U.S. PIPE

METROSEAL® 250 Resilient Seated Gate Valve

3"-16"

For Water and Wastewater

Fire Protection and Industrial Applications

1995 Edition

FOREWORD

We appreciate your interest in our growing line of METROSEAL® 250 Resilient Seated Gate Valves. And we're sure you'll appreciate everything we've put into making them the best R/S valves on the market.

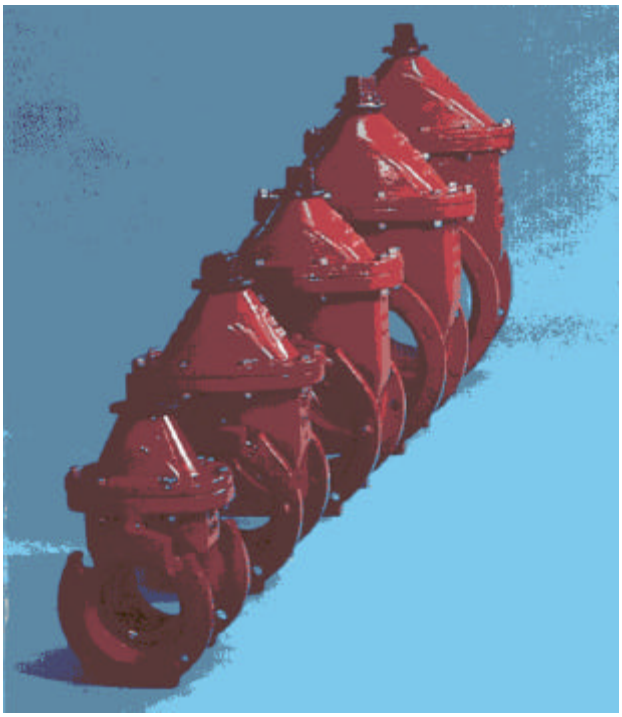
Resilient Seated Gate Valves are gaining rapid acceptance throughout the water and sewer industry. This remarkable growth is due to:

- The ability to seal tightly with no leakage.
- Assurance that the valve will operate reliably after long periods of inactivity

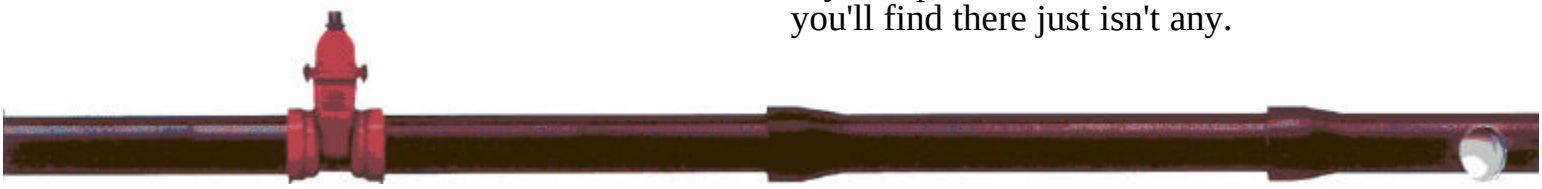
The standards of design and construction for R/S valves, as outlined in AWWA C509, are identical to the C500 standards for double disc gate valves in all common areas, such as body, bonnet, stem, seals, and number of turns to operate. The only differences between the standards occur in the way the valve seals between the gate and the body.

METROSEAL® 250 Valves from U.S. Pipe exceed the requirements of the AWWA standard in a number of significant areas:

- All METROSEAL® 250 Valves are rated for 250 psi operating pressure and tested at 500 psi.
- The body, bonnet and gate are Ductile iron, instead of gray iron. (3 " gates are bronze.)
- METROSEAL® 250 Valves have been tested in excess of 1000 cycles of operation at 250 psi differential pressure at closing, without damage to any components, including the epoxy coating.
- METROSEAL® 250 Valves are coated with PERMAFUSE® Epoxy coating on all internal and external surfaces.
- METROSEAL® 250 Valves 4"-16" can be ordered meeting the special requirements of Underwriters Laboratories, Inc. or Factory Mutual Research Corporation.



The METROSEAL® 250 R/S Valves represent the state-of-the-art from the leaders in piping technology. We invite you to read on and size them up. All the way up to 16 ". Then by a comparison to any competitive R/S valve. We think you'll find there just isn't any.



New ideas are flowing at U. S. Pipe.

CONTENTS

3 " through 16 "
METROSEAL® 250 R/S
Valves

At the time this catalog was printed we were not able to include information and data covering 20" and larger METROSEAL® Valves. This will be provided in a separate supplement. Please contact the nearest sales office listed on the back cover for current information. METROSEAL® Resilient Seated Valves, sizes 4 " through 16 " are NSF Certified and "Listed." 3 " valves will be tested by NSF in 1994.

Note: This catalog contains information that is current at the time of printing. U.S. Pipe reserves the right to make changes in the product which do not affect its serviceability, usefulness, or conformance wrath current standards.

INTRODUCTION

Rated for 250 psi Operating Pressures

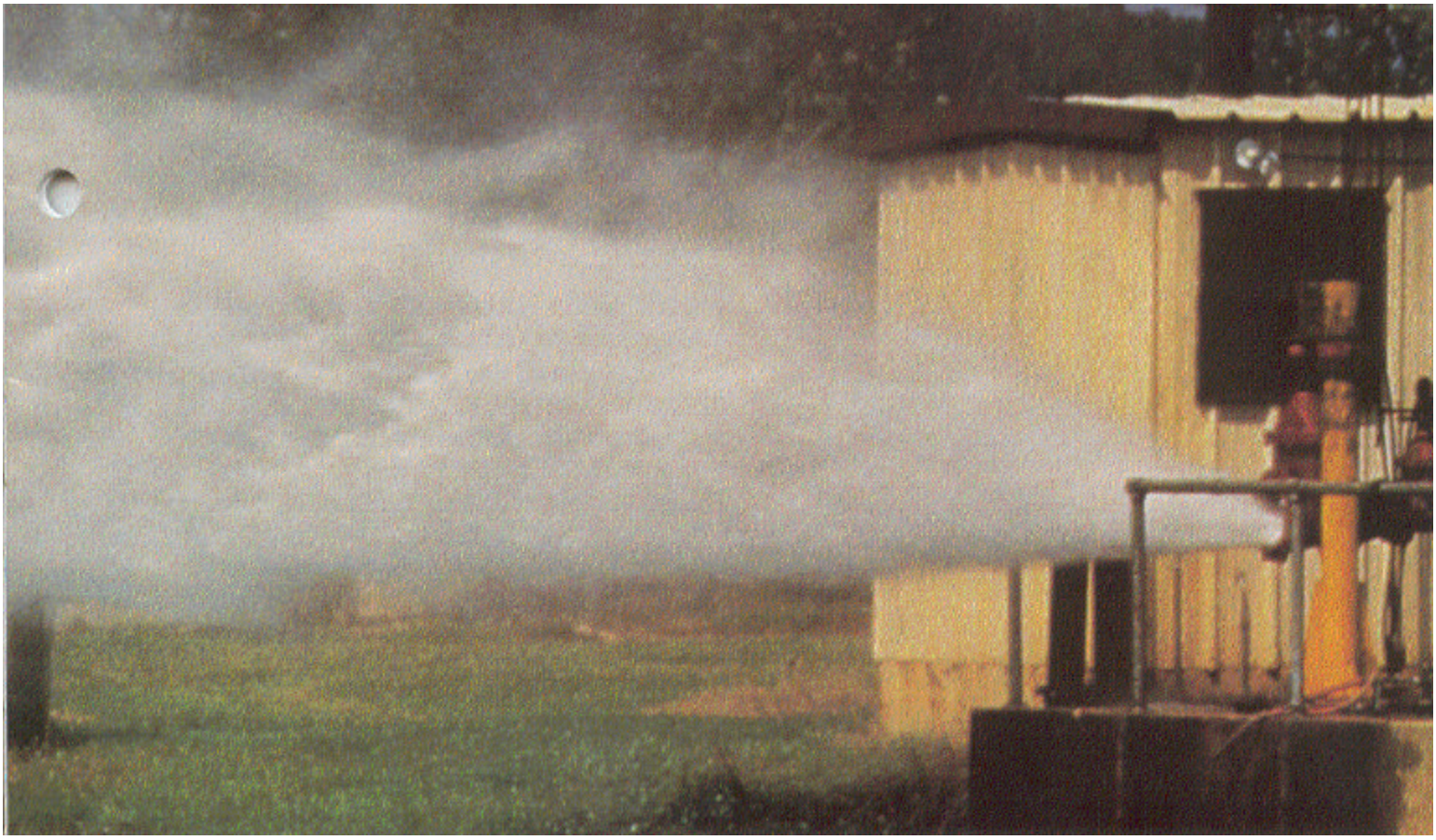
The ductile iron METROSEAL® 250 Resilient Seated Gate valve represents a combination of state of the art design and manufacturing methods plus exclusive U.S. Pipe patented features. Extensive tests, *made under high pressure and velocity conditions,* demonstrate that METROSEAL® 250 valves will operate through thousands of cycles at 250 psi pressure with no damage and virtually no wear to any part of the valve-including the PERMAFUSE® Epoxy coating in the body and rubber coating on the gate. Inside and out, METROSEAL® 250 valves are engineered for ease of operation and trouble-free service.

Size Range: 3-inch through 16-inch

METROSEAL® 250 valves are made in sizes 3-inch through 16-inch. They are designed, manufactured and tested to meet or exceed all the applicable requirements of AWWA C509 (AWWA Standard for Resilient Seated Gate Valves for Water and Sewerage Systems); and AWWA C500 (AWWA Standard for Gate Valves).

CAD/CAM Technology

The METROSEAL® 250 valve was developed with the use of CAD/CAM technology (Computer Aided Design-Computer Aided Manufacture). The complex curved sealing surfaces of the valve body and rubber coated gate were designed on a computer. These simulated



model parts were mated on the computer to assure uniform compression for the bulb shaped sealing surfaces of the gate The three dimensional coordinates of these computer generated parts were programmed into an NC (Numerically Controlled) machining center to accurately machine the production equipment for the valve bodies and gates.

Individually Tested

All METROSEAL® 250 valves undergo two hydrostatic proof tests before shipment from the factory. The first is a 500 psi test with the gate open and with both end joints sealed (bulkheaded). This test proves the body/ bonnet seal and stem O-ring seals, in addition to proving the strength of the ductile iron body and bonnet. In the second test, 250 psi pressure is imposed on each side of the closed gate with no pressure on the opposite side. No leakage is allowed. This test proves the sealing qualities of the gate for 250 psi service. During course of these tests, the valve is cycled from fully open to fully closed to assure that it operates properly.

More information about the materials and testing associated with resilient seated gate valves may be found in the AWWA C509 standard.

FEATURES AND BENEFITS

Ductile iron body and bonnet

Ductile Iron

The METROSEAL® 250 Valve body, bonnet and gate castings are all ductile iron (3" gates are bronze). In all sizes through 16 ", thicknesses conform to those listed for gray iron in the applicable AW WA gate valve standards, and are not reduced.

A ductile iron valve is a much stronger valve, more resistant to damage from abuse and improper installation. The use of ductile iron allows for a higher pressure rating which gives a greater safety factor over normal operating pressures.

Patented Guides and Stem Seal

The thermoplastic guides and cartridge stem seals are both U.S. Pipe patented features of all METROSEAL® 250 Valves.

Gate Guide Inserts
(U.S. Patent 4,532,957)
Thermoplastic gate guide inserts are locked into the guide slots of the gate They engage the PERMAFUSE® Epoxy coated guide rails inside the valve body This exclusive guide system accomplishes two important things:

First, the gate is kept in proper alignment with the body so that the rubber sealing surfaces are evenly compressed when the gate is closed. The valve can be operated using considerably less torque than with conventional gate valves.

Second, the METROSEAL® 250 valve is able to seal repeatedly at full flow and 250 psi-at low torque and zero leakage-over a thousand cycles with no damaging wear to *either the guide inserts, the* valve *body* epoxy coating, or the gate *rubber encapsulation*. And with no wear there's no chance for corrosion.

Cartridge Stem Seal
(U.S. Patent 3,912,221)
The seal between the stem and the bonnet is composed of a thermoplastic cartridge incorporating O-rings. The seal conforms to the requirements of Section 4.8 Stem Sealing of AWWA C509-87. The O-rings in the cartridge seal can be replaced while the valve is under pressure and while in either the fully open or fully closed position.

And the low friction on the O-rings makes the valve easy to operate through thousands of cycles without damage or leakage

PERMAFUSE® Epoxy Coating:

Both the inside and outside surfaces of the body and bonnet are protected with fusion bonded PERMAFUSE® Epoxy having exceptional abrasion and corrosion resistant properties. Examination of METROSEAL® 250 Valves cycled over 1000 times, under full flow with 250 psi at closing shows no damage to the PERMAFUSE® Epoxy coating.

Meets or Exceeds Standard Test Requirements

The PERMAFUSE® Epoxy coating has been tested in accordance with AWWA Standard 0550 (Protective Epoxy Coatings for Valves and Hydrants) and meets or exceeds all test requirements, including the following:

FDA Test Requirement

PERMAFUSE® Epoxy coating is formulated from materials deemed acceptable in the Food and Drug Administration document Title 21 of the Federal Regulations on Food Additives, Section 175.000 entitled *Resinous anti Polymeric Coating.*

Impact Test Requirement

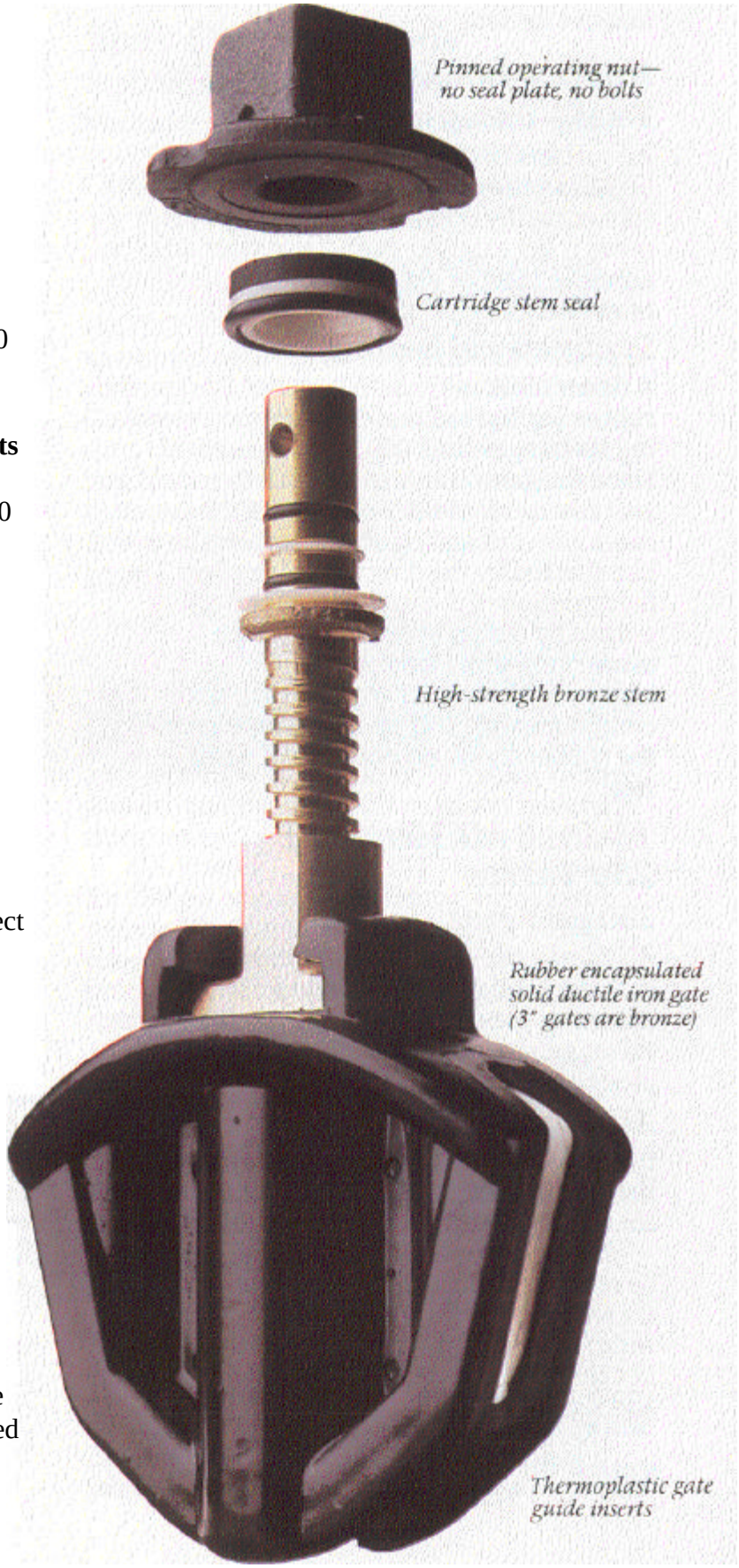
PERMAFUSE® Epoxy coating withstands a direct impact in excess of 20 in-lbs force applied to convex and concave cylindrical surfaces of a 4-inch x 6-inch test coupon, when tested in accordance with the ASTM D2794 test for resistance of organic coatings to the "Effects of Rapid Deformation-Impact."

Submersion Test Requirement

PERMAFUSE® Epoxy coating shows no disbondment or blistering on "X" scribed con cave and convex cylindrical surfaces of test coupons after 500 hours of immersion in 150° F distilled water.

Tougher Than Liquid Coatings

PERMAFUSE® Epoxy coating is tougher, more abrasion resistant, and more durable than sprayed or painted on liquid epoxies. These benefits are important to the critical parts of



the valve where longer life and more dependable valve operation is essential. This is especially attractive if the valve is expected to be inactive for long periods.

Rubber Encapsulated Gate:

Totally Encapsulated

All surfaces of the solid ductile iron gate, including the stem hole, are encapsulated in rubber tightly bonded to the gate. No bare metal is left exposed. Both the rubber and the adhesive meet or exceed all the requirements of AWWA C509 (3" gates are bronze).

Symmetrical Sealing

A direct result of Computer Aided Design, the rubber sealing bulbs of the gate and the sealing surfaces of the body are symmetrical. Since the gate bulbs seal on both the upstream and downstream sides of the gate, the performance and sealing ability of the valve are not affected by the direction of the flow. The deformation of the rubber sealing bulbs is limited by design to prevent damage and assure long-term, trouble-free service. Even after over 1000 cycles of operation, under flow conditions with 250 psi on the gate at closing, the rubber shows no evidence of damage or wear.

16-Inch METROSEAL® 250 Valves

250 psi Rated

All sizes of the METROSEAL® 250 Valve, including the 16-inch, are rated for 250 psi operating pressure. Other 16-inch AWWA gate valves are rated for only 150 psi operating pressure.

Alternative to a Butterfly Valve

Its ruggedness and ease of operation make the 16-inch METROSEAL® 250 Valve an ideal alternative to a 16-inch butterfly valve.

The 16-inch METROSEAL® 250 Valve can be readily operated at 250 psi by one man, therefore a by-pass valve is not necessary. And with its low operating torques, spur gearing is not necessary for vertically mounted valves and is not offered.

The 16-inch METROSEAL® 250 Valve is suitable for throttling service.

4" through 16" METROSEAL® 250 Mechanical Joint Valves.

Sixteen inch METROSEAL® 250 Valves are designed to be buried underground and operated with a 2" square valve wrench through a valve box. It is not necessary for them to be installed in a vault for accessibility since adjustment or maintenance requiring disassembly is not required.

With the gate of the METROSEAL® 250 Valve in the open position there is a clear waterway which permits "pigging" operations not possible in lines utilizing butterfly valves.

Horizontal Service-Bevel Gear Operator

Shallow depth of bury or other conditions of service may require that the valve be installed in the horizontal position. In this case the valve will befitted with a nut-operated 2:1 bevel gear designed for buried service for operation through a valve box.

The bevel gear is also suitable for use when the valve is installed above ground in exposed locations, in various positions, for handwheel or chain wheel operations in both NRS and OS&Y styles.

AVAILABLE STYLES OF METROSEAL® 250 VALVES 3 "-16"

The METROSEAL® 250 Valve is presently available in combinations of stem and body configurations to fit a wide variety of applications.

Stem and Operator Options

NRS (Non-Rising Stem)

The NRS valve, as the name implies, has a stem that does not move as the valve gate raises or lowers. The valve stem has threads inside the valve body, and the gate travels up and down the threads to open and close the valve. It is not possible to determine the gate position (if a valve is opened or closed) by observing the stem. NRS valves are usually furnished with a 2-inch square operating nut. Flanged NRS valves are normally furnished with a handwheel.

OS&Y (Outside Screw and Yoke)

The stem of an OS&Y valve consists of a threaded portion outside the valve body and a smooth portion inside the body. The stem raises and lowers with the valve gate and is therefore a positive indicator of the position of the gate. This stem indication is particularly important for critical service valves, like those in fire systems, to show at a glance whether a valve is open or closed.

The smooth internal stem of the valve makes the OS&Y valve suitable for highly abrasive flow applications. These valves are furnished with a handwheel.

Chain Wheel Operated Valves

In addition to handwheels, valves can also be fitted with chain wheels.

16" METROSEAL® 250 Valve-Bevel Gearing

An additional option for the 16-inch valve is a 2:1 ratio right angle enclosed bevel gearing (EBG) to allow aboveground operation. The bevel gearing allows for aboveground operation, through a valve box, of underground NRS valves installed in the horizontal position. Bevel gearing is also available for OS&Y valves.

Motor Operated Valves

Consult U.S. Pipe if motor or other non-manual styles of operation are contemplated.

Body Configurations

Mechanical Joint Valves

Mechanical joint valves are furnished with outlets which conform to ANSI/AWWA C111/A21.11 mechanical joint requirements.

TYTON® Valves

TYTON® Valves are provided with push-on joint sockets. The 4-inch through 12-inch METROSEAL® TYTON® Valves can be restrained with the use of FIELD LOK® Gaskets when used with Ductile Iron pipe. FIELD LOK® Gaskets are rated for 250 psi operating pressure. U.S. Pipe's FIELD LOK® Gasket product brochure is available for more complete information. METROSEAL® TYTON® Valves are now available for the 16-inch size.

Flanged Valves

Flanged valves are furnished with ANSI/ AWWA C 115 /A21.15 standard flange drilling. These flanges are rated for 250 psi operating pressures and have the same drilling as ASME B16.1 Class 125 flanges. ANSI/AWWA Standards recommend the use of 1/8" thick rubber gaskets, and the use of other gasket materials/ thicknesses should be cleared with U.S. Pipe.

U.S. Pipe's FLANGE-TYTE® Gaskets, rated for 250 psi operating pressures, are recommended for use with flanged valves. Please refer to US. Pipe's FLANGE-TYTE® Gasket product brochure for more complete information on this gasket.

TR FLEX Restrained Joint Valves

These are available in 16 " size only and are made with TR FLEX® Sockets on each end. Please refer to US. Pipe's 1992 *TR FLEX® Restrained joint Pipe and Fittings Catalog* for additional information regarding this joint.

Tapping Valves

Tapping valves are furnished with either a push-on or mechanical joint outlet on one end and a tapping flange on the other end. The tapping flange has a raised centering face and conforms to MSS SP-60 Standard. The bell of the opposite end, whether mechanical joint or push-on, is machined to assure proper

axial alignment of the valve for the tapping machine. All valve waterways are full opening to admit a full size shell cutter.

Unless otherwise specified, tapping valves are furnished with corrosion resistant bolts and nuts along with a special 1/8" thick rubber gasket to seal between the tapping flange and the tapping sleeve. Users should not substitute other types of flange gaskets in place of those furnished with the valve.

The 16-inch horizontal tapping valve is provided with stud bolts as needed to assure nut clearance between the valve body and the tapping sleeve flange.

Valves with a Combination of Ends

METROSEAL® 250 Valves can be furnished in the mechanical joint x flanged configuration. TYTON® Valves (4-inch through 12-inch) can also be furnished in the TYTON® by Flanged Valve configuration. *These valves are not rec-use as tapping valves since the absence of a raised centering face may allow misalignment between the tapping sleeve and the tapping valve which may result in damage to the valve or sleeve.*

OPERATION AND USE

The "Soft" Seating

It is recommended that first time users of a resilient-seated gate valve "get the feel" of closing the valve by fully opening and closing the valve through several cycles. The seating of the rubber seals on the gate is "softer" than the sealing of the metal seats on a double disc gate valve.

Turns to Open

The minimum number of turns to open and close valves is prescribed by the AWWA valve standards C500 and C509. The METROSEAL® 250 Valve conforms to these standards; thus, the number of turns required to operate the METROSEAL® 250 Valve is consistent with gate valves currently in service throughout the United States.

Operating Torques

Low Friction Components

Ease of operation is rightfully a major concern of those who operate valves, and this was a major objective of the METROSEAL® 250 valve designers. The use of low friction thermoplastic gate guides and thrust washers, coupled with the CAD-CAM design, all work together to produce a valve that is truly one-man operable-even the 16-inch size.

One Man Operable

The torque required to operate the METROSEAL® 250 Valve depends on the valve diameter, the operating pressure, and the flow through the valve. The largest valve, the 16inch, requires only approximately 200 ft-lbs torque to close at 250 psi pressure. Because of our design, this torque is comparable to what is required to close some of our competitors' *smaller diameter* resilient seated gate valves.

Certified Test Results

The pressure, cycle and torque tests for each diameter of the METROSEAL® 250 Valve were witnessed by Pittsburgh Inspection Services (formerly Pittsburgh Testing Laboratory). Copies of the certified test reports are available from our marketing representatives.

Excessive Torques

METROSEAL® 250 Valves will withstand, on both opening and closing, well over twice the input torque stated in Section 3.1 of AWWA C509-87 without damage or distortion to any part. Excessive torques can bend the valve stem or damage other bronze internal parts of the valve.

SERVICE APPLICATIONS

Underground (Buried) Service

The most common application for the METROSEAL® 250 Valve is in buried service for underground water and sewer lines. While the greatest use is for full open/full shut applications, the valve is also suitable for throttling service.

For buried service a NRS (Non-Rising Stem) valve, nut-operated, is normally specified. The valve is operable through a valve box with the use of a standard valve wrench which engages the 2-inch square operating nut.

For underground service, either mechanical joint or TYTON® Valves are recommended. These valve configurations have rubber gasketed sockets which conform to ANSI/AWWA C 111 /A21.11. Mechanical joint valves can be furnished with US. Pipe's MJ GRIPPER! Glands for joint restraint rating of 350 psi. TYTON® Valves 4" through 12" size can be furnished with FIELD LOP Gaskets for a joint restraint rating of 250 psi. 16" valves can furnished with TR FLEX® Sockets. These provide compatible joint restraint when used in connection with TR FLEX® Pipe and fittings.

Flanged joints, except for special uses such as with a tapping sleeve and valve, or hydrant auxiliary valve, should not be used underground. The flanged joint cannot accommodate soil shifting and settlement, which may put unacceptable stresses on pipeline components. (Rigid underground joints and components should be supported by external blocking or other means.)

Aboveground (Exposed) Service

Aboveground valves are operated more frequently than those in buried service. NRS valves are the most commonly used. OS&Y handwheel operated valves are chosen for this service when it is necessary to see at a glance whether the valve is open or shut. In addition, aboveground valves are commonly provided with flanged outlets for use in flanged piping systems.

Abrasive Flow Service

Even though NRS METROSEAL® 250 Valves have been successfully used in abrasive flow conditions, OS&Y valves are preferred since the stem is smooth inside the valve, and the threaded portion of the stem is outside. The stem is "wiped clean" each time the valve is operated.

The PERMAFUSE® Epoxy coating and the rubber encapsulation have exhibited excellent resistance to abrasives which may be encountered in normal water and sewerage systems.

Abrasive Environment Service

For service in abrasive atmosphere or environments, the NRS valve should be used since the threaded portion of the stem is not exposed outside the valve. The patented cartridge stem seal also serves as a dust seal on this valve.

Horizontal Service

METROSEAL® 250 Valves have been cycle tested and will operate equally well in the vertical, horizontal and flat positions with no significant difference in performance.

If sediments are present, the valve should be installed such that the valve bonnet does not create a pocket that could trap sediments. Contact U.S. Pipe for recommendations regarding questionable installations.

Throttling Service

The METROSEAL® 250 Valve has been successfully used for throttling service. Field installations and exhaustive testing have shown that the chatter, vibration, or wear normally associated with gate valves in such service is not experienced with the METROSEAL® 250 Valve.

Fire Protection Service

METROSEAL® 250 Valves are available listed by Underwriters Laboratories, Inc., in sizes 4"-12" for working pressures 175 or 250 psi; 16" valves are rated at 150 or 200 psi.

METROSEAL® 250 Valves are available approved by Factory Mutual Research Corporation for 250 psi in all sizes 4"-16".

All of these listings cover both NRS and OS&Y pattern valves.

Standard AWWA valves are not UL/FM rated. UL/FM valves must be special ordered.

MAINTENANCE, REPAIR, AND STORAGE

Routine Maintenance Is Normally Not Required

Because of the simple and rugged nature of the METROSEAL® 250 Valve, virtually no maintenance is required. Whether the valve is frequently operated or not operated for many years makes little difference-the valve is designed to function when required.

Routine Cycling Not Required

With double disc gate valves, it is a common practice to "cycle" the valve through a series of short strokes to remove products of corrosion from the path of the gates and seating surfaces of the valve. This is not necessary with the METROSEAL® 250 Valve since corrosion products cannot readily form on or bond to the rubber surface of the gate or the PERMAFUSE® Epoxy coating.

Replacement of Body Bonnet Assembly

Assuming a valve is damaged while in service, the simplest and quickest method of repair is to replace the bonnet assembly of the damaged valve with an assembly from a spare METROSEAL® 250 Valve. A bonnet assembly consists of all assembled valve parts except the body. Pipeline should be depressurized. De-watering the line may not be necessary. Loosen the body/bonnet bolts and assure that there is no pressure in the valve bonnet before removing the nuts. Remove the assembly and replace with a spare assembly (with gate in open position), and service is restored. The damaged bonnet assembly can then be brought back to the shop for further examination or repair.

Spare Parts

If for some reason the valve suffers physical damage, replacement parts can be ordered with the aid of the parts list.

Storage

The valve should be stored indoors in the upright position. METROSEAL® 250 Valves are produced with pads on the outlet ends so that the valve can stand upright. Rain water should not be allowed to collect in valves in storage: The accumulation of rain water in the valve and subsequent freezing can loosen or break the body/bonnet bolts or cause other damage to the valve. Outdoor storage and exposure to sunlight will dull the gloss on the PERMAFUSE® Epoxy coating. This affects the appearance but otherwise does not damage the quality of the PERMAFUSE® Epoxy coating.

INSTRUCTIONS FOR ORDERING AND INSPECTION

Directions for Ordering:
The following information should be specified on orders by the purchaser:

Order Instructions

1. The Quantity Required.
2. The Size or Outlet Diameter.
3. Body Configuration.

FIG. #	BODY CONFIGURATION
5460	MJ
5260	MJ x Flanged (non tap)
5860	MJ x Flange Tap
5150	Flanged
5080	Push-On (TYTON Valve)
5160	TR FLEX' (16 " only)
5220	Push-On x Flanged
5940	Push-On x Flange Tap
5120	Flanged OS&Y

4. Stem Configuration
Either NRS (Non-Rising Stem) or OS&Y (Out side Screw and Yoke). Standard stems are manganese bronze. "Low zinc" bronze stems are available on special order where water may cause dezincification.

5. Operating Nut or Handwheel
NRS valves are furnished with a 2-inch square operating nut for underground service unless otherwise specified. OS&Y valves are furnished with a handwheel for aboveground service unless otherwise specified.

6. Direction to Open
Valves are furnished "Open Left" (counter clockwise). "Open Right" (clockwise) is optional. Red operating nuts indicate Open Right valves. Black operating nuts indicate Open Left valves. All handwheels are similarly painted, and the opening direction is cast on the rim of the handwheels.

7. Accessories

Mechanical Joint Valve Ends
Mechanical joint ends of METROSEAL® 250 Valves are furnished with glands, SBR rubber gaskets, tee-head bolts and nuts unless other wise specified. To provide joint restraint, MJ GRIPPER® Glands will be furnished when specified.

TYTON® Valve Ends
METROSEAL® TYTON® 250 Valves are furnished with TYTON® Gaskets. If joint restraint is required, give the quantity of FIELD LOK® Gaskets to be provided.

Flanged Valves
Flanged valves are furnished with FLANGE-TYTE® Gaskets when requested. Flanged valves should only be used with rubber gaskets 1/8-inch thick.

Tapping Valve Flanged End
The tapping flange of a METROSEAL® 250 Valve is furnished with bolts, nuts, and a special 1/8-inch thick rubber gasket.

TR FLEX Valve Ends
These are available on 16 " size only. They are furnished with TYTON® Gaskets.

8. Special Drilling or Taps
Specify the size and location of any special drilling and/or taps required in the bosses on the horizontal centerline of flanged valves.

9. Spare Parts
Give quantity and part number of any spare parts required from the parts list in this manual, and a full description of the valve for which the parts are intended if different from the ordered valves.

10. UL/FM Valves
METROSEAL® 250 Valves with Underwriters Laboratories (UL) listing and Factory Mutual (FM) approved must be special ordered and are so identified. UL listed valves 4"-12" carry a standard 175 psig rating or 250 psig hi pressure rating; 16" size is 175 psig standard rating or 200 psig high pressure. FM approved valves 4"-16" are all standard rated 250 psig. Request for UL or FM valves should specify listing and rating desired.

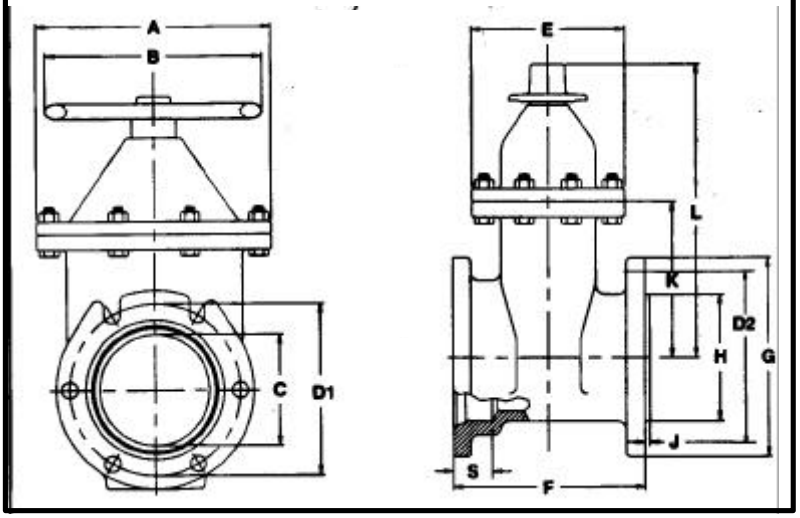
Inspection Upon Delivery

When the METROSEAL® 250 Valves are received they should be inspected for shipping damage and to assure that the parts or accessories received are as ordered. Immediately report any discrepancies or damage to the valve or valve parts by noting such damage on the delivery ticket and obtaining carrier's signature so claim can be filed. The body/bonnet bolts should be inspected for tightness.

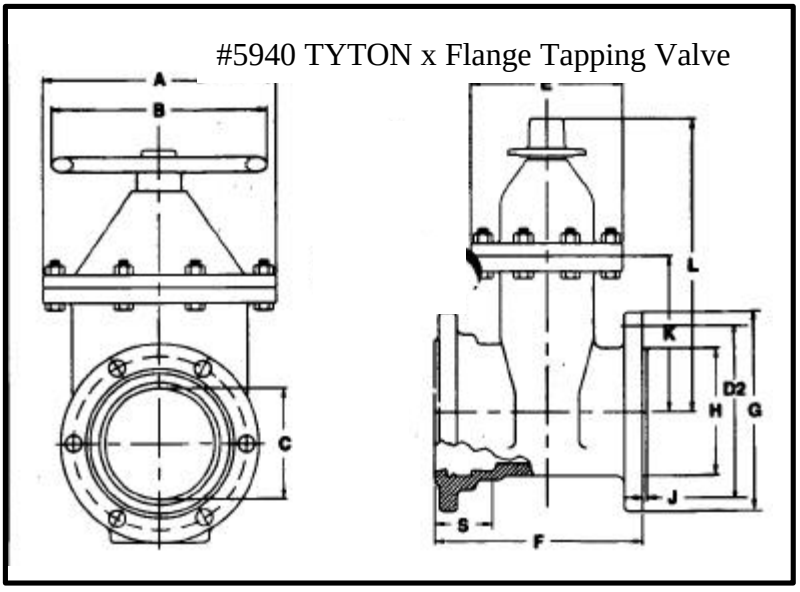
DIMENSIONAL CHARTS

N0.	DIMENSION DESCRIPTION	NOMINAL VALVE SIZE						
		3”	4”	6”	8”	10”	12”	16”
A	Bonnet Flange Length	8-3/8	9-13/16	13	15-5/8	19-7/16	21-1/8	25-5/8
B	Handwheel Diameter	10	10	12	14	16	16	23
C	Waterway Diameter	3-1/32	4-1/32	6 1/8	8-1/16	10-1/8	12-1/8	16-1/8
D1	Mechanical Joint BoIt Circle	6-13/64	7-1/2	91/2	11-3/4	14	16-1/4	21
D2	Flanged Bolt Circle	6	7-1/2	9-112	11-3/4	14-1/4	17	21-1/4
E	Bonnet Flange Width	4-1/8	7-1/4	8-3/8	9-5/8	10-15/16	11-1/16	13-5/8
F	Face-to-Face (End-to-End) Mechanical Joint	8-1/2	9-1/4	10-1/2	11-1/2	14-1/2	15	22
	Flanged. Face-to-Face	8	9	10-1/2	11-1/2	13	14	17
	Mechanical Joint X Flanged & Mechanical Joint X Flanged Tapping	8-1/2	9-3/32	10-3/4	12-1/2	13-3/4	14-1/2	19-1/2
	TYTON® Valve	N/A	11	12-3/8	14	14-3/8	14-7/8	23
	TYTON'® X Flanged Valve & TYTON'® X Flanged Tapping Valve	N/A	10-5/16	11-7/16	13-1/16	14	14-3/4	N/A
G	Flange Diameter	7-1/2	9	11	13-1/2	16	19	23-1/2
H	Tapping Flange Lip Diameter	3-63/64	4-63/64	6-63/64	8-63/64	10-63/64	12-63/64	16-15/16
J	Tapping Flange Lip Height	3/16	3/16	1/4	1/4	1/4	1/4	1/4
K	Body-Bonnet Flange to Centerline of Waterway	5-27/32	6-5/16	8-19/32	11-1/4	13-1/4	15-11/16	19-11/16
L	Top of NRS Nut or Handwheel to Center of Waterway	10-1/2	12-13/16	16-1/4	19-3/16	24-1/2	27-5/16	34-3/8
M	Top of OS&Y Stem to Centerline of Waterway Valve Closed	N/A	18-13/16	25-5/16	30-1/8	38-3/4	41-5/8	55-1/8
	Valve Open	N/A	23-3/8	32-16	38-3/4	49-1/2	53-7/8	71-3/8
N	Number of Turns to Open (NRS & OS&Y)	131/4	13	19	25	32	37	50
P	Maximum Tap Size (Optional)	1/2	1/2	3/4	¾	1	1	1
S	Depth of Socket Mechanical Joint Socket	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	3-5/8
	TYTON® Valve Socket	N/A	3-1/2	3-1/2	3-3/4	3 -7/8	3-7/8	5

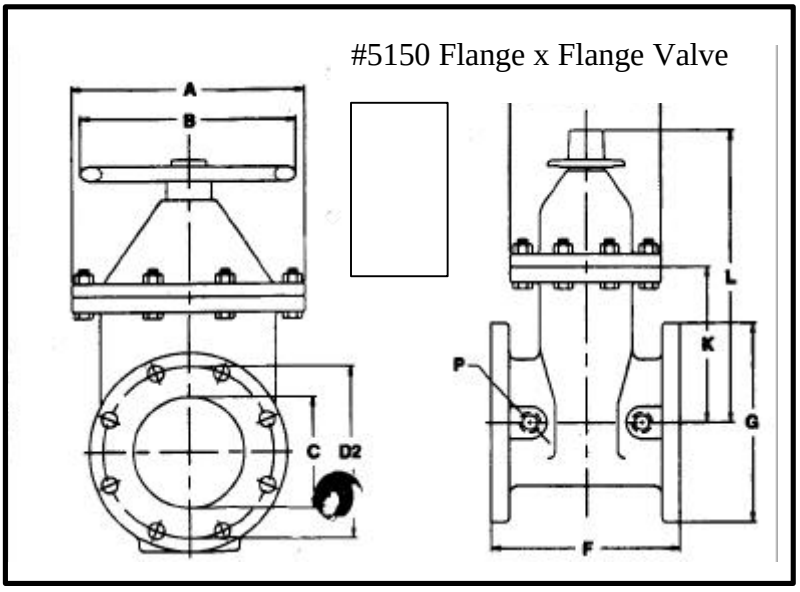
#5860 Mechanical Joint x Flange Tapping Valve



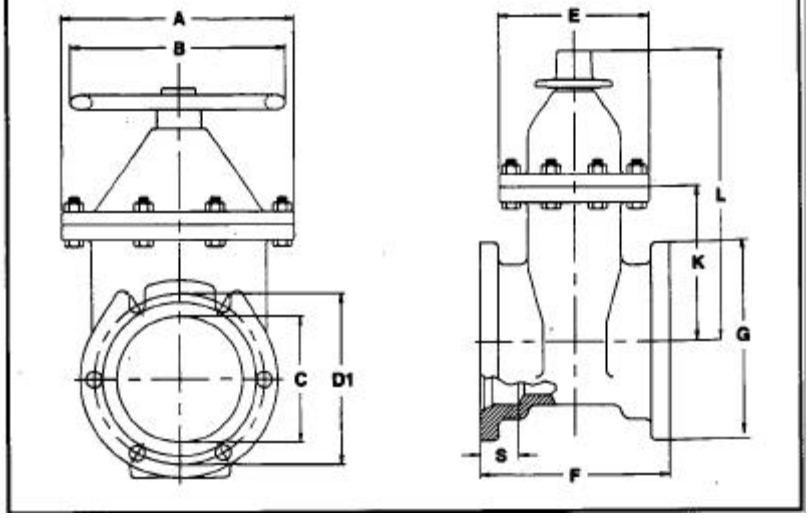
#5940 TYTON x Flange Tapping Valve



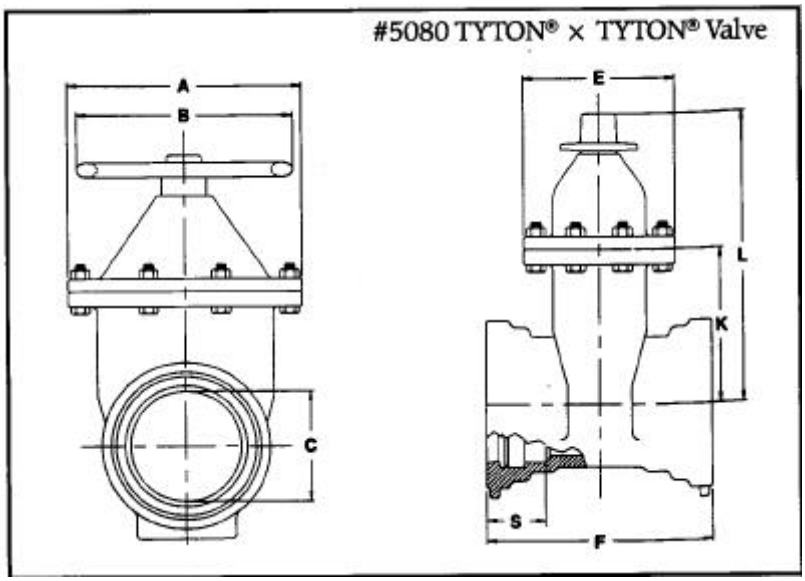
#5150 Flange x Flange Valve



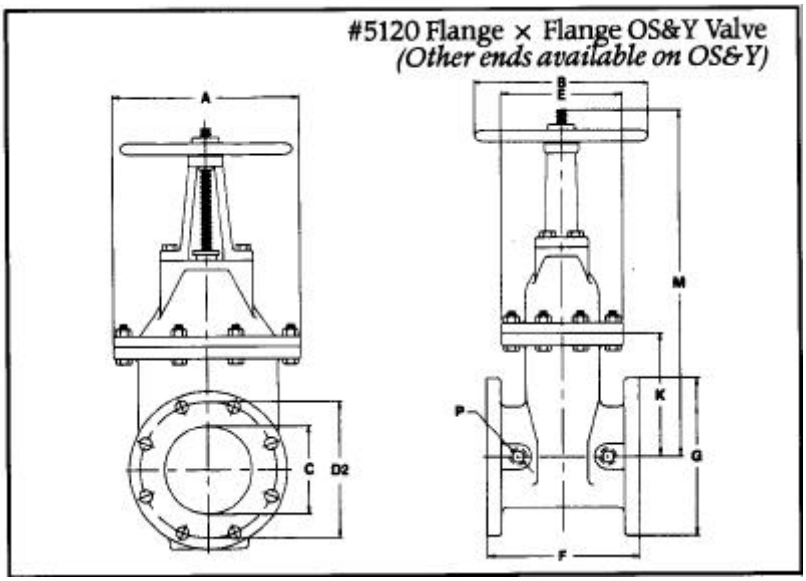
#5460 Mechanical Joint × Mechanical Joint Valve



#5080 TYTON® × TYTON® Valve

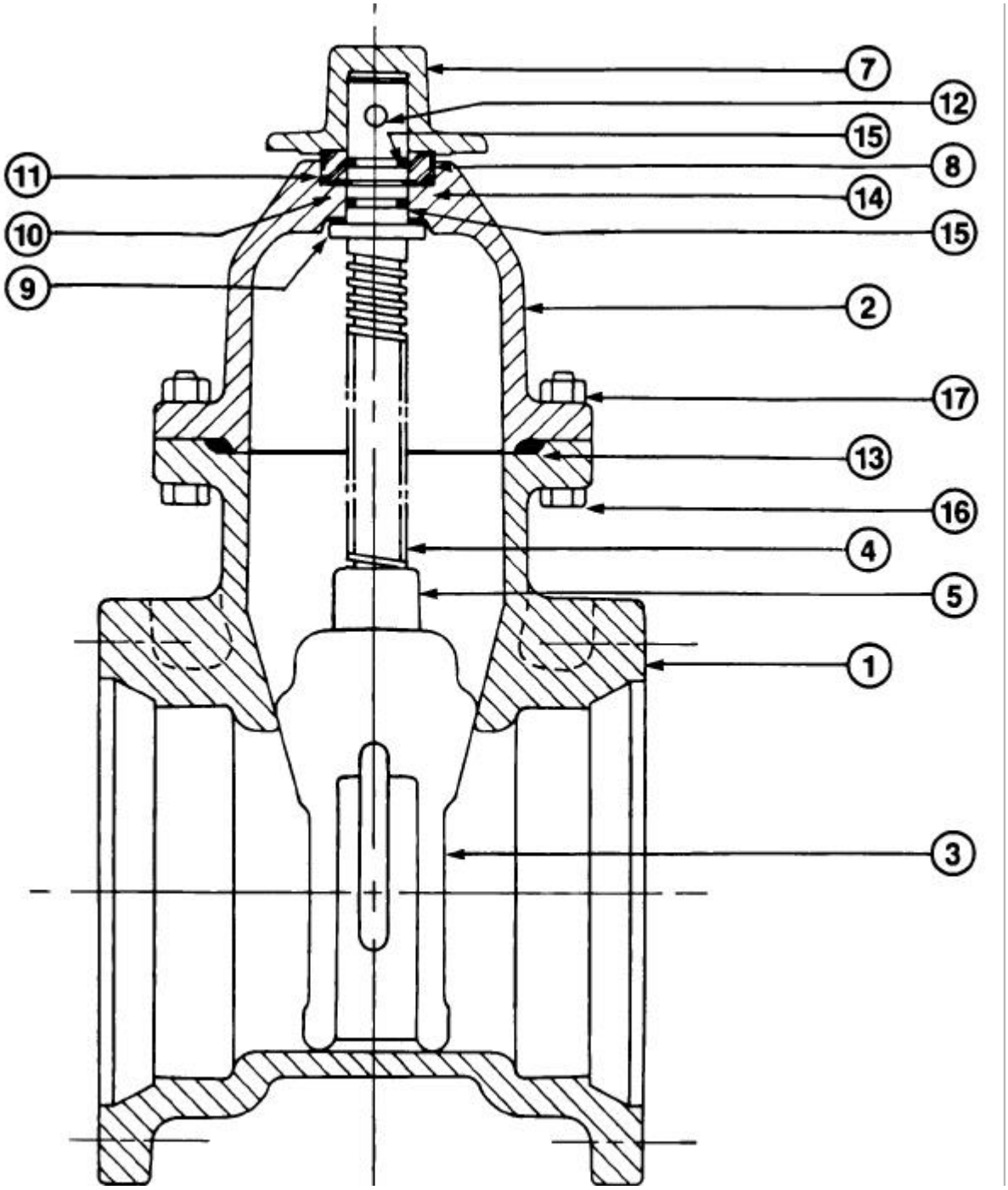


#5120 Flange × Flange OS&Y Valve
(Other ends available on OS&Y)



Note: Mechanical joints are shown with vertical bolt slots. Valves may also be famished with horizontal bolt slots.

PARTS LIST

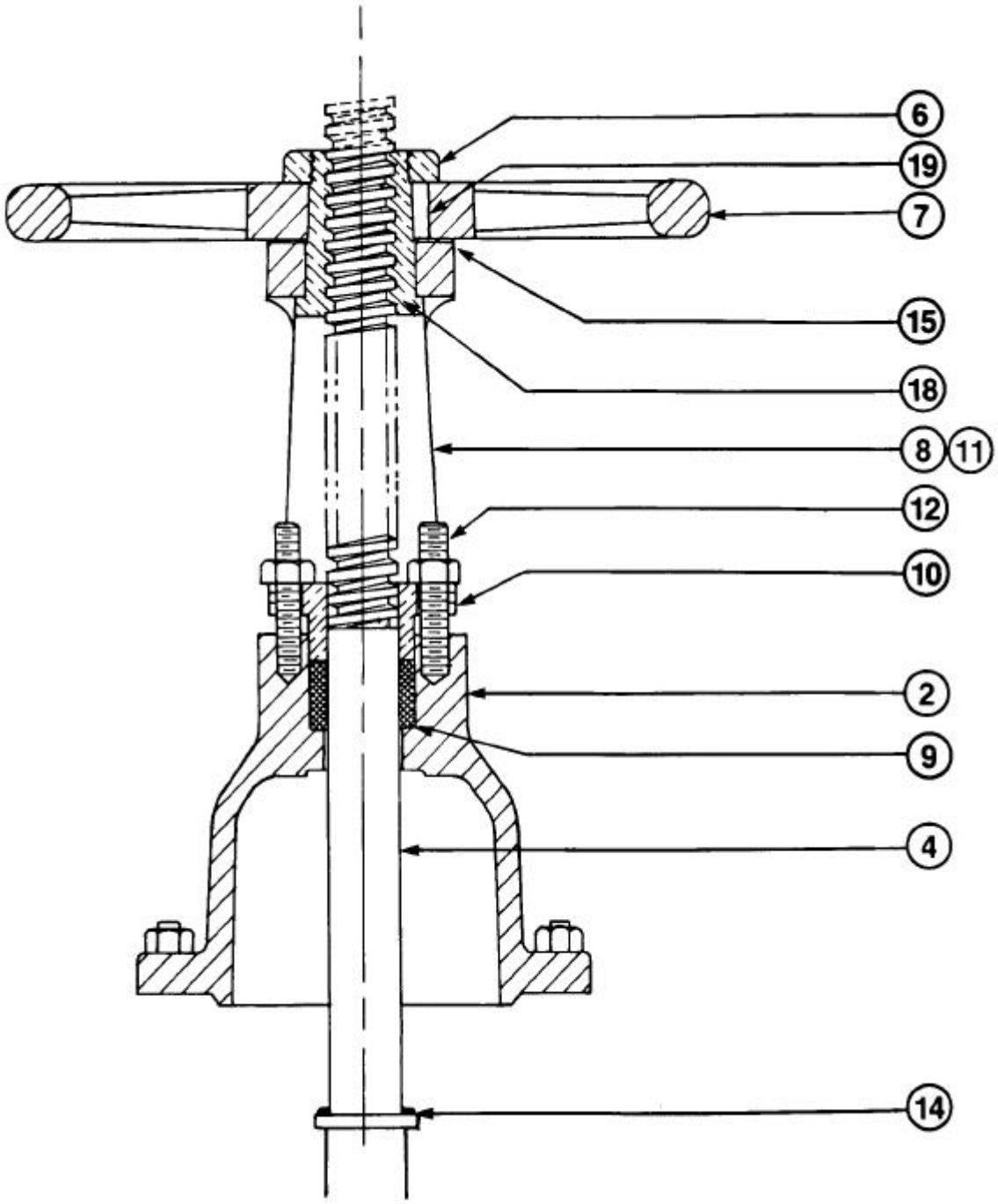


NON-RISING STEM

NO.	NAME OF PART	NO. reqd.	MATERIAL
1	BODY	1	DUCTILE IRON
2	BONNET	1	DUCTILE IRON
3	GATE, RUBBER COVERED	1	DUCTILE IRON*
4	STEM	1	BRONZE
5	STEM NUT	1	BRONZE
7	OPERATING NUT	1	GRAY IRON
8	CARTRIDGE	1	THERMOPLASTIC
9	BONNET THRUST WASHER	1	THERMOPLASTIC

NO.	NAME OF PART	NO. reqd.	MATERIAL
10	RETAINER RING	1	THERMOPLASTIC
11	DIRT SEAL	1	RUBBER
12	PIN, OPERATING NUT	1	STEEL
13	SEAL RING	1	RUBBER
14	"0" RING (CARTRIDGE)	1	RUBBER
15	"0" RING (STEM)	2	RUBBER
16	BOLT, HEX HEAD		STEEL
17	NUT, HEX		STEEL

*3" gates are bronze.



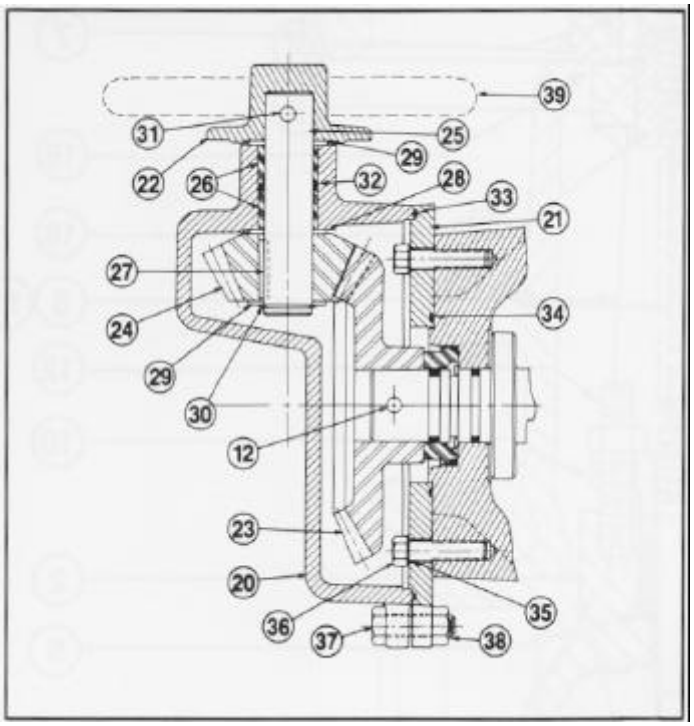
OUTSIDE STEM & YOKE

N0.	NAME OF PART	N0. reqd.	MATERIAL
2	BONNET, OS&Y	1	DUCTILE IRON
4	STEM, OS&Y	1	BRONZE
6	HANDWHEEL, LOCK NUT, OS&Y	1	BRONZE
7	HANDWHEEL, OS&Y	1	DUCTILE IRON
8	BRACKET, OS&Y	1	DUCTILE IRON
9	PACKING, OS&Y	1 set	TEFLON
10	GLAND, OS&Y	1	BRONZE

N0.	NAME OF PART	N0. reqd.	MATERIAL
11	BRACKET CAP SCREWS (not shown in this view)	4	STEEL
12	STUD AND NUT	8	BRONZE
14	"0" RING	1	RUBBER
15	FRICTION WASHER	1	BRONZE
18	STEM NUT, BRACKET	1	BRONZE
19	KEY, HANDWHEEL, OS&Y	1	STEEL

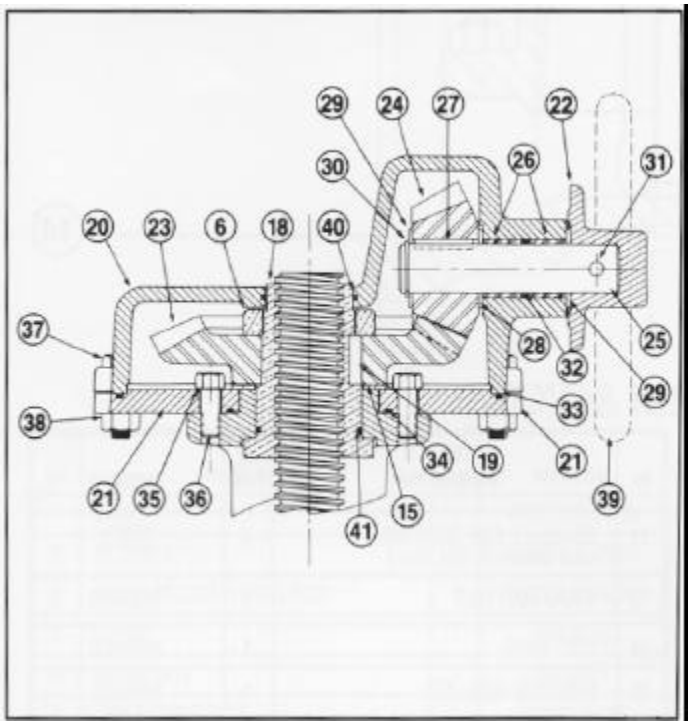
ENCLOSED BEVELED GEAR BOXES

NON-RISING STEM



N0.	NAME OF PART	NO. reqd.	MATERIAL
12	PIN	1	STEEL
20	GEAR BOX, EST	1	DUCTILE IRON
21	PLATE, GEAR, EBG	1	DUCTILE IRON
22	OPERATING NUT	1	GRAY IRON
23	GEAR, BEVEL, EBG	1	STEEL
24	GEAR, PINION, EBG	1	STEEL
25	SHAFT, PINION, EBG	1	STN STEEL
26	BEARING, SHAFT	2	TEFLON
27	KEY, PINION, SHAFT	1	STEEL
28	WASHER, THRUST	1	BRASS
29	WASHER, ANTI-FRICTION	2	THERMOPLASTIC
30	RING, RETAINER	1	STEEL
31	PIN, OPERATING NUT	1	STEEL
32	O-RING, SHAFT	1	RUBBER
37	O-RING, GEAR BOX	1	RUBBER
34	O-RING, GEAR PLATE	1	RUBBER
35	O-RING, SCREW SEAL	4	RUBBER
36	BOLT, HEX HEAD	4	STEEL
37	BOLT, HEX HEAD	6	STEEL
38	NUT, HEX	6	STEEL
39	HANDWHEEL, EBG-(OPTIONAL)	1	DUCTILE IRON

OUTSIDE SEEM & YOKE



NO.	NAME OF PART	N0. reqd.	MATERIAL
6	HANDWHEEL, LOCK NUT OS&Y	1	BRONZE
15	WASHER, ANTI-FRICTION	1	BRONZE
18	STEM NUT, OSY OUTSIDE	1	BRONZE
19	KEY, HANDWHEEL/ BEVEL GEAR	1	STEEL
20	GEAR BOX, EBG-OSY	1	DUCTILE IRON
21	PLATE GEAR, EBG-OSY	1	DUCTILE IRON
22	OPERATING NUT 7	I	GRAY IRON
23	GEAR, BEVEL, EBG-OSY	1	STEEL
24	GEAR, PINION, EBG	1	STEEL
25	SHAFT, PINION, EBG	1	STN STEEL
26	BEARING, SHAFT	2	TEFLON
27	KEY, PINION SHAFT	1	STEEL
28	WASHER, THRUST	1	BRASS
29	WASHER, ANTI-FRICTION	2	THERMOPLASTIC
30	RING, RETAINER	1	STEEL
31	PIN, OPERATING NUT	1	STEEL
32	O-RING, SHAFT	1	RUBBER
33	O-RING, GEAR BOX	1	RUBBER
34	O-RING, GEAR PLATE	1	RUBBER
35	O-RING, SCREW SEAL	4	RUBBER
36	BOLT, HEX HEAD	4	STEEL
37	BOLT, HEX HEAD	6	STEEL
38	NUT, HEX	6	STEEL
39	HANDWHEEL, EBG-OS&Y (OPTIONAL)	1	DUCTILE IRON
40	O-RING, UPR, STEM NUT OUTSIDE	1	RUBBER
41	O-RING, LWR, STEM NUT OUTSIDE	1	RUBBER

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REFERENCES

Additional information can be obtained from the following standards and sources:

ANSI/AWWA C500
AWWA Standard for Gate Valves for Water and Sewerage Systems

ANSI/AWWA C509
AWWA Standard for Resilient-Seated Gate Valves for Water and Sewerage Systems

ANSI/AWWA C110/A21.10
AWWA Standard for Ductile Iron and Gray Iron Fittings, 3" through 48" for Water and Other Liquids

ANSI/AWWA C111 /A21.11
AWWA Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

ANSI/AWWA C550
AWWA Standard for Protective Epoxy Interior Coatings for Valves and Hydrants

ANSI/AWWA C600 AWWA Standard for Installation of Ductile Iron Water Mains and Their Appurtenances

MSS-SP60
Standard Practice for Connecting Flange Joint between Tapping Sleeves and Tapping Valves

US Pipe MJ GRIPPER® Gland Catalog

US Pipe FIELD LOK® Gasket Catalog

US Pipe FLANGE-TYTE® Gasket Catalog

US Pipe TR FLEX Restrained Joint Pipe & Fittings Catalog

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