



**VALVE AND FLOW CONTROL SPECIALISTS**  
*SERVICE AND RELIABILITY*

JULY 1999

**MILLIKEN**

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**MILLCENTRIC**

— ECCENTRIC PLUG VALVE —



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**Valve & Flow Control Specialists**  
Melbourne Sydney Brisbane Perth Darwin  
E-MAIL: [sales@valveandflowcontrolspecialists.com](mailto:sales@valveandflowcontrolspecialists.com)



# MILLIKEN

# MILLCENTRIC

## ECCENTRIC PLUG VALVE

The Milliken criteria of quality, reliability, safety and value are embodied in the MILLCENTRIC Eccentric valve, setting higher standards for dependable performance with excellent features achieved by the utilization of the very latest design and manufacturing techniques.

### BODY

Conforming to AWWA C504 wall thickness, the Millcentric valve body casting is in ASTM A126 CL B cast iron using high pressure molding techniques. Alternative flanged, grooved or mechanical joint ends are available. Flange diameter, thickness and drilling conform to ANSI B16.1 Class 125 or 250. Grooved ends meet AWWA C-606 for ductile or steel pipe. Mechanical joints to AWWA C111 (ANSI A21.11).

### SEAT

The Millcentric valve incorporates as standard, on 3" and larger, a welded nickel seat for corrosion and erosion resistance specially profiled for low torque and extended seat life. An alternative corrosion resistant epoxy seat is available for general service duties.

### STEM SEAL

High integrity sealing by combining the advantages of a resilient and abrasion resistant U-Cup seal. From vacuum to high pressure, the self-adjusting sealing system (per AWWA C504) gives positive, trouble-free service and is retained independently of the plug stem or external torque device.

### BEARINGS

The plug rotates in permanently lubricated 316 grade stainless steel bearings located in the body and bonnet, along with upper and lower PTFE thrust washers, which ensure consistently low operating torque.

- Computer Aided Design
- High integrity casting
- CNC manufacturing delivers consistent sizes on all components

### All complemented by rigorous Quality Control System

### PLUG

Supported on integral trunnions, the plug face is covered with a elastomer that is molded 2 1/2" - 12" and vulcanized on 14" and larger to the casting providing tight shut off even under vacuum conditions. High integrity corrosion-free sealing is achieved by a variety of abrasion resistant elastomers which protect the plug right up to the trunnions. When assembled, the light compression of the elastomers onto PTFE thrust washers, prevents entry of abrasive materials into the bearings.

### BONNET SEAL

Superior "O" ring sealing with metal/metal contact means lower bolting stresses compared with compression gaskets.

### FLOW

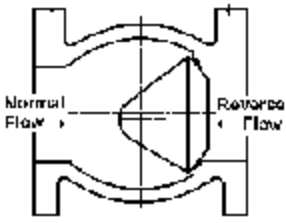
The port design (round on 2 1/2" - 12" and rectangular on 14" and larger) with streamlined internal contours gives high capacity straight through flow in the full open position, reducing turbulence and pressure drop and the effect of erosive media. Handling of sludges and slurries is therefore enhanced.

### INTERCHANGEABLE

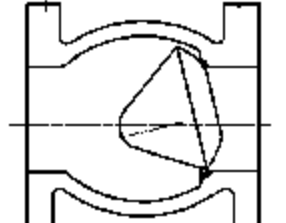
Because of common face to face dimensions with wedge gate valves ( 3" - 12" ), fitting the tight shut-off rotary MILLCENTRIC valve into existing systems is accomplished without pipeline modifications.

### TRAVEL STOPS

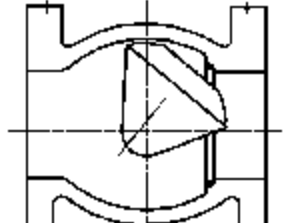
Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Millcentric valves.



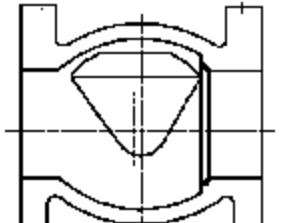
- Valve in closed position for bubble tight shut-off.
- Normal flow direction gives pressure assisted sealing.
- Torques are low even in reverse flow.



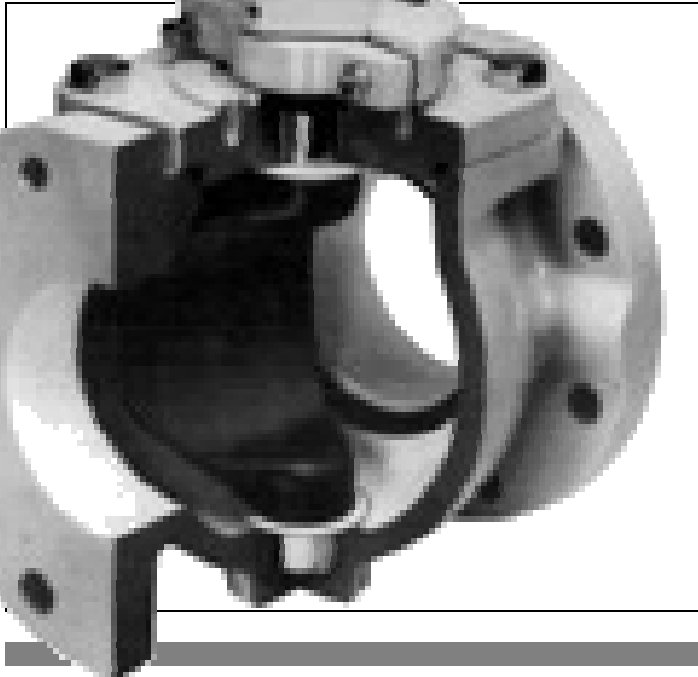
- Plug rotates away from the seat for instant opening.
- Seat wear and operating torque reduced.
- No further seat contact until valve is closed again.



- Design of MILLCENTRIC valve allows modulating control over the full 90° travel.
- Ideally suited for balancing service.
- Standard MILLCENTRIC rotary valve provides control and tight shut-off in one valve.



- Plug is out of the flow path when fully open.
- Straight through, uninterrupted smooth flow.
- Round port reduces turbulence and erosion, lowers pumping costs and can be "pigged" to clean the pipeline.



**INSTALLATION**

The Millcentric valve is suitable for flow and shut-off in either direction. Seat end downstream is the preferred orientation and any reverse flow requirement should be stated at time of order. For use on fluids with suspended solids, installation with the seat upstream and the valve stem horizontal may be preferable; plug rotation to the top of the valve will ensure smooth operation.

**IN-LINE MAINTENANCE**

In the unlikely event of gland leakage, the stem seals can be easily replaced without removing the bonnet. Access to the body for cleaning or inspection does not require removal from the line.

**MODULAR CONSTRUCTION**

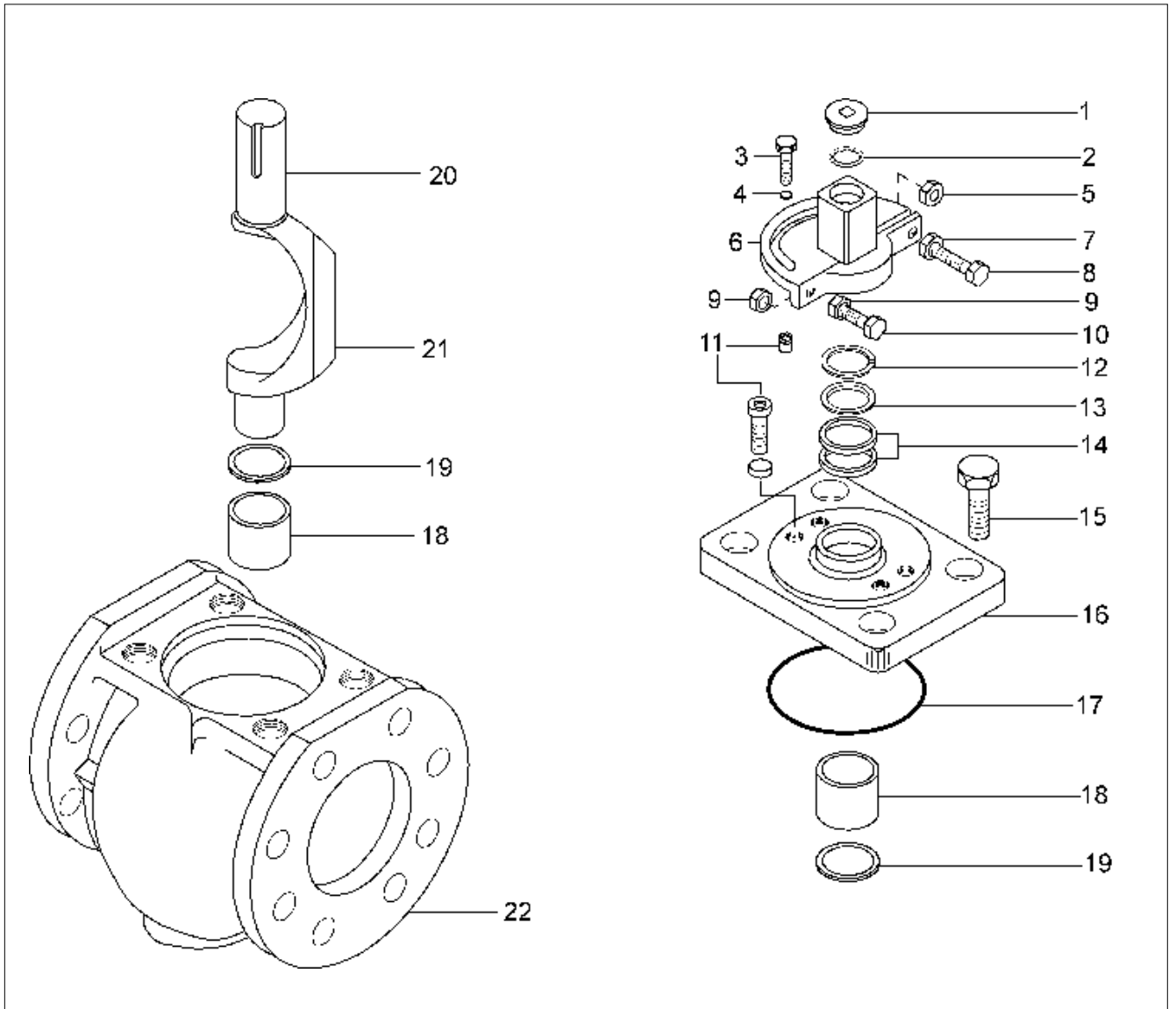
Design of the bonnet and stem allows for on-site adaptation of gear operators, power actuators, or extension devices on to standard valves. Conversion can be easily undertaken without removing the valve bonnet, thereby minimizing downtime.

**POWER OPERATION**

Pneumatic, electric or hydraulic operation is available, complete with accessories such as limit switches, solenoid valves and positioners when required.

## MATERIALS OF CONSTRUCTION

Item	Component	Material	Specification	Item	Component	Material	Specification
1	Indicator Cap	Plastic		12	Snap Ring	Spring Steel	
2	Star Nut	Steel		13	Washer	Brass	ASTM B-138-675
3	Open Stop	Steel		14	U-Cup Seal	Elastomer	Same as Plug
4	Washer	Steel		15	Capscrew	Steel	
5	Nut	Steel		16	Bonnet	Cast Iron	ASTM A-126 Class B
6	Torque Collar	Ductile Iron	ASTM A-536	17	"O" Ring	Elastomer	Same as Plug
7	Lock Nut	Steel		18	Journal Bearing	Stainless Steel	ANSI 316
8	Torque Bolt	Steel		19	Thrust Washer	PTFE	
9	Lock Nut	Steel		20	Plug	Ductile Iron	ASTM A-536 Grade 65-45-12
10	Closed Stop	Steel		21	Plug Coating	Elastomer	As Specified
11	Travel Stop	Steel		22	Body	Cast Iron	ASTM A-126 Class B



**ELASTOMERS AVAILABLE FOR MILLCENTRIC VALVE**

Natural rubber is also available.

**Nitrile**

A general purpose material sometimes referred to as BUNA-N or HYCAR with a -20°F to 225°F temperature range. Used on sewage, water, hydrocarbon and mineral oils.

**EPDM**

An excellent polymer for use on chilled water through to LP steam applications having a temperature range of -35°F to 250°F. Resistance to many acids, alkalies, detergents, phosphate esters, alcohols and glycols is an added benefit.

**Neoprene**

This versatile material shows outstanding resistance to abrasion and ozone. Chemical resistance to a wide range of petroleum based products and dilute acids and alkalies. Temperature range -20°F to 225°F.

**Viton**

Retention of mechanical properties at high temperature is an important feature of this elastomer- temperature range is -10°F to 400°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.

**PRESSURE RATING**

12" and smaller	ANSI 125	175 psi
14"-36"	ANSI 125	150 psi
42" and larger	ANSI 125	125 psi
12" and smaller	ANSI 250	400 psi
14"-36"	ANSI 250	300 psi

Body Hydrotest = 200% of rated pressure

Seat Test = 120% of rated pressure

**MILLCENTRIC VALVE - SERIES 600**

**ORDERING INFORMATION**

Valve Types	Designation
Mechanical Joint	600
ANSI 125 Flanged	601
ANSI 250 Flanged	602
ANSI 125 Grooved End for Steel Pipe	606S
ANSI 125 Grooved End for Ductile Iron Pipe	606D
<b>Seat</b>	
Nickel	N
Epoxy	E
<b>Elastomer Trim</b>	
EPDM	0
Nitrile (Buna)	1
Viton	2
Neoprene	3
Natural	4
<b>Gear Operators</b>	
Buried Gear with 2" nut	BG
Above Ground Gear with Indicator and Handwheel	AG
Memory Stop Gearbox with Handwheel	MG
<b>Example: 4" 601 N3AG</b>	
4" ANSI 125 Flanged with Nickel Seat, Neoprene Elastomer and Above Ground Gear with Indicator and Handwheel	

**VALVES ARE ONLY SUPPLIED FOR BI-DIRECTIONAL SHUT-OFF IF SPECIFIED AT TIME OF ORDER.**

**ELASTOMER SELECTION CHART**

The chart below is to assist in the selection of elastomers for some common fluids. It doesn't mean other elastomers are not suitable within varying limits. Temperature, concentration, and mixture all affect chemical attack. If there is any

doubt regarding compatibility, specific conditions should be referred to engineering for recommendations. The chart below is to serve as a guide only.

Service	Elastomer	Average Uselul Temp. Range	Service	Elastomer	Average Uselul Temp. Range	Service	Elastomer	Average Uselul Temp. Range
Acetone	EPDM	-35°F to 250°F	Caustic Soda	EPDM	-35°F to 250°F	Oil, Animal	Nitrile	0°F to 212°F
Air	EPDM	-35°F to 250°F	Cement Slurry	EPDM	-35°F to 250°F	Oil, Mobil Therm Light	Viton	10°F to 250°F
Air w/oil	Nitrile	0°F to 212°F	Copper Sulphate	EPDM	-35°F to 250°F	Oil, Mobil Therm 600	Viton	10°F to 250°F
Alcohol, Amyl	EPDM	-35°F to 250°F	Creasote (Coal)	Nitrile	0°F to 212°F	Oil, Mobil Therm 603	Nitrile	0°F to 212°F
Alcohol, Aromatic	Viton	10°F to 250°F	Coal Slurry	Nitrile	0°F to 212°F	Oil, Lubricating	Nitrile	0°F to 212°F
Alcohol, Butyl	Neoprene	-20°F to 225°F	Diesel Fuel No 1	Nitrile	0°F to 212°F	Oil, Vegetable	Nitrile	0°F to 212°F
Alcohol, Denatured	Nitrile	0°F to 212°F	Diethylene Glycol	EPDM	-35°F to 250°F	Paint, Latex	Nitrile	0°F to 212°F
Alcohol, Ethyl	EPDM	-35°F to 250°F	Ethylene Glycol	EPDM	-35°F to 250°F	Phosphate Ester	EPDM	-35°F to 250°F
Alcohol, Grain	Nitrile	0°F to 212°F	Fatty Acid	Nitrile	0°F to 212°F	Propane	Nitrile	0°F to 212°F
Alcohol, Isospropyl	Neoprene	-20°F to 225°F	Fuel Oil No 2	Nitrile	0°F to 212°F	Rape Seed Oil	EPDM	-35°F to 250°F
Alcohol, Methyl	EPDM	-35°F to 250°F	Fertilizer Liquid (H <sub>4</sub> N <sub>2</sub> O <sub>2</sub> )	EPDM	-35°F to 250°F	Sewage (w/oils)	Nitrile	0°F to 212°F
Ammonia, Anhydrous	Neoprene	-20°F to 225°F	Gasoline, Keg	Nitrile	0°F to 212°F	Sodium Hydroxide 20%	EPDM	-35°F to 250°F
Ammonium Nitrate	EPDM	-35°F to 250°F	Gas, Natural	Nitrile	0°F to 212°F	Starch	EPDM	-35°F to 250°F
Ammonia, Water	EPDM	-35°F to 250°F	Glue, Animal	Nitrile	0°F to 212°F	Steam to 300°F	EPDM	-35°F to 250°F
Animal Fats	Nitrile	0°F to 212°F	Green Liquor	EPDM	-35°F to 250°F	Sloddard Solvent	Nitrile	0°F to 212°F
Black Liquor	EPDM	-35°F to 250°F	Hydraulic Oil (Petro)	Nitrile	0°F to 212°F	Sulphuric Acid 10%-50%	Neoprene	-20°F to 225°F
Blast Furnace Gas	Neoprene	-20°F to 225°F	Hydrogen	Nitrile	0°F to 212°F	Sulphuric Acid 100%	Viton	10°F to 250°F
Butane	Nitrile	0°F to 212°F	JP4, JP5	Viton	10°F to 250°F	Trichloroethylene Dry	Viton	10°F to 250°F
Bunker Oil "C"	Nitrile	0°F to 212°F	Kerosene	Nitrile	0°F to 212°F	Triethanol Amine	EPDM	-35°F to 250°F
Calcium Chloride	EPDM	-35°F to 250°F	Ketone	EPDM	-35°F to 250°F	Varnish	Viton	10°F to 250°F
Carbon Dioxide.	EPDM	-35°F to 250°F	Lime Slurry	EPDM	-35°F to 250°F	Water, Fresh	EPDM	-35°F to 250°F
Carbon Monoxide (Cold)	Neoprene	-20°F to 225°F	Methane	Nitrile	0°F to 212°F	Water, Salt	EPDM	-35°F to 250°F
Carbon Monoxide (Hot)	Viton	10°F to 250°F	Methyl Ethy Ketone	EPDM	-35°F to 250°F	Xylene	Viton	10°F to 250°F
Carbon Tetrachloride	Viton	10°F to 250°F	Naptha (Berzin)	Nitrile	0°F to 212°F			

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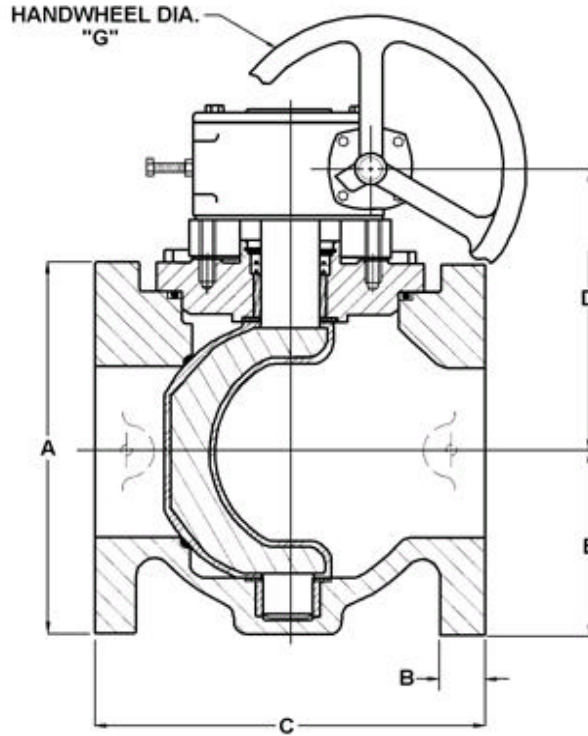
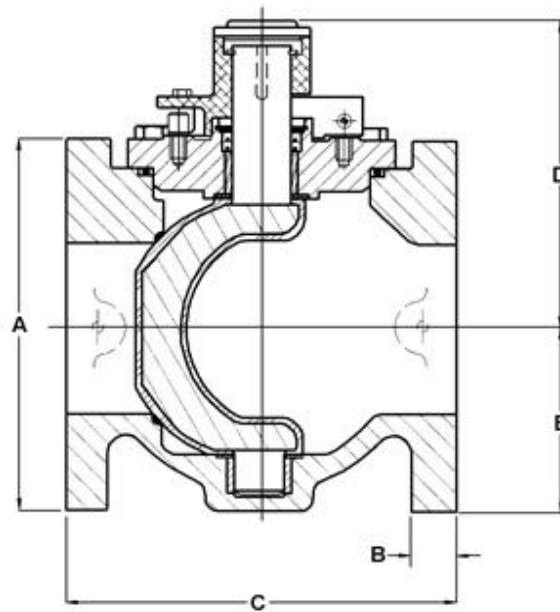
Melbourne Sydney Brisbane Perth Darwin

E-MAIL:sales@valveandflowcontrolspecialists.com

FLANGED END

FIG.601

175 PSI

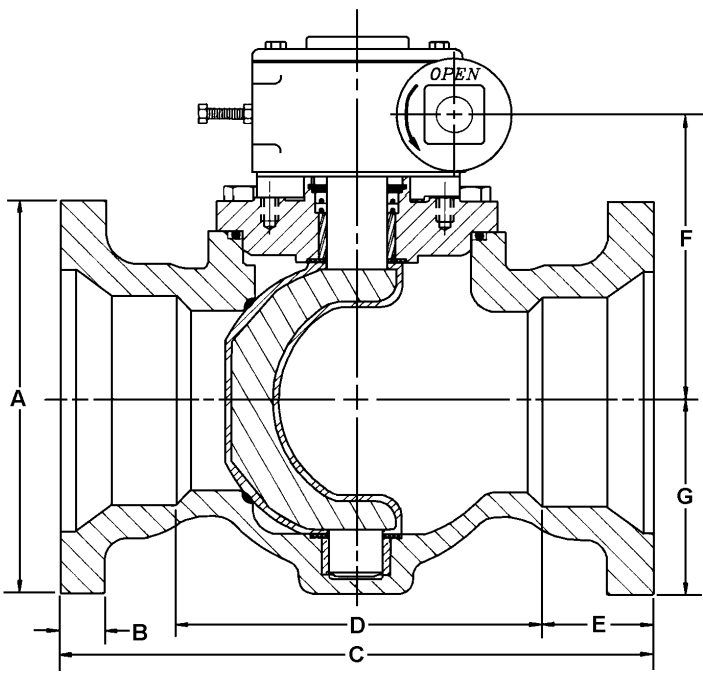
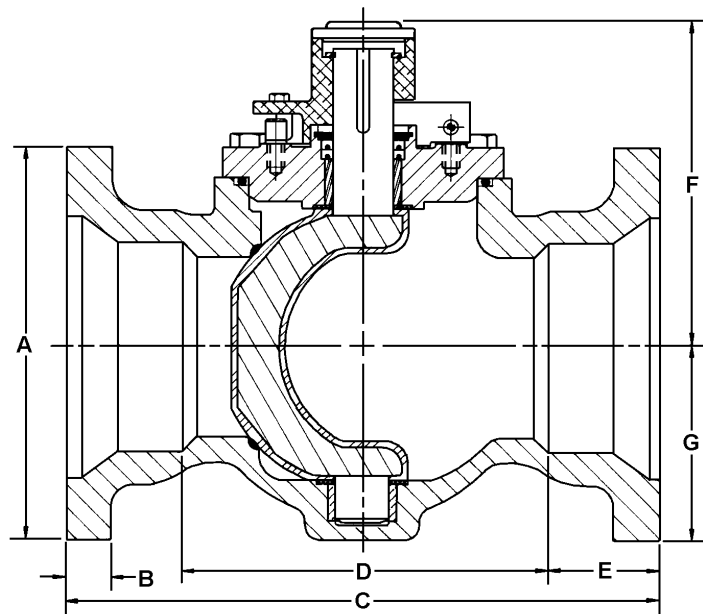


FLANGED END - ANSI 125									
Size	2.5	3	4	5	6	8	10	12	14
A	7	7.5	9	10	11	13.5	16	19	21
B	0.68	0.75	0.93	0.93	1	1.12	1.18	1.25	1.38
C	7.5	8	9	10	10.5	11.5	13	14	17
D	6.18	6.18	7.25	8.38	8.38	10.68	--	--	--
E	3.5	3.75	4.5	5.75	5.75	7.62	8.88	10	13
F	5.38	5.59	6.31	7.56	7.56	9.63	11.63	13.31	13.31
G	6	6	6	6	6	12	12	12	12
Weight (approx.)	30	40	70	105	115	190	345	440	510

\*10" & above have gear operators as standard

\*\* Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams



MECHANICAL JOINT END							
Size	3	4	6	8	10*	12*	14*
A	7.68	9.0	11.12	13.38	15.62	17.93	20.31
B	0.93	1.0	1.06	1.12	1.18	1.38	1.31
C	11.5	14.25	15.75	17.38	19.38	20.75	24.50
D	6.5	9.25	10.75	12.38	14.38	15.75	17.50
E	2.5	2.5	2.5	2.5	2.5	2.5	3.5
F	6.18	7.25	8.38	10.68	--	--	--
G	3.84	4.5	5.75	7.62	8.88	10.0	13.00
H	5.62	6.31	7.56	10.12	11.62	13.31	13.31
WT (approx.)	50	80	125	200	**	**	**

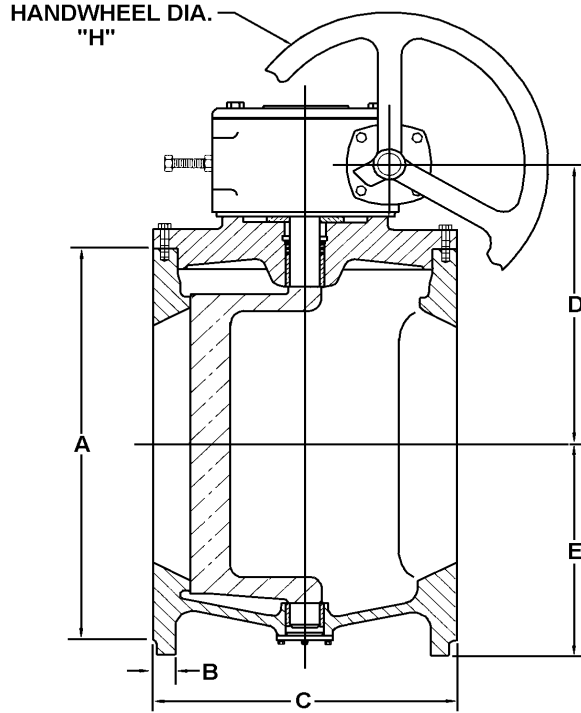
\*10" & above have gear operators as standard

\*\* Weight includes gear operator

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**FLANGED END**

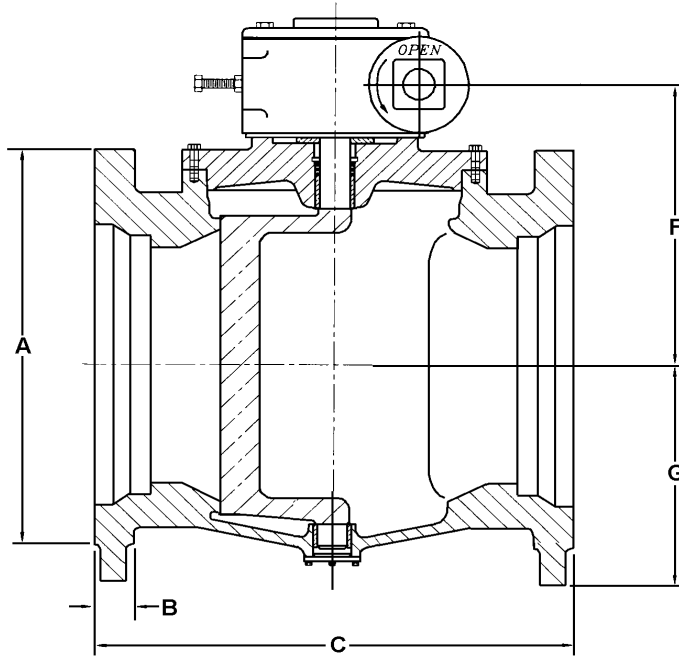
**FIG. 601**



**14" - 36" 150PSI  
42" and larger 125 PSI**

**MECHANICAL JOINT END**

**FIG. 600**



FLANGED END - ANSI 125 / 150										
Size	14	16	18	20	24	30	36	42	48	54
A	21.0	23.25	25.0	27.5	32.0	38.75	46.0	53.0	59.5	66.25
B	1.38	1.43	1.56	1.68	1.88	2.12	2.38	2.62	2.75	3.0
C	17.0	17.75	21.5	23.5	42.0	51.0	60.0	72.0	84.0	96.0
D	15.06	15.81	17.0	20.43	22.88	27.59	33.0	37.62	37.62	37.62
E	13.0	14.0	15.0	16.0	21.62	24.75	29.0	29.0	36.0	36.0
H	18.0	18.0	18.0	18.0	24.0	24.0	24.0	30.0	30.0	30.0
Weight (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350	15100

Flanged valves meet ANSI B16.1

MECHANICAL JOINT END									
Size	14	16	18	20	24	30	36	42	48
A	20.31	22.56	24.84	27.0	31.5	39.12	46.0	53.0	60.0
B	1.31	1.38	1.43	1.50	1.62	1.68	2.0	2.0	2.0
C	24.5	27.25	29.25	31.0	42.0	51.0	60.0	72.0	84.0
F	15.06	15.81	17.0	20.43	22.88	26.93	33.0	37.62	37.62
G	13.0	14.0	15.0	16.0	21.62	24.75	29.0	29.0	36.0
Weight (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350

M.J. valves meet ANSI 21.11 & AWWA C-111

Weight includes gear operator  
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

NOTE: Dimensions on 60" and larger available upon request.

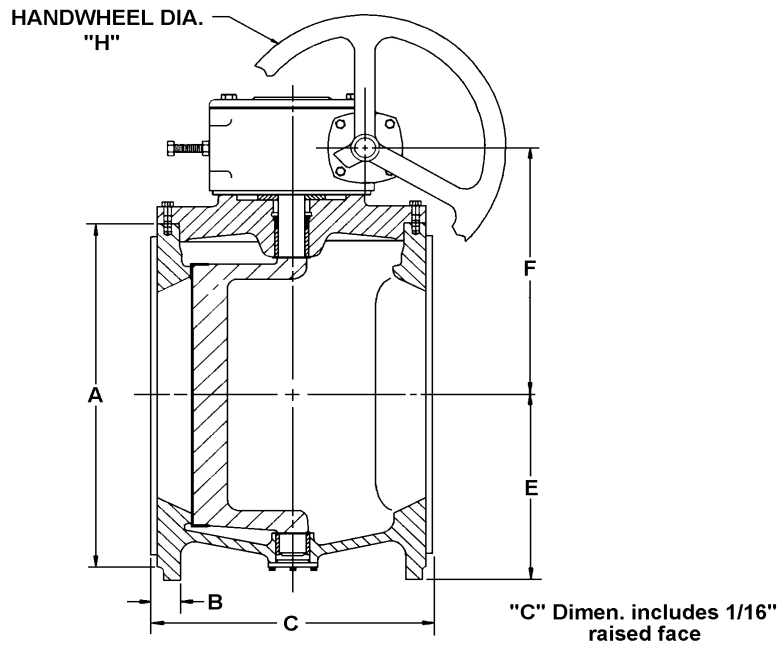
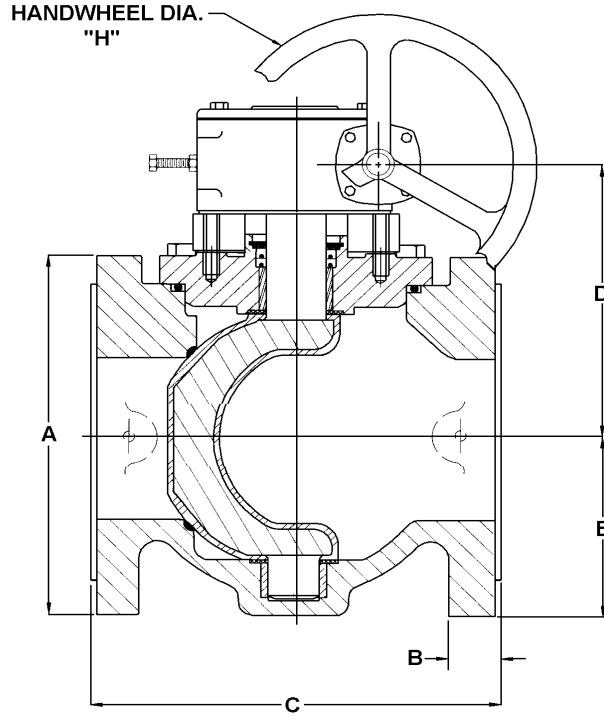


FLANGED END

FIG.602

2 1/2" -12" 400 PSI

14" -16" 300 PSI



FLANGED END - CLASS 250															
Size	2.5	3	4	5	6	8	10	12	14	16	18	20	24	30	36
A	7.50	8.25	10.00	11.00	12.50	15.00	17.50	20.50	23.00	25.50	28.00	30.50	36.00	43.00	50.00
B	1.06	1.12	1.25	1.38	1.43	1.62	1.88	2.00	2.12	2.25	2.38	2.50	2.75	3.00	3.38
C	9.50	11.12	12.00	15.00	15.88	16.50	18.00	19.75	18.50	19.38	23.12	25.00	42.88	51.88	61.00
E	3.50	3.75	4.50	5.75	5.75	8.25	8.88	10.00	13.00	14.00	15.00	16.00	21.62	24.75	29.00
F	6.00	6.09	7.06	8.31	8.31	10.13	13.88	14.75	15.60	15.81	17.00	20.43	22.88	27.59	33.00
H	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	18.00	18.00	18.00	18.00	24.00	24.00	24.00
Weight (approx.)	40	80	120	162	170	275	398	590	980	1125	1830	2060	4160	5700	7670

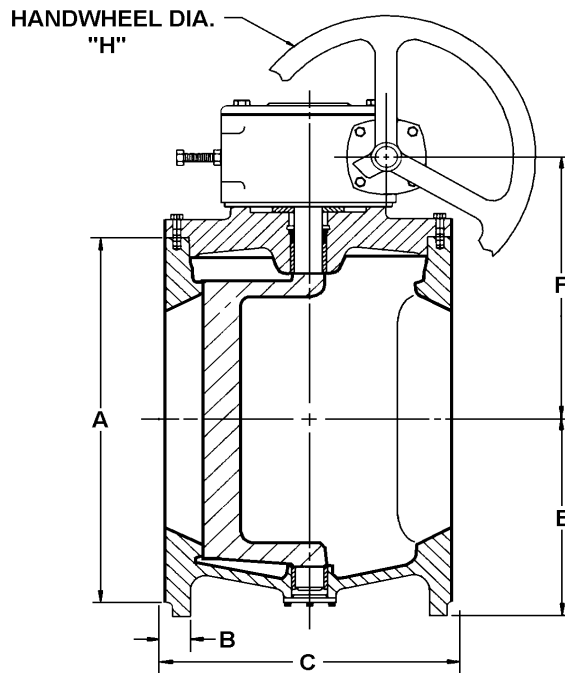
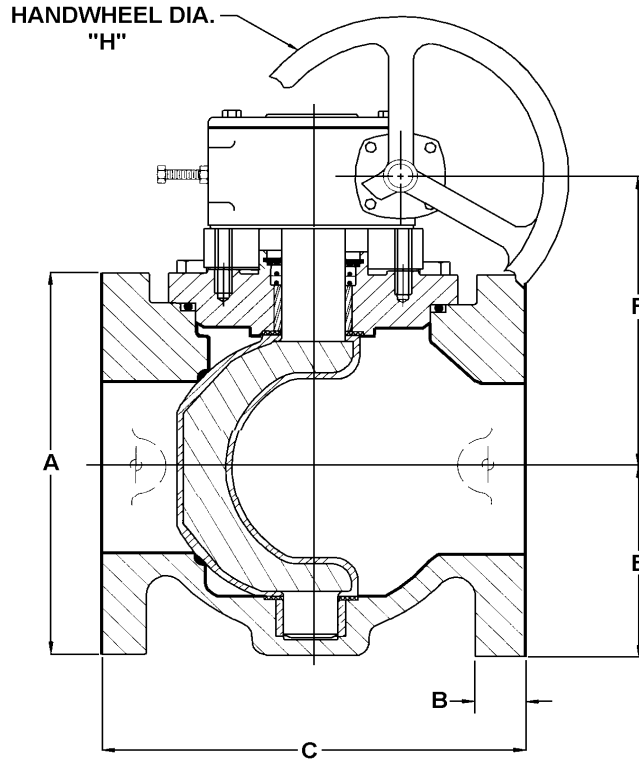
All above have gear operators as standard  
Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

**FLANGED END**

**FIG.601RL**

2 1/2" -12" 175 PSI  
 14" -16" 150 PSI  
 42" and larger 125 PSI



FLANGED END - ANSI 125 RUBBER LINED

Size	2.5	3	4	5	6	8	10	12	14	16	18	20	24	30	36	42
A	7.00	7.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.25	25.00	27.50	32.00	38.75	46.00	53.00
B	0.80	0.88	1.05	1.05	1.12	1.25	1.30	1.38	1.50	1.55	1.68	1.80	2.00	2.25	2.50	2.93
C	7.75	8.25	9.25	10.25	10.75	11.75	13.25	14.25	17.25	18.00	21.75	23.75	42.25	51.25	60.25	72.25
E	3.50	3.75	4.50	5.75	5.75	7.62	8.88	10.00	13.00	14.00	15.00	16.00	21.62	24.75	29.00	31.25
F	6.00	6.09	7.06	8.31	8.31	10.13	15.50	17.19	15.06	15.81	17.00	20.43	22.88	27.59	33.00	37.62
H	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	18.00	18.00	18.00	18.00	24.00	24.00	30.00	30.00
Weight (approx.)	30	70	100	135	145	240	345	440	905	1030	1355	1880	3800	5200	6950	10160

All above have gear operators as standard

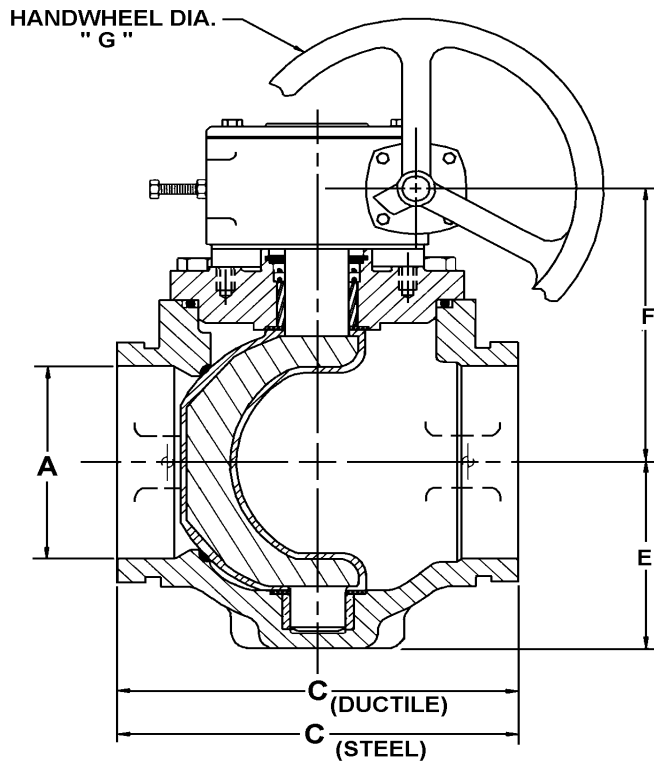
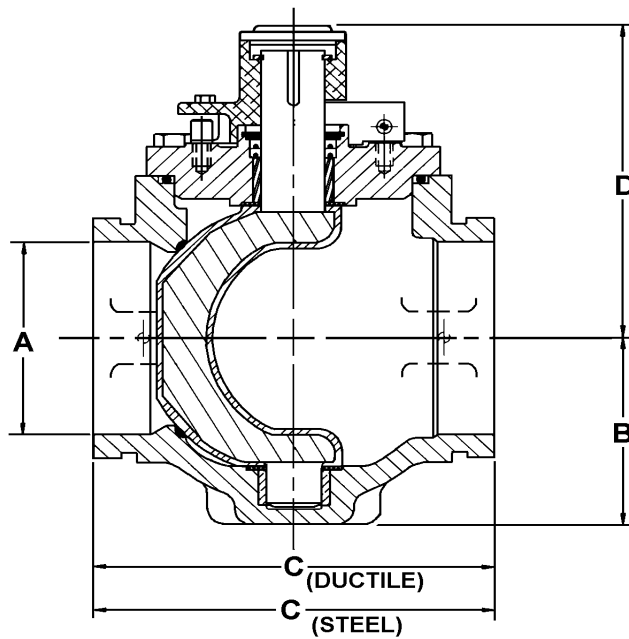
Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

GROOVED END

FIG.606

175 PSI



GROOVED END - AWWA 606									
Size	2.5	3	4	5	6	8	10*	12*	14*
A	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00
C - DUCT.	N/A	N/A	10.25	N/A	12.50	14.00	16.56	18.00	21.63
C - STEEL	8.50	8.50	10.13	12.38	12.38	13.88	16.44	18.00	21.50
D	6.18	6.18	7.25	8.38	8.38	10.68	--	--	--
E	3.50	3.75	4.50	5.75	5.75	7.62	8.88	10.00	10.00
F	5.38	5.59	6.31	7.56	7.56	9.63	11.63	13.31	13.31
G	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	18.00
Weight (approx.)							**	**	**
	20	30	50	70	80	145	325	420	460

\* 10" & above have gear operators as standard

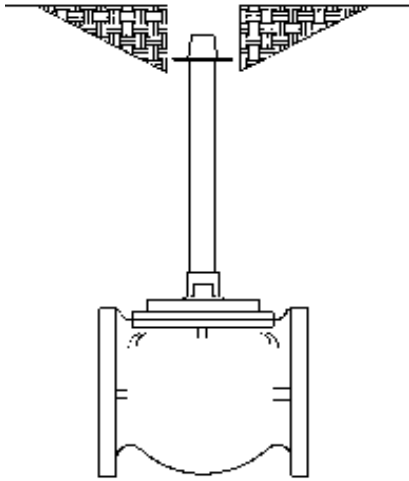
\*\* Weight includes gear operator

NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

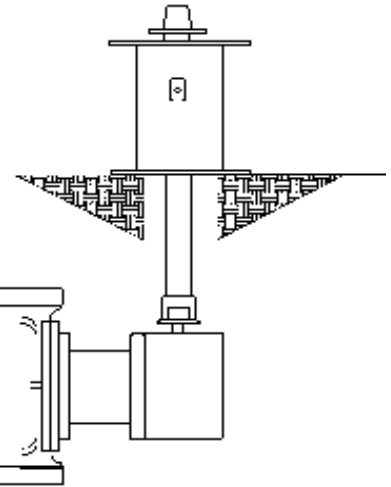
## ADAPTATION

A range of extended stems & floor mounted stands for remote operation, particularly in buried service, are available.

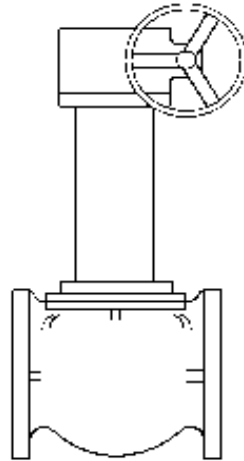
Chainwheel operation & locking devices are readily incorporated onto the MILLCENTRIC valve.



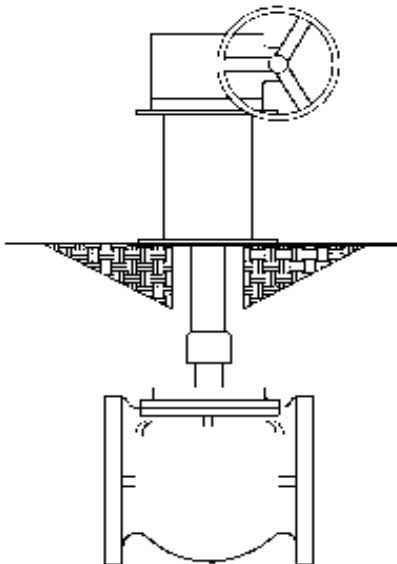
**Valve with Extended Stem**



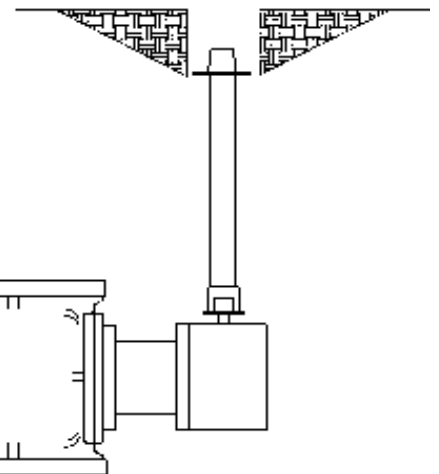
**Valve with indicating floorstand**



**Valve with extended bonnet**



**Valve with non-indicating floorstand**



**Valve with extended stem & buried gear**



# PROPOSED TECHNICAL SPECIFICATION Eccentric Plug Valves 3"- 72"

Valves shall be of the non-lubricated, eccentric type. Flanged valves shall be manufactured in accordance with **ANSI B16.1, Class 125/150**, including flange thickness as required by **AWWA C504-00, Table 2** and comply with MSS-SP-108 (Eccentric Plug Valves) in all respects. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**.

Valves shall be designed and manufactured to have a minimum wall thickness compliant to **AWWA C504-00**. Plug shall be round thru 12" and rectangular for sizes 14" and larger. Lay lengths shall be compliant to MSS-SP-108 for all valve sizes.

Valve bodies shall be of **ASTM A-126, Class B** cast iron in accordance with **AWWA C-504-00, Sec. 4.4.2.1**, or **ASTM A-536 ductile iron**. Valves 3" and larger shall be furnished with a welded-in overlay seat of not less than 90% nickel in accordance with **AWWA C-507-85, Sec. 3.2.3.5**. Nickel thickness shall be not less than .125". Sprayed, plated screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536, Grade 65-45-12** high strength ductile iron in conformance with **AWWA C-504-00, Sec. 4.4.2.2**, or solid one piece cast iron. Two piece plugs or plugs with internal cavities are not acceptable. The plug shall be of one piece solid construction with PTFE thrust bearings on the upper and lower bearing journals to reduce torque and prevent dirt and grit from entering the bearing and seal area. Valves that do not isolate the bearing area from debris are not acceptable. Valves shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-504-00, Sec. 4.5.6.4** and **AWWA C507-85, Sec. 3.2.4**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743, Grade CF8M**.

Part areas shall provide for the following minimum flow coefficients or be a minimum of 100% port.

<u>Valve Size</u>	<u>Cv(GPM)</u>	<u>Valve Size</u>	<u>Cv(GPM)</u>
3"	500	14"	6,000
4"	1,000	16"	9,000
5"	2,000	18"	11,000
6"	2,000	20"	13,000
8"	3,000	24"	21,000
10"	6,000	30"	36,000
12"	7,000	36"	47,000

All plug valves, for whatever service, shall be capable of passing "pigging" cleaning equipment in either direction and manufacturer shall so certify that this may be done without the use of special equipment.

Valve Shaft seals shall be of the dual "U" cup type in accordance with **AWWA C-504-00, Sec. 4.5.7.1**. Seals shall be self adjusting and repackable without removing the bonnet from the valve. Packing adjustment shall not result in an increase in plug friction or resulting torque. Packing replacement shall be achieved without need to cut packing during reinstallation and not require cap removal. Single piece packing arrangements are not acceptable.

Wrench operated valves 2 1/2" - 8" shall be capable of being converted to worm gear or automated operation without removal of the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removable levers or extended "T" handles. Worm gear operators, where required, shall be of heavy-duty ductile iron construction with ductile iron quadrant supported on top and bottom by oil impregnated bronze bearings. The worm gear and shaft shall be manufactured of hardened steel and run on high efficiency roller bearings. Gear shall have both open and closed stops, shall be flush-mounted to the valve exposing no portion of the plug stem and shall be rated for the valves design pressure rating for bi-directional shut off. Buried service gears shall be designed and certified to withstand input loads of up to 300 ft. lbs. minimum without damage.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2 1/2" through 12" and at 150 psi for valves 14" through 36". Valves 42" and larger shall be certified bubble tight at 125 psi. Each valve shall be given a bi-directional hydrostatic seat test with the test results being certified by the manufacturer when required. All actuation shall be supplied and full warranted by the plug valve manufacturer.

Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-504-00, Section 5.2.4**.