sup>1</sup> / <sub>2</sub>	4- <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	6-1	9	15
6	6 <sup>31</sup> / <sub>32</sub>	11	7 <sup>7</sup> / <sub>16</sub>	6 <sup>9</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	7 <sup>29</sup> / <sub>32</sub>	21	12 <sup>1</sup> / <sub>4</sub>	8- <sup>3</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	6-1	11	21
8	8 <sup>31</sup> / <sub>32</sub>	13 <sup>1</sup> / <sub>2</sub>	7 <sup>7</sup> / <sub>8</sub>	7 <sup>8</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>4</sub>	9 <sup>29</sup> / <sub>32</sub>	25	14 <sup>1</sup> / <sub>2</sub>	8- <sup>3</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>	6-1	13	27
10	10 <sup>31</sup> / <sub>32</sub>	16	7 <sup>11</sup> / <sub>16</sub>	7 <sup>9</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>4</sub>	12 <sup>3</sup> / <sub>32</sub>	27 <sup>3</sup> / <sub>4</sub>	17	12- <sup>7</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>4</sub>	8-1 <sup>1</sup> / <sub>8</sub>	15 <sup>1</sup> / <sub>2</sub>	23
12	12 <sup>31</sup> / <sub>32</sub>	19	8 <sup>8</sup> / <sub>8</sub>	7 <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>32</sub>	31 <sup>1</sup> / <sub>4</sub>	19	12- <sup>7</sup> / <sub>8</sub>	17	10-1 <sup>1</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>2</sub>	40
16	16 <sup>31</sup> / <sub>32</sub>	23 <sup>1</sup> / <sub>2</sub>	9 <sup>3</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	18 <sup>1</sup> / <sub>16</sub>	40	24 <sup>5</sup> / <sub>8</sub>	16-1	21 <sup>1</sup> / <sub>4</sub>	14-1 <sup>1</sup> / <sub>8</sub>	22 <sup>3</sup> / <sub>4</sub>	52

### TAPPING SLEEVES



### Dimensions—Inches

Sleeve Size	A	D	H	AA	DD	Sleeve Size	A	D	H	AA	DD	Sleeve Size	A	D	H
4x 2	7 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>4</sub>	3	6 <sup>1</sup> / <sub>2</sub>	17	12x 4	11 <sup>5</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	5	12 <sup>1</sup> / <sub>4</sub>	17 <sup>1</sup> / <sub>2</sub>	18x 6	15	17 <sup>1</sup> / <sub>4</sub>	7
4x 3	7 <sup>5</sup> / <sub>8</sub>	12 <sup>1</sup> / <sub>4</sub>	4	6 <sup>1</sup> / <sub>2</sub>	17	12x 6	11 <sup>8</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	7	12 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	18x 8	14 <sup>3</sup> / <sub>4</sub>	17 <sup>1</sup> / <sub>4</sub>	9
4x 4	7 <sup>3</sup> / <sub>4</sub>	12 <sup>1</sup> / <sub>4</sub>	5	6 <sup>1</sup> / <sub>2</sub>	17	12x 8	11 <sup>1</sup> / <sub>2</sub>	17 <sup>1</sup> / <sub>4</sub>	9	12 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	20x 4	16 <sup>3</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	5
6x 2	7 <sup>11</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	3	8	16 <sup>3</sup> / <sub>8</sub>	12x10	11 <sup>9</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	11	12 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	20x 6	16 <sup>1</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	7
6x 3	7 <sup>11</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	4	8 <sup>1</sup> / <sub>2</sub>	16 <sup>3</sup> / <sub>8</sub>	12x12	11 <sup>5</sup> / <sub>8</sub>	21 <sup>1</sup> / <sub>4</sub>	13	12 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	20x 8	16 <sup>3</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	9
6x 4	7 <sup>13</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	5	8 <sup>1</sup> / <sub>2</sub>	16 <sup>3</sup> / <sub>8</sub>	14x 2	13 <sup>1</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	3	...	...	20x10	16 <sup>3</sup> / <sub>2</sub>	21 <sup>1</sup> / <sub>4</sub>	11
6x 6	7 <sup>13</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>4</sub>	7	8 <sup>1</sup> / <sub>2</sub>	19 <sup>3</sup> / <sub>8</sub>	14x 4	13 <sup>5</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	5	...	...	20x12	16 <sup>9</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	13
8x 2	8 <sup>16</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	3	9 <sup>3</sup> / <sub>4</sub>	16 <sup>3</sup> / <sub>8</sub>	14x 6	13 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>4</sub>	7	...	...	20x16	19 <sup>13</sup> / <sub>16</sub>	25 <sup>1</sup> / <sub>4</sub>	17
8x 3	8 <sup>16</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	4	10	16 <sup>3</sup> / <sub>4</sub>	14x 8	13 <sup>5</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>4</sub>	9	...	...	24x 4	19 <sup>11</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	5
8x 4	9 <sup>1</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	5	10	16 <sup>3</sup> / <sub>4</sub>	14x10	13 <sup>11</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	11	...	...	24x 6	19 <sup>13</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	7
8x 6	9 <sup>1</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	7	10	22 <sup>3</sup> / <sub>4</sub>	14x12	13 <sup>7</sup> / <sub>8</sub>	21 <sup>1</sup> / <sub>4</sub>	13	...	...	24x 8	19 <sup>13</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	9
8x 8	9 <sup>3</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	9	10	22 <sup>3</sup> / <sub>4</sub>	16x 2	13 <sup>5</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	3	...	...	24x10	19 <sup>7</sup> / <sub>8</sub>	21 <sup>1</sup> / <sub>4</sub>	11
10x 2	11 <sup>3</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	3	11	17 <sup>3</sup> / <sub>8</sub>	16x 3	13 <sup>5</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	4	...	...	24x12	19 <sup>15</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	13
10x 3	11 <sup>3</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	4	11 <sup>1</sup> / <sub>4</sub>	17 <sup>3</sup> / <sub>8</sub>	16x 4	13 <sup>3</sup> / <sub>8</sub>	13 <sup>1</sup> / <sub>4</sub>	5	...	...	24x16	20 <sup>3</sup> / <sub>8</sub>	25 <sup>1</sup> / <sub>4</sub>	17
10x 4	11 <sup>5</sup> / <sub>16</sub>	13 <sup>1</sup> / <sub>4</sub>	5	11 <sup>1</sup> / <sub>4</sub>	17 <sup>3</sup> / <sub>8</sub>	16x 6	13 <sup>3</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>4</sub>	7	...	...	30x 6	22 <sup>1</sup> / <sub>2</sub>	16 <sup>1</sup> / <sub>4</sub>	7
10x 6	11 <sup>5</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	7	11 <sup>1</sup> / <sub>4</sub>	26 <sup>3</sup> / <sub>8</sub>	16x 8	13 <sup>3</sup> / <sub>8</sub>	17 <sup>1</sup> / <sub>4</sub>	9	...	...	30x 8	22 <sup>1</sup> / <sub>2</sub>	22 <sup>1</sup> / <sub>2</sub>	9
10x 8	11 <sup>7</sup> / <sub>16</sub>	17 <sup>1</sup> / <sub>4</sub>	9	11 <sup>1</sup> / <sub>4</sub>	26 <sup>3</sup> / <sub>8</sub>	16x10	13 <sup>10</sup> / <sub>16</sub>	21 <sup>1</sup> / <sub>4</sub>	11	...	...	30x12	22 <sup>1</sup> / <sub>2</sub>	22 <sup>1</sup> / <sub>2</sub>	13
10x10	11 <sup>7</sup> / <sub>16</sub>	19 <sup>1</sup> / <sub>4</sub>	11	11 <sup>1</sup> / <sub>4</sub>	26 <sup>3</sup> / <sub>8</sub>	16x12	14	21 <sup>1</sup> / <sub>4</sub>	13	...	...	36x12	25 <sup>1</sup> / <sub>2</sub>	26	13
12x 2	11 <sup>1</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>4</sub>	3	12	17 <sup>3</sup> / <sub>8</sub>	16x16	15 <sup>3</sup> / <sub>16</sub>	25 <sup>3</sup> / <sub>4</sub>	17	...	...	42x12	20	30	13
12x 3	11 <sup>1</sup> / <sub>4</sub>	13 <sup>1</sup> / <sub>4</sub>	4	12 <sup>1</sup> / <sub>4</sub>	17 <sup>1</sup> / <sub>2</sub>	18x 4	15	13 <sup>1</sup> / <sub>4</sub>	5	...	...				



## EDDY FIRE HYDRANTS

### DESCRIPTION

Eddy Fire Hydrants are built for dependability and lasting service and equal or exceed the specifications of the American Water Works Association in every respect.

Eddy Hydrants are furnished to open to the left or to the right. Direction of opening is indicated by an arrow and legend cast on the cover.

### Construction and Operation

The Eddy Fire Hydrant is a center stem type with a rising stem. The stem position provides a fast visual indication of the position of the valve.

The hydrant valve opens *with* the pressure. Water pressure in the main thus actually assists opening of the hydrant, providing instantaneous flow. The stem is supported from the top *and* the bottom of the hydrant and moves in direct line with the standpipe. There can be no misalignment of the valve with the seat, since the valve in the open position is above the seat and out of the flow of water entering the hydrant. The lower portion of the stem is threaded and engages a bronze stem nut cast into the base of the hydrant.

In closing, the hydrant valve is drawn gradually and smoothly to its solid bronze seat. Water hammer is eliminated because the valve closes against the pressure and cannot jump to its seat. The rubber faced valve seats perfectly on the bronze seat ring and remains stationary once it comes in contact with the seat. This prevents any scoring or marring of the valve face or seat ring.

In the closed position the hydrant valve is held in place from below by the threaded portion of the stem. Damage to the hydrant standpipe will not result in any loss of water.

The sturdy, independent drain rod provides complete, automatic drainage of the hydrant after use. The drain is closed quickly by one and one half opening turns of the operating nut which forces the drain valve to its seat and prevents any water from escaping through the drain opening while the hydrant is being used.

As the hydrant is closed, the drain mechanism is opened by the final one and one-half turns of the operating nut. The bronze drain cup extends through the base of the hydrant, eliminating danger of corrosion at the drain opening.

The drain rod can be removed through the top of the hydrant without shutting off the water in the main. This permits the drain to be rodded out at any time if it should become clogged with roots or other foreign matter.

### Design

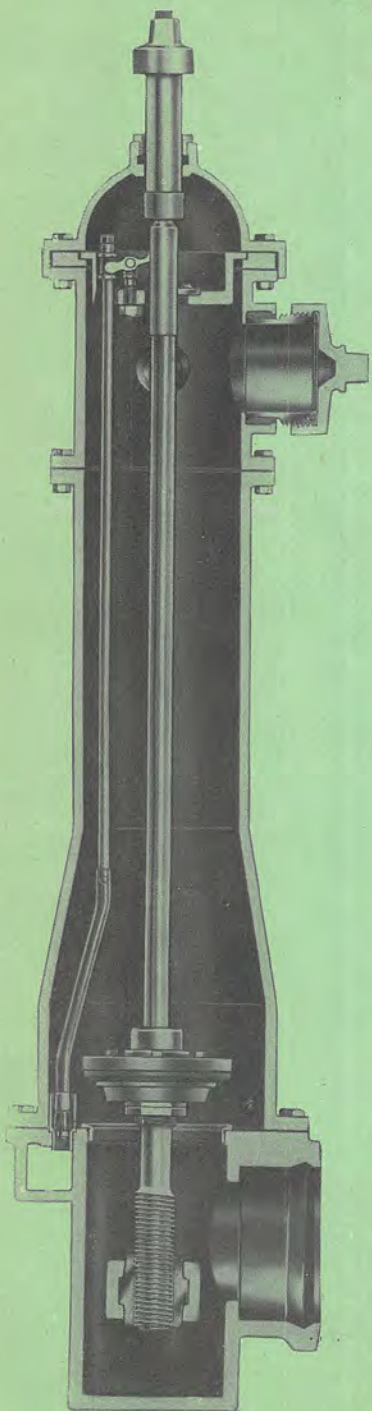
The Eddy design simplifies servicing the hydrant for inspection, repair or replacement of parts. One man can remove all working parts from the top of the hydrant, easily and quickly, without special tools.

The "Swivel Head," which contains the nozzles, permits nozzles to be faced in any of eight positions without digging.

Swivel head design also permits quick and inexpensive substitution of a new nozzle arrangement on the hydrant by installing a new swivel head which incorporates the desired nozzle arrangement. The change can be made without digging up the hydrant or the use of special tools.

The drain support, which holds the drain mechanism, has eight holes at 45° intervals, which permit the drain support to be kept always in its proper position in the hydrant if nozzle positions are changed.

All Eddy Fire Hydrant parts are fully interchangeable.



Open position

When Ordering or Inquiring About Hydrants, see "Ordering Information"—page 141.





## EDDY FIRE HYDRANTS

### ADVANTAGES

#### Service

Hydrant valve opens with the pressure. Water pressure actually makes opening the hydrant easier.

No loss of water should the standpipe be damaged.

The large waterway around the valve, when opened, assures a full flow at maximum efficiency.

Hydrant valve is free to revolve on the stem and seats in different positions.

The extent of hydrant opening is positively shown by the position of the rising stem.

Water hammer is eliminated. The hydrant valve closes against the pressure, and the water flow is shut off gradually as the valve approaches its seat.

Positive seating of the valve is assured. The valve is drawn, not pushed, against its seat.

The hydrant is automatically and positively drained after every use.

The high velocity of water caused by the throttling ring washes the valve and its seat as the valve is closed. Foreign matter cannot lodge between valve and seat.

#### Construction

Swivel head design permits selection of any of eight different nozzle positions.

Tapered barrel anchors the hydrant and prevents heaving by frost.

New nozzle arrangements can be provided at any time simply by replacement of the swivel head.

The protective shield around the drain minimizes clogging and prevents undermining.

Traffic damage to the standpipe will not result in any loss of water.

Balanced proportions and even distribution of weight make the Eddy Fire Hydrant easy to handle and install.

#### Maintenance

All working parts can be removed for inspection or replacement without digging, without a hoist or derrick, and without special tools by one man.

Removal of the hydrant cover or standpipe does not require the water to be shut off.

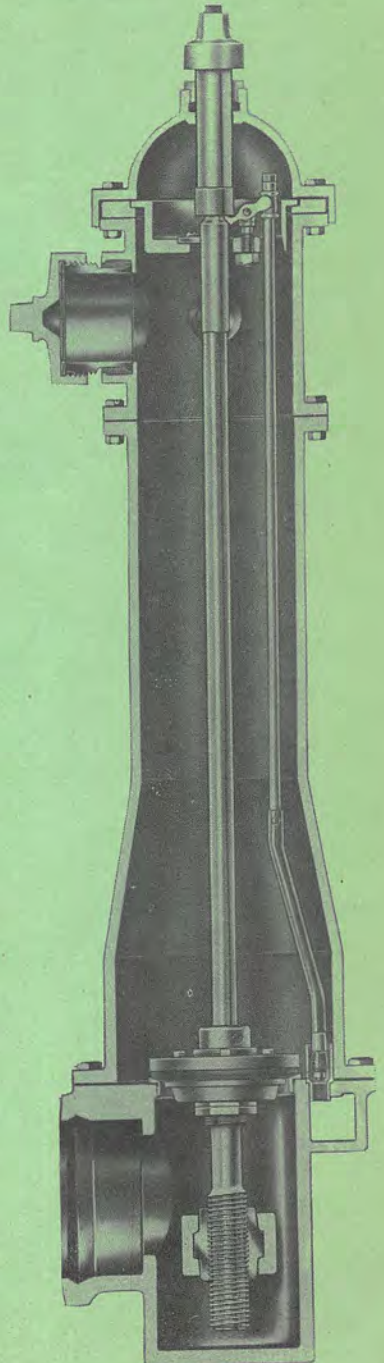
A damaged valve can be removed and replaced easily at little expense.

The hydrant valve is faced with specially selected rubber.

The drain rod is independent of the stem and can be easily adjusted or removed from the standpipe without shutting off the water.

All Eddy Hydrant parts are fully interchangeable.

The Eddy Valve Company carries a complete line of hydrant parts in stock for immediate shipment.



Closed position

When Ordering or Inquiring About Hydrants, see "Ordering Information"—page 141.



## EDDY FIRE HYDRANTS

HUB, MECHANICAL JOINT, OR FLANGED CONNECTION



**F-2650**  
Hub End



**F-2655**  
Mechanical Joint End



**F-2660**  
Flanged End

Eddy Hydrants can be furnished with any of the standard nozzle arrangements shown on the opposite page. Unless otherwise ordered, hose nozzle threads will be National Standard Hose Threads—for details, see page 290.

Hydrant size is determined by the diameter of the hydrant valve opening. Eddy hydrants are available in  $4\frac{1}{4}$ ,  $4\frac{3}{4}$ ,  $5\frac{1}{4}$ , and  $6\frac{1}{4}$ -inch size. For size of pipe connections of various

types of joint end in different hydrant sizes, see information on the opposite page.

Hydrants can be furnished with any of three types of packing, see page 141.

Parts for Eddy fire hydrants are standardized and fully interchangeable. When ordering parts, order by number and repair assemblies by letter designation shown on page 139.

**When Ordering or Inquiring About Hydrants, see "Ordering Information"—page 141.**





## EDDY FIRE HYDRANTS

### STANDARD NOZZLE ARRANGEMENTS



Two 2 1/2" Hose Nozzles



Two 2 1/2" Hose Nozzles  
One Pumper Nozzle



Outside Independent  
Hose Nozzles



Inside Independent  
Hose Nozzles

Outside Independent Hose Nozzle Valves may be either the F-2717 Mill Yard Hose Valves or the F-2710 Hose Valves—see page 140.

### Pipe Line Connections

**Hub Ends:** The 4 1/4-inch and the 4 3/4-inch hydrants are normally furnished with hub ends for 4 or 6-inch pipe. The 5 1/4-inch and 6 1/4-inch hydrants are normally furnished with hub ends for 6 or 8-inch pipe.

Hub end hydrants can be furnished with bolting lugs on 4, 6, and 8-inch hubs, to permit anchoring of the hydrant.

**Flanged Ends:** All hydrants can be furnished with flanged ends for 4, 6, or 8-inch pipe. All flanges are faced and drilled to Class 125 American Standard, ASA B16.1—see page 101.

**Mechanical Joint:** Standardized Mechanical Joint or the Cutting-in type Mechanical Joint connections complete with accessories can be furnished in 4, 6, and 8-inch pipe sizes.

**Other End Types:** Can be furnished when specified.

### AUXILIARY VALVES

F-2430

Flanged and Hub  
Auxiliary Valve  
Bolted to Hydrant

F-2435

Flanged and Mechanical Joint  
Auxiliary Valve  
Bolted to Hydrant



F-2430



F-2435

Flanged and mechanical joint and flanged and hub end auxiliary valves are manufactured in 4, 6, and 8-inch sizes. They are used with hydrants to provide an independent shut-off and make it unnecessary to interrupt water service for hydrant repairs or replacements.

Auxiliary valves are made to AWWA requirements, and bolt directly to flanged hydrant.

**When Ordering or Inquiring About Hydrants, see "Ordering Information"—page 141.**

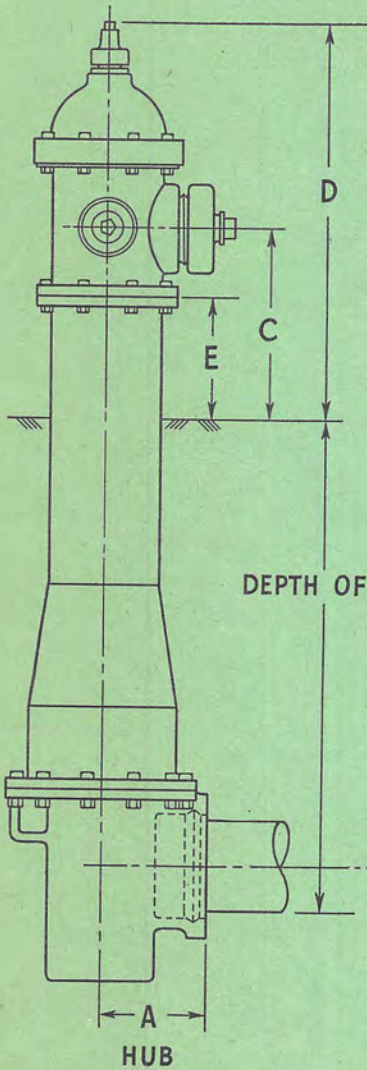


# EDDY VALVE COMPANY

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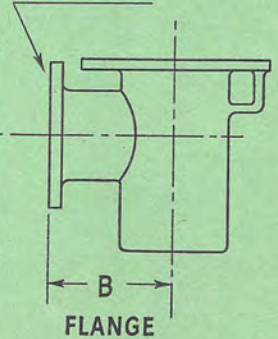
## EDDY FIRE HYDRANTS



### Hydrant Dimensions—Inches

Dimensions	Size Main Valve Opening					
	4¼ inch		4¾ inch	5¼ inch	6¼ inch	
	4-inch Inlet	6-inch Inlet	6-inch Inlet	6-inch Inlet	6-inch Inlet	8-inch Inlet
A	7¼	7½	7½	7¾	8	8¼
B	8¾	9	9	9½	9¾	9½
C	14½	14½	14½	14½	14½	14½
D	30½	30½	30½	30½	30½	30½
E	9¼	9¼	9¼	9¼	9¼	9¼
F	7½	9½	9½	9½	9½	11¾
G	8-⅝"	8-¾"	8-¾"	8-¾"	8-¾"	8-¾"

F- BOLT CIRCLE  
G- NO. & DIA. OF BOLTS



### Extension Sections

Eddy Fire Hydrants can be extended to any desired length with the use of intermediate extension sections. These sections are made in lengths from 6 to 60 inches, in 6-inch increments.

Two types of extension sections are available—the upper type, for bolting between the swivel head and the standpipe and the lower type for bolting between the standpipe and the hydrant bottom. When ordering, specify which type is desired.



F-2668 Extension  
Upper



F-2669 Extension  
Lower





# EDDY VALVE COMPANY

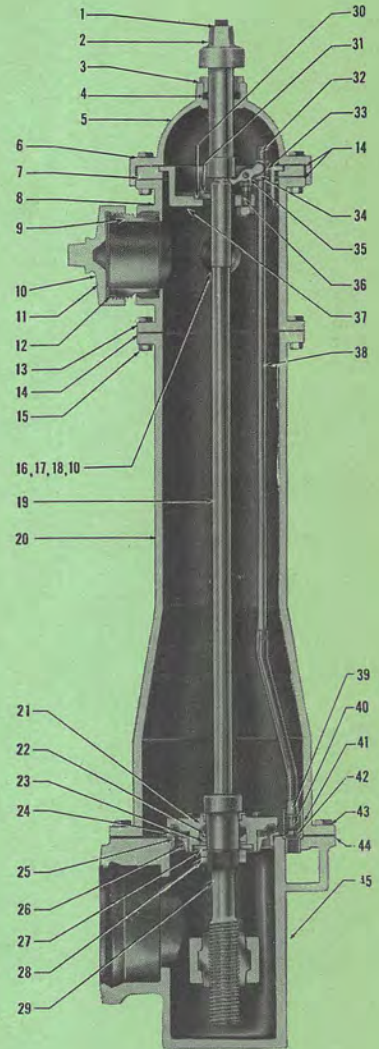


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## EDDY FIRE HYDRANTS

### PARTS LIST

Part No.	Part	Number Required	Material
1	Hold Down Nut	1	Bronze
2	Operating Nut	1	Cast Iron
3	Packing Gland	1	Bronze
4	Packing	1	Fibre
5	Cover	1	Cast Iron
6	Cover Bolts & Nuts	8	Steel
7	Swivel Ring	1	Cast Iron
8	Swivel Head	1	Cast Iron
9	Pumper Nozzle	As Ordered	Bronze
10	Nozzle Chain	As Ordered	Steel
11	Pumper Nozzle Cap	As Ordered	Cast Iron
12	Pumper Cap Washer	As Ordered	Leather
13	Swivel Hd. Bolts & Nuts	8	Steel
14	Swivel Head Gaskets	3	Bronze
15	Chain Anchor	1	Bronze
16	Hose Nozzle	As Ordered	Bronze
17	Hose Nozzle Cap	As Ordered	Cast Iron
18	Hose Cap Washer	As Ordered	Leather
19	Upper Stem	1	Stl. & Brz.
20	Standpipe	1	Cast Iron
21	Valve Plate	1	Cast Iron
22	Packing Ring	1	Rubber
23	Gland	1	Bronze
24	Valve Rubber	1	Rubber
25	Seat Ring	1	Bronze
26	Throttling Ring	1	Bronze
27	Loose Ring	1	Bronze
28	Lock Nuts	2	Bronze
29	Lower Stem	1	Mang. Brz.
30	Stem Wedge	1	Bronze
31	Stem Wedge Screw	1	Bronze
32	Lock Nut	1	Bronze
33	Drain Spool	1	Bronze
34	Drain Lever	1	Bronze
35	Lever Pin	1	Bronze
36	Clevis & Nut	1	Bronze
37	Drain Support	1	Cast Iron
38	Drain Rod	1	Steel
39	Drain Valve Backer	1	Bronze
40	Drain Valve Rubber	1	Rubber
41	Drain Cup	1	Bronze
42	Retaining Nut	1	Bronze
43	Bottom Bolts & Nuts	4 1/4" - 6 4 3/4" - 6 5 1/4" - 8 6 1/4" - 11	Steel
44	Bottom Gasket	1	
45	Bottom	1	Cast Iron



### Hydrant Repair Assemblies

Assembly	Consisting of Parts
A Main Stem	1-2-19-28-29
B Hydrant Valve	21-22-23-24-26-27
D Drain Support	30-31-34-35-36-37
C Drain Valve	32-33-38-39-40-42
E Complete Valve and Stem	Assemblies A & B



# EDDY VALVE COMPANY



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## EDDY BRONZE HOSE VALVES



**F-2710**  
With Bronze Cap  
and Chain



**F-2715**  
Without Cap  
and Chain



**F-2717**  
Bronze Mill Yard  
Hose Valve

## TAPER SEAT, DOUBLE DISC, BRONZE HOSE VALVES

Eddy Taper Seat, Double Disc, Bronze Hose Valves are available in 1½, 2 and 2½-inch sizes. The 2½-inch valves have bolted covers.

Their design and construction is similar to that of the Eddy Taper Seat AWWA Gate Valves described and illustrated on page 124.

Eddy Hose Valves are recommended for use

with water working pressures up to 150 lbs. They are tested to 300 lbs. hydrostatic pressure.

The male thread is normally furnished to National Standard Hose Thread dimensions. If male thread required is other than National Standard, send a hydrant nozzle or cap to identify the thread wanted.

## BRONZE MILL YARD HOSE VALVES

Eddy Bronze Mill Yard Hose Valves are non-rising stem, single gate, with positive wedging mechanism seating with the pressure.

The bolted-on type connection is in accordance with Factory Mutual Specifications. Normally furnished with handwheels—as shown above.

## HOSE AND HYDRANT WRENCHES



**F-2730**  
Hydrant Wrench



**F-2735**  
Throttling Ring and Check Nut Wrench



**F-2740**  
Combined Spanner and Wrench

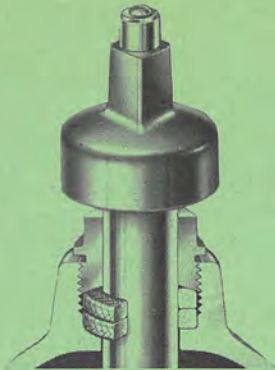


**F-2750**  
Adjustable Hydrant Wrench with Spanner

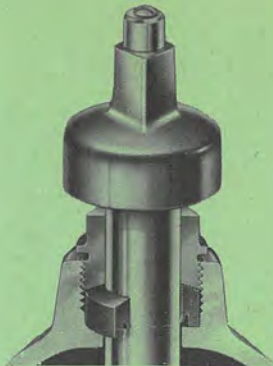




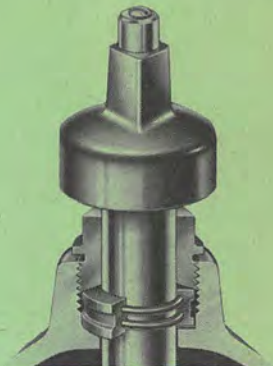
## EDDY FIRE HYDRANTS



Standard  
Asbestos Packing



Special  
Rubber Packing



O-Ring  
Packing

### HYDRANT PACKING

Eddy Hydrants can be furnished with any of three types of packing illustrated above and as follows: Standard Asbestos packing, Special Rubber packing, or the O-ring packing. Unless otherwise specified, hydrants are supplied with the standard stuffing box with packing of treated braided asbestos.

The standard stuffing box construction with the screwed bronze packing gland eliminates the need for follower bolts or nuts. It is so designed to permit repacking quickly and easily. Although normally furnished with treated braided asbestos packing, other materials, when specified, can be furnished.

The special rubber packing is a one piece rubber seal which fits over the stem and into the standard stuffing box. It requires no grooving of either the stem or the stuffing box. The higher the pressure the tighter the seal. This special rubber packing can be incorporated into any Eddy hydrant stuffing box no matter when the hydrant was installed.

The O-ring stuffing box incorporates two rubber seal rings. The top ring is the dirt seal, the lower ring is the pressure seal. This O-ring packing can be furnished, when specified, on new hydrants and can be incorporated into existing Eddy hydrants.

### ORDERING INFORMATION

Please furnish the following information on inquiries and orders:

- 1. Quantity.**
- 2. Size of main valve opening:**  $4\frac{1}{4}$ ,  $4\frac{3}{4}$ ,  $5\frac{1}{4}$ , or  $6\frac{1}{4}$ -inch.
- 3. Number of  $2\frac{1}{2}$ " hose nozzles.**
- 4. Number and size of pumper nozzles.**
- 5. Type of end connection:** Hub, flanged, mechanical joint, etc.
- 6. Size of end connection.**
- 7. Depth of trench:** Distance from ground line to bottom of trench. (Not to be confused with depth of cover, which is distance from ground line to top of pipe.) Care should be taken to determine proper dimension to eliminate any risk of error.
- 8. Direction of opening:** Must be specified. Open to left (counterclockwise); open to right (clockwise).
- 9. Size and shape of operating nut:** National Standard is  $1\frac{1}{2}$ -inch pentagon measured from point to opposite flat.
- 10. Hose and pumper nozzle threads:** If other than National Standard, thread specification and nut size must be furnished in the following manner:
  - Send sample nozzle or make hose coupling; or
  - Send drawing giving complete thread specification and size of nut; or
  - Refer us to previous hydrant order. Complete records are kept of all installations.
- 11. Color:** Specify color of paint wanted.
- 12. Packing:** Standard, Special Rubber, or O-Ring Packing.



# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## EDDY LIST 150 PARALLEL SEAT DOUBLE DISC GATE VALVES

### DESCRIPTION

Eddy List 150 parallel seat, double disc gate valves provide medium pressure valves in all sizes from 4 inches thru 54 inches. They are available with non-rising stem, and rising stem with outside screw and yoke, with any required combination of valve end types.

These valves can be of all iron construction; iron body, bronze mounted; or with other trim as specified. They can be equipped with anti-friction bearings, and can be furnished with any of the accessories listed below.

Either bevel or spur gearing can be furnished when required. The use of gearing is recom-

mended for valves 16 inches and larger—see page 159.

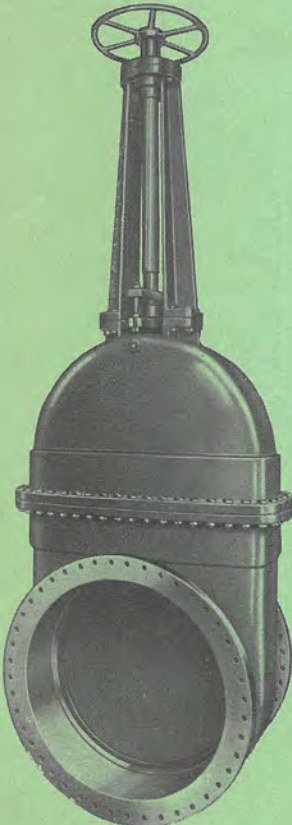
By-passes can be supplied for any size valves, and are recommended for 16-inch and larger valves—see page 158

When valves are to be installed in a horizontal position in a horizontal line, we recommend that valves 16-inch and larger be equipped with rollers, track and scrapers.

When 16-inch and larger valves are to be installed in a horizontal position in a vertical pipe line, we recommend the use of slides to assure positive and perfect seating of the gates and to eliminate unusual seat wear.

### Pressure Ratings

Valve Size Inches	Working Pressure psi		Hydrostatic Test Pressure psi
	Non-Shock Cold Water	Steam	
4 thru 24	100	50	200
30 thru 36	80	40	150
42 thru 54	60	30	120



**F-2815**  
Flanged Ends  
Rising Stem with  
Outside Screw and Yoke



**F-2800**  
Hub Ends  
Non-rising Stem



**F-2805**  
Flanged Ends  
Non-rising Stem

### INDEX TO ACCESSORIES

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# EDDY VALVE COMPANY



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## EDDY LIST 50 PARALLEL SEAT DOUBLE DISC GATE VALVES

### DESCRIPTION

Eddy List 50 parallel seat, double disc gate valves offer an extremely wide range of low pressure valves in sizes 16 through 72 inches for both municipal and industrial service.

All Eddy List 50 gate valves are equipped with a center type wedging mechanism, and are available in both non-rising stem and rising stem with outside screw and yoke. Any desired combination of valve ends can be furnished.

These valves can be of all iron construction; iron body, bronze mounted; or with other trim as specified. They can be equipped with anti-

friction bearings, and can be furnished with any of the accessories listed below.

Gearing is available for all List 50 valves—see page 159 for description and illustration. List 50 valves can be furnished equipped for ball bearing for easier operation.

We recommend that valves 16-inch and larger be fitted with rollers, tracks, and scrapers when they are to be installed in a horizontal position in a horizontal pipe line. When valves 16-inch and larger are to be installed in a horizontal position in a vertical pipe line, we recommend that they be fitted with slides.

### Pressure Ratings

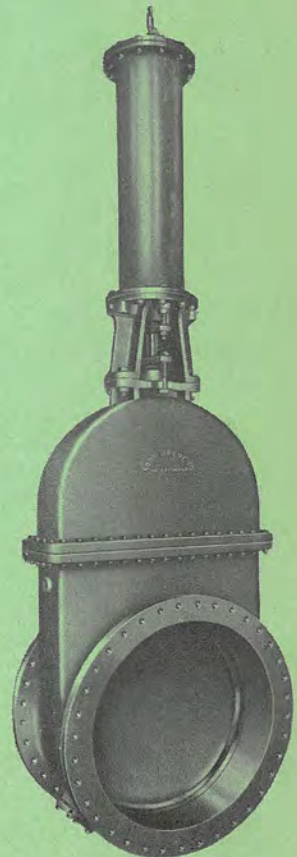
Valve Size Inches	Working Pressure psi		Hydrostatic Test Pressure psi
	Non-Shock Cold Water	Steam	
16 thru 24	50	25	75
30 thru 36	43	25	75
42 thru 48	35	20	50



**F-2832**  
Hub Ends  
Non-rising Stem



**F-2834**  
Flanged Ends  
Non-rising Stem



**F-2836**  
Flanged Ends  
Rising Stem with  
Outside Screw and Yoke

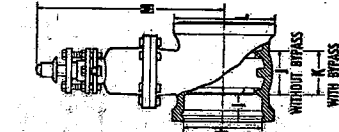
### INDEX TO ACCESSORIES

By-pass valves . . . . . p. 158	Floor stands . . . . . p. 147
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Electric motor operation . . . . . p. 149	Stem guides . . . . . p. 160
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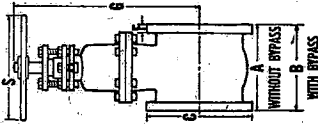
**DIMENSIONS OF EDDY PARALLEL SEAT DOUBLE DISC GATE VALVES**

**EDDY VALVE COMPANY**

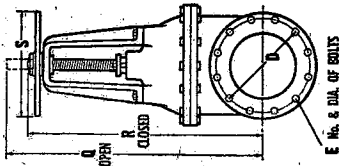
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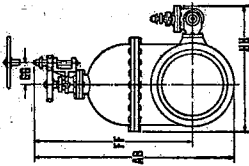
Hub Ends  
NRS



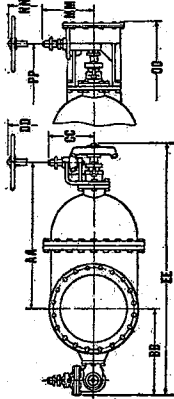
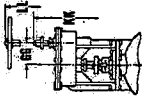
Flanged Ends  
NRS



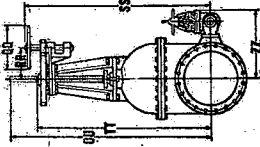
Flanged Ends  
OS&Y



Hub Ends,  
NRS, with Bevel  
Gears, Gearcase, By-pass



Flanged Ends,  
NRS, with Bevel  
Gears, Gearcase, By-pass



Flanged Ends,  
OS&Y, with Bevel  
or Spur Gears, By-pass

**Eddy Parallel Seat Valves—List 150**

Size Inches	A	B	C	D	E	F	G	H	I	J	K	L	M	Q	R	S	AA	BB	CC	Dia. Stem	Turns to Open	Size By-pass
4	8 3/8			7 1/2	8 - 5/8	3 1/2	15 1/4	5 11/16	3 1/2	4 5/8		7 3/4	16 1/8	22 1/8	17 5/8	10				1	14	3
6	9 3/4			9 1/2	8 - 3/4	7/8	18 1/4	7 13/16	3 3/4	5 1/4		10 3/4	19 1/8	30 1/4	23 5/8	10				1 1/4	20	3
8	11			11 3/4	8 - 3/4	1	23 1/8	10	3 3/4	5 1/2		13	24 3/4	38 5/8	10				1 1/2	26	3	
10	12			14 1/4	12 - 7/8	1 1/8	28 3/8	12 1/2	3 3/4	6 1/2		15 1/2	26 5/8	46 5/8	35 7/8	14			1 3/8	32	3	
12	12 3/8			17	12 - 7/8	1 1/8	30 1/2	14 1/4	4	6 3/4		17 1/2	31	53 1/2	40 5/8	16			1 3/8	38	4	
14	13 1/2			18 3/4	12 - 1/2	1 5/8	33 5/8	16 1/2	4	6 1/2		20 1/2	33 3/4	60 7/8	45 7/8	16			1 3/8	45	4	
16	14			21 1/4	16 - 1	1 3/4	38 1/4	18 7/8	4	7 1/4		22	39 1/4	70 1/4	53 1/4	18			1 1/2	51	3	
18	14 1/2			22 3/4	16 - 1 1/8	1 5/8	39 3/4	20 3/8	4	7 3/4		24 1/8	40 1/4	75 3/4	56 3/4	18			1 1/2	57	3	
20	15 1/2			25	20 - 1 1/8	1 5/8	45 3/8	22 3/8	4	7 3/4		26 1/8	46 3/8	84 3/8	63 3/8	20			1 3/4	52	3	
24	17			29 1/2	20 - 1 1/4	1 7/8	56 1/4	26 13/16	4	10 1/4		31	57 1/8	101 1/8	75 7/8	26			2 1/4	63	4	
30	21			36	28 - 1 1/4	1 3/4	67 1/4	33	4 1/2	10 5/8		37 1/8	67 7/8	124	92 3/4	30			2 1/4	78	4	
36	24			42 3/4	32 - 1 1/2	1 13/16	75 7/8	39 3/4	4 1/2	13		45	78 5/8	146 3/8	108 7/8	30			2 5/8	87	6	
42	27			49 1/2	36 - 1 1/2	1 15/16	86 9/8	45 3/8	5	14 5/8		51 1/2	89 1/8	170 1/4	126 3/4	30			2 5/8	87	6	
48	30			56	44 - 1 1/2	2 1/4	101 1/8	51 13/16	5 1/2	16 1/2		57 1/2	103 3/4	196 1/2	146 1/2	30			3	100	8	
54	36 1/2			62 3/4	44 - 3/4	2 1/2	112	58 7/8	5 1/2	17 3/4		65 3/4	114 5/8	221 1/8	165 1/8	30			3 1/2	112	12	

For additional dimensional data for 16-inch and larger List 150 valves, see facing page.





# EDDY VALVE COMPANY



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List 150 Valve Dimensions Continued From Preceding Page

Size Inches	DD	EE	FF	GG	HH	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	WW	XX	YY	ZZ	AB
16	14 1/2	64 3/4	44 1/4	87 1/8	37	48	47 1/8	17	16	49 1/2	42	14	8 7/16	60 1/4	55 1/8	72 1/8	55 7/8	13	54 1/2	71 1/2	24 1/4	55 1/4
18	15	67 1/8	45 1/2	87 1/8	38 3/4	49 1/8	48 1/4	17	16	50 1/2	43	14	8 7/16	63 3/8	58 5/8	76 5/8	59 3/8	13	58	77	25 1/8	57 3/4
20	15 1/2	73 1/2	51 1/2	87 1/8	41 1/4	53 3/8	52 1/2	17	16	54 3/4	47 1/4	14	8 7/16	69 5/8	64 3/4	85 5/8	65 1/4	13	64	85	26 1/2	64 7/8
24	15 3/4	87 3/8	60 3/4	87 1/8	49	63 1/4	62 1/4	19	17 3/4	63 1/4	55 3/4	16	10	82	77 1/4	102 1/2	72 3/4	15 3/4	79 1/2	104 3/4	31 3/8	76
30	16	103 5/8	72 3/4	88 1/8	57	72 5/8	71 5/8	19	17 3/4	77 3/8	69 1/2	22	14 1/4	98 1/2	93	124 1/4	88 1/4	15 3/4	95 3/8	127	34 3/8	91 5/8
36	14	118 1/4	81 3/4	87 1/8	63 3/4	80 5/8	79 5/8	19	17 3/4	85 1/2	77 3/4	22	14 1/4	114 1/8	108 3/4	146 1/8	110 5/8	17	112	147 1/2	39 3/4	108 3/4
42	14 1/2	133 5/8	91 3/4	87 1/8	73	90 5/8	90 3/8	19	18	95 3/4	87 3/4	22	14 1/4	131 1/8	126 1/4	169 5/8	128 3/4	17	129 1/2	173	44 3/8	117 1/4
48	19 1/4	156	104 1/2	14 3/8	84 1/2	106 1/2	106	23 3/4	23	111 1/2	101 1/4	26	18	151 3/4	145 1/2	195 1/2	146 1/2	20 1/4	146 1/2	196 1/2	52 1/2	133 1/4
54	26 1/4	177 3/4	120 3/4	18	96	116	116	23 3/4	23 1/4	121	110 3/4	26	18	171 5/8	166	221 1/8	163 5/8	25	165 3/4	221 3/4	48 3/4	183 1/2

Eddy Parallel Seat Valves—List 50

Size Inches	A	B	C	D	E	F	G	H	I	J	K	L	M	Q	R	S	AA	BB	CC	Di. Stem	Size To Open
16	13 1/8	...	23 1/2	21 1/4	16-1	1 1/2	37 3/8	18 3/8	4	7	...	21 3/8	38 5/8	69 1/2	52 7/8	18	...	...	1 1/2	51	
18	14	...	25	22 3/4	16-1 1/2	1 1/2	39 1/2	20 1/2	4	7 1/2	...	24 1/2	40 1/2	75 1/2	56 3/4	18	...	...	1 1/2	56	
20	14 1/2	...	27 1/2	25	20-1 1/8	1 1/2	43	22 5/8	4	8 1/2	...	26 1/2	44	82 1/2	61 1/2	18	...	...	1 1/2	63	
24	16	...	32	29 1/2	20-1 1/4	1 1/2	51 1/8	26 15/16	4	8 3/4	...	31	52 1/2	98 3/8	73 3/4	20	...	...	1 1/2	62	
30	20	...	38 3/4	36	28-1 1/4	1 1/2	62 3/8	32 3/4	4 1/2	10 1/2	...	37 1/2	63 1/4	122	60 1/2	22	...	...	2	78	
36	20	...	46	42 3/4	32-1 1/2	1 1/2	74 3/8	45 1/4	4 1/2	11 1/2	...	44	75 1/4	144 5/8	107 1/8	26	...	...	2 1/4	98	
42	20	...	53	49 1/2	36-1 1/2	1 3/4	84 1/2	49 1/4	5	11 1/4	...	50 1/2	84 1/2	166 1/2	122 5/8	30	...	...	2 1/4	108	
48	22	...	59 1/2	56	44-1 1/2	2	94 7/8	51 1/2	5	13	...	57 1/2	95 1/2	189	139 1/2	30	...	...	2 1/2	123	
60	25	...	73	69 1/2	52-1 3/4	2	123	63 15/16	5 1/2	14	...	70 1/2	125 3/4	235 3/4	174	30	...	...	3 1/2	124	
72	30 1/2	...	86 1/2	82 1/2	60-1 3/4	2 1/4	143 1/2	76 3/8	5 1/2	25 1/2	...	84	146	280 3/4	207	30	...	...	4	147	

Eddy Parallel Seat Valves—List 50 Geared

Size Inches	DD	EE	FF	GG	HH	KK	LL	MM	NN	OO	PP	QQ	RR	SS	TT	UU	VV	WW	XX	YY	ZZ	AB
18	14 7/8	...	44 7/8	7 5/8	...	57	56 1/8	16 7/8	16	50 1/2	43	14	8 7/16	63 3/4	38 5/8	77 5/8	59 3/8	13	58	77	...	57
20	14 7/8	...	48 3/8	7 5/8	...	60 1/2	59 5/8	16 7/8	16	54	46 1/2	14	8 7/16	68 1/2	63 3/8	84 3/4	64 1/8	13	62 3/4	83 3/4	...	61 1/2
24	14 7/8	...	56 3/4	8 7/8	...	67	66 1/8	16 7/8	16	60 1/2	53	14	8 7/16	79 1/2	74 1/2	99 3/4	75 1/8	13	73 1/2	99 1/2	...	73 1/4
30	15 1/8	...	67 1/8	8 7/8	...	83 5/8	82 3/4	16 7/8	16	71 3/8	63 5/8	14	8 7/16	96 1/2	91 3/4	123	87	15 3/4	93 1/8	125 1/8	...	86 1/2
36	16 3/8	...	78 1/2	8 7/8	...	93 3/8	92 7/8	17 3/4	17 3/4	81 5/8	73 3/4	16	10	113 1/4	108 3/4	145 1/8	103 3/4	110 1/2	110 1/2	149	...	100 1/2
42	15 3/4	...	89 3/8	8 7/8	...	102 3/8	101 3/8	18 3/4	17 3/4	94 5/8	86 3/4	22	14 3/4	129 3/8	122 7/8	166 3/8	118 3/8	17	125 5/8	169 1/8	...	115 1/8
48	15 3/4	...	100 3/4	8 7/8	...	113	112	18 3/4	17 3/4	105	97 1/2	22	14 3/4	146 1/4	139 3/4	189 1/4	135	17	142 1/2	192	...	129
60	26 1/4	...	128 3/4	18	...	142	141 1/4	23 1/2	23	129 3/8	119 1/2	26	18	180	174	235 3/8	172	25	181	242 3/4	...	164
72	26 1/4	...	149	18	...	162 1/4	161 1/4	30 1/2	29	153	142	26	18	203	207	280 3/4	205	25	214	287 3/4	...	191

Note: By-pass valves are not normally required on List 50 valves but can be furnished when required. Dimensions upon request.



# EDDY VALVE COMPANY

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## ASSOCIATED FACTORY MUTUAL APPROVED

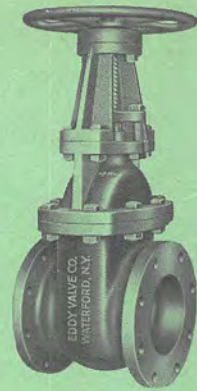
### EDDY GATE VALVES



**F-2842**  
Bell Ends  
Non-rising Stem



**F-2846**  
Flanged Ends  
Non-rising Stem

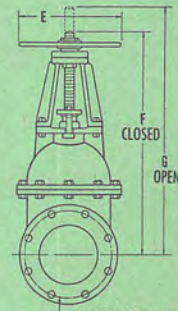
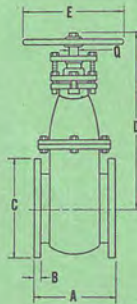
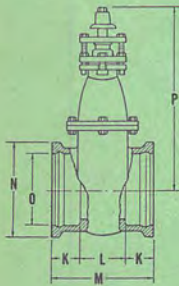


**F-2848** Flanged Ends  
Rising Stem with  
Outside Screw and Yoke

Eddy Associated Factory Mutual Approved Valves are designed for use in industrial fire protection systems. They are constructed and tested to conform strictly to the specifications and dimensions of the Associated Factory Mutual Fire Insurance Companies.

These valves are equipped with the hook type wedging mechanism and are available in sizes 4 thru 14 inches.

### DIMENSIONS



H—DIA. OF BOLT CIRCLE  
J—NUMBER & SIZE OF BOLTS

### Dimensions—Inches

Size of valve	4	6	8	10	12	14
A Face to face of end flanges	9	10½	11½	13	14	15
B Thickness of end flanges	<sup>15</sup> / <sub>16</sub>	1	1⅛	1⅜	1¼	1⅜
C Diameter of end flanges	9	11	13½	16	19	21
D Center of port to top of handwheel NRS valve	15⅝	18¾	23	26¼	30	34¾
E Diameter of handwheel	12	14	16	18	18	20
F Center of port to end of stem OS&Y valve closed	17⅝	23¼	29	35¼	40¼	46½
G Center of port to end of stem OS&Y valve open	22¼	29⅞	37¾	46	53⅞	61½
H Diameter of bolt circle in end flanges	7½	9½	11¾	14¼	17	18¾
J Size and number of bolts in end flanges	8-⅝	8-¾	8-¾	12-⅞	12-⅞	12-1
K Depth of bell	3½	4	4	4	4	4
L Laying length of valve	3⅞	4½	5	5½	6¼	7
M End to end of bells	10⅞	12½	13	13½	14¼	15
N Outside diameter of bell	8⅝	10⅝	13⅝	15¼	17⅝	19⅞
O Inside diameter of bell	<sup>5</sup> / <sub>16</sub>	7⅞	10⅞	12¼	14⅝	16½
P Center of port to top of operating nut NRS valve	16⅝	20	24	27¼	30⅞	35⅞
Q Diameter of stem	1⅛	1¼	1⅝	1½	1⅝	1¾
Number of turns to open valve	14	20	26	32	38	37





# EDDY VALVE COMPANY



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## EDDY FLOOR STANDS

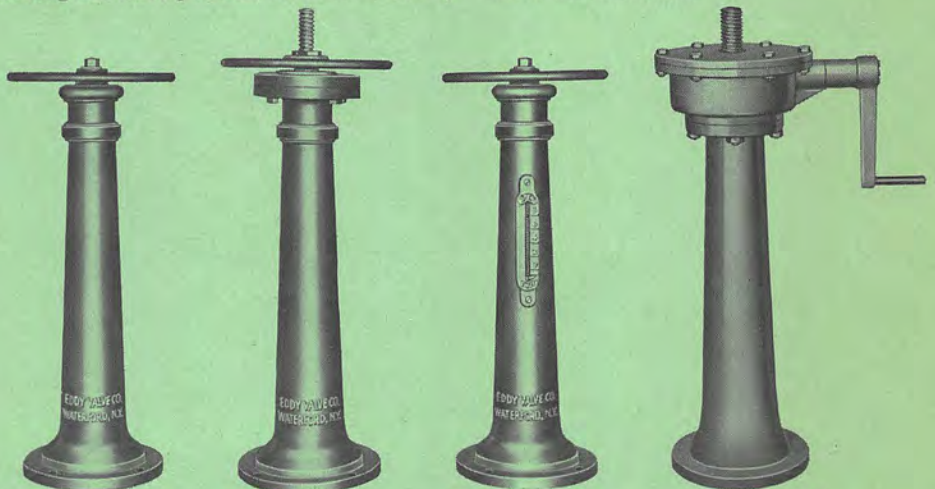
### DESCRIPTION

Eddy Floor Stands provide easy valve control at convenient working height. Indicators can be provided when it is important to show position of valve gates at all times.

Eddy Floor Stands are made in both rising stem and non-rising stem types. The stem of the rising stem type rises as the valve is opened, showing the valve position. As valve is closed,

the stem is withdrawn inside the body of the stand. On the non-rising stem indicating type, a pointer moves up and down a clearly marked scale on the body of the stand.

All floor stands are furnished with handwheels unless otherwise specified. Direction of opening is indicated by an arrow cast on the rim of the handwheel.



**F-3090**  
Non-rising Stem

**F-3094**  
Rising Stem

**F-3098**  
Indicating NRS

**F-3102**  
Enclosed Gearing with Crank

F-3100 Open Gearing (not illustrated)

### CONSTRUCTION

Eddy Floor Stands are cast iron, bronze mounted, and are provided with extension stems of cold rolled steel, stainless steel, or bronze—as may be specified on orders. When extension stem length exceeds 10 feet, we recommend adjustable stem guides to prevent misalignment or binding—see page 160.

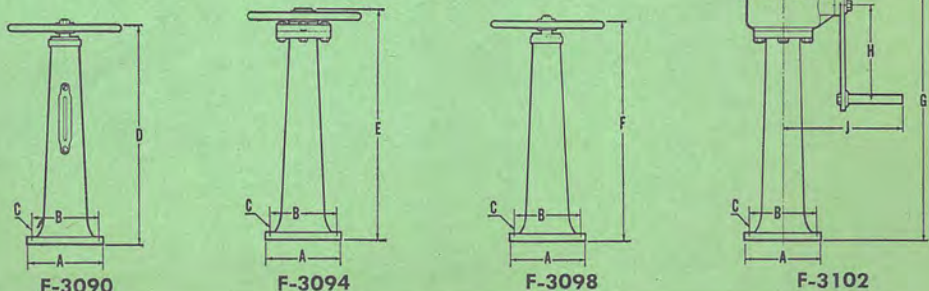
Gearing and enclosed gear cases can be furnished for operation of large valves. For non-rising stem valves we recommend that the gearing be installed on the valve rather than on the stand—see page 159. Cranks are

furnished on bevel geared floor stands unless otherwise specified.

Anti-friction bearings or motor operation can be furnished when specified.

Floor Stand Brackets can be furnished with floor stands for use where stand is to be mounted on tank walls or where there is no support for the floor stand above the valve.

Stem Covers are furnished for rising stem floor stands when specified. Name Plates of brass or of chromium plated brass can also be furnished.

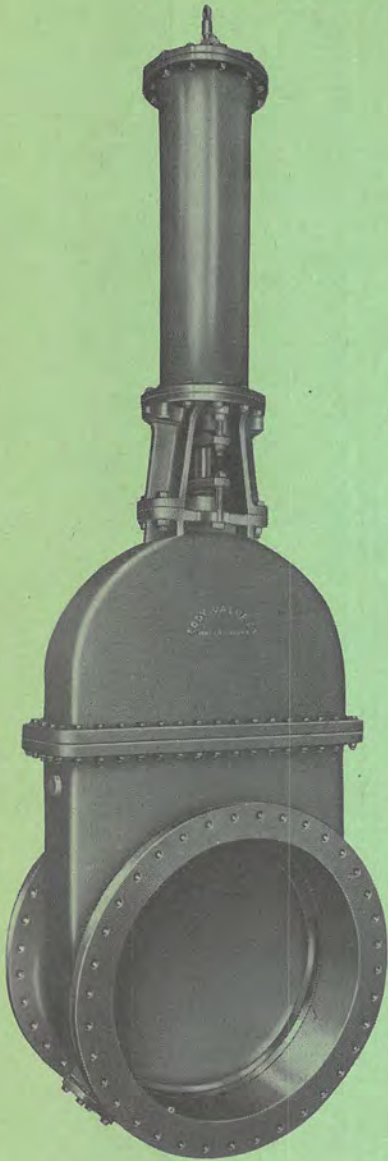


Dimensions in Inches	A	B	C*	D	E	F	G	H	J
	12	10 <sup>3</sup> / <sub>4</sub>	4- <sup>3</sup> / <sub>4</sub>	35	36 <sup>1</sup> / <sub>2</sub>	35	44	15	20

\*Number and size of bolts.



## EDDY CYLINDER OPERATED VALVES



**F-2920**  
Cast Iron Bronze Lined Cylinder  
with Tail-rod Mounted on  
Flanged Valve



**F-2920**  
Cast Iron Bronze Lined  
Cylinder with  
Outside Screw and  
Yoke for Emergency  
Manual Operation



**F-2922**  
Bronze Tube  
Cylinder

### Operation and Construction

Cylinder operation is recommended wherever speed or frequency of valve operation is important. When actuated by suitable control equipment, it permits valves to be installed in almost any position and in inaccessible locations. It permits a single operator to open and close rapidly several valves, simultaneously or in series, and saves both time and labor, especially where large valves must be opened and closed often.

Cylinders can be furnished cast iron, bronze lined; or of bronze tube construction. Operation of the cylinder may be either manually or electrically controlled, and cylinders can be equipped for emergency manual operation with an outside screw and yoke attachment. Cylinders with tail rods have an eye bolt at the upper end of the rod which permits attachment of mechanical means for operating the valve in case of power failure. Accessory equipment to adapt cylinder operated valves to individual installations is almost unlimited, including adjustable cushions, adjustable stops, locking devices, indicators and limit switches.

Cylinder construction may be cup leather or piston ring construction, including specially honed cylinders. Control equipment and piping is furnished only when specifically ordered.

### ORDERING INFORMATION

1. **Size of valve.**
2. **Maximum pressure** against gates.
3. **Minimum pressure** to operate the cylinder.
4. **Type of cylinder:** Bronze tubing or cast iron bronze lined.
5. **Type of piston:** Cup leather or piston ring.
6. **Operating fluid to be used for cylinder:** Water, oil, air, etc.
7. **Position of installation.**
8. **Type of valve ends:** Flange, Hub, etc.
9. **Packing in cylinder** (if special).
10. **Service conditions.**
11. **Any special features,** such as cushioned cylinder, auxiliary hand operation, etc.





## EDDY ELECTRIC MOTOR OPERATED VALVES

Eddy Double Disc Gate Valves can be equipped with standard motor operator units to provide automatic and positive valve operation. Simple in operation and flexible in design, Eddy Motor operated valves have a wide range of application in supply pipe lines, water and sewage treatment plants, and industrial installations of many types.

Motor operated valves can be adapted to the special requirements of a great variety of installations. The wide range of accessory equipment which can be incorporated into special installations includes float switches, pressure switches and other electrical devices. The valves in group installations can be operated singly or simultaneously.



**F-2932**  
Surface Mounted  
Push Button Station

### Pushbutton Station

Surface mounted or flush mounted pushbutton control stations are available for remote operation. They can be furnished in several types, but are normally furnished with three buttons (open, close, stop) and red and green indicating lights.



**F-2934**  
Flush Mounted  
Push Button Station

### Reversing Controllers

A reversing contactor panel is required for each motor operator unit. These controllers are specially designed for valve operation and consist of two mechanically interlocked contactors, each equipped with two auxiliary electrical contacts.



**F-2936**  
Reversing Controller



**F-2930**  
Electric Motor Operator  
Mounted on  
Non-Rising Stem Valve

### Enclosures

The motor operator unit is normally furnished in a weathertight enclosure. Explosion-proof or submersible enclosures can be furnished if required. Reversing controllers and pushbutton stations are available with general purpose, weathertight, watertight, or explosion-proof enclosures as required.

### Note

The electric motor control unit is mounted directly on the valve. All motor operated units can be equipped with local or remote type position indicators. Motor operated floor stands can also be furnished.

## ORDERING INFORMATION

Please provide the following information on inquiries and orders:

- 1. Valve size**, quantity, and end connections.
- 2. Rising or non rising stem.**
- 3. Installation position of valve.**
- 4. Maximum differential pressure.**
- 5. Type of service** water, gas, or oil.
- 6. If valve** is to be used for throttling, this fact should be stated.
- 7. Maximum temperature** at location of valve control.
- 8. Closing or opening time** in minutes.
- 9. Electrical characteristics:** voltage, type of current (alternating or direct), and phase and cycle if alternating current.

### Motor Operators

Motor operator units and their required accessories, as manufactured by Philadelphia Gear Works (Limitorque) or Cutler-Hammer Company, can be furnished.



## EDDY HORIZONTAL SWING CHECK VALVES

IRON BODY, BRONZE MOUNTED

Tested to 300 Pounds Hydraulic Pressure

Recommended for 150 Pounds Working Water Pressure

Eddy Horizontal Swing Check Valves are used in both vertical and horizontal installations wherever fluid flow must be in only one direction and any reverse flow must be prevented. Made in sizes from 4 thru 24 inches, and are available with flanged or hub ends.

These valves are constructed to give years of dependable operation. The bronze seat ring is back faced and screwed into the accurately machined body. The cast iron gate is mounted with a bronze gate ring, rolled into grooves under such pressure that the gate and gate

ring become one inseparable unit. After fitting, the gate rings are carefully machined to provide a watertight surface. The gate is hung from a bronze shaft with a heavy, solid bronze hinge. It is connected to the hinge in such a manner as to prevent gate rotation, distributing seat wear and assuring accurate alignment of the gate with the body seat.

For easy maintenance, the gate and all internal working parts can be removed through the top of the valve by simply unbolting and lifting off the cover.



**F-2978 Hub Ends Plain Type**

**F-2958 Hub Ends**

Outside Lever and Weight (Not Shown)

**F-2968 Hub Ends**

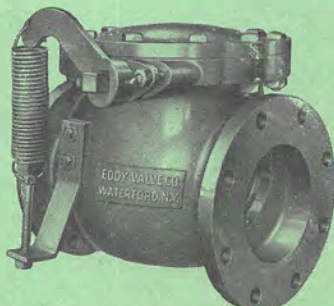
Outside Spring and Lever (Not Shown)



**F-2974 Flanged Ends Plain Type**



**F-2954 Flanged Ends Outside Lever and Weight**



**F-2964 Flanged Ends Outside Lever and Spring**

### ACCESSORIES

When the conditions of service require, Eddy Horizontal Swing Check Valves can be furnished with leather or rubber faced gates or with solid bronze gates. Aluminum gates can be furnished for air service.

Where service requires other than the standard check valves described above, horizontal swing check valves can be equipped with outside lever and spring, or outside lever and weight.

Depending upon the design of the individual

installation, lever and spring or lever and weight check valves serve several purposes: to assist the gate in closing; to allow a predetermined head to accumulate against the gate before it is opened; or to assist the gate in opening.

Water hammer, caused by slamming of a check valve not equipped with outside lever and weight or outside lever and spring, can cause serious damage to pipe lines.

By-passes can be furnished when desired.





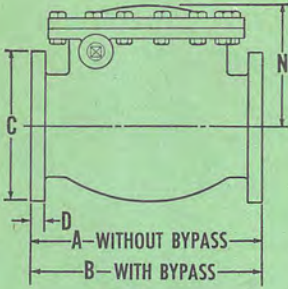
# EDDY VALVE COMPANY

A Subsidiary of James B. Clow & Sons

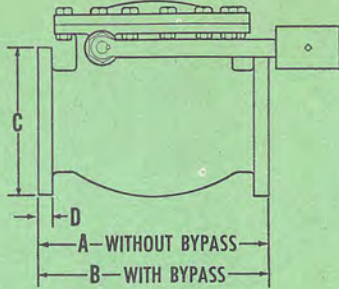


## EDDY HORIZONTAL SWING CHECK VALVES

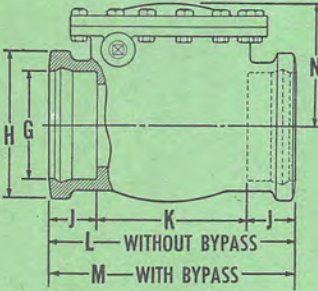
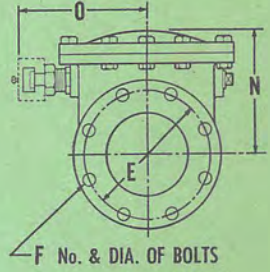
### DIMENSIONS



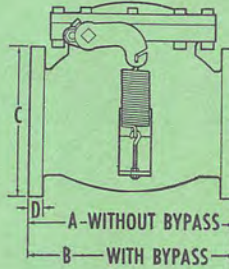
Flanged Ends



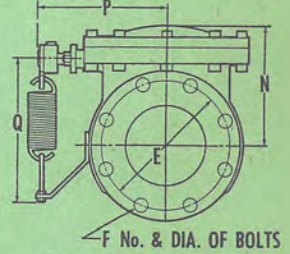
Outside Lever and Weight



Hub Ends



Outside Lever and Spring



### Dimensions—Inches

Size of Valve	4	6	8	10	12	14	16	18	20	24
A	12	17	17 $\frac{3}{4}$	23	24 $\frac{1}{2}$	26 $\frac{1}{2}$	30 $\frac{1}{2}$	32 $\frac{1}{2}$	35 $\frac{1}{2}$	42
B	...	...	...	...	...	...	30 $\frac{1}{2}$	32 $\frac{1}{2}$	35 $\frac{1}{2}$	42
C	9	11	13 $\frac{1}{2}$	16	19	21	23 $\frac{1}{2}$	25	27 $\frac{1}{2}$	32
D	1 $\frac{15}{16}$	1	1 $\frac{1}{8}$	1 $\frac{3}{16}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{7}{16}$	1 $\frac{9}{16}$	1 $\frac{11}{16}$	1 $\frac{7}{8}$
E	7 $\frac{1}{2}$	9 $\frac{1}{2}$	11 $\frac{3}{4}$	14 $\frac{1}{4}$	17	18 $\frac{3}{4}$	21 $\frac{1}{4}$	22 $\frac{3}{4}$	25	29 $\frac{1}{2}$
F	8 $\frac{5}{8}$	8 $\frac{3}{4}$	8 $\frac{3}{4}$	12 $\frac{7}{8}$	12 $\frac{7}{8}$	12-1	16-1	16-1 $\frac{1}{8}$	20-1 $\frac{1}{8}$	20-1 $\frac{1}{4}$
G	5 $\frac{3}{4}$	7 $\frac{7}{8}$	10	12 $\frac{1}{8}$	14 $\frac{1}{4}$	16 $\frac{1}{2}$	18 $\frac{13}{16}$	20 $\frac{15}{16}$	23 $\frac{1}{16}$	27 $\frac{5}{16}$
H	8 $\frac{3}{8}$	10 $\frac{11}{16}$	13 $\frac{1}{2}$	15 $\frac{3}{4}$	18 $\frac{5}{16}$	21 $\frac{1}{4}$	22 $\frac{3}{4}$	25 $\frac{1}{8}$	27 $\frac{5}{8}$	32 $\frac{1}{4}$
J	3	3 $\frac{1}{2}$	4	4	4	4	4	4	4	4 $\frac{1}{2}$
K	9	11	11 $\frac{7}{8}$	16 $\frac{3}{4}$	19 $\frac{1}{4}$	22 $\frac{3}{4}$	24 $\frac{3}{4}$	25 $\frac{5}{8}$	32 $\frac{3}{4}$	33 $\frac{1}{2}$
L	15	18	19 $\frac{7}{8}$	24 $\frac{3}{4}$	27 $\frac{1}{4}$	30 $\frac{3}{4}$	32 $\frac{3}{4}$	33 $\frac{3}{8}$	40 $\frac{3}{4}$	42 $\frac{1}{2}$
M	15	18	19 $\frac{7}{8}$	24 $\frac{3}{4}$	27 $\frac{1}{4}$	30 $\frac{3}{4}$	32 $\frac{3}{4}$	33 $\frac{3}{8}$	40 $\frac{3}{4}$	42 $\frac{1}{2}$
N	7	8 $\frac{7}{8}$	10 $\frac{1}{2}$	12	13 $\frac{1}{2}$	15 $\frac{1}{2}$	17 $\frac{3}{4}$	21	23 $\frac{3}{4}$	25 $\frac{1}{2}$
O	8 $\frac{3}{8}$	9 $\frac{5}{8}$	10	12 $\frac{1}{2}$	13	16	17 $\frac{1}{2}$	20	21	22 $\frac{1}{2}$
P	7 $\frac{3}{4}$	9 $\frac{1}{4}$	10 $\frac{3}{4}$	11 $\frac{3}{4}$	13 $\frac{1}{2}$	14 $\frac{3}{4}$	...	...	...	...
Q	8 $\frac{1}{2}$	10 $\frac{3}{4}$	11 $\frac{1}{4}$	11	12 $\frac{3}{8}$	13 $\frac{3}{8}$	...	...	...	...

### ORDERING INFORMATION

To assure the prompt handling of inquiries and orders and to be certain of getting what you want, please furnish all the information requested below:

- Quantity.**
- Size.**
- Type:** Whether plain, outside lever and weight, or outside lever and spring.
- End Types:** Whether flanged or hub.
- Special Features:** Leather or rubber facings, aluminum or bronze gates, etc.



# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## EDDY VERTICAL CHECK VALVES

IRON BODY, BRONZE MOUNTED

Tested to 300 Pounds Hydraulic Pressure  
Recommended for 150 Pounds Working Water Pressure



**F-3024**  
Flanged Ends with  
Single Gate



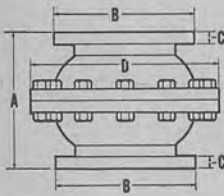
**F-3028**  
Flanged Ends with  
Multiple Gate and Hand Holes

Eddy Vertical Check Valves are designed for use in vertical pipe lines. They are installed on the discharge side of pumps and at any other point in the line where the flow must be in only one direction.

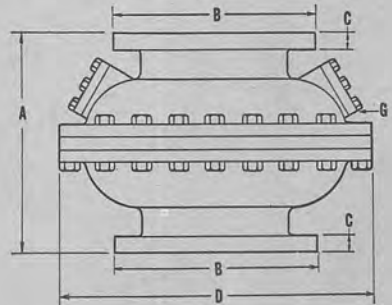
They are manufactured in sizes 4 through 24 inches. Valves 8 inches and smaller have single gates. Valves 10-inch and larger have spring-loaded multiple gates and are provided with convenient handholes.

Vertical check valves are of iron body, bronze mounted construction. They are regularly furnished with iron seats and rubber faced gates, and with stem nut, stem, and stem bearings of bronze. When service conditions require, valves can be furnished with bronze seats screwed into place in the deck plates. The bronze seat is recommended for hot water service.

The combined area of gate opening(s) in any valve is greater than area of connecting pipe.



Single Gate



Multiple Gate

### Dimensions—Inches

E—Bolt Circle. F—Number and Size of Bolts.

Valve Size	Single Gate				Multiple Gate						
	4	5	6	8	10	12	14	16	18	20	24
A	9	9½	10½	11	17½	18¾	21¾	18½	21	25¼	25
B	9	10	11	13½	16	19	21	23½	25	27½	32
C	7/8	7/8	7/8	1	1¼	1¼	1¾	1¾	1¾	1¾	1⅝
D	11	13¼	14¾	18¾	24¼	29	39	37	38	48	50½
E	7½	8½	9½	11¾	14¼	17	18¾	21¼	22¾	25	29½
F	8-5/8	8-3/4	8-3/4	8-3/4	12-7/8	12-7/8	12-1	16-1	16-1½	20-1½	20-1¼
G	...	...	...	...	2	2	3	3	3	4	4

Flanges are faced and drilled to ASA Class 125 Standard, unless otherwise instructed.





# EDDY VALVE COMPANY



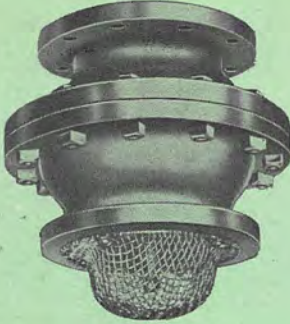
A Subsidiary of James B. Clow & Sons, Inc.

## EDDY VERTICAL FOOT VALVES

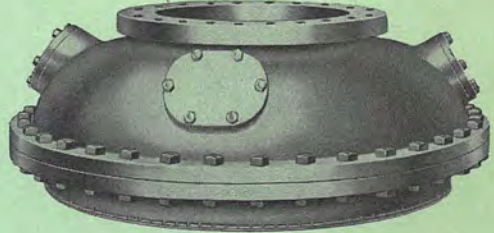
### IRON BODY, BRONZE MOUNTED

#### RUBBER FACED GATES

#### BRASS WIRE SCREENS



**F-3044**  
Flanged End with  
Single Gate



**F-3048**  
Flanged End with  
Multiple Gate and Handholes

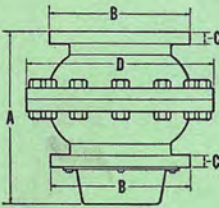
Eddy Vertical Foot Valves are ordinarily used on the end of pump suction lines to maintain the prime. A bronze screen prevents stones and other foreign matter from being drawn into the pump. The screen can be easily removed for cleaning or replacement.

Eddy Vertical Foot Valves are manufactured in sizes from 4 through 24 inches. Valves 8 inches and smaller are of single gate valve construction. Valves 10 inches through 24 inches have spring-loaded multiple gates and convenient handholes. The combined area of the multiple gates exceeds the area of the connecting pipe.

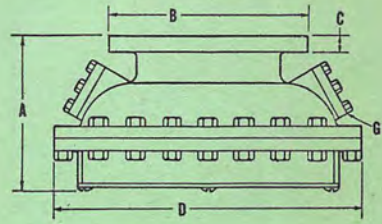
Vertical foot valves are normally furnished with iron seat and rubber faced gates. The stem nut, stem and stem bearings are of bronze. These valves can also be furnished with bronze seats screwed into the deck plates. Bronze seats are recommended for hot water service.

Eddy design assures tight, positive closure of the gates. Fluid in the line cannot escape past the valve, and loss of pump prime is prevented.

All working parts can be easily removed and replaced if necessary. The multiple gate design of the larger valves makes gate removal easy.



Single Gate



Multiple Disc

### Dimensions—Inches

E—Bolt Circle. F—Number and Size of Bolts. G—Number of Handholes.

Valve Size	Single Gate				Multiple Gate						
	4	5	6	8	10	12	14	16	18	20	24
A	11 3/4	12 1/4	13 1/4	13 3/4	12	12 3/8	15 3/4	14	14 3/4	17 3/4	19
B	9	10	11	13 1/2	16	19	21	23 1/2	25	27 1/2	32
C	7/8	7/8	7/8	1	1 1/4	1 1/4	1 3/8	1 3/8	1 3/8	1 5/8	1 5/8
D	11	13 1/4	14 3/4	18 3/4	24 1/4	29	39	37	38	48	50 1/2
E	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17	18 3/4	21 1/4	22 3/4	25	29 1/2
F	8-5/8	8-3/4	8-3/4	8-3/4	12-7/8	12-7/8	12-1	16-1	16-1 1/8	20-1 1/8	20-1 1/4
G	...	...	...	...	2	2	3	3	3	4	4
Number of gates	...				7	10	13	18	20	27	37

Flanges are faced and drilled to ASA Class 125 Standard, unless otherwise instructed.



# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons, Inc.

## EDDY SHEAR GATES

ALL IRON

4" THRU 30"

BRONZE MOUNTED



**F-3000**  
Flanged End  
Frame



**F-3002**  
Standard  
Frame



**F-3004**  
Hub End  
Frame

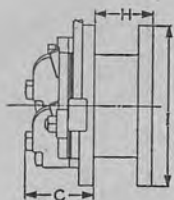


**F-3008**  
Spigot End  
Frame

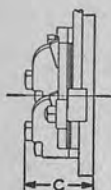
Eddy Shear Gates are designed for use in both water and sewage plants for filling or emptying tanks, for low pressure sludge discharge lines, and similar applications. They are recommended for use in lines of low seating pressure only. Although gates may be all iron, they are regularly furnished bronze mounted.

The wedges that seat the gate are bolted on to permit replacement of the wedges without the expense of a new frame if the wedges should become worn. Standard length of lifting handles is 2 feet for all size gates. Extended handles can be furnished. State length required when ordering.

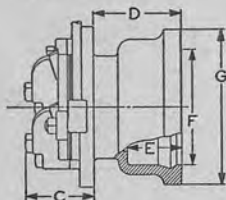
### DIMENSIONS



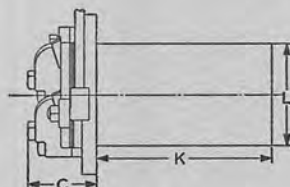
**F-3000**  
Flanged End  
Frame



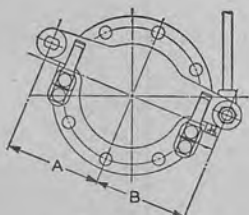
**F-3002**  
Standard  
Frame



**F-3004**  
Hub End  
Frame



**F-3008**  
Spigot End  
Frame



**End View  
of  
Shear Gates**

### Dimensions—Inches

Valve Size... In.	4	6	8	10	12	14	16	18	20	24	30
A	5	6 $\frac{1}{4}$	7 $\frac{5}{8}$	9	10 $\frac{1}{4}$	11 $\frac{3}{8}$	14	14 $\frac{5}{8}$	16	18	22
B	5	6 $\frac{1}{4}$	7 $\frac{5}{8}$	9	10 $\frac{1}{4}$	11 $\frac{3}{8}$	14	14 $\frac{5}{8}$	16	18	22
C	4 $\frac{1}{2}$	4 $\frac{3}{4}$	4 $\frac{3}{4}$	4 $\frac{7}{8}$	5	5 $\frac{7}{8}$	5 $\frac{1}{2}$	5 $\frac{3}{4}$	6 $\frac{1}{4}$	7 $\frac{5}{8}$	9 $\frac{1}{2}$
D	5 $\frac{1}{2}$	6	6	6	6	6	6	6	12	12	...
E	3 $\frac{1}{4}$	4	4	4	4	4	4	4	4	4	...
F	5 $\frac{3}{4}$	7 $\frac{7}{8}$	10	12 $\frac{1}{8}$	14 $\frac{1}{4}$	16 $\frac{3}{8}$	18 $\frac{1}{2}$	20 $\frac{1}{2}$	23	27 $\frac{1}{4}$	...
G	8	10 $\frac{5}{8}$	12 $\frac{7}{8}$	15	17 $\frac{1}{2}$	19 $\frac{1}{2}$	21 $\frac{3}{4}$	23 $\frac{3}{4}$	27 $\frac{1}{4}$	31 $\frac{1}{8}$	...
H	4	4	5	6	6	6	6	6	7	7 $\frac{1}{4}$	10 $\frac{1}{2}$
I	9	11	13 $\frac{1}{2}$	16	19	21	23 $\frac{1}{2}$	25	27 $\frac{1}{2}$	32	38 $\frac{3}{4}$
K	12	12	12	12	12	12	12	12	12	12	12
L	5 $\frac{1}{8}$	7	9 $\frac{1}{4}$	11 $\frac{1}{4}$	13 $\frac{3}{8}$	15 $\frac{3}{8}$	17 $\frac{5}{8}$	19 $\frac{3}{4}$	21 $\frac{3}{4}$	25 $\frac{3}{4}$	31 $\frac{3}{4}$

Flanges are faced and drilled to ASA Class 125 standard, unless otherwise instructed.





# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons, Inc.

## EDDY FLAP VALVES

ALL IRON

4" THRU 30"

BRONZE MOUNTED



**F-3012**  
Flanged End



**F-3014**  
Spigot End

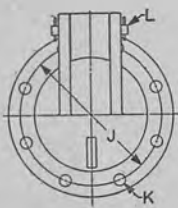


**F-3016**  
Hub End

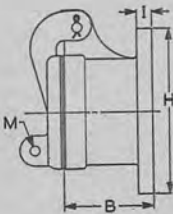
Eddy Flap Valves are used for end closure of outfall lines, or in manholes, to prevent entrance of backwater. They swing open under direct pressure to release the outfall fluid and close tightly when the direct pressure is relieved. Back pressure serves to hold the valve tightly against its seat.

Eddy Flap Valves are used in filtration and sewage disposal plants and in various industrial installations. Valves may be of all iron construction, but are regularly furnished fully bronze mounted, with bronze hinge bolts, flap ring, and seat ring. Flap valves are available in sizes 4 thru 30 inches.

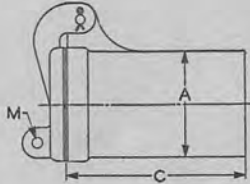
### DIMENSIONS



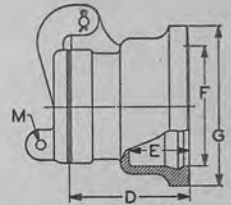
End  
View



**F-3012**  
Flanged End



**F-3014**  
Spigot End



**F-3016**  
Hub End

### Dimensions—Inches

Valve Size . . . . . Inches	4	6	8	10	12	14	16	18	20	24	30
A Outside diameter of spigot . . . . .	5 1/8	7	9 1/4	11 1/4	13 3/8	15 3/8	17 5/8	19 3/4	21 3/4	25 3/4	31 3/4
B Face of seat to face of flange . . . . .	4	6	8	8	8	10	10	10	10	10	10
C Face of seat to end of spigot . . . . .	12	12	12	12	12	12	12	12	12	12	12
D Face of seat to end of hub . . . . .	8	8	8	8	8	10	12	12	12	12	...
E Depth of hub . . . . .	3 1/4	4	4	4	4	4	4	4	4	4	...
F Inside diameter of hub . . . . .	5 3/4	7 7/8	10	12 1/8	14 1/4	16 3/8	18 1/2	20 1/2	23	27 1/4	...
G Outside diameter of hub . . . . .	8	10 5/8	12 7/8	15	17 1/2	19 1/2	21 3/4	23 3/4	27 1/4	31 1/8	...
H Diameter of end flange . . . . .	9	11	13 1/2	16	19	21	23 1/2	25	27 1/2	32	38 3/4
I Thickness of end flange . . . . .	3/4	7/8	1	1	1 1/8	1 1/4	1 1/4	1 1/4	1 3/8	1 1/2	1 1/2
J Diameter of bolt circle . . . . .	7 1/2	9 1/2	11 3/4	14 1/4	17	18 3/4	21 1/4	22 3/4	25	29 5/8	36
K Number and size of bolts . . . . .	8-5/8	8-3/4	8-3/4	12-7/8	12-7/8	12-1	16-1	16-1 1/8	20-1 1/8	20-1 1/4	28-1 1/4
L Diameter of flap pin (bronze) . . . . .	5/8	5/8	5/8	3/4	3/4	7/8	7/8	7/8	1	1	1 1/4
M Diameter of flap lug hole . . . . .	9/8	5/8	5/8	3/4	3/4	7/8	7/8	7/8	1	1	1

Flanges are faced and drilled to ASA Class 125 standard, unless otherwise instructed.

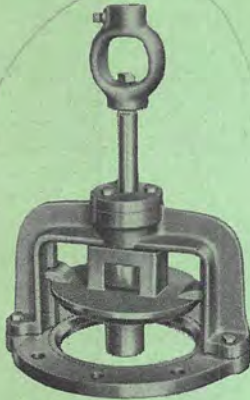


# EDDY VALVE COMPANY

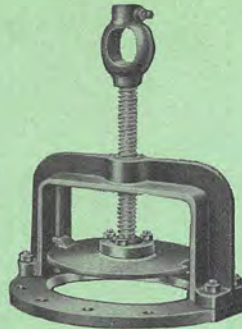


A Subsidiary of James B. Clow & Sons, Inc.

## EDDY PLUG DRAIN VALVES IRON BODY BRONZE MOUNTED



**F-3075 Flanged Ends  
Non-rising Stem**



**F-3085 Flanged Ends  
Rising Stem**



**F-3088 Spigot Ends  
Rising Stem**

**F-3080 Spigot Ends, Non-rising Stem also available (not illustrated)**

Eddy Plug or Mud Drain Valves are designed for settling basin drain lines, sump blow-offs, swimming pool drains, waterworks, sewage and filtration plants, irrigation systems, and industrial installations. They are available in sizes 4 thru 24 inches.

Eddy Plug Drain Valves are either rising stem, non-rising stem or sliding stem type. Bodies are cast iron. The stem, stem nut, disc ring, and seat ring are bronze. Bolts and nuts are rust-proofed steel.

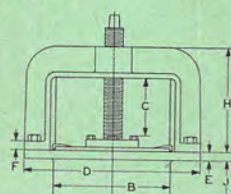
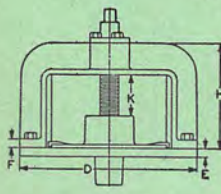
Plug drain valves can be furnished with handwheel instead of usual operating nut if required. They can also be furnished with extension stem, with plain or indicating floor stand, and can be furnished for cylinder operation if required.

When ordering extension stem, state length, and give distance from bottom face of flange to top of handwheel or nut, or to base of floor-stand. Spigot end valves are available in any desired length up through 12 inches.

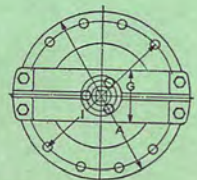
### DIMENSIONS



**F-3075, F-3080 Non-rising Stem**



**F-3085, F-3088 Rising Stem**



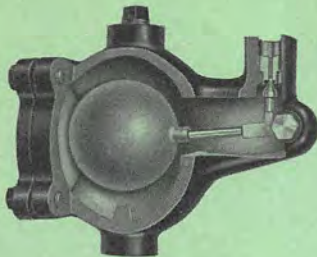
Dimensions—Inches		4	6	8	10	12	14	16	18	20	24
Valve Size	..... Inches	4	6	8	10	12	14	16	18	20	24
A	Diameter of body flange	9	11	13½	16	19	21	23½	25	27½	32
B	Outside diameter of spigot	5½	7	9¼	11¼	13¾	15¾	17¾	19¾	21¾	25¾
C	Travel of gate (rising stem)	2¾	2½	4¾	5¼	6	6½	7½	8½	8¾	11½
D	Overall width at yoke	10	12	14½	16¾	19¾	23	25¾	29	29½	37
E	Thickness of body flange	5/8	¾	7/8	7/8	1	1¼	1¼	1¼	1½	1¾
F	Thickness of yoke flange	5/8	7/8	7/8	7/8	1	1¼	1¾	1½	1¾	1¾
G	Width of yoke	2¼	2½	3¼	3½	4	6	6	6½	7	7
H	Height of yoke	6¾	7	8½	9¾	10¾	13½	14	15½	16¾	20
I	Diameter of bolt circle	7½	9½	11¾	14¼	17	18¾	21¼	22¾	25	29½
J	Length of spigot	12	12	12	12	12	12	12	12	12	12
K	Travel of gate (non-rising stem)	1½	2½	3½	3¾	3¾	5½	5½	6½	7	10

Flanges are faced and drilled to ASA Class 125 standard, unless otherwise instructed.





## AIR RELEASE AND VACUUM VALVES



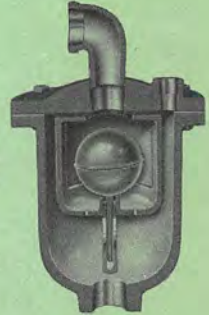
**F-3062**  
#55 and #65



**F-3062**  
#200A, 200, 205



**F-3066**  
(See description below)



**F-3070**  
#142, thru 153

### F-3062

#### Air Release Valves

Air Release valves are designed for use in lines where air, entrained under pressure, forms pockets of air. In some cases, the flow of fluid in a line can become almost blocked and, of course, will be quickly noted. However, usually, an increase in the resistance to flow of from 10 to 15 per cent can occur and go unnoticed for years. This forces the pump to use more power to overcome this resistance and still continue to operate at full line capacity. Installation of Air Release Valves at all points where air collects automatically solves such problems.

### F-3070

#### Air and Vacuum Valves

Air and Vacuum Valves are used to exhaust large quantities of air from lines being filled or deep well columns when the pump is started. When the line is filled, the Air and Vacuum Valve closes and remains closed until the fluid is drained. The valve then opens to let air reenter the line and prevent development of a vacuum. When Air and Vacuum Valves are used for deep well pump service, a throttling device is recommended to prevent possible water hammer. This device can be furnished as part of the valve at additional cost.

### F-3066 Combination Air and Vacuum Air Release Valves

These valves combine the large venting capacity of the Air and Vacuum Valve with the Air Release Valve's ability to vent small pockets of air which collect under pressure. Each combination consists of one valve selected from each of the types shown in the tables. Dimensions and sizes shown for Air Release and for Air and Vacuum Valves apply to the combination valves.

### F-3062

#### Air Release Valves

Size No.	Max. Working Pressure psi	Dimensions Inches		Approx. Wt. Lbs.
		Inlet	Outlet	
55	150	1/2 S	3/8	5 1/2
65	150	3/4 S	1/2	9
200A	300	1 S*	1/2	20
200	300	2†	1	45
205	500	2†	1	75

### F-3070

#### Air and Vacuum Valves

Size No.	Max. Working Pressure psi	Dimensions Inches		Approx. Wt. Lbs.
		Inlet	Outlet	
142	250	1 S	1	20
144	300	2 S*	2	50
146	300	3 S†	3	55
152	300	4‡	4	100
153	300	6‡	6	150

S = Screwed.

\* Also available with 2" screwed inlet.

† Available with 2" or 3" screwed or flanged inlet.

S = Screwed.

\* Available with 2" Flanged inlet.

† Available with 3" Flanged inlet.

‡ Flanges conform to Class 125 or 250.

### ORDERING INFORMATION

1. Quantity.
2. Size number.
3. Working pressure.
4. Size of line or tank.
5. Venting capacity, if known.
6. Specify construction wanted.

### Note

Valves are normally furnished with cast iron bodies and covers, bronze trim, and copper floats for waterworks service. Bodies, trim and floats can be furnished in aluminum, bronze, stainless steel, or monel—when specified.



# EDDY VALVE COMPANY



A Subsidiary of James B. Clow & Sons, Inc.

## EDDY BY-PASS VALVES



F-3120 By-pass  
Non-rising Stem



F-3125 By-pass  
Rising Stem  
OS&Y

By-pass valves make gate valve operation easier by equalizing the pressure on both sides of the gates. They can be furnished for any Eddy Parallel Seat Double Disc Gate Valve size 16 inches and larger.

Unless otherwise specified, by-pass valves will be furnished of the same type as the main valve to which it is fitted. When the main valve is equipped with either operating nut or handwheel, the by-pass valve will be furnished with the same operating device.

Unless otherwise specified, gate valves installed in a horizontal position will have the by-pass valve at the bottom of the valve and at right angles to the main valve stem. Valves installed in a vertical position will normally have the by-pass valve located at the side of the main valve with the stem parallel to the main valve stem.

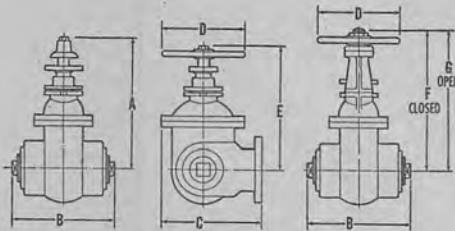
By-pass valves can be equipped for operation from floor stands—see page 147.

By-passes can be supplied for valves of any size. They are recommended for valves 16 inches and larger, and are normally furnished in the sizes listed at left.

### Recommended Sizes of By-pass Valves

Size Main Valve	Size By-pass Valve
16, 18, and 20-inch . . . . .	3-inch
24 and 30-inch . . . . .	4-inch
36 and 42-inch . . . . .	6-inch
48-inch . . . . .	8-inch
54 and 60-inch . . . . .	8-inch

### DIMENSIONS



Valve Size	Dimensions—Inches						
	A	B	C	D	E	F	G
3	14	10 $\frac{1}{2}$	11	10	13	13 $\frac{7}{8}$	17 $\frac{3}{8}$
4	16 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{3}{8}$	10	15 $\frac{1}{2}$	17 $\frac{3}{4}$	22 $\frac{3}{8}$
6	20 $\frac{1}{2}$	18 $\frac{1}{4}$	15	12	19 $\frac{1}{2}$	24	30 $\frac{3}{8}$
8	24	24 $\frac{5}{8}$	17 $\frac{3}{8}$	14	23 $\frac{1}{4}$	29 $\frac{1}{8}$	37 $\frac{1}{4}$

### ORDERING INFORMATION

1. **Location of by-pass**, if other than listed and described above.

2. **Special instructions**, as when by-pass valve is to be of rising stem with outside screw and yoke construction though used with non-

rising stem main valve; floor or bench stand operation, etc.

3. **If by-pass** is to be manually operated, state whether handwheel type or operating nut type is wanted.

### Handholes or Cleanouts

Handholes or cleanout pockets for inspection and removal of sediment or scale can be provided on any Eddy valve. The hole is located on the side of the valve body, near the bottom of the valve. Sizes are determined by the needs of individual installations. When referring to handholes or cleanouts, mention F-3130.



Partial View  
of a  
Gate Valve  
Showing  
a Cleanout

F-3130





## EDDY GEARING, GEAR CASES AND INDICATORS



**F-3140 Spur Gears  
Non-rising Stem**



**F-3145 Bevel Gears  
Non-rising Stem**



**F-3142 Spur Gears  
Rising Stem, OS&Y**



**F-3147 Bevel Gears  
Rising Stem, OS&Y**

### Gearing

Gearing is recommended for easier operation of large valves and of small valves on high pressure lines. Both spur and bevel types are available for either non-rising stem or rising stem with outside screw and yoke valves.

**Gear Teeth:** Cut tooth cast steel gears are normally furnished on AWWA gate valves

unless otherwise specified. Cast iron gears are normally furnished on all other valves. However, cut tooth cast steel or cut tooth cast iron gears can be furnished on all valves if specified.

**Pinion Shafts:** Are made of bronze.

**Floor Stands:** These can be equipped with gearing if specified—see page 147.

**Indicators:** Indicators, to show valve positions, can be furnished for geared valves.

### GEAR CASES

Eddy furnishes watertight gear or grease cases of the extended type for both spur and bevel gearing. They are available for either non-rising stem or rising stem with outside screw and yoke valves. Gear cases are cast iron and designed for easy filling and draining. Lubricant is normally supplied.

The case is extended above the valve cover, providing easy access to the valve stuffing box. Line pressure cannot develop in the extended gear case to force out the lubricant. Foreign matter is prevented from entering the case by the stuffing boxes on the stem and on the pinion shaft.



**F-3164 Spur Gears  
Extended Gear Case**



**F-3162 Bevel Gears  
Extended Gear Case**

### POSITION INDICATORS

#### Needle and Slot Type

Valve position is indicated by a bronze pointer attached to a threaded collar, which moves on the valve stem as the handwheel is rotated. A slotted bronze plate, with raised figures, is attached to the valve stuffing box, and the pointer moves within the slot to show valve position. All parts of the indicator are bronze.

#### Barrel Type

Barrel type indicators are cast iron, with bronze working parts and are of the worm gear type. A bronze pointer moves along a bronze plate on which figures indicate the position of the valve.



**F-3148 Indicator  
Needle and Slot Type,  
for NRS Valves  
without Gearing**



**F-3150 Indicator  
Barrel Type, for NRS  
Valves with Gearing**



## EDDY STEM GUIDES STEM PROTECTORS CHAIN WHEELS AND FLOOR BOXES



**F-3178**  
Stem Guide—Size No. 3

Adjustment from Wall—Inches

Size . . . . . Number	1	2	3	4	5	6
Minimum . . Inches	1	4	10	14	18	22
Maximum . . Inches	5	12	16	20	24½	33

### STEM GUIDES

Eddy Stem Guides are installed as wall brackets to support extension stems. They are fully adjustable and are made of cast iron. The guide is bronze bushed where it contacts the extension stem. They should be installed at a height which does not permit the stem to be unsupported through a length greater than 10 feet.

When ordering Eddy Stem Guides, state the distance from the center line of the operating stem to the face of the wall.



**F-3170**  
Chain Wheel on NRS Valve

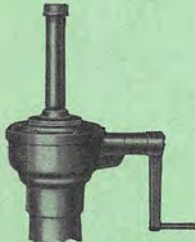
### CHAIN WHEELS

Eddy Chain Wheels are normally used for operation of valves located overhead. Wheels are made of high strength cast iron or steel. Guides are provided to prevent the chain from slipping off the wheel. Steel chain can be furnished rust proofed if specified. Chain wheels are approximately the same diameter as the handwheels.

In ordering, state distance from floor to center of wheel or number of feet of chain required.



**F-5670** Valve  
Stem Protector



**F-5675** Floor Stand  
Stem Protector

### STEM PROTECTORS

Stem Protectors are recommended for the protection of stem threads on outside screw and yoke valves. Their use guards the stem against damage and dirt.

Stem Protectors are available in two types. The top type protects the stem above the handwheel, and the stem type protects the stem throughout its length.

Stem Protectors are also furnished for rising stem floor stand, and can be equipped with slots.



**F-5690**



**F-5695**

### FLOOR BOXES

Eddy Floor Boxes are designed for installation in concrete floors or slabs to provide support for extension stems of the non-rising type, and to provide a cover for the operating nut on the extension stem. The F-5690 Plain Type is available in any length up to 12".

The F-5695 Bushing Type floor boxes are similar in design and construction with the F-5690 Floor Boxes, but are fitted with bronze bushings to preserve stem alignment. They are available 7" to 12" in length.

In ordering, state size of extension stem, length required or thickness of floor.





## BRONZE VALVES

FOR STEAM, WATER, OIL OR GAS SERVICE

With Screwed Ends

### 125-POUND BRONZE GATE VALVES

Solid Wedge Disc

**F-3182**

Non-Rising Stem with Screwed Bonnet

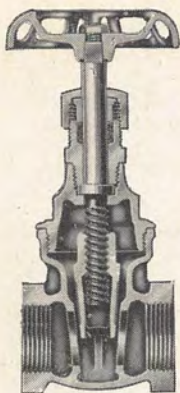
**F-3183**

Rising Stem with Union Bonnet

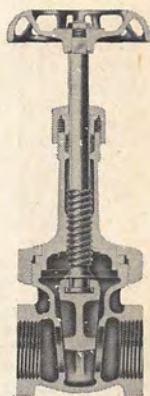
All sizes 1/4 thru 3-inch

#### Pressure Ratings psi

Figure Number	Steam at 500° F.	Non-Shock Cold Oil, Water or Gas
<b>F-3182</b>	125	200
<b>F-3183</b>	125	200



**F-3182**  
Gate Valve



**F-3183**  
Gate Valve

### 150-POUND BRONZE GATE VALVES

**F-3185**

Solid Wedge Disc

Non-Rising Stem with Screwed Bonnet

**F-3186**

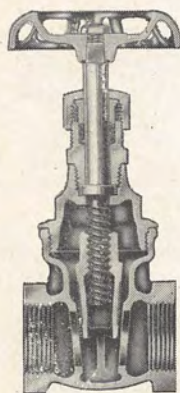
Split Wedge Disc

Rising Stem with Union Bonnet

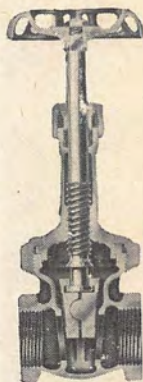
All sizes 1/4 thru 3-inch

#### Pressure Ratings psi

Figure Number	Steam at 500° F.	Non-Shock Cold Oil, Water or Gas
<b>F-3185</b>	150	300
<b>F-3186</b>	150	300



**F-3185**  
Gate Valve



**F-3186**  
Gate Valve

### BRONZE CHECK VALVES

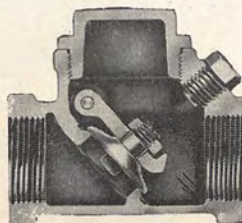
Screwed Cap

All sizes 1/4 thru 3-inch

#### Pressure Ratings psi

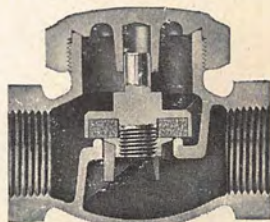
Figure Number	Steam at 500° F.	Non-Shock Cold Oil, Water or Gas
<b>F-3188</b>	125	250
<b>F-3189</b>	150	300

**Swing Check**  
Regrindable Renewable  
Bronze Disc



**F-3188**  
Swing Check Valve

**Lift Check**  
Renewable  
Composition Disc

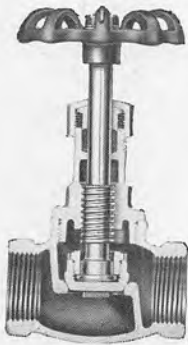


**F-3189**  
Lift Check Valve



**BRONZE VALVES**  
FOR STEAM, WATER, OIL OR GAS SERVICE  
With Screwed Ends

**125-POUND BRONZE GLOBE AND ANGLE VALVES**



**F-3191**  
Globe Valve

Beveled Bronze Disc  
Screwed Bonnet

All sizes 1/4 thru 3-inch

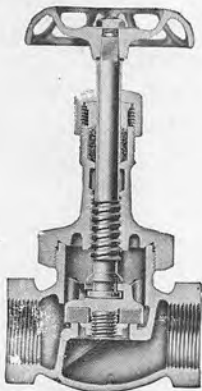
**Pressure Ratings psi**

Figure Number	Saturated Steam	Non-Shock Cold Oil, Water or Gas
<b>F-3191</b>	125	200
<b>F-3192</b>	125	200



**F-3192**  
Angle Valve

**150-POUND BRONZE GLOBE AND ANGLE VALVES**



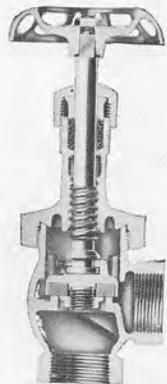
**F-3194**  
Globe Valve

Slip-on, Stay-on Disc Holder  
Renewable Composition Disc  
Screwed Bonnet

All sizes 1/4 thru 3-inch

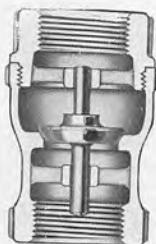
**Pressure Ratings psi**

Figure Number	Steam at 366° F.	Non-Shock Cold Oil, Water or Gas
<b>F-3194</b>	150	300
<b>F-3195</b>	150	300



**F-3195**  
Angle Valve

**BRASS VERTICAL CHECK AND FOOT VALVES**



**F-3197**  
Vertical Check Valve

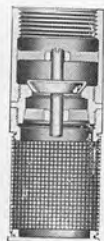
**F-3197**  
All sizes 1/4 thru 3-inch

**F-3198**  
All sizes 1/2 thru 3-inch

**Pressure Ratings psi**

Figure Number	Saturated Steam	Non-Shock Cold Oil, Water or Gas
<b>F-3197</b>	125	200

**F-3198**  
Rated at 200 (psi) Non-Shock Cold Water



**F-3198**  
Foot Valve



**FRAMES-COVERS**  
**GRATINGS, Etc.**

**CAST IRON MANHOLE FRAMES AND COVERS**

*Manufacturer's Specifications*

**Section 1. General Requirements:** All castings shall be made of clean, even grain, tough gray cast iron. The castings shall be smooth, true to pattern and free from projections, sand holes, warp and other defects which would interfere with the use of, or impair the serviceability of, the castings. All castings shall be well cleaned before inspection.

**Section 2. Machining:** (a) The following portions of cover seats and covers of round frames and covers intended for vehicular traffic shall be machined: Frame—horizontal surface of cover seat; Cover—under surface which rests upon the cover seat.

(b) After machining, it shall not be possible to rock any cover after it has been seated in any position in its associated frame.

**Section 3. Quality of Iron.** The iron used for these castings shall conform to the specifications of the ASTM designation A48-48 for Class 30 Gray Iron. The B test bar (1.2" diameter x 21" long) shall be used to prove the quality of the iron used.

**Section 4. Coating:** Unless otherwise specified, all castings shall be coated with coal tar pitch varnish, to which sufficient oil has been added to make a smooth coating, tough and tenacious when cold, not tacky and not brittle.

**Section 5. Marking:** Manufacturer's name and catalog figure number must be cast on each frame and cover.

***Specify Pipe Economy Figure Numbers on Orders***



**READY INDEX OF STREET AND ROADWAY CASTINGS**

For a quick reference, the street and roadway castings shown in this catalog have been listed in this index in the order of their clear openings; smallest to the largest.

**For complete dimensions, prices, illustrations, and sectional views of a selected manhole, refer to the page listed in the table.**

**ROUND FRAMES AND COVERS**

Clear Opening Inches	Figure Number	Page Number	Clear Opening Inches	Figure Number	Page Number
11	F-3380	171	21	F-3335	169
11	F-3385	171	21 3/4	F-3800	177
11 3/4	F-3800	177	21 3/4	F-3802	177
11 3/4	F-3802	177	22 1/4	F-3302	168
15	F-3800	177	22 1/4	F-3310	168
15	F-3802	177	22 1/2	F-3362	170
17 3/8	F-3366	170	22 3/4	F-3800	177
17 7/8	F-3302	168	22 3/4	F-3802	177
17 7/8	F-3310	168	23	F-3320	169
18	F-3392	171	23	F-3325	169
18 1/4	F-3800	177	23	F-3328	169
18 1/4	F-3802	177	23	F-3370	170
18 1/2	F-3320	169	23 1/2	F-3355	169
18 1/2	F-3325	169	24	F-3210	165
18 1/2	F-3328	169	24	F-3366	170
20 1/2	F-3800	177	24	F-3752	176
20 1/2	F-3802	177	24	F-3756	176
21	F-3220	166	25	F-3800	177
21	F-3225	166	25	F-3802	177
21	F-3230	166	27	F-3205	165
21	F-3240	167	30	F-3200	165
21	F-3245	167	31	F-3215	165
21	F-3250	167	32 1/2	F-3302	168
21	F-3290	168	32 1/2	F-3310	168
21	F-3305	168	.....	.....	...

**SQUARE AND RECTANGULAR FRAMES AND COVERS**

Clear Opening Inches	Figure Number	Page Number	Clear Opening Inches	Figure Number	Page Number
7 1/4 x 7 1/4	F-3615	173	22 5/8 x 22 5/8	F-3600	173
8 x 12	F-3705	175	22 3/4 x 28 3/4	F-3545	173
9 1/4 x 9 1/4	F-3834	178	22 3/4 x 28 3/4	F-3550	173
10 x 15	F-3705	175	23 3/8 x 23 3/8	F-3605	173
10 3/4 x 13 3/4	F-3545	173	23 1/2 x 27 1/2	F-3505	172
10 3/4 x 13 3/4	F-3550	173	24 x 30	F-3600	173
12 x 12	F-3834	178	24 1/2 x 30 1/2	F-3474	172
13 x 20	F-3710	175	28 x 50	F-3520	172
13 x 20	F-3715	175	28 x 28	F-3782	177
17 1/2 x 22 1/4	F-3775	177	30 x 30	F-3460	171
18 x 18	F-3460	171	34 x 34	F-3505	172
18 1/2 x 18 1/2	F-3545	173	34 x 34	F-3525	172
18 1/2 x 18 1/2	F-3550	173	45 x 45	F-3505	172
18 5/8 x 18 5/8	F-3600	173	45 x 45	F-3525	172

Pages

Basin Gratings with Frames	176
Bell Traps	179
Catch Basin Curbs	175
Cesspools	179
Drains	179
Drain Curbs	175
Gratings	176-177-178

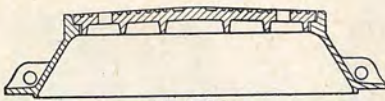
Pages

Gutter Inlets	175-176
Manhole Steps	174
Meter Box	171
Rainwater Pipe and Fittings	180
Sewer Inlets	175
Tile Pipe Grates	177
Inspection Cover	170





**LARGE MANHOLE FRAMES AND COVERS**



**F-3200**  
Section

**FOR  
HEAVY  
TRAFFIC**



**F-3200**  
Flared Frame and Perforated Cover

This frame and cover is one of the City of Chicago standards. Cover is crowned so that its center is  $\frac{3}{4}$ -inch above street level. Ribs have "hook holes" for easy handling and anchorage.

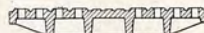
**Dimensions and Weight**

Dimensions—Inches							Approx. Weight Pounds
Clear Opening	Cover	Diameter of			Height of Frame		
		Top Outside	Base Flange	Projection Below Fl'g.	Above Fl'g. Bottom	Projection Below Fl'g.	
30	31 $\frac{3}{4}$	34	50 $\frac{1}{4}$	42 $\frac{1}{4}$	10	$\frac{1}{2}$	680

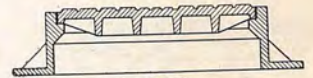
**FOR HEAVY TRAFFIC**



**F-3205**  
Frame and Solid Knobbed Cover\*



Perforated Cover\*



**F-3205**  
Frame and Solid Cover

Cover marked SDC when so ordered.

\*We can furnish the F-3205 frame with either solid or perforated cover but, unless order specifically calls for the perforated cover, the solid cover will always be furnished.

**Dimensions and Weights**

Dimensions—Inches					Approximate Weight—Pounds	
Diameter of Clear Opening	Diameter of Cover	Diameter of Top Outside	Diameter of Bottom Flange	Total Height	With Solid Cover	With Perforated Cover
27	28 $\frac{3}{4}$	32	42	9	785	765



**F-3210**  
Frame and Solid Knobbed Cover

**FOR  
HEAVY  
TRAFFIC**



**F-3215**  
Frame and Solid Knobbed Cover

**Dimensions and Weights**

Figure Number	Size Number	Dimensions—Inches					Approx. Weight Pounds
		Diameter of Clear Opening	Diameter of Cover	Diameter of Top Outside	Diameter of Bottom Flange	Total Height	
<b>F-3210</b>	2	24	25 $\frac{3}{4}$	27 $\frac{1}{2}$	39	7	445
<b>F-3215</b>		31	32 $\frac{3}{4}$	34 $\frac{1}{2}$	48	7	550



**CITY STANDARD**

**MANHOLE FRAMES AND COVERS FOR HEAVY TRAFFIC**



**F-3220**  
Frame and  
Solid Knobbed Cover

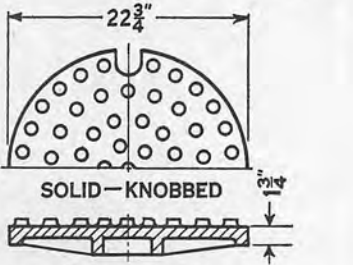


**F-3225**  
Frame and  
Solid Indented Cover

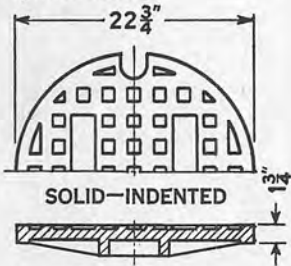


**F-3230**  
Frame and  
Perforated Cover

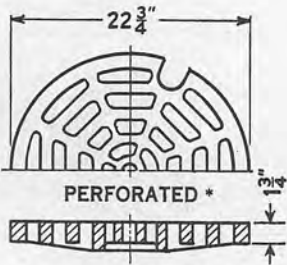
The City Standard frames and covers have been designed and made to withstand heavy traffic. In quantities of 25 or more, solid covers will be furnished with lettering to suit requirements at no additional charge.



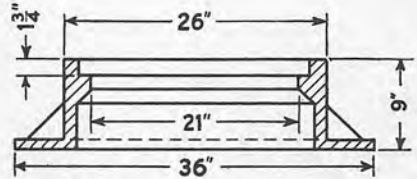
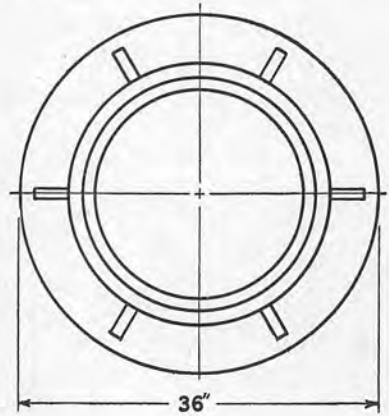
Style K Cover



Style I Cover



Style P Cover



City Standard Frame

**Dimensions**

Diameter of clear opening.....	Inches	21
Diameter of cover.....	Inches	22 <sup>3</sup> / <sub>4</sub>
Diameter of top, outside.....	Inches	26
Diameter of bottom flange.....	Inches	36
Total height.....	Inches	9

Covers are interchangeable with those used on the Suburban Standard frames, see page 167.

**Approximate Weights of Frames and Covers**

Figure.....	Number	F-3220		F-3225	F-3230	
		1	1-A	1	1	1-A
Weight.....	Number					
Frame only.....	Pounds	390	390	390	390	390
Cover only.....	Pounds	150	125	150	130	115
Total weight.....	Pounds	540	515	540	520	505

\* Can also be furnished with a beehive grating—see F-3290, or with bar grating—see F-3830.





## SUBURBAN STANDARD MANHOLE FRAMES AND COVERS FOR SUBURBAN TRAFFIC



**F-3240**  
Frame and  
Solid Knobbed Cover



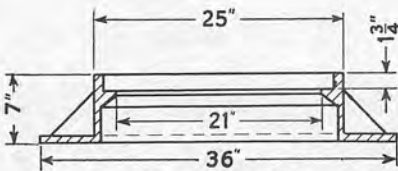
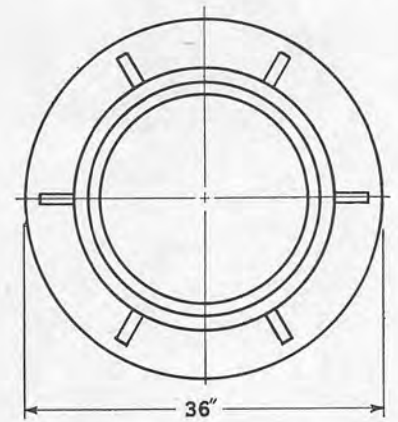
**F-3245**  
Frame and  
Solid Indented Cover



**F-3250**  
Frame and  
Perforated Cover

The Suburban Standard frames and covers are comparable in every way with the City Standard. They differ only in the overall height and in the outside diameter of the top of the frame.

In quantities of 25 or more, solid covers will be furnished with lettering to suit requirements at no additional charge.

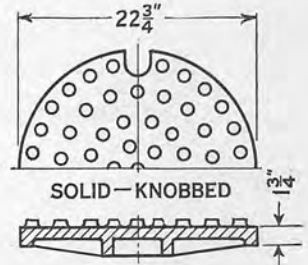


Suburban Standard Frame

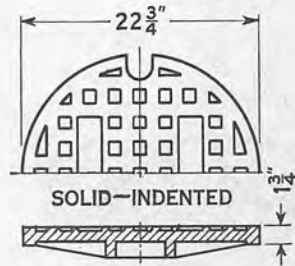
### Dimensions

Diameter of clear opening.....	Inches	21
Diameter of cover.....	Inches	22 <sup>3</sup> / <sub>4</sub>
Diameter of top, outside.....	Inches	25
Diameter of bottom flange.....	Inches	36
Total height.....	Inches	7

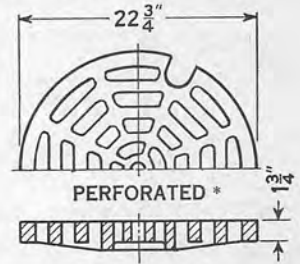
Covers are interchangeable with those used on the City Standard frames, see page 166.



Style K Cover



Style I Cover



Style P Cover

### Approximate Weights of Frames and Covers

Figure.....	Number	F-3240		F-3245		F-3250	
		1	1-A	1	1	1	1-A
Weight.....	Number						
Frame only.....	Pounds	250	250	250	250	250	250
Cover only.....	Pounds	150	125	150	130	130	115
Total weight.....	Pounds	400	375	400	380	380	365

\* Can also be furnished with a beehive grating—see F-3290, or with bar grating—see F-3830.



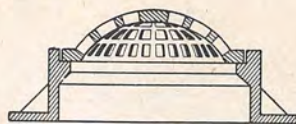
## FRAMES AND COVERS



**F-3290**  
Manhole Frame and Beehive Grating

### Weights

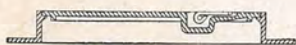
Size	Number	1	2
Approximate weight	Pounds	370	510



**F-3290 Section**

### Dimensions

Size	Number	1	2
Diameter of clear opening	Inches	21	21
Diameter of grating	Inches	22 <sup>3</sup> / <sub>4</sub>	22 <sup>3</sup> / <sub>4</sub>
Diameter of top, outside	Inches	25	26
Diameter of bottom flange	Inches	36	36
Frame height	Inches	7	9
Total height	Inches	13 <sup>1</sup> / <sub>2</sub>	15 <sup>1</sup> / <sub>2</sub>



**F-3302 Section**



**F-3302**  
Cleanout Frame and Solid Cover  
with Brass Lifting Handle

### Dimensions in Inches and Weights

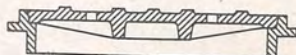
Size Number	Diameter of Clear Opening	Diameter of Cover	Diameter of Top Outside	Diameter of Bottom Flange	Total Height	Approximate Weight Pounds
1	17 <sup>7</sup> / <sub>8</sub>	19 <sup>1</sup> / <sub>8</sub>	20 <sup>3</sup> / <sub>8</sub>	28	4	135
2	22 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	24 <sup>3</sup> / <sub>4</sub>	34	4	165
3	32 <sup>1</sup> / <sub>2</sub>	34	35 <sup>3</sup> / <sub>8</sub>	42 <sup>3</sup> / <sub>4</sub>	4	315



**F-3305**  
Manhole Frame and Solid Knobbed Cover

### Weight

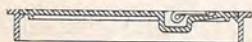
Approximate weight	Pounds	180
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**F-3305 Section**

### Dimensions

Diameter of clear opening	Inches	21
Diameter of cover	Inches	22
Diameter of top, outside	Inches	23 <sup>3</sup> / <sub>4</sub>
Diameter of anchor flange	Inches	25 <sup>1</sup> / <sub>2</sub>
Diameter of bottom	Inches	23
Total height	Inches	3 <sup>1</sup> / <sub>2</sub>



**F-3310 Section**



**F-3310**

Cleanout Frame and Solid Cover  
with Brass Lifting Handle

### Dimensions in Inches and Weights

Size Number	Diameter of Clear Opening	Diameter of Cover	Diameter of Top Flange	Diameter of Frame Bottom	Total Height	Approximate Weight Pounds
1	17 <sup>7</sup> / <sub>8</sub>	19 <sup>1</sup> / <sub>8</sub>	22	19 <sup>1</sup> / <sub>2</sub>	4	80
2	22 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	28	24 <sup>1</sup> / <sub>2</sub>	4	110
3	32 <sup>1</sup> / <sub>2</sub>	34	37	35 <sup>1</sup> / <sub>2</sub>	4	175





**FRAMES AND COVERS**



**F-3320**  
Frame and  
Solid Knobbed Cover

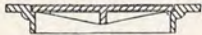


**F-3325**  
Frame and  
Perforated Cover

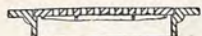


**F-3328**  
Frame and  
Grating Cover

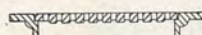
**Dimensions and Weights**



**F-3320**  
Section



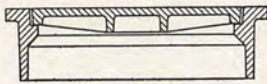
**F-3325**  
Section



**F-3328**  
Section

Figure . . . . . Number	<b>F-3320</b>		<b>F-3325</b>		<b>F-3328</b>	
	1	2	1	2	1	2
Size . . . . . Number	1	2	1	2	1	2
Diam. of clear opening . . . Inches	18½	23	18½	23	18½	23
Diam. of cover . . . . . Inches	19¾	24¼	19¾	24¼	19¾	24¼
Diam. of top flange* . . . . . Inches	27	31⅝	27	31⅝	27	31⅝
Diam. of frame bottom . . . Inches	21⅛	24½	21⅛	24½	21⅛	24½
Total height . . . . . Inches	4	4	4	4	4	4
Approximate weight . . . Pounds	195	240	185	250	160	215

\*Top flange drilled and countersunk for anchor bolts, when so ordered.



**F-3335**  
Section



**F-3335**  
Frame and Solid Indented Cover

**Dimensions and Weights**

Diameter of clear opening . . . Inches	21
Diameter of cover . . . . . Inches	22¾
Diameter of top, outside . . . . . Inches	28
Diameter of bottom, outside . . . Inches	24½
Thickness of top flange . . . . . Inches	1¼
Total height . . . . . Inches	8
Approximate weight . . . . . Pounds	355

F-3335 is a heavy traffic type frame and cover, suitable for use where it is desired to have the anchoring flange at the top of frame.

F-3335 can also be furnished with knobbed cover or with perforated cover—see page 166, or with grating cover—see page 178.



**F-3355**  
Manhole Frame and Solid Cover  
with Locking Device



**F-3355 Section**

**Dimensions and Weights**

Diameter of clear opening . . . . . Inches	23½
Diameter of cover . . . . . Inches	25½
Diameter of top, outside . . . . . Inches	25½
Diameter of bottom flange . . . . . Inches	36
Total height . . . . . Inches	6¼
Approximate weight . . . . . Pounds	295

An excellent wrench, our F-4975, for opening or closing locking device is shown on page 214.

**NOTE**

Unless otherwise specified on order, all frames in this section will be furnished with either the solid or perforated cover as shown. However, it is possible for us, in almost every case, to substitute a solid cover for one shown perforated, and a perforated cover for one shown solid, if by so doing the castings will more nearly suit your needs. Usually this substitution does not add to the cost of the complete frame and cover.



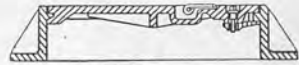
FRAMES AND COVERS



F-3362

Manhole Frame and Solid Cover with Locking Device and Brass Lifting Handle

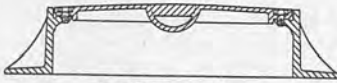
An excellent wrench, our F-4975, for opening or closing locking device is shown on page 214.



F-3362 Section

Dimensions and Weights

Diameter of clear opening . . . . . Inches	22 1/2
Diameter of cover . . . . . Inches	23 5/8
Diameter at top, outside . . . . . Inches	25 1/2
Diameter of bottom flange . . . . . Inches	32
Total height . . . . . Inches	6
Approximate weight . . . . . Pounds	285



F-3366 Section

Dimensions and Weights

Size . . . . .	Number	1	2
Diam. of clear opening . . . . . Inches		17 3/8	24
Diam. of cover . . . . . Inches		20 3/8	27
Diam. of top, outside . . . . . Inches		21 1/4	28
Diam. of bottom flange . . . . . Inches		28 5/8	34
Total height of frame . . . . . Inches		5 5/8*	5 5/8*
Approximate weight . . . . . Pounds		165	230



F-3366

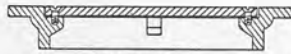
Manhole Frame and Solid Seal Cover Four Brass Screws, Tubular Rubber Gasket

\* Cover is crowned so that its center is 3/8-inch above street level.



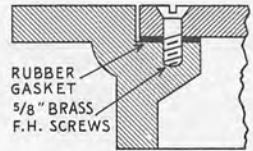
F-3370

Frame and Solid Seal Cover with Four Brass Screws



F-3370 Section

Four lugs, equally spaced on the inside of the frame, are drilled and tapped to take the brass screws.



F-3370 Detail

Dimensions in Inches and Weight

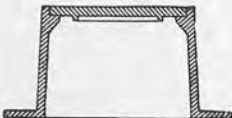
Diameter of Clear Opening†	Diameter of Cover	Diameter of Top Flange	Diameter of Frame Bottom	Total Height	Approximate Weight Pounds
23	24 1/4	32	24 1/2	4	270

† This diameter is reduced to 20 1/2 inches at points between lugs on inside of frame.

F-3375

Dimensions and Weight

Size . . . . .	Number	2
Diam. of clear opening . . . . . Inches		8 3/4
Diam. of cover . . . . . Inches		9 3/4
Diam. of top, outside . . . . . Inches		11
Diam. of bottom flange . . . . . Inches		15 1/2
Total height . . . . . Inches		6
Approximate weight . . . . . Pounds		65



F-3375 Section



F-3375 Inspection Cover

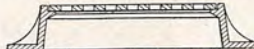




## FRAMES AND COVERS



**F-3380**  
Frame and Grating Cover



**F-3380** Section



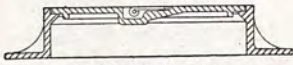
**F-3385** Section



**F-3385**  
Frame and Solid Cover

### Dimensions and Weights

Dimensions—Inches					Approximate Weight—Pounds	
Diameter of Clear Opening	Diameter of Cover	Diameter of Top Outside	Diameter of Bottom Flange	Total Height	<b>F-3380</b> with Grating Cover	<b>F-3385</b> with Solid Cover
11	11 $\frac{3}{4}$	13	18 $\frac{3}{4}$	4	85	90



**F-3392** Section

### Dimensions and Weight

Diameter of clear opening . . . . .	Inches	18
Diameter of cover . . . . .	Inches	19 $\frac{1}{2}$
Diameter of top, outside . . . . .	Inches	21
Diameter of bottom flange . . . . .	Inches	29
Total height . . . . .	Inches	5 $\frac{1}{4}$
Approximate weight . . . . .	Pounds	165



**F-3392**  
Manhole Frame and Solid Cover  
for Lawns and Parks



**F-3452** Meter Box and Cover with  
Brass Cover Bolt

### F-3452 Dimensions and Weight

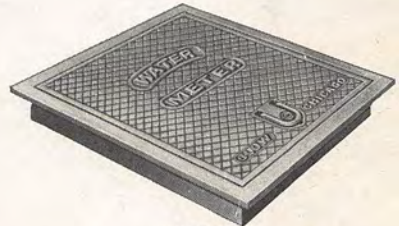
Diameter of clear opening . . . . .	Inches	4 $\frac{1}{4}$
Diameter of cover . . . . .	Inches	6
Diameter of top, outside . . . . .	Inches	5 $\frac{7}{8}$
Diameter of bottom flange . . . . .	Inches	8
Total height . . . . .	Inches	8 $\frac{1}{4}$
Approximate weight . . . . .	Pounds	15

For cover bolt wrench see F-4975 on page 214.



**F-3460** Section

Cover with special lettering  
made to order



**F-3460**  
Meter Frame and Solid Cover with  
Brass Lifting Handle

### Dimensions and Weights

Size Number	Dimensions—Inches					Approximate Weight Pounds
	Size of Clear Opening	Size of Cover	Size of Top Flange	Size of Frame Bottom	Total Height	
1	18 x 18	19 $\frac{1}{2}$ x 19 $\frac{1}{2}$	23 x 23	19 $\frac{3}{4}$ x 19 $\frac{3}{4}$	2	90
2	30 x 30	31 $\frac{3}{4}$ x 31 $\frac{3}{4}$	36 x 36	31 $\frac{1}{2}$ x 31 $\frac{1}{2}$	2	210



## FRAMES AND COVERS

F-3474

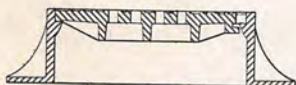
### Dimensions and Weights



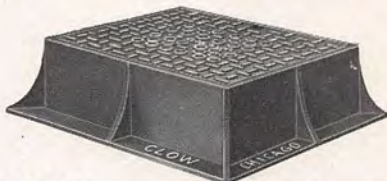
Size of clear opening.....Inches	24½ x 30½
Size of cover.....Inches	27 x 33
Size of top flange.....Inches	32 x 38
Size of frame bottom.....Inches	28¼ x 34¼
Total height.....Inches	4
Approximate weight.....Pounds	315

Cover with special lettering made to order

F-3474 City Standard Meter Frame and Solid Cover with Brass Lifting Handle



F-3505 Section



F-3505 Frame and Perforated Cover\*

### Dimensions in Inches and Weights

Size Number	Size of Clear Opening	Size of Cover	Size of Top Outside	Size of Bottom Flange	Total Height	Approx. Weight Pounds
1	23½x27½	25½x29½	27¾x31¾	38x42	9¾	820
2	34 x34	35¾x35¾	37¾x37¾	48x48	6⅝	1075
3	45 x45	47¾x47¾	50½x50½	60x60	6	1700



F-3520 Manhole Frame with Two-Piece Perforated Cover\*

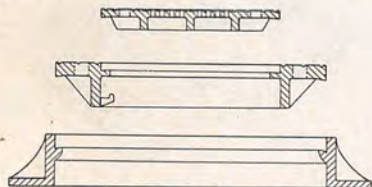


F-3520 Section

The use of this frame with its double cover will allow easy access to large size valves, water meters, transformers, and conduit lines in street manholes.

### Dimensions in Inches and Weights

Size of Clear Opening		Size of Cover		Size of Top Outside	Size of Bottom Flange	Total Height	Approx. Weight Pounds
Full	Half	Both	One				
28x50	28x25	29½x51¼	29½x25⅝	31½x53½	42x64	9½	1235



F-3525 Section



F-3525 Frame and Two-Piece Perforated Cover\*

### Dimensions in Inches and Weights

Size Number	Size of Clear Opening		Size of Cover		Size of Top Outside	Size of Bottom Flange	Total Height	Approx. Weight Pounds
	Large	Small	Large	Small				
1	34x34	21½x21½	35¾x35¾	23¾x23¾	37¾x37¾	48x48	6⅝	1200
2	45x45	23½x27½	47¾x47¾	25½x29½	50½x50½	60x60	6	2030

\* F-3505, F-3520 and F-3525 are also available with solid cover.

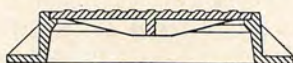




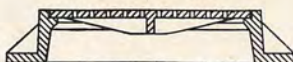
## FRAMES AND COVERS



**F-3545**  
Frame and Solid Cover



F-3545 Section



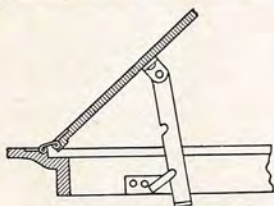
F-3550 Section



**F-3550**  
Frame and Perforated Cover

### Dimensions and Weights

Size Number	Dimensions—Inches					Approximate Weight Pounds	
	Size of Clear Opening	Size of Cover	Size of Top Outside	Size of Bottom Flange	Total Height	F-3545	F-3550
1	10 $\frac{3}{4}$ x13 $\frac{3}{4}$	12 x15	13 $\frac{1}{2}$ x16 $\frac{1}{2}$	18 x21	4	120	115
2	18 $\frac{1}{2}$ x18 $\frac{1}{2}$	19 $\frac{3}{4}$ x19 $\frac{3}{4}$	21 $\frac{5}{8}$ x21 $\frac{5}{8}$	28 $\frac{1}{4}$ x28 $\frac{1}{4}$	5	240	225
3	22 $\frac{3}{4}$ x28 $\frac{3}{4}$	24 x29 $\frac{7}{8}$	25 $\frac{3}{4}$ x31 $\frac{3}{4}$	30 x36	4	325	335

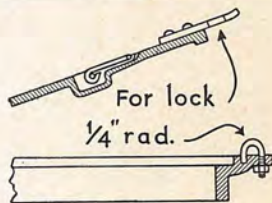


Ratchet Detail\*



**F-3600**

Sidewalk Frame and Hinged Cover with Brass Lifting Handle and Double Acting Recessed (Flush Top) Hinges.



Hasp Detail\*

### Dimensions and Weights

Size Number	Dimensions—Inches					Number of Hinges	Approx. Weight Pounds
	Size of Clear Opening	Size of Cover	Size of Top Flange	Size of Frame Bottom	Total Height		
1	18 $\frac{5}{8}$ x18 $\frac{5}{8}$	20 $\frac{1}{8}$ x20 $\frac{1}{8}$	24 $\frac{1}{2}$ x24 $\frac{1}{2}$	20 x20	3	2	85
2	22 $\frac{5}{8}$ x22 $\frac{5}{8}$	23 $\frac{7}{8}$ x23 $\frac{7}{8}$	28 $\frac{1}{4}$ x28 $\frac{1}{4}$	23 $\frac{3}{8}$ x23 $\frac{3}{8}$	3	2	160
2-A	24 x30	25 $\frac{1}{2}$ x31 $\frac{1}{2}$	30 $\frac{3}{4}$ x37	25 x31	3	2	245

**NOTE**  
Available with either steel or brass hinges—specify which is wanted.

\* F-3600 can be fitted when specified, with ratchet and/or locking hasp and staple as illustrated.



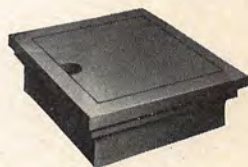
**F-3605**  
Sidewalk Frame and Cover with Brass Lifting Handle



F 3605 Section



F-3615 Section



**F-3615**  
Cleanout Frame and Cover

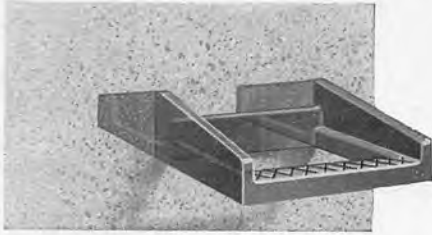
### Dimensions and Weights

Figure	Number	F-3605	F-3615
Size	Number	5	
Size of clear opening	Inches	23 $\frac{3}{8}$ x23 $\frac{3}{8}$	7 $\frac{1}{4}$ x 7 $\frac{1}{4}$
Size of cover	Inches	23 $\frac{7}{8}$ x23 $\frac{7}{8}$	7 $\frac{1}{8}$ x 7 $\frac{7}{8}$
Size of top outside	Inches	32 $\frac{1}{4}$ x32 $\frac{1}{4}$	10 x10
Size of frame bottom	Inches	24 $\frac{3}{8}$ x24 $\frac{3}{8}$	8 $\frac{1}{2}$ x 8 $\frac{1}{2}$
Total height	Inches	4	3
Approximate weight	Pounds	205	30



**CAST IRON STEPS**

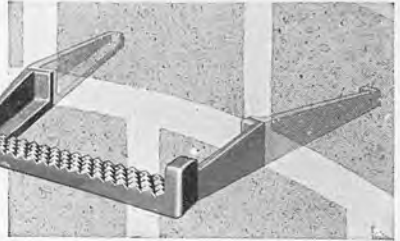
For Manholes, Sewage Disposal and Water Treatment Plants, Scale and Elevator Pits, Exposed Wall and Chimney Ladders, etc.



**F-3650**

Cast Iron Manhole Step  
For Concrete or Brick Walls

Approximate weight, 11 pounds



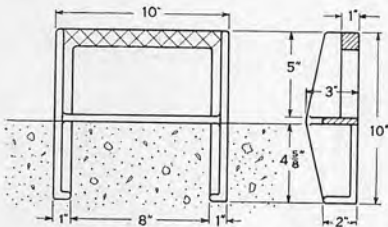
**F-3660**

Cast Iron Manhole Step  
For Concrete Block Walls

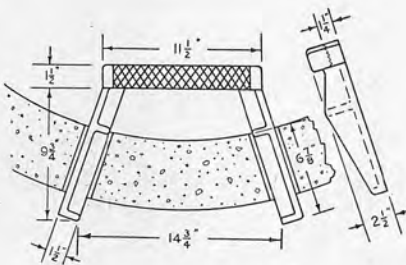
Approximate weight, 15 pounds

The F-3650 cast iron step is made for either brick or concrete walls. The F-3660 cast iron step is made for use with concrete blocks. The dimensions of standard bricks and standard concrete blocks have been carefully considered in the design of these two steps. The wide, checked treads give a safe footing while the raised sides prevent the foot from slipping off side-wise in either direction.

These steps are being generally specified for manholes, sewage disposal and water treatment plants, and for other work where dampness and the action of the elements must be considered. Extra long life, no replacement expense, and assured safety, make the use of these cast iron steps an actual economy.



**F-3650**  
Dimensions



**F-3660**  
Dimensions

**WATCH YOUR  
STEP!**



**TEST**

Note that the weight, 1827 pounds, is concentrated upon only 3 1/4 inches at the center of the tread, less than the width of a man's shoe across the ball of the foot. F-3650 step was used for this test.





## SEWER INLETS, DRAIN CURBS AND GUTTER INLETS



**F-3670 Sewer Inlet with Open Back**

Approx. weight, 385 pounds

**F-3670 and F-3675 Adjustable Sewer Inlets**

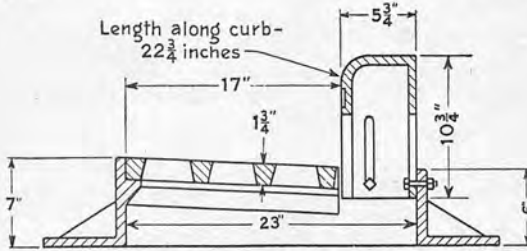
Adjustable to Curbs From 4 to 9 inches high.

With 36-inch Round Base Flange and 16 $\frac{1}{2}$ x22-inch Grating



**F-3675 Sewer Inlet with Strainer Back**

Approx. weight, 390 pounds



Sectional View of F-3670 and F-3675 Adjustable Sewer Inlets

Note: Once placed and adjusted to proposed curb height, the curb box will remain rigidly in place while the curbing is being made and ever after. Gratings and curb boxes are interchangeable.



**F-3705 Drain Curb and Grating**



Grating Section



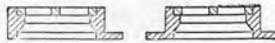
**F-3705 Section**

### Dimensions and Weights

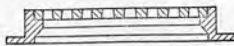
Size	Number	1	2
Size of clear opening	Inches	8x12	10x15
Diameter of bottom flange	Inches	24	30
Total height of frame	Inches	4 $\frac{3}{4}$	9 $\frac{1}{4}$
Approximate weight	Pounds	125	305



**F-3710 Gutter Inlet Base Flange on Three Sides**



**F-3710 F-3715 End Sections**



**F-3710 and F-3715 Front Section**



**F-3715 Gutter Inlet Base Flange on Four Sides**

### Dimensions and Weights

Figure	Number	F-3710	F-3715
Size of clear opening	Inches	13 x20	13 x20
Size of grating	Inches	14 $\frac{1}{2}$ x21 $\frac{1}{2}$	14 $\frac{1}{2}$ x21 $\frac{1}{2}$
Size of top, outside	Inches	17 x24	17 x24
Size of bottom flange	Inches	20 x30	23 x30
Total height	Inches	5 $\frac{1}{2}$	5 $\frac{1}{2}$
Approximate weight	Pounds	290	310



**GUTTER INLET—CATCH BASIN FRAMES AND GRATINGS**



**F-3718 Gutter Inlet Box**

\* Includes 1½-inch extension below box for connecting F-3722 to 8-inch sewer pipe.

**F-3718 Dimensions and Weight**

Size of grating.....	In.	14 <sup>7</sup> / <sub>8</sub> x21 <sup>5</sup> / <sub>8</sub>
Size of frame, outside.....	In.	17 <sup>1</sup> / <sub>4</sub> x24
Diameter of bottom opening.....	In.	8
Total height*.....	In.	6 <sup>3</sup> / <sub>4</sub>
Approximate weight.....	Pounds	245



**F-3722**

45° Inlet Bend

**F-3722 for use with F-3718**

Size 8 inches, approx. weight 85 pounds.



**F-3752**  
Catch Basin Frame and Grating

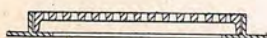


**F-3756**  
Catch Basin Frame and Dome Grating

**Dimensions and Weights**

Figure.....	Number	F-3752	F-3756†
Diameter of clear opening.....	Inches	24	24
Diameter of grating.....	Inches	29 <sup>1</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>4</sub>
Diameter of frame top, outside.....	Inches	30 <sup>3</sup> / <sub>4</sub>	30 <sup>3</sup> / <sub>4</sub>
Diameter of flange.....	Inches	36 <sup>1</sup> / <sub>2</sub>	36 <sup>1</sup> / <sub>2</sub>
Total height.....	Inches	3 <sup>3</sup> / <sub>8</sub>	9 <sup>5</sup> / <sub>8</sub>
Approximate weight.....	Pounds	275	365

† F-3756 has rounded grating with center 6" above frame top.



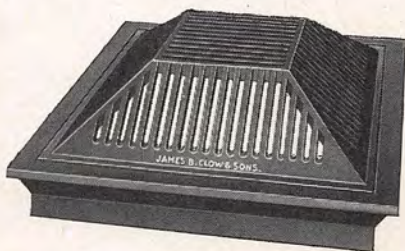
**F-3752 Section**



**F-3756 Section**



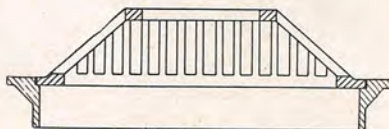
**F-3765**  
Catch Basin Grating only



**F-3770**  
Catch Basin Grating with Frame

**Dimensions and Weights**

Figure.....	Number	Dimensions—Inches	
		F-3765 Grating	F-3770 Complete
Size at bottom, outside.....	26	26 <sup>1</sup> / <sub>4</sub>	
Size at top, outside.....	12	12	
Size at top of frame, outside.....	..	..	30 <sup>1</sup> / <sub>4</sub>
Height of frame.....	..	..	4
Total height.....	6 <sup>1</sup> / <sub>4</sub>	..	9 <sup>5</sup> / <sub>8</sub>
Approximate weight.....	Pounds	100	225



**Section**  
Showing **F-3765** and **F-3770**  
Assembled

The F-3765 and F-3770 gratings are suitable for use at the low point of large graded areas to drain off large volumes of surface water from all sides.

The F-3765 grating is sometimes used without the F-3770 supporting frame. The top edge of the masonry catch basin may be shaped to support the grating or a simple frame of angle iron may be used for the purpose.





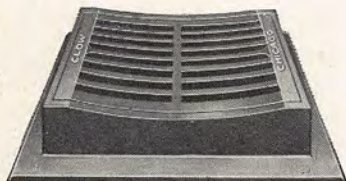
## FRAMES, GRATINGS AND COVERS

### F-3775 Dimensions and Weight

Size of clear opening . . . . . Inches	17½x22¼
Size of grating . . . . . Inches	18¾x23½
Size of top, outside . . . . . Inches	20½x25¼
Size of bottom flange . . . . . Inches	28¼x33
Height of frame at back . . . . . Inches	6¾
Height of frame at front . . . . . Inches	4⅞
Height of frame at ends . . . . . Inches	2⅞
Approximate weight . . . . . Pounds	260



**F-3775**  
Basin Grating and Frame



**F-3782**  
Basin Grating and Frame

### F-3782 Dimensions and Weight

Size of clear opening . . . . . Inches	28 x28
Size of grating . . . . . Inches	29⅝x29⅝
Size of top, outside . . . . . Inches	32 x32
Size of bottom flange . . . . . Inches	37⅝x37⅝
Height of frame at sides . . . . . Inches	5¼
Height of frame at ends . . . . . Inches	4¾
Approximate weight . . . . . Pounds	455



**F-3800**  
Cleanout Frame and Cover



Section Showing  
Application to Vitrified  
Sewer Pipe



**F-3802**  
Cleanout Frame and Grating

Frames, covers and gratings are of a uniform thickness of ⅝-inch

### F-3800 and F-3802 Dimensions and Weights

Size . . . . . Number	1	2	3	4	5	6	7
Fits in hub of sewer pipe, size . . . . . Inches	12	15	18	20	21	22	24
Diameter of clear opening . . . . . Inches	11¾	15	18¼	20½	21¾	22¾	25
Diameter of cover . . . . . Inches	13	16¼	19½	21¾	23	24	26¼
Diameter of top flange . . . . . Inches	17	20¼	24½	26¾	28	29	31¼
Diameter of frame bottom . . . . . Inches	14½	17¾	21	23¼	24½	25½	27¾
Depth of frame below flange . . . . . Inches	1¾	2	2¼	2½	2½	2½	2¾
<b>F-3800</b> , approximate weight . . . . . Pounds	50	70	100	120	135	145	165
<b>F-3802</b> , approximate weight . . . . . Pounds	45	55	80	100	110	120	130



**F-3810**  
Flat Grating for Bell of Tile Pipe  
Sizes 4, 6, and 8-inch



**F-3810** Flat Grating for Bell of Tile Pipe  
Sizes 10, 12, and 15-inch

### F-3810 Dimensions and Weights

For hub of tile sewer pipe, pipe size . . . . . Inches	4	6	8	10	12	15
Diameter of grating . . . . . Inches	5⅜	7½	10	12	15	18¼
Thickness of bars . . . . . Inches	⅜	¾	¾	⅞	1	1
Total height* . . . . . Inches	1⅝	2⅞	2⅞	2⅞	2⅞	2⅞
Approximate weight . . . . . Pounds	4	6	17	28	40	50

\* Total height, at outside edge, sets grating surface slightly below the face of the tile pipe bell.



**CAST IRON GRATINGS**



**F-3830**  
Flat Bar Grating

**Dimensions and Weights**

Diameter . . . . . Inches	4	4½	5	5⅜	6¾	8	9
Thickness . . . . . Inches	½	⅜	½	⅜	⅜	¾	½
Approx. weight . . Pounds	1¼	¾	2	1½	3½	6	7½
Diameter . . . . . Inches	10	10¾	11¾	12	13	14	16
Thickness . . . . . Inches	¾	⅝	1	⅞	⅝	⅞	1
Approx. weight . . Pounds	9	9	20	15	12	25	30
Diameter . . . . . Inches	16¼	18	18¾	19½	19¾	20	21¾
Thickness . . . . . Inches	⅝	1	⅝	⅝	¾	1	⅝
Approx. weight . . Pounds	30	35	30	35	35	50	35
Diameter . . . . . Inches	22¾*	23	24	24	24¼	26¼	28
Thickness . . . . . Inches	1¾	⅝	⅝	1¾	¾	⅝	1½
Approx. weight . . Pounds	110	40	45	130	55	60	155

\* Can be used with F-3220, F-3225, F-3230, F-3240, F-3245, F-3250, F-3290 and F-3335 frames.

**F-3834 Dimensions and Weights**



**F-3834**  
Grating and Frame  
(Illustration shows Size No. 2)

Figure . . . . . Number	F-3834	
	1†	2
Size . . . . . Number		
Size of clear opening . . . . . Inches	9¼x9¼	12x12
Size of grating . . . . . Inches	10¼x10¼	13x13
Thickness of grating . . . . . Inches	½	½
Thickness of top flange . . . . . Inches	⅝	⅝
Size of frame, outside . . . . . Inches	12½x12½	15x15
Size of frame, bottom . . . . . Inches	11⅜x11⅜	13¼x13¼
Total height . . . . . Inches	1¼	3
Approx. weight . . . . . Pounds	40	65

† Size No. 1 has two rows of perforations.



**F-3880** Grating



**F-3885** Grating

**Dimensions and Weights**

Figure . . . . . Number	F-3880	F-3885			
		8x12	9x9	12x12†	26x26
Size . . . . . Inches	22x36				
Thickness . . . . . Inches	2¼	⅝	⅝	¾	2
Approximate weight . . . . . Pounds	250	12	10	17	210

† The 12x12-inch size has two rows of perforations.

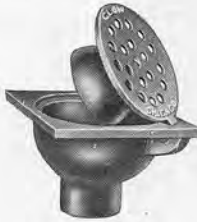




**PAINTED CAST IRON TRAPS, DRAINS AND CESSPOOLS**



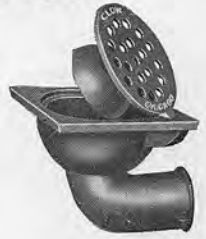
**F-3922**  
For Inside Calking



**F-3928**  
Short Spigot Outlet



**F-3932**  
Outlet Tapped for I. P.



**F-3936**  
Side Spigot Outlet

**Cast Iron Bell Traps with Hinged Strainer\***

**Dimensions and Weights**

Figure..... Number	F-3922			F-3928			F-3932			F-3936		
Size of top..... Inches	6x6	9x9	13x13	6x6	9x9	13x13	6x6	9x9	13x13	6x6	9x9	13x13
Size of outlet... Inches	2	3	4	2	3	4	2	3	4	2	3	4
Height overall.. Inches	4½	5½	6½	4¼	5	6	4¼	5	6	4½	7½	9½
Weight..... Pounds	4	9	18	4	9	18	4	9	18	8	20	41

2-3  
2-4

\* Also available galvanized and/or with finished, or chromium-plated brass top and strainer.  
Note: If long spigot outlet is required add 7-inch long I.P.S. cast iron nipple T.O.E. to F-3932.



**F-3942**  
Short Spigot Outlet

**F-3942**  
Cast Iron Bell Trap with Loose Strainer

Size of top..... Inches	6x6	9x9	13x13
Size of outlet... Inches	2	3	4
Height overall.. Inches	4¼	5	6
Weight..... Pounds	4	9	18



**F-3942**  
Sectional View



**F-3946**  
Short Spigot Outlet

**F-3946**  
Cast Iron Trap Inlet Drain with Loose Strainer

Size of top..... Inches	6x6	9x9	13x13
Size of outlet... Inches	2	3	4
Height overall.. Inches	4¼	5	6
Weight..... Pounds	3	8	13



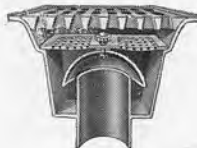
**F-3946**  
Sectional View

Traps used in connection with these drains are placed below the frost line.

**Cast Iron Cesspools with Loose Grating and Secondary Strainer with Bell Trap**



**F-3954**  
Short Spigot Outlet



**F-3954**  
Sectional View



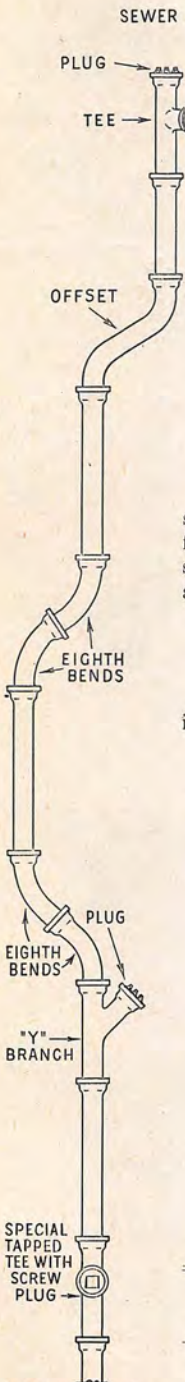
**F-3958**  
For Inside Calking

**Dimensions and Weights**

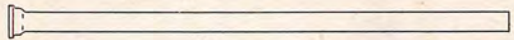
Figure..... Number	F-3954			F-3958	
Size of top..... Inches	12x12	16x16	16x16	12x12	16x16
Size of outlet... Inches	3	4	6	4	4
Length of outlet.. Inches	2	2	2	3½	3½
Height overall... Inches	10	10	10	12	11½
Weight..... Pounds	42	57	66	44	59



## RAIN WATER PIPE AND FITTINGS FOR DOWNSPOUTS INSIDE AND OUTSIDE OF BUILDINGS FOR BRIDGE AND ROADWAY DRAINAGE

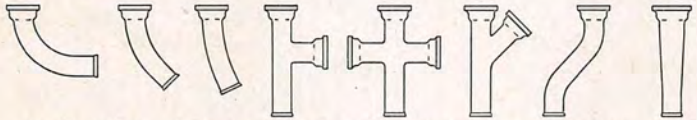


A typical example of downspout piping.



### Centrifugally Cast—Cast Iron Pipe

Clow Super-deLavaud *cast iron* pipe is highly adaptable and economical for use as downspout piping for drainage from bridges, viaducts and roadways; and for downspouts, waste and vent lines inside and outside of buildings. The pipe is made in 18-foot lengths and can be readily cut and fitted on the job. Two-inch pipe and fittings are shown on pages 32 through 34; I.P.S. pipe, in sizes 3 through 10 inches, on pages 30 and 31; and regular watermain appears on pages 17 through 28—for all types of joints.



### A. W. W. A. or Short Body Standard Bell and Spigot Fittings

Experience has shown that the majority of downspout piping jobs can be installed with stock patterns of fittings. Make the selection for your job from the fittings shown on pages 38 through 51—for bell and spigot joint; or use ordinary soil fittings or screwed drainage fittings with our I.P.S. pipe. See pages 30 and 31 for Clow I.P.S. pipe.

### F-4140 Cast Iron Roof Strainer

With female thread for use with 4-inch I.P.S. cast iron pipe in steel pipe sizes or with spigot end for 4-inch soil pipe bell.

Advise how wanted.  
Approximate weight, 12 pounds.



F-4140  
Roof Strainer

### CAST IRON RAIN WATER LEADERS



F-4165  
and  
F-4170



F-4180



F-4190  
Size No. 5

### Dimensions and Weights

Figure Number	Size Outside Spigot Inches	Size Inside Bell Inches	Laid Length Inches	Offset Inches	Approx. Weight Pounds
F-4165	4 <sup>7</sup> / <sub>8</sub>	4 x 5	60	...	80
F-4170	4 <sup>7</sup> / <sub>8</sub>	3 1/2 x 5	38	...	42
F-4180	4 <sup>7</sup> / <sub>8</sub>	4 x 5	25	2 1/2	38
F-4190-5	4 <sup>7</sup> / <sub>8</sub>	4 x 5	11 1/2	...	15



**MISCELLANEOUS**  
**PRODUCTS-TOOLS**

**ORDER THESE PRODUCTS BY FIGURE NUMBERS**

CAST IRON BLOW-OFF TANKS  
CATCH BASINS—MUD BASINS—GARAGE BASINS  
Pages 182 and 183

TAPPING MACHINES AND TOOLS  
Pages 184 thru 187

WATER SERVICE MATERIALS  
Pages 188 thru 200

ROADWAY BOXES  
Page 201

HYDRANTS AND STREET WASHERS  
Pages 202 and 203

WATER METERS  
Page 204

TEST PUMPS AND SUCTION PUMPS  
Page 205

CALKING MATERIALS  
Page 206

PIPE FITTING TOOLS  
Pages 207 thru 216

ROADWAY TORCHES AND STEEL HORSES  
Page 217

PAYNE DEAN VALVE OPERATORS  
Pages 218 and 219

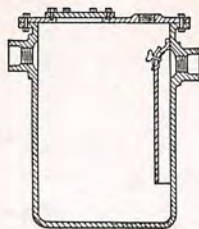
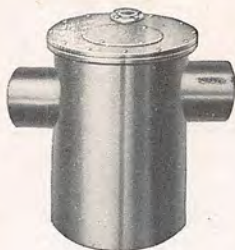
DRINKING FOUNTAINS  
Pages 220 and 221

GASTeam RADIATORS  
Pages 222 and 223

*Specify Pipe Economy Figure Numbers on Orders*



## CAST IRON BLOW-OFF TANKS



**F-4210**

**Blow-off Tank with Bolted Cover,  
Vent, and Handhole or Manhole**

The cover is bolted to the top flange on the tank and the handhole or manhole is fastened to the cover with cap screws. The flange joint is packed with braided asbestos rope to insure a perfect water, gas or steam-tight seal at reasonable pressures. However, the tank is not guaranteed for steam pressure or for any shocks that may occur while it is under pressure. The 16 and 18-inch diameter tanks are regularly fitted with a *handhole*; larger sizes have a *manhole*. All sizes have a 4-inch tapped vent. The center line of inlet is regularly placed 12 inches from top of manhole screws. The center line of outlet, opposite the inlet, is 13½ inches from top of manhole screws.

### Sizes and Weights

Diameter . . . . . Inches	16	16	16	18	18	18	18
Depth . . . . . Inches	18	24	30	18	24	30	36
Weight, each . . . Pounds	225	260	305	250	235	335	385
Diameter . . . . . Inches	20	20	20	20	20	20	24
Depth . . . . . Inches	18	24	30	36	42*	48*	30
Weight, each . . . Pounds	300	350	400	450	535	585	545
Diameter . . . . . Inches	24	24	24	24	24	30	30
Depth . . . . . Inches	36	42	48	54*	60*	30	36
Weight, each . . . Pounds	605	675	740	825	890	850	955
Diameter . . . . . Inches	30	30	30	30	30	30	36
Depth . . . . . Inches	42	48	54	60	66*	72*	36
Weight, each . . . Pounds	1060	1170	1280	1400	1485	1590	1200
Diameter . . . . . Inches	36	36	36	36	36	36	42
Depth . . . . . Inches	42	48	54	60	66*	72*	42
Weight, each . . . Pounds	1320	1450	1580	1715	1820	1940	1680
Diameter . . . . . Inches	42	42	42	42	42	48	48
Depth . . . . . Inches	48	54	60	66*	72*	48	54
Weight, each . . . Pounds	1825	1975	2130	2275	2410	2245	2420
Diameter . . . . . Inches	48	48	48	54, 60, 72 and 84" diameter tanks can also be furnished in any depth. Information on request.			
Depth . . . . . Inches	60	66*	72*				
Weight, each . . . Pounds	2605	2770	2930				

\* The body of these sizes of tanks is made up of two or more sections with bolted flanged joints.

### Note

Blow-off tanks are regularly furnished with vent, inlet, and trapped outlet (with cleanout) connections, located as shown in the line illustration above. Tanks with additional openings or with openings located other than regular, can also be furnished—send detailed sketch.

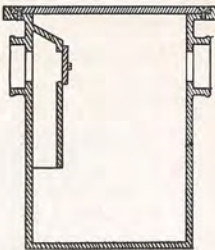
### Specify Type and Size of Connections Wanted

Inlet and outlet openings are available as follows: with plain hub (no threads) in sizes 2 thru 10 inches; with combination hub and female thread in sizes 2 thru 6 inches; or with tapped tank flanges (bolted on) in sizes ¼ thru 6 inches. Vent opening can be tapped in sizes ¼ thru 6 inches; or furnished with a plain hub for calked joint in sizes 4 thru 6 inches.

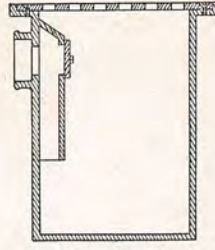




CAST IRON BASINS



F-4215 Catch Basin with Solid Cover



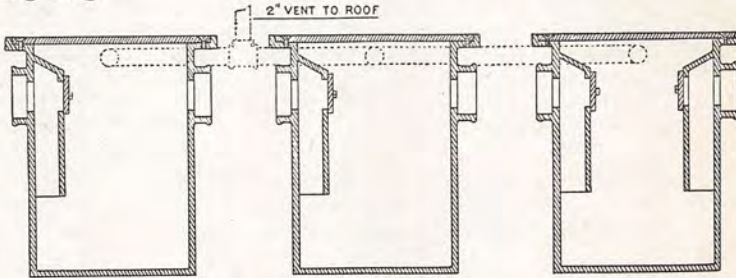
F-4218 Mud Basin with Grating Cover

The cover is fastened down with cap screws. A cleanout is provided on the trap for rodding. Catch (or Grease) Basins have solid cover and 4-inch inlet and outlet soil pipe hub connections. Mud Basins have grating cover and 6-inch outlet soil pipe hub connection. When F-4215 basins are to be used as Gravel Basins—so specify, for, in that case, basins will be furnished without trap. The center line from top of basin to center of 4-inch connections is 11 inches, and for 6-inch connections it is 8 inches.

F-4215 and F-4218 Size and Weight

Size 18-inch Diameter x 24-inch Depth . . . Approximate Weight, each 235 pounds.

Note: F-4215 can be furnished with 6-inch connections and F-4218 with 4-inch connection, when so specified. F-4218 basins can also be furnished in same range of sizes as the F-4210 Blow-off Tanks shown on preceding page. However, F-4218 basins 20-inch and larger in diameter are furnished with a 2½-inch high hat flange (increasing C/L measurement by 2½ inches) and 20-inch O.D. grating.



F-4220

Triple Garage Basin Set with Solid Bolted Covers

Garage basin sets are designed for installation in garages for the separation of gasoline, oil and other volatile liquids from drainage water in order to eliminate the danger of explosions. These liquids, being lighter than water, float on top, evaporate and the gases pass off through the vent. Each set consists of three basins, having a total of four deep water seals (two in the outlet basin) with cleanouts, 6-inch inlet and outlet soil pipe connections on center line 8 inches from top of basin. Each basin has two hub vent connections for calking 2-inch pipe on center line 5 inches from top of basin which are located directly opposite each other and at right angles to the inlet and outlet hubs. Garage basin covers are solid and are fastened down with cap screws.

Note: Garage basins can also be furnished with 4-inch inlet and outlet connections with center line 11 inches from top of basin.

F-4220 Sizes and Weights

Basins 18-inch Diameter x 24-inch Depth Weight, per set of three 790 pounds.

Basins 18-inch Diameter x 36-inch Depth Weight, per set of three 1155 pounds.

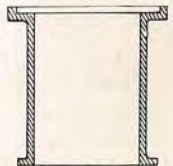
F-4230

Extension Top for Use with 18-inch Diameter Basins

The regular cover or grate of basin will fit the top of extension.

LENGTHS AND WEIGHTS

Length . . . . . Inches	6	12	18	24	30	36	42	48
Approx. weight, each. Lbs	85	115	155	195	240	290	350	390



F-4230

Information Required with Order

Figure number and size of basin, purpose for which used, size of inlet and outlet connections.





MUELLER TAPPING MACHINES

For Tapping Water Mains and Inserting Corporation Stops Under Pressure\*

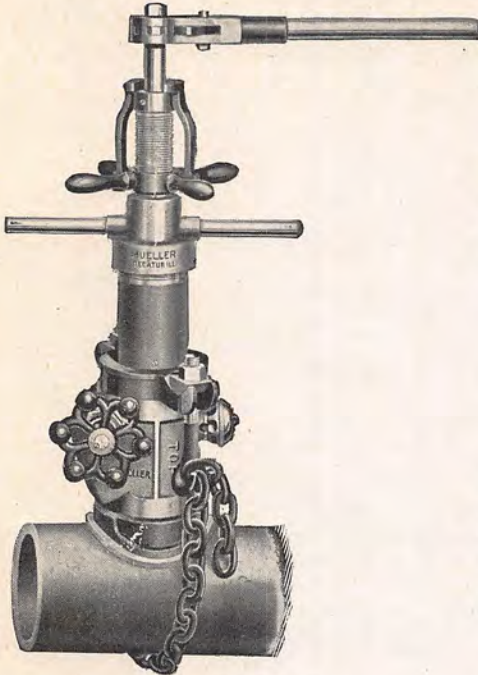


Illustration of the "B" Tapping Machine

F-4305 "B" Tapping Machine For Tapping Mains and Inserting Stops in Sizes 1/2 to 1-inch Inclusive

Standard Equipment

Ratchet handle; large saddle gasket for all sizes of cast iron pipe; small gasket for top of saddle; round link chain with eyebolt and chain hook for pipe up to 12-inch†; chain wrench; body cleaning chisel; stuffing nut spanner wrench; lubricating oil; and cutting grease.

Approximate weight, 100 pounds.

F-4308 "A-2" Tapping Machine For Tapping Mains and Inserting Stops in Sizes 1 to 2-inch Inclusive

Standard Equipment

Ratchet handle with extension; large saddle gasket for all sizes of cast iron pipe; small gasket for top of saddle; flat link chain with eyebolt and chain hook for 6 to 16-inch pipe†; chain wrench; body cleaning chisel; stuffing nut spanner wrench; wrench for 1 1/4, 1 1/2 and 2-inch corporation stops (for tightening stop in main after insertion by machine); lubricating oil; and cutting grease.

Approximate weight, 185 pounds.

† Extension chains to increase pipe size capacity to either 24, 36 or 48-inches are available.

Note

Above machines are furnished less saddles and tools. Make your selection of saddles and tools from those listed below and on the following page.

\* These machines can also be used for tapping dry mains

Maximum Size Tap in ASA Class 22 Cast Iron Pipe

Table with 2 rows and 8 columns: Pipe Size, Tap Size, and corresponding inch measurements.

F-4311 Iron Saddles for Cast Iron Pipe

Table with 2 rows and 8 columns: Pipe Size, Number, and corresponding inch measurements.

Note: Saddles for 14-inch and larger sizes of pipe are also available.



F-4311



F-4313

F-4313 Chain Spreader

For use when tapping pipe 3-inch or smaller to spread the chain so that it will clear the lower edge of the body of the machine.

F-4315 Combined Drill and Tap Mueller or Iron Pipe Thread For use with "A-2" and "B" machines

Table with 2 rows and 8 columns: Size, Mueller thread Size No., and Iron Pipe thread Size No.

Note: F-4315 Combined Drill and Tap is also available with short drill length for use when tapping 3-inch or smaller pipe.



F-4315

Important Note: When ordering give figure number followed by size number.





## MALE OR FEMALE THREAD SCREW PLUGS

For use with "A-2" and "B" Machines

For inserting corporation stops having outlet threads as indicated in table.



**F-4318**  
Screw Plug  
with Male Thread



**F-4320**  
Screw Plug  
with Female Thread



**F-4322 E-Z Release**  
Screw Plug  
with Female Thread

### Size Numbers

For stop size.....Inches	1/2	5/8	3/4	1	1 1/4	1 1/2	2
F-4318 Mueller Thread...Size No.	60691	60692	40155	40156	58482	58483	58484
F-4318 Iron Pipe Thread...Size No.	67259	.....	65178	65179	61212	61213	61214
F-4320 Mueller Thread...Size No.	58498	58499	58500	58501	.....	.....	.....
F-4320 Iron Pipe Thread...Size No.	58490	.....	58491	58492	58493	58494	58495
F-4322 For Wiped Joint— Mueller Thread...Size No.	83359	83376	80583	83036	.....	.....	.....
Iron Pipe Thread...Size No.	.....	.....	80519	80520	80014	83065	83066
F-4322 For Copper Service Tube— Mueller Thread...Size No.	88635	.....	88637	88638	88639	88640	88641
Iron Pipe Thread...Size No.	.....	.....	88643	88644	88646	88647	88648



**F-4324**

### F-4324

Corporation Stop Wrench

For operating 3/4 and 1-inch corporation stops.

## MUELLER DRILLING MACHINES

For Drilling Water Mains Under Pressure Through Stop Inserted in Tapped Pipe Saddle\*

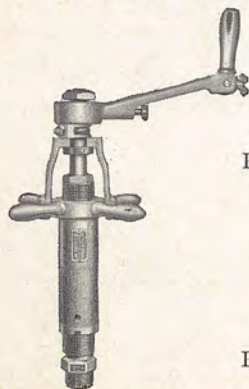


Illustration of the  
"E-4" Machine

### F-4326

"E-4" Drilling Machine

For drilling holes from 1/4 to 1-inch inclusive in mains

#### Standard Equipment

Ratchet handle; combined feed nut and yoke; body gasket; adjustable wrench; two end wrenches; lubricating oil; and cutting grease.  
Approximate weight, 35 pounds.

### F-4328

"D-4" Drilling Machine

For drilling holes from 5/8 to 2 inches inclusive in mains

#### Standard Equipment

Ratchet handle with extension; combined feed nut and yoke; body gasket; adjustable wrench; lubricating oil; and cutting grease.  
Approximate weight, 55 pounds.

### Note

Above machines are furnished less drill holders, drills and adapter nipples. Make your selection from items listed on the following pages.

\* Stop is not required when drilling a dry main (no pressure).

**Important Note: When ordering give figure number followed by size number.**



## TOOLS FOR MUELLER DRILLING MACHINES



**F-4330** Combined Drill and Holder



**F-4332** Drill Holder



**F-4334** Drill

Note: For use on most corporation stops the above tools should be ordered one size smaller than stop size i.e. for 3/4-inch stop use 11/16-inch drill, etc.

### Tools for "E-4" Drilling Machine—Size Numbers

Hole size..... Inches	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
<b>F-4330</b> ..... Size No.	61879	61788	62011		37030					
<b>F-4332</b> ..... Size No.				61981	61981	61789	61789	61993	61993	61969
<b>F-4334</b> ..... Size No.				61982	61992	61790	61991	61990	61989	61968

### Tools for "D-4" Drilling Machine—Size Numbers

Hole size..... Inches	5/8	3/4	7/8	1	1 1/8	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4
<b>F-4332</b> ..... Size No.	36998	36998	36915	37032	37032	33555	33555	33555	33555	33555
<b>F-4334</b> ..... Size No.	61982	61992	61790	61990	61989	33529	33530	33531	33532	

Hole size..... Inches	1 1/4	1 5/8	1 3/4	1 7/8	1 1/2	1 5/8	1 3/4	1 7/8	2
<b>F-4332</b> ..... Size No.	33316	33316	33316	33316	33316	33314	33314	33314	33314
<b>F-4334</b> ..... Size No.	33533	33534	33535	33536	33537	33538	33539	33540	33541



**F-4336**

### F-4336 Machine Adapter Nipples

These machine adapter nipples are used between the lower end of the drilling machine and the outlet end of the corporation stop.

### For "E-4" Drilling Machine—Size Numbers

Type of Machine Adapter Nipple	Maximum Pressure and Temperature Rating	Size of the Outlet Pipe Connection of the Corporation Stop to be Used—Inches				
		1/2	5/8	3/4	1	1 1/4
With Inside Thread for Lead Flange Coupling for Extra Strong Lead Pipe	200 psi at 100° F.	75498	75499	75937	75938	.....
With Inside Thread for Lead Flange Coupling for Double Ex. St. Lead Pipe	200 psi at 100° F.	.....	.....	78637	45122	.....
With Inside Mueller Thread for Wiped Joint	200 psi at 100° F.	75493	75494	75495	75496	.....
With Inside Iron Pipe Thread for Wiped Joint	1200 psi at 100° F. 1000 psi at 500° F.	36966	.....	36919	36917	36928
With Inside Mueller Thread for Copper Service Tube	200 psi at 100° F.	63796	.....	52019	36750	45385
With Inside Iron Pipe Thread for Copper Service Tube	200 psi at 100° F.	.....	.....	43900	43870	.....
With Outside Iron Pipe Thread	1200 psi at 100° F. 1000 psi at 500° F.	36967	.....	36920	36918	36733

### For "D-4" Drilling Machine—Size Numbers

Type of Machine Adapter Nipple	Maximum Pressure and Temperature Rating	Size of the Outlet Pipe Connection of the Corporation Stop to be Used—Inches					
		3/4	1	1 1/4	1 1/2	2	2 1/2
With Inside Thread for Lead Flange Coupling for Extra Strong Lead Pipe	200 psi at 100° F.	63663	33895	73106	75431	75432	.....
With Inside Thread for Lead Flange Coupling for Double Ex. St. Lead Pipe	200 psi at 100° F.	.....	74155	74156	63662	62174	.....
With Inside Mueller Thread for Wiped Joint	200 psi at 100° F.	61165	77375	.....	.....	.....	.....
With Inside Iron Pipe Thread for Wiped Joint	1200 psi at 100° F. 1000 psi at 500° F.	36910	36911	36912	36913	36525	36526
With Inside Mueller Thread for Copper Service Tube	200 psi at 100° F.	37902	37903	37904	37905	37906	.....
With Inside Iron Pipe Thread for Copper Service Tube	1200 psi at 100° F. 1000 psi at 500° F.	45380	.....	46702	.....	.....	.....
With Outside Iron Pipe Thread	1200 psi at 100° F. 1000 psi at 500° F.	33556	36323	36195	36196	36188	36975

**Important Note:** When ordering give figure number followed by size number.





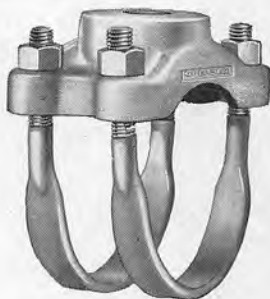
## SERVICE CLAMPS FOR CAST IRON PIPE



**F-4338 Single Strap Service Clamp**



Optional  
Lead Ring  
Gasket



**F-4339 Double Strap Service Clamp**

Bodies are of galvanized malleable iron, straps and nuts of cadmium-plated steel, with Neoprene gasket cemented in place on underside of body. A lead ring gasket may be had in place of the Neoprene gasket if specified.

### F-4338 Single Strap Service Clamps

Size Number	Pipe Size Inches	Size of Tapping Inches
With Mueller Corporation Stop Thread		
10475	2	1/2, 5/8, 3/4, 1
10478	3	1/2, 5/8, 3/4, 1, 1 1/4
10480	4	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10484	6	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10488	8	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10490	10	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10493	12	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
With Iron Pipe Thread		
10453	2	1/2, 3/4, 1, 1 1/4
10455	3	1/2, 3/4, 1, 1 1/4
10457	4	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10461	6	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10466	8	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10468	10	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10471	12	1/2, 3/4, 1, 1 1/4, 1 1/2, 2

### F-4339 Double Strap Service Clamps

Size Number	Pipe Size Inches	Size of Tapping Inches
With Mueller Corporation Stop Thread		
10517	2	1/2, 5/8, 3/4, 1, 1 1/4
10520	3	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10522	4	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10526	6	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10530	8	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10533	10	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
10536	12	1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, 2
With Iron Pipe Thread		
10496	2	1/2, 3/4, 1, 1 1/4, 1 1/2
10499	3	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10501	4	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10505	6	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10509	8	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10512	10	1/2, 3/4, 1, 1 1/4, 1 1/2, 2
10515	12	1/2, 3/4, 1, 1 1/4, 1 1/2, 2



Assembly of Drilling Machine  
and Sundries  
To Service Clamp on Main

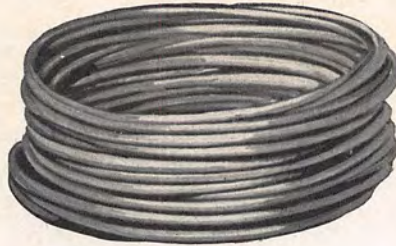
When ordering give figure number followed by size number and size of tapping.



**COPPER WATER TUBE**

**For Underground**

Cold Water Service Lines from Water Main to Water Meter



**For Interior**

Hot and Cold Water Piping from Water Meter to All Fixtures

**F-4340**

Soft Temper Copper Water Tube  
Types "K" and "L"

Sizes 1/2 thru 1-inch in 60 or 100-foot Coils  
Sizes 1 1/4 and 1 1/2-inch in 60-foot Coils

**Type "K"**

Size 2-inch in 45-foot Coils



**F-4345**

Hard or Soft Temper Copper Water Tube

**Types "K" and "L"**

All sizes in 20-foot Straight Lengths

**When Ordering**

Specify whether Hard or Soft temper is wanted.

Hard Temper is for use with Solder Joint Fittings Only

Soft Temper is for use with Either Copper Flanged or Solder Joint Fittings

**Type "K"**

Hard or Soft Temper for Underground Services and General Piping Purposes

Nominal size.....Inches	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Actual outside diameter.....Inches	.625	.750	.875	1.125	1.375	1.625	2.125
Wall thickness.....Inches	.049	.049	.065	.065	.065	.072	.083
Approximate weight, per foot.....Pounds	.344	.418	.641	.839	1.04	1.36	2.06

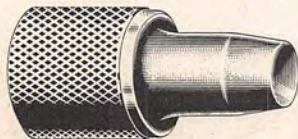
**Type "L"**

Hard or Soft Temper for General Piping Purposes

The Type "L" tube is heavy enough for use with copper flanged fittings but is not recommended for underground service. Use the Type "K" tube for underground lines.

Nominal size.....Inches	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Actual outside diameter.....Inches	.625	.750	.875	1.125	1.375	1.625	2.125
Wall thickness.....Inches	.040	.042	.045	.050	.055	.060	.070
Approximate weight, per foot.....Pounds	.285	.362	.455	.655	.884	1.14	1.75

Copper water tube is available in sizes smaller than 1/2-inch and larger than 2-inch. Information will be furnished promptly upon request.



**F-4350**

**F-4350**

Flanging Tool for Copper Water Tube

An individual flanging tool is required for each size of tube. Oil or grease surface of tool before using.

**Order by Tube Size**

1/2, 3/4, 1, 1 1/4, 1 1/2, or 2 inches.

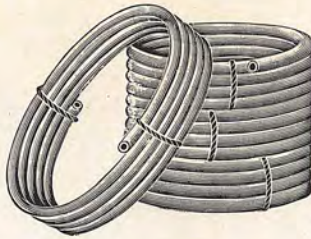
For fittings, corporation stops, etc., for use with Copper Water Tube, see following pages.





## LEAD SERVICE PIPE

For  
Wiped  
Joint



For  
Flanged  
Joint

F-4360 Lead pipe

Listed weights are those adopted by the manufacturers of lead goods. However, lead pipe will actually run heavier—about 10% over listed weights. Listed weights are for estimating purposes only. Orders will be invoiced at *actual* scale weights, at current market price, and including manufacturer's charge for wrapping or boxing

Diameter—Inches			Weight Per Foot		Diameter—Inches			Weight Per Foot	
Inside	Outside	Kind	Lbs.	Ozs.	Inside	Outside	Kind	Lbs.	Ozs.
1/2	.756	Medium	1	4	1	1.492	X Strong	4	12
1/2	.798	Strong	1	8	1	1.596	XX Strong	6	..
1/2	.876	X Strong	2	..	1 1/4	1.592	Medium	3	12
1/2	1.012	XX Strong	3	..	1 1/4	1.670	Strong	4	12
5/8	.953	Medium	2	..	1 1/4	1.765	X Strong	6	..
5/8	1.019	Strong	2	8	1 1/4	1.889	XX Strong	7	12
5/8	1.082	X Strong	3	..	1 1/2	1.882	Medium	5	..
5/8	1.137	XX Strong	3	8	1 1/2	1.984	Strong	6	8
3/4	1.068	Medium	2	4	1 1/2	2.076	X Strong	8	..
3/4	1.156	Strong	3	..	1 1/2	2.272	XX Strong	11	4
3/4	1.212	X Strong	3	8	2	2.410	Medium	7	..
3/4	1.336	XX Strong	4	12	2	2.503	Strong	8	12
1	1.356	Medium	3	4	2	2.751	X Strong	13	12
1	1.428	Strong	4	..	2	3.008	XX Strong	19	8

Coils of Lead pipe weigh about 200 pounds

**Safe Cold Water Pressures in Pounds per Square Inch for Lead Pipe**  
Strong, 50 lbs.; X Strong, 75 lbs.; XX Strong, 100 lbs.

### BRASS SOLDERING NIPPLES



F-4370 Male

F-4370 and F-4374  
With Iron Pipe Connection  
Nipple Sizes—Inches  
1/2, 3/4, 1, 1 1/4, 1 1/2, 2



F-4374 Female

### COUPLINGS FOR LEAD FLANGED JOINT



F-4378

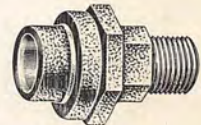
Lead to Lead Pipe

F-4378 and F-4382 sizes: 1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, and 2 inches.



F-4382

Lead to Female Iron Pipe



F-4384

Lead to Male Iron Pipe

Size: 1/2, 5/8, 3/4, and 1-inch

Couplings are regularly furnished for Extra Strong lead pipe. Also available for use with other weights. When ordering F-4382 or F-4384 couplings state first the size of the iron pipe thread, then the size and weight of lead pipe.

### F-4385 Flanging Tool for Lead Pipe

Order by Pipe Size

1/2, 5/8, 3/4, 1, 1 1/4, 1 1/2, or 2 inches.

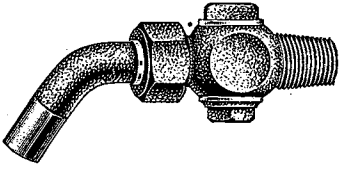
The F-4385 lead flanging tool is always furnished for Extra Strong lead pipe unless otherwise specified.



F-4385



**CORPORATION STOPS**

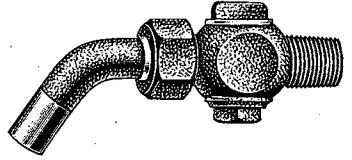


**F-4400**  
Mueller Thread Inlet

For Wiped Lead  
Joint

**F-4400 and F-4402**

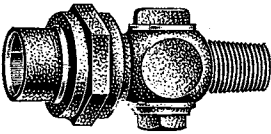
Stop Sizes—Inches  
 $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2



**F-4402**  
Iron Pipe Thread Inlet\*

Furnished complete with  $\frac{1}{8}$  bend tailpiece (as illustrated) or with straight or  $\frac{1}{4}$  bend tailpiece. Also available without coupling and tailpiece.

The male thread on the outlet end of these stops in sizes  $\frac{1}{2}$  thru 1-inch is a Mueller Thread; in sizes  $1\frac{1}{4}$  thru 2-inch it is Iron Pipe Thread—next size larger than stop size. The outlet end is tapped to make use of F-4318 Male Screw Plug for inserting stops in water main under pressure.

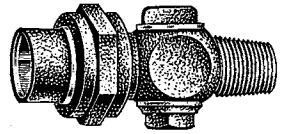


**F-4404**  
Mueller Thread Inlet

For Lead Flanged Joint

**F-4404 and F-4406**

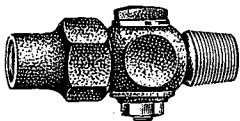
Stop Sizes—Inches  
 $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2



**F-4406**  
Iron Pipe Thread Inlet\*

The outlet end of these stops has a union coupling connection for Extra Strong lead pipe—same size as stop size. The outlet end of stop body is also tapped to make use of F-4318 Male Screw Plug for inserting the stops in a water main under pressure.

Note: Can also be furnished for other weights of lead pipe.

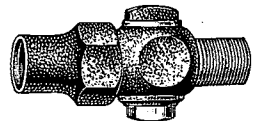


**F-4408**  
Mueller Thread Inlet

For Copper Flanged Joint

**F-4408 and F-4410**

Stop Sizes—Inches  
 $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2



**F-4410**  
Iron Pipe Thread Inlet\*

Also available with either  $\frac{1}{8}$  or  $\frac{1}{4}$  bend coupling.

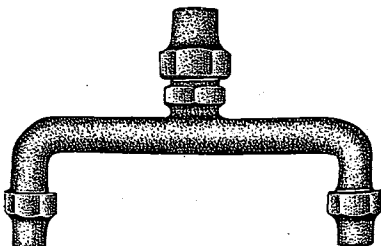
The outlet end of these stops has a union coupling connection for Copper Water Tube—same size as stop size except for the  $\frac{5}{8}$ -inch size which takes  $\frac{3}{4}$ -inch tube. The F-4320 Female Screw Plug is required for inserting these stops in a water main under pressure.

\* Inlet end is for iron pipe same size as stop size except  $\frac{5}{8}$ -inch which is for  $\frac{3}{4}$ -inch iron pipe.

**CAST BRASS "U" BRANCH SERVICE CONNECTION**

For Copper Flanged Joints

**F-4413 "U" Branch**



**F-4413 "U" Branch**

Size Number	Size of Inlet Inches	Size of Outlets Inches	Cent. to Cent Inches
1	$\frac{3}{4}$	$\frac{3}{4}$	10
2	1	$\frac{3}{4}$	10
3	1	1	$13\frac{1}{2}$

Note: In housing development areas where a large number of water service connections are required, installation costs can be greatly reduced with the use of these "U" branch connections. Only one trench, one tap in the main, one corporation stop, and one gooseneck are required between main and two service box locations to provide service for every two water users.





**GOOSENECKS—WATER CONNECTIONS**

Extra Strong  
Lead Pipe in Sizes  
1-inch and Smaller



Double Extra Strong  
Lead Pipe in Sizes  
1¼-inch and Larger

**F-4420 Lead Pipe Gooseneck  
with Wiped Joints\***



**F-4424 Lead Pipe Gooseneck  
with Lead Flanged Joints\***



**F-4428 Copper Tube Gooseneck  
with Copper Flanged Joints\***

**Sizes and Lengths**

Size of stop..... Inches	½	⅝	¾	1	1¼	1½	2
Length of pipe or tube... Inches	18	18	18	18	24	30	36

\* Outlet end is for iron pipe same size as stop size except ⅝-inch which is for ¾-inch iron pipe.

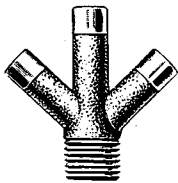
**Note**

Unless otherwise specified, goosenecks will be fitted with a corporation stop having Mueller Thread on the inlet end. For other styles of corporation stops, see preceding page.

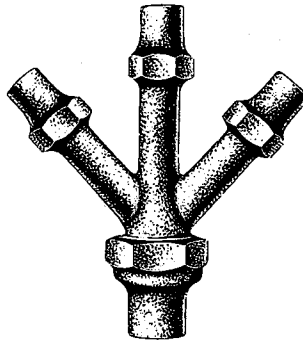
**Longer Lengths Available**

Goosenecks are shown only in the lengths considered to be standard, however, we can furnish them in special lengths to meet your requirements.

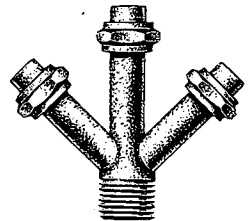
**CAST BRASS WATER CONNECTIONS**



**F-4430**  
For Wiped Lead Joints  
Outlet for Iron Pipe



**F-4433**  
For Copper Flanged  
Joints†



**F-4435**  
For Lead Flanged Joints  
Outlet for Iron Pipe‡

**Order by Size Number**

Figure.....	Number	F-4430			F-4433			F-4435		
Size.....	Number	80	83	85	45	50	50-A	16	22	23
Number of inlets.....		3	4	4	3	4	4	3	4	4
Size of inlets.....	Inches	¾	¾	1	¾	¾	1	¾	¾	1
Size of outlet.....	Inches	1½	2	2	1½	2	2	1½	2	2

† F-4433 can also be furnished with outlet for iron pipe.

‡ For couplings for lead flanged joints—see page 189.

Note: Where a large water service is required, 1-inch inlets are the most efficient.

**F-4430 and F-4435 can also be furnished with 2½ or 3-inch outlet connection.**



**FLAT WAY GROUND KEY STOPS  
FOR IRON PIPE**

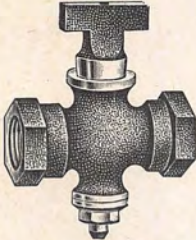
**Nut and Washer Bottom**

**F-4440 and F-4442**

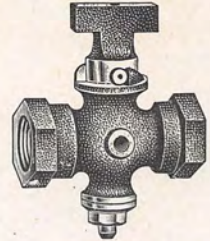
Solid  
Tee Handle

Stop Sizes—Inches

1/2	5/8	3/4	1	1 1/4	1 1/2	2
-----	-----	-----	---	-------	-------	---



**F-4440**  
Stop Only



**F-4442**  
Stop and Drain

**F-4452 and F-4454**

Combined Cap  
and  
Tee Handle

Stop Sizes—Inches

1/2	5/8	3/4	1	1 1/4
-----	-----	-----	---	-------

The cap fits snugly around the top of the stop, preventing sand and grit from getting in between key and body of stop.



**F-4452**  
Stop Only



**F-4454**  
Stop and Drain

**Lever Handle Stops**

F-4452 and F-4454 Tee Handle stops, as illustrated, are regular and will always be furnished unless otherwise ordered. When so ordered, stops with Lever Handles can also be furnished.

**HYDRANT STOPS WITH DRAIN**

Solid Tee Handle



Iron Pipe  
Inlet

Iron Pipe  
Outlet

**F-4458**  
Hydrant Stop and Drain

Stop Sizes—Inches

1/2	5/8	3/4	1	1 1/4
-----	-----	-----	---	-------

**Note**

Iron pipe connections are for pipe same size as body except 5/8-inch which is for 3/4-inch pipe.

For Service Boxes, see page 199.

For Complete Hydrants, see pages 202 and 203.





**ROUND WAY GROUND KEY STOPS**

**FOR IRON PIPE**

**F-4466 and F-4468**

Solid Tee Handle  
Nut and Washer Bottom

Stop Sizes—Inches

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
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**F-4466**  
Stop Only



**F-4468**  
Stop and Drain

**F-4478 and F-4480**  
**MINNEAPOLIS PATTERN**

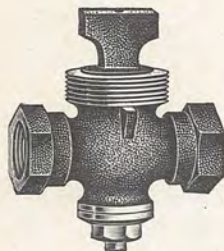
Solid Tee Handle  
Nut and Washer Bottom

Stop Sizes—Inches

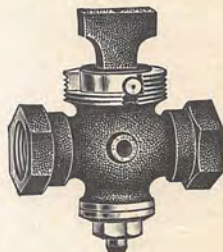
$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
---------------	---------------	---------------	---	----------------	----------------	---

Minneapolis Thread Sizes—Inches

$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
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**F-4478**  
Stop Only



**F-4480**  
Stop and Drain

**F-4490 and F-4492**

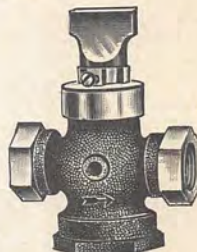
Inverted Key  
Combined Cap and Tee Handle

Stop Sizes—Inches

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
---------------	---------------	---------------	---	----------------	----------------	---



**F-4490**  
Stop Only



**F-4492**  
Stop and Drain

**F-4502 and F-4504**  
**MINNEAPOLIS PATTERN**

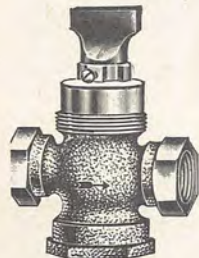
Inverted Key  
Combined Cap and Tee Handle

Stop Sizes—Inches

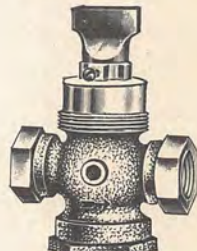
$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
---------------	---------------	---------------	---	----------------	----------------	---

Minneapolis Thread Sizes—Inches

$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
----------------	----------------	----------------	---	----------------	---	----------------



**F-4502**  
Stop Only



**F-4504**  
Stop and Drain

**Note**

Iron pipe connections are for pipe same size as body except  $\frac{5}{8}$ -inch which is for  $\frac{3}{4}$ -inch pipe.

**Inverted Key Stops**

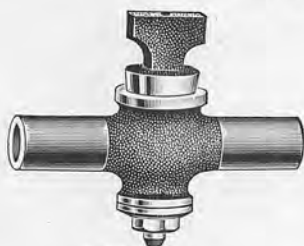
Inverted Key stops are most suitable for underground installations. The tapering of the key from the bottom up prevents wedging when pressing down with the rod to open or close the stop, and the key is held in position by the pressure of the water through a by-pass into a chamber beneath the key bottom. The cap fits snugly around the top of the stop, preventing sand and grit from getting in between the key and the body of the stop.

Stops must be installed in pipe line as indicated by the arrow cast on the body.

For Minneapolis Pattern Service Boxes, see page 198.



**ROUND WAY GROUND KEY STOPS**



**F-4505 Stop**  
Lead Pipe on Both Ends

**F-4505-D**  
Stop and Drain  
Lead Pipe on Both Ends

For Wiped Lead Joint  
**F-4505 and F-4505-D**

Solid Tee Handle  
Nut and Washer Bottom

Stop Sizes—Inches

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
---------------	---------------	---------------	---	----------------	----------------	---

**F-4506 and F-4506-D**  
**MINNEAPOLIS PATTERN**

Inverted Key  
Combined Cap and Tee Handle

Stop Sizes—Inches

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1
---------------	---------------	---------------	---

Minneapolis Thread Sizes—Inches

$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2
----------------	----------------	----------------	---

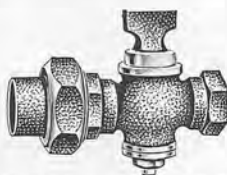


**F-4506 Stop**  
Lead Pipe on Both Ends

**F-4506-D**  
Stop and Drain  
Lead Pipe on Both Ends

**F-4514 Stop**  
Solid Tee Handle  
Nut and Washer Bottom

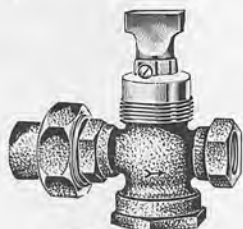
Stop Sizes—Inches  
 $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2



**F-4514 and F-4514-D**  
Lead Flange and Iron Pipe

**F-4514-D Stop and Drain**  
Solid Tee Handle  
Nut and Washer Bottom

Stop Sizes—Inches  
 $\frac{1}{2}$ ,  $\frac{5}{8}$ ,  $\frac{3}{4}$ , 1,  $1\frac{1}{4}$ ,  $1\frac{1}{2}$ , 2



**F-4526 Stop**  
Lead Flange and Iron Pipe

**F-4526-D**  
Stop and Drain  
Lead Flange and Iron Pipe

**F-4526 and F-4528**  
**MINNEAPOLIS PATTERN**

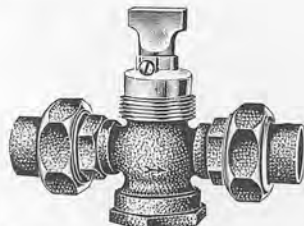
Inverted Key  
Combined Cap and Tee Handle

Stop Sizes—Inches

$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
---------------	---------------	---------------	---	----------------	----------------	---

Minneapolis Thread Sizes—Inches

$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
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**F-4528 Stop**  
Lead Flange on Both Ends

**F-4528-D**  
Stop and Drain  
Lead Flange on Both Ends

Read the note "Inverted Key Stops" at bottom of the preceding page.

**Note**

Iron pipe connections are for pipe same size as stop size except  $\frac{5}{8}$ -inch which is for  $\frac{3}{4}$ -inch pipe.

All above stops are regularly furnished for use with Extra Strong lead pipe but can be furnished for use with other weights when specified.

**Making Up Lead Flanged Joints**

Follow these simple rules for making up joints on Lead Service Pipe. With a little practice perfect joints can be made quickly. 1. Cut the pipe with a hack saw to the required length—cut it square across. 2. Remove burrs from both inside and outside of pipe ends. 3. Slip the coupling nut over the pipe end. 4. Oil and insert the flanging tool, of proper size (a separate one is required for each size pipe) so that end of pipe engages the flanging surface of the tool. 5. Strike the head of the flanging tool with a hammer, turning the tool slightly after each blow. Keep the coupling nut up close to the flanging tool to properly shape the outside of pipe end. 6. When making up joint, pull coupling nut up tight, then loosen it slightly and again make it tight.

For Lead Service Pipe, Flanging Tool, Couplings, etc., see page 189.

For Minneapolis Pattern Service Boxes, see page 198.





**ROUND WAY GROUND KEY STOPS**

**FOR COPPER WATER TUBE**



**F-4530 Stop**  
Copper Flange and Iron Pipe

Solid Tee Handle  
Nut and Washer  
Bottom



**F-4532 Stop**  
Copper Flange on Both Ends

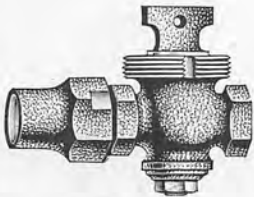
**F-4530-D**  
Stop and Drain  
Copper Flange and Iron Pipe

**F-4532-D**  
Stop and Drain  
Copper Flange on Both Ends

**F-4530 thru F-4532-D**

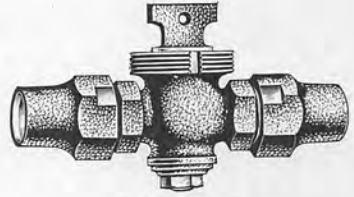
Stop size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2
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**MINNEAPOLIS PATTERN**



**F-4534 Stop**  
Copper Flange and Iron Pipe

Solid Tee Handle  
Nut and Washer  
Bottom



**F-4536 Stop**  
Copper Flange on Both Ends

**F-4534-D**  
Stop and Drain  
Copper Flange and Iron Pipe

**F-4536-D**  
Stop and Drain  
Copper Flange on Both Ends

**F-4534 thru F-4536-D**

Stop size . . . . . Inches	1/2	3/4	1
Minneapolis thread size . . . . . Inches	1 1/4	1 1/2	2

**Note**

All above stops are for use with Copper Water Tube having outside diameters as given in table under heading "For Underground Service"—see page 188.  
Iron pipe connections are for pipe same size as body.

**Making Up Copper Flanged Joints**

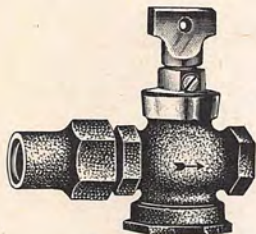
Follow these simple rules for making up joints on Copper Water Tube. With a little practice perfect joints can be made quickly. 1. Cut the tube with a tubing cutter to the required length. 2. Remove burrs from both inside and outside of tube ends. 3. Slip the coupling nut over the tube end. 4. Oil and insert the flanging tool, of proper size (a separate one is required for each size tube) so that end of tube engages the flanging surface of the tool. 5. Strike the head of the flanging tool with a hammer, turning the tool slightly after each blow. Keep the coupling nut up close to the flanging tool to properly shape the outside of tube end. 6. When making up joint, pull coupling nut up tight, loosen it slightly and again make it tight.

For Copper Water Tube and Flanging Tool, see page 188.  
For Minneapolis Pattern Service Boxes, see page 198.



**ROUND WAY GROUND KEY STOPS**

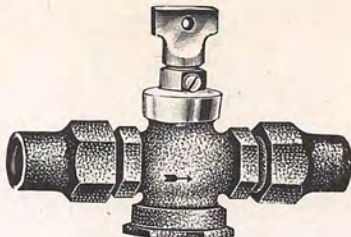
**FOR COPPER WATER TUBE**



**F-4538 Stop**  
Copper Flange and Iron Pipe

**F-4538-D**  
Stop and Drain  
Copper Flange and Iron Pipe

Inverted Key  
with  
Combined Cap  
and Tee Handle

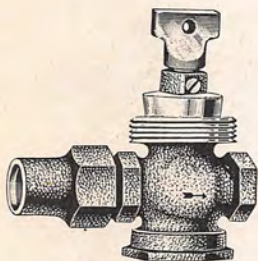


**F-4540 Stop**  
Copper Flange on Both Ends

**F-4540-D**  
Stop and Drain  
Copper Flange on Both Ends

**F-4538 Thru F-4540-D**

Stop size . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2
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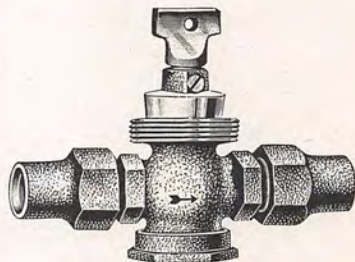


**F-4542 Stop**  
Copper Flange and Iron Pipe

**F-4542-D**  
Stop and Drain  
Copper Flange and Iron Pipe

**MINNEAPOLIS PATTERN**

Inverted Key  
with  
Combined Cap  
and Tee Handle



**F-4544 Stop**  
Copper Flange on Both Ends

**F-4544-D**  
Stop and Drain  
Copper Flange on Both Ends

**F-4542 thru F-4544-D**

Stop size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2
Minneapolis thread size . . . . . Inches	1 1/2	1 1/2	2	2 1/2	3	3 1/2

**Note**

All above stops are for use with Copper Water Tube having outside diameters as given in table under heading "For Underground Service" on page 188.

Iron pipe connections are for pipe same size as body.

**Inverted Key Stops**

Inverted Key stops are most suitable for underground installations. The tapering of the key from the bottom up prevents wedging when pressing down with the rod to open or close, and the key is held in position by the pressure of the water through a by-pass into a chamber under the key bottom. The cap fits snugly around the top of the stop, preventing sand and grit from getting in between key and body of stop.

Stops must be installed in pipe line as indicated by the arrow cast on the body.

For Minneapolis Pattern Service Boxes, see page 198.





**COPPER FLANGED WATER TUBE CONNECTIONS**

For  
Copper Water Tube  
See Page 188



For  
Copper Flanging Tool  
See Page 188

**F-4550 Coupling**  
Copper to Copper



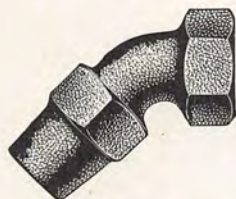
**F-4555 Coupling**  
Copper to Female Iron Pipe



**F-4560 Coupling**  
Copper to Male Iron Pipe

**F-4550, F-4555 and F-4560**

For water tube, size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2
Iron pipe thread, size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2



**F-4565 Eighth Bend**  
Copper to Female Iron Pipe

When replacing lead or iron pipe service with copper, these bends may be used to make the connection between the old corporation stop and the new copper water tube.

Specify style of thread wanted when ordering—see tables below.



**F-4570 Quarter Bend**  
Copper to Female Iron Pipe

**F-4565**

**Water Tube to I.P.S. Thread of Same Size**

**F-4570**

For water tube, size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2
Iron pipe thread, size . . . . . Inches	1/2	3/4	1	1 1/4	1 1/2	2

**F-4565-A**

**Water Tube to I.P.S. Thread One Size Larger**

**F-4570-A**

For water tube, size . . . . . Inches	1/2	5/8	3/4	1	1 1/4	1 1/2	2
Iron pipe thread, size . . . . . Inches	3/4	3/4	1	1 1/4	1 1/2	2	2 1/2

**F-4565-B**

**Water Tube to Mueller Corporation Stop Thread**

**F-4570-B**

For water tube, size . . . . . Inches	1/2	3/4	3/4	1	1 1/4	1 1/2	2
Mueller thread, size . . . . . Inches	1/2	5/8	3/4	1	1 1/4	1 1/2	2

Bends are for use only where very short radius turns are required, as copper water tube, because of its flexibility, can readily be bent into moderate bends and offsets.

**F-4575 Tee**  
Copper to Copper to Copper

Sizes—Inches  
1/2, 3/4, 1, 1 1/4, 1 1/2, 2



**F-4575 Tee**

The F-4575 Tee for copper tube is available in a number of reducing sizes—information furnished on request.



## "MINNEAPOLIS PATTERN" SERVICE BOXES FOR WATER

The lower section of the service box is of cast iron and has a groove on the inside into which a lug, swaged on the lower end of the upper section, engages to prevent separation of the two sections and to prevent the upper section from turning when access plug is being removed. The upper section is of standard steel pipe, fitted with a heavy cast iron top (marked WATER) into which a brass bushing is embedded and tapped to take the cast iron access plug. Boxes are dip coated with black asphaltum paint.

### Size Data

For Stop Size Inches	Size of Minneapolis Thread On Stop	Figure Number of Box	Size of Minn. Tapping In Base Inches	Bushed Down To Size Inches	Size of Pipe in Upper Section Inches
1/2, 5/8 or 3/4	1 1/2	F-4580	1 1/2	No Bushing	1 1/4
1/2, 5/8 or 3/4	1 1/2	F-4582	2	1 1/2	1 1/2
1	2	F-4580	2	No Bushing	1 1/4
1	2	F-4582	2	No Bushing	1 1/2
1 1/4	2 1/2	F-4584	2 1/2	No Bushing	2
1 1/2	3	F-4584	3 1/2	3	2
2	3 1/2	F-4584	3 1/2	No Bushing	2

### When Ordering

Specify figure number, size number, size of curb stop, and size of base tapping.

### F-4580, F-4582 and F-4584

Extension in Inches	F-4580* 1 1/4" Upper Section Size Number	F-4582* 1 1/2" Upper Section Size Number	F-4584* 2" Upper Section Size Number
18- 24	112	2	202
18- 30	112 1/2	2 1/2	202 1/2
24- 36	113	3	203
30- 42	113 1/2	3 1/2	203 1/2
36- 48	114	4	204
42- 54	114 1/2	4 1/2	204 1/2
48- 60	115	5	205
54- 66	115 1/2	5 1/2	205 1/2
60- 72	116	6	206
66- 78	116 1/2	6 1/2	206 1/2
72- 84	117	7	207
78- 90	117 1/2	7 1/2	207 1/2
84- 96	118	8	208
90-102	118 1/2	8 1/2	208 1/2
96-108	119	9	209
102-114	119 1/2	9 1/2	209 1/2
108-120	120	10	210

\* Regularly furnished painted. Also available galvanized on request.

### Tops and Access Plugs for "Minneapolis Pattern" Service Boxes



"Minneapolis Pattern" Service Box



**F-4586**  
Top Casting  
for 1 1/4, 1 1/2 or 2-inch  
upper section



**F-4587**  
Access Plug  
for F-4580, F-4582 or F-4584  
Service Box

For access plug wrench—see F-4677.





## SERVICE BOXES—GAS OR WATER

### F-4590

Slip Type Service Boxes—2½-inch Shaft

For Service Stops 1¼-inch and Smaller\*

Size No. 1 Extension 29 to 43 inches    Size No. 2 Extension 35 to 49 inches

### F-4600

Screw Type Service Boxes—2½-inch Shaft

For Service Stops 1¼-inch and Smaller\*



F-4590



F-4600 and F-4605

Extension Inches	F-4600	F-4607	F-4608	Extension Inches	F-4600	F-4607	F-4608
	Box Number	Top Sec.	Bottom Sec.		Box Number	Top Sec.	Bottom Sec.
Overall Length—In.							
12†	88	..	..	42- 60	94E	24	39
15-21	89A	12	12	48- 66	95E	24	45
18-24	90B	12	15	54- 72	100E	24	51
21-27	90C	15	15	54- 78	100F	30	51
24-33	91C	15	21	60- 84	101F	30	57
30-39	92C	15	27	48- 84	95G	42	45
30-42	92D	18	27	54- 90	100G	42	51
36-48	93D	18	33	60- 96	101G	42	57
36-54	93E	24	33	66-102	110G	42	63

### F-4605

Screw Type Service Boxes—3-inch Shaft

For Service Stops 1½-inch and Smaller\*



F-4607 Top Section†



F-4608 Bottom Section

Extension Inches	F-4605	F-4607	F-4608	Extension Inches	F-4605	F-4607	F-4608
	Box Number	Top Sec.	Bottom Sec.		Box Number	Top Sec.	Bottom Sec.
Overall Length—In.							
10†	0	..	..	33-48	3	21	30
17-22	1	11	14	39-58	4	25	36
21-28	1½	13	18	45-66	5	27	42
27-39	2	18	24	51-72	7	27	48

### F-4610 Extension Sections for Screw Type Service Boxes

For box.....	Size	2½-Inch				3-Inch			
		Section.....	Number	151	152	153	154	155	156
Increasing length of box. Inches			9	16	28	33	20	24	30

### F-4615

Screw Type Service Boxes—2½-inch Shaft

For Service Stops 1¼-inch and Smaller\*

With Stationary Rod and Ring Guide

Water works and gas companies frequently desire a stationary rod inside of service boxes, having the rod attached to service stop, and extending to within twelve or eighteen inches of the surface, thereby discarding the old style of long key for turning off or on.



F-4615



F-4610

Extension Inches	F-4615	F-4607	F-4608	Extension Inches	F-4615	F-4607	F-4608
	Box Number	Top Section	Bottom Sec.		Box Number	Top Section	Bottom Sec.
Overall Length—Inches							
15-21	385	12	12	48- 66	398	24	45
18-24	386	12	15	54- 72	399	24	51
21-27	387	15	15	54- 78	400	30	51
24-33	391	15	21	60- 84	401	30	57
30-39	392	15	27	48- 84	402	42	45
30-42	393	18	27	54- 90	403	42	51
36-48	394	18	33	60- 96	404	42	57
36-54	395	24	33	66-102	405	42	63
42-60	397	24	39	.....	.....	.....	.....

\* Can also be furnished with an enlarged base for 2-inch stop—see F-4660.

† Not adjustable, made in one piece.

‡ Including cover and cover bolt.



## SERVICE BOX PARTS AND ACCESSORIES



**F-4620**  
Combination Key

### F-4620 Combination Key

Removes cover bolt and fits end of stationary rod used in the F-4615 service box.

Available in either 18, 27 or 36-inch lengths.

### Service Box Parts

Available for either 2½ or 3-inch box—see note at bottom of page.



**F-4650**  
Ring Guide\*



**F-4652**  
Gas Cover



**F-4654**  
Water Cover

\*Keeps rod centered in box.



**F-4658**  
Stop Holder



**F-4660**  
Enlarged Base†



**F-4662**  
Brass Cover Bolt

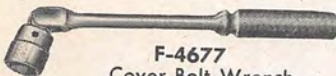
† Can be inserted in regular service boxes for 2-inch stop. Will increase height of box by 6 inches.

### F-4675

Fits Buffalo or Minneapolis pattern boxes. Furnished in any specified length. Size No. 1 for ½ thru 1-inch stops. Size No. 2 for 1¼ thru 2-inch stops.



**F-4675**  
Rod and Clamp

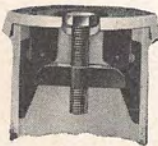


**F-4677**  
Cover Bolt Wrench

### F-4677 Cover Bolt Wrench with Pentagon Socket

Will remove the most stubborn pentagon head cover bolt or plug from Buffalo or Minneapolis pattern service boxes.

## REPAIR LIDS FOR SERVICE BOXES



**F-4680**  
Outside Pattern  
For 2½ or 3-inch box

For use on damaged Buffalo pattern service boxes which will not take the regular cover.



**F-4682**  
Inside Pattern  
For 2½-inch box only

## MALLEABLE IRON ROD CLAMPS

### F-4684 and F-4688

Figure . . . . . Number	F-4684		Copper	F-4688†
	1	3		5
Size . . . . . Number	1	3		5
Size of hole . . . . . Inches	3/8	1/2		1/2
Width of slot . . . . . Inches	7/16	1/2		1/2

† F-4688 can also be furnished galvanized.



**F-4684**  
Square Hole



**F-4688**  
Tapped Hole

Note: Service box parts regularly furnished for 2½" box unless 3" is specifically mentioned.





**ROADWAY BOXES—FOR WATER OR GAS**

Screw Type—4½-inch Shaft



**F-4700**  
Round Top  
Flanged Base



**F-4702**  
Round Top  
Open Base



**F-4704**  
Square Top  
Flanged Base



**F-4706**  
Square Top  
Open Base

**F-4700 Round Top Roadway Boxes—Flanged Base**

Box . . . . . Number	40Q	41Q	42Q	42R	43R	44R	45R
Extension . . . . . Inches	18-24	22-30	30-36	30-42	36-48	42-54	48-60
Approx. weight, each . . . Pounds	50	54	60	70	74	78	82

**F-4702 Round Top Roadway Boxes—Open Base**

Box . . . . . Number	140Q	141Q	142Q	142R	143R	144R	145R
Extension . . . . . Inches	18-24	22-30	30-36	30-42	36-48	42-54	48-60
Approx. weight, each . . . Pounds	50	54	60	70	74	78	82

**F-4704 Square Top Roadway Boxes—Flanged Base**

Box . . . . . Number	37*	38*	40U	41S	42S	42T	43T	44T	45T
Extension . . . . . Inches	12	16	18-24	22-31	30-36	30-42	33-48	39-54	45-60
Approx. weight, each . Pounds	27	35	55	63	68	80	85	90	95

**F-4706 Square Top Roadway Boxes—Open Base**

Box . . . . . Number	137*	138*	140U	141S	142S	142T	143T	144T	145T
Extension . . . . . Inches	12	16	18-24	22-31	30-36	30-42	33-48	39-54	45-60
Approx. weight, each . Pounds	27	35	55	63	68	80	85	90	95

\* These sizes are not adjustable—made in one piece.

**Roadway Box Parts Available**

**Cover Only**

Round drop or square flange

**Top Section**

With or without cover

**No. 49 Extension Section**—will increase height of box by 18 inches

**Note:** Roadway boxes, because of their diameter, can be used over 3" valves or large service stops.



**HYDRANTS AND STREET WASHERS**



**F-4710**  
Genuine  
"Murdock"  
Compression  
Hydrant



**F-4715**  
Genuine  
"Murdock"  
Street  
Washer

**"Murdock"  
Anti-Freezing**

The Genuine  
"Murdock"  
Has the Name  
Cast in the  
Product  
are  
Factory Tested  
and  
Known to be  
Mechanically  
Right Before  
Shipment



**F-4717**  
Genuine  
"Murdock"  
Lock-Lid  
Street Washer



**F-4720**  
Genuine  
"Murdock"  
Self-Closing  
Hydrant

**Inlet and Outlet Connections**

F-4710 and F-4720— $\frac{3}{4}$  or 1-inch

F-4715 and F-4717— $\frac{3}{4}$ , 1, 1 $\frac{1}{4}$ , 1 $\frac{1}{2}$ , or 2-inch

Note: Sizes 1 $\frac{1}{4}$  and 2-inch have 1 $\frac{1}{2}$ -inch body.

**To Set into Ground**

2, 2 $\frac{1}{2}$ , 3, 3 $\frac{1}{2}$ , 4, 4 $\frac{1}{2}$ , 5, 5 $\frac{1}{2}$  or 6 feet.

Lead pipe connection can be made by soldering to regular inlet tail piece.

**California Type—Not Frost Proof**



**F-4725**  
Wheel Handle  
Compression  
Hydrant

For  
Non-Freezing  
Climates

Valve Is Located  
in Top  
Nozzle Section



**F-4730**  
Street Washer

To  
Extend 18 Inches  
into Ground

Can Be Repaired  
without  
Digging Up

**Inlet and Outlet Connections**

$\frac{3}{4}$ , 1, 1 $\frac{1}{4}$ , 1 $\frac{1}{2}$  or 2-inch

Regularly furnished to set into ground 18 inches.

Can be furnished longer if required.

F-4730 and F-4735 are furnished with loose operating key.



**F-4735**  
Loose Key  
Compression  
Hydrant

**Note**

All hydrants and street washers are regularly furnished with iron pipe connection on inlet and hose thread on outlet.

**When Ordering**

Give figure number, size of connections, and depth to set into ground.





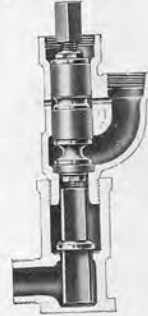
ANTI-FREEZING HYDRANTS AND STREET WASHERS



F-4745 Type No. 2  
Compression Hydrant



F-4755  
Street Washer



F-4758  
Automatic  
Shut-Off

Valve and working parts are made of brass. One key is furnished with each hydrant or street washer. Extra keys available.

Lead pipe connection can be furnished when so ordered.

Can be furnished on F-4745 hydrant or F-4755 street washer, permitting the replacement of parts without shutting off the water supply. The shut-off closes with the pressure as the operating stem and all working parts are withdrawn from the barrel for repairs. A separate stop in the line is not required.

F-4745 and F-4755

Inlet and Outlet Connections— $\frac{3}{4}$  or 1-inch  
To Set in Ground  $1\frac{1}{2}$ , 2,  $2\frac{1}{2}$ , 3,  $3\frac{1}{2}$ , 4,  $4\frac{1}{2}$ , 5,  $5\frac{1}{2}$  or 6 feet  
Regularly furnished with iron pipe connection on inlet and hose thread on outlet.

F-4760

"Vogel" Spring Action Hydrant  
with Lead Waste Connection

Has 1-inch galvanized steel pipe casing,  $\frac{3}{4}$ -inch male iron pipe inlet and  $\frac{3}{4}$ -inch hose nozzle. Regularly furnished with 6 feet of casing to set 22 inches from ground line to nozzle and 48-inch bury. Can also be furnished for other depths of bury.

F-4762 and F-4764  
"Eclipse" Fire Hydrants

Are bronze mounted, have a rubber valve washer, positive automatic drain, and close against pressure. Furnished with inlet and outlet for iron pipe thread connection unless otherwise ordered, operating wrench furnished with each hydrant.

To Set in Ground  
 $1\frac{1}{2}$ , 2, 3, 4, 5 or 6 feet

Sizes

Figure.....	Number	F-4762	F-4764
Size.....	Number	2A	2
Valve opening diameter.....	In.	$1\frac{1}{2}$	$2\frac{3}{16}$
Standpipe diameter.....	In.	$1\frac{1}{2}$	3
Inlet and outlet.....	In.	$1\frac{1}{4}$ or $1\frac{1}{2}$	2*

\* Also available with 2 1/2 or 3-inch inlet, one 2 1/2-inch outlet, or two 2 or 2 1/2-inch outlets.

When Ordering

Give figure number, depth to set into ground, and size of inlet and outlet connections.



F-4760  
"Vogel" Spring  
Action Hydrant



F-4764  
Eclipse "No. 2"  
Fire Hydrant



**NEPTUNE WATER METERS**

**THE "TRIDENT" LINE**

**When Ordering**

Specify whether meters are to be furnished in cubic feet or gallon reading, and in the round or straight reading type.



**F-4766\***  
"Trident"  
Frost-Proof Mete.



**F-4769**  
"Trident Style 3"  
Disc Meter

The Frost-Proof meter has breakable bottom, to relieve pressure on working parts. Style 3 Disc Meters (not frost-proof) are designed for intermediate flows. Trident design includes Oil-Enclosed Gear Train. Interchangeability of parts reduces maintenance costs.

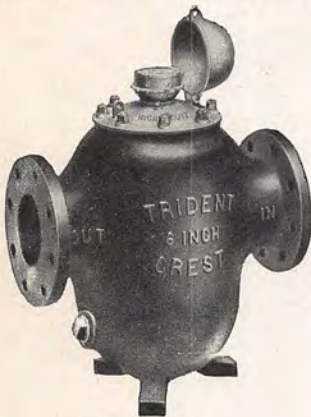
Note: The F-4766 and F-4769 meters are regularly furnished with inlet and outlet couplings—specify if couplings are not wanted. On the 5/8-inch size of F-4766, the meter body has either 3/4-inch spuds with 1/2-inch couplings or 1-inch spuds with 3/4-inch couplings.

**\* Note**

Made in Frost-Proof and Split Case types. Frost-Proof furnished unless otherwise ordered.

Figure.....	Number	F-4766				F-4769	
		5/8x1/2	5/8x3/4	3/4	1	1 1/2	2
Size.....	Inches						
Capacity.....	G.P.M.	20	20	30	50	100	160
Length.....	Inches	7 1/2	7 1/2	9	10 3/4	12 5/8	15 1/4
Width.....	Inches	5 1/2	5 1/2	6	9 3/8	10	12 3/16
Height.....	Inches	8 3/4	8 3/4	8 3/4	9 1/2	10 5/8	11 3/4
Weight.....	Pounds	10 3/4	11 1/2	15	26	36	58

City of Chicago meters require special testing and sealing by the city for which there is a charge.



**F-4774**  
"Trident" Crest Meter



**F-4778**  
"Trident" Compound Meter

Velocity or inferential type ("current meters"). For continuous high rates of flow. Oil-Enclosed Gear Train. Weight of hard rubber propellers, plus phosphor-bronze shaft, only slightly exceeds water. Practically no weight or thrust on agate bearings; friction almost nil; extreme sensitivity; wear negligible. Regularly furnished with flanged ends—faced and drilled—as shown.†

Combine in a single case a Crest meter and a Disc meter. Automatic valve (controlled by volume of flow) directs water through Disc meter for low volume and through Crest meter for high volume flow. Combined reading of both meters gives total recording of consumption. Regularly furnished with flanged ends—faced and drilled—as shown.†

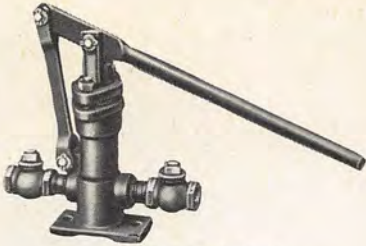
Figure....	Number	F-4774						F-4778					
		3	4	6	8	10	12	16	3	4	6	8	10
Size.....	Inches												
Capacity... G.P.M.		400	700	1600	2800	4400	6400	12400	320	500	1000	1600	2300
Length.....	Inches	24	24	24	26 3/4	30	36	42	33	33	36 1/2	42	45 7/16
Width.....	Inches	13 5/8	13 5/8	14 5/8	17 1/2	26 3/4	30 1/2	36 1/2	13 3/4	13 3/4	14 5/8	17 1/2	20 5/8
Height.....	Inches	27 1/4	27 1/4	28 3/4	30 1/4	29 1/4	34 7/8	40 7/8	27 1/8	27 1/8	28 5/8	29 7/8	29 1/8
Weight.....	Pounds	250	260	300	500	800	1200	1950	460	475	685	970	1500

† Can also furnish with flange and bell and/or flange and spigot connections for cast iron pipe.

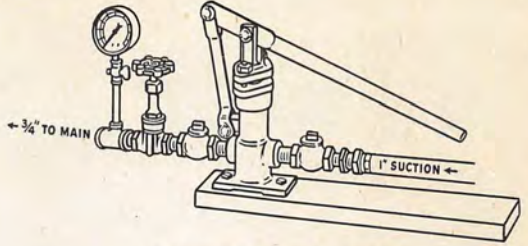




**TEST PUMPS—SUCTION PUMPS**



**F-4801 Test Pump**

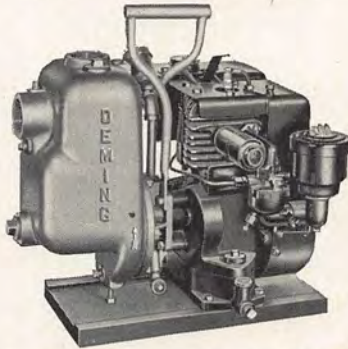


**F-4806 Test Pump Outfit**

The F-4801 is a double action pump for working pressure to 400 psi. with 1½-inch diameter cylinder, polished steel plunger with 3-inch stroke, 24-inch long lever handle, and ¾-inch suction and discharge valves. Pump is bolted to a heavy wooden base. Approximate weight, 26 pounds.

Long pipe lines and large boilers and tanks should be filled with water from regular water supply or pumped full by large capacity low pressure pumps. The test pump is then used to give the final pressure test. The water for testing may be drawn from any available source of supply, can be pumped from a barrel, tank, etc.

The F-4806 Test Pump Outfit is furnished complete with F-4801 pump, 16½ feet of 1-inch water suction hose with coupling, ¾-inch 125-lb. brass gate valve, pressure gauge, and fittings. Approximate weight, 48 pounds.



**F-4812 Centrifugal Suction Pump\***

The F-4812 is a sturdily built, self-priming, bronze fitted, portable pump which can be carried by one man, for evacuating drainage or seepage water from trenches, pits, etc. Equipped with a Briggs & Stratton 1½ H.P., four cycle, air cooled gasoline engine with high tension magneto and 2-quart capacity gasoline tank (pump will operate for approximately 2¾ hours on one filling), and 1½-inch suction hose strainer. Maximum capacity of 5400 gallons per hour against a 15-foot head.

Dimensions—inches: Length, 20; Width, 13; Height, 19.  
Approximate weight, 84 pounds.

\* Recommended for use with two 15-foot lengths of hose—one for suction and one for discharge. Two 1½-inch I.P.S. nipples are required to make connections between pump and hose couplings.



**F-4818 Smooth Bore Suction or Discharge Hose**

1½-inch smooth bore wire-inserted rubber hose suitable for suction or discharge, is regularly furnished in 15-foot lengths with male and female I.P.S. couplings attached. Other lengths can also be furnished to order.



**F-4822 Galvanized Iron Suction Hose Strainer**  
Sizes 2, 2½, 3 and 4 inches

**Note**

Smooth bore suction hose can also be furnished in 2, 2½, 3 and 4-inch sizes in specified lengths.



## JOINT CALKING MATERIALS FOR CAST IRON PIPE



**F-4826 Pig Lead**  
100 Pound Pigs



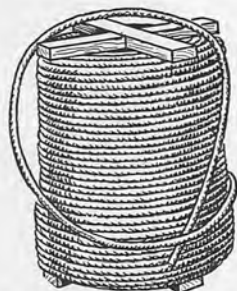
**F-4828 Ingot Lead**  
5 Pound Ingots



**F-4830 Lead Wool**  
50 Pound Bags

### F-4830 Lead Wool

Lead wool does not require melting and is universally used for submarine calking or for any calking job in a wet ditch where it is impossible to dry the joint.



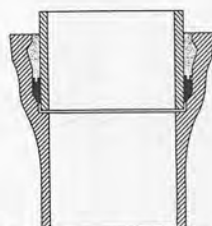
**F-4833 Braided Fibrex**  
60 Pound Reels

### F-4833 Round Braided Fibrex

A sanitary, non-bacteria breeding paper packing. Chemically treated making it water repellent, sterile, and preventing it from disintegrating. Constructed with a hard twisted core with a basket weave jacket into 1/2-inch diameter rope form for calking all sizes of cast iron pipe.

### F-4835 Hydroring Rubber Joint Packing Sanitary—Easy to Apply—Maintains Uniform Joint Space

To install, stretch the ring over pipe and slide it back until the narrow edge is about 2 1/2-inches from end of pipe. After the spigot end of the pipe is socketed within the bell, the ring is calked into position. The joint is then finished in the usual manner.



**Application of F-4835 Hydroring Packing**

### F-4835 Sizes and Weights

For Cast Iron Pipe, size.....Inches	4	6	8	10	12	14	16	18	20	24
Approx. weight, each ring.....Pounds	1/4	1/8	1/2	1/2	3/8	3/4	1 1/4	1 1/2	1 1/2	1 3/4



**F-4837 Braided Jute**

Clean, dry, long fiber jute stock, braided into a square rope form, 3/8, 1/2, or 5/8-inch thick. The 1/2-inch size is recommended for sizes 3 thru 14-inch cast iron pipe and the 5/8-inch for 16-inch and larger sizes.

Packed in cartons of approximately 50 pounds.



**F-4838 Twisted Jute**

Clean, dry, long fiber jute stock, especially prepared in 8-strand rope form, each strand about 5/8-inch in diameter. Easily rolled to desired thickness required for size of cast iron pipe being calked.

Packed in cartons of approximately 50 pounds.

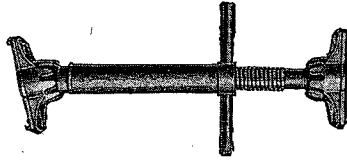




Inc.

**EXTENSIBLE STEEL TRENCH BRACES**

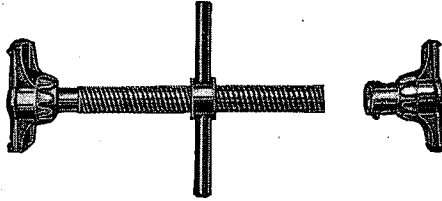
**Ball and Socket  
Joints**



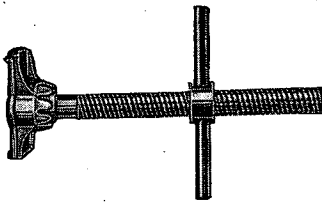
**Adjustable At  
Any Angle**

**F-4840 Steel Trench Brace—Complete with Pipe  
Sizes and Weights**

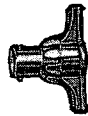
Size No.	Diameter Pipe and Screw Inches	Length			Safe Extension of Screw Inches	Approx. Weight Complete Pounds—Each
		Of Pipe Inches	Of Screw Inches	Brace Closed Inches		
1001	1½	8½	10	16	6	13½
1002	1½	10½	12	18	7	14¾
1003	1½	13½	14	21	8	15¾
1004	1½	16½	14	24	8	16¼
1005	1½	19½	16	27	9	17¼
1006	1½	22½	16	30	9	18
1007	1½	28½	18	36	10	20¼
1008	1½	34½	18	42	10	21¼
1009	1½	40½	18	48	10	23¼
1011	2	28½	18	36	10	38¾
1012	2	34½	18	42	10	40¼
1013	2	40½	18	48	10	42½
1014	2	46½	18	54	10	44¼
1015	2	52½	18	60	10	46¼



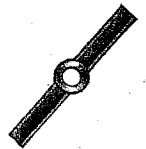
**F-4845 Steel Trench Brace Fittings Only\***



**F-4850 Screw End**



**F-4852 Socket Butt**



**F-4854 Lever Nut**

**Sizes and Weights**

Size No.	Size of Screw Inches	Safe Extension of Screw Inches	F-4845*	F-4850	F-4852	F-4854
			Fittings Complete	Screw Ends	Socket Butts	Lever Nuts
			Weight Pounds	Weight Pounds	Weight Pounds	Weight Pounds
1	1½x10	6	11¼	8	3¼	1½
2	1½x12	7	11¾	8½	3¼	1½
3	1½x14	8	12½	9¼	3¼	1½
4	1½x16	9	13¼	10	3¼	1½
5	1½x18	10	14	10¾	3¼	1½
6	2 x18	10	31	23½	7	5¼

\* We furnish our braces in this form to parties who wish to put on pipe to suit themselves. Plain end pipe is required and needs only a small hole drilled in one end for insertion of cotter pin. This cotter pin may be removed at any time and longer or shorter pipe used.

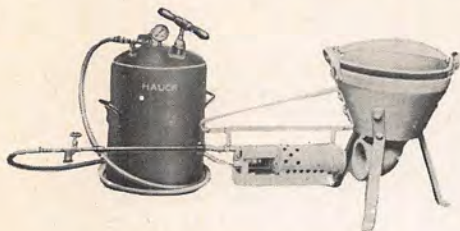
Use 1½-inch pipe for the 1½-inch screws, and 2-inch pipe for the 2-inch screws. Cut pipe 7½ inches shorter than length of complete brace wanted when closed.



**"HAUCK" MELTING FURNACES AND BURNERS**

Burns Kerosene or Light Furnace Oil

For Melting Lead, Babbitt, Spelter and Other Soft Metals



**F-4860** Combination Melting Furnace and Portable Torch

Size . . . . .	Number	289	290	291
Capacity, lead . . . . .	Pounds	125	200	450
Hose length . . . . .	Feet	6	12	12
Fuel capacity . . . . .	Gallons	5	12	15
Fuel consumption . . . . .	G.P.H.	1	2	2
Approximate weight	Pounds	140	225	300



**F-4862** Combination Melting Furnace and Portable Torch on Wheels

Size . . . . .	Number	200	201	202
Capacity, lead . . . . .	Pounds	200	450	800
Hose length . . . . .	Feet	12	12	12
Fuel capacity . . . . .	Gallons	10	12	15
Fuel consumption . . . . .	G.P.H.	2	2	2
Approximate weight	Pounds	355	390	415



**F-4865**  
Compound Melting Furnace  
(Burns Gasoline Only)

Size . . . . .	Number	41	42
Capacity, compound . . . . .	Pounds	140	200
Capacity, liquid . . . . .	Gallons	10	6
Fuel capacity . . . . .	Gallons	4	12
Fuel consumption . . . . .	G.P.H.	1/2	1/2
Approximate weight . . . . .	Pounds	180	240

For Melting  
Pipe Jointing  
Compounds



**F-4866**  
Compound Melting Furnace on Wheels  
(Burns Kerosene or Light Furnace Oil)

Size . . . . .	Number	329	330	331
Capacity, compound	Gallons	8	15	25
Hose length . . . . .	Feet	6	6	6
Fuel capacity . . . . .	Gallons	5	5	5
Fuel consumption . . . . .	G.P.H.	1	1	1 1/2
Approximate weight	Pounds	225	315	415

**F-4868 "Hauck" Burner Unit Only (Not Illustrated)**

Similar to Burner Unit Illustrated in F-4866 (Burns Kerosene or Light Furnace Oil)

For melting lead out of pipe; heating tar, pitch and asphalt kettles; brazing, burning, thawing and for general construction and maintenance uses.

Size . . . . .	Number	211	211-A	212*	213	214	215	216
Hose length . . . . .	Feet	6	6	6	12	12	12	12
Fuel capacity . . . . .	Gallons	5	5	5	12	15	20	20
Fuel consumption . . . . .	G.P.H.	1	1 1/2	2	2	3	3	4
Weight . . . . .	Pounds	32	45	50	110	115	125	130

\* Can also be furnished with 12-foot hose—furnished regularly with 6 feet of hose.

**Note:** "Hauck" Melting Furnaces are also available for burning LP gas—information on request.





**POURING POTS, LADLES, JOINT RUNNERS AND SEWER RODS**



**F-4894**

**F-4894**  
Cast Iron Pouring Pot

Size . . . . .	Number	1	2
Size, inside . . . . .	Inches	6x7	7x8½
Capacity, lead . . . . .	Pounds	50	100



**F-4896** Pouring Pot Hook



**F-4900**  
Malleable Iron Ladle



**F-4905** Bottom-Pour  
Self-Skimming Ladle with  
Sliding Grip Sleeve on Handle

**F-4900 and F-4905**

Figure . . . . .	Number	<b>F-4900</b>						<b>F-4905</b>			
Diam. of bowl . . . . .	Inches	2½	3	3½	4	5	6	5	6	7	8
Cap. of lead . . . . .	Pounds	1	2	2¾	3¾	8½	15	9	18	25	40



**F-4920**

**LEAD JOINT RUNNERS**

**F-4920**

Made of a special asbestos packing and has a metal band riveted around the outside.

For Pipe Sizes—Inches

2, 3, 4, 6, 8, 10, 12, 14, 16, 18, 20, 24, 30, 36, 42, 48, 54, 60



**F-4925**

**F-4925**

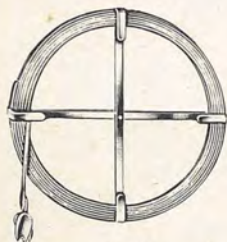
Made of specially prepared pure asbestos rope, of square cross-section, having a ferrule on each end and provided with a spring clamping device for fastening in place on the pipe.

Size . . . . .	Number	1	2	3	4	5	6	7	8	9	10
Size of square rope. In.		¾	¾	1	1	1¼	1¼	1¼	1¼	1¼	1¼
For pipe sizes . . . . .	Inches	2, 3 & 4	4, 5 & 6	6, 8 & 10	10, 12 & 14	16, 18 & 20	24	30	36	42	48

**SEWER RODS**

**F-4928** Oil Tempered Steel Sewer Rod

Complete with choice of head attached and with carrying frame as shown. Specify HEAD wanted—see below



**F-4928**

Rod dim . . . . .	Inches	½x¾			½x1			½x1¼		
Length . . . . .	Feet	50	75	100	50	75	100	50	75	100

**HEADS ONLY**

When Ordering—Specify

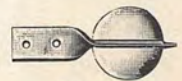
No. ¾ for ¾" & 1" Rods. No. 1¼ for 1¼" Rod



**F-4932**  
Spiral Head



**F-4934**  
Universal "Two Direction" Revolving Roller Head



**F-4936**  
Roller Head



**CALKING TOOLS**



**F-4940**

**Water or Gas Main Calking Set\***

Includes one each of the following:

- No. 3—Regular pattern hand calking iron,  $\frac{3}{8}$ -inch thick at point
- No. 4— $\frac{3}{4}$ -inch cold chisel
- No. 5—Regular pattern hand calking iron,  $\frac{5}{8}$ -inch thick at point
- No. 7—Lead cutting chisel, 3 inches wide at point
- No. 8—Pipe cutting chisel, with handle
- No. 9—3  $\frac{1}{2}$ -pound calking hammer, with handle
- No. 10—Regular pattern yarning iron,  $\frac{1}{8}$ -inch thick at point

\* This calking tool set is selected for tools necessary to meet the requirements of water or gas mains 12 inches and smaller. Select other sizes from those shown below.

**Note**

A leather bag for conveniently carrying above tools can be supplied.



**F-4944 Yarning Iron**



**F-4946†  
Calking Iron**

**F-4944 Yarning Irons**

Size . . . . .	Number	1	2	3
Thickness at point.. Inches		$\frac{1}{16}$	$\frac{1}{8}$	$\frac{1}{4}$



**F-4948  
Cold Chisel**

**F-4946 Calking Irons**

Size . . . . .	Number	1	2	3	4	5	6	7	8
Thickness at point.. Inches		$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1

† Inside pattern will always be furnished unless outside pattern is requested.

**F-4948 Cold Chisels**

Size . . . . .	Number	1	2	3	4	5	6
Stock size . . . . . Inches		$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1

**F-4950 Sledges**



**F-4950 Sledge**

Size . . . . .	Number	1	2	3	4	5	6	7
Weight, each. . Pounds		3	4	6	7	8	10	12

Handles are not included—specify if wanted.





**PIPE CUTTERS**

**WACHS POWER OPERATED PIPE SAWS**

**F-4955**

**Guillotine Pipe Saw**

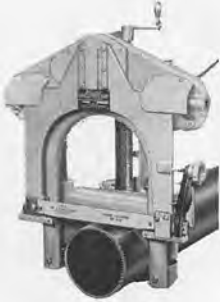
Cuts 2 thru 8-inch Cast Iron or Steel Pipe

Complete with either electric or air motor, chain clamp, two 12-inch long high speed blades, and storage case. Saw is portable and can be set up on pipe at any angle by one man in a few minutes. Chain type pipe vise with accurately machined steel V base gives positive grip and alignment on pipe that assures a square cut at right angle to the pipe that can be made in a 25-inch wide trench. Cuts pipe with any wall thickness. Blade has 2-inch stroke and is lifted from cut on return stroke thus extending blade life.

Overall Dimensions—Inches

Width, 22¼; Height, 28; Depth 12

Approximate weight, each 105 pounds



**F-4955**  
Front View



**F-4955**  
Rear View

A "BIG" Guillotine saw, similar to above, is also available for 10, 12, 14, and 16-inch pipe.

**F-4957**

**National Pipe Saw**

Cuts 10 thru 48-inch Cast Iron or Steel Pipe

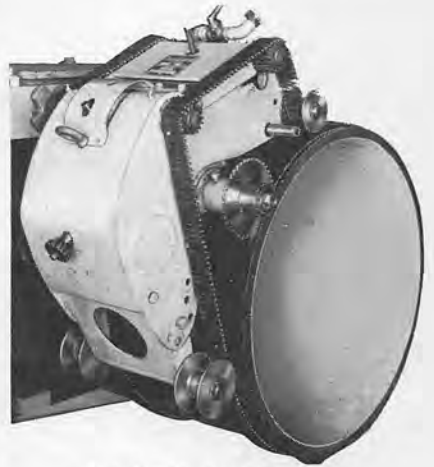
Complete with Thor air motor, wrenches, basic length of chain to fit 12-inch pipe\*, extra links and pins, and wooden storage case. Several types of cutter wheels, high speed steel, bevel type, and carbide tipped are available for either cast iron or steel pipe. Saw is portable and can be set up on pipe by two men in approximately 15 minutes. The two chains act as a flexible ring gear for positive feed (2½ inches per minute) with automatic compensation for equalized pressure on each chain. Thus an accurate milled cut, in one rotation around pipe, is assured under all conditions—above ground or in a dry or wet trench with a clearance of 16 inches.

Clearance Dimensions On Pipe

Along pipe, 23 inches. Around pipe, 16 inches

Approximate weight, each 300 pounds.

\* Extra length chain for larger sizes of pipe is required—specify size of pipe when ordering.



**F-4957 National Pipe Saw**

**NOTE:** Operating manual and parts list furnished with each Guillotine and National Pipe Saw

**ELLIS MANUAL OPERATED PIPE CUTTER**

Frame and Links  
are  
Drop-forged



Cutter Wheels  
are  
Best Quality Steel

**F-4960**  
Ellis Pipe Cutter

The Ellis pipe cutter answers the purpose of a cutter for work in or out of a ditch. For cast iron pipe unless otherwise ordered. Every point in contact with the pipe is a cutting disc, thus, when the cutter is adjusted on the pipe it need only be moved in a small part of a circle in order to cut entirely around. When used in a trench, a hole just large enough to pass the links under the pipe is all that is required.

Size No. 01 cuts 4 thru 8-inch cast iron or steel pipe. Weighs approx. 45 pounds.  
Size No. 1 cuts 4 thru 12-inch cast iron or steel pipe. Weighs approx. 55 pounds.



CLOW "STRICKLER" PIPE CUTTER

CUTS CAST IRON OR STEEL PIPE

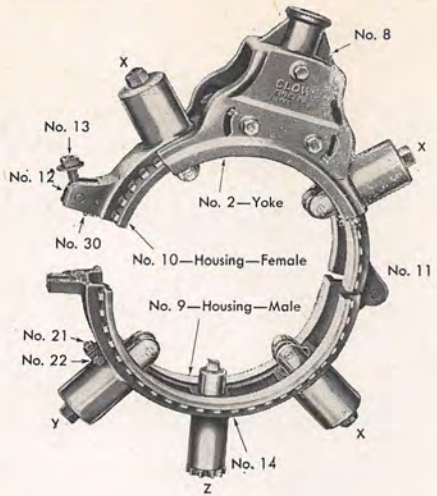
F-4965

Clow "Strickler" Pipe Cutter

The Clow "Strickler" Pipe Cutter body is made of lightweight but strong heat-treated aluminum, making it easier to handle. Simplifies the job of cutting cast iron or steel pipe in the trench or in the shop. Makes a good, clean, square cut and leaves a 3/8-inch clearance to prevent binding when removing machine or pipe section from trench—no chance for a "pinch cut" or binding pipe.

It's easy and simple to operate the cutter. The hinged ring which fits around the pipe has four adjustable rollers for quick centering. The ratchet mechanism automatically feeds the proper amount of cutting blade for each revolution of the machine. An eight inch pipe can be cut through in about fifteen minutes. The cutting blade can be quickly replaced or readily sharpened.

If a sleeve or valve is to be inserted in a pipe line, the clean, smooth cut made by the cutter assures a far better fit. Also saves pipe by quickly cutting off any damaged ends.



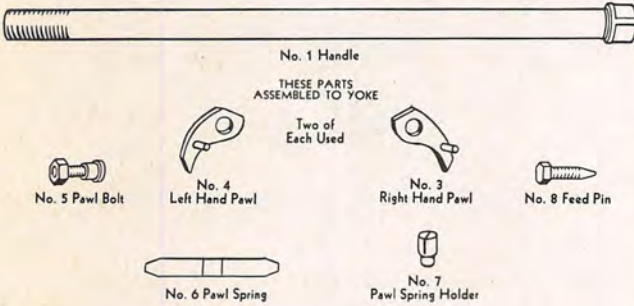
F-4965

Sizes and Weights

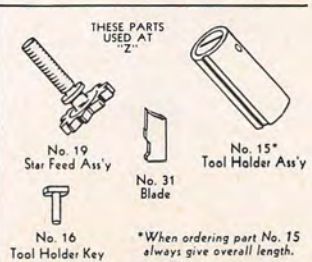
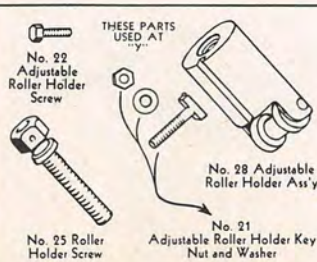
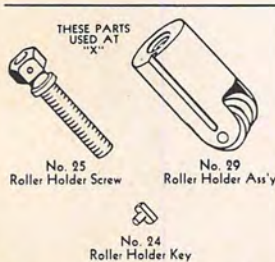
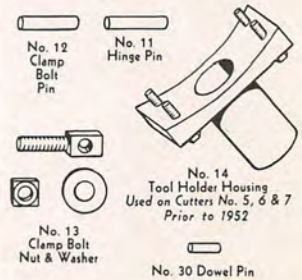
Size . . . . .	Number	3	4	5	6	7
Cuts pipe sizes . . . . .	Inches	2 1/2-6	4-8	8-12	12-16	16-24
Approximate weight, each . . . . .	Pounds	40	57	69	148	215

Replacement Parts for Clow "Strickler" Pipe Cutter

(Also see the above illustration)



THESE PARTS ASSEMBLED TO HOUSING  
See the above illustration



Ordering Instructions: When ordering replacement parts, give size number of the machine, part number, and part description. If date of machine's purchase is available, that should be given.

Note

Due to their similarity, care should be used in ordering part No. 28 and part No. 29.





**WRENCHES**

**Ratchet Wrench**

**Torque Wrench**

**Wrench Sockets**

For Bolting Up  
"C-N"  
Pipe and Fittings



For Bolting Up  
River Crossing  
Pipe

**F-4967**

**Reversible Ratchet Wrench**

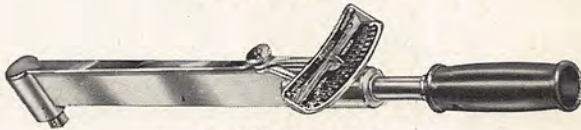
Equipped with a reversible ratchet—which often proves extremely useful in close quarters. The head of the wrench is holed through—allowing bolt end to pass through if necessary.

**Sizes and Weights**

For bolt size. . . . . Inches	5/8	3/4	7/8	1	1 1/8	1 1/4
For Use on "C-N" Mechanical Joint Pipe and Fittings						
Diameter across flats of nuts. . . Inches	1 1/16	1 1/4	...	1 5/8	...	2
Wrench size. . . . . Number	1-H	2-H	...	4-H	...	6-H
Wrench length. . . . . Inches	8	10	...	16	...	24
Approximate weight, each. . . . Pounds	1 3/4	2	...	4 1/2	...	9 3/4
For Use on F-142 River Crossing Pipe						
Diameter across flats of nuts. . . Inches	...	1 1/8	1 5/16	1 1/2	1 11/16	...
Wrench size. . . . . Number	...	2-R	3-R	4-R	5-R	...
Wrench length. . . . . Inches	...	10	16	16	24	...
Approximate weight, each. . . . Pounds	...	2	4 1/2	4 1/2	9 1/2	...

Note: When ordering, be sure to give size number of wrench wanted.

**TORQUE WRENCH**



**F-4968 No. S-150**

**"Sensory" Torque Measuring Wrench**

With signaling mechanism, capacity 0 to 150 foot-pounds, graduated in steps of 5 foot-pounds, equipped with 3/4-inch square drive, effective length of 18 inches, overall length 20 1/2 inches, and the weight is 3 3/4 pounds.

**F-4969 SOCKETS**

**Special Sockets for Use With Torque Wrench**

For bolt size. . . . . Inches	5/8	3/4	7/8	1	1 1/8	1 1/4
For Bolt Nuts Used on "C-N" Mechanical Joint Pipe and Fittings						
Socket size. . . . . Number	HG-1034	HG-740	...	HG-352	...	HG-364
For Bolt Nuts Used on F-142 River Crossing Pipe						
Socket size. . . . . Number	...	HG-1236	HG-342	HG-248	HG-154	...



**F-4969**

**Note:** To avoid overstressing of bolts, the use of a torque wrench is recommended to (a) test the "pull" of the men using ordinary socket wrenches, (b) to "spot check" after joints are made up, or (c) to completely make up joints with torque wrenches.

For water and gas service, the normal range of bolt torque to be applied to the bolts in the joints of "C-N" pipe and fittings and the joints of River Crossing pipe are as follows:

For bolt size. . . . . Inches	5/8	3/4	7/8	1	1 1/8	1 1/4
Range of torque*. . . . . Foot Pounds	40-60	60-90	65-95	70-100	80-110	90-120

\* For additional data with reference to torque, see page 72.



Inc.

WRENCHES



F-4971 Heavy Duty Reversible Ratchet Wrench
Approximate weight, each, 5 1/4 pounds.
18 inches Long with 3/4-inch square drive.



F-4973 Socket

F-4973 Hexagon "12 Point" Heavy Duty Sockets

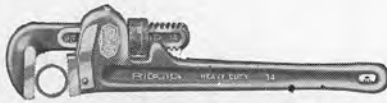
Table with 11 columns (Size, Number, 1-10) and 3 rows (For bolt size, Diameter across flats of nut).



F-4975 Cover Bolt Wrench

Will remove the most stubborn locking bolts on F-3355 and F-3362 Frames and Covers and F-3452 Meter Box; the cover bolt on Slip and Screw type service Boxes; and the access plug on Minneapolis pattern Service Boxes.

Approximate weight, each 1/2 pound.



F-4980 Ridgid Straight Wrench



F-4985 Ridgid End Wrench

F-4980 and F-4985 Pipe Wrenches

Table with 5 columns (Length when open, Grips pipe sizes, Approximate weight) and 2 rows for F-4980 and F-4985.



F-4990 Improved Pipe Tong with Double-Ended Reversible Jaws and Flat Link Chain

Table with 8 columns (Number, 30-35) and 4 rows (For pipe sizes, Length over all, Approximate weight).





**"TOLEDO" STOCKS AND DIES**

**F-4993 No. 00**

**Ratchet Stock With Removable Heads**

A very desirable tool for threading small pipe. Being only 16½ inches long it is easily carried in the tool kit. Complete die heads or chaser dies only are available.

**Sizes and Weights**

Capacity, pipe sizes. Inches	1/8 to 3/4	3/8 to 3/4
Approx. weight, each. . . . . Lbs.	9	6 1/2



**F-4993**

**No. 00 Ratchet Stock with Removable Heads**

Note: An all metal carrying case can be furnished for the F-4993 No. 00 set.



**F-4995**

**No. 1BR Adjustable Ratchet Stock**

**F-4995 No. 1BR**

**Adjustable Ratchet Stock**

This tool has a pipe holder with three large wing head thumb screws, guide bars, and broad face chuck jaws. Handle is 24 inches long. Overall length is 32 inches.

Capacity, pipe sizes, 1 to 2 inches.  
Approximate weight, each 23 pounds.

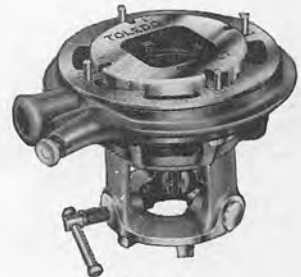
**F-4997**

**Simpact Adjustable Ratchet Stock**

This self-contained ratchet threader has one set of dies for four pipe sizes—1, 1¼, 1½ and 2-inch—and can be changed in a matter of seconds.

Handle is 24 inches long. Overall length is 30 inches.

Approximate weight, each 24 pounds.



**F-4997**

**Simpact Adjustable Ratchet Stock**

**F-4999**

**No. 2, 2½, 3, & 4 Geared Adjustable Stock**

The various sizes differ slightly, but embody the same principles of construction and operation. Separate dies for each pipe size. Ratchet handle included.



**F-4999**

**Geared Adjustable Stock**

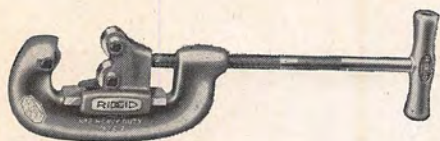
**Sizes and Weights**

Size.....Number	2	2½	3	4
Capacity, pipe sizes. In.	2½, 3 & 4	5 & 6	5, 6 & 8	10 & 12
Approx. weight, each Lbs.	84	176	200	373

The productive capacity of geared tools can be increased many times by operation with one of the Toledo Power Drives—information on request.



## PIPE CUTTERS, REAMER AND FLANGE JACKS



**F-5002**

Ridgid Cutter for Steel Pipe



**F-5004**

Ridgid Cutter for Copper Tube\*

### F-5002 Sizes and Weights

Size . . . . .	Number	1	2	3	4	6
Capacity, pipe sizes . . . . .	Inches	1/8 to 1 1/4	1/8 to 2	1 to 3	2 to 4	4 to 6
Approximate weight, each . . . . .	Pounds	6 1/2	7 1/2	15	19 1/2	24 1/4

### F-5004 Sizes and Weights

Size . . . . .	Number	000	00	0
Capacity, tube sizes . . . . .	Inches	1/8 to 1 O.D.	3/16 to 1 1/8 O.D.	1/2 to 2 1/8 O.D.
Approximate weight, each . . . . .	Pounds	3/4	1 1/4	2

\* With integral tube end reamer.



**F-5008**

"Reed" Ratchet Reamer for Steel Pipe

**F-5008**

"Reed" Ratchet Pipe Reamer

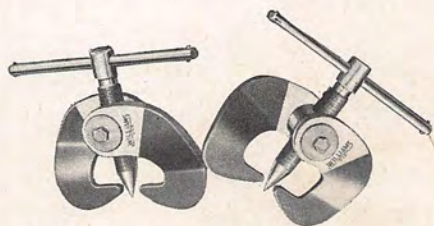
These Reamers are made of finest tool steel and ground with great care. Designed especially for removing burrs from pipe, caused by cutting; also used extensively for countersinking work.

Capacity, pipe sizes, 1/4 to 2 inches  
Approximate weight, each 8 pounds

**F-5012**  
Flange-Jacks

Flange-Jacks exert tremendous pressure smoothly and evenly, parting the flanges and holding them in perfect alignment without damage to flange faces while replacing gaskets.

Note: Flange-Jacks sold in pairs only.



**F-5012**

### F-5012 Sizes and Weights

Size Number	Flange Capacity—Inches		Approx. Weight Per Pair—Pounds
	Standard Flanges	Extra Heavy Flanges	
20	2 to 20	Up to 12	13
30	14 to 48	10 to 30	45

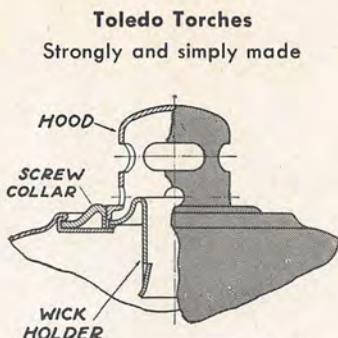




## ROADWAY TORCHES, STEEL FOLDING HORSES AND ROLATAPE



**F-5015 Torch**  
Self-Righting



**F-5018 Torch**  
Non-Self-Righting

Toledo torches are made from 20-gauge steel and the halves are joined together by a leakproof, double seamed joint. Finished in high luster black, baked enamel. The No. 651 burns up to 52 hours on one filling of kerosene—other sizes in proportion.

### Sizes and Weights

Figure.....Number	F-5015		F-5018	
	620	630*	641	651
Size.....Number	6	6	4½	6½
Capacity, kerosene.....Pints	6	6	4½	6½
Approximate weight, each...Pounds	5	7	2½	2¾

Extra hoods, wick holders and wicks are available.

\* Extra heavy, 14 gauge, all welded construction.

### F-5022

#### Toledo Steel Folding Horse

Steel A frames only. Cross-rail is not included. Adapted for use with standard sized 2-inch timbers which actually measure 1¾ inches thick. Can also be used with 1¼ inch pipe.

### Sizes and Weights

Size.....Number	25	32	36
Height over cross rail.....Inches	25	32	36
Approximate weight, each...Pounds	24	27	30



**F-5022 Steel Folding Horse**

### F-5030

#### No. 400 Rolatape

Has a four foot circumference wheel and fold-a-way handle. Can be operated from a car window or on foot on either smooth or rough terrain. Keeps on course without swaying. Has stand that supports unit freeing operator to log data. Registers to 100,000 feet (over eighteen miles) in feet, and increments of 2 inches can be obtained.

Approximate weight, each 5 pounds.

### F-5033

#### No. 200 Rolatape

A compact measuring wheel having a two-foot circumference, with extendable folding handle and carrying case. Registers to 100 feet (repeats cycle) in feet and inches.

Approximate weight, each 2¾ pounds.



**F-5030 No. 400**  
Rolatape



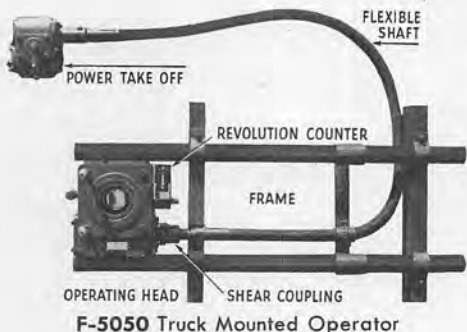
**F-5033 No. 200**  
Rolatape



**PAYNE DEAN VALVE OPERATORS**

Power Operation for Distribution Valves

**TRUCK MOUNTED EQUIPMENT**



**F-5050 Truck Mounted Operator**

The valve operator equipment is mounted on a telescoping tubular steel frame with oak supports which bolt to the floor of the truck. The Operator can be attached to almost any size or make of truck provided that the transmission is drilled for attachment of the power take off.

Long wheel base trucks should be used in order to provide an opening in the body, on the left hand side, back of the cab, for the valve operator door. The required opening measures 16" x 12" for the Junior Model; 20" x 12" for the Heavy Duty Model.

Installation requires 16 to 20 manhours.



Utility Truck Operating Distribution Valve

**F-5050 Valve Operator**

The F-5050 Valve Operator operates valves and gates by power furnished by the truck engine. Equipment consists of a frame, operating head, flexible shaft, and a power take off.

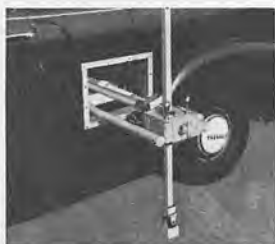
The power take off attaches to the transmission of the truck, and transmits power to the operating head through a heavy duty flexible shaft. The operating head is a worm geared reducing unit, with a drive sleeve and a universal ball joint through which the valve or gate key passes. To operate, the head, in its telescoping tubular frame, moves outward from the truck body. The outward movement in conjunction with the universal action of the valve key permits an easy, quick connection with the valve nut. Operating controls are located on the dashboard of the truck.

Protection against damage is provided by an overload shear coupling which provides a breakable link between engine power and the valve stem. A revolution counter avoids jamming and indicates the exact position of the gate in number of turns open.

The equipment is available in two sizes: the Junior Model for operation of valves 10" through 24"; and the Heavy Duty Model for valves 12" through 60". Operators are furnished complete with power take off and flexible shaft, ready for attachment to truck. Each operator is furnished with one universal socket, one gate key 8-ft. long, one key 12-ft. long, and one handle.

**Ordering Information**

1. Make, year and model and type of body of motor truck to be used. Truck must have opening in transmission for attachment of power take off.
2. Size of gates to be operated, with operating pressure.
3. Junior Model for valves 10" through 24". Heavy Duty unit for valves 12" through 60".



Mounted Operator Extended to Operating Position.

For service, operating head extends 18". Head, coupling and counter are easily seen from the driver's seat.



Interior View of Operator Mounted in Carryall Truck

Interior space required for operator is small. A tool box and auxiliary seat can be placed over the operator for added convenience.



Mounted Operator Equipped with Pipe Tapping Attachment.

For tapping, flexible shaft connects to tapping machine shank. Speed controlled by engine throttle.





**PAYNE DEAN VALVE OPERATORS**

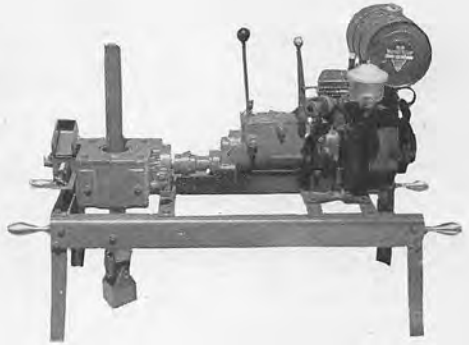
**Power Operation for Valves and Gates**

**PORTABLE EQUIPMENT**

**F-5054 Carryable Gatender**

The F-5054 Carryable Gatender incorporates a special aluminum operating head in a carryable frame. It will operate valves and gates through 24" diameter, and is powered by a 3 H.P. gasoline engine with clutch and reverse. Swivel mounting of the operating head permits both horizontal and vertical positions of the key. Equipment includes safety shear coupling and revolution counter. Weight approximately 150-pounds. Useful for maintenance and tapping machine operations.

Larger units with 6 and 7½ H.P. engines on rubber tired wheels are also available.

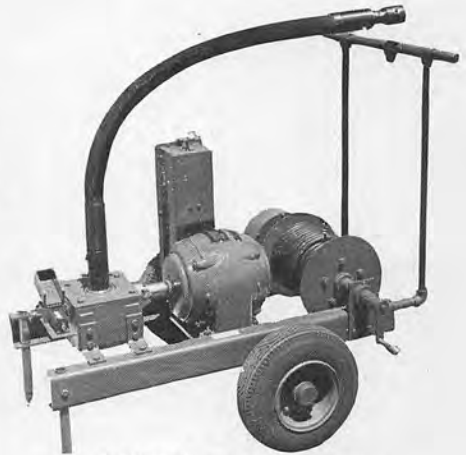


**F-5054 Carryable Gatender**

**F-5057 Portable Gatender**

The F-5057 Portable Gatender is an electrically driven operator that is particularly well adapted for operation of hand operated floorstands in Water and Sewage Treatment plants. This equipment has a 1 H.P. motor driving an aluminum operating head, which transmits power to the handwheel of the floorstand by short flexible shaft. Safety shear coupling and revolution counter are included. Cable and drum are optional.

Larger units mounted on 3 and 4 wheel chassis with motors up to 5 H.P. are available for operating either floorstands or underground valves.



**F-5057 Portable Gatender**

**F-5060 Floorstand for Power Operation**

The F-5060 Floorstand is a ball bearing, worm geared floorstand to be operated by Payne Dean valve operators. Worms gear ratios 15-30-35 to 1. Each stand has a separate safety coupling, revolution counter, and handwheel.

Both rising stem and non-rising stem floorstands are available to take stem diameters up to 3½-inches. One Valve Operator will service any number of floorstands.



**F-5060 Floorstand operated by Portable Gatender**



DRINKING FOUNTAINS—DRINKING FAUCETS



F-6010

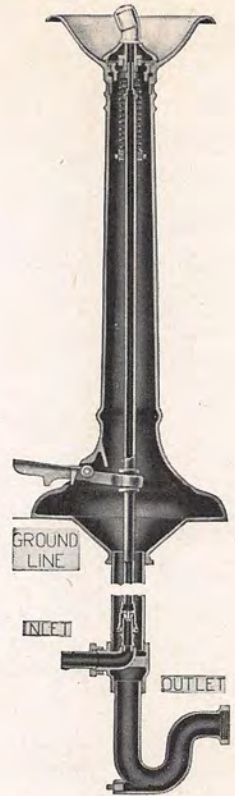
Frost-proof cast iron green painted pedestal drinking fountain with aluminized painted cast iron receptor; anti-squirt angle stream head with concealed screw volume regulator; brass waste plug with strainer; 3/4-inch I.P. supply connection; self-closing foot pedal control; and cast iron trap with 1 1/2-inch I.P. connection. Supply and waste connections extended below frost line.

Height from ground to top of rim, 30 or 34 inches.  
Diameter: of receptor, 12 inches; of base, 14 inches.

Depth to supply pipe . . . . . Feet	2	3	4	5	6
Approx. weight, each . . . . . Pounds	115	120	125	130	135

Specify height of fountain and depth to supply when ordering.

The F-6010 fountain can also be furnished with white porcelain enameled iron or chromium-plated bronze receptor; chromium-plated bronze receptor with white porcelain enameled pedestal; white porcelain enameled all over; or galvanized all over.



Sectional View of the F-6010 Frost-proof Fountain

DRINKING FAUCETS



F-6015\*

Self-closing drinking faucet with cross handle, 2-stream mound building head with hood guard, and automatic volume regulator. Flange tapped for 1/2-inch supply.

Approximate weight, each 5 pounds.

\* F-6015 can also be furnished without automatic volume regulator.



F-6018

Self-closing lavatory drinking faucet with lever handle, 2-stream mound building head with hood guard, and volume regulator. Coupling and tailpiece for 1/4" supply.

Approximate weight, each 3 1/2 pounds.



F-6022

Self-closing drinking faucet with lever handle 2-stream mound building head with hood guard. Inlet tapped for 3/8-inch supply.

Approximate weight, each 3 pounds.

Note

Other styles of drinking fountains can be furnished. Write us for information.



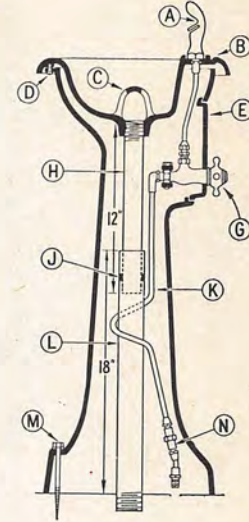


**CLOW VANDAL-PROOF DRINKING FOUNTAIN**

For Either Indoor or Outdoor Installation



**F-6050 Drinking Fountain**



**Section**

The Clow cast iron pedestal drinking fountain with white acid-resisting porcelain enameled pedestal and receptor with integral strainer tapped female for 1-inch waste pipe; 2-stream mound building head with hood guard; self-closing stop with four-ball handle; 3/8-inch O.D. flexible copper tubing supply with elbow connection to stop, automatic flow control regulator, and with coupling connection for joining at floor line to 1/4-inch I.P. size supply line; galvanized waste pipe consisting of upper section of 1-inch size 12 inches long with the plain end beveled to telescope into lower section of 1 1/2-inch size 18 inches long, with roll-in gasket; lag screws and washers.

Height from ground to top of rim, 30 inches.  
 Diameter: of receptor, 13 1/2 inches; of base, 12 inches.  
 Approximate weight crated, each 85 pounds.

Can also be furnished, when specified, with the pedestal in forest green porcelain enamel—or just prime coated for decorating after installation.

*Fountain heads are mounted on an elevated base to meet requirements of public health dep'ts.*

**PARTS DESCRIPTION**

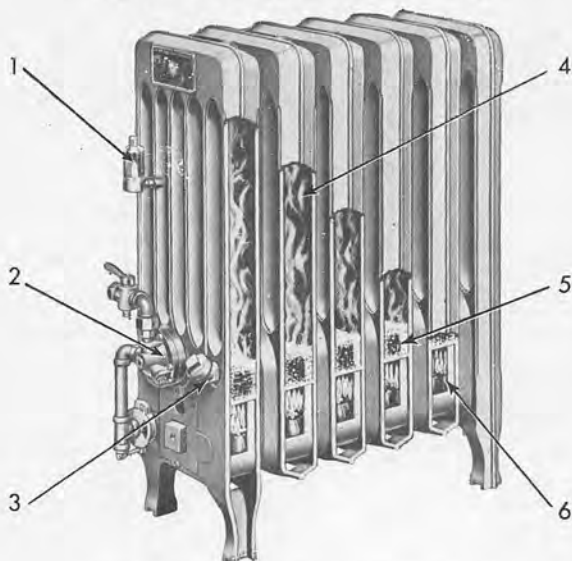
- (A) Chromium-plated 2-stream head, arranged so that it cannot be removed from top of basin.
- (B) Integral raised base. Water supply cannot be contaminated should waste line become clogged.
- (C) Integral beehive strainer.
- (D) Three brass cap screws fastening receptor to pedestal from under side of rim.
- (E) Cast iron access door held in place by handle stem assembly and integral cast locking device, requiring special tools which are furnished. Final hook-up of supply line between the stop and the head is made through this opening.
- (G) Self-closing stop with all parts renewable
- (H) 1-inch galvanized steel waste pipe with beveled end.
- (J) Rubber molded gasket.
- (K) 1/4-inch (3/8-inch O.D.) flexible copper supply with flared fittings for connections, looped around waste pipe.
- (L) 1 1/2-inch galvanized steel waste pipe, top end reamed inside.
- (M) Three extra long lag screws.
- (N) Automatic water flow control regulator, designed to keep stream of water uniform.

Installation instructions are furnished with each fountain shipped.



## CLOW GASTEAM RADIATOR

Makes Its Own Steam Heat with Gas



Made in both Vented and Unvented types

- |   |   |   |   |
|---|---|---|---|
| 1 | Air valve that automatically allows air in the radiator to escape, but holds back steam.                        | 4 | Steam rising in the radiator sections and evenly heating all portions of the radiator.      |
| 2 | Steam regulator that automatically controls the size of the gas flame to maintain uniform heat in the radiator. | 5 | Boiling water that is heated from the gas flames below it and which supplies the steam.     |
| 3 | Filling cup by means of which the water supply for the steam is replenished.                                    | 6 | Gas burner enclosed in a combustion chamber in the bottom portion of the radiator sections. |

### Combines

The Superiority of Steam Heating  
The Flexibility of Individual Room Heaters  
The Cleanliness and Convenience of Gas

#### It Requires No Boiler, Basement, or Steam Pipes

Each Clow Gasteam radiator is a complete steam heating unit. The gas flame, completely enclosed in the lower part of the radiator, generates steam from a shallow layer of water and the steam completely and evenly heats the entire radiator. A steam pressure regulator on each radiator automatically controls the gas flame so that the steam pressure remains uniform.

#### It is One of the Most Economical Heating Systems Ever Devised

The low fuel cost of Gasteam heating results from making the heat right where it is needed in each room and in just the right amount to meet the varying demands caused by changing outside temperatures, by wind direction, and by the amount of sunshine. There is no heat loss from a boiler or steam piping, because there are none with Gasteam.

#### It Provides Uniform Heat for Each Room Independently of All Others

By locating Clow Gasteam radiators underneath windows and along outside walls, the cold air from these sources is warmed before it starts across the floors. Gasteam produces a gentle circulation of warm air that, together with the direct radiant heat from the radiator surfaces, results in comfortable, pleasant and uniform heating.

#### It Combines Superiority of Radiator Heat with Flexibility of Room Heaters

The completely independent operation of each Clow Gasteam radiator permits the installation of large enough units in each room to properly heat that room during the coldest days but, through individual control of each radiator, the heat can be regulated to just the right amount for the more moderate days of Fall and Spring.





## CLOW GASTEAM RADIATORS

Use Manufactured—Natural—Propane—Butane or Sewage Gas  
Vented and Unvented Types for Varying Requirements

In the selection of vented or unvented radiators for the average installation, the severity of the winter climate should be given first consideration. Where freezing temperatures rarely occur, all unvented are used. Where freezing temperatures are common, some of the radiation should be vented. Where the temperature falls below zero, most of the radiation should be vented.

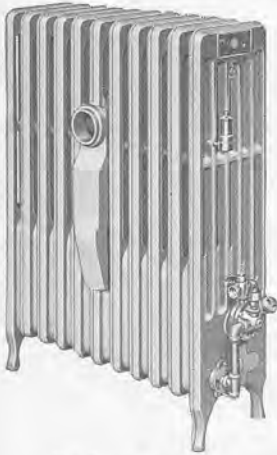
With vented radiators the moisture produced by the burning gas is carried to the outside of the building through vent stacks. With unvented radiators the moisture is added to the room air and provides the humidity necessary for winter heating.

An intelligent proportioning of vented and unvented radiators will provide healthful humidity and at the same time prevent excessive condensation on the windows.

### Ratings of Vented Radiators

Six Tube Vented		32 Inches High Approx. Ship. Wt. 36 lbs. per Section		38 Inches High Approx. Ship. Wt. 40 lbs. per Section	
Number of Sections	Lgth. less Gas Cock Inches	Equiv. Sq. Ft. of Radiation	B.t.u. per Hour Delivery	Equiv. Sq. Ft. of Radiation	B.t.u. per Hour Delivery
5	15½	26	6200	...	...
7	20½	35	8400	44	10600
9	25½	44	10600	56	13500
11	30½	53	12700	67	16100
13	35½	62	14900	78	18800
15	40½	71	17000	90	21600
19	50½	90	21600	114	27400
23	60½	108	26000	138	33100

Outside diameter of vent opening is 4"; inside diameter, 3".

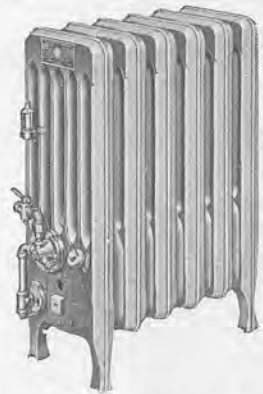


Six Tube Vented  
Clow Gasteam Radiator

### Ratings of Unvented Radiators

Six Tube Unvented		22 Inches High Approx. Ship. Wt. 35 lbs. per Section		31 Inches High Approx. Ship. Wt. 47 lbs. per Section	
Number of Sections	Lgth. less Gas Cock Inches	Equiv. Sq. Ft. of Radiation	B.t.u. per Hour Delivery	Equiv. Sq. Ft. of Radiation	B.t.u. per Hour Delivery
3	13¾	25	6000	...	...
4	17½	33	7900	49	11800
5	21¼	41	9800	61	14600
6	25	49	11800	73	17500
8	32½	63	15100	97	23300
10	40	77	18500	121	29000
12	47½	89	21400	145	34800
14	55	104	25000	179	43000

Automatic cut-off valve required with LP gas.



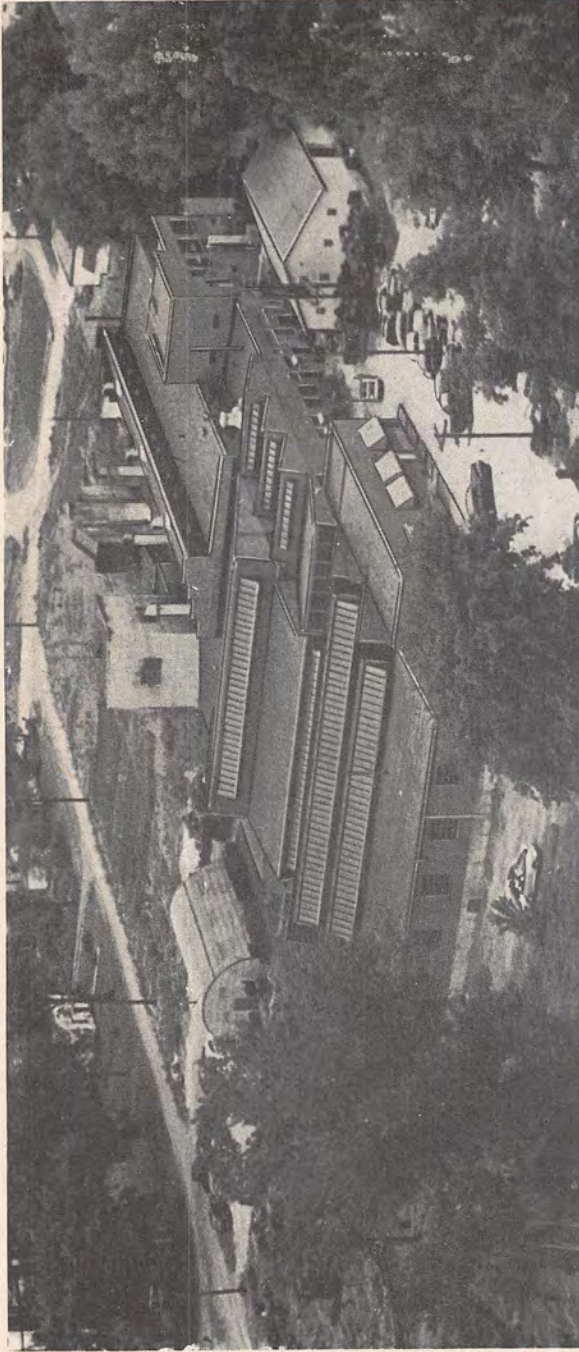
Six Tube Unvented  
Clow Gasteam Radiator

All radiators furnished with left-hand trim unless right-hand trim is ordered.

Two-way burners are optional equipment on all types of Gasteam radiators. The two-way burner is divided into two parts—the front division serves as a pilot lighter and supplies just enough heat to keep the front portion of the radiator moderately warm. When the full heating capacity of the radiator is required, all that is necessary is to turn on the gas cock controlling the rear burner. A steam pressure regulator automatically maintains a constant steam pressure in the radiator.

An automatic cut-off valve (safety pilot valve) can be furnished, which automatically shuts off all gas flow to the radiator in case the pilot flame is accidentally extinguished.

Room temperature control can be furnished with Clow Gasteam radiators where manual operation is inconvenient.



### The Iowa Valve Company

The Iowa Valve Company, founded in 1909, has been a subsidiary of James B. Clow & Sons, Inc., since 1947. Located at Oskaloosa, in southeastern Iowa, on the Rock Island and the Minneapolis and St. Louis Railways, the plant is situated to make fast shipment by rail or truck throughout the entire West.

Since its founding, the company has grown with the communities and the industries its products have served for so many years. Today, Iowa products include fire hydrants, valves and accessories for water distribution, water filtration, and sewage treatment plants and, also, for many industrial uses.



# IOWA



## FIRE HYDRANTS—VALVES

### and Accessories

In order to display Iowa products with emphasis on product grouping, and also to maintain established figure numbers appearing in other printed matter, some figure numbers of Iowa products are not in numerical sequence. To facilitate finding product by figure number this index below has been prepared.

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## IOWA VALVE COMPANY

General Sales Office and Plant  
Oskaloosa, Iowa

Subsidiary of James B. Clow & Sons, Inc.





## IOWA FIRE HYDRANTS

### DESCRIPTION

Iowa Latest Improved Corey Type Fire Hydrants are designed and built for many years of rugged service, easy operation and maximum water delivery. Their advanced design assures minimum friction losses, positive drainage and easier maintenance. Their sound construction equals or exceeds specifications of the American Water Works Association in every particular.

As the hydrant is opened the main valve, fitted with a specially compounded valve rubber, is moved from its seat by two operating arms of strong cast iron. The operating arms provide solid support between the back of the hydrant and the main valve through the upper and lower stem nuts. Four full turns of the operating nut provide an opening equal to the area of the valve opening. When hydrant is opened all the way, the main valve is moved back entirely out of the waterway, and delivers a solid stream of water the full size of the valve opening.

In closing, the main valve is moved rapidly toward its seat with the first few turns of the operating nut. The movement of the valve is slowed as closing of the hydrant continues, providing a sure and gradual seating of the main valve and eliminating any chance of water hammer.

When the valve is closed, a mechanically actuated drain valve at the bottom of the hydrant opens and any water remaining in the hydrant drains out. The drain valve consists of a bronze barrel with a tapered seat and a cup-shaped rubber designed to assure positive closing of the drain when the hydrant is open. When the hydrant is closed, the drain rubber is out of contact with its seat. In opening the hydrant, the first two turns of the operating nut automatically close the drain valve. In closing the hydrant, the last two turns of the operating nut automatically open the drain valve. This eliminates any loss of pressure through the drain valve or any washing away of soil at the base of the hydrant.

### Pipe Line Connections

**Hub End:** The 4-inch hydrant ( $4\frac{1}{4}$ " valve opening) is normally furnished with hub end for 4 or 6-inch pipe. The 5-inch hydrant ( $5\frac{1}{4}$ " valve opening) and 6-inch hydrant ( $6\frac{1}{4}$ " valve opening) are normally furnished with hub end for 6-inch pipe; however, hub end connection for 8-inch pipe can be supplied at additional cost.

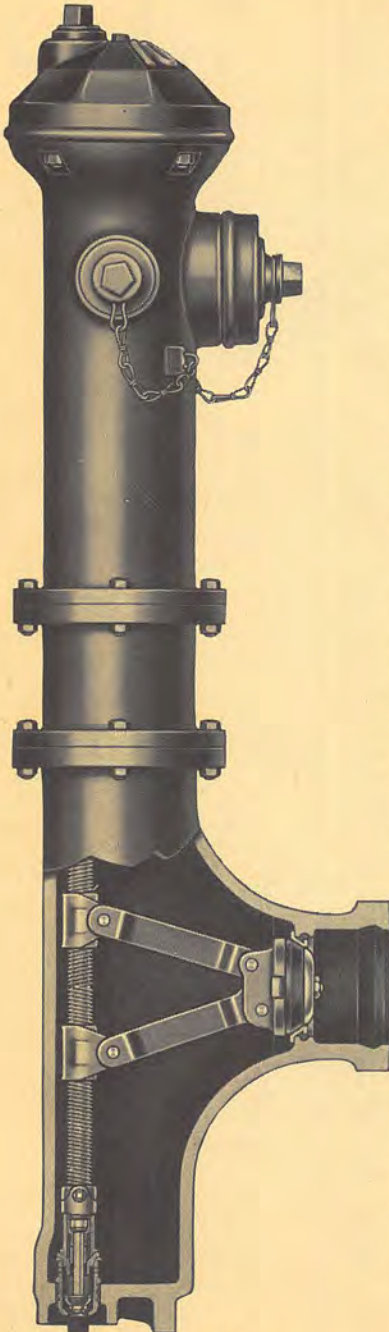
Hub end hydrants can be furnished with bolting lugs on 4, 6 and 8-inch hubs, to permit anchoring the hydrant to the supply line.

**Flanged End:** The  $4\frac{1}{4}$ ",  $5\frac{1}{4}$ ", or  $6\frac{1}{4}$ -inch main valve opening hydrants can be furnished with flanged end for 4, 6, or 8-inch pipe.

All flanges are faced and drilled to comply with Class 125 American Standard Drilling, ASA B16.1.

**Mechanical Joint:** Both the standardized mechanical joint and the Cutting-in type Mechanical Joint can be furnished for 4, 6 and 8-inch pipe connections. Unless otherwise ordered, hydrants are shipped complete with accessories, with plain rubber gaskets.

**Other End Types:** Can be furnished to order.



Sectional View  
Showing  
Hydrant in Closed Position  
and Drain Valve Open





## IOWA FIRE HYDRANTS

### ADVANTAGES

Iowa Fire Hydrants offer many advantages in design and are constructed of best quality materials.

#### Fire Protection and Service

The free and unobstructed flow of water through the hydrant assures maximum water delivery and minimum pressure loss.

Opening with the pressure permits water to enter the hydrant instantly and provide water at the nozzles in the shortest possible time.

Working parts are entirely clear of the waterway in the fully open position.

The fixed position of the arms in the closed position prevents flooding in case of standpipe breakage. The main valve is kept closed mechanically, not by water pressure.

The foolproof drain valve constructed entirely of bronze, will not rust or corrode. It is entirely automatic. It provides rapid drainage of the hydrant after use and closes securely when the hydrant is open.

The superior design of this hydrant guarantees gradual, sure closing against the pressure, eliminating water hammer.

#### Easy Maintenance and Repair

An ordinary wrench is the only tool required to remove all working parts.

All working parts can be removed from the top. There is no digging required to inspect, repair or replace any of the internal working parts.

All working parts rest on the bottom of the hydrant. No special adjustment is needed to align the main valve with its seat.

The simple and sturdy operating arms assure trouble-free service. They are designed for maximum strength and made of high strength cast iron.

A damaged top section can be replaced, or the hydrant nozzles raised, without digging. The flange at the ground line makes removal or raising easy.

Hose nozzles and steamer nozzles are threaded into the hydrant standpipe. They cannot blow out or leak. In the event of damage, they are easily replaced.

Removal of the single dome bolt and dome makes the standard stuffing box immediately accessible for repacking. When the Iowa O-Ring stuffing box is used, specially developed O-rings eliminate the need for conventional packing.

#### Materials, Construction and Design

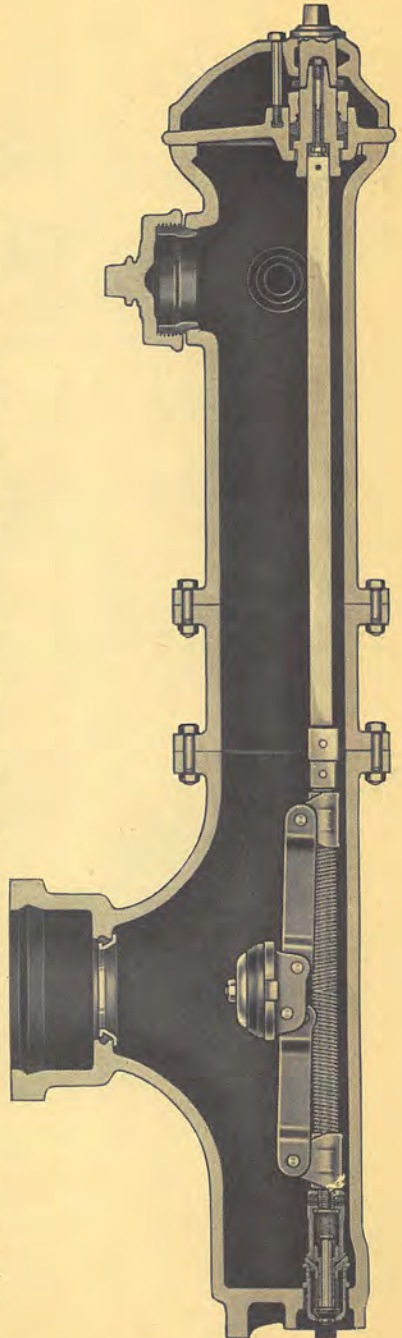
All cast iron used is of high strength and controlled quality.

The stem, arm pins and gate pins are of Everdur bronze. All other bronze parts are of high strength cast manganese bronze.

Specially produced rubber of the finest quality is used for the main valve and the drain valve.

The rod between the bronze stem and the operating nut is of high strength steel.

All materials used in Iowa Hydrants equal or exceed the requirements of the American Water Works Association in every detail.

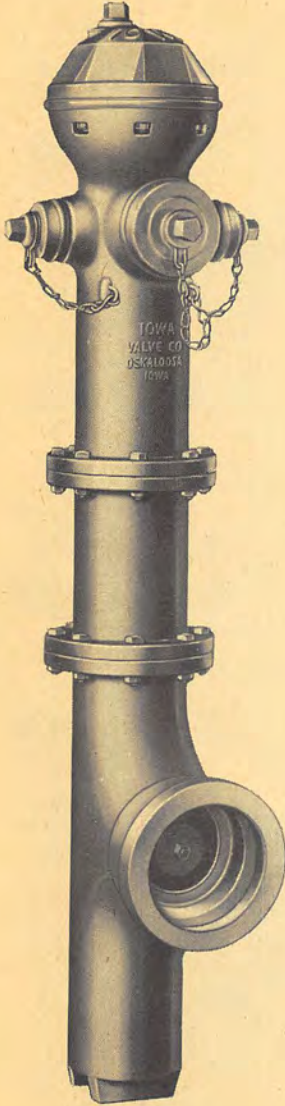


Sectional View  
Showing  
Hydrant in Open Position  
and Drain Valve Closed



## IOWA FIRE HYDRANTS

HUB, MECHANICAL JOINT, OR FLANGED CONNECTION



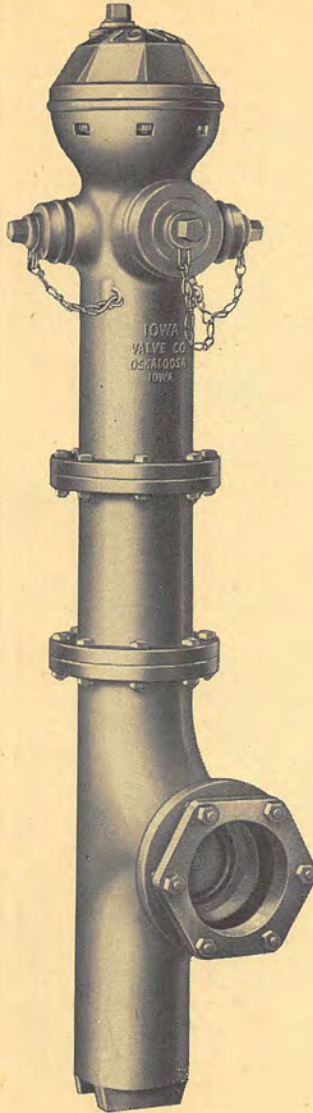
Hub

**F-5100-P**

with pumper nozzle

**F-5100**

without pumper nozzle



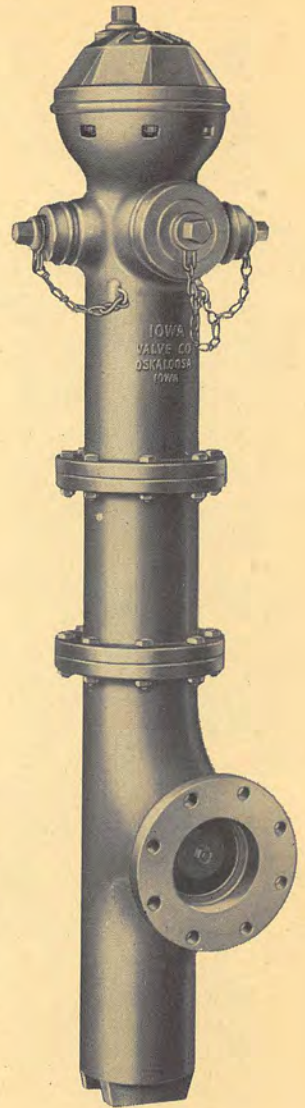
Mechanical Joint

**F-5105-P**

with pumper nozzle

**F-5105**

without pumper nozzle



Flanged

**F-5110-P**

with pumper nozzle

**F-5110**

without pumper nozzle

Iowa Hydrants can be furnished with any of the standard nozzle arrangements shown on the opposite page. Unless otherwise specified, hose nozzle threads will be the National Standard Hose Threads—details appear on page 290.

Hydrant sizes are determined by the diameter of the main valve opening. Iowa hydrants are available with 4¼, 5¼, or 6¼-inch valve opening. For sizes of various pipe connections available, see page 226.



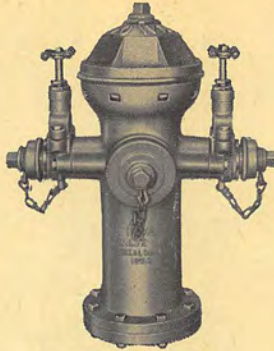


## IOWA FIRE HYDRANTS

### STANDARD NOZZLE ARRANGEMENTS



Two 2 1/2-inch  
Hose Nozzles

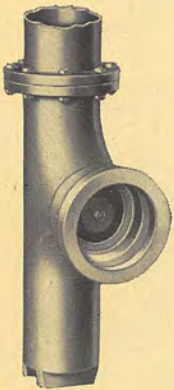


Outside Independent  
Hose Nozzles



Two 2 1/2-inch Hose Nozzles  
One Pumper Nozzle

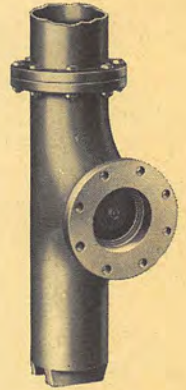
### TYPES OF PIPE CONNECTIONS



Hub



Mechanical Joint

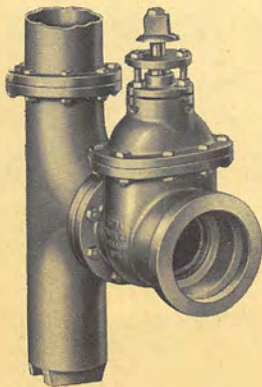


Flanged

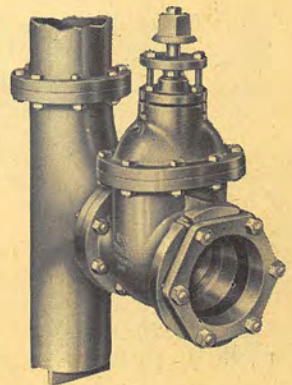
### AUXILIARY VALVES

Auxiliary valves have either Flanged and Hub or Flanged and Mechanical Joint ends and are used in conjunction with flanged end fire hydrants to provide for independent shut-off. They meet AWWA valve requirements and are available in 4, 6 and 8-inch sizes.

The auxiliary valve bolts directly to the flanged inlet of the hydrant and, when the valve is closed, inspection and repairs of internal parts of the hydrant can be made without interrupting water service to consumers.



Flanged and Hub  
Auxiliary Valve

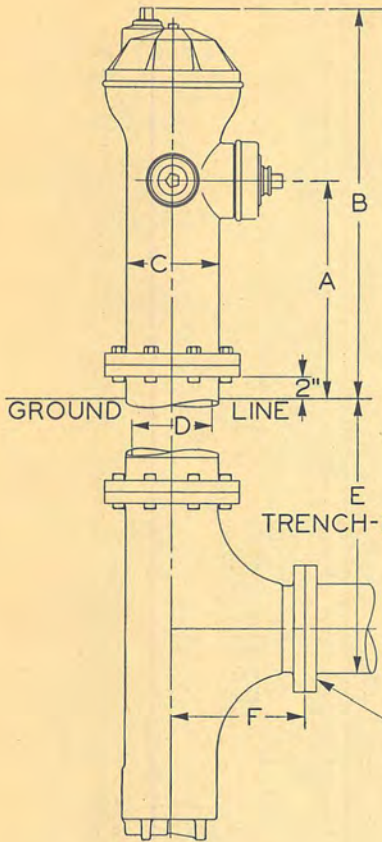


Flanged and Mechanical Joint  
Auxiliary Valve



## IOWA FIRE HYDRANTS

### DIMENSIONS



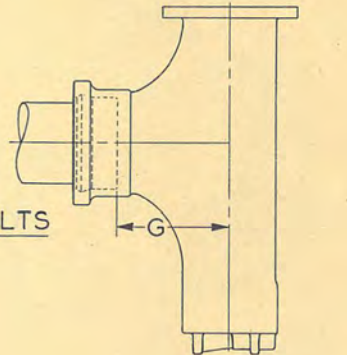
#### Dimensions — Inches

Dimensions	Size Main Valve Opening		
	4¼-inch	5¼-inch	6¼-inch
A	19	19	19
B	34	34¾	35
C	6⅞	8	9⅞
D	6	7	8
E	As ordered	As ordered	As ordered
G	9	9¾	12

The following dimensions apply for flanged connection

	4-inch	6-inch	6-inch	8-inch	6-inch	8-inch
F	11⅝	11⅝	11¾	11¾	12⅜	12⅜
H	8-⅝"	8-¾"	8-¾"	8-¾"	8-¾"	8-¾"
I	7½	9½	9½	11¾	9½	11¾

H=NO. & DIA. of BOLTS  
I=BC.



FLANGE END TYPE

HUB END TYPE

### F-5130 Extension Sections

Iowa Fire Hydrants can be extended to any desired length, without interrupting the flow of water with the use of extension sections. These sections are made in lengths from 6 to 60 inches, in 6-inch increments. Each section is flanged at both ends for bolting in place between the ground line flange and the nozzle section of the hydrant. Gaskets, bolts and nuts for one flange end are furnished with each extension section.

Extension rods, with coupling and pins, are also provided for lengthening the hydrant stem, which is drilled to receive the insert pin furnished with the extension rod.



F-5130  
Extension Section

### Hydrant Wrench



F-2750  
Hydrant Wrench

The Iowa Combination Hydrant Wrench combines hose spanner and serrated jaw (adjustable for size and shape) for the nuts on the operating stem and nozzle caps of fire hydrants. Effective length is 15 inches.

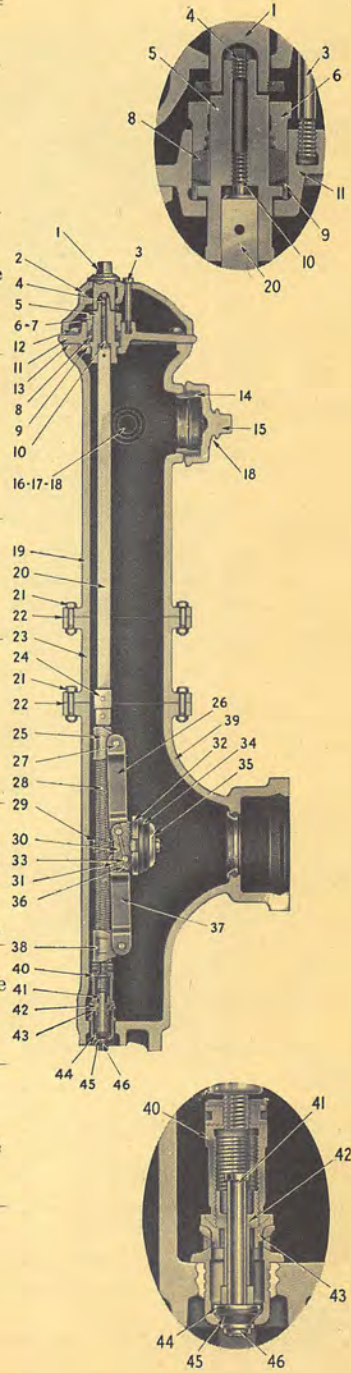




## IOWA FIRE HYDRANTS

### PARTS LIST

Part No.	Part	Number Required	Construction
1	Operating nut and retaining ring	1	Cast iron and bronze
2	Dome	1	Cast iron
3	Dome bolt	1	Steel
4	Cap screw	1	Bronze
5	Operating sleeve	1	Cast iron
6	Stuffing box follower	1	Cast iron, bronze bushed
7	Follower bolts	2	Steel—nuts bronze
8	Stuffing box packing		Lubricated
9	Stuffing box packing ring	1	Bronze
10	Adjusting screw	1	Bronze
11	Head	1	Cast iron
12	Head bolts and nuts	4 (4 1/4") 8 (5 1/4", 6 1/4")	Steel
13	Head gasket	1	
14	Pumper nozzle	1	Bronze
15	Pumper nozzle cap	1	Cast iron
16	Hose nozzle	1	Bronze
17	Hose nozzle cap	1	Cast iron
18	Nozzle chain	1 Set	Steel
19	Stand pipe	1	Cast iron
20	Square operating rod	1	Steel
21	Flange bolts and nuts	4 (4 1/4") 8 (5 1/4", 6 1/4")	Steel
22	Flange gasket	2	
23	Extension piece	1	Cast iron
24	Coupling and pin	1	Bronze
25	Top stem nut	1	Bronze
26	Upper operating arm	1	Cast iron
27	Operating arm pins	2	Everdur bronze
28	Threaded stem	1	Everdur bronze
29	Center piece and pin	1 (5 1/4" & 6 1/4")	Everdur bronze
30	Connecting link	1	Aluminum bronze
31	Connecting link pins	2	Everdur bronze
32	Gate, stud, and nut	1	Cast iron—bronze
33	Gate pins	2	Everdur bronze
34	Rubber valve	1	Rubber
35	Gate washer	1	Cast iron
36	Cotter pins	2	Brass
37	Lower operating arm	1	Cast iron
38	Bottom stem nut	1	Bronze
39	Bottom, seat ring, and drain barrel	1	Cast iron—bronze
40	Drain valve holder	1	Bronze
41	Drain valve lifter stem	1	Bronze
42	Drain valve	1	Bronze
43	Drain valve lifter guide	1	Bronze
44	Drain rubber valve washer	1	Bronze
45	Drain rubber valve	1	Rubber
46	Drain valve lifter washer nut	1	Bronze

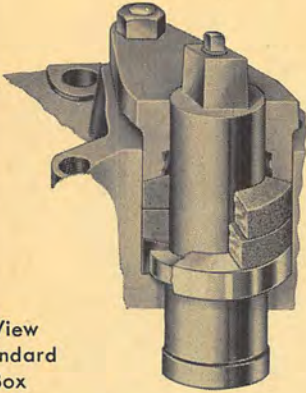


Specify part number when ordering.

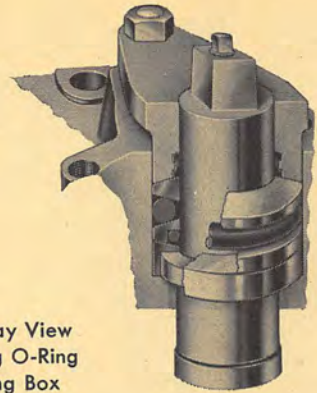


**IOWA FIRE HYDRANTS**

**HYDRANT STUFFING BOX CONSTRUCTION**



Cutaway View  
Showing Standard  
Stuffing Box



Cutaway View  
Showing O-Ring  
Stuffing Box

Iowa Hydrants are available with either the Standard stuffing box or the O-Ring type of stuffing box construction. Unless otherwise specified, hydrants are regularly furnished with the Standard stuffing box, packed with a braided, graphited, asbestos packing which gives years of trouble-free service, and which

can be quickly replaced whenever necessary.

The O-Ring packing incorporates two specially designed O-Ring seals. The top ring is the dirt seal, and the lower ring is the pressure seal. The construction provides an excellent seal, and can be made a part of any Iowa hydrant, no matter when it was installed.

**DIRECTIONS FOR ORDERING  
IOWA FIRE HYDRANTS**

1. **Quantity.**
2. **Size of Main Valve Opening**—4¼, 5¼, or 6¼-inch.
3. **Number of 2½-inch Hose Nozzles.**
4. **Number and Size of Steamer or Pumper Nozzle.**
5. **Type of Inlet Connection**—Hub, flanged, mechanical joint, etc.
6. **Size of Inlet Connection**—4, 6, or 8-inch.
7. **Depth of Trench**—Distance to bottom of connecting pipe.
8. **Size and Shape of Operating Nut**—National Standard is 1½-inch pentagon shape—measured from point to opposite flat.
9. **Direction of Opening**—Usually left (counter-clockwise). If hydrants previously installed open right, new hydrants should be ordered to open in the same direction.
10. **Hose and Steamer Nozzle Threading**—If other than National Standard, specify by name or send the following with your order.
  - (a) Sample nozzle from hydrant or male coupling from fire hose.
  - (b) Drawing giving complete thread specifications. (See page 290).
  - (c) If we have furnished hydrant to you previously, this information about threads is not required as records are kept of each installation.
11. **Color**—Specify color of paint wanted.
12. **Stuffing Box**—Standard stuffing box is furnished unless otherwise specified.





## IOWA LIST 14

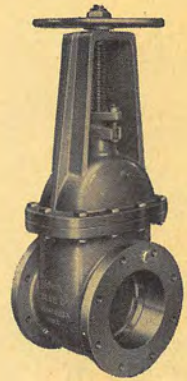
### AWWA HEAVY PRESSURE GATE VALVES

IRON BODY, BRONZE MOUNTED  
DOUBLE DISC, PARALLEL SEAT

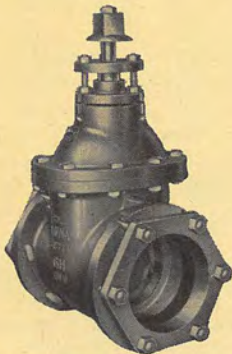


F-5150 Hub Ends  
Non-Rising Stem  
2" thru 36"

Valve Size Inches	Working Pressure psi		Hydrostatic Test Pressure psi
	Non-Shock Cold Water	Steam	
	2 thru 12	200	125
14 thru 36	150	100	300



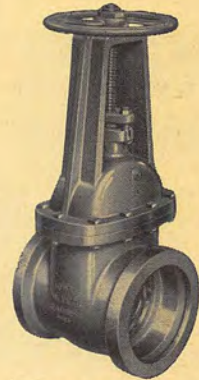
F-5175 Flanged Ends  
O S & Y  
2" thru 36"



F-5155 Mech. Joint  
Non-Rising Stem  
3" thru 24"



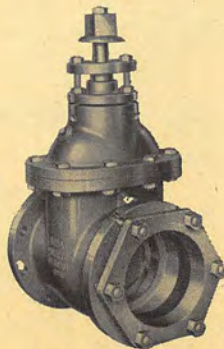
F-5165 Flanged Ends  
Non-Rising Stem  
2" thru 36"



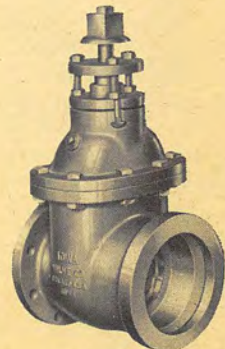
F-5180 Hub End  
O S & Y  
2" thru 36"



F-5160 Screwed Ends  
Non-Rising Stem  
2" thru 12"



F-5170\* Flanged and  
Mechanical Joint Ends  
with Non-Rising Stem



F-5185\* Flanged  
and Hub Ends  
Non-Rising Stem

\*For use as auxiliary valves—sizes 4, 6, and 8-inch.





## IOWA LIST 14

### AWWA HEAVY PRESSURE GATE VALVES

#### IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

##### Pressure Ratings

Valve Size Inches	Working Pressure psi		Hydrostatic Test Pressure psi
	Non-Shock Cold Water	Steam	
2 thru 12	200	125	350
14 thru 36	150	100	300

##### DESCRIPTION AND ADVANTAGES

Iowa AWWA Gate Valves are double disc, parallel seat valves designed primarily for flow control of water in underground pipe lines. They equal or exceed the requirements established by specifications of the American Water Works Association and conform to Federal Specifications WW-V-58, Type II, Class A.

Iowa AWWA Gate Valves are specifically designed for heavy pressure service. Neck, flanges, and bell are made extra heavy to withstand pipe strain and ground shifting. Body, cover, gates, and stem are built for extra strength, with clean and simple internal construction, to assure long service and low maintenance in inaccessible locations.

All working parts are bronze or bronze mounted and are standardized, and interchangeable.

The construction of Iowa List 14 Valves is clearly illustrated by the sectional view on the opposite page.

**Body:** Cast iron, bronze mounted. Sturdy proportions provide protection against damage.

**Stem:** Manganese bronze of high tensile and torsional strength, with accurate, perfectly machined threads. Ample diameters assure smooth valve movement.

**Stem Nut:** Solid bronze. Independent of hooks, gates, and wedges. Stem or stem nut will not bind or spring out of line, as can happen when stem nut is attached to wedges.

**Wedges:** Independent, solid bronze. In 8-inch and smaller valves, two V-shaped wedges placed loosely in iron hooks are free to adjust to varying positions of the gates—see sectional view, opposite page.

In 10-inch and larger valves, each wedge has one long and one short surface. The bottom of each wedge forms a rocker bearing on the iron hooks, letting wedges adjust to varying positions of the gates in closing. The long side is

used in closing the valve and the short side in opening it.

**Gates and Gate Rings:** Gates are high strength cast iron. Bronze gate rings are rolled into machined and dovetailed grooves under pressure to make gate and ring one inseparable unit. After fitting, gate rings are accurately machined to provide a watertight surface.

**Case Rings:** Bronze case rings are screwed into place and machined to a watertight surface. They can be removed and replaced if necessary.

**Operating Nut and Handwheel:** All valves except flanged valves and outside screw and yoke valves are supplied with 2-inch square operating nuts of high strength cast iron unless otherwise specified. Flanged valves and outside screw and yoke valves are supplied with handwheels of high strength cast iron unless otherwise specified. Direction of opening is indicated by arrow cast on operating nut skirt or on the rim of the handwheel.

**Yoke:** Yokes for outside screw and yoke valves are of rugged cast iron. On 8-inch and smaller valves they are cast integral with the cover. Yokes are bolted to valve cover on 10-inch and larger valves. Careful machining assures accurate stem alignment.

**Rollers, Tracks, and Scrapers:** When specified for 16-inch or larger valves, bronze tracks and rollers are provided to overcome friction. Scrapers assure a clean track and easy roller travel. This provision is recommended when valves are to be used in a horizontal position in a horizontal pipe line.

**Slides:** For 16-inch and larger valves, intended to lie flat in vertical pipe lines, we recommend the use of bronze slides to assure positive and perfect seating of the gates without unusual wear.

**NOTE:** All valves open to the left unless otherwise specified.



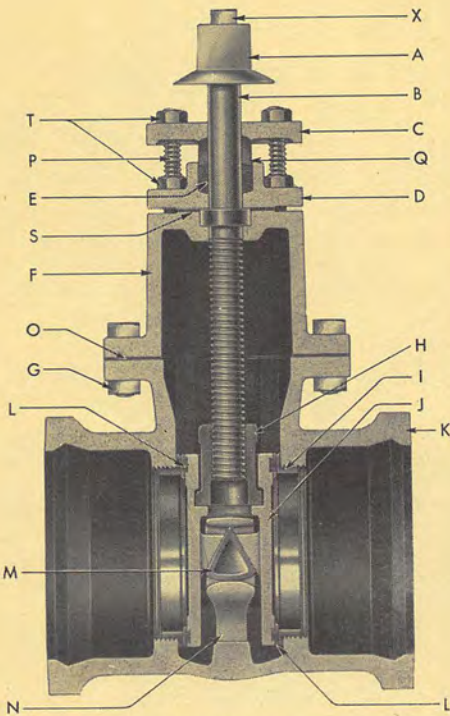


IOWA LIST 14

AWWA HEAVY PRESSURE GATE VALVES

IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

SECTIONAL VIEW AND PARTS LIST



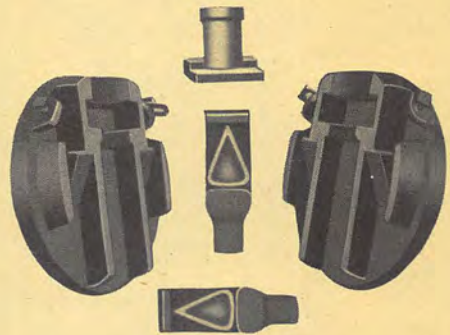
Sectional View

OPERATION OF THE VALVE

Turning the stem releases the valve wedging mechanism, relieves the wedging pressure on the gates and opens the valve. Further turning of the stem raises the gates into the fully open position.

When closing the valve, the gates move freely downward without friction, to a position opposite their seats.

As the gates approach the bottom of the valve, the iron hooks come into contact with stops which prevent further downward movement of the hooks. The bronze wedges riding on these hooks spread the gates apart and force them against their seats to effect a watertight seal and shut off all flow through the valve.



Gate Assembly

Valves 16 inches and larger have bronze facings on the wedging surface.

PARTS LIST

Part Letter	Part	Part Letter	Part
A	Wrench nut: cast iron	K	Body: cast iron
B	Stem: bronze	L	Gate ring: bronze
C	Stuffing box follower: cast iron	M	Wedge: bronze
D	Stuffing box: cast iron	N	Hook: cast iron
E	Packing	O	Neck flange gasket
F	Cover: cast iron	P	Stuffing box bolts: rust-proofed steel
G	Neck flange bolts and nuts: rust-proofed steel	Q	Follower gland: bronze
H	Stem nut: bronze	S	Stuffing box gasket
I	Case ring: bronze	T	Follower and stuffing box nuts: bronze
J	Gate: cast iron	X	Hold-down nut

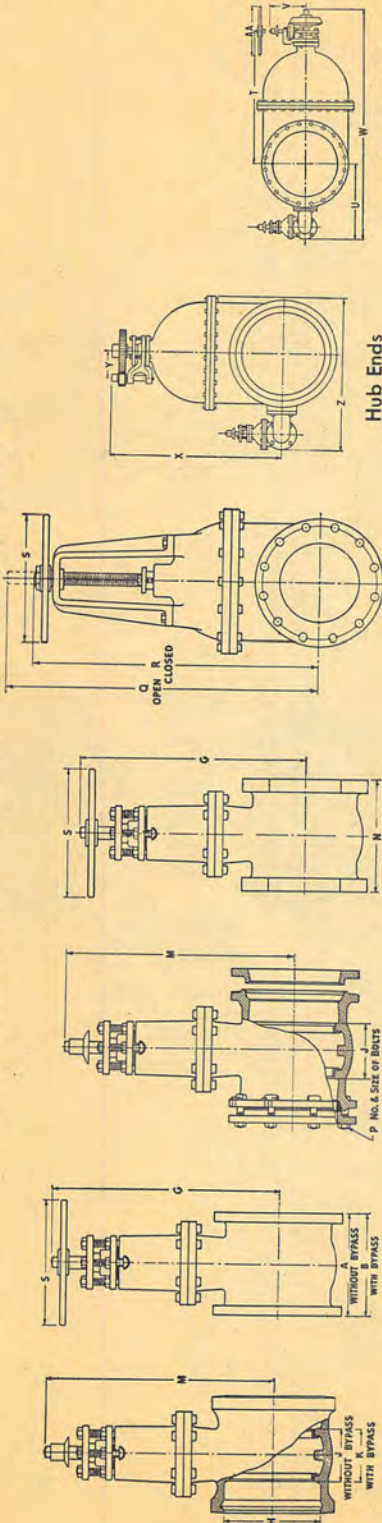


# IOWA VALVE COMPANY

A Subsidiary of James B. Clow & Sons



## DIMENSIONS OF IOWA LIST 14 AWWA HEAVY PRESSURE GATE VALVES IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT



Hub Ends, NRS  
Flanged Ends, NRS  
Screwed Ends, OS&Y  
Mechanical Joint, NRS  
Flanged Ends, OS&Y  
Screwed Ends, NRS  
Flanged Ends, OS&Y  
Hub Ends  
NRS with Spur  
Gears, By-pass  
Flanged Ends, NRS  
with Bevel Gears, By-pass

Dimensions—Inches

Size Inches	A	B	G	H	J	K	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	AA	Turns to Open	Diam. of Stem
2	7	...	11	3 1/8	3 1/4	...	11	5 1/4	...	12 3/4	10 3/8	7 1/4	...	...	...	...	...	...	...	...	5	7/8
2 1/2	7 1/2	...	11 1/2	...	...	...	...	5 3/4	...	15	12	7 1/4	...	...	...	...	...	5 1/2	...	...	6	7/8
3	8	...	12 1/2	4 5/8	3 3/8	...	12 1/2	6	4-5/8"	17	13 1/2	7 1/4	11 3/8	...	12 3/4	...	187/8	5 1/2	7 1/2	...	7	7/8
3 1/2	8 1/2	...	16	...	...	...	...	6 7/8	...	...	...	...	...	...	...	...	...	...	...	...	8	7/8
4	9	...	16 1/4	5 3/4	4 3/4	...	16 1/4	9 1/8	4-3/4"	21 1/2	17	9	14 1/8	...	12 3/4	...	...	...	...	...	10	1 1/16
5	10	...	18 3/4	...	...	...	...	10 1/4	...	26 7/8	21	10	15 3/4	...	12 3/4	...	...	...	...	...	18	1 1/4
6	10 1/2	...	20 1/2	7 15/16	5 1/2	...	20 1/2	10 3/4	6-3/4"	30 1/4	24 1/4	12	17 3/4	...	12 3/4	...	...	...	...	...	21	1 1/4
8	11 1/2	...	24 7/8	10	6 3/8	...	24 7/8	12 1/2	6-3/4"	38 1/2	29 1/2	13	20 9/16	...	12 3/4	...	...	...	...	...	27	1 3/8
10	13	...	30 1/4	12 1/2	6 3/4	...	30 1/4	13	8-3/4"	47 1/4	36 1/4	16	24 7/8	...	12 3/4	...	...	...	...	...	33	1 1/2
12	14	...	33	14 1/4	7	...	33	13 1/2	8-3/4"	55 1/2	42 1/2	18	27 7/8	...	16	...	...	...	...	...	39	1 5/8
14	15 3/4	...	38	16 3/8	7 3/4	...	33	14	10-3/4"	61 1/2	47	22	32	...	16	56 1/2	...	...	...	...	45	1 7/8
16	17	...	40	18 3/4	9 1/8	...	42	...	12-3/4"	68 1/2	51 1/2	22	34	23	16	63 1/4	...	...	...	...	...	...
18	19	...	44 3/4	20 3/4	9 1/4	...	46 3/4	...	12-3/4"	78	59	22	39	24	16	69 1/4	...	...	...	...	...	...
20	20	...	46	23	10 1/4	...	48	...	14-3/4"	84 3/4	63 3/4	24	41	25 1/4	16	73	...	...	...	...	...	...
24	23	...	53	27 3/8	10 1/2	...	55	...	16-3/4"	100 1/4	75 1/4	30	48	27 1/8	16	82 1/4	...	...	...	...	...	...
30	25	...	68 1/4	33 3/4	12 1/2	...	70 1/4	...	...	123 1/2	92	30	59 1/8	31 1/8	18 3/4	99 3/4	...	...	...	...	...	...
36	27	...	78 1/4	40 1/8	14	...	80 1/4	...	...	147 1/2	110	36	71	39 3/8	21 1/8	120	81	13 3/8	70	54 1/2	94	2 3/4
																					22	112

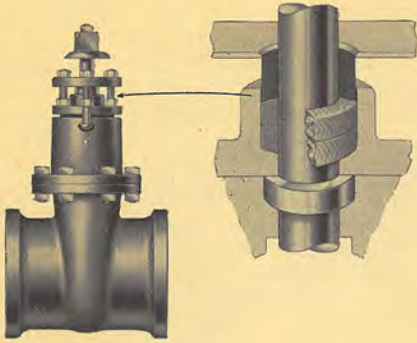
Flanges faced and drilled to ASA Class 125 standard, unless otherwise instructed.



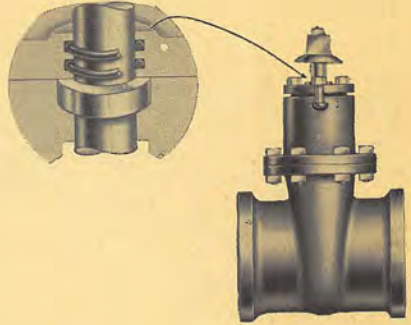


## IOWA VALVE STUFFING BOX CONSTRUCTION

Iowa Valves are available with either STANDARD stuffing box construction, or with O-RING stuffing box. Unless otherwise specified, valves are furnished with the standard stuffing box.



Standard Stuffing Box



O-Ring Stuffing Box

Valves in sizes 2 thru 12-inch the standard stuffing box has a two-piece cast iron follower with bronze gland. Larger size valves have a one piece cast iron follower with bronze bushing. The standard stuffing box is normally packed with a braided, graphited, asbestos packing, although other material can be furnished whenever specified. Valves with the standard stuffing box can be repacked under pressure with valve in fully open position.

The Iowa O-Ring stuffing box incorporates two specially designed rubber O-Ring seals. The top ring is the dirt seal, and the lower ring is the pressure seal.

This stuffing box eliminates the need for stuffing box follower, bolts and nuts. Manufactured to high standards and close tolerances, the O-Rings will not bind the stem. O-Rings provide an excellent seal which allows easy operation of the valve.

### ORDERING INFORMATION

When placing orders or making inquiries, please furnish the following information. This information will enable us to answer your questions, prepare quotations, and fill your order promptly. Lack of essential information is almost sure to cause delays.

#### Gate Valves

1. **Quantity.**
2. **Size.**
3. **Working Pressure**—See List Number pages 233, 240, 242 and 244.
4. **End Type or Types** are furnished with any combination available—see page 233.
  - 4A. **Flanged Valves**—Normally furnished with flanges drilled to 125-pound standard and bolt holes straddling center lines.
  - 4B. **Mechanical Joint Valves**—Can be furnished with either "Standardized" mechanical joints or "Cutting-in" type mechanical joint for use with either AWWA Sand Cast, WW-P-421, WW-P-421a, or ASA Cast Iron Pipe in all classes.
5. **Direction of Opening**—Unless otherwise specified, valves will be furnished to open left (counter-clockwise).
6. **Type of Stem**—State whether non-rising, outside screw and yoke, or sliding stem.
7. **Installation Position**—Indicate position in which valve will be installed (e.g.,

vertically in horizontal pipe line or horizontally in horizontal pipe line).

8. **Wrench Nut or Handwheel**—2-inch square operating nuts furnished on hub ends, mechanical joint, and screwed valves unless handwheels are specified. All OS&Y and flanged valves are furnished with handwheels.
9. **Gearing**—Either bevel or spur gearing can be furnished—see page 254.
10. **Gear Cases**—Extended gear cases can be furnished—see page 254.
11. **By-passes**—Give size required and location of valve—see page 255.
12. **Parts**—Order by part letter—see page 235.

#### Tapping Valves and Sleeves

1. **Quantity.**
2. **Nominal Size of Main**, is essential.
3. **Type and Class of Main**—Specify outside diameter of main.
4. **Size of Side Outlet.**





## IOWA TAPPING VALVES AND SLEEVES

### DESCRIPTION AND ADVANTAGES

Iowa tapping sleeves are bolted around the main, and the ends calked or the bolts tightened. The valve is bolted to the flanged outlet of the sleeve and with the valve open, the tapping machine is bolted on and the tap made. The cutter is then withdrawn, the valve closed, and the machine removed. Tapping is accomplished with no interruption of service.

Tapping sleeves are built in two sections for easy installation, and assembled around the main without halting service. Closely spaced bolts, located close to the lead gaskets, assure uniform gasket pressure. A bead or jute stop at each end of the sleeve guarantees centering of the sleeve on the pipe and provides a calking

stop. Mechanical joint tapping sleeves are furnished complete with joint accessories and eliminate the need of calking.

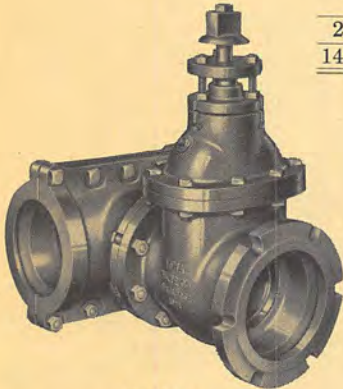
Oversize seat rings on Iowa tapping valves permit entry of the tapping machine cutters. One end of the calk type valve has a standard flange for bolting to the sleeve; the other end has a standard Class D hub with a flange for bolting to any standard tapping machine.

Iowa mechanical joint tapping valves are provided with a standardized mechanical joint outlet for use with mechanical joint cast iron pipe. In all other respects these valves are similar to the Iowa AWWA gate valves as regards operation and materials.

### Pressure Ratings

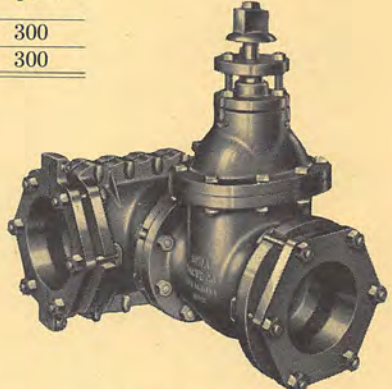
Valve Size Inches	Working Pressure psi	Hydrostatic Test Pressure psi
	Non-Shock Cold Water	
2 thru 12	200	300
14 thru 24	150	300

### CALK TYPE



Calk Type  
F-5190 Valve and F-5195 Sleeve

### MECHANICAL JOINT



Mechanical Joint  
F-5200 Valve and F-5205 Sleeve

### Sizes—Inches

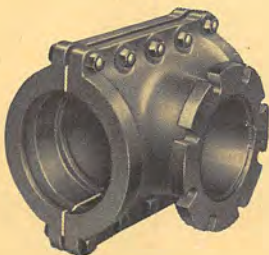
- F-5190  
2 thru 24
- F-5195  
3x2 thru 30x24
- F-5200  
3 thru 12
- F-5205  
3x2 thru 12x12

### Note

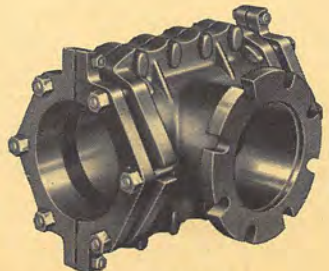
For dimensions, see opposite page

### Not Illustrated

- F-5210  
Calk Type  
Tapping Cross  
and
- F-5220  
Mechanical Joint  
Tapping Cross



F-5195 Sleeve



F-5205 Sleeve





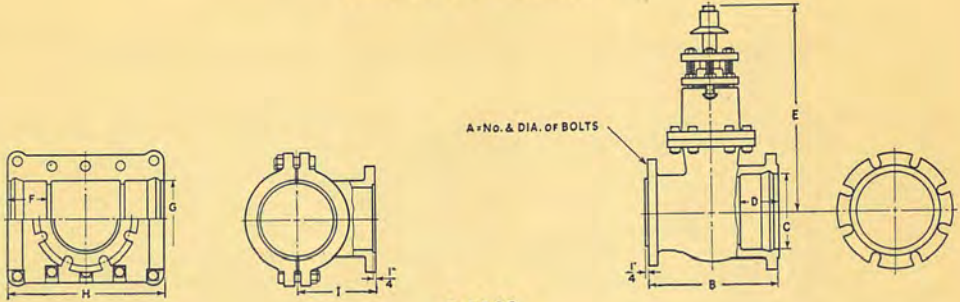
# IOWA VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## IOWA TAPPING VALVES AND SLEEVES

### SIZES AND DIMENSIONS



**F-5190**  
Tapping Valve

### Dimensions—Inches

Dimensions	Valve Size—Inches											
	2	3	4	6	8	10	12	14	16	18	20	24
A	4- <sup>5</sup> / <sub>8</sub>	4- <sup>3</sup> / <sub>4</sub>	4- <sup>3</sup> / <sub>4</sub>	8- <sup>3</sup> / <sub>4</sub>	8- <sup>3</sup> / <sub>4</sub>	12- <sup>7</sup> / <sub>8</sub>	12- <sup>7</sup> / <sub>8</sub>	12-1	16-1	16-1 <sup>1</sup> / <sub>8</sub>	20-1 <sup>1</sup> / <sub>8</sub>	20-1 <sup>1</sup> / <sub>4</sub>
B	7 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	10	12 <sup>1</sup> / <sub>2</sub>	14 <sup>1</sup> / <sub>8</sub>	14 <sup>1</sup> / <sub>2</sub>	15 <sup>1</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>4</sub>	19 <sup>1</sup> / <sub>8</sub>	19 <sup>1</sup> / <sub>4</sub>	21 <sup>1</sup> / <sub>4</sub>	24 <sup>5</sup> / <sub>8</sub>
C	3 <sup>21</sup> / <sub>32</sub>	4 <sup>11</sup> / <sub>16</sub>	5 <sup>5</sup> / <sub>8</sub>	7 <sup>29</sup> / <sub>32</sub>	9 <sup>29</sup> / <sub>32</sub>	12 <sup>1</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>32</sub>	16 <sup>1</sup> / <sub>2</sub>	18 <sup>15</sup> / <sub>16</sub>	21 <sup>3</sup> / <sub>16</sub>	23 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>
D	2 <sup>3</sup> / <sub>4</sub>	2 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>8</sub>	4	4 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>4</sub>	6 <sup>1</sup> / <sub>4</sub>
E	11	12 <sup>1</sup> / <sub>2</sub>	16 <sup>1</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>2</sub>	24 <sup>1</sup> / <sub>8</sub>	30 <sup>1</sup> / <sub>4</sub>	33	40	42	46 <sup>3</sup> / <sub>4</sub>	48	55
Turns to open	5	7	10	21	27	33	39	45	52	58	64	76

Note: Dimensions for F-5200 Tapping Valve available on request.

### F-5195 Tapping Sleeve

Size Inches	Dimensions—Inches				Size Inches	Dimensions—Inches				Size Inches	Dimensions—Inches			
	F	G	H	I		F	G	H	I		F	G	H	I
3x 2	2 <sup>1</sup> / <sub>2</sub>	4 <sup>3</sup> / <sub>4</sub>	9	5 <sup>1</sup> / <sub>4</sub>	14x 4	4	16 <sup>1</sup> / <sub>2</sub>	13	12 <sup>1</sup> / <sub>4</sub>	20x 8	4	23 <sup>1</sup> / <sub>16</sub>	15	16 <sup>1</sup> / <sub>4</sub>
3x 3	2 <sup>1</sup> / <sub>2</sub>	4 <sup>3</sup> / <sub>4</sub>	9	5 <sup>1</sup> / <sub>4</sub>	14x 6	4	16 <sup>1</sup> / <sub>2</sub>	18	12 <sup>1</sup> / <sub>4</sub>	20x10	4	23 <sup>1</sup> / <sub>16</sub>	21	16 <sup>1</sup> / <sub>4</sub>
4x 2	3	6	10	6	14x 8	4	16 <sup>1</sup> / <sub>2</sub>	18	12 <sup>1</sup> / <sub>2</sub>	20x12	4 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	21	16 <sup>1</sup> / <sub>4</sub>
4x 3	3	6	11	6	14x10	4	16 <sup>1</sup> / <sub>2</sub>	25	12 <sup>1</sup> / <sub>2</sub>	20x14	4 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	23	16 <sup>1</sup> / <sub>4</sub>
4x 4	4	6	14	6 <sup>5</sup> / <sub>8</sub>	14x12	4	16 <sup>1</sup> / <sub>2</sub>	25	12 <sup>3</sup> / <sub>4</sub>	20x16	4 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	27	16 <sup>3</sup> / <sub>4</sub>
6x 2	3 <sup>1</sup> / <sub>2</sub>	8	10	7 <sup>1</sup> / <sub>4</sub>	14x14	4	16 <sup>1</sup> / <sub>2</sub>	25	12 <sup>3</sup> / <sub>4</sub>	20x18	4 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	32	16 <sup>3</sup> / <sub>4</sub>
6x 3	3 <sup>1</sup> / <sub>2</sub>	8	11	7 <sup>1</sup> / <sub>2</sub>	16x 2	3 <sup>1</sup> / <sub>2</sub>	18 <sup>3</sup> / <sub>4</sub>	10	13	20x20	4 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>16</sub>	36	17
6x 4	4	8	14	7 <sup>1</sup> / <sub>2</sub>	16x 3	3 <sup>3</sup> / <sub>4</sub>	18 <sup>3</sup> / <sub>4</sub>	12	13 <sup>1</sup> / <sub>2</sub>	24x 2	4	27 <sup>1</sup> / <sub>2</sub>	12	18
6x 6	4	8	16	7 <sup>7</sup> / <sub>8</sub>	16x 4	4	18 <sup>3</sup> / <sub>4</sub>	13	13 <sup>3</sup> / <sub>4</sub>	24x 3	4	27 <sup>1</sup> / <sub>2</sub>	12	18
8x 2	3 <sup>1</sup> / <sub>2</sub>	10	10	8 <sup>3</sup> / <sub>8</sub>	16x 6	4	18 <sup>3</sup> / <sub>4</sub>	15	13 <sup>3</sup> / <sub>4</sub>	24x 4	4	27 <sup>1</sup> / <sub>2</sub>	13	18 <sup>1</sup> / <sub>4</sub>
8x 3	3 <sup>1</sup> / <sub>2</sub>	10	11	8 <sup>5</sup> / <sub>8</sub>	16x 8	4	18 <sup>3</sup> / <sub>4</sub>	17	13 <sup>3</sup> / <sub>4</sub>	24x 6	4	27 <sup>1</sup> / <sub>2</sub>	15	18 <sup>1</sup> / <sub>4</sub>
8x 4	4	10	14	8 <sup>3</sup> / <sub>4</sub>	16x10	4	18 <sup>3</sup> / <sub>4</sub>	19	14	24x 8	4	27 <sup>1</sup> / <sub>2</sub>	17	18 <sup>1</sup> / <sub>4</sub>
8x 6	4	10	16	9	16x12	4	18 <sup>3</sup> / <sub>4</sub>	21	14	24x10	4	27 <sup>1</sup> / <sub>2</sub>	21	18 <sup>3</sup> / <sub>4</sub>
8x 8	4	10	17	9	16x14	4	18 <sup>3</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	14	24x12	4 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	26 <sup>1</sup> / <sub>2</sub>	18 <sup>3</sup> / <sub>4</sub>
10x 2	3 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>8</sub>	10	9 <sup>8</sup> / <sub>8</sub>	16x16	4 <sup>1</sup> / <sub>4</sub>	18 <sup>3</sup> / <sub>4</sub>	29 <sup>1</sup> / <sub>2</sub>	14 <sup>1</sup> / <sub>8</sub>	24x14	4 <sup>1</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	26 <sup>1</sup> / <sub>2</sub>	19
10x 3	3 <sup>3</sup> / <sub>4</sub>	12 <sup>1</sup> / <sub>8</sub>	11 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>2</sub>	18x 2	3 <sup>1</sup> / <sub>4</sub>	20 <sup>5</sup> / <sub>16</sub>	10	14	24x16	4 <sup>3</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	26 <sup>1</sup> / <sub>2</sub>	19 <sup>1</sup> / <sub>4</sub>
10x 4	4	12 <sup>1</sup> / <sub>8</sub>	13	9 <sup>3</sup> / <sub>4</sub>	18x 3	4	20 <sup>5</sup> / <sub>16</sub>	12	14	24x18	4 <sup>3</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	32	19 <sup>1</sup> / <sub>2</sub>
10x 6	4	12 <sup>1</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>4</sub>	9 <sup>7</sup> / <sub>8</sub>	18x 4	4	20 <sup>5</sup> / <sub>16</sub>	15	14 <sup>1</sup> / <sub>2</sub>	24x20	4 <sup>3</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	36	20
10x 8	4	12 <sup>1</sup> / <sub>8</sub>	17	9 <sup>3</sup> / <sub>4</sub>	18x 6	4	20 <sup>5</sup> / <sub>16</sub>	15	14 <sup>1</sup> / <sub>2</sub>	24x24	4 <sup>3</sup> / <sub>4</sub>	27 <sup>1</sup> / <sub>2</sub>	36	20
10x10	4	12 <sup>1</sup> / <sub>8</sub>	21	10	18x 8	4	20 <sup>5</sup> / <sub>16</sub>	21	14 <sup>3</sup> / <sub>4</sub>	30x 4	4	33 <sup>7</sup> / <sub>8</sub>	18	24
12x 2	3 <sup>1</sup> / <sub>2</sub>	14 <sup>1</sup> / <sub>4</sub>	10	10 <sup>7</sup> / <sub>8</sub>	18x10	4	20 <sup>5</sup> / <sub>16</sub>	21	14 <sup>3</sup> / <sub>4</sub>	30x 6	4	33 <sup>7</sup> / <sub>8</sub>	18	24
12x 3	3 <sup>3</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>4</sub>	12	10 <sup>7</sup> / <sub>8</sub>	18x12	4 <sup>1</sup> / <sub>4</sub>	20 <sup>5</sup> / <sub>16</sub>	23	14 <sup>3</sup> / <sub>4</sub>	30x 8	5	33 <sup>7</sup> / <sub>8</sub>	18	24 <sup>1</sup> / <sub>4</sub>
12x 4	4	14 <sup>1</sup> / <sub>4</sub>	13	11	18x14	4 <sup>1</sup> / <sub>4</sub>	20 <sup>5</sup> / <sub>16</sub>	25	14 <sup>3</sup> / <sub>4</sub>	30x10	5	33 <sup>7</sup> / <sub>8</sub>	20	24 <sup>1</sup> / <sub>4</sub>
12x 6	4	14 <sup>1</sup> / <sub>4</sub>	16	11 <sup>5</sup> / <sub>8</sub>	18x16	4 <sup>1</sup> / <sub>4</sub>	20 <sup>5</sup> / <sub>16</sub>	32	14 <sup>3</sup> / <sub>4</sub>	30x12	5	33 <sup>7</sup> / <sub>8</sub>	22	24 <sup>1</sup> / <sub>4</sub>
12x 8	4	14 <sup>1</sup> / <sub>4</sub>	17	11 <sup>1</sup> / <sub>8</sub>	18x18	4 <sup>1</sup> / <sub>4</sub>	20 <sup>5</sup> / <sub>16</sub>	32	15	30x14	5	33 <sup>7</sup> / <sub>8</sub>	25	24 <sup>3</sup> / <sub>8</sub>
12x10	4	14 <sup>1</sup> / <sub>4</sub>	19	11 <sup>1</sup> / <sub>4</sub>	20x 2	4	23 <sup>1</sup> / <sub>16</sub>	13	16 <sup>1</sup> / <sub>4</sub>	30x16	5	33 <sup>7</sup> / <sub>8</sub>	27	24 <sup>3</sup> / <sub>8</sub>
12x12	4	14 <sup>1</sup> / <sub>4</sub>	23	11 <sup>1</sup> / <sub>2</sub>	20x 3	4	23 <sup>1</sup> / <sub>16</sub>	13	16 <sup>1</sup> / <sub>4</sub>	30x18	5	33 <sup>7</sup> / <sub>8</sub>	32	24 <sup>1</sup> / <sub>2</sub>
14x 2	3 <sup>1</sup> / <sub>2</sub>	16 <sup>1</sup> / <sub>2</sub>	13	12 <sup>1</sup> / <sub>4</sub>	20x 4	4	23 <sup>1</sup> / <sub>16</sub>	13	16 <sup>1</sup> / <sub>4</sub>	30x20	5	33 <sup>7</sup> / <sub>8</sub>	36	24 <sup>3</sup> / <sub>4</sub>
14x 3	3 <sup>3</sup> / <sub>4</sub>	16 <sup>1</sup> / <sub>2</sub>	13	12 <sup>1</sup> / <sub>4</sub>	20x 6	4	23 <sup>1</sup> / <sub>16</sub>	15	16 <sup>1</sup> / <sub>4</sub>	30x24	5	33 <sup>7</sup> / <sub>8</sub>	36	24 <sup>3</sup> / <sub>8</sub>

For dimensions of mechanical joint tapping sleeves and valves, see page 133.





## IOWA LIST 10 LIGHT PRESSURE GATE VALVES

### IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

Iowa List 10 (Light Pressure) Gate Valves are especially designed and built for low pressure water, steam, or gas service. The cross section on page 235 showing general operation of the internal wedging mechanism also applies to Iowa List 10 Gate Valves, and the parts list letters are to be used when ordering parts.

All outside screw and yoke valves and flanged valves are normally supplied with handwheels

unless otherwise specified. All other valves are normally supplied with a 2-inch square operating nut. Valves open to the left unless otherwise ordered.

List 10 Valves can be furnished with gearing and/or by-pass, equipped for cylinder or motor operation; or fitted with any of the accessories described on pages 250 thru 256.

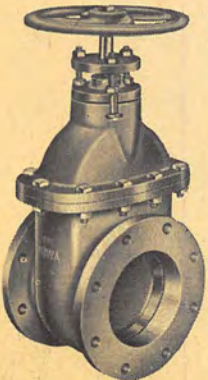


**F-5250 Hub Ends  
Non-rising Stem**

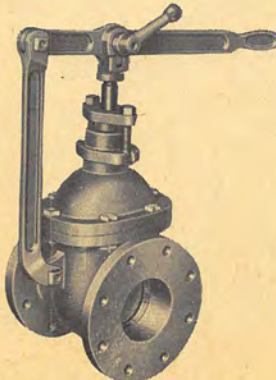
Pressure Rating			
Valve size . . . . Inches		4 thru 24	30 thru 42
Working Pressure psi	Non-shock Cold Water	50	25
	Steam	30	15
Hydrostatic Test Pressure psi		100	75

#### Note

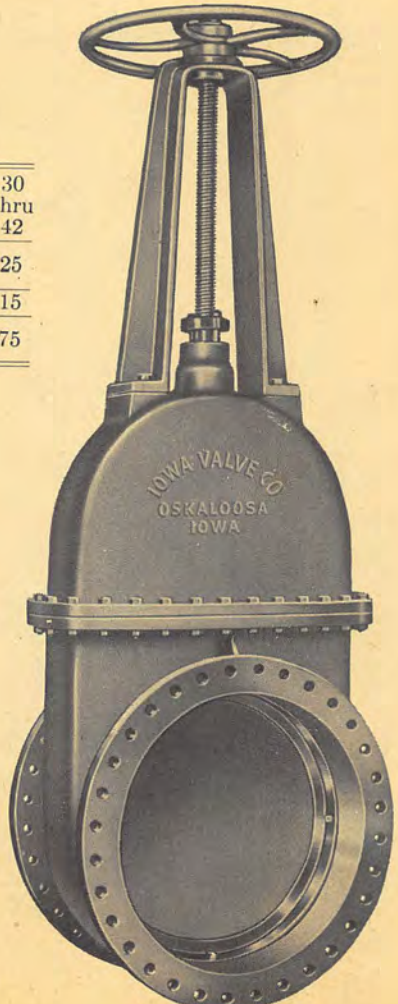
When ordering F-5260 quick opening valves, specify Class (List 10, 12, 14 or 16) and end type required.



**F-5255 Flanged Ends  
Non-rising Stem**



**F-5260 Flanged Ends  
Quick Opening, Sliding Stem**



**F-5265 Flanged Ends  
Outside Screw and Yoke**





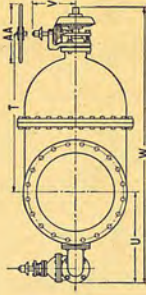
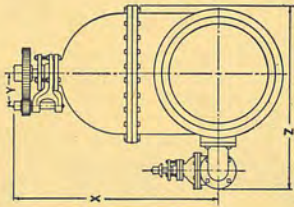
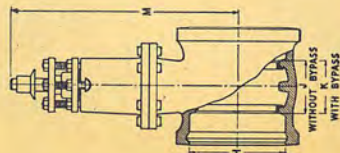
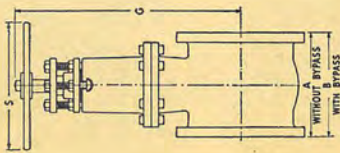
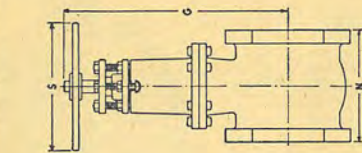
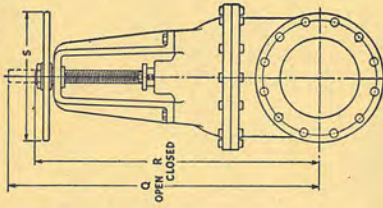
# IOWA VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## DIMENSIONS OF IOWA LIST 10 LIGHT PRESSURE GATE VALVES

IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT



Hub Ends, NRS, with Spur Gears, By-pass

Flanged Ends, NRS, with Bevel Gears, By-pass

Hub Ends, NRS Flanged Ends, OS&Y

### Dimensions—Inches

Size Inches	A	B	G	H	J	K	M	N	Q	R	S	T	U	V	W	X	Y	Z	AA	Turns Diam. to Open Stem
4	9	...	16 1/4	5 3/4	5	...	16 1/4	9 1/8	21 1/2	17	9	14 5/16	...	12 3/4	...	21 1/2	5 1/2	...	8 1/2	9
5	9 1/2	...	17	7 19/16	4 1/2	...	17	9 1/2	25 1/8	19 5/8	10	15 1/8	...	12 3/4	...	22 1/2	5 1/2	...	8 1/2	17
6	9 1/2	...	19 3/4	10	6	...	19 3/4	10 1/2	28 1/2	22 7/8	12	16 1/2	...	12 3/4	...	24 1/8	5 1/2	...	12	21
8	10	...	23 3/4	10 1/2	6	...	23 3/4	10 1/2	36 3/4	29	14	20 7/8	...	12 3/4	...	28 1/4	5 1/2	...	14	27
10	11	...	29	12 1/8	6	...	29	13	45 1/4	34 3/8	16	23 1/2	...	12 3/4	...	30 7/8	5 1/2	...	14	33
12	12	...	30 7/8	14 1/4	6 1/2	...	30 7/8	13	52 1/4	39 1/4	16	26 7/8	...	12 3/4	...	34 1/4	5 1/2	...	16	39
14	13	...	34 3/4	16 3/8	6 1/2	...	34 3/4	13	60 1/4	45 1/4	18	29	...	12 3/4	...	36 7/8	5 1/2	...	16	45
16	13	...	38 3/4	18 1/2	6 1/2	...	38 3/4	...	66 3/4	49 3/4	18	32 3/8	...	12 3/4	...	42	8	...	16	45
18	13 1/2	...	40 1/2	20 1/2	6 1/2	...	40 1/2	...	77 5/8	58 7/8	18	35 1/4	...	16	...	44 1/2	8	...	16	51
20	14	...	46 1/4	23	6 1/2	...	46 1/4	...	84 1/2	63 1/2	22	38 3/4	...	16	...	48	8	...	18	57
24	17	...	52 3/4	27 1/4	9	...	52 3/4	...	99 1/2	74 1/4	24	45	...	16	...	54 1/2	8	...	18	64
30	18	...	62 3/4	33 3/8	8	...	62 3/4	...	122	90 3/4	24	56 1/8	...	16	...	65 3/8	8	...	22	76
36	20	...	82 1/4	39 7/8	9	...	82 1/4	...	145	108 1/2	30	67 3/4	...	18 3/4	...	75 1/2	10	...	22	94
42	22	...	102 1/2	46	12	...	102 1/2	...	174 1/4	131	36	79 1/2	...	20 3/4	...	96 3/8	13 21/64	...	30	129

Flanges faced and drilled to ASA Class 125 standard, unless otherwise ordered.





## IOWA LIST 12 MEDIUM PRESSURE GATE VALVES

### IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

Iowa List 12 (Medium Pressure) gate valves are designed for use in water and sewage plants and for industrial installations where medium pressures are encountered. They are available with any desired end connection shown on page 233.

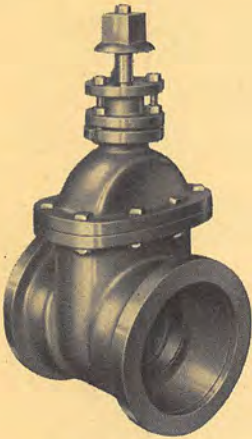
All outside screw and yoke valves and flanged valves are normally supplied with handwheels

unless otherwise specified. All other valves are normally supplied with a 2-inch square operating nut. Valves open to the left unless otherwise ordered.

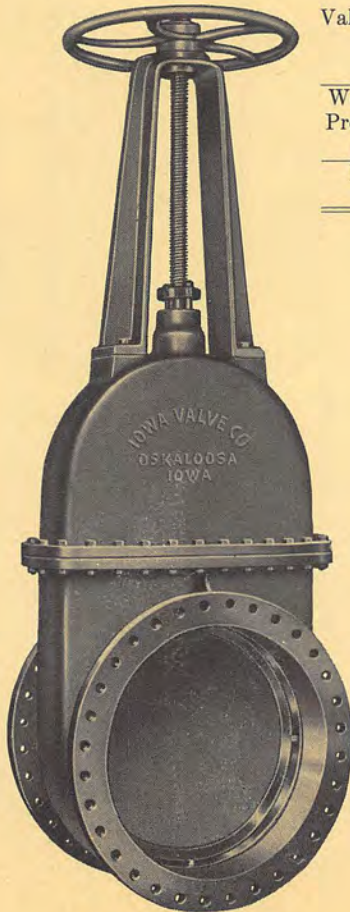
List 12 valves can be furnished with gearing and/or by-pass, equipped for cylinder or motor operation, or fitted with any of the accessories described on pages 250 thru 256.

#### Pressure Rating

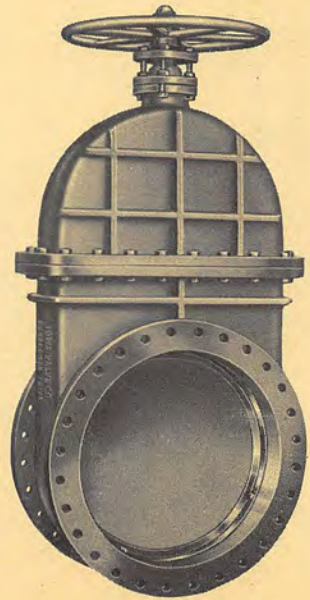
		Valves size . . . Inches			
		4 thru 12	14 thru 24	30 and 36	42
Working Pressure	Non-Shock Cold Water	125	100	65	50
	Steam	60	60	40	35
Hydrostatic Test Pressure		300	200	150	100



F-5270 Hub Ends  
Non-rising Stem



F-5285 Flanged Ends  
Outside Screw and Yoke



F-5280 Flanged Ends  
Non-rising Stem



F-5275 Screwed Ends  
Non-rising Stem

For illustration of quick opening gate valve, see page 240.





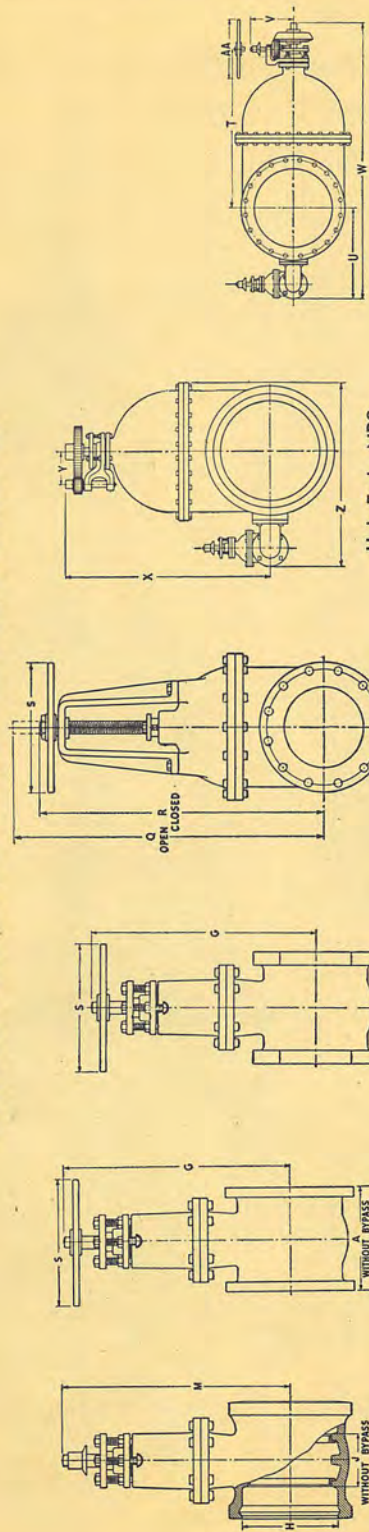
# IOWA VALVE COMPANY

A Subsidiary of James B. Clow & Sons



## DIMENSIONS OF IOWA LIST 12 MEDIUM PRESSURE GATE VALVES

IRON BODY, BRONZE MOUNTED, DOUBLE DISC, DOUBLE DISC, PARALLEL SEAT



Hub Ends, NRS, with Spur Gears, By-pass

Flanged Ends, OS&Y

Flanged Ends, NRS, with Spur Gears, By-pass

Hub Ends, NRS

Flanged Ends, NRS

Hub Ends, NRS

Dimensions—Inches

Size Inches	A	B	G	H	J	K	M	N	Q	R	S	T	U	V	W	X	Y	Z	AA	Turns to Open	Stem Diam.
4	9	...	16 1/4	5 3/4	5	...	16 1/4	9 1/8	21 1/2	17	9	14 3/16	...	12 3/4	...	21 1/2	5 1/2	...	8 1/2	9	1
5	9 1/2	...	17	...	...	...	17	9 1/2	25 1/8	19 5/8	10	15 1/8	...	12 3/4	...	22 1/2	5 1/2	...	8 1/2	17	1 1/8
6	9 1/2	...	19 3/4	7 15/16	4 1/2	...	19 3/4	9 1/2	29 1/2	22 7/8	12	16 1/2	...	12 3/4	...	24 7/8	5 1/2	...	12	21	1 1/8
8	10	...	23 3/4	10	6	...	23 3/4	10 1/2	36 3/4	29	13	20 7/8	...	12 3/4	...	28 1/4	5 1/2	...	14	27	1 1/4
10	11	...	29	12 1/8	6	...	29	13	45 1/4	34 3/8	16	23 1/2	...	12 3/4	...	30 7/8	5 1/2	...	14	33	1 3/8
12	12	...	30 7/8	14 1/4	6	...	30 7/8	13	52 1/4	39 1/4	16	26 7/8	...	12 3/4	...	34 1/4	5 1/2	...	16	39	1 1/2
14	14	...	34 3/4	16 3/8	6 1/2	...	34 3/4	...	60 1/4	45 1/4	18	29	...	16	...	38	8	...	16	45	1 3/4
16	14	23	38 3/4	18 1/2	6 1/2	15 1/4	38 3/4	...	66 3/4	49 3/4	18	32 5/8	...	16	60 5/8	42	8	34 1/4	16	51	1 5/8
18	15	24	40 1/2	20 1/2	6 1/2	15 1/4	42 1/2	...	77 5/8	58 5/8	22	35 1/2	...	16	64	44 1/2	8	36 1/8	18	57	1 3/4
20	15	24	46 3/4	23	6 1/2	15 1/4	48 3/4	...	84 1/2	63 1/2	24	38 3/4	...	16	69	48	8	38 5/8	18	64	1 7/8
24	18	28 1/2	52 3/4	27 1/4	9	16	54 3/4	...	99 1/2	74 1/4	24	45	...	16	79	54 1/4	8	45 3/8	18	76	2
30	23	26 1/2	68	33 3/8	10	17	67 7/8	...	123 1/2	92 1/4	30	57 1/2	...	18 3/4	101 3/4	66 1/4	10	60	22	94	2 1/2
36	25 1/2	27 1/2	79	39 7/8	11 1/2	19	79	...	145 1/2	108	36	69 1/2	...	21 1/8	117 1/4	78 1/2	13 21/64	62 1/2	22	112	2 3/4
42	22	28 1/2	102 1/2	46	12	29 1/4	105	...	174 1/4	131	36	79 1/2	...	20 3/4	132 1/2	96 3/8	13 21/64	70	30	129	2 3/4

Flanges faced and drilled to ASA Class 125 standard, unless otherwise instructed.





## IOWA LIST 16

### EXTRA HEAVY PRESSURE GATE VALVES

#### IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

Iowa List 16 (Extra Heavy Pressure) Gate Valves exceed the requirements of AWWA specifications. Their construction is extra heavy and ribbed to withstand the greater pressures at which they are intended to operate.

List 16 valves are made with any desired combination of valve ends. For illustrations of various valve end types, see page 233.

Square operating nuts or handwheels can be furnished as required. Direction of opening is indicated by an arrow cast on the operating nut skirt or on the rim of the handwheel.

List 16 valves can be furnished with gearing and by-passes; equipped for cylinder or motor operation; or fitted with any of the accessories described on pages 250 thru 256.



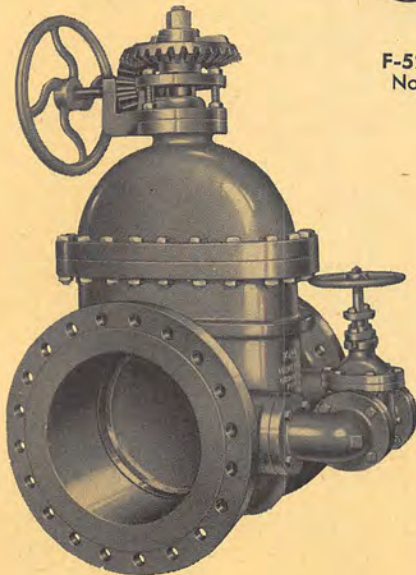
F-5295 Screwed Ends  
Non-rising Stem

#### Pressure Rating

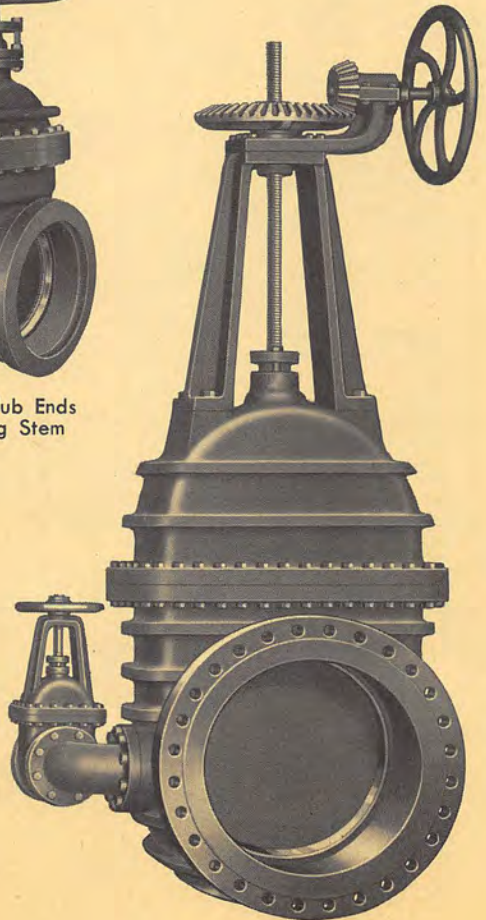
Valve size . . . Inches		4 thru 20	24 thru 36
		250	225
Working Pressure psi	Non-shock Cold Water	150	150
	Steam	500	450
Hydrostatic Test Pressure psi			



F-5290 Hub Ends  
Non-rising Stem



F-5300 Flanged Ends, Non-rising Stem, with  
F-5585 Bevel Gears and F-5625 By-pass



F-5305 Flanged Ends, Outside Screw and Yoke  
with F-5595 Bevel Gears and F-5630 By-pass





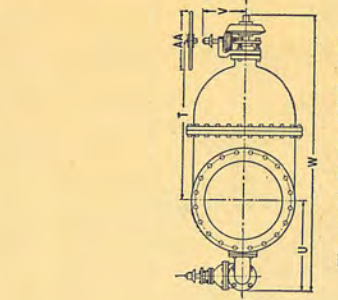
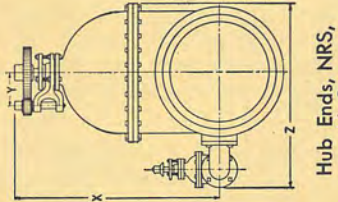
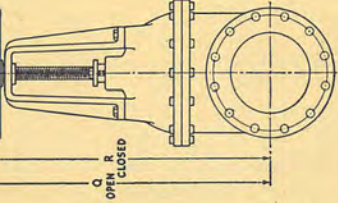
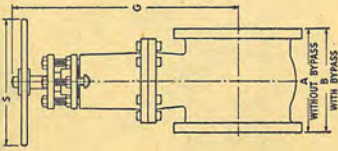
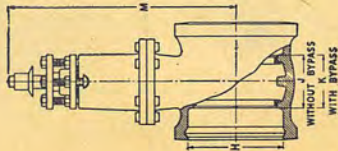
# IOWA VALVE COMPANY



A Subsidiary of James B. Clow & Sons

## DIMENSIONS OF IOWA LIST 16 EXTRA HEAVY PRESSURE GATE VALVES

IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT



Hub Ends, NRS

Flanged Ends, NRS

Screwed Ends, NRS

Flanged Ends, OS&Y

Hub Ends, NRS, with Spur Gears, By-pass

Flanged Ends, NRS, with Bevel Gears, By-pass

Dimensions—Inches

Size Inches	A	B	G	H	J	K	M	N	Q	R	S	T	U	V	W	X	Y	Z	AA	Turns to Open	Diam. of Stem
4	12	...	16 1/4	5 3/4	4 3/4	...	16 1/4	9 1/2	21 1/2	17	9	14 3/8	...	12 3/4	...	21 7/8	5 1/2	...	8 1/2	10	1 1/2
5	13 1/4	...	18 3/4	...	5 1/2	...	18 3/4	10 1/4	26 7/8	21	12	16	...	12 3/4	...	23 1/2	5 1/2	...	8 1/2	18	1 3/8
6	14	...	20 1/2	8	6 3/8	...	20 1/2	11 5/8	32 1/2	25 1/2	13	17 3/4	...	12 3/4	...	25 1/4	5 1/2	...	12	21	1 3/8
8	15 1/2	...	25	10 3/16	6 3/8	...	25	13 1/4	38 1/8	29 1/4	16	20 5/8	...	12 3/4	...	28 1/4	5 1/2	...	14	27	1 1/2
10	16	...	30 1/4	12 3/8	6 3/4	...	30 1/4	15	47 1/4	36 1/4	18	24 1/4	...	16	...	33 1/2	8	...	14	33	1 3/8
12	17	...	32 3/4	14 5/8	7	...	32 3/4	16	55 1/2	42 1/2	18	27 7/8	...	16	...	37 1/8	8	...	16	39	1 3/4
14	17 1/2	...	38 1/4	16 7/8	7	...	40 1/4	...	61 1/2	47	22	32 1/2	21 3/4	16	60 1/2	41 3/4	8	33 1/4	16	45	1 7/8
16	19	...	40 1/4	18 3/4	9 1/8	...	42 1/4	...	68 1/2	51 1/2	24	34 1/2	23	16	64	43 3/4	8	36 1/4	16	52	2
18	21	...	45	21	9 1/4	...	47	...	78	59	24	39 1/2	24 1/4	16	71	48 3/4	8	38 1/2	18	58	2 1/8
20	21 1/2	...	46 1/2	23 1/4	10 1/4	...	48 1/2	...	84 3/4	63 1/4	24	41 1/2	25 1/2	16	73 1/4	50	8	42 1/2	18	64	2 1/4
24	26	...	53 1/2	27 5/8	10 1/2	...	55 1/2	...	100 1/4	75 1/4	30	50	32 1/2	18 3/4	91 1/2	59	10	50 1/2			





## IOWA SQUARE BOTTOM GATE VALVES

### IRON BODY, BRONZE MOUNTED, DOUBLE DISC, PARALLEL SEAT

Iowa Square Bottom gate valves in general are similar in design and construction to Iowa List 10, List 12, List 14 and List 16 valves described in earlier pages in this catalog. They differ from other Iowa gate valves in that the design of the gates incorporates three point bearing. Three shoes or lugs are cast integral with the gate. Two of these are located on each side at the bottom and one at the top center. Each shoe is faced with bronze or other material as specified.

The body has side and center tracks tapered at the bottom ends. The center track is located above the seat ring and continues up into the bonnet of the valve. These tracks can be furnished of either iron, bronze, stainless steel or other metal as specified.

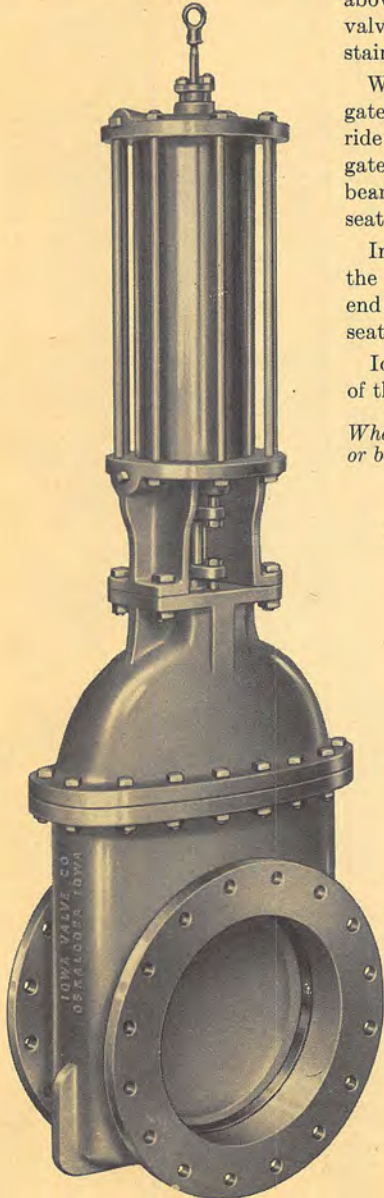
When the valve is opened, the three lugs or shoes on the gates contact the tapered ends of the tracks and continue to ride up the tracks for the entire travel of the gates. Thus, the gates are held firmly away from the seats by this three point bearing and eliminate any chatter or vibration against the seat rings.

In closing, the lugs or shoes on the gates ride smoothly down the tracks to a point opposite the seats. There the tapered end of the tracks allow the wedging action of the valve to seat the gates tightly against the seat rings.

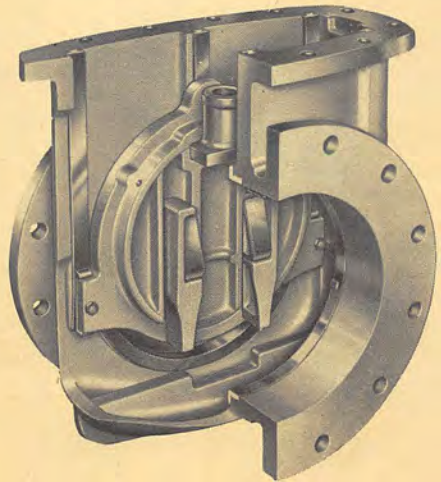
Iowa Square Bottom Valves are available with one or both of the gates having the special construction as outlined above.

*When ordering, specify whether one gate (single square bottom) or both gates (double square bottom) is required.*

**To order, use figure number of valves as shown on preceding pages, and specify that square bottom construction is wanted.**



Flanged Cylinder Operated  
Square Bottom Valve



Sectional View Through Body of  
Square Bottom Valve





## IOWA SLUICE GATES

MANUAL, HYDRAULIC, OR ELECTRIC MOTOR OPERATION



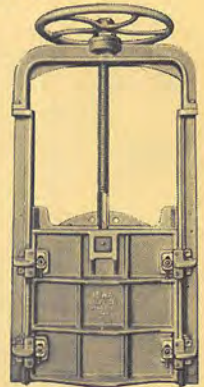
Circular Type Sluice Gate

Iowa Sluice Gates are cast iron, bronze mounted, and have solid bronze adjustable wedges. They are available in sizes 4 through 24 inches, with circular or square opening, and can be installed in lines having both seating and unseating pressure. For heavy unseating pressures, top and bottom wedges can be furnished on gates 12-inch and larger.

Circular Sluice Gates are available with non-rising stem, with circular opening, in sizes 4 through 12 inches; and with either flanged, flange and spigot, or hub connection.

Rectangular Sluice Gates can be furnished with non-rising stem or rising stem, with circular or square opening, in sizes 12 through 24 inches, and with either flanged, flange and spigot, or flat frame connection.

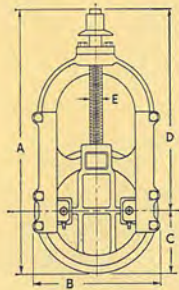
Complete specifications should accompany orders or requests for quotations. Unless otherwise specified, flanged connections will be faced and drilled to the ASA Class 125 standard.



Rectangular Type Sluice Gate

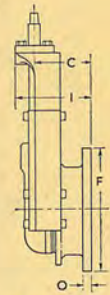
### F-5350

Circular Sluice Gates Flanged, Circular Opening



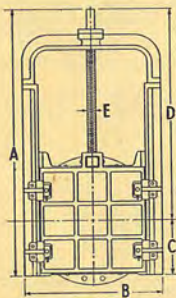
Front View

Size Inches	Non-rising Stem									
	A	B	C	D	E	F	G	I	O	
4	18 $\frac{7}{8}$	8 $\frac{1}{4}$	4 $\frac{1}{2}$	14 $\frac{3}{8}$	1	9	4 $\frac{3}{8}$	6 $\frac{3}{16}$	3 $\frac{3}{4}$	
6	24	11 $\frac{1}{4}$	5 $\frac{1}{2}$	18 $\frac{1}{2}$	1 $\frac{1}{8}$	11	4 $\frac{5}{8}$	6 $\frac{1}{4}$	7 $\frac{7}{8}$	
8	29	13 $\frac{3}{4}$	6 $\frac{3}{4}$	22 $\frac{1}{4}$	1 $\frac{1}{4}$	13 $\frac{1}{2}$	6	8 $\frac{1}{8}$	7 $\frac{7}{8}$	
10	32 $\frac{7}{8}$	15 $\frac{1}{2}$	8	24 $\frac{7}{8}$	1 $\frac{3}{8}$	16	6 $\frac{1}{4}$	8 $\frac{7}{16}$	1	
12	38 $\frac{1}{4}$	18 $\frac{1}{2}$	9 $\frac{1}{2}$	28 $\frac{3}{4}$	1 $\frac{1}{2}$	19	6 $\frac{3}{8}$	8 $\frac{7}{8}$	1	

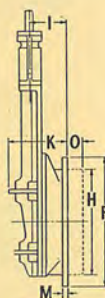


Side View

All F-5350 Sluice Gates have two side wedges. These Circular Sluice Gates are also available F-5355 Flange and Spigot and F-5360 Hub End.



Circular Opening

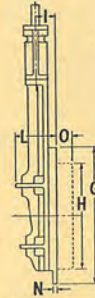


Flanged

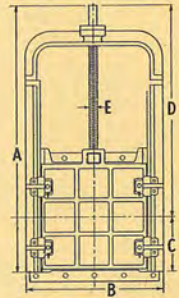
**Circular Opening**  
F-5365-C Flanged  
F-5370-C  
Flange and Spigot

**Square Opening**  
F-5385-S Flanged  
F-5390-S  
Flange and Spigot

**Flat Frame**  
F-5395-S Flanged  
F-5400-S  
Flange and Spigot



Flat Frame



Square Opening

### Rectangular Sluice Gates, Non-Rising Stem, Circular or Square Opening

Size Inches	Dimensions—Inches														
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
12	38 $\frac{1}{4}$	20	6 $\frac{7}{8}$	31 $\frac{3}{8}$	1 $\frac{3}{8}$	19	20	13	6 $\frac{7}{8}$	4 $\frac{3}{8}$	11 $\frac{1}{8}$	8 $\frac{3}{8}$	1	7 $\frac{7}{8}$	4
14	43	23	8 $\frac{1}{4}$	34 $\frac{3}{4}$	1 $\frac{1}{2}$	21	23	15	7	4 $\frac{3}{8}$	11 $\frac{1}{4}$	8 $\frac{5}{8}$	1	7 $\frac{7}{8}$	4
16	47 $\frac{7}{8}$	24 $\frac{1}{4}$	9	38 $\frac{7}{8}$	1 $\frac{1}{2}$	23 $\frac{1}{2}$	24 $\frac{1}{4}$	17 $\frac{1}{4}$	7 $\frac{7}{8}$	4 $\frac{1}{2}$	12 $\frac{3}{8}$	8 $\frac{3}{4}$	1 $\frac{1}{8}$	1	4
18	53 $\frac{1}{8}$	28	10 $\frac{1}{2}$	42 $\frac{5}{8}$	1 $\frac{5}{8}$	25	28	19 $\frac{1}{4}$	8 $\frac{1}{2}$	4 $\frac{3}{4}$	13 $\frac{1}{2}$	9 $\frac{3}{4}$	1 $\frac{1}{8}$	1	4
20	57 $\frac{3}{8}$	29 $\frac{1}{2}$	11 $\frac{1}{2}$	45 $\frac{7}{8}$	1 $\frac{3}{4}$	27 $\frac{1}{2}$	29 $\frac{1}{2}$	21 $\frac{1}{2}$	8 $\frac{1}{2}$	5	13 $\frac{1}{2}$	10	1 $\frac{1}{4}$	1	4
24	65 $\frac{1}{2}$	34	13 $\frac{1}{2}$	52	1 $\frac{7}{8}$	32	34	25 $\frac{1}{2}$	8 $\frac{3}{4}$	5	13 $\frac{3}{4}$	10	1 $\frac{1}{4}$	1	4

Dimensions of rectangular sluice gates with rising stem will be furnished upon request.





## IOWA HORIZONTAL SWING CHECK VALVES IRON BODY, BRONZE MOUNTED

### DESCRIPTION AND PRESSURE RATING

Iowa Swing Check Valves are used in both vertical and horizontal installations, wherever fluid flow must be in one direction and any reverse flow must be prevented. By-passes can be furnished when desired.

#### Design and Construction

Iowa Check Valves have bronze gate and seat rings—machined to a water tight surface. The gate is hung from stainless steel hinge pins with heavy solid bronze hinges. Perfect balance assures tight closing and positive response to the slightest flow in opening.

Iowa Check Valves can be furnished with leather or rubber faced gates or with solid bronze gates. Aluminum gates can be furnished for air service.

Iowa Check Valves are normally furnished with flanged ends. They are, however, available with either hub ends or screwed ends.

Where service requirements or individual preference suggest other than standard check valves, Iowa Check Valves can be furnished with an extended hinge pin and outside spring and lever or outside weight and lever.



F-5320 Hub Ends, Plain Type, is shown

#### F-5325

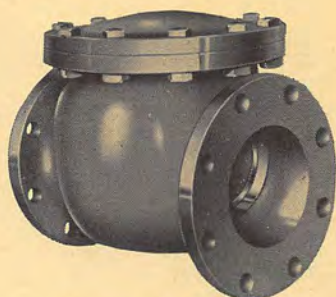
Hub Ends, Outside Weight and Lever

#### F-5330

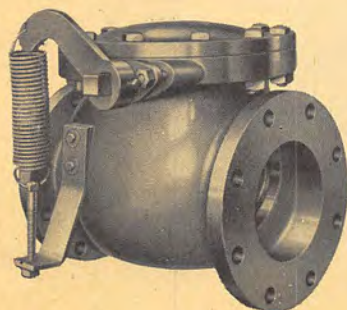
Hub Ends, Outside Spring and Lever

#### Pressure Rating psi

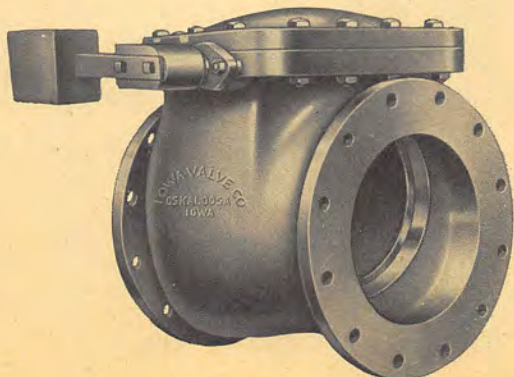
Non Shock Cold Water	Steam	Hydrostatic Test Pressure
150	125	300



F-5335 Flanged Ends  
Plain Type



F-5340 Flanged Ends,  
Outside Spring and Lever



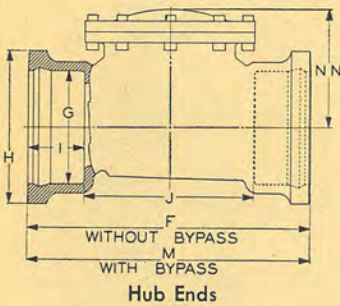
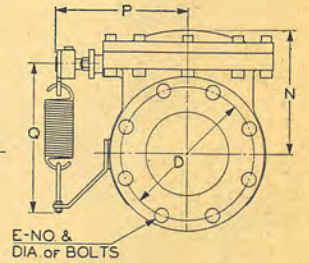
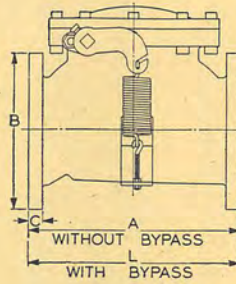
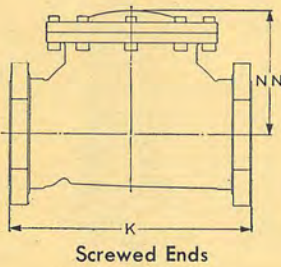
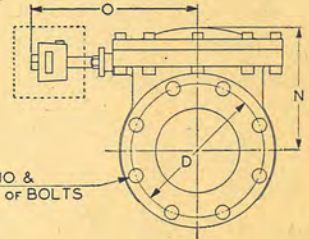
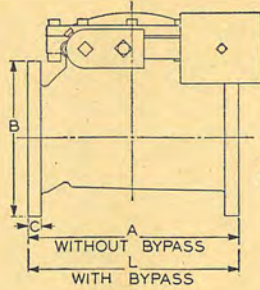
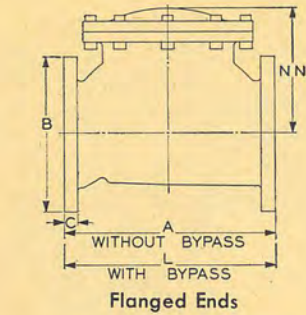
F-5345 Flanged Ends,  
Outside Weight and Lever





## IOWA HORIZONTAL SWING CHECK VALVES

### DIMENSIONS



### Dimensions—Inches

Dimensions	Valve Size—Inches													
	2	2½	3	4	5	6	8	10	12	14	16	18	20	24
A	8	9½	10	13	14	15	17	19	21	28	26	26	28	33
B	6	7	7½	9	10	11	13½	16	19	21	23½	25	27½	32
C	5/8	11/16	3/4	7/8	15/16	1	1 1/8	1 3/16	1 1/4	1 3/8	1 1/2	1 5/8	1 3/4	1 7/8
D	4¾	5½	6	7½	8½	9½	11¾	14¼	17	18¾	21¼	22¾	25	29½
E	4-5/8	4-5/8	4-5/8	8-5/8	8-3/4	8-3/4	8-3/4	12-7/8	12-7/8	12-1	16-1	16-1/8	20-1/8	20-1/4
F	10	...	13½	16½	...	20	22	24	26½	33	29½	32¾	35	37
G	3 3/8	...	4 5/8	5 3/4	...	8	10	12 5/8	14 1/4	16 3/8	18 5/8	20 5/8	23	27 3/8
H	4 3/8	...	6 3/4	8 1/4	...	10 3/4	13	15 5/8	17 3/8	20 1/4	23	24 3/8	27 1/4	32
I	2	...	2¾	3	...	4	4	4	4	4½	4½	5	5	5
J	6	...	8	10½	...	12	14	16	18½	20	20½	22¾	25	27
K	7½	8½	10	14	15	17	19	...	...	...	...	...	...	...
L	...	...	...	...	...	...	...	...	...	28	26	26	28	33
M	...	...	...	...	...	...	...	...	...	33	29½	32¾	35	37
N	...	...	5¼	7½	9	8½	11½	12½	14½	16¼	18½	19½	21¼	25
NN	3 5/8	4 3/16	4¾	7 1/8	8½	8 7/8	11	12 7/8	14	16 1/8	18	19	20¾	24½
O	...	...	7	8¾	10¼	11¾	12¾	14½	15¾	22½	20½	21	23¼	27½
P	...	...	6	7¾	9¼	10¾	11¾	13½	14¾	...	...	...	...	...
Q	...	...	...	8½	10¾	11¼	11	12¾	13¾	...	...	...	...	...

Flanges faced and drilled to ASA Class 125 standard, unless otherwise instructed.



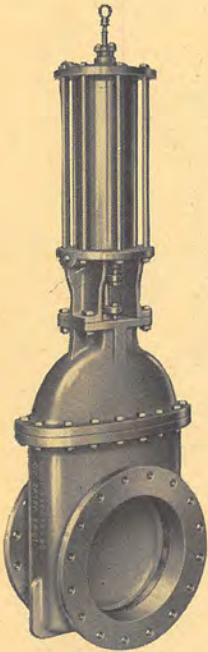
## IOWA CYLINDER OPERATED GATE VALVES DESCRIPTION AND ORDERING INFORMATION

All Iowa Double Disc Parallel Seat Gate Valves can be equipped with cylinders for hydraulic or pneumatic operation in both municipal and industrial installations.

The cylinders are seamless bronze tubing or bronze-lined cast iron, and can be furnished with a bronze tail rod extending through the top of the cylinder head to show the position of the gate.

The pistons are of cast iron fitted with specially designed cup leathers. They can be prepared for water, oil or air service. Synthetic rubber cups or piston rings can be furnished to meet special service requirements.

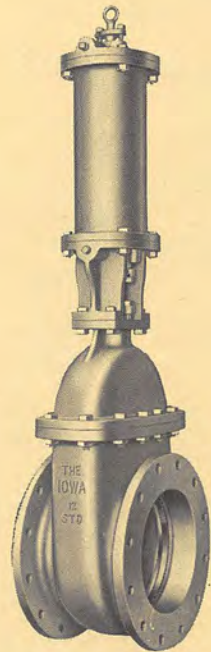
Cylinder operated valves can be equipped with a special outside screw and yoke attachment and handwheel for emergency manual operation.



Flanged End with F-5450  
Solid Bronze Tube Cylinder



Flanged End with F-5455  
Cast Iron, Bronze Lined  
Cylinder and Outside Screw  
and Yoke Attachment



Flanged End with F-5455  
Cast Iron, Bronze Lined  
Cylinder

### ORDERING INFORMATION

Please provide the information called for below when making inquiries or placing orders for cylinder operated valves.

1. **Quantity.**
2. **Size.**
3. **Working pressure:** use List number.
4. **End Type:** see page 233 for available end types.
5. **Type of cylinder:** whether bronze tubing or cast iron, bronze lined.
6. **Maximum pressure** against gates.
7. **Minimum pressure** available for operating gates.
8. **Cylinder operating medium:** whether hot or cold water, oil, air, steam, etc.
9. **Installation position** of valve.
10. **Accessory equipment:** adjustable stops, 4-way control valves, auxiliary manual control, by-passes, etc.





## IOWA ELECTRIC MOTOR OPERATED VALVES

### ADVANTAGES AND ORDERING INFORMATION

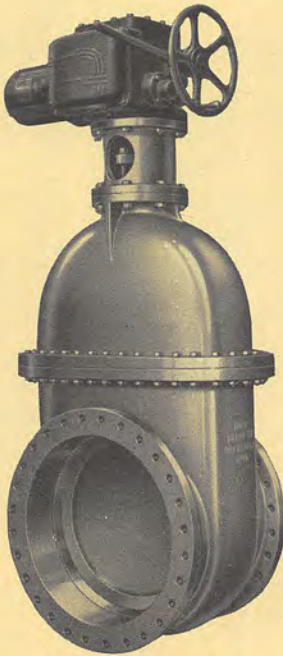
All Iowa Double Disc Gate Valves can be equipped with standard motor operating units to provide automatic and positive valve operation.

Motor operation saves time and labor wherever large diameter valves require considerable power to open and close, and wherever valves are operated frequently. Where valves are widely spaced, as they often must be, motor operation saves time and permits rapid series operation from a central point.

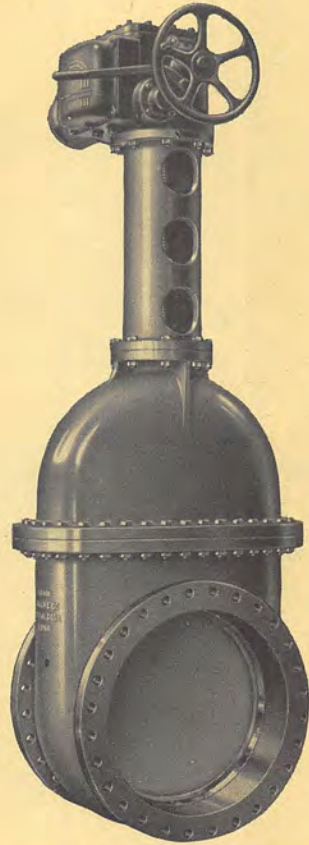
Provision is made for manual operation in the event of power failure.

The motor operator unit is normally furnished in a weather-tight enclosure. Explosion-proof or submersible enclosures can be furnished if required. Reversing controllers and push button stations are available with general purpose, weather-tight, water-tight, or explosion-proof enclosures as required.

All motor operated units can be equipped with local or remote type position indicators.



Non-rising Stem Valve  
with Motor Operator



Outside Screw and Yoke Valve  
with Motor Operator

### ORDERING INFORMATION

Please provide the following information on inquiries and orders:

1. **Valve size**, quantity and end connections.
2. **Rising or Non-rising stem.**
3. **Installation position** of valve.
4. **Maximum differential pressure.**
5. **Type of service**—water, gas, or oil.
6. **If the valve** is to be used for throttling, this fact should be stated.
7. **Maximum temperature** at location of valve control.
8. **Closing or opening time** in minutes.
9. **Electrical characteristics:** voltage, type of current (alternating or direct), and phase and cycle if alternating current.



## IOWA FLOOR AND BENCH STANDS

### DESCRIPTION AND DIMENSIONS



Standard Pattern  
F-5500 Non-Rising Stem  
F-5505 NRS, Indicating  
F-5510 Rising Stem



Heavy Pattern  
F-5515 NRS, Indicating  
F-5520 Non-Rising Stem  
F-5525 Rising Stem



Extra Heavy Geared Pattern  
F-5530 Rising Stem  
F-5535 Non-Rising Stem  
F-5540 NRS, Indicating

Iowa Floor Stands are made in Standard, Heavy, and Extra Heavy Geared Patterns with either rising or non-rising stems. Non-rising stem floor stands can be equipped with indicators to show valve position.

Iowa Floor Stands are of high strength cast iron, bronze mounted, and are provided with extension stems of cold rolled steel, stainless steel, or bronze as specified.

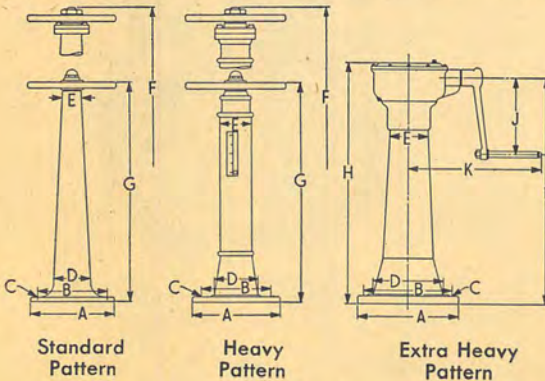
Gearing and enclosed gear cases (see page 254) can be furnished for floor stand operation of large valves. For non-rising stem valves, we recommend that the gearing be installed

on the valve rather than on the stand.

Cranks are furnished on geared floor stands when specified. The use of cranks rather than handwheels is recommended on all Extra Heavy Pattern Floor Stands. Handwheels can be furnished if specified.

Ball or roller thrust bearings and motor operated floor stands can be furnished when specified.

Stem covers are furnished, when specified, for rising stem floor stands. Name plates can be furnished for floor stands of either brass or chromium plated brass.



Dimensions—Inches

Dimen.	Standard Pattern	Heavy Pattern	Ex. Heavy Geared Pattern
A	13 $\frac{1}{4}$	14	16 Sq.
B	11 $\frac{1}{2}$	12	13 $\frac{1}{2}$
C	4 $\frac{1}{2}$	4 $\frac{5}{8}$	4 $\frac{7}{8}$
D	6	7	11
E	3	5	6
F	38	38	...
G	36	36	...
H	...	...	38 $\frac{3}{4}$
I	...	...	36
J	...	...	12
K	...	...	21

B = Diameter of bolt circle. C = Number and size of bolts.

### F-5545 Bench Stands



F-5545  
Bench Stand

Iowa Bench Stands are similar in operation to Iowa floor stands described above. They can be mounted on any upright surface such as tank walls and in most uses eliminate the need of stem guides or special brackets. Both non-rising stem or rising stem types are available.





## IOWA INDICATOR POSTS AND VALVES

Indicator Post Valves are used for underground installations where it is necessary to tell at a glance whether the valve is in an open or closed position. They can be furnished complete for new installations or if necessary an adapter for the valve can be furnished to convert existing valves.

Iowa indicator posts are ruggedly built of high strength cast iron. Two large window openings near the top of the post are fitted with a heavy plate of glass. An aluminum target plate, with the words OPEN and SHUT cast on it in large, easy-to-read, raised

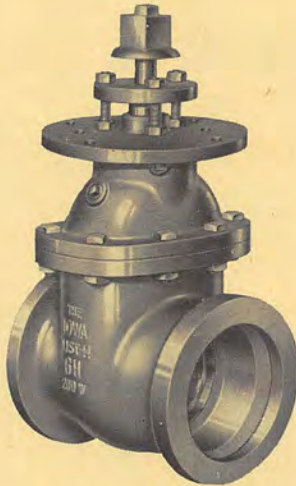
letters, is located directly behind each window in such a position that the appropriate word appears as the valve is operated.

An angle type operating wrench, padlock and locking staple are furnished with the F-5565 Lock Type post. The wrench can be locked to prevent unauthorized operation of the post and to keep the wrench always available.

Stem, indicators, and all working parts are fully protected from moisture or weather damage by complete enclosure. Operating nuts are of bronze. Operating nuts 1½ inches square are furnished unless otherwise specified.



**F-5560** Plain Type Indicator Post with F-5570 Valve



**F-5570** Indicator Post Valve



**F-5565** Lock Type Indicator Post with F-5570 Valve

### ORDERING INFORMATION

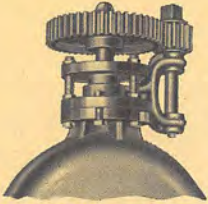
Please furnish the following information on orders and inquiries:

1. **Quantity.**
2. **Size, List and Type** of valves and end types.
3. **Direction of opening** valve.
4. **Depth of trench** (distance from surface to bottom of pipe line).
5. **Size and shape of operating nuts**, if other than standard.
6. **For valves already in place**, state whether or not valve is equipped with flange for post support; if so, give flange dimensions.



## IOWA GEARING, GEAR CASES, AND POSITION INDICATORS

### Gearing



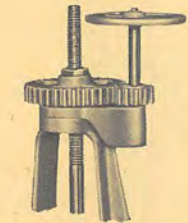
**F-5580 Spur Gears**  
Non-rising Stem



**F-5585 Bevel Gears**  
Non-rising Stem

Cut tooth cast steel gears are normally furnished on AWWA gate valves unless otherwise specified. Cast iron gears are normally furnished on all other valves. However, cut tooth cast steel gears or cut tooth cast iron gears can be furnished on all valves if specified. Pinion shafts are made of rolled bronze.

### Gear Cases



**F-5590 Spur Gears**  
Outside Screw & Yoke



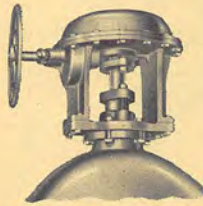
**F-5595 Bevel Gears**  
Outside Screw & Yoke

Watertight gear or grease cases for both spur and bevel gearing are available for all geared valves. They are made of high strength cast iron and designed for easy refilling. The use of gear cases keeps foreign matter out of the gearing and provides easy operation, by keeping the gears lubricated.

### Extended Gear Cases



**F-5600 Spur Gears**  
Extended Gear Case



**F-5610 Bevel Gears**  
Extended Gear Case

Extended gear cases can be furnished for either non-rising stem or outside screw and yoke valves. The case is mounted on distance pieces which hold it above the valve cover and make the valve stuffing box easily accessible.

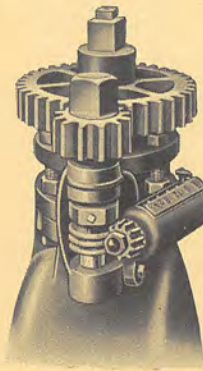
### Position Indicators

Indicators, to show the valve position in non-rising stem gate valves can be furnished for valves in sizes 2 thru 42 inches.

#### Needle and Slot Type (Navy Type)



**F-5650 Indicator**  
Needle and Slot Type



**F-5655 Indicator**  
Barrel Type

Valve position is indicated by a bronze pointer attached to a threaded collar, which moves on the valve stem as the handwheel is operated. A slotted bronze plate, with raised figures is attached to the valve stuffing box and the pointer moves within the slot to show valve position. All parts of the indicator are of bronze.

#### Barrel Type

Barrel type indicators are made of high strength cast iron, with bronze working parts and are of the worm gear type. They are used on valves with bevel or spur gearing. A bronze pointer moves along a bronze plate on which figures indicate valve position.





## IOWA BY-PASS VALVES



**F-5625 By-pass  
Non-rising Stem**

By-pass valves fitted to gate valves make valve operation easier by equalizing the pressure on both sides of the gates. They may be rising stem or non-rising stem type, and are normally the same type as the main valve to which they are fitted, and have the same operating device, handwheel or operating nut, as the main valve.

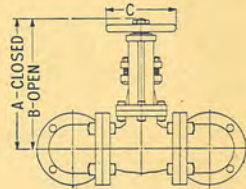
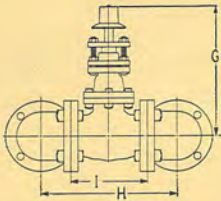
Unless otherwise ordered, by-pass valves are furnished in the sizes recommended by the American Water Works Association, as follows:



**F-5630 By-pass  
Rising Stem, OS&Y**

### F-5625 and F-5630

For size of valve.....Inches	14	16	18	20	24	30	36	42
By-pass valve, size.....Inches	2	3	3	3	4	4	6	6



### F-5625 and F-5630

Size of By-pass Inches	Type of Valve By-pass Used On	Size of Elbows Inches	Dimensions—Inches								
			A	B	C	D	E	F	G	H	I
2	Flanged	2 x 2	10 <sup>3</sup> / <sub>8</sub>	12 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>4</sub>	9	3	6	11	9 <sup>1</sup> / <sub>2</sub>	7
	Hub	2 x 2	10 <sup>3</sup> / <sub>8</sub>	12 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>4</sub>	9	3	6	11	9 <sup>1</sup> / <sub>2</sub>	7
3	Flanged	3 x 3	13 <sup>1</sup> / <sub>2</sub>	17	7 <sup>1</sup> / <sub>4</sub>	9	3 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>2</sub>	12 <sup>7</sup> / <sub>8</sub>	8
	Hub	4 x 3	13 <sup>1</sup> / <sub>2</sub>	17	7 <sup>1</sup> / <sub>4</sub>	9	3 <sup>3</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>2</sub>	14 <sup>1</sup> / <sub>4</sub>	8
4	Flanged	4 x 4	17	21 <sup>1</sup> / <sub>2</sub>	9	11 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	9	16 <sup>1</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>4</sub>	9
	Hub	4 x 4	17	21 <sup>1</sup> / <sub>2</sub>	9	11 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>2</sub>	9	16 <sup>1</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>4</sub>	9
6	Flanged	6 x 6	23 <sup>1</sup> / <sub>2</sub>	30 <sup>1</sup> / <sub>4</sub>	12	13 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	11	20 <sup>1</sup> / <sub>2</sub>	17 <sup>1</sup> / <sub>2</sub>	8
	Hub	6 x 6	23 <sup>1</sup> / <sub>2</sub>	30 <sup>1</sup> / <sub>4</sub>	12	13 <sup>1</sup> / <sub>2</sub>	5 <sup>1</sup> / <sub>2</sub>	11	20 <sup>1</sup> / <sub>2</sub>	18 <sup>1</sup> / <sub>2</sub>	9

### ORDERING INFORMATION FOR BY-PASS VALVES

- 1 Location** of by-pass, if other than listed above.
- 2 Special instructions**, as when by-pass valve is to be of outside screw and yoke construction though used with non-rising stem main valve; floor or bench stand operation, etc.
- 3 If by-pass** is to be manually operated, state whether hand-wheel or operating nut is required.

### Handholes—Cleanouts

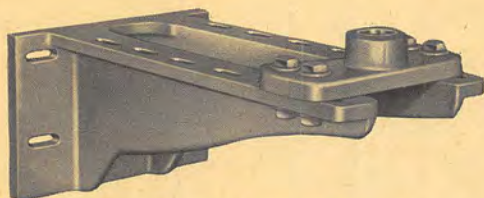
Handholes or clean-out pockets for inspection or removal of sediment can be provided on any Iowa valve. The hole is located on the side of the valve body, near the bottom of the valve. Sizes are determined by the needs of the individual installation.



**F-5640 Gate Valve  
with Cleanout**



## IOWA STEM GUIDES, STEM PROTECTORS AND CHAIN WHEELS



**F-5660 Stem Guide, Size No. 2**

Adjustment From Wall—Inches

Size . . . . . Number	1	2	3	5	6
Minimum .Inches	1	1½	1½	1½	1½
Maximum .Inches	5	12	16	24½	33

50.90

### Stem Guides

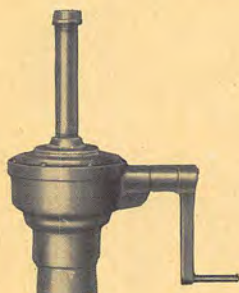
Iowa Stem Guides are installed as wall brackets to support extension stems. They are fully adjustable and are made of high strength cast iron. The guide is bronze bushed where the extension stem passes through. They should be installed at a height which does not permit the stem to be unsupported through a length of more than 10 feet.

Iowa Stem Guides are available in five sizes. When ordering state distance from center line of operating stem to face of wall, or give the size number as shown in table.

### Stem Protectors



**F-5670 Valve Stem Protector**



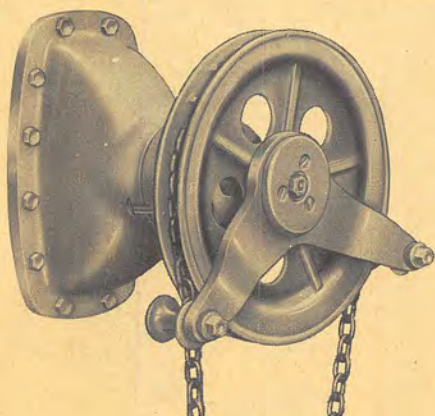
**F-5675 Floor Stand Stem Protector**

Stem Protectors are recommended for the protection of stem threads on outside screw and yoke valves. Their use guards the stem against damage and dirt.

Stem Protectors are available in two types. The top type protects the stem above the handwheel, and the stem type protects the stem throughout its length.

Stem Protectors are also furnished for rising stem floor stand, and can be equipped with slots.

### Chain Wheels



**F-5680 Chain Wheel on NRS Valve**

Iowa Chain Wheels are normally used for operation of valves located overhead. They are made of high strength steel and are provided with chain guides to prevent the chain from slipping off the wheel. Iowa Chain Wheels can be furnished rust proofed if specified.

Chain Wheels are of the direct mounted type and are mounted directly on the valve. They are of approximately the same diameter as the handwheels.

In ordering please state distance from floor to center line of wheel, or give the exact number of feet of chain required.



# **ADDENDA**

## **AMERICAN STANDARDS ASSOCIATION TABLES 6.2 AND 6.4**

**Pages 258 thru 261**

The dimensional data and weights for pipe appearing in the tables on pages 17 thru 23 and on page 27 of this catalog meet all requirements of ASA A21.6 and AWWA C106 specifications for Laying Condition "B"—*for pipe laid without blocks, on flat bottom trench, with tamped back-fill, under 5 feet of cover.*

To determine the pipe required to meet certain other laying conditions and/or for either 3½ feet or 8 feet of cover, refer to Tables 6.2 and 6.4 on the following pages. If these tables do not provide the data to meet your particular problem, the information can be found in the ASA Manual A21.1—which we will be glad to send to you upon request.

## **FEDERAL SPECIFICATIONS WW-P-421 CAST IRON PIPE**

**Pages 262 thru 264**

Tables of dimensions and weights of cast iron Bell and Spigot pipe and for "C-N" Mechanical Joint pipe have been reprinted from our "Pipe Economy" No. 41 catalog and appear on pages 262 thru 264. Pipe made to meet requirements of these specifications can still be furnished by Clow—when so ordered. However, we call attention to the fact that WW-P-421 has been superseded by a revised Federal specification issued in 1955 with the number WW-P-421a—available on request.

## **AMERICAN WATER WORKS ASSOCIATION CAST IRON FITTINGS**

**Pages 265 thru 281**

Our experience indicates that the greatest demand for cast iron fittings is in sizes 24-inch and smaller with a preference shown for *short body* fittings in sizes 12-inch and smaller and *long body* fittings for the 14 thru 24-inch sizes. The tables of dimensional data and weights appearing on pages 38 thru 51 have been arranged to conform with this modern practice—and to simplify ordering of bell and spigot fittings. Also, on pages 55 thru 60, flanged *long body* fittings for water are shown for all sizes 24 inches and smaller.

However, considering that the users of this catalog may also have occasional need for such information, pages 265 thru 281 have been prepared for ready reference. Dimensions and weights are shown for AWWA *long body* fittings (both bell and spigot and flanged joints) in a full range of sizes and types—not otherwise shown on the pages mentioned above. The dimensional data corresponds with AWWA C100 for Cast Iron Pressure Fittings for Water.

## **AWWA SAND CAST—CAST IRON PIPE**

**Page 282**

To close this section, and for information purposes only, we have included a page showing sizes and weights for old sand cast pipe in Classes A, B, C, and D, according to the AWWA specifications adopted May 12, 1908.

### **Note**

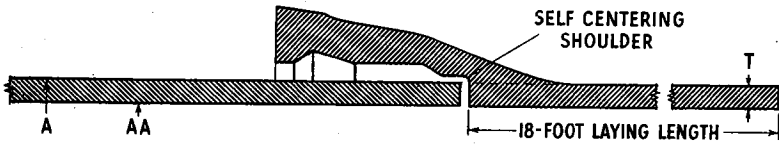
The article—"Evolution of Specifications" for cast iron pipe and fittings, on page 12, is both factual and interesting reading.



## STANDARD THICKNESSES, DIAMETERS, AND WEIGHTS OF PIPE

CENTRIFUGALLY CAST IN METAL MOLDS

American Standards Association Specifications A21.6



**TABLE 6.2**

Nominal Inside Diameter Inches	Pipe Thickness		Dimensions—Inches		Approximate Weight—Pounds			
	ASA Class No.	Wall T Inches	A Pipe O.D.	AA Pipe I.D.	Pipe Barrel Per Ft.	Bell Metal Only	18-Foot Length*	
							Average Per Foot	Per Length
3	22	.32	3.96	3.32	11.4	11	12.0	215
	23	.35	3.96	3.26	12.4	11	13.0	235
	24	.38	3.96	3.20	13.3	11	13.9	250
4	22	.35	4.80	4.10	15.3	14	16.1	290
	23	.38	4.80	4.04	16.5	14	17.3	310
	24	.41	4.80	3.98	17.6	14	18.4	330
	25	.44	4.80	3.92	18.8	14	19.5	350
6	22	.38	6.90	6.14	24.3	25	25.6	460
	23	.41	6.90	6.08	26.1	25	27.5	495
	24	.44	6.90	6.02	27.9	25	29.3	525
	25	.48	6.90	5.94	30.2	25	31.7	570
8	22	.41	9.05	8.23	34.7	41	36.9	665
	23	.44	9.05	8.17	37.1	41	39.4	710
	24	.48	9.05	8.09	40.3	41	42.6	765
	25	.52	9.05	8.01	43.5	41	45.8	825
	26	.56	9.05	7.93	46.6	41	48.9	880
10	22	.44	11.10	10.22	46.0	54	49.0	880
	23	.48	11.10	10.14	50.0	54	53.0	955
	24	.52	11.10	10.06	53.9	54	56.9	1025
	25	.56	11.10	9.98	57.9	54	60.9	1095
	26	.60	11.10	9.90	61.8	54	64.8	1165
12	22	.48	13.20	12.24	59.8	66	63.4	1140
	23	.52	13.20	12.16	64.6	66	68.3	1230
	24	.56	13.20	12.08	69.4	66	73.1	1315
	25	.60	13.20	12.00	74.1	66	77.8	1400
	26	.65	13.20	11.90	80.0	66	83.7	1505
14	21	.48	15.30	14.34	69.7	78	74.1	1335
	22	.51	15.30	14.28	73.9	78	78.2	1410
	23	.55	15.30	14.20	79.5	78	83.8	1510
	24	.59	15.30	14.12	85.1	78	89.5	1610
	25	.64	15.30	14.02	92.0	78	96.5	1735
	26	.69	15.30	13.92	98.8	78	103.1	1855
	21	.48	15.65	14.69	71.4	80	75.8	1365
	22	.51	15.65	14.63	75.7	80	80.2	1445
	23	.55	15.65	14.55	81.4	80	85.8	1545
	24	.59	15.65	14.47	87.1	80	91.6	1650*
	25	.64	15.65	14.37	94.2	80	98.7	1775
	26	.69	15.65	14.27	101.2	101	106.9	1925
	27	.75	15.65	14.15	109.5	101	115.1	2070
28	.81	15.65	14.03	117.8	101	123.4	2220	

\*Including calking bell. Calculated weight of full length pipe is rounded off to nearest 5 pounds.

continued →





## STANDARD THICKNESSES, DIAMETERS, AND WEIGHT OF PIPE

TABLE 6.2 (concluded)

Nominal Inside Diameter Inches	Pipe Thickness		Dimensions—Inches		Approximate Weight—Pounds				
	ASA Class No.	Wall T Inches	A Pipe O.D.	AA Pipe I.D.	Pipe Barrel Per Ft	Bell Metal Only	18-Foot Length*		
							Average Per Foot	Per Length	
16	21	.50	17.40	16.40	82.8	96	88.1	1585	
	22	.54	17.40	16.32	89.2	96	94.5	1700	
	23	.58	17.40	16.24	95.6	96	100.9	1815	
	24	.63	17.40	16.14	103.6	96	109.0	1960	
	25	.68	17.40	16.04	111.4	96	116.8	2100	
	26	.73	17.40	15.94	119.3	96	124.8	2245	
	21	.50	17.80	16.80	84.8	98	90.2	1625	
	22	.54	17.80	16.72	91.4	98	96.9	1745	
	23	.58	17.80	16.64	97.9	98	103.3	1860	
	24	.63	17.80	16.54	106.0	98	111.5	2005	
	25	.68	17.80	16.44	114.1	98	119.5	2150	
	26	.73	17.80	16.34	122.1	121	128.8	2320	
	27	.79	17.80	16.22	131.7	121	138.4	2490	
	28	.85	17.80	16.10	141.2	121	148.0	2665	
	18	21	.54	19.50	18.42	100.4	114	106.7	1920
		22	.58	19.50	18.34	107.6	114	113.9	2050
23		.63	19.50	18.24	116.5	114	122.8	2210	
24		.68	19.50	18.14	125.4	114	131.8	2370	
25		.73	19.50	18.04	134.3	114	140.6	2530	
26		.79	19.50	17.92	144.9	114	151.2	2720	
21		.54	19.92	18.84	102.6	116	109.1	1965	
22		.58	19.92	18.76	109.9	116	116.3	2095	
23		.63	19.92	18.66	119.1	116	125.5	2260	
24		.68	19.92	18.56	128.2	116	134.8	2425	
25		.73	19.92	18.46	137.3	116	143.7	2585	
26		.79	19.92	18.34	148.1	145	156.1	2810	
27		.85	19.92	18.22	158.9	145	166.9	3005	
28		.92	19.92	18.08	171.3	145	179.4	3230	
20		21	.57	21.60	20.46	117.5	133	124.9	2250
		22	.62	21.60	20.36	127.5	133	134.9	2430
	23	.67	21.60	20.26	137.5	133	144.9	2610	
	24	.72	21.60	20.16	147.4	133	154.8	2785	
	25	.78	21.60	20.04	159.2	133	166.8	3000	
	26	.84	21.60	19.92	170.9	133	178.4	3210	
	21	.57	22.06	20.92	120.1	136	127.7	2300	
	22	.62	22.06	20.82	130.3	136	137.9	2480	
	23	.67	22.06	20.72	140.5	136	148.1	2665	
	24	.72	22.06	20.62	150.6	136	158.1	2845	
	25	.78	22.06	20.50	162.7	136	170.3	3065	
	26	.84	22.06	20.38	174.7	171	184.1	3315	
	27	.91	22.06	20.24	188.7	171	198.2	3570	
	28	.98	22.06	20.10	202.5	171	212.0	3815	
	24	21	.63	25.80	24.54	155.4	179	165.3	2975
		22	.68	25.80	24.44	167.4	179	177.3	3190
23		.73	25.80	24.34	179.4	179	189.4	3410	
24		.79	25.80	24.22	193.7	179	203.6	3665	
25		.85	25.80	24.10	207.9	179	217.8	3920	
26		.92	25.80	23.96	224.4	179	234.4	4220	
21		.63	26.32	25.06	158.6	182	168.7	3035	
22		.68	26.32	24.96	170.9	182	181.0	3260	
23		.73	26.32	24.86	183.1	182	193.2	3480	
24		.79	26.32	24.74	197.7	182	207.8	3740	
25		.85	26.32	24.62	212.2	182	222.3	4000	
26		.92	26.32	24.48	229.0	229	241.7	4350	
27		.99	26.32	24.34	245.8	229	258.5	4655	
28		1.07	26.32	24.18	264.8	229	277.5	4995	

\*Including calking bell. Calculated weight of full length pipe is rounded off to nearest 5 pounds.

Note: See pages 260 and 261 for Tables 6.4



## STANDARD THICKNESSES OF CAST IRON PIPE CENTRIFUGALLY CAST IN METAL MOLDS

American Standards Association Specifications A21.6

### To Find Thickness of Pipe Required to Meet Specific Conditions

1. From the table "Standard Metal Thickness of Pipe" (starting below and continued on following page), determine the *required thickness* of pipe by its size, working pressure, and laying condition.
2. In the table "Class Thicknesses" (page 261) locate "Class No." for the *thickness* of pipe required—as determined above.
3. By the size of the pipe and by the "Class Thickness No.", the dimensions and weights of pipe to meet almost any service requirement can be selected from data in the tables on pages 258 and 259.

### Laying Conditions

- A—Flat bottom trench, untamped backfill.      C—Pipe laid on blocks, untamped backfill.  
B—Flat bottom trench, tamped backfill.        D—Pipe laid on blocks, tamped backfill.

TABLE 6.4

Nominal Inside Diameter Inches	Working Pressure psi	3½ Feet of Cover				5 Feet of Cover				8 Feet of Cover			
		Laying Condition				Laying Condition				Laying Condition			
		A	B	C	D	A	B	C	D	A	B	C	D
Thickness of Pipe in Inches*													
3	50	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.38	.32
	100	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.38	.32
	150	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.38	.32
	200	.32	.32	.32	.32	.32	.32	.32	.32	.32	.32	.38	.32
	250	.32	.32	.32	.32	.32	.32	.35	.32	.32	.32	.38	.32
	300	.32	.32	.32	.32	.32	.32	.35	.32	.32	.32	.38	.32
	350	.32	.32	.32	.32	.32	.32	.35	.32	.32	.32	.38	.32
4	50	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.41	.35
	100	.35	.35	.35	.35	.35	.35	.35	.35	.35	.35	.41	.35
	150	.35	.35	.35	.35	.35	.35	.38	.35	.35	.35	.41	.35
	200	.35	.35	.35	.35	.35	.35	.38	.35	.35	.35	.44	.35
	250	.35	.35	.35	.35	.35	.35	.38	.35	.35	.35	.44	.35
	300	.35	.35	.35	.35	.35	.35	.38	.35	.35	.35	.44	.35
	350	.35	.35	.38	.35	.35	.35	.38	.35	.35	.35	.44	.35
6	50	.38	.38	.41	.38	.38	.38	.44	.38	.38	.38	.48	.38
	100	.38	.38	.41	.38	.38	.38	.44	.38	.38	.38	.48	.38
	150	.38	.38	.41	.38	.38	.38	.44	.38	.38	.38	.48	.38
	200	.38	.38	.41	.38	.38	.38	.44	.38	.38	.38	.52	.38
	250	.38	.38	.44	.38	.38	.38	.44	.38	.38	.38	.52	.38
	300	.38	.38	.44	.38	.38	.38	.44	.38	.38	.38	.52	.38
	350	.38	.38	.44	.38	.38	.38	.48	.38	.38	.38	.52	.38
8	50	.41	.41	.44	.41	.41	.41	.48	.41	.41	.41	.52	.41
	100	.41	.41	.48	.41	.41	.41	.48	.41	.41	.41	.56	.41
	150	.41	.41	.48	.41	.41	.41	.48	.41	.41	.41	.56	.41
	200	.41	.41	.48	.41	.41	.41	.52	.41	.41	.41	.56	.44
	250	.41	.41	.48	.41	.41	.41	.52	.41	.44	.41	.56	.44
	300	.41	.41	.48	.41	.41	.41	.52	.41	.44	.44	.60	.44
	350	.41	.41	.52	.41	.44	.41	.52	.44	.48	.44	.60	.48
10	50	.44	.44	.48	.44	.44	.44	.52	.44	.44	.44	.60	.48
	100	.44	.44	.52	.44	.44	.44	.52	.44	.48	.44	.60	.48
	150	.44	.44	.52	.44	.44	.44	.56	.44	.48	.44	.60	.48
	200	.44	.44	.52	.44	.44	.44	.56	.44	.48	.48	.60	.52
	250	.44	.44	.56	.44	.48	.44	.56	.48	.52	.48	.65	.52
	300	.48	.44	.56	.48	.48	.48	.56	.48	.52	.52	.65	.56
	350	.48	.48	.56	.48	.52	.52	.60	.52	.56	.52	.65	.56
12	50	.48	.48	.52	.48	.48	.48	.56	.48	.52	.48	.65	.52
	100	.48	.48	.56	.48	.48	.48	.56	.48	.52	.48	.65	.52
	150	.48	.48	.56	.48	.48	.48	.56	.48	.52	.52	.65	.56
	200	.48	.48	.56	.48	.48	.48	.60	.52	.56	.52	.65	.56
	250	.52	.48	.60	.52	.52	.52	.60	.52	.56	.56	.70	.60
	300	.52	.52	.60	.52	.56	.52	.60	.56	.60	.56	.70	.60
	350	.56	.56	.60	.56	.56	.56	.65	.60	.60	.60	.76	.65

\*Thickness includes allowances for foundry practice, corrosion, and either water hammer or truck load.

Continued →





**STANDARD THICKNESSES OF CAST IRON PIPE  
CENTRIFUGALLY CAST IN METAL MOLDS**

American Standards Association Specifications A21.6

TABLE 6.4 (concluded)

Nominal Inside Diameter Inches	Working Pressure psi	3½ Feet of Cover				5 Feet of Cover				8 Feet of Cover				
		Laying Condition				Laying Condition				Laying Condition				
		A	B	C	D	A	B	C	D	A	B	C	D	
Thickness of Pipe in Inches*														
14	50	.51	.48	.59	.51	.51	.48	.59	.55	.59	.55	.69	.59	.59
	100	.51	.48	.59	.55	.55	.51	.64	.55	.59	.55	.69	.64	.64
	150	.55	.51	.59	.55	.55	.51	.64	.59	.64	.59	.75	.64	.64
	200	.55	.51	.64	.59	.55	.55	.64	.59	.64	.59	.75	.69	.69
	250	.59	.55	.64	.59	.59	.59	.69	.59	.64	.64	.75	.69	.69
	300	.59	.59	.69	.59	.64	.59	.69	.64	.69	.64	.81	.69	.69
350	.64	.64	.69	.64	.64	.64	.75	.69	.75	.69	.81	.75	.75	
16	50	.54	.50	.63	.58	.58	.54	.63	.58	.63	.58	.73	.63	.63
	100	.54	.54	.63	.58	.58	.54	.68	.58	.63	.58	.73	.68	.68
	150	.58	.54	.63	.58	.58	.54	.68	.63	.68	.63	.79	.68	.68
	200	.58	.58	.68	.63	.63	.58	.68	.63	.68	.63	.79	.73	.73
	250	.63	.58	.68	.63	.63	.63	.73	.68	.73	.68	.79	.73	.73
	300	.63	.63	.73	.68	.68	.68	.73	.68	.73	.73	.85	.79	.79
350	.68	.68	.73	.68	.73	.68	.79	.73	.79	.73	.85	.79	.79	
18	50	.58	.54	.63	.58	.58	.54	.68	.63	.68	.63	.79	.68	.68
	100	.58	.54	.68	.63	.63	.58	.73	.63	.68	.63	.79	.73	.73
	150	.63	.58	.68	.63	.63	.58	.73	.68	.73	.68	.79	.73	.73
	200	.63	.58	.73	.68	.68	.63	.73	.68	.73	.68	.85	.79	.79
	250	.68	.63	.73	.68	.68	.68	.79	.73	.79	.73	.85	.79	.79
	300	.68	.68	.79	.73	.73	.73	.79	.79	.79	.79	.92	.85	.85
350	.79	.73	.79	.79	.79	.79	.85	.79	.85	.85	.92	.85	.85	
20	50	.62	.57	.72	.62	.67	.57	.72	.67	.72	.67	.78	.72	.72
	100	.62	.57	.72	.67	.67	.62	.78	.67	.72	.67	.84	.78	.78
	150	.67	.62	.72	.67	.67	.62	.78	.72	.78	.72	.84	.78	.78
	200	.67	.62	.78	.72	.72	.67	.78	.72	.78	.72	.91	.84	.84
	250	.72	.67	.78	.72	.78	.72	.84	.78	.84	.78	.91	.84	.84
	300	.78	.72	.84	.78	.78	.78	.84	.84	.84	.84	.98	.91	.91
350	.84	.78	.84	.84	.84	.84	.91	.84	.91	.84	.98	.91	.91	
24	50	.68	.63	.79	.68	.73	.63	.79	.73	.79	.73	.85	.79	.79
	100	.73	.63	.79	.73	.73	.68	.85	.79	.85	.73	.92	.85	.85
	150	.73	.68	.79	.79	.79	.73	.85	.79	.85	.79	.92	.85	.85
	200	.79	.73	.85	.79	.79	.79	.92	.85	.92	.85	.99	.92	.92
	250	.79	.79	.85	.85	.85	.79	.92	.85	.92	.85	.99	.99	.99
	300	.85	.85	.92	.85	.92	.85	.99	.92	.99	.92	1.07	.99	.99
350	.92	.92	.99	.92	.99	.92	.99	.99	1.07	.99	1.07	1.07	1.07	

\*Thickness includes allowances for foundry practice, corrosion, and either water hammer or truck load.

**CLASS THICKNESSES**

Nominal Diameter Inches	Standard Class Numbers for Thickness of Pipe							
	No. 21	No. 22	No. 23	No. 24	No. 25	No. 26	No. 27	No. 28
	Pipe Thickness in Inches							
3	..	.32	.35	.38	..	..	..	..
4	..	.35	.38	.41	.44	..	..	..
6	..	.38	.41	.44	.48	..	..	..
8	..	.41	.44	.48	.52	.56	..	..
10	..	.44	.48	.52	.56	.60	..	..
12	..	.48	.52	.56	.60	.65	..	..
14	.48	.51	.55	.59	.64	.69	.75	.81
16	.50	.54	.58	.63	.68	.73	.79	.85
18	.54	.58	.63	.68	.73	.79	.85	.92
20	.57	.62	.67	.72	.78	.84	.91	.98
24	.63	.68	.73	.79	.85	.92	.99	1.07

**Note:** Tables for cast iron pipe required for Laying Condition B—"for pipe laid without blocks, on flat bottom trench, with tamped backfill, under 5 feet of cover"—have been completely computed for pipe made with various types of joints and will be found on pages 17 thru 23 and 27.

For other laying conditions, see Important Notes on page 15



Inc.

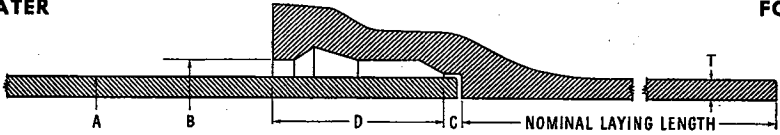
Super-delavaud

## STANDARD BELL AND SPIGOT CAST IRON PIPE

(Meets All Requirements of Federal Specifications WW-P-421)

FOR WATER

FOR GAS



F-100

### DIMENSIONS AND WEIGHTS

Nominal Inside Diameter Inches	Class or Maximum Working Pressure	Dimensions in Inches					Weight—Pounds					
		A	B	C	D	T	Bell Only	Pipe Barrel Per Foot	Nominal Laying Length			
									12-Foot		18-Foot	
									Per Foot	Per Length	Per Foot	Per Length
3	150	3.96	4.76	.30	3.00	.33	12	11.7	12.7	155	12.4	225
3	250	3.96	4.76	.30	3.00	.36	12	12.7	13.7	165	13.4	240
4	150	4.80	5.60	.30	3.00	.34	17	14.9	16.3	195	15.9	285
4	250	4.80	5.60	.30	3.00	.38	17	16.5	18.4	220	17.9	325
6	150	6.90	7.70	.38	3.50	.37	27	23.7	26.3	315	25.5	460
6	250	6.90	7.70	.38	3.50	.43	27	27.3	29.3	350	28.5	515
8	150	9.05	9.85	.38	4.00	.42	41	35.5	39.4	475	38.3	690
8	200	9.05	9.85	.38	4.00	.46	41	38.7	42.4	510	41.3	745
8	250	9.05	9.85	.38	4.00	.50	42	41.9	45.5	545	44.3	800
10	150	11.10	11.90	.38	4.00	.47	51	49.0	53.3	640	51.8	935
10	200	11.10	11.90	.38	4.00	.52	51	53.9	58.3	700	56.8	1025
10	250	11.10	11.90	.38	4.00	.57	52	58.8	63.3	760	61.9	1115
12	150	13.20	14.00	.38	4.00	.50	65	62.2	67.4	810	65.6	1180
12	200	13.20	14.00	.38	4.00	.57	65	70.6	75.4	905	73.7	1325
12	250	13.20	14.00	.38	4.00	.62	66	76.5	82.5	990	80.7	1450
14	100	15.30	16.10	.50	4.00	.48	78	69.7	76.5	920	74.3	1340
14	150	15.65	16.45	.50	4.00	.55	78	82.0	88.5	1060	85.8	1555
14	200	15.65	16.45	.50	4.00	.62	96	91.0	99.0	1190	96.3	1735
14	250	15.65	16.45	.50	4.00	.69	96	102.0	110.0	1320	107.3	1930
16	100	17.40	18.40	.50	4.00	.52	98	86.0	94.2	1130	91.4	1645
16	150	17.80	18.80	.50	4.00	.60	98	102.0	110.2	1320	107.4	1935
16	200	17.80	18.80	.50	4.00	.68	121	114.0	124.1	1490	120.7	2175
16	250	17.80	18.80	.50	4.00	.75	121	126.0	136.1	1635	132.7	2390
18	100	19.50	20.50	.50	4.00	.56	118	104.0	113.8	1365	110.6	1990
18	150	19.92	20.92	.50	4.00	.65	118	123.0	132.8	1595	129.6	2330
18	200	19.92	20.92	.50	4.00	.74	143	139.0	150.9	1810	146.9	2645
18	250	19.92	20.92	.50	4.00	.83	143	156.0	168.0	2015	163.9	2950
20	100	21.60	22.60	.50	4.00	.58	144	119.5	132.0	1585	128.0	2305
20	150	22.06	23.06	.50	4.00	.68	144	143.0	155.0	1860	151.0	2720
20	200	22.06	23.06	.50	4.00	.78	169	163.0	177.1	2125	172.4	3105
20	250	22.06	23.06	.50	4.00	.88	169	183.0	197.1	2365	192.4	3465
24	100	25.80	26.80	.50	4.00	.64	190	157.8	173.8	2085	168.6	3035
24	150	26.32	27.32	.50	4.00	.76	190	191.0	206.8	2480	201.6	3630
24	200	26.32	27.32	.50	4.00	.88	226	219.0	237.8	2855	231.6	4170
24	250	26.32	27.32	.50	4.00	1.00	226	248.0	266.8	3200	260.6	4690

In sizes 14 thru 24 inch: Class 100 pipe is made for use with "B" fittings; Class 150 and heavier pipe, for use with "D" fittings.

Pipe having wall thickness heavier than shown in table, or equivalent to A. W. W. A. Specifications, can also be furnished. Pipe lighter than shown in table, for flow lines, drains, exhaust lines and other low pressure installations, where conditions will permit its use, can be furnished.





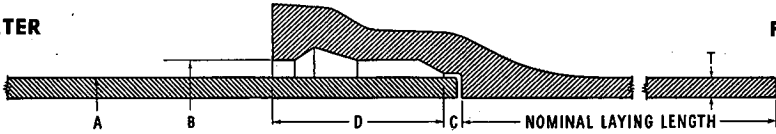
Super-deLavaud

**SPECIAL CLASS 150 BELL AND SPIGOT PIPE**

(Meets All Requirements of Federal Specifications WW-P-421)

FOR WATER

FOR GAS



**F-110**

This special pipe will meet the requirements of engineers who specify Class 150 thickness pipe for use with "B" fittings, bearing in mind that working pressures should not exceed the pressure rating of the fittings used.

**DIMENSIONS AND WEIGHTS**

Nominal Inside Diameter Inches	Class or Maximum Working Pressure	Dimensions in Inches					Bell Only	Pipe Barrel Per Foot	Weight—Pounds			
		A	B	C	D	T			Nominal Laying Length		Per Foot	Per Length
									12-Foot	18-Foot		
14	150	15.30	16.10	.50	4.00	.55	78	79.5	86.5	1040	84.3	1520
16	150	17.40	18.40	.50	4.00	.60	98	98.8	107.2	1285	104.4	1880
18	150	19.50	20.50	.50	4.00	.65	118	120.1	129.8	1560	126.6	2280
20	150	21.60	22.60	.50	4.00	.68	144	139.4	151.0	1810	147.0	2645
24	150	25.80	26.80	.50	4.00	.76	190	186.5	202.8	2435	197.6	3555

EXCERPTS FROM

Federal Specifications WW-P-421 of July 21, 1931  
and Amendment 3 of April 26, 1940, for

**TYPE "I" BELL AND SPIGOT CAST IRON PIPE FOR WATER**

**E. DETAIL REQUIREMENTS:**

E-1. Tolerances in thickness.—

E-1a. The tolerances in thickness of pipe, plus or minus, shall not exceed those listed below:

Nominal Diameter in Inches	Tolerance, Plus or Minus (inch)
4	0.04
6	0.045
8	0.05
10	0.055
12	0.06
14, 16, 18, 20, 24	0.08

E-1b. For all sizes of pipe, tolerances not exceeding 0.02 inch additional to above will be allowed for spaces not exceeding 8 inches in length in any direction.

E-2. Tolerance in weight.—The weight of no single pipe shall be less than the nominal tabulated weight by more than 5 per cent. The total weight of any order shall be not more than 2 per cent under nominal weight.

**E-3. Type I—Centrifugally cast in metal contact molds in 18-foot lengths.**

E-3a. Type I pipe shall be of the bell and spigot type, centrifugally cast in metal contact molds with plain spigot end, and with lead

groove and self-centering shoulder in the bell.

E-3b. Annealing.—Type I pipe, after withdrawing from machines, shall be annealed to meet the hardness limits established in the specification.

E-3c. Physical requirements.—Type I pipe shall have a secant modulus of elasticity not to exceed 12,000,000 pounds per square inch with a corresponding modulus of rupture not less than 40,000 pounds per square inch.

E-3d. Tolerances in diameter.—The inside diameters of the bells and the outside diameters of the spigot ends of Type I pipe shall not vary plus or minus from the tabulated dimensions by more than 0.06 inch for pipe 12 inches and less in nominal diameter and 0.08 inch for pipe 14 inches and larger.

E-3e. Dimensions and weights.—Type I pipe shall conform to the dimensions and weights given in Figure 1 and Tables I and II (in specifications\*) for the respective classes and subject to the tolerances given in paragraphs E-1a, E-1b, E-2, and E-3d.

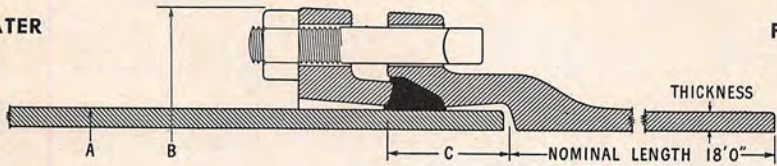
**\*Note**

Complete WW-P-421 Specification and Amendment 3 may be purchased from the Superintendent of Documents, Washington, D.C.



Super-deLavaud  
**"C-N" MECHANICAL JOINT CAST IRON PIPE**  
 (Federal Specifications WW-P-421 Pipe Barrel)

FOR WATER



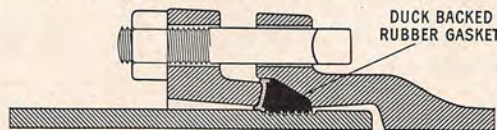
FOR GAS

F-120  
**DIMENSIONS AND WEIGHTS**

Nominal Inside Diameter Inches	Class or Maximum Working Pressure	Dimensions Inches			Number and Size of Bolts	Average Thickness Inches	18-Foot Length		Weight of Gland, Bolts and Gasket Pounds
		A	B	C			Weight-Pounds *		
							Per Foot	Per Length	
3	150	3.96	7.69	2.50	4-5/8x3	.33	12.3	220	7
3	250	3.96	7.69	2.50	4-5/8x3	.36	13.3	240	7
4	150	4.80	9.12	2.50	4-3/4x3 1/2	.34	15.7	280	10
4	250	4.80	9.12	2.50	4-3/4x3 1/2	.38	17.2	310	10
6	150	6.90	11.12	2.50	6-3/4x3 1/2	.37	24.7	445	16
6	250	6.90	11.12	2.50	6-3/4x3 1/2	.43	28.3	510	16
8	150	9.05	13.37	2.50	6-3/4x4	.42	37.1	670	25
8	250	9.05	13.37	2.50	6-3/4x4	.50	43.4	780	25
10	150	11.10	15.62	2.50	8-3/4x4	.47	51.1	920	30
10	250	11.10	15.62	2.50	8-3/4x4	.57	60.9	1095	30
12	150	13.20	17.88	2.50	8-3/4x4	.50	64.9	1170	40
12	250	13.20	17.88	2.50	8-3/4x4	.62	79.2	1425	40
14	150	15.30	20.25	3.50	10-3/4x4	.55	83.4	1500	45
14	250	15.30	20.25	3.50	10-3/4x4	.69	102.8	1850	45
16	150	17.40	22.50	3.50	12-3/4x4 1/2	.60	103.6	1865	55
16	250	17.40	22.50	3.50	12-3/4x4 1/2	.75	127.2	2290	55
18	150	19.50	24.75	3.50	12-3/4x4 1/2	.65	125.9	2265	65
18	250	19.50	24.75	3.50	12-3/4x4 1/2	.83	157.7	2840	65
20	150	21.60	27.00	3.50	14-3/4x4 1/2	.68	146.3	2635	85
20	250	21.60	27.00	3.50	14-3/4x4 1/2	.88	185.6	3340	85
24	150	25.80	31.50	3.50	16-3/4x5	.76	195.6	3520	105
24	250	25.80	31.50	3.50	16-3/4x5	1.00	252.1	4540	105

\*Weights do not include weight of gland, bolts or gasket—see last column in table. Pipe with lighter or heavier wall thickness than that shown above can also be furnished.

**"C-N" MECHANICAL LOCKED JOINT PIPE**



F-125

This is our regular "C-N" Mechanical Joint pipe except, in this locked joint, the spigot end of the pipe is grooved where it rests in contact with the gasket. While provision is made for only slight expansion or contraction of the pipe line in this joint, the flexibility of our regular "C-N" joint pipe is maintained. From 5° to 7° deflection of our "Locked Joint" is possible without rupture of the finished joint.

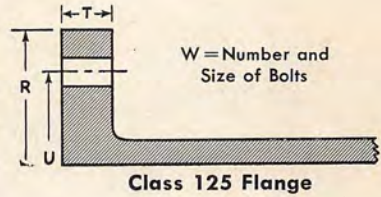
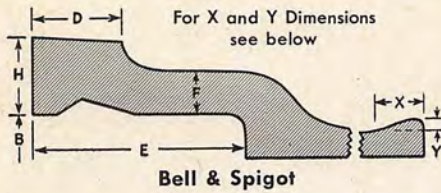
"Locked Joint" pipe can be furnished in sizes from 3 to 12-inch inclusive. We recommend Class 250 Locked Joint pipe for industrial pipe lines, oil condensers and other special piping in the process industries, and for any pipe line installation where severe lateral thrusts may be encountered on the pipe joints. Sizes 3 to 8-inch are limited to working pressures of 250 pounds; sizes 10 and 12-inch to 200 pounds.





## STANDARD BELL AND FLANGE DIMENSIONS

AWWA Standard Fittings Specifications C100



X = 3/4" on sizes 3, 4 and 6 inches; 1" on larger sizes.

Y = 3/16" on sizes 12-inch and smaller, 1/4" on larger sizes.

E = Depth of Socket

R = Outside Diameter of Flange

U = Diameter of Bolt Circle

### Dimensions apply to the bells and flanges on AWWA Standard Fittings only\*

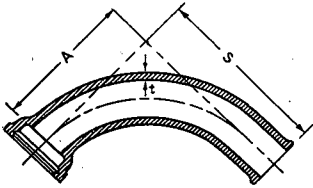
Fitting Size Inches	Class	Dimensions—Inches								
		For Standard Bells*					For Class 125 Flanges			
		B	D	E	F	H	R	T	U	W
3	D	4.66	1.25	3.50	.65	1.30	7 1/2	3/4	6	4- 5/8x2 1/2
4	D	5.70	1.50	4.00	.65	1.30	9	15/16	7 1/2	8- 5/8x3
6	D	7.80	1.50	4.00	.70	1.40	11	1	9 1/2	8- 3/4x3 1/4
8	D	10.00	1.50	4.00	.75	1.50	13 1/2	1 1/8	11 3/4	8- 3/4x3 1/2
10	D	12.10	1.50	4.00	.80	1.60	16	1 3/16	14 1/4	12- 7/8x3 3/4
12	D	14.20	1.50	4.00	.85	1.70	19	1 1/4	17	12- 7/8x3 3/4
14	B	16.10	1.50	4.00	.85	1.70	21	1 3/8	18 3/4	12-1 x4 1/4
14	D	16.45	1.50	4.00	.90	1.80	21	1 3/8	18 3/4	12-1 x4 1/4
16	B	18.40	1.75	4.00	.90	1.80	23 1/2	1 7/16	21 1/4	16-1 x4 1/2
16	D	18.80	1.75	4.00	1.00	1.90	23 1/2	1 7/16	21 1/4	16-1 x4 1/2
18	B	20.50	1.75	4.00	.95	1.90	25	1 9/16	22 3/4	16-1 1/8x4 3/4
18	D	20.92	1.75	4.00	1.05	2.10	25	1 9/16	22 3/4	16-1 1/8x4 3/4
20	B	22.60	1.75	4.00	1.00	2.00	27 1/2	1 11/16	25	20-1 1/8x5
20	D	23.06	1.75	4.00	1.15	2.30	27 1/2	1 11/16	25	20-1 1/8x5
24	B	26.80	2.00	4.00	1.05	2.10	32	1 7/8	29 1/2	20-1 1/4x5 1/2
24	D	27.32	2.00	4.00	1.25	2.50	32	1 7/8	29 1/2	20-1 1/4x5 1/2
30	A	32.74	2.00	4.50	1.15	2.30	38 3/4	2 1/8	36	28-1 1/4x6 1/4
30	B	33.00	2.00	4.50	1.15	2.30	38 3/4	2 1/8	36	28-1 1/4x6 1/4
30	C	33.40	2.00	4.50	1.32	2.60	38 3/4	2 1/8	36	28-1 1/4x6 1/4
30	D	33.74	2.00	4.50	1.50	3.00	38 3/4	2 1/8	36	28-1 1/4x6 1/4
36	A	38.96	2.00	4.50	1.25	2.50	46	2 3/8	42 3/4	32-1 1/2x7
36	B	39.30	2.00	4.50	1.40	2.80	46	2 3/8	42 3/4	32-1 1/2x7
36	C	39.70	2.00	4.50	1.60	3.10	46	2 3/8	42 3/4	32-1 1/2x7
36	D	40.16	2.00	4.50	1.80	3.40	46	2 3/8	42 3/4	32-1 1/2x7
42	A	45.20	2.00	5.00	1.40	2.80	53	2 5/8	49 1/2	36-1 1/2x7 1/2
42	B	45.50	2.00	5.00	1.50	3.00	53	2 5/8	49 1/2	36-1 1/2x7 1/2
42	C	46.10	2.00	5.00	1.75	3.40	53	2 5/8	49 1/2	36-1 1/2x7 1/2
42	D	46.58	2.00	5.00	1.95	3.80	53	2 5/8	49 1/2	36-1 1/2x7 1/2
48	A	51.50	2.00	5.00	1.50	3.00	59 1/2	2 3/4	56	44-1 1/2x7 3/4
48	B	51.80	2.00	5.00	1.65	3.30	59 1/2	2 3/4	56	44-1 1/2x7 3/4
48	C	52.40	2.00	5.00	1.95	3.80	59 1/2	2 3/4	56	44-1 1/2x7 3/4
48	D	52.98	2.00	5.00	2.20	4.20	59 1/2	2 3/4	56	44-1 1/2x7 3/4
54	A	57.66	2.25	5.50	1.60	3.20	66 1/4	3	62 3/4	44-1 3/4x8 1/2
54	B	58.10	2.25	5.50	1.80	3.60	66 1/4	3	62 3/4	44-1 3/4x8 1/2
54	C	58.80	2.25	5.50	2.15	4.00	66 1/4	3	62 3/4	44-1 3/4x8 1/2
54	D	59.40	2.25	5.50	2.45	4.40	66 1/4	3	62 3/4	44-1 3/4x8 1/2
60	A	63.80	2.25	5.50	1.70	3.40	73	3 1/8	69 1/4	52-1 3/4x8 3/4
60	B	64.40	2.25	5.50	1.90	3.70	73	3 1/8	69 1/4	52-1 3/4x8 3/4
60	C	65.20	2.25	5.50	2.25	4.20	73	3 1/8	69 1/4	52-1 3/4x8 3/4
60	D	65.82	2.25	5.50	2.60	4.70	73	3 1/8	69 1/4	52-1 3/4x8 3/4

\*For Short Body bells and spigots, 12" and smaller, see page 36.

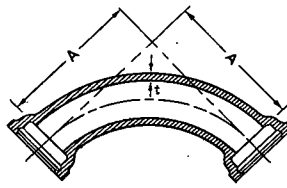


**CAST IRON ¼ BENDS—FOR WATER**

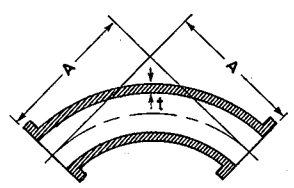
American Water Works Association Specifications C100



**F-400**  
(90°) Quarter Bend  
Bell and Spigot



**F-405**  
(90°) Quarter Bend  
Double Bell



**F-410**  
(90°) Quarter Bend  
Flanged Ends

**DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches	Class	Dimensions—Inches				Approximate Weight—Pounds		
		t	A	S	Radius	F-400	F-405	F-410
3	D	.48	16.00	24.00	16	65	75	45
4	D	.52	16.00	24.00	16	90	100	70
6	D	.55	16.00	24.00	16	135	145	100
8	D	.60	16.00	26.00	16	200	200	145
10	D	.68	16.00	28.00	16	285	275	205
12	D	.75	16.00	28.00	16	365	350	285

For Sizes 14 thru 24 inches

Bell & Spigot  
See page 38

Flanged  
See page 55

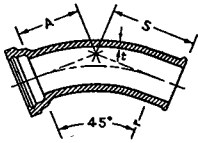
30	A	.88	36.00	48.00	36	1820	1850	1640
30	B	1.03	36.00	48.00	36	2090	2075	1845
30	C	1.20	36.00	48.00	36	2450	2430	2075
30	D	1.37	36.00	48.00	36	2825	2820	2315
36	A	.99	48.00	60.00	48	3000	3025	2830
36	B	1.15	48.00	60.00	48	3500	3525	3180
36	C	1.36	48.00	60.00	48	4145	4155	3650
36	D	1.58	48.00	60.00	48	4830	4835	4145
42	A	1.10	48.00	60.00	48	3930	4000	3740
42	B	1.28	48.00	60.00	48	4540	4585	4200
42	C	1.54	48.00	60.00	48	5495	5540	4865
42	D	1.78	48.00	60.00	48	6380	6415	5485
48	A	1.26	54.00	66.00	48	5575	5620	5280
48	B	1.42	54.00	66.00	48	6300	6355	5815
48	C	1.71	54.00	66.00	48	7630	7690	6770
48	D	1.96	54.00	66.00	48	8810	8890	7610
54	A	1.35	54.00	66.00	48	6925	7040	6560
54	B	1.55	54.00	66.00	48	7990	8130	7310
54	C	1.90	54.00	66.00	48	9820	9960	8650
54	D	2.23	54.00	66.00	48	11570	11725	9925
60	A	1.39	54.00	66.00	48	7960	8135	7595
60	B	1.67	54.00	66.00	48	9520	9645	8765
60	C	2.00	54.00	66.00	48	11495	11660	10140
60	D	2.38	54.00	66.00	48	13720	13905	11795



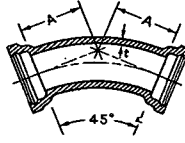


**CAST IRON 1/8 BENDS—FOR WATER**

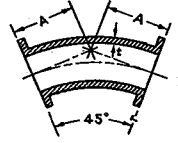
American Water Works Association Specifications C100



**F-415**  
**(45°) Eighth Bend**  
**Bell and Spigot**



**F-420**  
**(45°) Eighth Bend**  
**Double Bell**



**F-425**  
**(45°) Eighth Bend**  
**Flanged Ends**

**DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches	Class.	Dimensions—Inches				Approximate Weight—Pounds		
		t	A	S	r	F-415	F-420	F-425
3	D	.48	9.94	15.94	24	55	65	35
4	D	.52	9.94	15.94	24	75	90	60
6	D	.55	9.94	15.94	24	110	125	80
8	D	.60	9.94	15.94	24	155	180	125
10	D	.68	9.94	15.94	24	210	240	170
12	D	.75	9.94	15.94	24	270	305	240

For sizes 14 thru 24 inches

Bell & Spigot  
See page 38

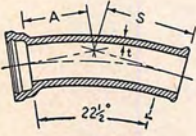
Flanged  
See page 55

30	A	.88	24.85	30.85	60	1480	1645	1435
30	B	1.03	24.85	30.85	60	1690	1830	1600
30	C	1.20	24.85	30.85	60	1980	2145	1790
30	D	1.37	24.85	30.85	60	2285	2490	1985
36	A	.99	37.28	37.28	90	2500	2885	2690
36	B	1.15	37.28	37.28	90	2920	3360	3015
36	C	1.36	37.28	37.28	90	3450	3960	3455
36	D	1.58	37.28	37.28	90	4020	4605	3915
42	A	1.10	37.28	37.28	90	3280	3820	3560
42	B	1.28	37.28	37.28	90	3785	4370	3985
42	C	1.54	37.28	37.28	90	4580	5280	4605
42	D	1.78	37.28	37.28	90	5315	6115	5185
48	A	1.26	37.28	37.28	90	4250	4905	4565
48	B	1.42	37.28	37.28	90	4800	5545	5005
48	C	1.71	37.28	37.28	90	5815	6710	5790
48	D	1.96	37.28	37.28	90	6715	7755	6475
54	A	1.35	37.28	37.28	90	5180	6025	5545
54	B	1.55	37.28	37.28	90	5975	6960	6140
54	C	1.90	37.28	37.28	90	7330	8510	7200
54	D	2.23	37.28	37.28	90	8635	10020	8220
60	A	1.39	37.28	37.28	90	5960	6975	6435
60	B	1.67	37.28	37.28	90	7110	8245	7365
60	C	2.00	37.28	37.28	90	8585	9970	8450
60	D	2.38	37.28	37.28	90	10230	11870	9760

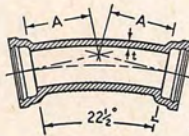


**CAST IRON  $\frac{1}{16}$  BENDS—FOR WATER**

American Water Works Association Specifications C100



**F-430**  
(22 $\frac{1}{2}$ °) Sixteenth Bend  
Bell and Spigot



**F-435**  
(22 $\frac{1}{2}$ °) Sixteenth Bend  
Double Bell



**F-440**  
(22 $\frac{1}{2}$ °) Sixteenth Bend  
Flanged Ends

**DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches	Class	Dimensions—Inches				Approximate Weight—Pounds		
		t	A	S	r	F-430	F-435	F-440
3	D	.48	9.55	15.55	48	55	65	35
4	D	.52	9.55	15.55	48	75	90	60
6	D	.55	9.55	15.55	48	110	125	80
8	D	.60	9.55	15.55	48	155	180	125
10	D	.68	9.55	15.55	48	210	240	170
12	D	.75	9.55	15.55	48	270	305	240

For sizes 14 thru 24 inches

Bell & Spigot  
See page 39

Flanged  
See page 55

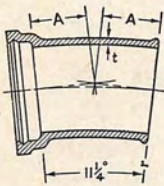
30	A	.88	23.87	23.87	120	1345	1645	1435
30	B	1.03	23.87	23.87	120	1530	1830	1600
30	C	1.20	23.87	23.87	120	1795	2145	1790
30	D	1.37	23.87	23.87	120	2075	2490	1985
36	A	.99	35.80	35.80	180	2500	2885	2690
36	B	1.15	35.80	35.80	180	2920	3360	3015
36	C	1.36	35.80	35.80	180	3450	3960	3455
36	D	1.58	35.80	35.80	180	4020	4605	3915
42	A	1.10	35.80	35.80	180	3280	3820	3560
42	B	1.28	35.80	35.80	180	3785	4370	3985
42	C	1.54	35.80	35.80	180	4580	5280	4605
42	D	1.78	35.80	35.80	180	5315	6115	5185
48	A	1.26	35.80	35.80	180	4250	4905	4565
48	B	1.42	35.80	35.80	180	4800	5545	5005
48	C	1.71	35.80	35.80	180	5815	6710	5790
48	D	1.96	35.80	35.80	180	6715	7755	6475
54	A	1.35	35.80	35.80	180	5180	6025	5545
54	B	1.55	35.80	35.80	180	5975	6960	6140
54	C	1.90	35.80	35.80	180	7330	8510	7200
54	D	2.23	35.80	35.80	180	8635	10020	8220
60	A	1.39	35.80	35.80	180	5960	6975	6435
60	B	1.67	35.80	35.80	180	7110	8245	7365
60	C	2.00	35.80	35.80	180	8585	9970	8450
60	D	2.38	35.80	35.80	180	10230	11870	9760



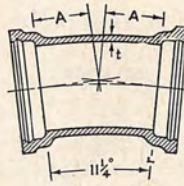


**CAST IRON 1/32 BENDS—FOR WATER**

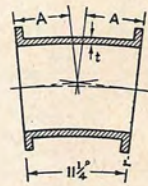
American Water Works Association Specifications C100



**F-445**  
(11 1/4°) Thirty-second Bend  
Bell and Spigot



**F-450**  
(11 1/4°) Thirty-second Bend  
Double Bell



**F-455**  
(11 1/4°) Thirty-second Bend  
Flanged Ends

**DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches	Class	Dimensions—Inches			Approximate weight—Pounds		
		t	A	r	F-445	F-450	F-455
3	D	.48	11.82	120	55	75	45
4	D	.52	11.82	120	70	95	65
6	D	.55	11.82	120	105	140	95
8	D	.60	11.82	120	150	200	145
10	D	.68	11.82	120	205	265	195
12	D	.75	11.82	120	260	340	270

For sizes 14 thru 24 inches

Bell & Spigot  
See page 39

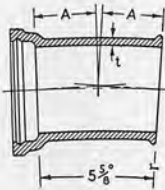
Flanged  
See page 55

30	A	.88	23.64	240	1345	1640	1430
30	B	1.03	23.64	240	1530	1830	1600
30	C	1.20	23.64	240	1795	2145	1790
30	D	1.37	23.64	240	2075	2490	1985
36	A	.99	23.64	240	1795	2180	1985
36	B	1.15	23.64	240	2095	2540	2195
36	C	1.36	23.64	240	2470	2980	2475
36	D	1.58	23.64	240	2875	3460	2770
42	A	1.10	23.64	240	2370	2905	2645
42	B	1.28	23.64	240	2720	3305	2920
42	C	1.54	23.64	240	3290	3985	3310
42	D	1.78	23.64	240	3815	4615	3685
48	A	1.26	23.64	240	3055	3715	3375
48	B	1.42	23.64	240	3455	4195	3655
48	C	1.71	23.64	240	4180	5075	4155
48	D	1.96	23.64	240	4825	5870	4590
54	A	1.35	23.64	240	3740	4585	4105
54	B	1.55	23.64	240	4315	5305	4485
54	C	1.90	23.64	240	5285	6470	5160
54	D	2.23	23.64	240	6225	7610	5810
60	A	1.39	23.64	240	4320	5330	4790
60	B	1.67	23.64	240	5125	6260	5380
60	C	2.00	23.64	240	6195	7580	6060
60	D	2.38	23.64	240	7370	9015	6905

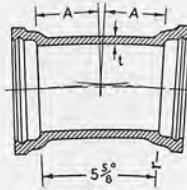


## CAST IRON $\frac{1}{64}$ BENDS—FOR WATER

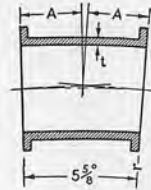
American Water Works Association Specifications C100



**F-460**  
( $5\frac{5}{8}$ " ) Sixty-fourth Bend  
Bell and Spigot



**F-465**  
( $5\frac{5}{8}$ " ) Sixty-fourth Bend  
Double Bell

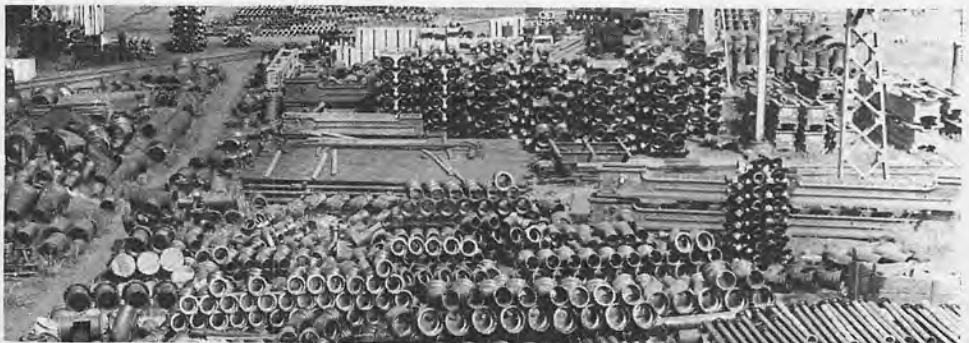


**F-470**  
( $5\frac{5}{8}$ " ) Sixty-fourth Bend  
Flanged Ends\*

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches	Class	Dimensions—Inches			Approximate Weight—Pounds		
		t	A	r	F-460	F-465	F-470
20	B	.80	23.58	480	800	955	820
20	D	1.03	23.58	480	1030	1215	1000
24	B	.89	23.58	480	1060	1255	1105
24	D	1.16	23.58	480	1375	1620	1345
30	A	.88	23.58	480	1345	1640	1430
30	B	1.03	23.58	480	1530	1830	1600
30	C	1.20	23.58	480	1795	2145	1790
30	D	1.37	23.58	480	2075	2490	1985
36	A	.99	23.58	480	1795	2180	1985
36	B	1.15	23.58	480	2095	2540	2195
36	C	1.36	23.58	480	2470	2980	2475
36	D	1.58	23.58	480	2875	3460	2770
42	A	1.10	23.58	480	2370	2905	2645
42	B	1.28	23.58	480	2720	3305	2920
42	C	1.54	23.58	480	3290	3985	3310
42	D	1.78	23.58	480	3815	4615	3685
48	A	1.26	23.58	480	3055	3715	3375
48	B	1.42	23.58	480	3450	4195	3655
48	C	1.71	23.58	480	4180	5075	4155
48	D	1.96	23.58	480	4825	5870	4590
54	A	1.35	23.58	480	3740	4585	4105
54	B	1.55	23.58	480	4315	5305	4485
54	C	1.90	23.58	480	5285	6470	5160
54	D	2.23	23.58	480	6225	7610	5810
60	A	1.39	23.58	480	4320	5330	4790
60	B	1.67	23.58	480	5125	6260	5380
60	C	2.00	23.58	480	6195	7580	6060
60	D	2.38	23.58	480	7370	9015	6905

\*For American Standard Class 125 flanged fittings for steam, see pages 97 thru 118

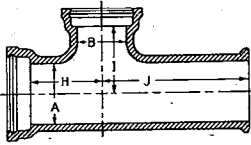




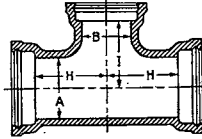


**CAST IRON TEES AND CROSSES—FOR WATER**

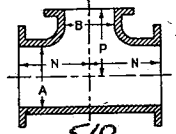
American Water Works Association Specifications C100



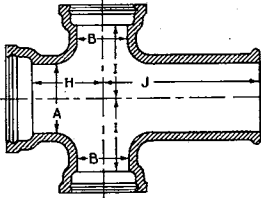
**F-500 Tee**  
Bell and Spigot



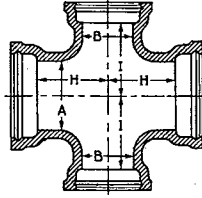
**F-505 Tee**  
Bell Ends



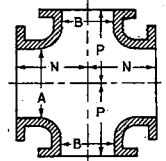
**F-150 Tee**  
Flanged Ends



**F-520 Cross**  
Bell and Spigot



**F-525 Cross**  
All Bell Ends



**F-530 Cross**  
Flanged Ends

Tees and crosses, 30 inches and larger, shall be of the thickness shown in tables, except when the working conditions necessitate strengthening. Such strengthening may be in the form of additional thickness, higher strength iron, ribs, bolts, or other means proposed by the manufacturer and finally approved by the purchaser. Weights are for fittings *without* reinforcement.

**DIMENSIONS AND WEIGHTS**

Nominal Diameter Inches		Class	Dimensions Inches					Approximate Weight Pounds					
								Tees			Crosses		
A	B		H	J	I	N	P	F-500	F-505	F-510	F-520	F-525	F-530
3	3	D	10	22	10	10	10	95	100	60	125	130	75
4	3	D	11	23	11	11	11	120	125	80	150	155	95
4	4	D	11	23	11	11	11	130	130	85	170	170	110
6	3	D	12	24	12	..	..	175	170	..	205	200	..
6	4	D	12	24	12	12	12	180	180	120	220	220	145
6	6	D	12	24	12	12	12	200	200	135	260	255	165
8	4	D	13	25	13	13	13	250	250	180	290	290	205
8	6	D	13	25	13	13	13	270	265	185	325	325	225
8	8	D	13	25	13	13	13	290	285	200	370	370	260
10	4	D	14	26	14	14	14	340	330	245	380	370	270
10	6	D	14	26	14	14	14	360	350	260	415	405	295
10	8	D	14	26	14	14	14	380	370	275	455	445	320
10	10	D	14	26	14	14	14	405	390	290	505	495	360
12	4	D	15	27	15	15	15	445	425	345	485	465	370
12	6	D	15	27	15	15	15	460	440	350	515	495	385
12	8	D	15	27	15	15	15	485	465	370	560	540	420
12	10	D	15	27	15	15	15	505	495	395	610	590	455
12	12	D	15	27	15	15	15	535	515	415	665	645	515

For sizes 14 thru 24 inches

Bell and Spigot

See pages 40 and 41 for Tees and pages 42 and 43 for Crosses

Flanged

See pages 56 and 57 for Tees and Crosses

30	6	A	13	25	24	13	24	1290	1320	1090	1350	1375	1120
30	6	B	13	25	24	13	24	1450	1430	1180	1505	1485	1210
30	6	C	13	25	24	13	24	1690	1670	1290	1745	1725	1325
30	6	D	13	25	24	13	24	1945	1935	1405	1995	1985	1435
30	8	A	14	26	24	14	24	1365	1390	1150	1445	1470	1205
30	8	B	14	26	24	14	24	1525	1505	1250	1600	1580	1300
30	8	C	14	26	24	14	24	1775	1755	1370	1850	1830	1420
30	8	D	14	26	24	14	24	2040	2030	1495	2110	2100	1540

Continued on next page.



## CAST IRON TEES AND CROSSES—FOR WATER

American Water Works Association Specifications C100

**F-500 Tee**  
Bell and Spigot

**F-505 Tee**  
Bell Ends

**F-510 Tee**  
Flanged Ends

**F-520 Cross**  
Bell and Spigot

**F-525 Cross**  
All Bell Ends

**F-530 Cross**  
Flanged Ends

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches		Class	Dimensions Inches					Approximate Weight Pounds					
								Tees			Crosses		
								F-500	F-505	F-510	F-520	F-525	F-530
A	B		H	J	I	N	P						
30	10	A	15	27	24	15	24	1430	1460	1215	1535	1560	1285
30	10	B	15	27	24	15	24	1605	1585	1325	1705	1685	1395
30	10	C	15	27	24	15	24	1865	1840	1450	1955	1935	1510
30	10	D	15	27	24	15	24	2135	2125	1585	2220	2210	1640
30	12	A	15	27	24	15	24	1460	1485	1225	1585	1615	1320
30	12	B	15	27	24	15	24	1630	1610	1330	1750	1730	1415
30	12	C	15	27	24	15	24	1885	1865	1445	2000	1975	1525
30	12	D	15	27	24	15	24	2155	2145	1565	2260	2250	1635
30	14	A	18	30	26	18	26	1625	1650	1385	1775	1800	1500
30	14	B	18	30	26	18	26	1815	1795	1515	1960	1940	1625
30	14	C	18	30	26	18	26	2135	2110	1680	2300	2280	1805
30	14	D	18	30	26	18	26	2430	2420	1825	2590	2575	1930
30	16	A	19	31	26	19	26	1710	1735	1460	1895	1920	1595
30	16	B	19	31	26	19	26	1910	1890	1595	2085	2065	1720
30	16	C	19	31	26	19	26	2250	2225	1775	2460	2435	1915
30	16	D	19	31	26	19	26	2555	2540	1925	2755	2745	2065
30	18	A	20	34	26	20	26	1840	1815	1520	2060	2035	1675
30	18	B	20	34	26	20	26	2050	1975	1665	2260	2185	1805
30	18	C	20	34	26	20	26	2425	2335	1860	2680	2590	2020
30	18	D	20	34	26	20	26	2745	2655	2015	2990	2900	2165
30	20	A	21	36	26	21	26	1945	1905	1610	2205	2160	1795
30	20	B	21	36	26	21	26	2170	2070	1750	2420	2315	1930
30	20	C	21	36	26	21	26	2580	2455	1955	2890	2770	2160
30	20	D	21	36	26	21	26	2910	2785	2125	3205	3075	2295
30	24	A	23	38	26	23	26	2130	2080	1775	2470	2425	2040
30	24	B	23	38	26	23	26	2365	2255	1930	2680	2575	2170
30	24	C	23	38	26	23	26	2825	2700	2170	3250	3130	2455
30	24	D	23	38	26	23	26	3165	3040	2350	3560	3435	2590
30	30	A	26	43	26	26	26	2445	2355	2015	2920	2825	2370
30	30	B	26	43	26	26	26	2765	2600	2235	3260	3100	2610
30	30	C	26	43	26	26	26	3245	3055	2480	3825	3635	2870
30	30	D	26	43	26	26	26	3745	3545	2725	4425	4225	3130
36	8	A	14	26	27	14	27	1785	1805	1585	1865	1885	1635
36	8	B	14	26	27	14	27	2070	2090	1720	2140	2165	1765
36	8	C	14	26	27	14	27	2420	2430	1895	2490	2500	1940
36	8	D	14	26	27	14	27	2800	2795	2080	2865	2865	2125
36	10	A	15	27	27	15	27	1875	1895	1670	1970	1990	1730
36	10	B	15	27	27	15	27	2165	2190	1815	2255	2280	1870
36	10	C	15	27	27	15	27	2525	2535	1995	2615	2625	2055
36	10	D	15	27	27	15	27	2920	2920	2200	3000	3000	2250
36	12	A	16	28	27	16	27	1960	1985	1745	2085	2105	1830
36	12	B	16	28	27	16	27	2260	2285	1880	2375	2400	1960
36	12	C	16	28	27	16	27	2635	2645	2065	2745	2755	2140
36	12	D	16	28	27	16	27	3040	3040	2265	3140	3140	2325
36	14	A	18	30	29	18	29	2110	2130	1885	2255	2275	1995
36	14	B	18	30	29	18	29	2430	2455	2045	2565	2590	2150
36	14	C	18	30	29	18	29	2860	2865	2275	3020	3025	2385
36	14	D	18	30	29	18	29	3295	3295	2505	3435	3435	2595
36	16	A	19	31	29	19	29	2210	2230	1975	2390	2410	2100
36	16	B	19	31	29	19	29	2540	2560	2140	2705	2730	2260
36	16	C	19	31	29	19	29	3000	3005	2390	3195	3205	2525
36	16	D	19	31	29	19	29	3440	3440	2625	3625	3625	2745

Continued on next page.





## CAST IRON TEES AND CROSSES—FOR WATER

American Water Works Association Specifications C100

**F-500 Tee**  
Bell and Spigot

**F-505 Tee**  
Bell Ends

**F-510 Tee**  
Flanged Ends

**F-520 Cross**  
Bell and Spigot

**F-525 Cross**  
All Bell Ends

**F-530 Cross**  
Flanged Ends

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches		Class	Dimensions Inches					Approximate Weight Pounds					
								Tees			Crosses		
								F-500	F-505	F-510	F-520	F-525	F-530
A	B		H	J	I	N	P						
36	18	A	20	34	29	20	29	2370	2325	2050	2580	2535	2195
36	18	B	20	34	29	20	29	2715	2665	2230	2915	2860	2355
36	18	C	20	34	29	20	29	3215	3135	2495	3455	3375	2540
36	18	D	20	34	29	20	29	3690	3585	2750	3920	3810	2880
36	20	A	21	36	29	21	29	2505	2425	2145	2750	2670	2320
36	20	B	21	36	29	21	29	2865	2775	2335	3095	3000	2485
36	20	C	21	36	29	21	29	3405	3275	2615	3695	3565	2795
36	20	D	21	36	29	21	29	3890	3730	2875	4160	4000	3030
36	24	A	23	38	29	23	29	2710	2630	2340	3025	2950	2580
36	24	B	23	38	29	23	29	3080	2990	2540	3375	3285	2755
36	24	C	23	38	29	23	29	3685	3560	2870	4080	3950	3110
36	24	D	23	38	29	23	29	4190	4030	3145	4545	4385	3350
36	30	A	26	43	29	26	29	3075	2930	2605	3500	3360	2925
36	30	B	26	43	29	26	29	3535	3370	2880	3980	3815	3200
36	30	C	26	43	29	26	29	4170	3955	3215	4685	4470	3540
36	30	D	26	43	29	26	29	4850	4585	3570	5445	5180	3890
36	36	A	29	46	29	29	29	3430	3290	2975	4020	3875	3455
36	36	B	29	46	29	29	29	3995	3825	3270	4675	4510	3765
36	36	C	29	46	29	29	29	4705	4490	3670	5490	5275	4185
36	36	D	29	46	29	29	29	5465	5200	4090	6365	6100	4615
42	12	A	16	28	30	16	30	2545	2615	2300	2660	2735	2385
42	12	B	16	28	30	16	30	2895	2935	2485	3005	3045	2560
42	12	C	16	28	30	16	30	3470	3505	2745	3565	3605	2810
42	12	D	16	28	30	16	30	3990	4030	2990	4080	4120	3050
42	14	A	18	30	32	18	32	2735	2805	2490	2870	2945	2590
42	14	B	18	30	32	18	32	3110	3150	2695	3235	3275	2785
42	14	C	18	30	32	18	32	3750	3785	3010	3895	3930	3105
42	14	D	18	30	32	18	32	4305	4345	3295	4440	4475	3375
42	16	A	19	31	32	19	32	2850	2920	2585	3020	3090	2710
42	16	B	19	31	32	19	32	3235	3280	2810	3395	3435	2920
42	16	C	19	31	32	19	32	3910	3945	3150	4095	4135	3265
42	16	D	19	31	32	19	32	4485	4520	3450	4650	4690	3550
42	18	A	20	34	32	20	32	3045	3035	2685	3245	3230	2815
42	18	B	20	34	32	20	32	3455	3400	2915	3640	3580	3030
42	18	C	20	34	32	20	32	4180	4100	3275	4405	4325	3410
42	18	D	20	34	32	20	32	4790	4690	3595	4990	4890	3700
42	20	A	21	36	32	21	32	3205	3150	2790	3435	3380	2960
42	20	B	21	36	32	21	32	3635	3525	3035	3850	3740	3185
42	20	C	21	36	32	21	32	4405	4265	3425	4675	4535	3580
42	20	D	21	36	32	21	32	5040	4870	3755	5280	5110	3880
42	24	A	23	38	32	23	32	3430	3380	3015	3725	3675	3235
42	24	B	23	38	32	23	32	3885	3780	3285	4160	4050	3475
42	24	C	23	38	32	23	32	4730	4595	3725	5090	4950	3930
42	24	D	23	38	32	23	32	5390	5220	4075	5705	5535	4240
42	30	A	26	43	32	26	32	3865	3730	3335	4260	4120	3610
42	30	B	26	43	32	26	32	4385	4205	3665	4785	4605	3940
42	30	C	26	43	32	26	32	5310	5050	4130	5770	5510	4400
42	30	D	26	43	32	26	32	6155	5845	4570	6685	6375	4825
42	36	A	29	46	32	29	32	4250	4115	3725	4780	4645	4150
42	36	B	29	46	32	29	32	4910	4705	4105	5520	5315	4525
42	36	C	29	46	32	29	32	5885	5630	4630	6575	6315	5040
42	36	D	29	46	32	29	32	6815	6510	5140	7600	7295	5550

Continued on next page.



## CAST IRON TEES AND CROSSES—FOR WATER

American Water Works Association Specifications C100

**F-500 Tee**  
Bell and Spigot

**F-505 Tee**  
Bell Ends

**F-510 Tee**  
Flanged Ends

**F-520 Cross**  
Bell and Spigot

**F-525 Cross**  
All Bell Ends

**F-530 Cross**  
Flanged Ends

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches		Class	Dimensions Inches					Approximate Weight Pounds					
								Tees			Crosses		
A	B		H	J	I	N	P	F-500	F-505	F-510	F-520	F-525	F-530
42	42	A	32	49	32	32	32	4745	4610	4185	5515	5380	4815
42	42	B	32	49	32	32	32	5440	5235	4610	6290	6085	5255
42	42	C	32	49	32	32	32	6565	6310	5220	7570	7315	5860
42	42	D	32	49	32	32	32	7595	7285	5785	8740	8430	6425
48	12	A	17	29	33	17	33	3345	3395	3010	3455	3505	3100
48	12	B	17	29	33	17	33	3760	3815	3240	3865	3920	3315
48	12	C	17	29	33	17	33	4520	4585	3630	4610	4675	3690
48	12	D	17	29	33	17	33	5195	5280	3965	5275	5355	4010
48	14	A	18	30	35	18	35	3475	3520	3145	3600	3650	3240
48	14	B	18	30	35	18	35	3900	3955	3380	4020	4075	3465
48	14	C	18	30	35	18	35	4710	4775	3810	4845	4905	3895
48	14	D	18	30	35	18	35	5400	5485	4160	5525	5610	4240
48	16	A	19	31	35	19	35	3615	3660	3245	3775	3820	3360
48	16	B	19	31	35	19	35	4050	4105	3470	4200	4255	3575
48	16	C	19	31	35	19	35	4900	4960	3900	5070	5135	4005
48	16	D	19	31	35	19	35	5615	5700	4250	5770	5855	4335
48	18	A	20	34	35	20	35	3860	3795	3365	4040	3980	3485
48	18	B	20	34	35	20	35	4320	4255	3605	4490	4420	3700
48	18	C	20	34	35	20	35	5230	5145	4060	5435	5350	4165
48	18	D	20	34	35	20	35	5990	5900	4425	6170	6085	4515
48	20	A	21	36	35	21	35	4055	3935	3500	4265	4145	3640
48	20	B	21	36	35	21	35	4540	4405	3750	4735	4605	3880
48	20	C	21	36	35	21	35	5500	5335	4230	5745	5585	4365
48	20	D	21	36	35	21	35	6285	6110	4620	6505	6330	4720
48	24	A	23	38	35	23	35	4330	4210	3765	4595	4475	3950
48	24	B	23	38	35	23	35	4830	4700	4035	5080	4945	4200
48	24	C	23	38	35	23	35	5875	5720	4580	6205	6045	4755
48	24	D	23	38	35	23	35	6700	6520	4990	6985	6805	5130
48	30	A	26	43	35	26	35	4845	4620	4140	5195	4965	4375
48	30	B	26	43	35	26	35	5445	5190	4485	5810	5555	4725
48	30	C	26	43	35	26	35	6560	6250	5060	6970	6660	5280
48	30	D	26	43	35	26	35	7580	7230	5575	8055	7705	5775
48	36	A	29	46	35	29	35	5280	5055	4585	5740	5515	4940
48	36	B	29	46	35	29	35	5995	5735	4965	6535	6275	5320
48	36	C	29	46	35	29	35	7210	6900	5630	7815	7510	5970
48	36	D	29	46	35	29	35	8320	7975	6220	9020	8675	6550
48	42	A	32	49	35	32	35	5815	5590	5085	6480	6250	5600
48	42	B	32	49	35	32	35	6565	6305	5510	7305	7050	6050
48	42	C	32	49	35	32	35	7925	7620	6260	8805	8490	6765
48	42	D	32	49	35	32	35	9150	8800	6915	10150	9800	7415
48	48	A	35	52	35	35	35	6390	6165	5620	7300	7075	6345
48	48	B	35	52	35	35	35	7220	6965	6085	8235	7980	6810
48	48	C	35	52	35	35	35	8720	8410	6915	9945	9630	7640
48	48	D	35	52	35	35	35	10065	9715	7640	11465	11115	8350
54	20	A	28	46	38.5	28	38.5	6015	5745	5200	6225	5955	5345
54	20	B	28	46	38.5	28	38.5	6885	6585	5700	7075	6775	5825
54	20	C	28	46	38.5	28	38.5	8460	8050	5640	8695	8285	6755
54	20	D	28	46	38.5	28	38.5	9885	9395	7485	10085	9595	7575
54	24	A	30	48	40	30	40	6365	6095	5540	6655	6390	5760
54	24	B	30	48	40	30	40	7275	6970	6075	7540	7230	6260
54	24	C	30	48	40	30	40	8945	8535	7085	9280	8875	7285
54	24	D	30	48	40	30	40	10420	9925	7985	10715	10225	8145

Continued on next page.





# JAMES B. CLOW & SONS

Inc.



## CAST IRON TEES AND CROSSES—FOR WATER

American Water Works Association Specifications C100

**F-500 Tee**  
Bell and Spigot

**F-505 Tee**  
Bell Ends

**F-510 Tee**  
Flanged Ends

**F-520 Cross**  
Bell and Spigot

**F-525 Cross**  
All Bell Ends

**F-530 Cross**  
Flanged Ends

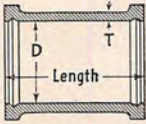
### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches		Class	Dimensions Inches					Approximate Weight Pounds					
			H	J	I	N	P	Tees			Crosses		
A	B						F-500	F-505	F-510	F-520	F-525	F-530	
54	30	A	33	51	40	33	40	6835	6565	5980	7205	6930	6240
54	30	B	33	51	40	33	40	7845	7540	6605	8230	7925	6875
54	30	C	33	51	40	33	40	9585	9175	7690	10005	9600	7940
54	30	D	33	51	40	33	40	11270	10775	8725	11750	11255	8955
54	36	A	36	54	42	36	42	7390	7120	6540	7920	7650	6970
54	36	B	36	54	42	36	42	8550	8250	7260	9190	8890	7730
54	36	C	36	54	42	36	42	10425	10015	8455	11125	10720	8910
54	36	D	36	54	42	36	42	12245	11755	9630	13040	12545	10095
54	42	A	39	57	42	39	42	8020	7755	7145	8795	8525	7785
54	42	B	39	57	42	39	42	9120	8920	7910	10075	9770	8570
54	42	C	39	57	42	39	42	11275	10865	9220	12270	11860	9880
54	42	D	39	57	42	39	42	13230	12735	10470	14345	13850	11120
54	48	A	42	60	45	42	45	8840	8570	7920	10030	9760	8940
54	48	B	42	60	45	42	45	10140	9840	8750	11450	11155	9795
54	48	C	42	60	45	42	45	12430	12020	10250	13960	13550	11320
54	48	D	42	60	45	42	45	14535	14040	11600	16290	15795	12715
54	54	A	45	63	45	45	45	9600	9330	8610	11155	10885	9925
54	54	B	45	63	45	45	45	11070	10780	9550	12860	12560	10920
54	54	C	45	63	45	45	45	13565	13160	11195	15735	15315	12695
54	54	D	45	63	45	45	45	15955	15460	12760	18465	17970	14370
60	20	A	28	46	42	28	42	6915	6650	6045	7130	6865	6195
60	20	B	28	46	42	28	42	8160	7750	6805	8345	7940	6930
60	20	C	28	46	42	28	42	9875	9390	7760	10145	9635	7895
60	20	D	28	46	42	28	42	11685	11100	8880	11890	11300	8970
60	24	A	30	48	44	30	44	7315	7040	6425	7615	7350	6660
60	24	B	30	48	44	30	44	8600	8195	7240	8870	8460	7430
60	24	C	30	48	44	30	44	10425	9940	8280	10770	10290	8490
60	24	D	30	48	44	30	44	12290	11710	9460	12590	12000	9610
60	30	A	33	51	44	33	44	7845	7575	6930	8225	7955	7205
60	30	B	33	51	44	33	44	9265	8850	7855	9650	9235	8125
60	30	C	33	51	44	33	44	11160	10680	8985	11585	11100	9230
60	30	D	33	51	44	33	44	13265	12675	10315	13735	13145	10535
60	36	A	36	54	44	36	44	8385	8120	7480	8880	8615	7875
60	36	B	36	54	44	36	44	9980	9570	8520	10530	10120	8900
60	36	C	36	54	44	36	44	12000	11515	9745	12610	12130	10110
60	36	D	36	54	44	36	44	14260	13670	11235	14935	14340	11580
60	42	A	39	57	48	39	48	9205	8940	8270	10065	9800	9000
60	42	B	39	57	48	39	48	10900	10490	9420	11825	11415	10155
60	42	C	39	57	48	39	48	13145	12660	10805	14235	13755	11565
60	42	D	39	57	48	39	48	15595	15000	12425	16815	16220	13180
60	48	A	42	60	48	42	48	9935	9670	9020	11075	10810	9990
60	48	B	42	60	48	42	48	11730	11320	10230	12935	12530	11170
60	48	C	42	60	48	42	48	14150	13665	11895	15595	15110	12880
60	48	D	42	60	48	42	48	16770	16175	13735	18375	17785	14705
60	54	A	45	63	48	45	48	10720	10455	9675	12190	11930	10910
60	54	B	45	63	48	45	48	12695	12285	10995	14325	13915	12215
60	54	C	45	63	48	45	48	15345	14860	12685	17320	16840	14010
60	54	D	45	63	48	45	48	18230	17640	14630	20520	19925	16015
60	60	A	48	66	48	48	48	11455	11190	10380	13210	12945	11865
60	60	B	48	66	48	48	48	13625	13210	11890	15630	15220	13460
60	60	C	48	66	48	48	48	16420	15940	13660	18815	18335	15295
60	60	D	48	66	48	48	48	19575	18980	15815	22410	21815	17595



## CAST IRON STANDARD SLEEVES AND WALL SLEEVES FOR WATER

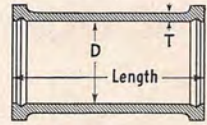
American Water Works Association Specifications C100



F-554 Solid Sleeve—Short

Note

If no choice is indicated we will always ship the F-554 short pattern sleeve.

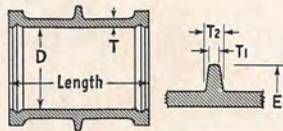


F-558 Solid Sleeve—Long

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches	Class	Dimensions Inches		F-554 Short		F-558 Long	
		T	D	Length Inches	Weight Pounds	Length Inches	Weight Pounds
30	A	1.15	32.80	15	625	24	910
30	B	1.15	33.10	15	630	24	920
30	C	1.32	33.50	15	735	24	1075
30	D	1.50	33.80	15	860	24	1250
36	A	1.25	39.00	15	810	24	1175
36	B	1.40	39.40	15	920	24	1340
36	C	1.60	39.80	15	1055	24	1540
36	D	1.80	40.20	15	1195	24	1750
42	A	1.40	45.30	15	1050	24	1530
42	B	1.50	45.60	15	1140	24	1660
42	C	1.75	46.20	15	1340	24	1960
42	D	1.95	46.70	15	1530	24	2230
48	A	1.50	51.60	15	1280	24	1865
48	B	1.65	51.90	15	1435	24	2080
48	C	1.95	52.50	15	1710	24	2490
48	D	2.20	53.10	15	1950	24	2845
54	A	1.60	57.70	15	1580	24	2280
54	B	1.80	58.20	15	1800	24	2595
54	C	2.15	58.90	15	2115	24	3080
54	D	2.45	59.50	15	2410	24	3525
60	A	1.70	63.90	15	1850	24	2670
60	B	1.90	64.50	15	2075	24	3000
60	C	2.25	65.30	15	2455	24	3570
60	D	2.60	65.90	15	2850	24	4150

F-1430 Wall Sleeve Short



F-1434 Wall Sleeve Long

Standard Wall Sleeve\*

### DIMENSIONS AND WEIGHTS

Nominal Diameter Inches	Class	Dimensions—Inches					F-1430 Short		F-1434 Long	
		Body Casting		Intermediate Flange			Length Inches	Weight Pounds	Length Inches	Weight Pounds
		T	F	T <sup>1</sup>	T <sup>2</sup>	D				
30	B	1.15	33.10	1.00	1.25	40.00	15	710	24	1000
30	D	1.50	33.80	1.00	1.25	40.00	15	915	24	1305
36	B	1.40	39.40	1.00	1.25	47.00	15	1020	24	1440
36	D	1.80	40.20	1.00	1.25	47.00	15	1260	24	1815
42	B	1.50	45.60	1.25	1.50	54.50	15	1310	24	1830
42	D	1.95	46.70	1.25	1.50	54.50	15	1645	24	2345
48	B	1.65	51.90	1.25	1.50	61.25	15	1635	24	2280
48	D	2.20	53.10	1.25	1.50	61.25	15	2075	24	2970

\*Wall sleeves will be furnished with machined ends, when so ordered, at additional cost.

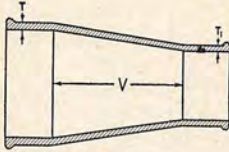
Note: If intermediate flange is to be located other than center, send sketch and details.



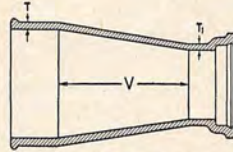


## CAST IRON REDUCERS—FOR WATER

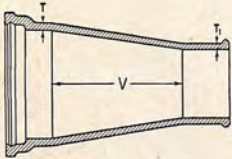
American Water Works Association Specifications C100



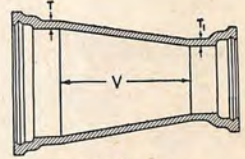
**F-580 Reducer**  
Spigot Ends



**F-582 Reducer**  
Small End Bell



**F-584 Reducer**  
Large End Bell



**F-590 Reducer**  
Bell and Bell

### WHEN ORDERING\*

Order reducers wanted by Fig. No., followed by size and description thus: F-582, 8 x 6", Small End Bell.

### DIMENSIONS AND WEIGHTS

Nom. Diam. Inches		Class	Dimensions Inches			Laying Length Inches				Approximate Weight Pounds			
Large End	Small End		T	T <sup>1</sup>	V	F-580	F-582	F-584	F-590	F-580	F-582	F-584	F-590
4	3	D	.52	.48	8	24	20 $\frac{1}{2}$	20	16 $\frac{1}{2}$	40	55	55	70
6	3	D	.55	.48	18	34	30 $\frac{1}{2}$	30	26 $\frac{1}{2}$	70	85	95	110
6	4	D	.55	.52	18	34	30	30	26	80	100	105	125
8	4	D	.60	.52	18	34	30	30	26	100	120	135	155
8	6	D	.60	.55	18	34	30	30	26	120	145	155	180
10	4	D	.68	.52	18	34	30	30	26	130	145	170	185
10	6	D	.68	.55	18	34	30	30	26	145	170	190	210
10	8	D	.68	.60	18	34	30	30	26	170	205	210	245
12	4	D	.75	.52	18	34	30	30	26	155	175	205	225
12	6	D	.75	.55	18	34	30	30	26	175	200	225	250
12	8	D	.75	.60	18	34	30	30	26	200	230	245	280
12	10	D	.75	.68	18	34	30	30	26	230	270	275	315

For sizes 14 thru 24 inches  
See pages 48 and 49

30	18	A	.88	.75	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	710	790	900	985
30	18	B	1.03	.75	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	780	865	960	1045
30	18	C	1.20	.96	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	950	1045	1160	1250
30	18	D	1.37	.96	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	1040	1130	1290	1385
30x20 Short	A	.88	.80	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	755	855	945	1045	
	B	1.03	.80	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	830	930	1010	1105	
	C	1.20	1.03	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	1015	1130	1225	1340	
	D	1.37	1.03	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	1105	1220	1355	1475	
30x20 Long	A	.88	.80	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	1465	1565	1660	1755	
	B	1.03	.80	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	1610	1710	1790	1885	
	C	1.20	1.03	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	1970	2085	2180	2295	
	D	1.37	1.03	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	2140	2255	2395	2510	
30x24 Short	A	.88	.89	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	855	975	1045	1170	
	B	1.03	.89	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	930	1055	1110	1230	
	C	1.20	1.16	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	1150	1300	1360	1510	
	D	1.37	1.16	26	42	38	37 $\frac{1}{2}$	33 $\frac{1}{2}$	1240	1390	1495	1645	
30x24 Long	A	.88	.89	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	1660	1785	1850	1975	
	B	1.03	.89	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	1810	1935	1985	2110	
	C	1.20	1.16	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	2235	2390	2445	2595	
	D	1.37	1.16	66	82	78	77 $\frac{1}{2}$	73 $\frac{1}{2}$	2410	2565	2665	2820	

\*Unless otherwise ordered, we will always ship the F-582 Reducer.

Continued on next page.



# JAMES B. CLOW & SONS

Inc.



## CAST IRON REDUCERS—FOR WATER

American Water Works Association Specifications C100

**F-580 Reducer**  
Spigot Ends

**F-582 Reducer**  
Small End Bell

WHEN ORDERING\*

**F-584 Reducer**  
Large End Bell

Order reducers wanted by Fig. No.,  
followed by size and description  
thus: F-582, 8 x 6", Small End Bell.

**F-590 Reducer**  
Bell and Bell

### DIMENSIONS AND WEIGHTS

Nom. Diam. Inches		Class	Dimensions Inches			Laying Length Inches				Approximate Weight Pounds			
Large End	Small End		T	T <sup>1</sup>	V	F-580	F-582	F-584	F-590	F-580	F-582	F-584	F-590
36x20 Short	A	.99	.80	32	48	44	43 1/2	39 1/2	1040	1135	1280	1380	
	B	1.15	.80	32	48	44	43 1/2	39 1/2	1145	1245	1430	1530	
	C	1.36	1.03	32	48	44	43 1/2	39 1/2	1405	1520	1725	1840	
	D	1.58	1.03	32	48	44	43 1/2	39 1/2	1555	1670	1920	2035	
36x20 Long	A	.99	.80	66	82	78	77 1/2	73 1/2	1765	1860	2005	2105	
	B	1.15	.80	66	82	78	77 1/2	73 1/2	1945	2045	2230	2325	
	C	1.36	1.03	66	82	78	77 1/2	73 1/2	2385	2500	2705	2820	
	D	1.58	1.03	66	82	78	77 1/2	73 1/2	2640	2755	3005	3120	
36x24 Short	A	.99	.89	32	48	44	43 1/2	39 1/2	1155	1280	1400	1520	
	B	1.15	.89	32	48	44	43 1/2	39 1/2	1265	1390	1550	1675	
	C	1.36	1.16	32	48	44	43 1/2	39 1/2	1565	1715	1885	2040	
	D	1.58	1.16	32	48	44	43 1/2	39 1/2	1720	1875	2085	2235	
36x24 Long	A	.99	.89	66	82	78	77 1/2	73 1/2	1965	2090	2210	2335	
	B	1.15	.89	66	82	78	77 1/2	73 1/2	2155	2275	2435	2560	
	C	1.36	1.16	66	82	78	77 1/2	73 1/2	2665	2815	2985	3135	
	D	1.58	1.16	66	82	78	77 1/2	73 1/2	2930	3080	3290	3440	
36x30 Short	A	.99	.88	32	48	43 1/2	43 1/2	39	1255	1450	1500	1690	
	B	1.15	1.03	32	48	43 1/2	43 1/2	39	1470	1645	1755	1930	
	C	1.36	1.20	32	48	43 1/2	43 1/2	39	1735	1945	2055	2265	
	D	1.58	1.37	32	48	43 1/2	43 1/2	39	2010	2265	2375	2630	
36x30 Long	A	.99	.88	66	82	77 1/2	77 1/2	73	2140	2330	2380	2575	
	B	1.15	1.03	66	82	77 1/2	77 1/2	73	2500	2680	2785	2960	
	C	1.36	1.20	66	82	77 1/2	77 1/2	73	2955	3165	3275	3485	
	D	1.58	1.37	66	82	77 1/2	77 1/2	73	3425	3680	3790	4040	
42x20 Short	A	1.10	.80	32	48	44	43	39	1235	1335	1575	1675	
	B	1.28	.80	32	48	44	43	39	1375	1470	1725	1825	
	C	1.54	1.03	32	48	44	43	39	1700	1815	2120	2235	
	D	1.78	1.03	32	48	44	43	39	1890	2005	2370	2485	
42x20 Long	A	1.10	.80	66	82	78	77	73	2095	2190	2430	2530	
	B	1.28	.80	66	82	78	77	73	2325	2420	2675	2775	
	C	1.54	1.03	66	82	78	77	73	2875	2990	3300	3415	
	D	1.78	1.03	66	82	78	77	73	3190	3305	3670	3785	
42x24 Short	A	1.10	.89	32	48	44	43	39	1355	1480	1695	1820	
	B	1.28	.89	32	48	44	43	39	1495	1620	1850	1975	
	C	1.54	1.16	32	48	44	43	39	1865	2015	2290	2440	
	D	1.78	1.16	32	48	44	43	39	2060	2210	2540	2690	
42x24 Long	A	1.10	.89	66	82	78	77	73	2305	2430	2645	2770	
	B	1.28	.89	66	82	78	77	73	2540	2665	2895	3020	
	C	1.54	1.16	66	82	78	77	73	3170	3320	3590	3745	
	D	1.78	1.16	66	82	78	77	73	3495	3645	3975	4125	
42x30 Short	A	1.10	.88	32	48	43 1/2	43	38 1/2	1460	1650	1800	1990	
	B	1.28	1.03	32	48	43 1/2	43	38 1/2	1705	1885	2060	2235	
	C	1.54	1.20	32	48	43 1/2	43	38 1/2	2040	2250	2465	2670	
	D	1.78	1.37	32	48	43 1/2	43	38 1/2	2360	2615	2840	3095	
42x30 Long	A	1.10	.88	66	82	77 1/2	77	72 1/2	2480	2675	2820	3015	
	B	1.28	1.03	66	82	77 1/2	77	72 1/2	2905	3080	3255	3435	
	C	1.54	1.20	66	82	77 1/2	77	72 1/2	3475	3680	3895	4105	
	D	1.78	1.37	66	82	77 1/2	77	72 1/2	4015	4270	4495	4750	

\*Unless otherwise ordered, we will always ship the F-582 Reducer.

Continued on next page.





## CAST IRON REDUCERS—FOR WATER

American Water Works Association Specifications C100

**F-580 Reducer**  
Spigot Ends

**F-582 Reducer\***  
Small End Bell

**F-584 Reducer**  
Large End Bell

**F-590 Reducer**  
Bell and Bell

### DIMENSIONS AND WEIGHTS

Nom. Diam. Inches		Class	Dimensions Inches			Laying Length Inches				Approximate Weight Pounds			
			T	T <sup>1</sup>	V	F-580	F-582	F-584	F-590	F-580	F-582	F-584	F-590
42x36 Short	A	B	1.10	.99	32	48	43½	43	38½	1655	1900	1995	2240
	B	C	1.28	1.15	32	48	43½	43	38½	1930	2215	2285	2570
	C	D	1.54	1.36	32	48	43½	43	38½	2315	2635	2740	3060
	D		1.78	1.58	32	48	43½	43	38½	2700	3060	3180	3540
42x36 Long	A	B	1.10	.99	66	82	77½	77	72½	2820	3060	3155	3400
	B	C	1.28	1.15	66	82	77½	77	72½	3285	3570	3640	3925
	C	D	1.54	1.36	66	82	77½	77	72½	3945	4270	4370	4690
	D		1.78	1.58	66	82	77½	77	72½	4600	4960	5080	5445
48x30 Short	A	B	1.26	.88	66	82	77½	77	72½	2935	3125	3335	3525
	B	C	1.42	1.03	66	82	77½	77	72½	3360	3540	3815	3990
	C	D	1.71	1.20	66	82	77½	77	72½	4025	4235	4570	4780
	D		1.96	1.37	66	82	77½	77	72½	4635	4890	5275	5530
48x30 Long	A	B	1.26	.88	132	148	143½	143	138½	5275	5470	5675	5870
	B	C	1.42	1.03	132	148	143½	143	138½	6050	6225	6500	6675
	C	D	1.71	1.20	132	148	143½	143	138½	7240	7450	7785	7995
	D		1.96	1.37	132	148	143½	143	138½	8335	8590	8975	9230
48x36 Short	A	B	1.26	.99	66	82	77½	77	72½	3285	3530	3685	3930
	B	C	1.42	1.15	66	82	77½	77	72½	3760	4045	4215	4495
	C	D	1.71	1.36	66	82	77½	77	72½	4520	4840	5065	5385
	D		1.96	1.58	66	82	77½	77	72½	5240	5605	5880	6245
48x36 Long	A	B	1.26	.99	132	148	143½	143	138½	5915	6155	6315	6560
	B	C	1.42	1.15	132	148	143½	143	138½	6770	7055	7225	7510
	C	D	1.71	1.36	132	148	143½	143	138½	8140	8460	8685	9005
	D		1.96	1.58	132	148	143½	143	138½	9440	9805	10080	10445
48x42 Short	A	B	1.26	1.10	66	82	77	77	72	3670	4010	4070	4410
	B	C	1.42	1.28	66	82	77	77	72	4205	4560	4655	5010
	C	D	1.71	1.54	66	82	77	77	72	5095	5515	5640	6065
	D		1.96	1.78	66	82	77	77	72	5895	6375	6535	7015
48x42 Long	A	B	1.26	1.10	132	148	143	143	138	6610	6950	7010	7350
	B	C	1.42	1.28	132	148	143	143	138	7580	7935	8030	8385
	C	D	1.71	1.54	132	148	143	143	138	9185	9605	9730	10150
	D		1.96	1.78	132	148	143	143	138	10630	11110	11270	11750
54x36 Short	A	B	1.35	.99	66	82	77½	76½	72	3680	3925	4190	4435
	B	C	1.55	1.15	66	82	77½	76½	72	4260	4545	4860	5145
	C	D	1.90	1.36	66	82	77½	76½	72	5180	5500	5885	6205
	D		2.23	1.58	66	82	77½	76½	72	6085	6450	6910	7270
54x36 Long	A	B	1.35	.99	132	148	143½	142½	138	6620	6865	7130	7375
	B	C	1.55	1.15	132	148	143½	142½	138	7665	7950	8265	8550
	C	D	1.90	1.36	132	148	143½	142½	138	9320	9640	10025	10345
	D		2.23	1.58	132	148	143½	142½	138	10955	11320	11775	12140
54x42 Short	A	B	1.35	1.10	66	82	77	76½	71½	4075	4415	4585	4925
	B	C	1.55	1.28	66	82	77	76½	71½	4720	5075	5315	5675
	C	D	1.90	1.54	66	82	77	76½	71½	5775	6200	6480	6900
	D		2.23	1.78	66	82	77	76½	71½	6770	7250	7590	8070
54x42 Long	A	B	1.35	1.10	132	148	143	142½	137½	7335	7675	7850	8190
	B	C	1.55	1.28	132	148	143	142½	137½	8500	8855	9100	9455
	C	D	1.90	1.54	132	148	143	142½	137½	10405	10830	11110	11535
	D		2.23	1.78	132	148	143	142½	137½	12195	12675	13015	13500
54x48 Short	A	B	1.35	1.26	66	82	77	76½	71½	4585	4985	5100	5500
	B	C	1.55	1.42	66	82	77	76½	71½	5240	5690	5835	6290
	C	D	1.90	1.71	66	82	77	76½	71½	6405	6950	7110	7655
	D		2.23	1.96	66	82	77	76½	71½	7475	8115	8300	8935
54x48 Long	A	B	1.35	1.26	132	148	143	142½	137½	8265	8665	8780	9180
	B	C	1.55	1.42	132	148	143	142½	137½	9440	9895	10040	10495
	C	D	1.90	1.71	132	148	143	142½	137½	11550	12095	12255	12800
	D		2.23	1.96	132	148	143	142½	137½	13480	14120	14300	14940

\* Unless otherwise ordered, we will always ship the F-582 Reducer.



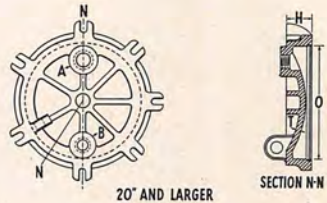
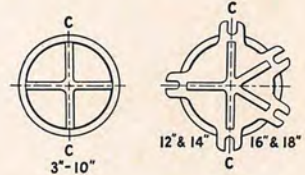
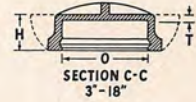
**CAST IRON CAPS AND PLUGS—FOR WATER**

American Water Works Association Specifications C100

**DIMENSIONS AND WEIGHTS**

**F-600 Standard Caps**

For Pipe Size* Inches	Class	Dimensions Inches			Number of Lugs	Weight—Lbs.	
		T	O	H		With Lugs	Without Lugs
30	A	1.15	32.74	5.75	6	665	590
30	B	1.15	33.00	5.75	6	670	595
30	C	1.15	33.40	5.75	6	725	645
30	D	1.15	33.74	5.75	6	785	700
36	A	1.25	38.96	6.00	6	925	845
36	B	1.30	39.30	6.00	6	995	915
36	C	1.35	39.70	6.00	6	1085	1000
36	D	1.40	40.16	6.00	6	1170	1085
42	A	1.40	45.20	7.00	8	1395	1275
42	B	1.50	45.50	7.00	8	1520	1395
42	C	1.60	46.10	7.00	8	1675	1545
42	D	1.70	46.58	7.00	8	1820	1685
48	A	1.70	51.50	7.00	8	1915	1790
48	B	1.90	51.80	7.00	8	2075	1945
48	C	2.00	52.40	7.00	8	2275	2140
48	D	2.10	52.98	7.00	8	2475	2335
54	A	1.90	57.66	7.50	8	2515	2375
54	B	2.00	58.10	7.50	8	2700	2555
54	C	2.10	58.80	7.50	8	2950	2800
54	D	2.20	59.40	7.50	8	3195	3045
60	A	2.00	63.80	7.50	8	3045	2900
60	B	2.10	64.40	7.50	8	3250	3105
60	C	2.20	65.20	7.50	8	3545	3395
60	D	2.30	65.82	7.50	8	3835	3680

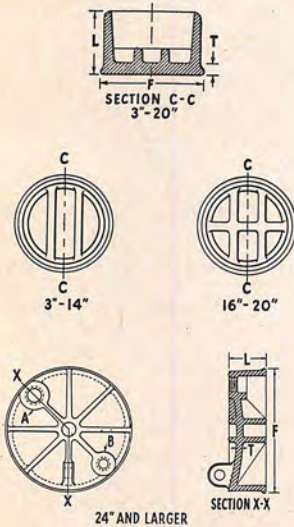


**F-600 Standard Caps**

**Bosses A and B**

Tap bosses are cast on large sizes of caps and plugs *only* when so ordered, in which case, the "A" boss will be tapped for 3-inch pipe and the "B" boss for 2-inch pipe.

**F-610 Standard Plugs**



For Pipe Size* Inches	Class	Dimensions Inches			Number of Ribs	Approx. Weight Pounds
		T	F	L		
30	A	.88	32.24	8.00	4	480
30	B	1.03	32.50	8.00	4	555
30	C	1.20	32.90	8.00	4	640
30	D	1.37	33.24	8.00	4	725
36	A	.99	38.46	8.00	4	680
36	B	1.15	38.80	8.00	4	785
36	C	1.36	39.20	8.00	4	915
36	D	1.58	39.66	8.00	4	1050
42	A	1.10	44.70	9.00	4	990
42	B	1.28	45.00	9.00	4	1140
42	C	1.54	45.60	9.00	4	1355
42	D	1.78	46.08	9.00	4	1550
48	A	1.26	51.00	9.00	4	1340
48	B	1.42	51.30	9.00	4	1505
48	C	1.71	51.90	9.00	4	1800
48	D	1.96	52.48	9.00	4	2045
54	A	1.35	57.16	9.00	4	1695
54	B	1.55	57.60	9.00	4	1945
54	C	1.90	58.30	9.00	4	2355
54	D	2.23	58.90	9.00	4	2735
60	A	1.39	63.30	9.00	4	2045
60	B	1.67	63.90	9.00	4	2435
60	C	2.00	64.70	9.00	4	2905
60	D	2.38	65.32	9.00	4	3395

**F-610 Standard Plugs**

\* For smaller sizes of AWWA Caps and Plugs, see page 47.

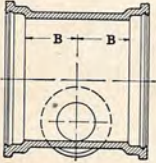




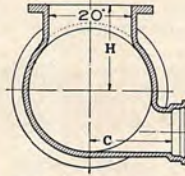
Inc.

## CAST IRON BLOW-OFF BRANCHES—FOR WATER

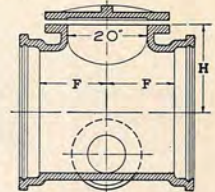
American Water Works Association Specifications C100



**F-615 Standard Blow-off Branch**



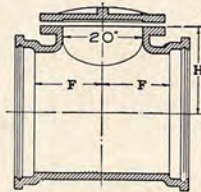
**F-615 and F-618 Section**



**F-618 Blow-off Branch with Manhole**

### DIMENSIONS AND WEIGHTS\*

Nominal Diameter Inches		Class	Dimensions Inches				Approximate Weight Pounds		Nominal Diameter Inches		Class	Dimensions Inches				Approximate Weight Pounds	
Run	Branch		B	C	F	H	F-615	F-618	Run	Branch		B	C	F	H	F-615	F-618
30	8	A	13	20	21	26	1345	2240	48	12	A	17	30	21	35	3435	4330
30	8	B	13	20	21	26	1455	2400	48	12	B	17	30	21	35	3840	4790
30	8	C	13	20	21	26	1690	2735	48	12	C	17	30	21	35	4610	5655
30	8	D	13	20	21	26	1950	3060	48	12	D	17	30	21	35	5300	6415
30	12	A	13	20	21	26	1385	2285	48	16	A	17	30	21	35	3440	4345
30	12	B	13	20	21	26	1490	2435	48	16	B	17	30	21	35	3850	4795
30	12	C	13	20	21	26	1725	2770	48	16	C	17	30	21	35	4660	5710
30	12	D	13	20	21	26	1980	3090	48	16	D	17	30	21	35	5335	6455
36	8	A	13	23	21	29	1750	2760	54	12	A	19	33	28	38½	4505	6155
36	8	B	13	23	21	29	2025	3110	54	12	B	19	33	28	38½	5170	6975
36	8	C	13	23	21	29	2345	3555	54	12	C	19	33	28	38½	6245	8370
36	8	D	13	23	21	29	2695	4005	54	12	D	19	33	28	38½	7295	9695
36	12	A	13	23	21	29	1800	2805	54	16	A	19	33	28	38½	4515	6160
36	12	B	13	23	21	29	2065	3145	54	16	B	19	33	28	38½	5175	6985
36	12	C	13	23	21	29	2375	3590	54	16	C	19	33	28	38½	6300	8425
36	12	D	13	23	21	29	2720	4035	54	16	D	19	33	28	38½	7340	9735
42	12	A	15	26	21	32	2555	3535	60	12	A	21	36	28	42	5540	7065
42	12	B	15	26	21	32	2850	3900	60	12	B	21	36	28	42	6430	8145
42	12	C	15	26	21	32	3395	4570	60	12	C	21	36	28	42	7740	9715
42	12	D	15	26	21	32	3895	5170	60	12	D	21	36	28	42	9155	11400
42	16	A	15	26	21	32	2575	3555	60	16	A	21	36	28	42	5555	7065
42	16	B	15	26	21	32	2870	3910	60	16	B	21	36	28	42	6440	8145
42	16	C	15	26	21	32	3460	4640	60	16	C	21	36	28	42	7795	9770
42	16	D	15	26	21	32	3940	5205	60	16	D	21	36	28	42	9185	11445



**F-622 Manhole Pipe**

### DIMENSIONS AND WEIGHTS\*

Dimensions F and H are same as shown in upper table.

Size . . . . . Inches	30				36				42			
	A	B	C	D	A	B	C	D	A	B	C	D
Approx. weight . . . Lbs.	2155	2320	2660	2990	2675	3025	3485	3935	3400	3775	4470	5075
Size . . . . . Inches	48				54				60			
	A	B	C	D	A	B	C	D	A	B	C	D
Approx. weight . . . Lbs.	4185	4655	5540	6320	5995	6835	8255	9600	6900	8005	9595	11310

\* Weights for F-618 and F-622 include 300 pounds for blind flange, steel bolts and nuts, and 1/8" full face flat rubber gasket; which are regularly furnished. Flanges are Class 125 ASA Standard.





## SAND CAST—BELL AND SPIGOT CAST IRON PIPE—FOR WATER

American Water Works Association Specifications of

May 12, 1908

12 FOOT  
LENGTHS



16 FOOT  
LENGTHS

Classes A, B, C, D

### THICKNESSES AND WEIGHTS\*

Nominal Inside Diameter Inches	CLASS "A" 100-Foot Head 43 Pounds Pressure					CLASS "B" 200-Foot Head 86 Pounds Pressure				
	Thick-ness Inches	Weight of 12-Foot Length Pounds Per		Weight of 16-Foot Length Pounds Per		Thick-ness Inches	Weight of 12-Foot Length Pounds Per		Weight of 16-Foot Length Pounds Per	
		Foot	Length	Foot	Length		Foot	Length	Foot	Length
4	.42	20.0	240	19.7	315	.45	21.7	260	21.2	340
6	.44	30.8	370	30.3	485	.48	33.3	400	32.5	520
8	.46	42.9	515	42.2	675	.51	47.5	570	46.6	745
10	.50	57.1	685	55.9	895	.57	63.8	765	62.5	1000
12	.54	72.5	870	71.2	1140	.62	82.1	985	80.6	1290
14	.57	89.6	1075	...	...	.66	102.5	1230	...	...
16	.60	108.3	1300	...	...	.70	125.0	1500	...	...
18	.64	129.2	1550	...	...	.75	150.0	1800	...	...
20	.67	150.0	1800	...	...	.80	175.0	2100	...	...
24	.76	204.2	2450	...	...	.89	233.3	2800	...	...
30	.88	291.7	3500	...	...	1.03	333.3	4000	...	...
36	.99	391.7	4700	...	...	1.15	454.2	5450	...	...
42	1.10	512.5	6150	...	...	1.28	591.7	7100	...	...
48	1.26	666.7	8000	...	...	1.42	750.0	9000	...	...

Nominal Inside Diameter Inches	CLASS "C" 300-Foot Head 130 Pounds Pressure					CLASS "D" 400-Foot Head 173 Pounds Pressure				
	Thick-ness Inches	Weight of 12-Foot Length Pounds Per		Weight of 16-Foot Length Pounds Per		Thick-ness Inches	Weight of 12-Foot Length Pounds Per		Weight of 16-Foot Length Pounds Per	
		Foot	Length	Foot	Length		Foot	Length	Foot	Length
4	.48	23.3	280	22.8	365	.52	25.0	300	24.4	390
6	.51	35.8	430	35.0	560	.55	38.3	460	37.5	600
8	.56	52.1	625	50.9	815	.60	55.8	670	54.7	875
10	.62	70.8	850	69.4	1110	.68	76.7	920	75.3	1205
12	.68	91.7	1100	90.0	1440	.75	100.0	1200	98.4	1575
14	.74	116.7	1400	...	...	.82	129.2	1550	...	...
16	.80	143.8	1725	...	...	.89	158.3	1900	...	...
18	.87	175.0	2100	...	...	.96	191.7	2300	...	...
20	.92	208.3	2500	...	...	1.03	229.2	2750	...	...
24	1.04	279.2	3350	...	...	1.16	306.7	3680	...	...
30	1.20	400.0	4800	...	...	1.37	450.0	5400	...	...
36	1.36	545.8	6550	...	...	1.58	625.0	7500	...	...
42	1.54	716.7	8600	...	...	1.78	825.0	9900	...	...
48	1.71	908.3	10900	...	...	1.96	1050.0	12600	...	...

\*All weights are approximate. The difference in weight per foot between the 12 and 16 foot lengths is accounted for by the fact that the weight of the bell in the longer length is spread over a greater number of feet. The weight per foot of pipe without bell is the same in both lengths.

← FOR INFORMATION ONLY →

Most of the cast iron pipe installed in water distribution systems in our country prior to 1927 was made to the above specifications and, considering that most of these installations are still in service, we include these data in our catalog for those who may have need for this information.



**USEFUL**  
**INFORMATION**

**TABLES AND DATA**

FLOW OF WATER IN CAST IRON PIPE  
Pages 284 thru 288

LOSS OF HEAD DATA  
Page 289

NOZZLE THREADS AND NOZZLE DISCHARGE DATA  
Pages 290 and 291

EQUATION OF PIPE  
Page 292

FLOW OF WATER THROUGH VALVES AND FITTINGS  
Page 293

APPROXIMATE WATER USE  
Page 294

SIZING OF SERVICES  
Page 295

CONTENTS OF PIPE  
Page 296

THEORETICAL HORSE POWER TO RAISE WATER  
Page 297

LINEAR EXPANSION OF CAST IRON PIPE  
Page 298

CONVERSION FACTORS  
Pages 299 thru 301

PROPERTIES OF NUMBERS  
Pages 302 and 303

DEPTH OF TRENCH  
Page 304

**Note**

The data and tables in the following pages are reproduced as useful information. While the information has been carefully prepared, and every precaution taken in proof-reading, we do not assume responsibility for its accuracy.



## FLOW OF WATER IN CAST IRON PIPE

In attempting to compute the capacity of a pipe line or to figure the probable loss in head, after the pipe has reached a certain age, it is absolutely essential to know something about the water to be conveyed. In most cases the quality of the water is such that the carrying capacity is affected very little by the age of the pipe. In other cases, the water may be so soft as to cause tuberculation and consequent loss in carrying capacity or so turbid as to cause deposits of sand or mud with the same effect. Waters that cause tuberculation are the rare exception and outside of a few raw water conduits, muddy water is also unusual.

In spite of this fact, many of the books and articles on hydraulics and water supply, make the bold statement that a definite correction factor must be applied to flow formulae as the pipe increases in age. It is evident that this is incorrect, since first of all a large number of experiments have been made that show quite definitely that in many places there is no change whatever in carrying capacity with age. Secondly, assume that a layer of tubercles 2 inches thick are produced as a result of many years use of a pipe, it is evident that the carrying capacity of a 12 inch pipe would be considerably more reduced than would a 48 inch pipe with the same thickness of tubercles, a fact that is not taken into consideration in the formulae in common use.

In presenting the flow tables, that follow, we are giving the values for new pipe. In most cases, it can be told beforehand whether or not the water to be conveyed will cause tuberculation. If tuberculation is not to be expected, ordinary Cast Iron Pipe should be used and the carrying capacity figured as shown in the tables. If it is known beforehand, the water is of such a nature as to cause tuberculation, cement lined Cast Iron Pipe should be used and, as in previous case, the tables used without any correction factor.

The following tables represent the Flow of Water through Clean Cast Iron Pipe computed by the Williams-Hazen formula. The Williams-Hazen formula is as follows:

$$V = cr^{0.63}S^{0.54} 0.001^{-0.04}$$

in which

V = Velocity in feet per second

c = A factor the value of which is an approximation to a constant, but depends upon the roughness of the pipe and upon the hydraulic radius and slope. For clean cast iron pipe, c = approx. 130.

r = Hydraulic radius in feet

s = Slope of the hydraulic gradient, or loss of head in feet per foot of pipe.

The value of "c" in the following tables is approximated as 130, which is a conservative value for modern smooth cast iron pipe. The tables are based on pipe of inside diameters as noted for cast iron pipe made to the A. W. W. A. Specifications. For centrifugal pipe conforming to Federal Specifications WW-P-421 or WW-P-421a, or to ASA Specifications A21.6, the internal diameters of most sizes are greater than the nominal inside diameters. Therefore the discharge values are as great as 10% higher than those shown in the tables. It should be remembered that the "loss of head," or friction head, given in feet per thousand feet of length, is also the fall in feet per thousand (the slope) required to produce the given velocity in pipe of the diameter given. The following examples illustrate the various uses of the table:

### Example 1. Maximum Delivery

To find the maximum delivery of an 8-inch pipe, 7,500 feet long under 150 foot head. The available head per thousand feet is  $150 \div 7.5 = 20$  feet per thousand. The table for 8-inch pipe, under "loss of head," shows that for a loss of head of 19.5 feet per thousand the corresponding delivery at velocity of 6.65 feet per second is 1,500,000 gallons per day.

By use of diagram on page 288 for same conditions, result is 1,040 gals. per min.  $\times 60 \times 24 = 1,500,000$  gals. per day.

### Example 2. Determination of Diameter

To find diameter of pipe necessary to deliver 3,000,000 gallons per day through a line 25,000 feet long under 150 foot head. The available head per thousand feet is  $150 \div 25 = 6$  feet per thousand. Reading across table from discharge of 3,000,000 gallons, at the left, the first "loss of head" of 6 feet or less per thousand is 4.65 under 14-inch pipe. Hence the least diameter which will answer in regular commercial sizes is 14 inches.

By use of diagram on page 288 for same condition, result is 14 inches.  $(4.65 \text{ ft. loss per } 1000, 3,000,000 \div 1440 = 2083 \text{ gals. per min.})$

### Example 3. Friction Loss

To find loss of head through a 10-inch line, 4,000 feet long delivering 1,400,000 gallons per 24 hours. The table shows "loss of head" of 5.8 feet per 1,000 feet of length; hence in 4,000 feet the loss will be 23.2 feet. If the water is delivered at a point 100 feet above pump, the total head pumped against is 100 feet (static) plus 23.2 feet (friction), or 123.2 feet total.

(Continued on next page)





## FLOW OF WATER IN CAST IRON PIPE

By use of diagram on page 288 for same conditions, the flow is  $1,400,000 \div 1440 = 972$  gals. per min. and the result is  $5.8 \times 4 = 23.2$ .

### Example 4. Delivery Determined From Pressure Reduction

Two accurate pressure gauges should be placed at a known distance apart, and measurement made of the difference in elevation of the points where readings are taken; thus, if in a 12-inch pipe the gauges are 500 feet apart and show a difference in pressure of 2 pounds (4.6 feet) while one gauge is 1.8 feet above the other, the actual loss of head will be 4.6 plus or minus  $1.8 = 6.4$  or 2.8 feet per 500 feet, or 12.8 or 5.6 feet per thousand feet, depending on whether the down stream gauge is higher or lower than the gauge nearest the pump. Assuming that the down stream gauge is at the higher elevation the loss of head due to friction is 5.6 per thousand feet. In the table for 12-inch pipe we find that a loss of head of 5.6 feet per thousand

is due to velocity of 4.33 corresponding to discharge of 2,200,000 gallons per day.

By use of diagram on page 288 for same conditions, result is 4.33 per second velocity and a discharge of 1,530 gals. per min. = 2,200,000 gals. per day.

### Example 5. To Find The Pressure

To find the pressure at any point in a water main when diameter, rate of delivery and static head are known. Assume that 1,200,000 gallons per day are to be pumped through 5,000 feet of 12-inch pipe laid on an incline to a total vertical height of 100 feet and that it is desired to learn the pressure in the pipe at each 1,000 feet from the pump. At the given delivery the loss of head in a 12-inch pipe is 1.81 per 1,000 feet or 9.05 for 5,000 feet; to this is added the static head, making total of 109.05 feet. The drop in pressure for each 1,000 feet will then be one-fifth of this quantity or 21.8 feet.

### WILLIAMS-HAZEN FORMULA, C = 130

#### Frictional Heads, per Thousand Feet, at Given Rates of Discharge

3" Pipe			4" Pipe				6" Pipe				
Discharge in Gallons		Velocity ft. per Second	Discharge in Gallons		Velocity ft. per Second	Loss of Head in ft. per 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in ft. per 1000 ft. of pipe	
Per Minute	Per 24 Hours		Per Minute	Per 24 Hours			Gallons Per 24 Hours	Cubic ft. per Second			
10	14,400	0.45	0.43	20	28,800	0.51	0.38	50,000	0.0774	0.39	0.15
15	21,600	0.68	0.91	25	36,000	0.64	0.58	60,000	0.0928	0.47	0.20
20	28,800	0.91	1.55	30	43,200	0.77	0.81	70,000	0.1083	0.55	0.27
25	36,000	1.13	2.34	35	50,400	0.89	1.07	80,000	0.1238	0.63	0.35
30	43,200	1.36	3.29	40	57,600	1.02	1.38	90,000	0.1392	0.71	0.43
35	50,400	1.59	4.38	50	72,000	1.28	2.08	100,000	0.1547	0.79	0.53
40	57,600	1.82	5.6	60	86,400	1.53	2.91	110,000	0.1702	0.87	0.63
50	72,000	2.27	8.5	70	100,800	1.79	3.88	120,000	0.1857	0.95	0.74
60	86,400	2.72	11.8	80	115,200	2.04	4.97	140,000	0.2166	1.10	0.99
70	100,800	3.18	15.8	90	129,600	2.30	6.2	160,000	0.2476	1.26	1.26
80	115,200	3.63	20.2	100	144,000	2.55	7.5	180,000	0.2785	1.42	1.57
90	129,600	4.09	25.1	120	172,800	3.06	10.5	200,000	0.3094	1.58	1.91
100	144,000	4.54	30.6	140	201,600	3.57	14.0	220,000	0.3404	1.73	2.29
120	172,800	5.45	42.8	160	230,400	4.08	17.9	240,000	0.3713	1.89	2.69
140	201,600	6.35	57	180	259,200	4.60	22.2	260,000	0.4023	2.05	3.10
160	230,400	7.26	73	200	288,000	5.11	27.0	280,000	0.4332	2.21	3.58
180	259,200	8.17	91	220	316,800	5.62	32.2	300,000	0.4642	2.36	4.06
200	288,000	9.08	110	240	345,600	6.13	37.9	350,000	0.541	2.76	5.4
220	316,800	9.99	132	260	374,400	6.64	44	400,000	0.619	3.15	6.9
240	345,600	10.89	154	280	403,200	7.15	50	450,000	0.696	3.55	8.6
260	374,400	11.80	179	300	432,000	7.66	57	500,000	0.774	3.94	10.4
280	403,200	12.71	206	320	460,800	8.17	65	550,000	0.851	4.33	12.4
300	432,000	13.62	233	340	489,600	8.68	72	600,000	0.928	4.73	14.6
320	460,800	14.52	263	360	518,400	9.19	80	650,000	1.006	5.12	16.9
340	489,600	15.43	294	400	576,000	10.21	98	700,000	1.083	5.52	19.5
360	518,400	16.34	328	450	648,000	11.49	122	800,000	1.238	6.30	24.9
380	547,200	17.25	361	500	720,000	12.77	148	900,000	1.392	7.09	30.9
400	576,000	18.16	399	550	792,000	14.04	177	1,000,000	1.547	7.88	37.8
420	604,800	19.06	436	600	864,000	15.32	207	1,100,000	1.702	8.67	45.1
440	633,600	19.97	475	650	936,000	16.59	240	1,200,000	1.857	9.46	53
460	662,400	20.88	520	700	1,008,000	17.87	276	1,400,000	2.166	11.03	70
480	691,200	21.79	560	750	1,080,000	19.15	312	1,600,000	2.476	12.61	90
500	720,000	22.70	600	800	1,152,000	20.42	352	1,800,000	2.785	14.18	112
550	792,000	24.96	720	850	1,224,000	21.70	395	2,000,000	3.094	15.76	137
600	864,000	27.23	840	900	1,296,000	22.98	439	2,200,000	3.404	17.34	162

(Continued on next page)



Inc.

## FLOW OF WATER IN CAST IRON PIPE

WILLIAMS-HAZEN FORMULA, C = 130

(Continued from preceding page)

### Frictional Heads, per Thousand Feet, at Given Rates of Discharge

8" Pipe				10" Pipe				12" Pipe			
Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe
Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second		
200,000	0.3094	0.89	0.47	300,000	0.464	0.85	0.34	100,000	0.155	0.20	0.02
220,000	0.3404	0.98	0.56	320,000	0.495	0.91	0.38	200,000	0.309	0.39	0.07
240,000	0.3713	1.06	0.66	340,000	0.526	0.96	0.42	300,000	0.464	0.59	0.14
260,000	0.4023	1.15	0.77	360,000	0.557	1.02	0.47	400,000	0.619	0.79	0.24
280,000	0.4332	1.24	0.88	380,000	0.588	1.08	0.52	500,000	0.774	0.99	0.36
300,000	0.4642	1.33	1.00	400,000	0.619	1.13	0.57	600,000	0.928	1.18	0.50
320,000	0.4951	1.42	1.13	450,000	0.696	1.28	0.71	700,000	1.083	1.38	0.66
340,000	0.526	1.51	1.26	500,000	0.774	1.42	0.87	800,000	1.238	1.58	0.85
360,000	0.557	1.60	1.40	550,000	0.851	1.56	1.03	900,000	1.392	1.77	1.06
380,000	0.588	1.68	1.55	600,000	0.928	1.70	1.21	1,000,000	1.547	1.97	1.29
400,000	0.619	1.77	1.70	650,000	1.006	1.84	1.41	1,100,000	1.702	2.17	1.54
450,000	0.696	1.99	2.11	700,000	1.083	1.99	1.62	1,200,000	1.857	2.36	1.81
500,000	0.774	2.22	2.58	750,000	1.160	2.13	1.84	1,300,000	2.011	2.56	2.10
550,000	0.851	2.44	3.07	800,000	1.238	2.27	2.08	1,400,000	2.166	2.76	2.40
600,000	0.928	2.66	3.61	900,000	1.392	2.55	2.58	1,500,000	2.321	2.96	2.73
650,000	1.006	2.88	4.18	1,000,000	1.547	2.84	3.13	1,600,000	2.476	3.15	3.09
700,000	1.083	3.10	4.80	1,100,000	1.702	3.12	3.72	1,700,000	2.630	3.35	3.45
750,000	1.160	3.32	5.4	1,200,000	1.857	3.40	4.40	1,800,000	2.785	3.55	3.82
800,000	1.238	3.55	6.1	1,300,000	2.011	3.69	5.1	1,900,000	2.940	3.74	4.24
900,000	1.392	3.99	7.6	1,400,000	2.166	3.97	5.8	2,000,000	3.094	3.94	4.65
1,000,000	1.547	4.43	9.3	1,500,000	2.321	4.26	6.7	2,200,000	3.404	4.33	5.6
1,100,000	1.702	4.88	11.1	1,600,000	2.476	4.54	7.5	2,400,000	3.713	4.73	6.5
1,200,000	1.857	5.37	13.0	1,800,000	2.785	5.11	9.3	2,600,000	4.023	5.12	7.6
1,300,000	2.011	5.76	15.1	2,000,000	3.094	5.67	11.3	2,800,000	4.332	5.52	8.7
1,400,000	2.166	6.20	17.3	2,200,000	3.404	6.24	13.4	3,000,000	4.642	5.91	9.9
1,500,000	2.321	6.65	19.5	2,400,000	3.713	6.81	15.7	3,500,000	5.41	6.89	13.2
1,600,000	2.476	7.09	22.0	2,600,000	4.023	7.38	18.4	4,000,000	6.19	7.88	16.6
1,800,000	2.785	7.98	27.2	2,800,000	4.332	7.94	21.0	4,500,000	6.96	8.87	20.6
2,000,000	3.094	8.86	33.3	3,000,000	4.642	8.51	23.8	5,000,000	7.74	9.85	25.1
2,200,000	3.404	9.75	40.0	3,200,000	4.951	9.08	27.0	5,500,000	8.51	10.84	30.3
2,400,000	3.713	10.64	47	3,400,000	5.26	9.65	30.2	6,000,000	9.28	11.82	35.7
2,600,000	4.023	11.52	55	3,600,000	5.57	10.21	33.5	7,000,000	10.83	13.79	47.2
2,800,000	4.332	12.41	62	3,800,000	5.88	10.78	37.2	8,000,000	12.38	15.76	61
3,000,000	4.642	13.30	71	4,000,000	6.19	11.35	40.8	9,000,000	13.92	17.73	75
3,200,000	4.951	14.18	80	4,500,000	6.96	12.77	51	10,000,000	15.47	19.70	93

14" Pipe				16" Pipe				18" Pipe			
Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in 1000 ft. of pipe
Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second		
100,000	0.155	0.15	0.009	200,000	0.309	0.22	0.016	200,000	0.309	0.17	0.009
200,000	0.309	0.29	0.031	400,000	0.619	0.44	0.058	400,000	0.619	0.35	0.033
300,000	0.464	0.43	0.066	600,000	0.928	0.66	0.124	600,000	0.928	0.52	0.069
400,000	0.619	0.58	0.112	800,000	1.238	0.89	0.210	800,000	1.238	0.70	0.118
500,000	0.774	0.72	0.169	1,000,000	1.547	1.11	0.319	1,000,000	1.547	0.88	0.179
600,000	0.928	0.87	0.238	1,200,000	1.857	1.33	0.446	1,200,000	1.857	1.05	0.251
700,000	1.083	1.01	0.317	1,400,000	2.166	1.55	0.60	1,400,000	2.166	1.22	0.333
800,000	1.238	1.16	0.406	1,600,000	2.476	1.77	0.76	1,600,000	2.476	1.40	0.430
900,000	1.392	1.30	0.50	1,800,000	2.785	1.99	0.95	1,800,000	2.785	1.57	0.53
1,000,000	1.547	1.45	0.61	2,000,000	3.094	2.22	1.15	2,000,000	3.094	1.75	0.65
1,100,000	1.702	1.59	0.73	2,200,000	3.404	2.44	1.37	2,200,000	3.404	1.93	0.77
1,200,000	1.857	1.73	0.86	2,400,000	3.713	2.66	1.62	2,400,000	3.713	2.10	0.90
1,300,000	2.011	1.88	0.99	2,600,000	4.023	2.88	1.87	2,600,000	4.023	2.28	1.06
1,400,000	2.166	2.02	1.14	2,800,000	4.332	3.10	2.15	2,800,000	4.332	2.45	1.21
1,500,000	2.321	2.17	1.28	3,000,000	4.642	3.32	2.43	3,000,000	4.642	2.63	1.37
1,600,000	2.476	2.31	1.46	3,200,000	4.951	3.55	2.75	3,500,000	5.41	3.07	1.83
1,700,000	2.630	2.46	1.63	3,400,000	5.26	3.77	3.08	4,000,000	6.19	3.50	2.34
1,800,000	2.785	2.60	1.82	3,600,000	5.57	3.99	3.42	4,500,000	6.96	3.94	2.92
1,900,000	2.940	2.75	1.99	3,800,000	5.88	4.21	3.78	5,000,000	7.74	4.38	3.53
2,000,000	3.094	2.90	2.20	4,000,000	6.19	4.43	4.15	5,500,000	8.51	4.83	4.20
2,200,000	3.404	3.18	2.64	4,500,000	6.96	4.99	5.2	6,000,000	9.28	5.25	4.95
2,400,000	3.713	3.48	3.08	5,000,000	7.74	5.54	6.3	6,500,000	10.06	5.70	5.7
2,600,000	4.023	3.76	3.58	5,500,000	8.51	6.09	7.5	7,000,000	10.83	6.13	6.6
2,800,000	4.332	4.05	4.12	6,000,000	9.28	6.65	8.8	7,500,000	11.60	6.57	7.5
3,000,000	4.642	4.35	4.65	6,500,000	10.06	7.20	10.2	8,000,000	12.38	7.01	8.4
3,500,000	5.41	5.07	6.2	7,000,000	10.83	7.76	11.7	8,500,000	13.15	7.45	9.4
4,000,000	6.19	5.79	8.0	7,500,000	11.60	8.31	13.3	9,000,000	13.92	7.90	10.5
4,500,000	6.96	6.51	9.9	8,000,000	12.38	8.86	14.9	9,500,000	14.70	8.33	11.6
5,000,000	7.74	7.24	12.0	9,000,000	13.92	9.97	18.6	10,000,000	15.47	8.76	12.7
5,500,000	8.51	7.96	14.3	10,000,000	15.47	11.08	22.6	11,000,000	17.02	9.65	15.2
6,000,000	9.28	8.68	16.8	11,000,000	17.02	12.19	27.0	12,000,000	18.57	10.50	17.8
7,000,000	10.83	10.12	22.3	12,000,000	18.57	13.30	31.8	14,000,000	21.66	12.3	23.8
8,000,000	12.38	11.58	28.7	13,000,000	20.11	14.40	36.8	16,000,000	24.76	14.0	30.4
9,000,000	13.92	13.02	35.9	14,000,000	21.66	15.51	42.2	18,000,000	27.85	15.8	37.8
10,000,000	15.47	14.48	43.5	15,000,000	23.21	16.62	48.0	20,000,000	30.94	17.5	45.8

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## FLOW OF WATER IN CAST IRON PIPE

WILLIAMS-HAZEN FORMULA, C = 130

(Continued from preceding page)

### Frictional Heads, per Thousand Feet, at Given Rates of Discharge

20" Pipe				24" Pipe				30" Pipe			
Discharge in		Velocity ft. per Second	Loss of Head in ft. per 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in ft. per 1000 ft. of pipe	Discharge in		Velocity ft. per Second	Loss of Head in ft. per 1000 ft. of pipe
Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second			Gallons per 24 Hours	Cubic ft. per Second		
400,000	0.619	0.28	0.020	500,000	0.774	0.25	0.012	1,000,000	1.547	0.32	0.015
600,000	0.928	0.43	0.049	1,000,000	1.547	0.49	0.044	1,500,000	2.321	0.47	0.032
800,000	1.238	0.57	0.071	1,500,000	2.321	0.74	0.093	2,000,000	3.094	0.63	0.054
1,000,000	1.547	0.71	0.107	2,000,000	3.094	0.98	0.159	2,500,000	3.868	0.79	0.081
1,200,000	1.857	0.85	0.150	2,500,000	3.868	1.23	0.240	3,000,000	4.642	0.95	0.113
1,400,000	2.166	0.99	0.200	3,000,000	4.642	1.48	0.338	3,500,000	5.41	1.10	0.151
1,600,000	2.476	1.13	0.257	3,500,000	5.41	1.72	0.449	4,000,000	6.19	1.26	0.194
1,800,000	2.785	1.28	0.319	4,000,000	6.19	1.97	0.58	4,500,000	6.96	1.42	0.241
2,000,000	3.094	1.42	0.389	4,500,000	6.96	2.22	0.72	5,000,000	7.74	1.58	0.292
2,500,000	3.868	1.77	0.58	5,000,000	7.74	2.46	0.87	5,500,000	8.51	1.73	0.349
3,000,000	4.642	2.13	0.82	5,500,000	8.51	2.71	1.03	6,000,000	9.28	1.89	0.410
3,500,000	5.41	2.48	1.09	6,000,000	9.28	2.96	1.22	6,500,000	10.06	2.05	0.475
4,000,000	6.19	2.84	1.39	6,500,000	10.06	3.20	1.41	7,000,000	10.83	2.21	0.55
4,500,000	6.96	3.19	1.74	7,000,000	10.83	3.45	1.62	7,500,000	11.60	2.36	0.62
5,000,000	7.74	3.55	2.11	7,500,000	11.60	3.69	1.84	8,000,000	12.38	2.52	0.70
5,500,000	8.51	3.90	2.52	8,000,000	12.38	3.94	2.07	8,500,000	13.15	2.68	0.78
6,000,000	9.28	4.26	2.97	8,500,000	13.15	4.19	2.32	9,000,000	13.92	2.84	0.87
6,500,000	10.06	4.61	3.43	9,000,000	13.92	4.43	2.58	10,000,000	15.47	3.15	1.06
7,000,000	10.83	4.96	3.95	9,500,000	14.70	4.68	2.85	11,000,000	17.02	3.47	1.28
7,500,000	11.60	5.32	4.48	10,000,000	15.47	4.92	3.12	12,000,000	18.57	3.78	1.47
8,000,000	12.38	5.67	5.1	11,000,000	17.02	5.42	3.74	13,000,000	20.11	4.10	1.72
8,500,000	13.15	6.03	5.6	12,000,000	18.57	5.91	4.39	14,000,000	21.66	4.41	1.97
9,000,000	13.92	6.38	6.3	13,000,000	20.11	6.40	5.1	15,000,000	23.21	4.73	2.24
9,500,000	14.70	6.74	6.9	14,000,000	21.66	6.89	5.8	16,000,000	24.76	5.04	2.52
10,000,000	15.47	7.09	7.6	15,000,000	23.21	7.39	6.6	17,000,000	26.30	5.36	2.82
11,000,000	17.02	7.80	9.1	16,000,000	24.76	7.88	7.5	18,000,000	27.85	5.67	3.14
12,000,000	18.57	8.51	10.7	17,000,000	26.30	8.37	8.4	19,000,000	29.40	5.99	3.47
13,000,000	20.11	9.22	12.4	18,000,000	27.85	8.86	9.3	20,000,000	30.94	6.30	3.81
14,000,000	21.66	9.93	14.2	19,000,000	29.40	9.36	10.3	22,000,000	34.04	6.93	4.55
15,000,000	23.21	10.64	16.2	20,000,000	30.94	9.85	11.3	24,000,000	37.13	7.56	5.4
16,000,000	24.76	11.35	18.2	22,000,000	34.04	10.83	13.5	26,000,000	40.23	8.20	6.2
17,000,000	26.30	12.06	20.4	24,000,000	37.13	11.82	15.8	28,000,000	43.32	8.83	7.1
18,000,000	27.85	12.77	22.7	26,000,000	40.23	12.80	18.4	30,000,000	46.42	9.46	8.1
19,000,000	29.40	13.47	25.0	28,000,000	43.32	13.79	21.1	35,000,000	54.1	11.03	10.8
20,000,000	30.94	14.18	27.6	30,000,000	46.42	14.77	24.0	40,000,000	61.9	12.61	13.8
36" Pipe				42" Pipe				48" Pipe			
2,000,000	3.094	0.44	0.022	3,000,000	4.64	0.48	0.022	4,000,000	6.19	0.49	0.020
2,500,000	3.868	0.55	0.033	4,000,000	6.19	0.64	0.035	5,000,000	7.74	0.62	0.030
3,000,000	4.642	0.66	0.047	5,000,000	7.74	0.80	0.057	6,000,000	9.28	0.74	0.042
3,500,000	5.41	0.77	0.062	6,000,000	9.28	0.96	0.080	8,000,000	12.38	0.98	0.071
4,000,000	6.19	0.88	0.080	7,000,000	10.83	1.13	0.106	10,000,000	15.47	1.23	0.107
5,000,000	7.74	1.09	0.121	8,000,000	12.38	1.29	0.136	12,000,000	18.57	1.48	0.150
6,000,000	9.28	1.31	0.168	9,000,000	13.92	1.45	0.168	14,000,000	21.66	1.72	0.199
7,000,000	10.83	1.53	0.224	10,000,000	15.47	1.61	0.207	16,000,000	24.76	1.97	0.256
8,000,000	12.38	1.75	0.288	11,000,000	17.02	1.77	0.245	18,000,000	27.85	2.22	0.319
9,000,000	13.92	1.97	0.358	12,000,000	18.57	1.93	0.288	20,000,000	30.94	2.46	0.387
10,000,000	15.47	2.19	0.434	14,000,000	21.66	2.25	0.382	22,000,000	34.04	2.71	0.480
11,000,000	17.02	2.41	0.52	16,000,000	24.76	2.57	0.490	24,000,000	37.13	2.96	0.54
12,000,000	18.57	2.63	0.61	18,000,000	27.85	2.89	0.61	26,000,000	40.23	3.20	0.63
13,000,000	20.11	2.85	0.71	20,000,000	30.94	3.22	0.74	28,000,000	43.32	3.45	0.72
14,000,000	21.66	3.06	0.81	22,000,000	34.04	3.53	0.88	30,000,000	46.42	3.69	0.82
15,000,000	23.21	3.28	0.92	24,000,000	37.13	3.86	1.04	32,000,000	49.51	3.94	0.92
16,000,000	24.76	3.50	1.03	26,000,000	40.23	4.18	1.21	34,000,000	52.6	4.19	1.03
17,000,000	26.30	3.72	1.16	28,000,000	43.32	4.50	1.38	36,000,000	55.7	4.43	1.15
18,000,000	27.85	3.94	1.29	30,000,000	46.42	4.82	1.57	38,000,000	58.8	4.68	1.27
19,000,000	29.40	4.16	1.43	32,000,000	49.51	5.15	1.77	40,000,000	61.9	4.92	1.39
20,000,000	30.94	4.38	1.57	34,000,000	52.6	5.47	1.98	42,000,000	65.0	5.17	1.53
22,000,000	34.04	4.82	1.87	36,000,000	55.7	5.79	2.20	44,000,000	68.1	5.42	1.67
24,000,000	37.13	5.25	2.20	38,000,000	58.8	6.11	2.43	46,000,000	71.2	5.66	1.81
26,000,000	40.23	5.69	2.55	40,000,000	61.9	6.45	2.68	48,000,000	74.3	5.91	1.96
28,000,000	43.32	6.13	2.92	42,000,000	65.0	6.75	2.92	50,000,000	77.4	6.16	2.12
30,000,000	46.42	6.57	3.32	44,000,000	68.1	7.08	3.19	55,000,000	85.1	6.77	2.52
32,000,000	49.51	7.00	3.74	46,000,000	71.2	7.40	3.48	60,000,000	92.8	7.39	2.97
34,000,000	52.6	7.44	4.19	48,000,000	74.3	7.72	3.76	65,000,000	100.6	8.00	3.43
36,000,000	55.7	7.88	4.67	50,000,000	77.4	8.04	4.05	70,000,000	108.3	8.62	3.94
38,000,000	58.8	8.32	5.2	55,000,000	85.1	8.84	4.82	75,000,000	116.0	9.25	4.48
40,000,000	61.9	8.76	5.7	60,000,000	92.8	9.65	5.7	80,000,000	123.8	9.85	5.1
45,000,000	69.6	9.85	7.1	65,000,000	100.6	10.45	6.6	85,000,000	131.5	10.48	5.6
50,000,000	77.4	10.95	8.6	70,000,000	108.3	11.26	7.6	90,000,000	139.2	11.08	6.3
55,000,000	85.1	12.04	10.2	75,000,000	116.0	12.06	8.6	95,000,000	147.0	11.69	7.0
60,000,000	92.8	13.13	12.1	80,000,000	123.8	12.86	9.6	100,000,000	154.7	12.31	7.6

(Continued on next page)



## FLOW OF WATER IN CAST IRON PIPE

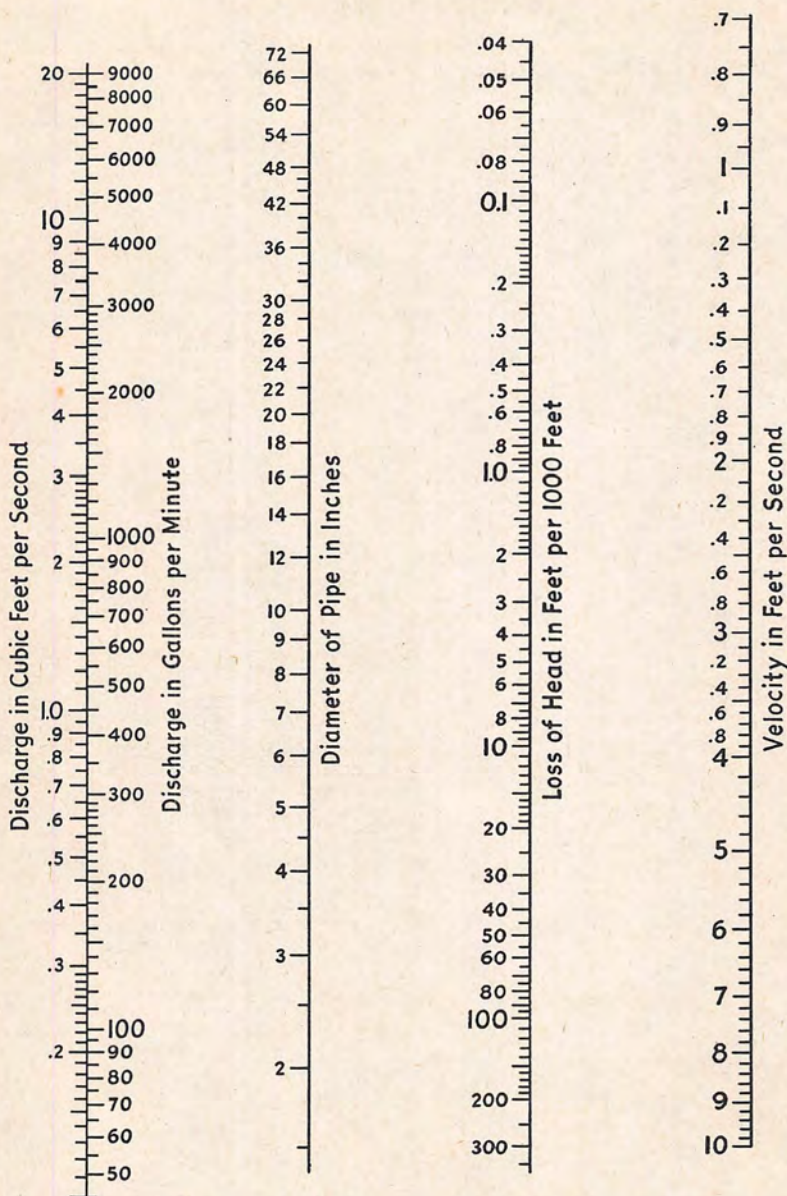


Diagram for Calculating Cast Iron Pipe

The above figure is a diagram of the Williams-Hazen formula for  $C = 130$ .

On the four vertical lines are shown the four quantities, discharge, diameter, loss of head or slope, and velocity. The intersections of any straight line with these four vertical lines indicate corresponding values of these four quantities; so that any two being given, the other two are determined by the application of a straight-edge. For examples, refer to pages 284 and 285.

This diagram is based on pipe diameters being equal to the nominal size, which applies to A. W. W. A. specifications. For centrifugal pipe conforming to Federal Specifications WW-P-421 or WW-P-421a, or to ASA Specifications A21.6, the internal diameters of most sizes are greater than the nominal inside diameters, and the discharge values are as high as 10% greater than those shown in the above diagram.





## LOSS OF HEAD DATA

APPLIES TO ANY FLUID

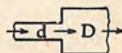
### Entrance Losses for Pipe in Feet of Liquid

Based on formula:  $h = k \frac{v^2}{2g}$  in which  
 $h$  = entrance loss in feet of liquid.  
 $k$  = constant depending on shape of entrance.

$v$  = velocity of flow in feet per second.  
 $g$  = acceleration of gravity: at 45° latitude and sea level,  $g = 32.174$  feet per second

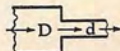
Type of entrance	Value of k	Velocity in Feet Per Second (v)															
		2	3	4	5	6	7	8	9	10	12	15	20	25	30	35	40
Inward projecting pipe.....	.78	.05	.11	.19	.30	.44	.59	.78	.98	1.21	1.75	2.73	4.85	7.58	10.91	14.82	19.41
Sharp cornered.....	.50	.03	.07	.12	.19	.28	.38	.50	.63	.78	1.12	1.75	3.11	4.86	7.00	9.50	12.44
Slightly rounded.....	.23	.01	.03	.06	.09	.13	.18	.23	.29	.36	.51	.81	1.43	2.24	3.22	4.37	5.72
Bell mouthed.....	.04	.00	.01	.01	.02	.02	.03	.04	.05	.06	.09	.14	.25	.39	.56	.76	1.00

### Loss of Head in Feet of Liquid Due to Sudden Enlargements



D/d	Velocity in smaller pipe in Feet Per Second													
	2	3	4	5	6	7	8	10	12	15	20	25	30	40
1.2	.01	.01	.02	.04	.06	.07	.10	.14	.21	.32	.55	.87	1.20	2.08
1.4	.02	.04	.06	.10	.14	.18	.23	.36	.51	.78	1.36	2.09	2.96	5.14
1.6	.02	.05	.09	.14	.20	.28	.36	.55	.78	1.19	2.07	3.16	4.50	7.82
1.8	.03	.07	.12	.18	.26	.35	.45	.70	.99	1.52	2.64	4.03	5.74	9.97
2.0	.04	.08	.14	.22	.31	.41	.53	.81	1.16	1.77	3.08	4.76	6.71	11.65
2.5	.05	.10	.17	.27	.38	.51	.66	1.01	1.44	2.20	3.83	5.93	8.34	14.48
3.0	.05	.11	.19	.30	.42	.57	.74	1.13	1.60	2.46	4.27	6.61	9.29	16.14
4.0	.06	.12	.22	.33	.47	.63	.82	1.25	1.78	2.76	4.73	7.29	10.30	17.90
5.0	.06	.13	.23	.35	.49	.66	.85	1.31	1.86	2.85	4.95	7.63	10.79	18.73
10.0	.06	.14	.24	.37	.52	.70	.91	1.39	1.97	2.96	5.25	8.07	11.44	19.87
∞.	.06	.14	.24	.37	.53	.71	.92	1.42	2.01	3.09	5.36	8.21	11.66	20.26

### Loss of Head in Feet of Liquid Due to Sudden Contractions



D/d	Velocity in Smaller Pipe in Feet Per Second													
	2	3	4	5	6	7	8	10	12	15	20	30	40	
1.1	.00	.00	.01	.01	.02	.03	.04	.06	.09	.15	.29	.75	1.49	
1.2	.00	.01	.02	.03	.04	.06	.07	.12	.18	.28	.54	1.38	2.74	
1.4	.01	.02	.04	.07	.10	.13	.17	.27	.40	.65	1.14	2.68	4.98	
1.6	.02	.04	.06	.10	.14	.20	.26	.40	.67	.89	1.56	3.44	5.97	
1.8	.02	.05	.08	.13	.19	.25	.33	.51	.73	1.12	1.92	4.05	6.72	
2.0	.02	.05	.09	.14	.21	.28	.36	.55	.79	1.19	2.06	4.28	7.09	
2.2	.02	.06	.10	.15	.22	.30	.38	.59	.84	1.28	2.20	4.56	7.41	
2.5	.03	.06	.10	.16	.23	.31	.40	.62	.88	1.34	2.30	4.76	7.71	
3.0	.03	.06	.11	.17	.24	.32	.42	.65	.92	1.40	2.41	4.98	8.11	
4.0	.03	.06	.12	.18	.25	.34	.44	.69	.97	1.48	2.53	5.24	8.48	
5.0	.03	.07	.12	.18	.26	.35	.46	.70	1.00	1.52	2.60	5.36	8.67	
10.0	.03	.07	.12	.19	.27	.36	.47	.72	1.02	1.56	2.68	5.56	9.06	
∞.	.03	.07	.12	.19	.27	.36	.47	.72	1.03	1.58	2.71	5.68	9.36	

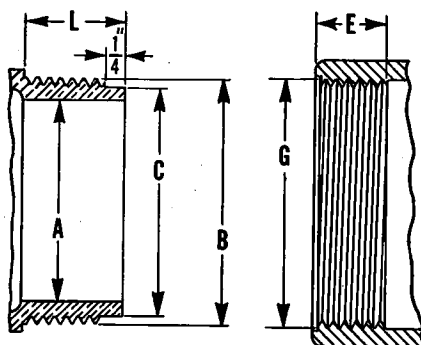
D = Diameter Large Pipe.      d = Diameter Small Pipe.

From Cameron Hydraulic Data—published by Ingersoll-Rand Company.



## NATIONAL STANDARD HOSE THREADS

### FORM 60° V PATTERN



### Dimensions—Inches

Nominal size	A	2½	3	3½	4½
Number of threads	Per inch	7½	6	6	4
Outside diameter of male thread	B	3¼	3½	4¼	5¾
Diameter at root of thread	C	2.8715	3.3763	4.0013	5.3970
Length of female thread	E	7/8	1	1	1¼
Outside diameter of female thread	G	3.0925	3.6650	4.2800	5.8000
Length of male thread	L	1	1¼	1½	1¾

### NOZZLE DISCHARGE FORMULA

The following formulas may be used to determine the volume of discharge, hydrant pressure, or nozzle pressure for nozzles of varying size and with different lengths of 2½ inch cotton rubber-lined hose when one factor is unknown.

The use of these formulas will give the same result as Freeman's Fire Stream Tables, since

the constants indicated have been derived from the tables. The detailed nozzle discharge tables on the following page are limited to the 1¼ and 1½ inch smooth nozzles as these are the most common sizes encountered in private fire protection. The discharge from nozzles of other sizes can be calculated from the following formulas and tables.

$$G = K \sqrt{p}$$

$$P = p(AB + 1)$$

$$p = \frac{P}{AB + 1}$$

G = Discharge, gal. per min.

p = Nozzle (pitot) pressure, lb. per sq. in.

P = Hydrant pressure, lb. per sq. in.

K = Constant for discharge

A = Constant for size of nozzle

B = Constant for length of hose

#### Value of A and K for Various Nozzle Sizes

Nozzle size	In.	1	1¼	1½	1¾	2	2¼	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9	9½	10	
Value of K		29.1	32.8	36.8	41.0	45.4	50.1	54.9	60.0	65.4	70.9	76.8	82.8	89.0	95.5	102.0	109.0	116.0						
Value of A		.024	.031	.039	.048	.059	.072	.087	.104	.123	.145	.170	.197	.228	.262	.300	.343	.389						

#### Value of B for Various Lengths of 2½-inch Cotton Rubber-Lined Hose

Hose length	Ft.	50	100	150	200	250	300	350	400	450	500	550	600	650	700	800	900	1000
Value of B		4.9	8.8	12.8	16.7	20.6	24.5	28.4	32.4	35.3	40.2	44.1	48.1	52.1	55.9	63.8	71.6	79.4

Note: For square root of numbers, see "Properties of Numbers" tables on pages 302 and 303.





## NOZZLE DISCHARGE TABLES

Showing Pressures Required at Hydrant or Fire Department Pumper while Stream is Flowing

To Maintain Nozzle Pressure Indicated in First Column through Various Lengths of Best Quality Cotton Rubber-Lined Hose

Nozzle Pressure Pounds Per Sq. In.	1 1/8-inch Smooth Nozzle					1 3/4-inch Smooth Nozzle				
	Discharge Gallons Per Minute	Hydrant Pressure Pounds per Sq. In.				Discharge Gallons Per Minute	Hydrant Pressure Pounds per Sq. In.			
		Single 2 1/2" Lines (feet)					Single 2 1/2" Lines (feet)			
		50	100	150	200		50	100	150	200
2	52	2	3	3	3	125	4	6	8	9
4	74	5	6	6	7	178	8	12	16	19
6	90	7	8	9	10	217	13	18	23	29
8	104	9	11	12	13	251	17	24	31	39
10	116	12	13	14	16	280	21	30	38	48
12	127	14	16	17	19	307	25	36	46	58
14	137	17	18	20	23	332	29	42	54	68
16	146	19	21	23	26	355	34	48	62	77
18	155	21	24	26	29	376	38	54	69	87
20	164	24	27	29	33	397	42	60	77	96
22	172	26	29	32	36	416	46	66	85	106
24	180	29	32	35	39	435	50	72	93	116
26	187	31	35	38	43	452	54	78	101	126
28	194	33	38	41	46	469	58	84	112	135
30	201	36	40	44	50	486	63	90	120	145
32	208	38	43	47	53	502	67	96	128	155
34	213	40	45	50	56	517	72	102	135	165
36	220	42	48	53	59	532	76	108	143	175
38	226	45	51	56	63	547	80	114	150	...
40	232	47	54	59	66	561	85	120	158	...
42	238	50	56	62	69	574	89	126	165	...
44	243	52	59	65	73	588	93	132	173	...
46	248	54	61	68	76	601	97	138	181	...
48	254	57	64	71	80	614	101	144	...	...
50	259	59	66	74	83	627	106	149	...	...
52	264	62	69	77	86	639	110	154	...	...
54	269	64	72	80	89	651	115	160	...	...
56	274	66	75	83	92	663	119	166	...	...
58	279	68	78	86	95	675	123	172	...	...
60	283	71	80	89	98	687	127	...	...	...
62	288	73	83	92	101	698	131	...	...	...
64	293	76	86	95	104	709	135	...	...	...
66	298	78	89	98	107	720	140	...	...	...
68	302	81	91	101	110	731	145	...	...	...
70	307	83	94	104	113	742	149	...	...	...
72	311	85	97	107	116	753	154	...	...	...
74	315	88	99	110	120	763	158	...	...	...
76	319	90	102	113	123	773	163	...	...	...
78	323	92	105	116	126	783	167	...	...	...
80	328	95	108	119	130	793	172	...	...	...
82	332	97	111	122	133	803	177	...	...	...
84	336	100	113	125	136	813	...	...	...	...
86	340	103	116	128	140	823	...	...	...	...
88	343	105	118	131	143	832	...	...	...	...
90	347	107	121	133	146	841	...	...	...	...
92	351	110	124	136	150	850	...	...	...	...
94	355	113	127	139	153	859	...	...	...	...
96	359	115	129	142	156	868	...	...	...	...
98	363	117	132	145	160	877	...	...	...	...
100	367	119	135	148	164	887	...	...	...	...

Nozzle Pressure = Pitot Tube Pressure, Discharge Coef. = .97

(The nozzle discharge data appearing above and on preceding page from No. 31 booklet "Hydraulic Tables" and are reproduced by permission from Associated Factory Mutual Fire Insurance Cos.)



Inc.

EQUATION OF PIPE

It is frequently desired to know what number of pipe of a given size are equal in carrying capacity to one pipe of a larger size. At the same velocity of flow the volume delivered by two pipe of different sizes is proportional to the squares of their diameters; thus one 4-inch pipe will deliver the same volume as four 2-inch pipe. With the same head however, the velocity is less in the smaller pipe, and the volume delivered varies about as the square root of the fifth power. This table is calculated on this basis. The figures opposite the intersection of any two sizes is the number of the smaller-sized pipe required to equal one of the larger; thus one 4-inch equals 5.7 two-inch.

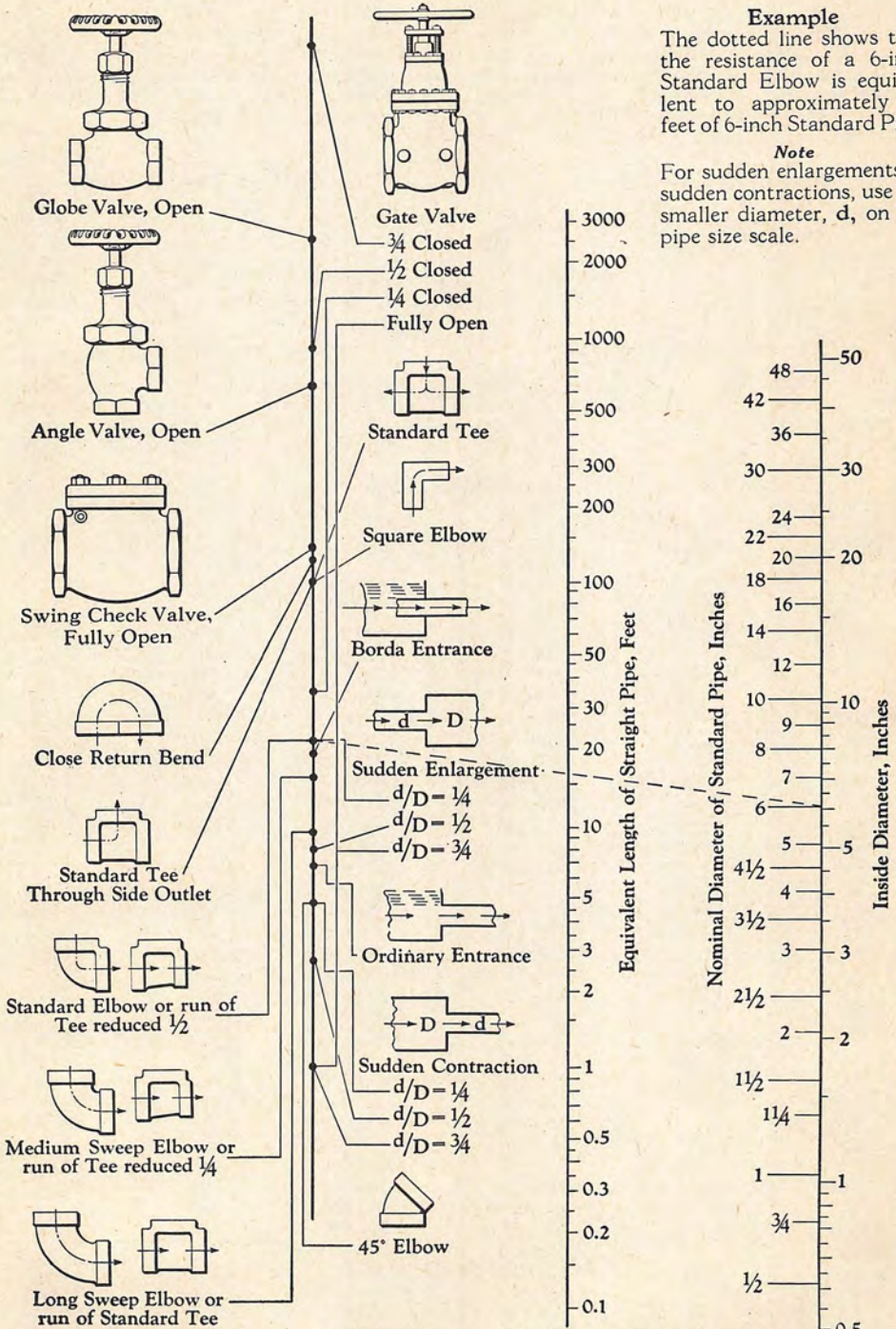
Equation of Pipe

Diam. Inches	1/2	3/4	1	2	3	4	5	6	7	8	10	12	14	16	18	20	24	30	36	42	48
2	32.0	11.7	5.7	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
3	88.2	32.0	15.6	2.8	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
4	181.	65.7	32.0	5.7	2.1	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
5	316.	115.	55.9	9.9	3.6	1.7	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
6	499.	181.	88.2	15.6	5.7	2.8	1.6	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
7	733.	266.	130.	22.9	8.3	4.1	2.3	1.5	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
8	.....	372.	181.	32.0	11.7	5.7	3.2	2.1	1.4	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10	.....	649.	316.	55.9	20.3	9.9	5.7	3.6	2.4	1.7	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
11	.....	.....	401.	70.9	25.7	12.5	7.2	4.6	3.1	2.2	1.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
12	.....	.....	499.	88.2	32.0	15.6	8.9	5.7	3.8	2.8	1.6	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....
13	.....	.....	609.	108.	39.1	19.0	10.9	7.1	4.7	3.4	1.9	1.2	.....	.....	.....	.....	.....	.....	.....	.....	.....
14	.....	.....	733.	130.	47.1	22.9	13.1	8.3	5.7	4.1	2.3	1.5	1.0	.....	.....	.....	.....	.....	.....	.....	.....
15	.....	.....	787.	154.	55.9	27.2	15.6	9.9	6.7	4.8	2.8	1.7	1.2	.....	.....	.....	.....	.....	.....	.....	.....
16	.....	.....	.....	181.	65.7	32.0	18.3	11.7	7.9	5.7	3.2	2.1	1.4	1.0	.....	.....	.....	.....	.....	.....	.....
17	.....	.....	.....	211.	76.4	37.2	21.3	13.5	9.2	6.6	3.8	2.4	1.6	1.2	.....	.....	.....	.....	.....	.....	.....
18	.....	.....	.....	243.	88.2	43.0	24.6	15.6	10.6	7.6	4.3	2.8	1.9	1.3	1.0	.....	.....	.....	.....	.....	.....
19	.....	.....	.....	278.	101.	49.1	28.1	17.8	12.1	8.7	4.8	3.2	2.1	1.5	1.1	.....	.....	.....	.....	.....	.....
20	.....	.....	.....	316.	115.	55.9	32.0	20.3	13.8	9.9	5.7	3.6	2.4	1.7	1.3	1.0	.....	.....	.....	.....	.....
22	.....	.....	.....	401.	146.	70.9	40.6	25.7	17.5	12.5	7.2	4.6	3.1	2.2	1.7	1.3	.....	.....	.....	.....	.....
24	.....	.....	.....	499.	181.	88.2	50.5	32.0	21.8	15.6	8.9	5.7	3.8	2.8	2.1	1.6	1.0	.....	.....	.....	.....
30	.....	.....	.....	.....	.....	.....	.....	.....	.....	27.2	15.6	10.0	6.7	4.8	3.6	2.8	1.7	1.0	.....	.....	.....
36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24.6	15.6	10.6	7.6	5.7	4.3	2.8	1.6	1.0	.....	.....
42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	36.2	22.9	15.6	11.2	8.3	6.4	4.1	2.3	1.5	1.0
48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	50.5	32.0	21.8	15.6	11.7	8.9	5.7	3.2	2.1





**FLOW OF WATER THROUGH VALVES AND FITTINGS**



**Example**  
The dotted line shows that the resistance of a 6-inch Standard Elbow is equivalent to approximately 16 feet of 6-inch Standard Pipe.

**Note**  
For sudden enlargements or sudden contractions, use the smaller diameter, *d*, on the pipe size scale.

From "Flow of Fluids through Valves, Fittings and Pipe." Copyright 1942 by Crane Company.





**APPROXIMATE WATER USE**

The following table of approximate water use per person for various purposes is necessarily general, but may serve as a guide in determining the quantities of water likely to be required for new installations. Water consumption will, of course, vary considerably with climate, season, weather, and other conditions. The

maximum expected demand flow is not the total combined flow of all fixtures, but is proportional to the number of fixtures that may be expected to be in use simultaneously. The average 5-room house should be able to draw water at the rate of 12 to 15 gpm. Quantities shown are in U. S. gallons.

**Domestic Fixtures—Each Use**

Bathtub.....	15-30
Shower bath.....	10-30
Lavatory.....	1-2
Toilet.....	4-7

**Buildings—Each Person Per Day**

Residence.....	40-100
Apartment.....	50-100
Hotel.....	80-120
Office Building.....	25-40
Factory (personal use only).....	20-40

**Lawn and Garden—Per Hour**

$\frac{1}{2}$ " hose with nozzle.....	175-225
$\frac{3}{4}$ " hose with nozzle.....	250-350
Lawn sprinkler.....	100-150

**Farm Animals—Each Per Day**

Horses, cows, and mules.....	8-12
Hogs.....	4-6
Sheep.....	2-4

**Conversion Table**

Cu. Ft. Per Second to Gals. Per 24 Hours			Gals. Per 24 Hours to Cu. Ft. Per Second		
Cubic Feet Per Second	Gallons Per Minute	Gallons Per 24 Hours	Gallons Per 24 Hours	Gallons Per Minute	Cubic Feet Per Second
.02	9	12,925	100,000	69	0.15
.04	18	25,851	200,000	139	0.31
.06	27	38,776	300,000	208	0.46
.08	36	51,702	400,000	278	0.62
.1	45	64,627	500,000	347	0.77
0.2	90	129,254	600,000	417	0.93
0.4	180	258,508	700,000	486	1.08
0.6	269	387,763	800,000	556	1.24
0.8	359	517,017	900,000	625	1.39
1.0	449	646,272	1,000,000	694	1.55
1.2	539	775,526	2,000,000	1,389	3.09
1.4	628	904,780	3,000,000	2,083	4.64
1.6	718	1,034,035	4,000,000	2,778	6.19
1.8	808	1,163,290	5,000,000	3,472	7.74
2.0	898	1,292,544	6,000,000	4,167	9.28
2.2	987	1,421,798	7,000,000	4,861	10.83
2.4	1,077	1,551,053	8,000,000	5,556	12.38
2.6	1,167	1,680,307	9,000,000	6,250	13.92
2.8	1,257	1,809,562	10,000,000	6,944	15.47
3.0	1,346	1,938,816	11,000,000	7,638	17.02
3.2	1,436	2,068,070	12,000,000	8,333	18.56
3.4	1,526	2,197,325	13,000,000	9,028	20.12
3.6	1,616	2,326,579	14,000,000	9,722	21.65
3.8	1,705	2,455,834	15,000,000	10,417	23.20
4.0	1,795	2,585,088	16,000,000	11,111	24.75
4.2	1,885	2,714,342	17,000,000	11,806	26.30
4.4	1,975	2,843,597	18,000,000	12,500	27.85
4.6	2,068	2,972,851	19,000,000	13,194	29.40
4.8	2,154	3,102,106	20,000,000	13,889	30.94
5.0	2,244	3,231,360	40,000,000	27,778	61.88
6.0	2,693	3,877,920	50,000,000	34,722	77.35
7.0	3,142	4,524,480	60,000,000	41,667	92.82
8.0	3,590	5,170,176	80,000,000	55,556	123.76
9.0	4,039	5,816,448	100,000,000	69,444	154.72
10.0	4,488	6,462,720	1,000,000,000	694,440	1,547.20

In the above table, 1 cubic foot equals 7.48 gallons





**SIZING OF WATER SERVICES**

The data below has been compiled by the Water Department of the City of St. Paul, Minnesota, for calculating the size of water services. It is published here with their per-

mission in the belief that others may find it helpful. Given the rate of flow desired, the calculation of the pressure losses through meters and services can be easily determined.\*

**Approximate Pressure Losses Through Meters and Services**

Approximate Loss in Head through Meters psi.						Rate of Flow gpm.	Approximate Pressure Loss in 100 feet of Service Pipe psi.					
5/8"	3/4"	1"	1 1/4"	1 1/2"	2"		5/8"	3/4"	1"	1 1/4"	1 1/2"	2"
6.0	2.0	0.5	0.5	0.2	...	10	30.0	11.0	3.0	0.9	0.3	0.1
7.0	2.5	0.7	0.7	...	...	11	35.5	13.0	3.5	1.0	0.4	...
9.0	3.0	1.0	1.0	...	...	12	41.5	15.0	4.5	1.4	0.5	...
10.0	3.5	1.2	1.2	...	...	13	48.5	17.0	5.5	1.5	0.6	...
11.0	4.0	1.5	1.5	...	...	14	55.5	19.5	6.0	2.0	0.7	...
13.0	4.5	1.7	1.7	0.6	0.2	15	63.0	22.0	7.0	2.1	0.8	0.3
14.0	5.0	2.0	2.0	...	...	16	71.0	24.5	7.5	2.3	0.9	...
17.0	6.5	2.7	2.5	...	...	18	...	31.0	9.5	3.0	1.1	...
22.0	8.0	3.5	3.0	1.0	0.4	20	...	37.5	11.5	3.7	1.4	0.4
...	10.0	4.2	3.5	...	...	22	...	45.0	14.0	4.4	1.8	...
...	11.0	5.0	4.2	...	...	24	...	53.5	16.5	5.0	2.2	...
...	19.5	8.0	7.0	2.0	0.9	30	...	...	25.5	7.5	3.5	0.9
...	...	11.0	9.0	3.0	1.0	35	...	...	37.0	11.5	5.0	1.2
...	...	14.0	12.0	4.0	1.5	40	...	...	48.0	14.8	6.5	1.6
...	...	18.0	15.0	5.0	2.0	45	...	...	...	17.8	8.2	2.0
...	...	22.0	...	6.0	2.5	50	...	...	...	22.0	10.0	2.4
...	...	...	...	14.0	5.5	75	...	...	...	45.6	22.4	5.3
...	...	...	...	25.0	10.0	100	...	...	...	...	39.0	9.5

**\* Procedure**

Read down through any size of meter or service to see how the approximate pressure losses increase as the rate of flow increases. Read across through any rate of flow to see how the approximate pressure losses decrease as the size of meter or service increases.

**Example**

**EXAMPLE:** Determine size of service for a 5-room home with demand of 15 gpm., with distance of 20 ft. from main to property line and 30 ft. from property line to the meter, making a total length of 50 ft., with available pressure at the main of 40 psi.

**Answer:** Assuming a 3/4 in. service to be adequate, it will be found by referring to table that for 100 ft. of 3/4 in. pipe at 15 gpm. there is a frictional loss of 22 psi. As pressure loss is directly proportional to length, there is, then, for 50 ft. a loss of 11 psi. Reference to the table shows a loss of head through meters of 4.5 psi., making a total loss of 15.5 psi. This leaves a residual pressure at the outlet of the meter of 24.5 psi. Assuming that the plumbing fixtures are in accordance with the best plumbing standards, it is known from information on the best practices that 25 psi. at the outlet of meter

is adequate. In this case 24.5 psi may prove sufficient, but for the sake of illustration try a 1" connection. Here the frictional loss for 100 ft. is 7 psi. and for 50 ft. 3.5 psi. As the demand charge for meters is based upon size, the customer, in this case, will be benefited by using the smaller (3/4") meter to give him 32 psi. residual pressure at the meter outlet. Assuming that the extra outlay for a larger connection is not prohibitive, the 1 in. service would be preferable. Although more fixtures are involved in office buildings and industries, the procedure is the same.

**Safe Maximum Delivery in Meters**

Size of meter..... Inches	5/8	3/4	1	1 1/2	2
Flow in gallons..... Per Minute	20	34	53	100	160



## CONTENTS OF PIPE

Capacities in Cubic Feet and in United States Gallons (231 Cubic Inches)

Per Foot Length

Diameter Inches	Diameter Feet	For 1 Foot Length		Diameter Inches	Diameter Feet	For 1 Foot Length	
		Cubic Feet, Also Area in Sq. Feet	U.S. Gals. (231 Cu. In.)			Cubic Feet, Also Area in Sq. Feet	U.S. Gals. (231 Cu. In.)
1/4	.0208	.0003	.0026	11.25	.9375	.6903	5.163
5/16	.0260	.0005	.0040	11.50	.9583	.7213	5.395
3/8	.0313	.0008	.0057	11.75	.9792	.7530	5.633
7/16	.0365	.0010	.0078	12.00	1.000	.7854	5.876
1/2	.0417	.0014	.0102	12.50	1.042	.8523	6.375
9/16	.0469	.0017	.0129	13.00	1.083	.9218	6.895
5/8	.0521	.0021	.0159	13.50	1.125	.9940	7.435
11/16	.0573	.0026	.0193	14.00	1.167	1.069	7.997
3/4	.0625	.0031	.0230	14.50	1.208	1.147	8.578
13/16	.0677	.0036	.0270	15.00	1.250	1.227	9.180
7/8	.0729	.0042	.0312	15.50	1.292	1.310	9.801
15/16	.0781	.0048	.0359	16.00	1.333	1.396	10.44
1.00	.0833	.0055	.0408	16.50	1.375	1.485	11.11
1.25	.1042	.0085	.0638	17.00	1.417	1.576	11.79
1.50	.1250	.0123	.0918	17.50	1.458	1.670	12.50
1.75	.1458	.0168	.1250	18.00	1.500	1.767	13.22
2.00	.1667	.0218	.1632	18.50	1.542	1.867	13.97
2.25	.1875	.0276	.2066	19.00	1.583	1.969	14.73
2.50	.2083	.0341	.2550	19.50	1.625	2.074	15.52
2.75	.2292	.0413	.3085	20.00	1.666	2.182	16.32
3.00	.2500	.0491	.3673	20.50	1.708	2.292	17.15
3.25	.2708	.0576	.4310	21.00	1.750	2.405	17.99
3.50	.2917	.0668	.4998	21.50	1.792	2.521	18.86
3.75	.3125	.0767	.5738	22.00	1.833	2.640	19.75
4.00	.3333	.0873	.6528	22.50	1.875	2.761	20.65
4.25	.3542	.0985	.7370	23.00	1.917	2.885	21.58
4.50	.3750	.1105	.8263	23.50	1.958	3.012	22.53
4.75	.3958	.1231	.9205	24.00	2.000	3.142	23.50
5.00	.4167	.1364	1.020	25.00	2.083	3.409	25.50
5.25	.4375	.1503	1.124	26.00	2.166	3.687	27.58
5.50	.4583	.1650	1.234	27.00	2.250	3.976	29.74
5.75	.4792	.1803	1.349	28.00	2.333	4.276	31.99
6.00	.5000	.1963	1.469	29.00	2.416	4.587	34.31
6.25	.5208	.2130	1.594	30.00	2.500	4.909	36.72
6.50	.5417	.2305	1.724	31.00	2.583	5.241	39.21
6.75	.5625	.2485	1.859	32.00	2.666	5.585	41.78
7.00	.5833	.2673	1.999	33.00	2.750	5.940	44.43
7.25	.6042	.2868	2.144	34.00	2.833	6.305	47.17
7.50	.6250	.3068	2.295	35.00	2.916	6.681	49.98
7.75	.6458	.3275	2.450	36.00	3.000	7.069	52.88
8.00	.6667	.3490	2.611	37.00	3.083	7.468	55.86
8.25	.6875	.3713	2.777	38.00	3.166	7.876	58.92
8.50	.7083	.3940	2.948	39.00	3.250	8.296	62.06
8.75	.7292	.4175	3.125	40.00	3.333	8.728	65.29
9.00	.7500	.4418	3.305	41.00	3.416	9.168	68.58
9.25	.7708	.4668	3.492	42.00	3.500	9.620	71.96
9.50	.7917	.4923	3.682	43.00	3.583	10.084	75.43
9.75	.8125	.5185	3.879	44.00	3.666	10.560	79.00
10.00	.8333	.5455	4.081	45.00	3.750	11.044	82.62
10.25	.8542	.5730	4.286	46.00	3.833	11.540	86.32
10.50	.8750	.6013	4.498	47.00	3.916	12.048	90.12
10.75	.8958	.6303	4.714	48.00	4.000	12.566	94.02
11.00	.9167	.6600	4.937	.....	.....	.....	.....

1 Cubic foot of water weighs 62.35 pounds; 1 gallon (U. S.) weighs 8.335 pounds.





**HORSEPOWER REQUIRED TO RAISE WATER**

(THEORETICAL)

**From 5 to 60 Feet**

Gallons per Minute	To Raise Water to Height of										
	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	60'
	Horse Power Required										
5	.006	.012	.019	.025	.031	.037	.044	.05	.06	.06	.07
10	.012	.015	.037	.050	.062	.075	.087	.10	.11	.12	.15
15	.019	.037	.056	.075	.094	.112	.131	.15	.17	.19	.22
20	.025	.050	.075	.100	.125	.150	.175	.20	.22	.25	.30
25	.031	.062	.093	.125	.156	.187	.219	.25	.28	.31	.37
30	.037	.075	.112	.150	.187	.225	.262	.30	.34	.37	.45
35	.043	.087	.131	.175	.219	.262	.306	.35	.39	.44	.52
40	.050	.100	.150	.200	.250	.300	.350	.40	.45	.50	.60
45	.056	.112	.168	.225	.281	.334	.394	.45	.51	.56	.67
50	.062	.125	.187	.250	.312	.375	.437	.50	.56	.62	.75
60	.075	.150	.225	.300	.375	.450	.525	.60	.67	.75	.90
75	.093	.187	.281	.375	.469	.562	.656	.75	.84	.94	1.12
90	.112	.225	.337	.450	.562	.675	.787	.90	1.01	1.12	1.35
100	.125	.250	.375	.500	.625	.750	.875	1.00	1.12	1.25	1.50
125	.156	.312	.469	.625	.781	.937	1.094	1.25	1.41	1.56	1.87
150	.187	.375	.562	.750	.937	1.125	1.312	1.50	1.69	1.87	2.25
175	.219	.437	.656	.875	1.090	1.312	1.531	1.75	1.97	2.19	2.62
200	.250	.500	.700	1.000	1.250	1.500	1.750	2.00	2.25	2.50	3.00
250	.312	.625	.937	1.250	1.562	1.875	2.187	2.50	2.81	3.12	3.75
300	.375	.750	1.125	1.500	1.875	2.250	2.625	3.00	3.37	3.75	4.50
350	.437	.875	1.312	1.750	2.187	2.625	3.062	3.50	3.94	4.37	5.25
400	.500	1.000	1.500	2.000	2.500	3.000	3.500	4.00	4.50	5.00	6.00
500	.625	1.200	1.875	2.500	3.125	3.760	4.375	5.00	5.62	6.25	7.50

**From 75 to 400 Feet**

Gallons Per Minute	To Raise Water to Height of										
	75'	90'	100'	125'	150'	175'	200'	250'	300'	350'	400'
	Horse Power Required										
5	.09	.11	.12	.16	.19	.22	.25	.31	.37	.44	.50
10	.19	.22	.25	.31	.37	.44	.50	.62	.75	.87	1.00
15	.28	.34	.37	.47	.56	.66	.75	.94	1.12	1.31	1.50
20	.37	.45	.50	.62	.75	.87	1.00	1.25	1.50	1.75	2.00
25	.47	.56	.62	.78	.94	1.09	1.25	1.56	1.87	2.19	2.50
30	.56	.67	.75	.94	1.12	1.31	1.50	1.87	2.25	2.62	3.00
35	.66	.79	.87	1.08	1.30	1.53	1.75	2.19	2.62	3.06	3.50
40	.75	.90	1.00	1.25	1.50	1.75	2.00	2.50	3.00	3.50	4.00
45	.84	1.01	1.12	1.41	1.60	1.97	2.25	2.81	3.37	3.94	4.50
50	.94	1.12	1.25	1.56	1.87	2.19	2.50	3.12	3.75	4.37	5.00
60	1.12	1.35	1.50	1.87	2.25	2.62	3.00	3.75	4.50	5.25	6.00
75	1.40	1.69	1.87	2.34	2.81	3.28	3.75	4.69	5.62	6.56	7.50
90	1.68	2.02	2.25	2.81	3.37	3.94	4.50	5.62	6.75	7.87	9.00
100	1.87	2.25	2.50	3.12	3.75	4.37	5.00	6.25	7.50	8.75	10.00
125	2.34	2.81	3.12	3.91	4.69	5.47	6.25	7.81	9.37	10.94	12.50
150	2.81	3.37	3.75	4.69	5.62	6.56	7.50	9.37	11.25	13.12	15.00
175	3.28	3.94	4.37	5.47	6.56	7.66	8.75	10.94	13.12	15.31	17.50
200	3.75	4.50	5.00	6.25	7.50	8.75	10.00	12.00	15.00	17.50	20.00
250	4.69	5.62	6.25	7.81	9.37	10.94	12.50	15.72	18.75	21.87	25.00
300	5.62	6.75	7.50	9.37	11.25	13.12	15.00	18.75	22.50	26.25	30.00
350	6.56	7.87	8.75	10.94	13.12	15.31	17.50	21.87	26.25	30.62	35.00
400	7.50	9.00	10.00	12.50	15.00	17.50	20.00	25.00	30.00	35.00	40.00
500	9.37	11.25	12.50	15.62	18.75	21.87	25.00	31.25	37.50	43.75	50.00

**Note**

Allowance of approximately 25% should be made for friction.



## LINEAR EXPANSION OF CAST IRON PIPE

The coefficient of linear expansion of cast iron may be taken as 0.0000058 per degree Fahrenheit. The expansion or contraction in *inches* that will take place in a line of given length with various temperature changes is shown in the following table:

Temperature Difference °F	Length of Line in Feet			
	100	500	1000	5280
	Expansion and Contraction in Inches			
5	0.035	0.17	0.35	1.83
10	0.070	0.35	0.70	3.67
20	0.139	0.70	1.39	7.34
30	0.209	1.04	2.09	11.01
40	0.278	1.39	2.78	14.70
50	0.348	1.74	3.48	18.35
60	0.418	2.09	4.18	22.04
70	0.487	2.44	4.87	25.72
80	0.557	2.79	5.57	29.39
90	0.626	3.13	6.26	33.05
100	0.696	3.48	6.96	36.71
120	0.835	4.17	8.35	44.10
150	1.043	5.22	10.43	55.10

### INCHES CONVERTED TO DECIMALS OF A FOOT

Inches		Decimal of a Foot	Inches		Decimal of a Foot
<b>0</b>	1/8	.010416	<b>6</b>	1/8	.510416
	1/4	.020833		1/4	.520833
	3/8	.031250		3/8	.531250
	1/2	.041666		1/2	.541666
	5/8	.052083		5/8	.552083
	3/4	.062500		3/4	.562500
	7/8	.072916	7/8	.572916	
	1/8	.093750	<b>.50</b>	1/8	.593750
	1/4	.104166		1/4	.604166
	3/8	.114583		3/8	.614583
	1/2	.125000		1/2	.625000
	5/8	.135416		5/8	.635416
	3/4	.145833		3/4	.645833
	7/8	.156250	7/8	.656250	
<b>1</b>	1/8	.177083	<b>7</b>	1/8	.677083
	1/4	.187500		1/4	.687500
	3/8	.197916		3/8	.697916
	1/2	.208333		1/2	.708333
	5/8	.218750		5/8	.718750
	3/4	.229166		3/4	.729166
	7/8	.239583	7/8	.739583	
<b>.66666</b>	1/8	.260416	<b>8</b>	1/8	.760416
	1/4	.270833		1/4	.770833
	3/8	.281250		3/8	.781250
	1/2	.291666		1/2	.791666
	5/8	.302083		5/8	.802083
	3/4	.312500		3/4	.812500
	7/8	.322916	7/8	.822916	
<b>2</b>	1/8	.343750	<b>9</b>	1/8	.843750
	1/4	.354166		1/4	.854166
	3/8	.364583		3/8	.864583
	1/2	.375000		1/2	.875000
	5/8	.385416		5/8	.885416
	3/4	.395833		3/4	.895833
	7/8	.406250	7/8	.906250	
<b>.333333</b>	1/8	.427083	<b>10</b>	1/8	.927083
	1/4	.437500		1/4	.937500
	3/8	.447916		3/8	.947916
	1/2	.458333		1/2	.958333
	5/8	.468750		5/8	.968750
	3/4	.479166		3/4	.979166
	7/8	.489583	7/8	.989583	
<b>3</b>	1/8	.427083	<b>11</b>	1/8	.927083
	1/4	.437500		1/4	.937500
	3/8	.447916		3/8	.947916
	1/2	.458333		1/2	.958333
	5/8	.468750		5/8	.968750
	3/4	.479166		3/4	.979166
	7/8	.489583	7/8	.989583	
<b>.416666</b>	1/8	.427083	<b>5</b>	1/8	.927083
	1/4	.437500		1/4	.937500
	3/8	.447916		3/8	.947916
	1/2	.458333		1/2	.958333
	5/8	.468750		5/8	.968750
	3/4	.479166		3/4	.979166
	7/8	.489583	7/8	.989583	





## CONVERSION FACTORS

Unless designated otherwise, the English measures of capacity are those used in the United States, and the units of weight and mass are avoirdupois units.

The word gallon, used in any conversion factor, designates the U.S. gallon. To convert into the Imperial gallon, multiply the U. S. gallon by 0.83267. Likewise, the word ton designates a short ton, 2,000 pounds.

The figures  $10^{-1}$ ,  $10^{-2}$ ,  $10^{-3}$ , etc. denote 0.1, 0.01, 0.001, etc. respectively.

The figures  $10^1$ ,  $10^2$ ,  $10^3$ , etc. denote 10, 100, 1000, etc. respectively.

In the conversion factors given below using the properties of water, calculations are based on water at 39.2° F. in vacuo, weighing 62.427 pounds per cubic foot, or 8.345 pounds per U. S. gallon. Water freezes at 32° F., and is at its maximum density at 39.2° F.

"Parts Per Million," designated as P.P.M., is always by weight. As used in the Sanitary field, P.P.M. represents the number of pounds of dry solids contained in one million pounds of water, including solids. In this field, one part per million may be expressed as 8.345 pounds of dry solids to one million U. S. gallons of water.

MULTIPLY	BY	TO OBTAIN
Acres	43,560	Square feet
"	4047	Square meters
Acre-feet	43,560	Cubic feet
"	325,851	Gallons
"	1233.49	Cubic meters
Atmospheres	76.0	Cms. of mercury
"	29.92	Inches of mercury
"	33.90	Feet of water
"	14.70	Lbs./sq. inch
Barrels-cement	376	Pounds-cement
Bags or sacks-cement	94	Pounds-cement
British thermal units	0.2520	Kilogram-calories
"	777.5	Foot-lbs.
"	$3.927 \times 10^{-4}$	Horse-power-hrs.
"	107.5	Kilogram-meters
"	$2.928 \times 10^{-4}$	Kilowatt-hrs.
B.t.u./min.	12.96	Foot-lbs./sec.
" / "	0.02356	Horse-power
" / "	0.01757	Kilowatts
Centimeters	0.3937	Inches
"	0.01	Meters
"	10	Millimeters
Centimtrs. of mercury	0.01316	Atmospheres
"	0.4461	Feet of water
"	27.85	Lbs./sq. ft.
"	0.1934	Lbs./sq. inch
Centimeters/second	1.969	Feet/min.
" / "	0.03281	Feet/sec.
" / "	0.6	Meters/min.
" / "	0.02237	Miles/hr.
" / "	$3.728 \times 10^{-4}$	Miles/min.
Cubic centimeters	$3.531 \times 10^{-5}$	Cubic feet
"	$6.102 \times 10^{-2}$	Cubic inches
"	$10^{-6}$	Cubic meters
"	$2.642 \times 10^{-4}$	Gallons
"	$10^{-3}$	Liters
"	$2.113 \times 10^{-3}$	Pints (liq.)
"	$1.057 \times 10^{-3}$	Quarts (liq.)

MULTIPLY	BY	TO OBTAIN
Cubic feet	$2.832 \times 10^4$	Cubic cms.
"	1728	Cubic inches
"	0.02832	Cubic meters
"	0.03704	Cubic yards
"	7.48052	Gallons
"	28.32	Liters
"	59.84	Pints (liq.)
"	29.92	Quarts (liq.)
Cubic feet/minute	472.0	Cubic cms./sec.
" / "	0.1247	Gallons/sec.
" / "	0.4720	Liters/sec.
" / "	62.43	Pounds of water/min.
Cubic feet/second	0.646317	Million gals./day
" / "	448.831	Gallons/min.
Cubic inches	16.39	Cubic centimeters
"	$5.787 \times 10^{-4}$	Cubic feet
"	$1.639 \times 10^{-5}$	Cubic meters
"	$2.143 \times 10^{-5}$	Cubic yards
"	$4.329 \times 10^{-3}$	Gallons
"	$1.639 \times 10^{-2}$	Liters
"	0.03463	Pints (liq.)
"	0.01732	Quarts (liq.)
Cubic meters	$10^6$	Cubic centimeters
"	35.31	Cubic feet
"	61.023	Cubic inches
"	1.308	Cubic yards
"	264.2	Gallons
Cubic meters	$10^3$	Liters
"	2113	Pints (liq.)
"	1057	Quarts (liq.)
Cubic yards	$7.646 \times 10^6$	Cubic centimeters
"	27	Cubic feet
"	46,656	Cubic inches
"	0.7646	Cubic meters
"	202.0	Gallons
"	764.6	Liters
"	1616	Pints (liq.)
"	807.9	Quarts (liq.)
Drams	27.34375	Grains
"	0.0625	Ounces
"	1.771845	Grams



## CONVERSION FACTORS

Continued from preceding page

MULTIPLY	BY	TO OBTAIN
Fathoms	6	Feet
Feet	30.48	Centimeters
"	0.3048	Meters
Feet of water	0.02950	Atmospherès
" " "	0.8826	Inches of mercury
" " "	304.8	Kgs./sq. meter
" " "	62.43	Lbs./sq. ft.
" " "	0.4335	Lbs./sq. inch
Feet/min	0.1667	Feet/sec.
" / "	0.01829	Kilometers/hr.
" / "	0.3048	Meters/min.
" / "	0.01136	Miles/hr.
Feet/sec	30.48	Centimeters/sec.
" / "	18.29	Meters/min.
" / "	0.6818	Miles/hr.
Foot-pounds	1.286x10 <sup>-3</sup>	British thermal units
" "	5.050x10 <sup>-7</sup>	Horse-power-hrs.
" "	3.241x10 <sup>-4</sup>	Kilogram-calories
" "	0.1383	Kilogram-meters
" "	3.766x10 <sup>-7</sup>	Kilowatt-hrs.
Foot-pounds/min	1.286x10 <sup>-3</sup>	B.t. units/min.
" " / "	0.01667	Foot-pounds/sec.
" " / "	3.030x10 <sup>-5</sup>	Horse-power
" " / "	3.241x10 <sup>-4</sup>	Kg.-calories/min.
" " / "	2.260x10 <sup>-5</sup>	Kilowatts
Foot-pounds/sec.	7.717x10 <sup>-2</sup>	B.t. units/min.
" " / "	1.818x10 <sup>-3</sup>	Horse-power
" " / "	1.945x10 <sup>-2</sup>	Kg.-calories/min.
" " / "	1.356x10 <sup>-3</sup>	Kilowatts
Gallons	3785	Cubic centimeters
"	0.1337	Cubic feet
"	231	Cubic inches
"	3.785x10 <sup>-3</sup>	Cubic meters
"	3.785	Liters
"	8	Pints (liq.)
"	4	Quarts (liq.)
Gallons, Imperial	1.20095	U. S. gallons
" U. S.	0.83267	Imperial gallons
Gallons water	8.3453	Pounds of water
Gallons/min	2.228x10 <sup>-3</sup>	Cubic feet/sec.
" / "	0.06308	Liters/sec.
" / "	8.0208	Cu. ft./hr.
Gallons water/min	6.0086	Tons-water/24 hrs.
Grains (troy)	1	Grains (avoir)
" "	0.06480	Grams
Grains/U. S. gal	17.118	Parts/million
" /U. S. gal	142.86	Lbs./million gal.
" /Imp. gal	14.254	Parts/million

MULTIPLY	BY	TO OBTAIN
Grams	980.7	Dynes
"	15.43	Grains
"	0.03527	Ounces
Grams/liter	58.417	Grains/ga
" / "	8.345	Pounds/1000 gals.
" / "	1000	Parts/million
Hectares	2.471	Acres
Horse-power	42.44	B.t. units/min.
" "	33,000	Foot-lbs./min.
" "	550	Foot-lbs./sec.
" "	0.7457	Kilowatts
" "	745.7	Watts
Horse-power (boiler)	33,479	B.t.u./hr.
Inches	2.540	Centimeters
Inches of mercury	0.03342	Atmospheres
" " "	1.133	Feet of water
" " "	70.73	Lbs./sq. ft.
" " "	0.4912	Lbs./sq. inch
Inches of water	0.002458	Atmospheres
" " "	0.07355	Inches of mercury
" " "	0.5781	Ounces./sq. inch
" " "	5.202	Lbs./sq. foot
" " "	0.03613	Lbs./sq. inch
Kilograms	2.205	Lbs.
Kilogram-calories/min	51.43	Foot-pounds/sec.
" " / "	0.09351	Horse-power
" " / "	0.06972	Kilowatts
Kgs./sq. meter	3.281x10 <sup>-3</sup>	Feet of water
" / " "	1.422x10 <sup>-3</sup>	Lbs./sq. inch
Kilometers	3281	Feet
"	0.6214	Miles
"	1094	Yards
Kilometers/hr	27.78	Centimeters/sec.
" / "	54.68	Feet/min.
" / "	0.9113	Feet/sec.
" / "	0.6214	Miles/hr.
Kilowatts	56.92	B.t. units/min.
"	4.425x10 <sup>4</sup>	Foot-lbs./min.
"	737.6	Foot-lbs./sec.
"	1.341	Horse-power
"	14.34	Kg.-calories/min.
Liters	0.03531	Cubic feet
"	61.02	Cubic inches
"	0.2642	Gallons
Liters/min	5.886x10 <sup>-4</sup>	Cubic ft.-sec.
" / "	4.403x10 <sup>-3</sup>	Gals./sec.

Continued on the next page









# JAMES B. CLOW & SONS

Inc.



## PROPERTIES OF NUMBERS

DECIMAL EQUIVALENTS

SQUARES

SQUARE ROOTS

CIRCUMFERENCES AND AREAS OF CIRCLES

Number, $N$		$N^2$	$\sqrt{N}$	Circle ( $N = \text{Dia.}$ )		$N$	$N^2$	$\sqrt{N}$	Circle ( $N = \text{Dia.}$ )	
Fraction	Decimal			Circum.	Area				Circum.	Area
1/64	.015625	0.000244	.1250	0.04909	.00019	1.	1.0000	1.0000	3.1416	0.7854
1/32	.03125	.000977	.1768	.09818	.00077	1.125	1.2656	1.0606	3.5343	.9940
3/64	.046875	.002197	.2165	.14726	.00173	1.25	1.5625	1.1180	3.9270	1.2272
1/16	.0625	.003906	.2500	.19635	.00307	1.375	1.8906	1.1726	4.3197	1.4849
5/64	.078125	.006104	.2795	.24544	.00479	1.5	2.25	1.2247	4.7124	1.7671
3/32	.09375	.008789	.3062	.29452	.00690	1.625	2.6406	1.2748	5.1051	2.0739
7/64	.109375	.011196	.3307	.34361	.00939	1.75	3.0625	1.3229	5.4978	2.4053
1/8	.125	.01563	.3536	.39270	.01227	1.875	3.5156	1.3693	5.8905	2.7612
9/64	.140625	.01978	.3750	.44179	.01554	2.	4.0000	1.4142	6.2832	3.1416
5/32	.15625	.02441	.3953	.49087	.01917	2.125	4.5156	1.4577	6.6759	3.5466
11/64	.171875	.02954	.4146	.53996	.02320	2.25	5.0625	1.5000	7.0686	3.9761
3/16	.1875	.03516	.4330	.58905	.02761	2.375	5.6406	1.5411	7.4613	4.4301
13/64	.203125	.04126	.4507	.63814	.03241	2.5	6.2500	1.5811	7.8540	4.9087
7/32	.21875	.04785	.4677	.68722	.03758	2.625	6.8906	1.6202	8.2467	5.4119
15/64	.234375	.05493	.4841	.73631	.04314	2.75	7.5625	1.6583	8.6394	5.9396
1/4	.250	.0625	.5000	.78540	.04909	2.875	8.2656	1.6956	9.0321	6.4918
17/64	.265625	.07056	.5154	.83448	.05542	3.	9.0000	1.7321	9.4248	7.0686
9/32	.28125	.07910	.5303	.88357	.06213	3.125	9.7656	1.7678	9.8175	7.6699
19/64	.296875	.08813	.5449	.93266	.06922	3.25	10.5625	1.8028	10.2102	8.2958
5/16	.3125	.09766	.5590	.98175	.07670	3.375	11.3906	1.8371	10.6029	8.9462
21/64	.328125	.10767	.5728	1.0308	.08456	3.5	12.2500	1.8708	10.9956	9.6211
11/32	.34375	.11816	.5863	1.0799	.09281	3.625	13.1406	1.9039	11.3883	10.3206
23/64	.359375	.12915	.5995	1.1290	.10143	3.75	14.0625	1.9365	11.7810	11.0447
3/8	.375	.14063	.6124	1.1781	.11045	3.875	15.0156	1.9685	12.1737	11.7932
25/64	.390625	.15259	.6250	1.2272	.11984	4.	16.0000	2.0000	12.5664	12.5664
13/32	.40625	.16504	.6374	1.2763	.12962	4.125	17.0156	2.0310	12.9591	13.3640
27/64	.421875	.17798	.6495	1.3254	.13979	4.25	18.0625	2.0616	13.3518	14.1863
7/16	.4375	.19141	.6614	1.3744	.15033	4.375	19.1406	2.0916	13.7445	15.0330
29/64	.453125	.20532	.6732	1.4235	.16126	4.5	20.2500	2.1213	14.1372	15.9043
15/32	.46875	.21973	.6847	1.4726	.17257	4.625	21.3906	2.1506	14.5299	16.8001
31/64	.484375	.23462	.6960	1.5217	.18427	4.75	22.5625	2.1795	14.9226	17.7205
1/2	.500	.2500	.7071	1.5708	.19635	4.875	23.7656	2.2079	15.3153	18.6655
33/64	.515625	.26587	.7181	1.6199	.20881	5.	25.0000	2.2361	15.7080	19.6350
17/32	.53125	.28223	.7289	1.6690	.22166	5.125	26.2656	2.2638	16.1006	20.6289
35/64	.546875	.29907	.7395	1.7181	.23489	5.25	27.5625	2.2913	16.4933	21.6475
9/16	.5625	.31641	.7500	1.7671	.24850	5.375	28.8906	2.3184	16.8860	22.6906
37/64	.578125	.33423	.7604	1.8162	.26250	5.5	30.2500	2.3452	17.2787	23.7583
19/32	.59375	.35254	.7706	1.8653	.27688	5.625	31.6406	2.3727	17.6714	24.8505
39/64	.609375	.37134	.7806	1.9144	.29165	5.75	33.0625	2.3979	18.0641	25.9672
5/8	.625	.39063	.7906	1.9635	.30680	5.875	34.5156	2.4238	18.4568	27.1085
41/64	.640625	.41040	.8004	2.0126	.32233	6.	36.0000	2.4495	18.8495	28.2743
21/32	.65625	.43066	.8101	2.0617	.33824	6.125	37.5156	2.4749	19.2422	29.4647
43/64	.671875	.45142	.8197	2.1108	.35454	6.25	39.0625	2.5000	19.6349	30.6796
11/16	.6875	.47266	.8297	2.1598	.37122	6.375	40.6406	2.5249	20.0276	31.9190
45/64	.703125	.49438	.8385	2.2089	.38829	6.5	42.2500	2.5495	20.4203	33.1831
23/32	.71875	.51660	.8478	2.2580	.40574	6.625	43.8906	2.5739	20.8130	34.4716
47/64	.734375	.53931	.8570	2.3071	.42357	6.75	45.5625	2.5981	21.2057	35.7847
3/4	.750	.56250	.8660	2.3562	.44179	6.875	47.2656	2.6220	21.5984	37.1223
49/64	.765625	.58618	.8750	2.4053	.46038	7.	49.0000	2.6458	21.9911	38.4845
25/32	.78125	.61035	.8839	2.4544	.47937	7.125	50.7656	2.6693	22.3838	39.8712
51/64	.796875	.63501	.8927	2.5035	.49874	7.25	52.5625	2.6926	22.7765	41.2825
13/16	.8125	.66016	.9014	2.5525	.51849	7.375	54.3906	2.7157	23.1692	42.7183
53/64	.828125	.68579	.9100	2.6016	.53862	7.5	56.2500	2.7386	23.5619	44.1786
27/32	.84375	.71191	.9186	2.6507	.55914	7.625	58.1406	2.7613	23.9546	45.6635
55/64	.859375	.73853	.9270	2.6998	.58004	7.75	60.0625	2.7839	24.3473	47.1730
7/8	.875	.76563	.9354	2.7489	.60132	7.875	62.0156	2.8063	24.7400	48.7069
57/64	.890625	.79321	.9437	2.7980	.62299	8.	64.0000	2.8284	25.1327	50.2655
29/32	.90625	.82129	.9520	2.8471	.64504	8.125	66.0156	2.8504	25.5254	51.8485
59/64	.921875	.84985	.9601	2.8962	.66747	8.25	68.0625	2.8723	25.9181	53.4562
15/16	.9375	.87891	.9683	2.9452	.69029	8.375	70.1406	2.8940	26.3108	55.0883
61/64	.953125	.90845	.9763	2.9943	.71349	8.5	72.2500	2.9155	26.7035	56.7450
31/32	.96875	.93848	.9843	3.0434	.73708	8.625	74.3906	2.9368	27.0962	58.4262
63/64	.984375	.96899	.9922	3.0925	.76104	8.75	76.5625	2.9580	27.4889	60.1320
						8.875	78.7656	2.9791	27.8816	61.8623



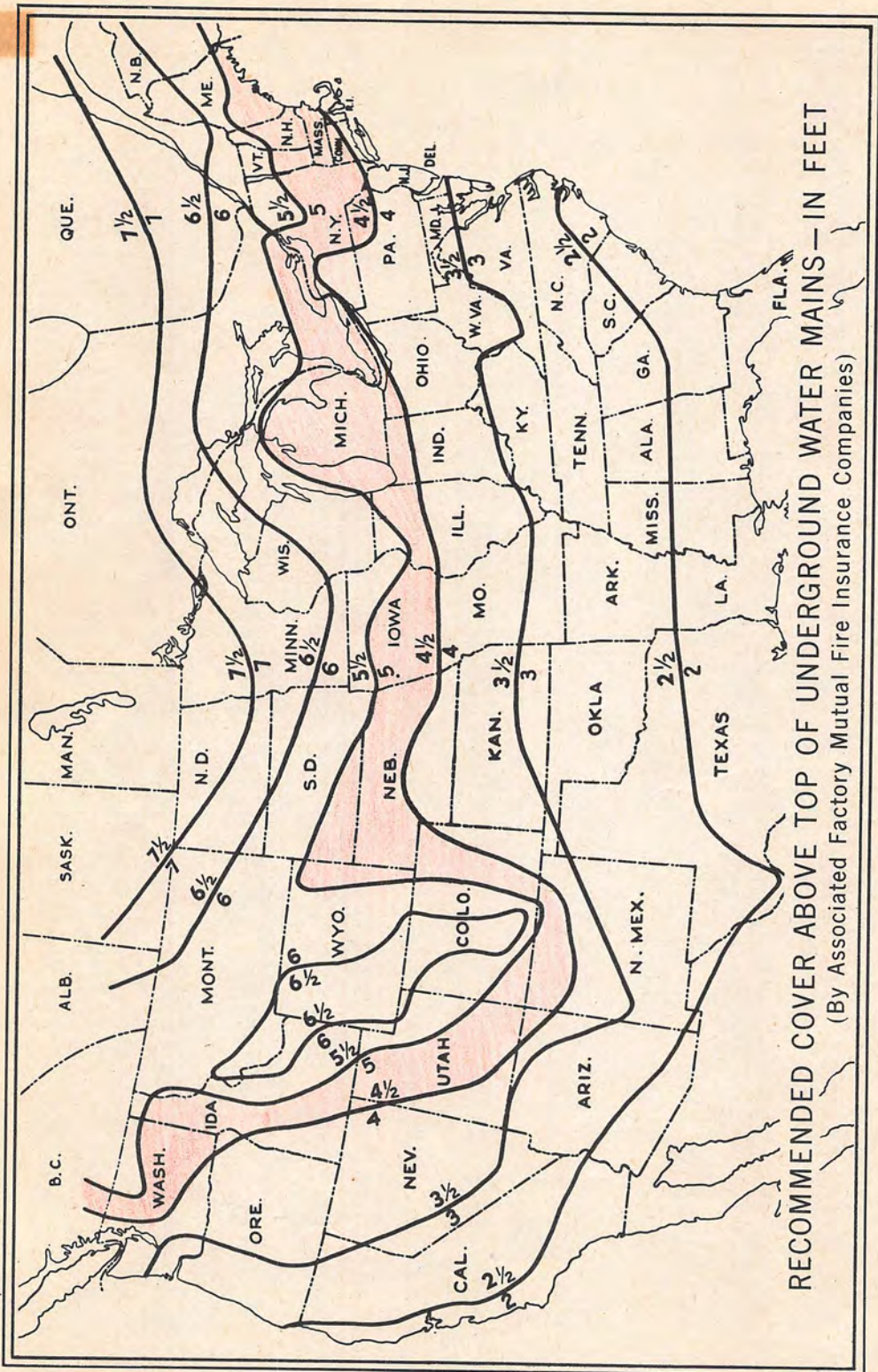


Inc.

## PROPERTIES OF NUMBERS

(Continued from preceding page)

N	N <sup>2</sup>	√N	Circle (N = Dia.)		N	N <sup>2</sup>	√N	Circle (N = Dia.)	
			Circum.	Area				Circum.	Area
9.	81.0000	3.0000	28.2743	63.6172	66	4356	8.1240	207.3449	3421.194
9.125	83.2656	3.0207	28.6670	65.3966	67	4489	8.1854	210.4865	3625.652
9.25	85.5625	3.0414	29.0597	67.2006	68	4624	8.2462	213.6281	3631.680
9.375	87.8906	3.0619	29.4524	69.0291	69	4761	8.3066	216.7697	3739.280
9.5	90.2500	3.0822	29.8451	70.8822	70	4900	8.3666	219.9113	3848.450
9.625	92.6406	3.1024	30.2378	72.7597	71	5041	8.4261	223.0529	3959.191
9.75	95.0625	3.1225	30.6305	74.6619	72	5184	8.4853	226.1945	4071.503
9.875	97.5156	3.1425	31.0232	76.5886	73	5329	8.5440	229.3361	4185.386
10	100	3.1623	31.4159	78.5398	74	5476	8.6023	232.4777	4300.839
11	121	3.3166	34.5575	95.0332	75	5625	8.6603	235.6193	4417.864
12	144	3.4641	37.6991	113.0973	76	5776	8.7178	238.7608	4536.459
13	169	3.6056	40.8407	132.7323	77	5929	8.7750	241.9024	4656.625
14	196	3.7417	43.9823	153.9380	78	6084	8.8318	245.0440	4778.361
15	225	3.8730	47.1239	176.7146	79	6241	8.8882	248.1856	4901.669
16	256	4.0000	50.2654	201.0619	80	6400	8.9443	251.327	5026.547
17	289	4.1231	53.4070	226.9801	81	6561	9.0000	254.469	5152.998
18	324	4.2426	56.5486	254.4690	82	6724	9.0554	257.610	5281.016
19	361	4.3589	59.6902	283.5287	83	6889	9.1104	260.742	5410.607
20	400	4.4721	62.8318	314.1593	84	7056	9.1652	263.894	5541.770
21	441	4.5826	65.9734	346.3606	85	7225	9.2195	267.035	5674.501
22	484	4.6904	69.1150	380.1327	86	7396	9.2736	270.177	5808.805
23	529	4.7958	72.2566	415.4756	87	7569	9.3274	273.318	5944.679
24	576	4.8990	75.3982	452.3893	88	7744	9.3808	276.460	6082.124
25	625	5.0000	78.5398	490.8739	89	7921	9.4340	279.602	6221.138
26	676	5.0990	81.6813	530.9292	90	8100	9.4868	282.743	6361.725
27	729	5.1962	84.8229	572.5553	91	8281	9.5394	285.885	6503.882
28	784	5.2915	87.9645	615.7522	92	8464	9.5917	289.026	6647.610
29	841	5.3852	91.1061	660.5198	93	8649	9.6437	292.168	6792.909
30	900	5.4772	94.2477	706.8583	94	8836	9.6954	295.309	6939.778
31	961	5.5678	97.3893	754.7676	95	9025	9.7468	298.451	7088.219
32	1024	5.6569	100.5309	804.2477	96	9216	9.7980	301.593	7238.230
33	1089	5.7446	103.6725	855.2986	97	9409	9.8489	304.734	7389.812
34	1156	5.8310	106.8141	907.9203	98	9604	9.8995	307.876	7542.962
35	1225	5.9161	109.9557	962.1127	99	9801	9.9499	311.017	7697.688
36	1296	6.0000	113.0972	1017.8760	100	10000	10.0000	314.159	7853.982
37	1369	6.0828	116.2388	1075.2101	101	10201	10.0499	317.301	8011.85
38	1444	6.1644	119.3804	1134.1149	102	10404	10.0995	320.442	8171.28
39	1521	6.2450	122.5220	1194.5906	103	10609	10.1489	323.584	8332.29
40	1600	6.3246	125.6636	1256.6371	104	10816	10.1980	326.725	8494.87
41	1681	6.4031	128.8052	1320.2543	105	11025	10.2470	329.867	8659.01
42	1764	6.4807	131.9468	1385.4424	106	11236	10.2956	333.009	8824.73
43	1849	6.5574	135.0884	1452.2012	107	11449	10.3441	336.150	8992.02
44	1936	6.6332	138.2300	1520.5308	108	11664	10.3923	339.292	9160.88
45	2025	6.7082	141.3716	1590.4313	109	11881	10.4403	342.433	9331.32
46	2116	6.7823	144.5131	1661.9025	110	12100	10.4881	345.575	9503.32
47	2209	6.8557	147.6547	1734.9445	111	12321	10.5357	348.716	9676.89
48	2304	6.9282	150.7963	1809.5574	112	12544	10.5830	351.858	9852.03
49	2401	7.0000	153.9379	1885.7410	113	12769	10.6301	355.000	10028.75
50	2500	7.0711	157.0795	1963.500	114	12996	10.6771	358.141	10207.03
51	2601	7.1414	160.2211	2042.820	115	13225	10.7238	361.283	10386.89
52	2704	7.2111	163.3627	2123.716	116	13456	10.7703	364.424	10568.32
53	2809	7.2801	166.5043	2206.183	117	13689	10.8167	367.566	10751.31
54	2916	7.3485	169.6459	2290.221	118	13924	10.8628	370.708	10935.88
55	3025	7.4162	172.7875	2375.829	119	14161	10.9087	373.849	11122.02
56	3136	7.4833	175.9290	2463.008	120	14400	10.9545	376.991	11309.73
57	3249	7.5498	179.0706	2551.758	121	14641	11.0000	380.132	11499.01
58	3364	7.6158	182.2122	2642.079	122	14884	11.0454	383.274	11689.86
59	3481	7.6811	185.3538	2733.970	123	15129	11.0905	386.416	11882.29
60	3600	7.7460	188.4954	2827.433	124	15376	11.1355	389.557	12076.28
61	3721	7.8102	191.6370	2922.466	125	15625	11.1803	392.699	12271.84
62	3844	7.8740	194.7786	3019.070	126	15876	11.2250	395.840	12468.98
63	3969	7.9373	197.9202	3117.245	127	16129	11.2694	398.982	12667.68
64	4096	8.0000	201.0618	3216.990	128	16384	11.3137	402.124	12867.96
65	4225	8.0623	204.2034	3318.307	129	16641	11.3578	405.265	13069.81



RECOMMENDED COVER ABOVE TOP OF UNDERGROUND WATER MAINS — IN FEET  
 (By Associated Factory Mutual Fire Insurance Companies)





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