

# ENVIREQUIP

## MIX-TECH MIXERS - WARRANTY - SERVICE

### WARRANTY

ENVIREQUIP offers a 2 Year warranty against defects on materials and workmanship and a process warranty providing that the process information provided at the time on which the mixer selection was based is correct.

### SERVICE

MIX-TECH have shipped mixers to many parts of the world. MIX-TECH provide sales and service in North America through our own staff and through our network of distributors and representatives. For the MIX-TECH Series EVG mixers, the drives are Nord Gear. Because MIX-TECH do not remove the nameplates from the original Nord drive, our clients have the original serial numbers of the drive(s). For any problems or for new applications, please contact us directly toll free at 1-866-819-6123 or fax us at 1-613-874-2629.

Additionally, Nord provide sales and service in hundreds of locations in most countries worldwide. You are never far from service anywhere in the world.

### CONTACT US

From all of us at ENVIREQUIP, we thank our clients very much for your interest in our equipment and for your patronage. We promise to continue to manufacture top quality, rugged equipment, that is energy-efficient, feature-packed, at a reasonable price. Contact us toll free at 1-866-819-6123, fax us at 1-613-874-2629, send e-mail to : [envireqp@glen-net.ca](mailto:envireqp@glen-net.ca) or visit our web site at [www.envirequip.com](http://www.envirequip.com)

Or contact Vivendi one of our licensees for water and waste water applications at 1-514-334-7230.

For a mixer selection and quotation, please call, fax, e-mail, check our web site, or write to us, and we will be pleased to provide you with a prompt energy-efficient mixer quotation.

### REPRESENTED BY :



**MIX-TECH... GOOD PEOPLE TO MIX WITH**

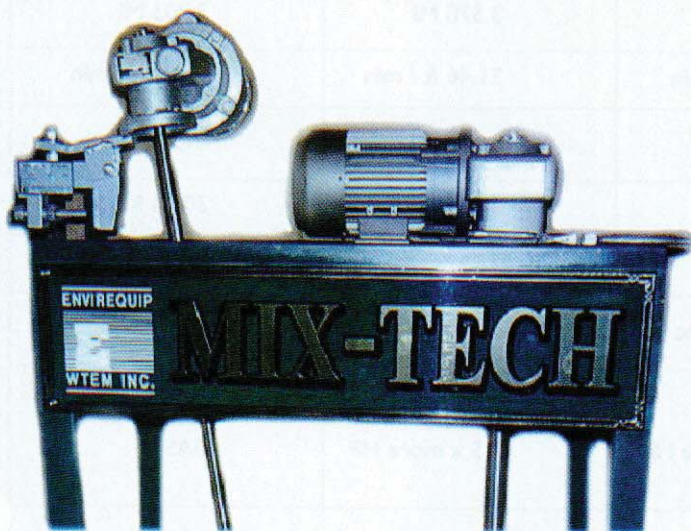


ENVIREQUIP



WTEM INC.

## MIX-TECH PORTABLE MIXERS 1/4 to 2 HP



Nord Gear reducers with hollow quill, Crown & Worm gearing and fixed mount is Standard, Parallel Shaft Helical optional.

Commercially available Nord reducers  
No proprietary parts nor their  
high prices - Availability worldwide.

Motors: 575/3/60 or 460/3/60 TEFC,  
inverter service Standard 120/1/60  
TEFC 56C inverter service optional air or  
hydraulic motor and XP optionally available.

Mounting: Flanged Fixed mount Standard  
optional: Angle Riser base (2) axis Clamp; Custom designs.

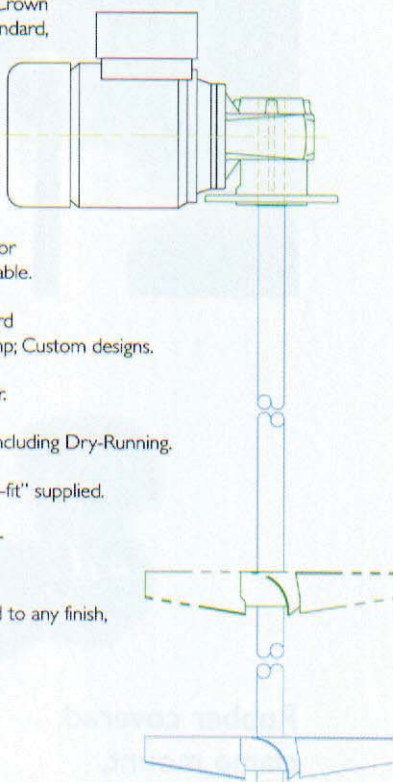
Shafts: 0.75", 1.0", 1.25", 1.4375" diameter.

Seals: LRSB, Lip seals, Mechanical Seals including Dry-Running.

Impellers: ENVIROFOILs Standard "best-fit" supplied.

Materials: Steel, 304, 316 SS, PVC and/or  
elastomer coatings et al.

Sanitary Design: Welded design, Polished to any finish,  
SS pedestals, Washdown motors.



## 15 Reasons why you should consider buying MIX-TECH Portable Mixers:

MIX-TECH MIXERS operate below the 1st shaft harmonic frequency or Critical Speed and have no problems using VFD's over the entire speed range.

MIX-TECH MIXERS consume up to (10) times less HP than others operating at 350 RPM.

MIX-TECH MIXERS are selected taking THE MECHANICAL ADVANTAGE, thus optimizing energy usage.

MIX-TECH MIXERS are equipped with large impellers (Compared to others), providing excellent batch control.

MIX-TECH MIXERS operate at low peripheral speeds which provide less wear, shear and foaming problems

MIX-TECH standard mixers equipped with Crown & Worm gearing operating at low RPM's are more energy efficient than any other mixer operating at 350 RPM. Parallel shaft helical drives also available.

Crown & Worm drives can withstand momentary overloads up to 300%.

MIX-TECH MIXERS all have a minimum service factor of 2.5, others are usually 1.25 to 1.5 maximum.

MIX-TECH MIXERS are equipped with oversized bearings and are sized to provide a B10 Life of 100,000 hours minimum.

MIX-TECH MIXERS drive's high speed gears are ground to AGMA 13; the low speed gears to AGMA 11 minimum.

MIX-TECH MIXERS come equipped with fixed flange mounts as standard (OPTIONS: Clamp, Angle-Riser, Custom), and can be field converted to any other mounting (or visa versa).

MIX-TECH MIXERS have an easy shaft removal system (thrust plate & bolt).

MIX-TECH MIXERS are equipped with ENVIROFOIL high pumping - Low Power-Draw Impellers.

MIX-TECH MIXER'S warranty is (2) years against defects in materials or workmanship and includes a Process Warranty.

At ENVIREQUIP, our goal is to manufacture MIX-TECH MIXERS which are rugged, feature packed, easy to maintain and energy efficient at a reasonable price.

# MIX-TECH...GOOD PEOPLE TO MIX WITH



# VL2 & VL3 AGITATOR

## MIXER & SHREDDER REDUCERS

### VL2 - SPREAD BEARING DESIGN

Increased bearing spreads with an oversized double row spherical bearing on the lower side. It is commonly used in shredders, mixers or applications requiring increased bearing load carrying capacities.

### VL3 - SPREAD BEARING DESIGN

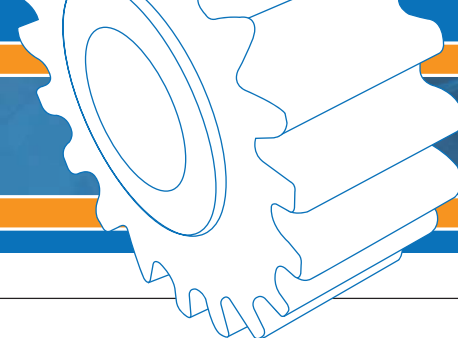
In addition to the VLII design an oil leakage control system is added. Our Dry Cavity System provides a very high degree of oil safety. The anti-leak QUADRILIP™ Oil Sealing System is enhanced with an oil collection cavity (just-in-case) and various ways to sense and remove the leakage from the cavity. Standard is a viewable oil sight indicator with an optional capacitive proximity switch and control available for electronic indication of a leak.

### OPTIONS TO BOTH DESIGNS

You may include a grease zerk to lubricate the lower bearing, and a removable plug to allow excess grease to purge from the bearing cavity.



Unit Size	B5 Flange Diameter		Solid Shaft Diameter		Hollow Shaft Diameter		Shrink Disc Diameter		Output Bearings		Bearing Spread	
	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	upper	lower	[in]	[mm]
<b>Offset Parallel (Clincher)</b>												
SK 1282	7.87	200	1.250	30	1.188	30	1.250	30	6009Z	22210E	4.91	125
SK 2282 or SK 2382	9.84	250	1.375	35	1.438	35	1.500	35	NUP210E	22212E	5.55	141
SK 3282 or SK 3382	11.81	300	1.875	45	1.625	40	1.625	40	NUP211E	22213E	6.58	167
SK 4282 or SK 4382	11.81	300	2.250	55	2.062	50	2.000	50	NUP214E	22216E	8.45	215
SK 5282 or SK 5382	13.78	350	2.500	65	2.438	60	2.500	60	NUP217E	22219E	9.92	252
SK 6282 or SK 6382	15.75	400	3.000	75	2.750	70	3.000	70	NUP220E	23222E	12.67	322
SK 7282 or SK 7382	17.72	450	3.500	90	3.188	80	3.188	80	NUP222E	23224E	14.08	358
SK 8282 or SK 8382	21.65	550	4.250	110	4.062	100	4.000	100	NUP226E	23228E	16.76	426
SK 9282 or SK 9382	25.98	660	5.250	140	4.750	120	4.750	125	NUP232E	23236E	19.04	484
SK 10282 or SK 10382	25.98	660	6.250	160	----	----	6.250	160	23044MB	22244MB	23.70	602
SK 11282 or SK 11382	25.98	660	7.000	180	----	----	7.000	180	23048MB	22244MB	24.29	617
SK 12382	25.98	660	7.000	180	----	----	7.000	180	23048MB	22244MB	24.29	617
<b>Helical-Bevel Speed Reducer</b>												
SK 9012.1 or SK 9013.1	7.87	200	1.250	30	1.375	35	1.375	35	6010Z	22210E	6.17	157
SK 9016.1 or SK 9017.1	7.87	200	1.375	35	1.500	40	1.500	40	6010Z	22210E	6.17	157
SK 9022.1 or SK 9023.1	9.84	250	1.375	35	1.500	40	1.500	40	6010Z	22210E	7.13	181
SK 9032.1 or SK 9033.1	11.81	300	1.750	45	2.000	50	2.000	50	6014 2RS	22214ES	8.17	207
SK 9042.1 or SK 9043.1	13.78	350	2.375	65	2.375	60	2.375	60	NUP216E	22219ES	10.47	266
SK 9052.1 or SK 9053.1	15.75	400	2.875	75	2.750	70	3.250	70	NUP220E	23222ES	13.28	337
SK 9072.1	17.72	450	3.625	90	3.250	80	3.250	80	NUP222E	23224ES	15.74	400
SK 9072.1/32	17.72	450	3.625	90	3.250	80	3.250	80	NUP222E	23224ES	15.74	400
SK 9072.1/42	17.72	450	3.625	90	3.250	80	3.250	80	NUP222E	23224ES	15.74	400
SK 9082.1	21.65	550	4.375	110	4.000	110	4.000	110	NUP228E	23228ES	18.61	473
SK 9082.1/42	21.65	550	4.375	110	4.000	110	4.000	110	NUP228E	23228ES	18.61	473
SK 9082.1/52	21.65	550	4.375	110	4.000	110	4.000	110	NUP228E	23228ES	18.61	473
SK 9086.1	25.98	660	4.750	120	4.750	120	4.750	125	22232E	23236ES	21.50	546
SK 9086.1/52	25.98	660	4.750	120	4.750	120	4.750	125	22232E	23236ES	21.50	546
SK 9092.1	25.98	660	5.500	140	----	----	5.500	150	23040E	23236ES	25.57	650
SK 9092.1/52	25.98	660	5.500	140	----	----	5.500	150	23040E	23236ES	25.57	650
SK 9096.1	25.98	660	7.500	190	----	----	----	----	23040E	23236ES	25.57	650
SK 9096.1/62	25.98	660	7.500	190	----	----	----	----	23040E	23236ES	25.57	650
SK 9096.1/63	25.98	660	7.500	190	----	----	----	----	23040E	23236ES	25.57	650



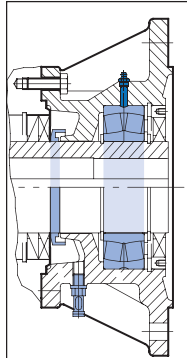
## RATIO & SPEED

### OFFSET PARALLEL CLINCHER

- Ratio range : 4.03:1 to 6616.79:1
- Speed range from 1750 rpm motor : 0.26 to 434 rpm
- 95.5% minimum standard efficiency

### 90 SERIES RIGHT ANGLE BEVEL

- Ratio range : 8.04:1 to 4916.63:1
- Speed range from 1750 rpm motor : 0.36 to 218 rpm
- 95.5% minimum standard efficiency



## STANDARD CONFIGURATION

- B5 flange housing style
- Output shaft types : Keyed solid shaft, Keyed hollow shaft, Keyless shrink disc connector
- VLII-spread bearing design has an Increased bearing spread, and a Large double row spherical bearing on lower side
- VLIII-dry cavity design : Includes the VLII features with added oil leakage control, Oil flinger, Oil accumulation cavity, sight glass to show if oil is present in the control cavity

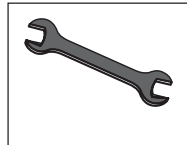
## STANDARD CONFIGURATION OPTIONS

Regreasable zerk lubricating nipple for lower bearing, Capacitive oil sensing switch, Capacitive oil switch



## SHAFT DATA

- AISI 4140 output shaft material
- Inch shaft key dimensions according to AISI B17
- Metric shaft key dimensions according to DIN 6885
- Standard output shaft drill and tap
- Shrink disc size range [in] : 1.250 to 7.000
- Shrink disc size range [mm] : 30 to 180



## INTERNAL PARTS ASSEMBLY

- Heavy press fit assembly method
- Standard reversing duty
- Typical backlash range [arc minutes] : 6 to 13



## GEARING

- Up to AGMA Class 13 quality rating on gears
- 58 Rockwell C minimum hardness of steel gears
- Ground or skive hobbled hard finishing of gear teeth
- Standard drop forged gear blanks
- 275% momentary overload capacity
- Standard hunting tooth ratios



## HOUSING

- Class 35 gray iron typical housing material
- Single setup machining method
- UNICASE™ one piece main housing design
- Seals directly contact main housing
- Exceptional housing torsional stiffness
- Thick housing wall section
- Castings are dip sealed



## BEARINGS

- ABEC-1 quality bearings
- Bearing spread is larger than standard unit by at least 50%
- Double row spherical lower output bearing
- Optional housing with grease zerk available for lower bearing regreasing
- NIGI 2EP lithium based lower bearing lubricant
- 50,000 + hours of L10 output bearing life



## LUBRICANT & SEALING COMPONENTS

- Factory filled ISO 220 mineral oil
- Standard AUTOVENT™ breather style
- QUADRILIP™ output seal system
- 3 double lip & 2 single lip output shaft oil seals
- Double lipped lower flange seal
- Nitrile rubber oil seals

## LUBRICANT & SEALING OPTIONS

Custom synthetic lubricating oil, High or low temperature lubricating oil, Fluid grease lubricant, Food grade lubricating oil, Long term storage preparation, Magnetic drain plug, Bullseye sight glass, Custom drain plug, Fluorinated rubber oil seal material



## ENVIRONMENTAL PROTECTION

- Exterior primer coverage : all metal exterior surfaces
- Paint type : Water Based Resin
- Paint additive : 316 stainless steel flakes
- USDA incidental contact exposure : H1

## ENVIRONMENTAL OPTIONS

Severe duty and washdown duty paint options, Custom paint, Top side shaft covers

**Project name:** AMARUQ

**Project#:** 5000218009

**Document #:** SPK\_0004\_RX

**by:** LJ

**chkd:** GP

**appvd:** CB



# SLUDGE TANKS RX75-2

## VALVES

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# PRATT

Henry Pratt Company

## Ballcentric® Plug Valve



**Engineering Creative Solutions  
for Fluid Systems Since 1901**

## A Tradition of Excellence

With the development of the first rubber seated butterfly valve more than 70 years ago, the Henry Pratt Company became a trusted name in the flow control industry, setting the standard for product quality and customer service. Today Pratt provides the following range of superior products to the water, wastewater and power generation industries.

**Butterfly Valves:** from 3" to 162"

**Rectangular Valves:** 1' x 1' to 14' x 16'

**Ball Valves –**

**Rubber Seated:** from 4" to 60"

**Metal Seated:** from 6" to 48"

**Plug Valves:** from 1/2" to 72", 100% port available up to 48", 3 ways

**Air Valves for Water and Wastewater:** from 1/2" to 20"

## Hydraulic Control Systems

### Valve Controls

**Energy Dissipating Valves  
and Fixed Energy Dissipaters**

**Cone Valves**

**Check Valves**

**Plunger Valves**

## A Commitment to Meeting The Customers' Needs

Henry Pratt valves represent a long-term commitment to both the customer and to a tradition of product excellence. This commitment is evident in the number of innovations we have brought to the industries we serve. In fact, the Henry Pratt Company was the first to introduce many of the flow control products in use today, including the first rubber seated butterfly valve, one of the first nuclear N-Stamp valves, and the bonded seat butterfly valve.

## Innovative Products For Unique Applications

Though many of the standard valves we produce are used in water filtration and distribution applications, Pratt has built a reputation on the ability to develop specialized products that help customers to meet their individual operational challenges.

## Creative Engineering for Fluid Systems

Pratt's ability to provide practical solutions to complex issues is demonstrated by the following case histories.

### Earthquake Proof Valves

Pratt designed and manufactured hydraulically actuated valves for a water storage application so that the valves would automatically operate in the event of earthquakes. This led to the development of a valve that will withstand acceleration forces of up to 6gs.

### Custom Actuation/Isolation Valves

Pratt has designed and manufactured nuclear quality quarter-turn valves and parts since the first nuclear-powered generating plants were built. Our custom valves are able to close in a millisecond, using specially designed Pratt electro-pneumatic actuators.

## Valves Designed for Harsh Environments

Pratt designed and manufactured a 144" diameter butterfly valve for the emergency cooling system at a jet engine test facility. The valve was designed to supply water to help dissipate the tremendous heat generated by the engines during testing.



**Through experience, commitment and creative engineering, Pratt is uniquely suited to provide superior products for our customers' special needs. For more information, contact our corporate headquarters in Aurora, Illinois.**



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# Scope of Line

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

- Computer Aided Design
- High Integrity Casting
- CNC manufacturing delivers consistent sizes on all components

All complemented by rigorous Quality Control System

## Body

Conforming to AWWA C504 wall thickness, the Ballcentric® plug 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 Ballcentric® plug valve incorporates as standard, on 3" and larger, a 1/8" thick welded 99% nickel seat for corrosion and erosion resistance specifically profiled for low torque and extended seat life.

## 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, thereby eliminating periodic maintenance.

## 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.

## Plug

Supported on integral trunnions, the plug is totally encapsulated with an elastomer that is molded on 2 1/2" – 48" and vulcanized on 54" 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 the highest industry 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.

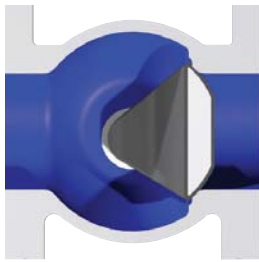
## Interchangeable

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

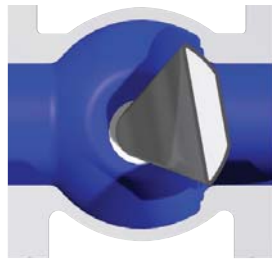
## Travel Stops

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

## Features and Benefits



- 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 Ballcentric® plug valve allows modulating control over the full 90° travel
- Ideally suited for balancing service
- Standard rotary valve provides control and tight shut off in one valve



- Plug is out of 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 Ballcentric® plug 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 the time of order. For use on fluids with suspended solids, it is recommended that the valve should be installed with the seat upstream and the valve stem horizontal with plug rotation to the top of the valve ensuring smooth operation.

### In-Line Maintenance

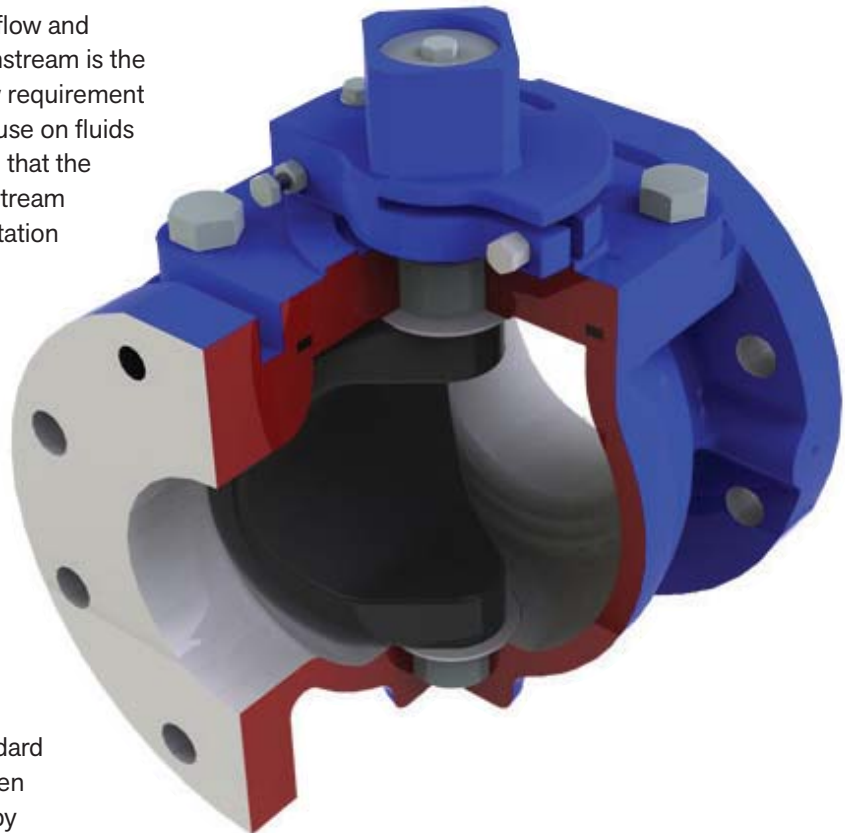
In the unlikely event of stem leakage, the stem seals can be easily replaced without removing the bonnet. Access to the body for cleaning or inspection does not require removal from the line.

### Modular Construction

Design of the bonnet and stem allows for on-site adaption 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.





# Dimensional Data

## ORDERING INFORMATION

### Valve Types

Valve Types	Designation
Mechanical Joint Cast Iron	600
Mechanical Joint Ductile Iron	610
ANSI 125 Flanged Cast Iron	601
ANSI 125 Flanged Ductile Iron	611
ANSI 150 Flanged Ductile Iron	621
ANSI 250 Flanged Ductile Iron	602
ANSI 125 Grooved for Steel Pipe	606S
ANSI 125 Grooved for Ductile Pipe	606D
ANSI 150 Flanged 316SS	601S
SEAT	
Nickel (3" & Larger)	N
Epoxy (2½" ONLY)	E
316SS (on stainless steel valve only)	S
Rubberlined	RL
Glasslined	GL
ELASTOMER TRIM	
EPDM	0
Buna-Nitrile	1
Viton	2
Neoprene	3
Natural	4

### MANUAL OPERATORS

MANUAL OPERATORS	
Above Ground Gear and Handwheel	AGHW
Above Ground Gear with 2" Nut	AGNUT
Buried Gear with 2" Nut	BG
Memory Stop Gear with Handwheel	MGHW
Lever / Wrench (8" & smaller)	L
Direct Nut (8" & smaller)	TC

Example: 4" 601N3AGHW = 4" ANSI 125 Flanged, Nickel Seat, Neoprene plug with Above Ground Gear and Handwheel

Valves are only tested for bi-directional shut-off if specified at time of order. Contact Henry Pratt for bi-directional ratings.

**NOTE:** We recommend mechanical joint or buried flanged valves to have gear operators

**NOTE:** We recommend valves for bi-directional service to have gear operators

## PRESSURE RATING

12" and smaller	ANSI 125	175 psi
14" and larger	ANSI 125	150 psi
20" and smaller	ANSI 150	285 psi
12" and smaller	ANSI 250	400 psi
14" and larger	ANSI 250	300 psi
Body Hydrotest = 150% of rated pressure / Seat Test = 100% of rated pressure Testing per AWWA C517		

## ELASTOMERS AVAILABLE FOR BALLCENTRIC® PLUG VALVE

Natural rubber is also available.

### Nitrile

A general purpose material sometimes referred to as BUNA-N or HYCAR with a -20°F to 212°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 base 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 300°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.

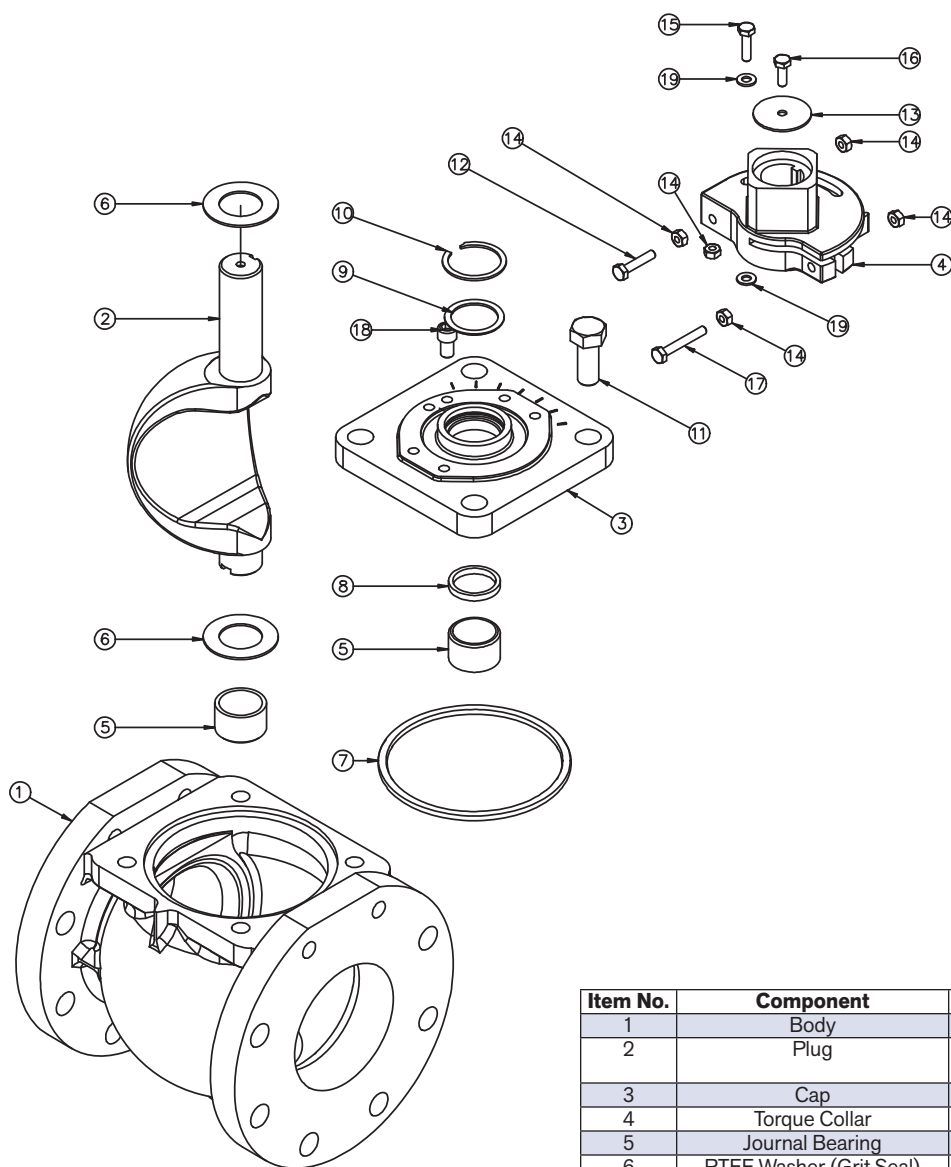
Note: Not for water or steam applications.

## Elastomer Selection Chart

Service	Elastomer	Average Useful Temp. Range	Service	Elastomer	Average Useful Temp. Range	Service	Elastomer	Average Useful Temp. Range
Acetone	EPDM	-35°F to 250°F	Caustic Soda	EPDM	-35°F to 250°F	Oil, Animal	Nitrile	-20°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	0°F to 212°F	Creosote (Coal)	Nitrile	-20°F to 212°F	Oil, Mobil Therm 603	Nitrile	-20°F to 212°F
Alcohol Aromatic	Viton	10°F to 250°F	Coal Slurry	Nitrile	-20°F to 212°F	Oil, Lubricating	Nitrile	-20°F to 212°F
Alcohol Butyl	Neoprene	-20°F to 225°F	Diesel Fuel No. 3	Nitrile	-20°F to 212°F	Oil, Vegetable	Nitrile	-20°F to 212°F
Alcohol Denatured	Nitrile	-20°F to 212°F	Diethylene Glycol	EPDM	-35°F to 250°F	Paint, Latex	Nitrile	-20°F to 212°F
Alcohol Ethyl	EPDM	-20°F to 250°F	Ethylene Glycol	EPDM	-35°F to 250°F	Phosphate Ester	EPDM	-35°F to 250°F
Alcohol Grain	Nitrile	-20°F to 212°F	Fatty Acid	Nitrile	-20°F to 212°F	Propane	Nitrile	-20°F to 212°F
Alcohol Isopropyl	Neoprene	-20°F to 225°F	Fuel Oil No. 2	Nitrile	-20°F to 212°F	Rape Seed Oil	EPDM	-35°F to 250°F
Alcohol Methyl	EPDM	-20°F to 250°F	Fertilizer Liquid H4N2O2	EPDM	-35°F to 250°F	Sewage with Oils	Nitrile	-20°F to 212°F
Ammonia Anhydrous	Neoprene	-20°F to 225°F	Gasoline Keg	Nitrile	-20°F to 212°F	Sodium Hydroxide 20%	EPDM	-35°F to 250°F
Ammonium Nitrate	EPDM	-20°F to 250°F	Gas Natural	Nitrile	-20°F to 212°F	Starch	EPDM	-35°F to 250°F
Ammonia, water	EPDM	-20°F to 250°F	Glue, Animal	Nitrile	-20°F to 212°F	Steam to 250°F	EPDM	-35°F to 250°F
Animal Fats	Nitrile	-20°F to 212°F	Green Liquor	EPDM	-20°F to 212°F	Stoddard, Solvent	Nitrile	-20°F to 80°F
Black Liquor	EPDM	-20°F to 250°F	Hydraulic Oil (Petro)	Nitrile	-20°F to 212°F	Sulphuric Acid 10% 50%	Neoprene	-20°F to 158°F
Blast Furnace Gas	Neoprene	-20°F to 225°F	Hydrogen	Nitrile	-20°F to 212°F	Sulphuric Acid 100%	Viton	10°F to 300°F
Butane	Nitrile	-20°F to 212°F	JF4, JP5	Viton	-20°F to 212°F	Trichloroethylene Dry	Viton	10°F to 300°F
Bunker Oil "C"	Nitrile	-20°F to 212°F	Kerosene	Nitrile	0°F to 212°F	Triethanol Amine	EPDM	-35°F to 250°F
Calcium Chloride	EPDM	-20°F to 250°F	Ketone	EPDM	-35°F to 250°F	Varnish	Viton	10°F to 300°F
Carbon Dioxide	EPDM	-20°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 150°F	Methane	Nitrile	-20°F to 212°F	Water, Salt	EPDM	-35°F to 250°F
Carbon Monoxide (Hot)	Viton	10°F to 300°F	Methyl Ethyl Ketone	EPDM	-35°F to 250°F	Xylene	Viton	10°F to 300°F
Carbon Tetrachloride	Viton	10°F to 300°F	Naptha (Berzin)	Nitrile	-20°F to 212°F			

**NOTE:** Above elastomer/temperature chart are guidelines only. See Henry Pratt Compatibility Chart for specific applications.

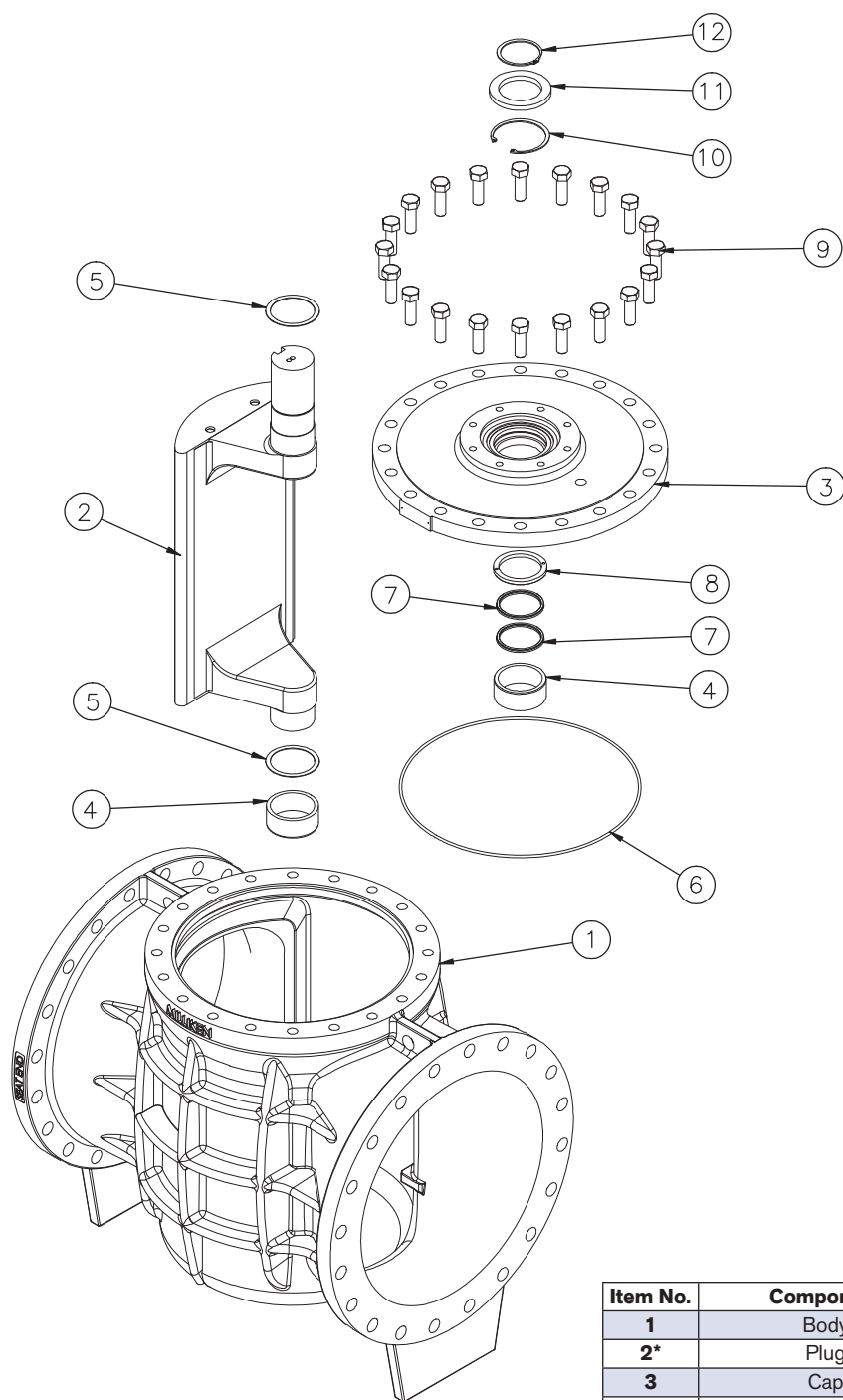
## Standard Materials of Construction, Fig. 601/600, 12" & Smaller



Item No.	Component	Material
1	Body	Cast Iron A126 Class B
2	Plug	Rubber Coated Ductile Iron ASTM A536
3	Cap	Cast Iron A126 Class B
4	Torque Collar	Ductile Iron ASTM A536
5	Journal Bearing	St. Steel – ANSI 316
6	PTFE Washer (Grit Seal)	PTFE
7	O Ring	Elas. as Spec.
8	U Cup Seal	Elas. as Spec.
9	Washer	Brass – ASTM B-138-675
10	Internal Snap Ring	Spring Steel
11	Setscrew	Steel (Zinc Plated)
12*	Closed Stop	Steel (Zinc Plated)
13*	Locking Washer	Steel
14*	Nut	Steel (Zinc Plated)
15*	Open Stop	Steel (Zinc Plated)
16*	Setscrew	Steel (Zinc Plated)
17*	Torque Bolt	Steel (Zinc Plated)
18*	Travel Stop	Steel
19*	Washer	Steel

**\*NOTE:** Torque Collar Assembly on 8" and Smaller

## Standard Materials of Construction, Fig. 601/600, 14" & Larger



Item No.	Component	Material	Qty.
1	Body	Cast Iron A126 Class B	1
2*	Plug	Rubber Coated See Note 1	1
3	Cap	Cast Iron A126 Class B	1
4	Sleeve Bearing	Stainless Steel/Bronze	2
5	PTFE Washer (Grit Seal)	PTFE	2
6	Cap "O" Ring	Elas. as Spec.	1
7	U Cup Seal	Elas. as Spec.	2
8*	Seal Retaining Ring	See Note 2	1
9	Cap Screw	Steel (Zinc Plated)	A/R
10	Internal Snap Ring	Spring Steel	1
11	Support Collar	Steel	1
12	External Snap Ring	Spring Steel	1

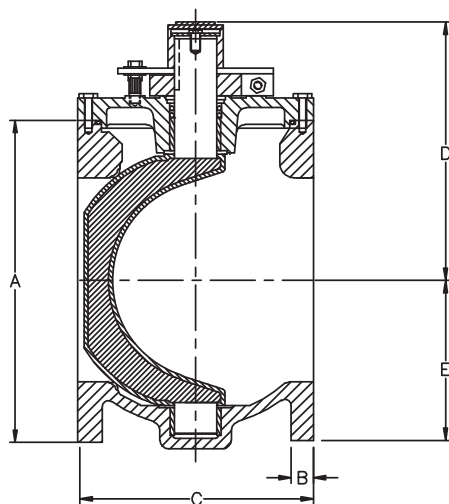
\*NOTE 1: Plugs: Ductile Iron — ASTM A536 on 14" – 20"  
Cast Iron — A126 Class B on 24" and larger

\*NOTE 2: Seal Retaining Ring: Brass — ASTM B-138-675 on 14" – 20"  
Steel on 24" and larger

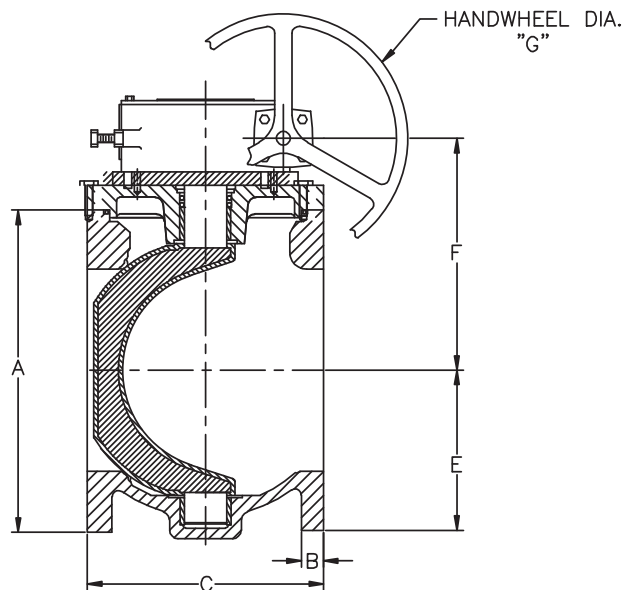


## Fig. 601 Cast Iron / 611 Ductile Iron – Flanged End 2 1/2" – 12", 175 PSI

2 1/2" – 8" VALVES ONLY



2 1/2" – 12" VALVES



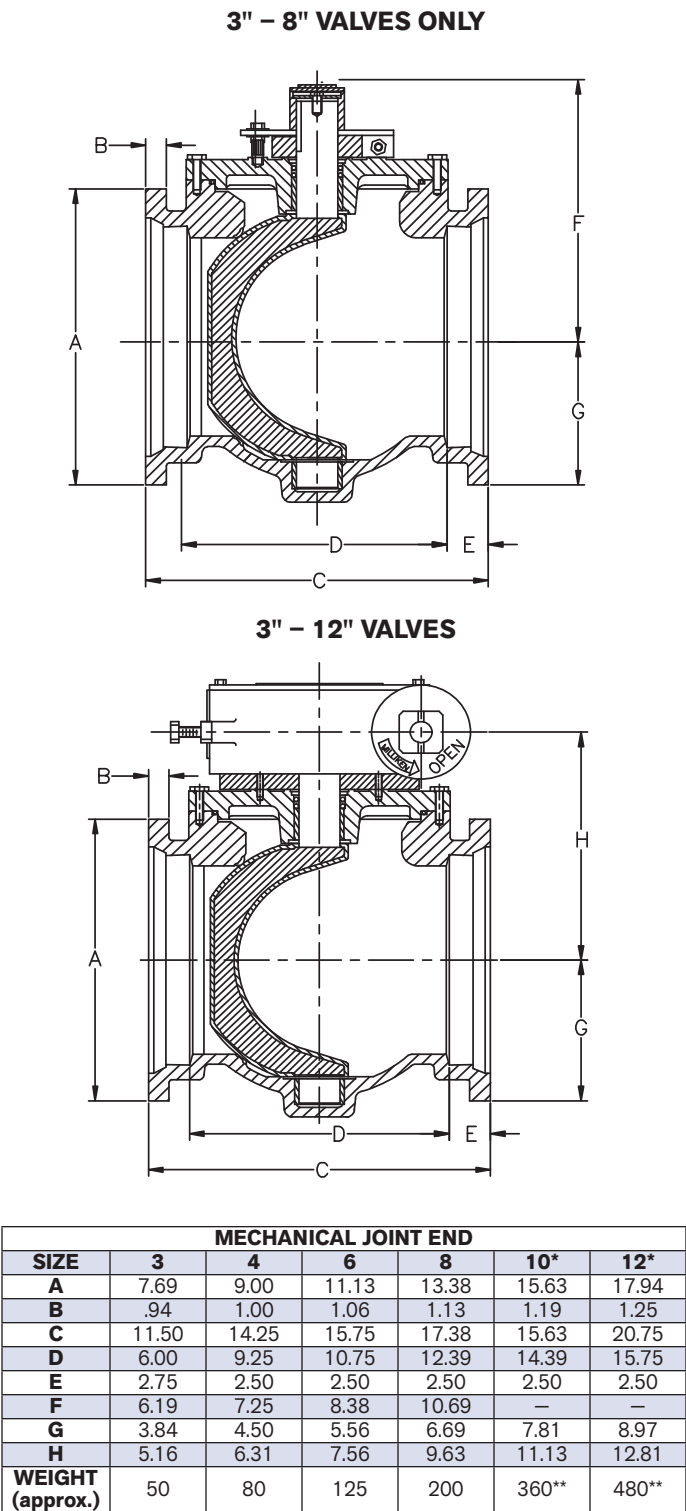
FLANGED END – ANSI 125								
SIZE	2.50	3	4	5	6	8	10*	12*
A	7.00	7.50	9.00	10.00	11.00	13.50	16.00	19.00
B	.69	.75	.94	.94	1.00	1.13	1.19	1.25
C	7.50	8.00	9.00	10.00	10.50	11.50	13.00	14.00
D	6.19	6.19	7.25	8.38	8.38	10.69	—	—
E	3.50	3.75	4.50	5.75	5.75	7.63	8.88	10.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.81
G	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00
WEIGHT (approx.)	30	40	70	105	115	190	345**	440**

\*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

**Fig. 600 Cast Iron / 610 Ductile Iron – Mechanical Joint**  
**3" – 12", 175 PSI**



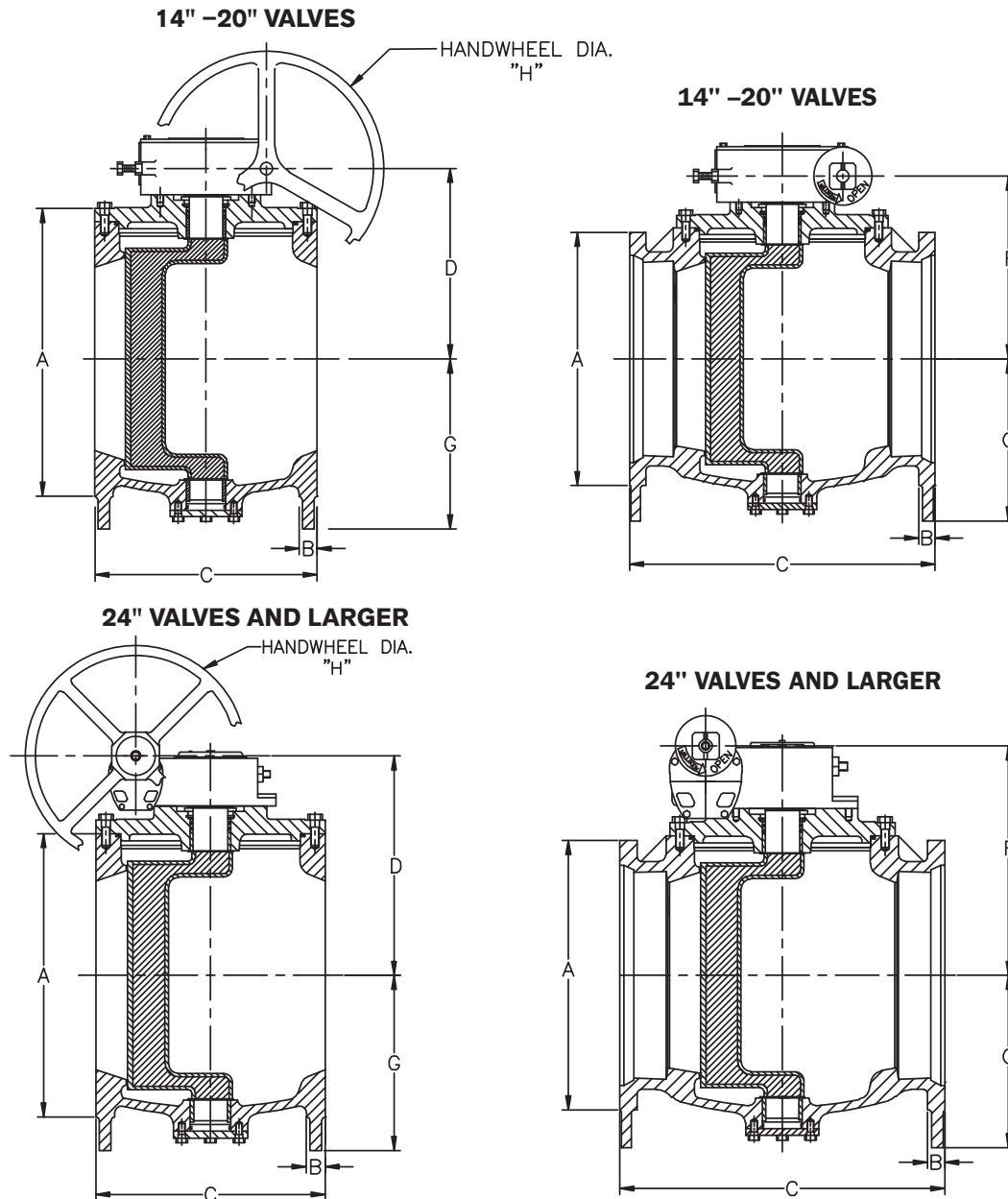
\*10" & above have gear operators as standard

\*\*Weight includes gear operator

We recommend gears on all Mechanical Joint Valves

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

**Fig. 601 Cast Iron / 611 Ductile Iron Flanged End**  
**Fig. 600/610 Ductile Iron Mechanical Joint End**  
**14" & Larger, 150 PSI**



FLANGED END – ANSI 125										
SIZE	14	16	18	20	24	30	36	42	48	54
A	21.00	23.50	25.00	27.50	32.00	38.75	46.00	53.00	59.00	66.25
B	1.38	1.44	1.56	1.69	1.88	2.13	2.38	2.63	2.75	3.00
C	17.00	17.75	21.50	23.50	42.00	51.00	60.00	72.00	84.00	96.00
D	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88	39.57	50.86
G	13.00	14.00	15.00	16.00	21.62	24.43	29.00	29.00	36.00	36.00
H	18.00	18.00	18.00	18.00	24.00	24.00	24.00	30.33	30.00	30.00
WEIGHT (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350	15100

Flanged Valves Meet ANSI B16.1

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.

MECHANICAL JOINT END									
SIZE	14	16	18	20	24	30	36	42	48
A	20.13	22.56	24.84	27.06	31.50	39.13	46.00	53.13	60.00
B	1.31	1.38	1.43	1.50	1.62	1.68	2.00	2.00	2.00
C	24.50	27.25	29.25	31.00	42.00	51.00	60.00	72.00	84.00
F	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88	39.57
G	13.00	14.00	15.00	16.00	21.62	24.75	29.00	29.00	36.00
WEIGHT (approx.)	905	1030	1355	1880	3800	5200	6950	10160	13350

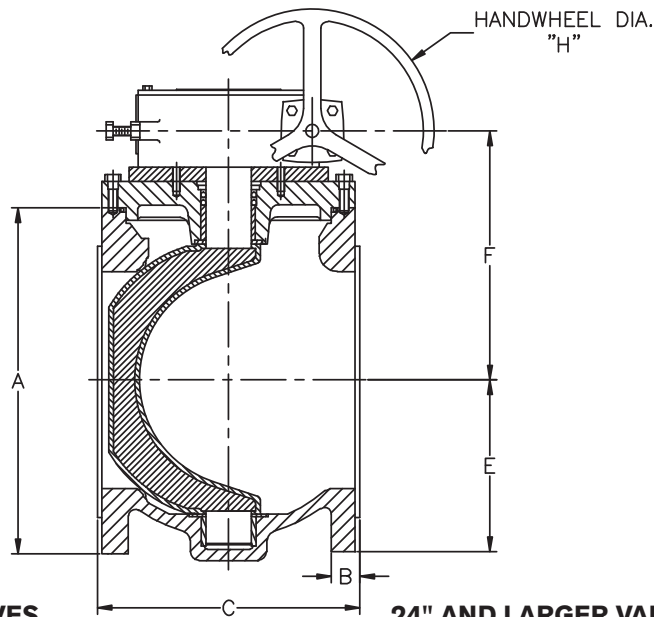
Mechanical Joint Valves Meet ANSI 21.11 & AWWA C-111



# Fig. 602 Class 250 Flanged End

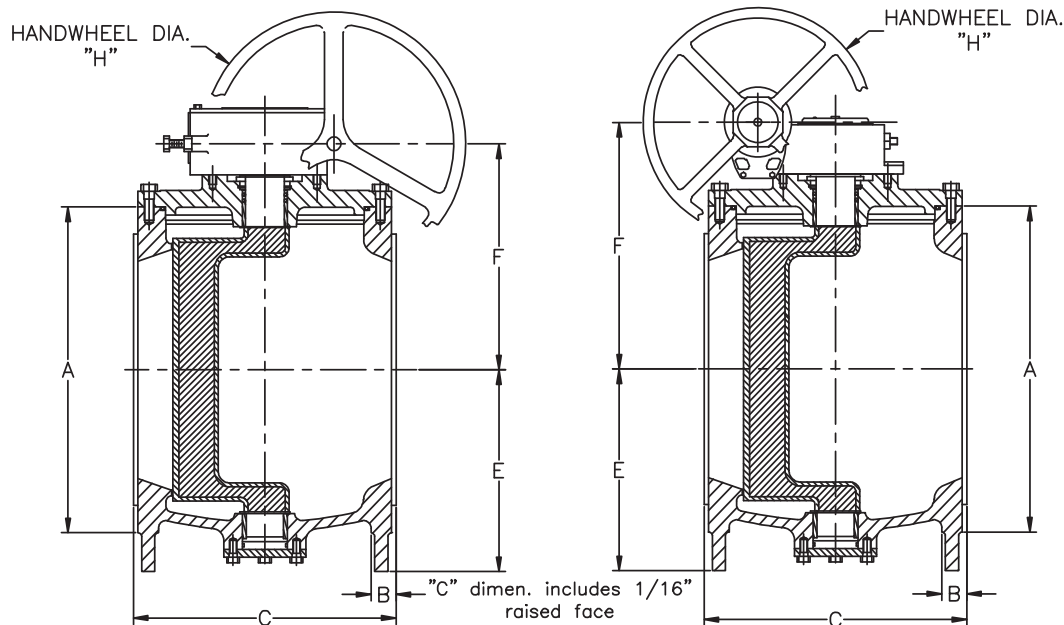
## 2 1/2" – 12", 400 PSI, 14" – 36", 300 PSI

2 1/2" – 12" VALVES



14" – 20" VALVES

24" AND LARGER VALVES



FLANGED END – ANSI 250															
SIZE	2.50	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	1.13	1.25	1.38	1.44	1.63	1.88	2.00	2.12	2.25	2.38	2.50	2.75	3.00	3.38
C	9.50	11.13	12.00	15.00	15.88	16.50	18.00	19.75	18.50	19.38	23.13	25.00	42.88	51.88	61.00
E	3.50	3.75	4.50	5.75	5.75	17.63	8.88	10.00	13.00	14.00	15.00	16.00	21.62	24.75	29.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.81	14.56	15.81	16.36	17.63	22.81	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.)	70	80	120	162	170	275	398	590	980	1125	1830	2060	4160	5700	7670

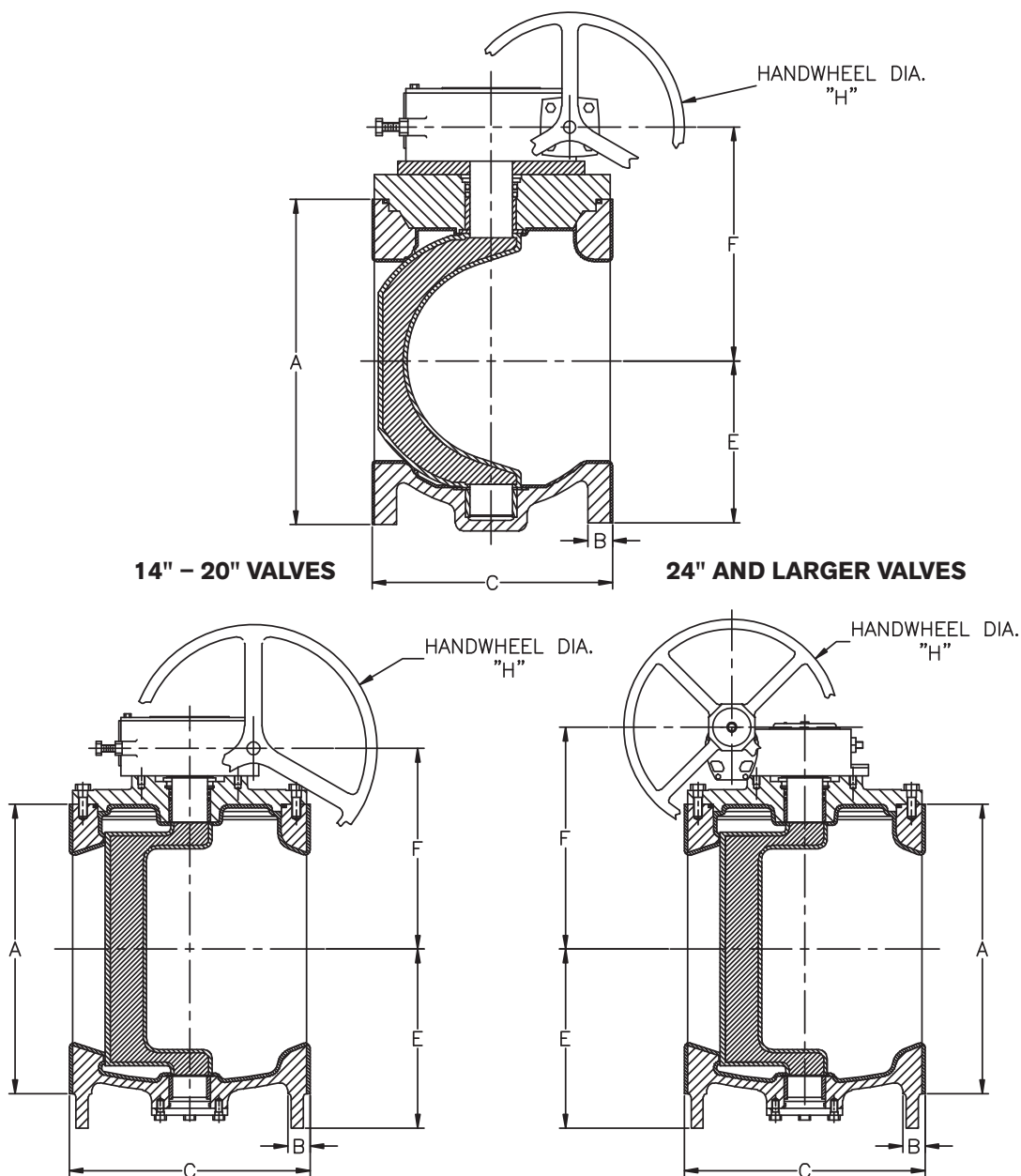
All above have gear operators as standard

Weight includes gear operator

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

**NOTE:** Dimensions on 42" and larger available upon request

**Fig. 601RL Rubberlined – Flanged End**  
**3" – 12", 175 PSI, 14" & Larger, 150 PSI**  
**3" – 12" VALVES**



FLANGED END – ANSI 125 RUBBER LINED															
SIZE	3	4	5	6	8	10	12	14	16	18	20	24	30	36	42
A	7.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.25	25.00	27.50	32	38.75	46.00	53.00
B	.88	1.07	1.07	1.13	1.26	1.32	1.38	1.26	2.25	2.38	2.50	2.75	3.00	3.38	3.38
C	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	3.75	4.50	7.75	7.75	7.63	8.88	10.00	13.00	14.00	15.00	16.00	21.63	24.75	29.00	29.00
F	5.16	6.31	7.56	7.56	9.63	11.13	12.81	14.56	15.81	16.36	17.63	25.13	29.00	33.51	33.88
H	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	24.00
WEIGHT (approx.)	70	100	135	145	240	345	440	905	1030	1355	1880	3800	5200	6940	10160

All above have gear operators as standard

Weight includes gear operator

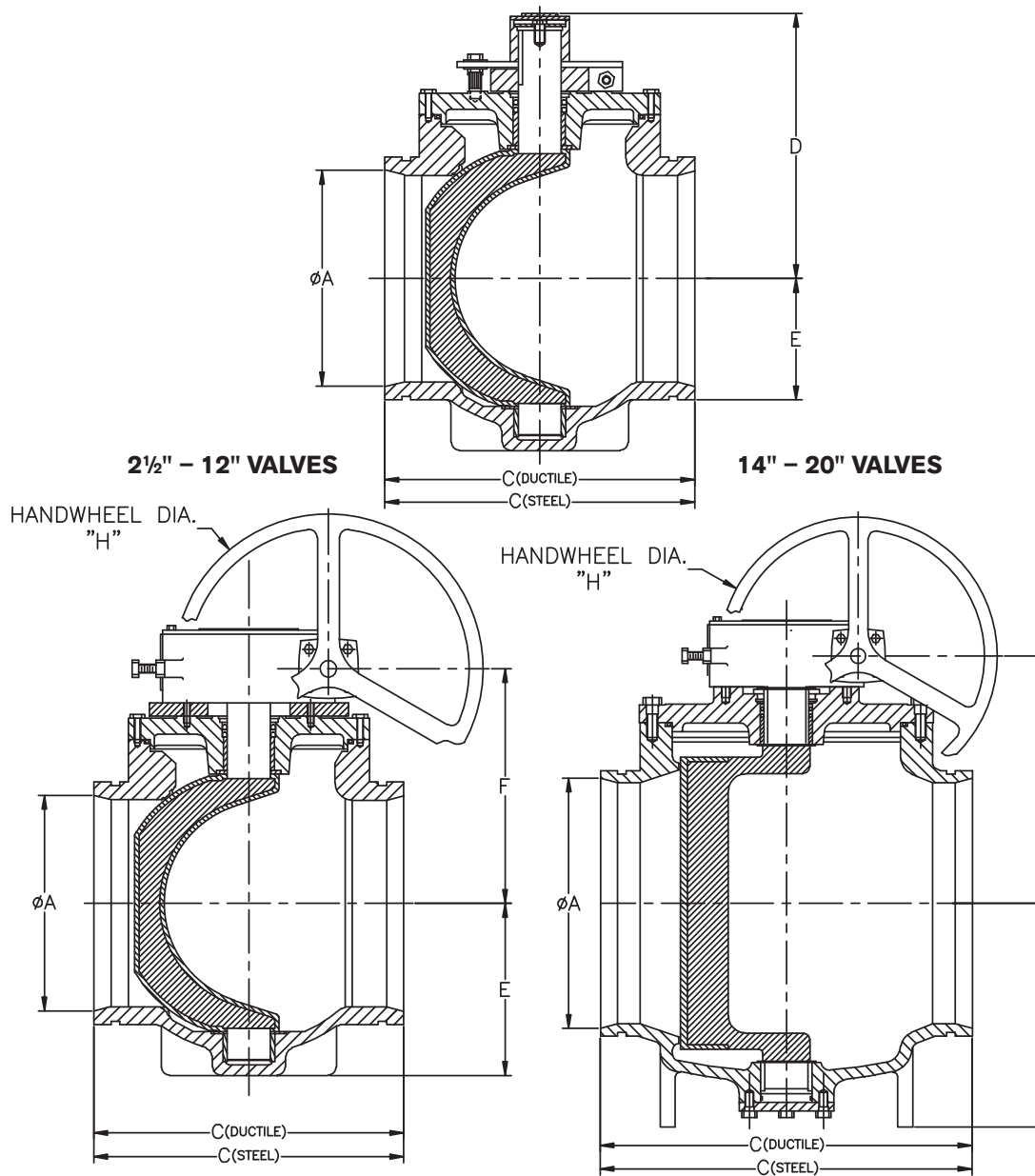
**NOTE:** Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

**NOTE:** Dimensions on 48" and larger available upon request

# Fig. 606 Grooved End

## 2 1/2" – 12", 175 PSI, 14" – 20", 150 PSI

2 1/2" – 8" VALVES



GROOVED END – AWWA 606												
SIZE	2.50	3	4	5	6	8	10*	12*	14*	16*	18*	20*
A	2.50	3.00	4.00	5.00	6.00	8.00	10.00	12.00	14.00	15.25	16.19	18.06
C (Duct.)	N/A	9.06	10.25	N/A	12.50	14.00	16.56	18.00	21.63	N/A	27.50	30.00
C (Steel)	7.13	8.50	10.13	12.38	12.38	13.88	16.44	17.88	21.63	22.50	27.50	30.00
D	6.19	6.19	7.25	8.38	8.38	10.69	—	—	—	—	—	—
E	3.50	3.75	4.50	5.75	5.75	7.63	8.88	10.00	10.00	14.00	15.00	16.00
F	5.16	5.16	6.31	7.56	7.56	9.63	11.13	12.86	13.56	15.81	16.35	17.63
H	6.00	6.00	6.00	6.00	6.00	12.00	12.00	12.00	12.00	18.00	18.00	18.00
WEIGHT (approx.)	20	30	50	70	80	145	325**	420**	RTF	RTF	RTF	RTF

\*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

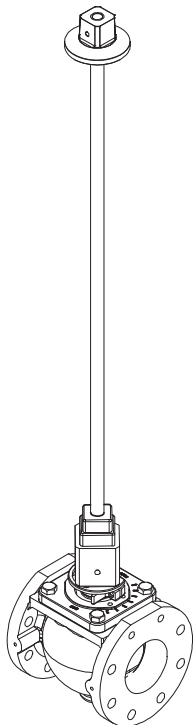
**NOTE:** Larger sizes are available. Contact Henry Pratt Valve for data.



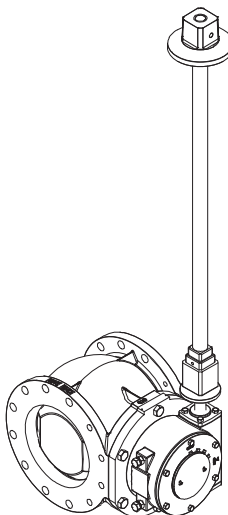
## Adaption

A range of extended stems & floor mounted stands for remote operation, particularly in buried service, are available.  
Chainwheels & locking devices are readily incorporated onto the Ballcentric® Plug Valve.

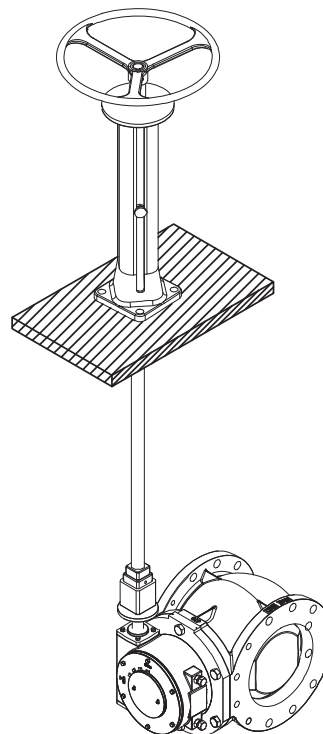
Valve with extended stem & 2" nut  
(Only for 8" and smaller valves)



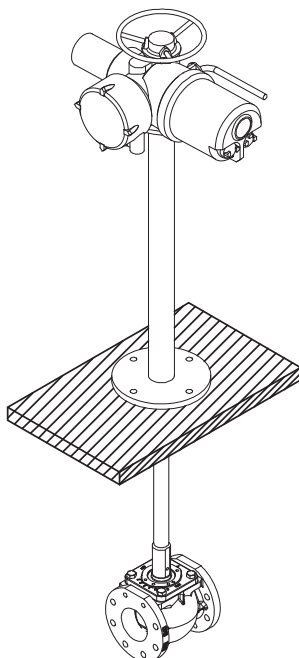
Valve with extended stem, buried gear and 2" nut



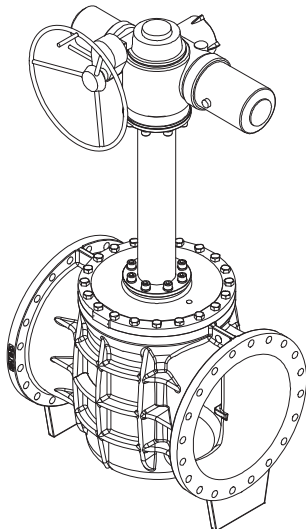
Valve with indicating floorstand



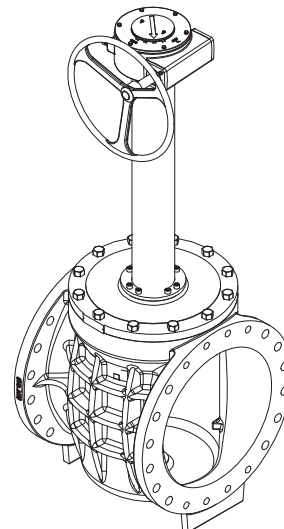
Valve with non-indicating floorstand & motor operator



Valve with extended bonnet & motor operator



Valve with extended bonnet with gear



# Technical Specification Ballcentric® Series 601/600 Plug Valves

## AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C-517-09 Section 4.3.3.1**. Valves 3" and larger shall be furnished with a welded-in overlay seat of 1/8" thick of not less than 99% nickel in accordance with **AWWA C-517-09, Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the 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.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve Series 601/600 as manufactured by Henry Pratt Company of Aurora, Illinois.

# Technical Specification Ballcentric® Series 602 ANSI Class 250 Plug Valves

## AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 250** including facing, drilling and flange thickness. Ports shall be round on sizes 2½" through 12" to facilitate "pigging" when required. Valves 14" and larger shall be of a rectangular port design.

Valve bodies shall be of **ASTM A-536 Grade 65-45-12** ductile iron in accordance with **AWWA C-517-09 Section 4.3.3.2**. Valves 3" and larger shall be furnished with a welded-in overlay seat of ⅛" thick of not less than 99% nickel in accordance with **AWWA C-517-09 Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** in compliance with **AWWA C-517-09 Section 4.3.3.2**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09 Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Worm gear operators shall be of the heavy duty construction with the ductile iron quadrant supported on the 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. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 400 psi for valves 2½"-12" and 300 psi for valves 14"-48" with pressure behind the plug.

Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 602** as manufactured by Henry Pratt Company of Aurora, Illinois.

# Technical Specification Ballcentric® Series 601RL Rubberlined Plug Valves

## AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C-517-09 Section 4.3.3.1**. The interior of the valve bodies shall be covered with a suitable elastomer with a minimum thickness of 1/8". The elastomer shall extend through the valve flow way and onto the flanges to ensure a positive seal.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Worm gear operators shall be of the heavy duty construction with the ductile iron quadrant supported on the 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. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 601RL** as manufactured by **Henry Pratt Company of Aurora, Illinois**.



# Technical Specification Ballcentric® Series 601S – Stainless Steel Plug Valves

## **AWWA C517-09 Standards**

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125** including facing, drilling and flange thickness. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **CF8M (316 stainless steel)**.

Valves shall be furnished with 316 stainless steel seat in accordance with **AWWA C-517-09 Section 4.3.3.4**.

Plugs shall be of **CF8M (316 stainless steel)**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09 Section 4.3.3.6**.

Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing 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 the heavy duty construction with the ductile iron quadrant supported on the 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. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 601S** as manufactured by Henry Pratt Company of Aurora, Illinois.

# Technical Specification Ballcentric® Series 611/610

## Ductile Iron Plug Valves

### AWWA C517-09 Standards

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 2½"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-536 Grade 65-45-12** in accordance with **AWWA C-517-09 Section 4.3.3.2**. Valves 3" and larger shall be furnished with a welded-in overlay seat of ⅛" thick of not less than 99% nickel in accordance with **AWWA C-517-09, Section 4.3.3.4**. Sprayed, plated or screwed-in seats are not acceptable.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for all sizes in accordance with **AWWA C-517-09 Section 4.3.3.2**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the 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. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve **Series 611/610** as manufactured by Henry Pratt Company of Aurora, Illinois.

# Technical Specification Ballcentric® Series 601GL Glass Lined Plug Valves

## **AWWA C517-09 Standards**

Valves shall be of the non-lubricated eccentric type with an elastomer covering all seating surfaces. The elastomer shall be suitable for the service intended. Flanged valves shall be manufactured in accordance with **ANSI B16.1 Class 125/150** including facing, drilling and flange thickness. Mechanical joint ends shall be in compliance with **AWWA/ANSI C-111-92**. Grooved ends shall be manufactured to the dimensions of **ANSI/AWWA C606** for ductile or steel pipe as required. Ports shall be round on sizes 3"-12" and rectangular port design on valves 14" and larger. All valves shall be capable of being "pigged" with a soft pig when required.

Valve bodies shall be of **ASTM A-126 Class B** cast iron in accordance with **AWWA C-517-09 Section 4.3.3.1**. Interior of valves shall be glass lined at .008-.012 mils thickness, covering the entire interior of valve bodies and stopping at the flange faces.

Plugs shall be of **ASTM A-536-Grade 65-45-12** for sizes 20" and smaller, and **ASTM A126 Class B Cast Iron** for sizes 24" and larger in compliance with **AWWA C-517-09 Sections 4.3.3.1 and 4.3.3.2**. The plugs 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 shall be furnished with replaceable sleeve type bearings conforming to **AWWA C-517-09, Section 4.3.3.6**. Bearings shall be of sintered, oil impregnated type 316 stainless steel **ASTM A-743 Grade CF-8M**. Valve shaft seals shall be of the "U" cup type in accordance with **AWWA C-517-09 Section 4.4.7**. Seals shall be self adjusting and repackable without removing the bonnet from the valve.

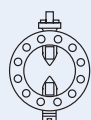
Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

Worm gear operators, where required, shall be of the heavy duty construction with the ductile iron quadrant supported on the 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. All worm gear operators shall be sized for bi-directional shutoff at the valves design pressure rating.

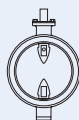
Valves shall be designed and manufactured to shut off bubble tight at 175 psi for valves 2½"-12" and 150 psi for valves 14" and larger. Each valve shall be given a hydrostatic and seat test with the test results being certified when required by the customer. Certified copies of Proof-of-Design test reports shall be furnished as outlined in **AWWA C-517-09 Section 5.2.2** when requested.

Plug valves shall be Ballcentric® Plug Valve Series **601GL/600GL** as manufactured by Henry Pratt Company of Aurora, Illinois.

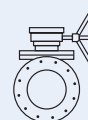
# PRATT PRODUCT GUIDE



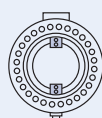
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2FI**



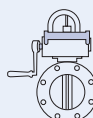
**Monoflange  
MKII**



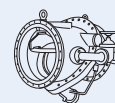
**Plug  
Valve**



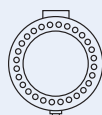
**Triton®  
XR70**



**Indicating Butterfly Valve  
UL & FM approved**



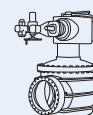
**Tilting Disc  
Check Valve**



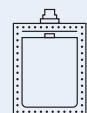
**Triton®  
XL**



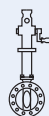
**N-Stamp Nuclear  
Butterfly Valve**



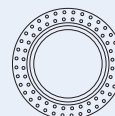
**Cone  
Valve**



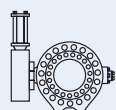
**Rectangular**



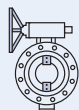
**PIVA Post Indicating Valve Assembly  
UL & FM approved**



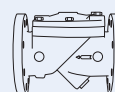
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Valve**



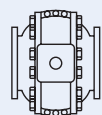
**Rubber Seated  
Ball Valve**



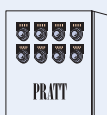
**Triton®  
HP250**



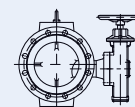
**Check  
Valve**



**Metal Seated  
Ball Valve**

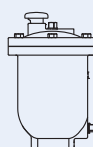


**Control  
Systems**



**Plunger Valve**

# PRATT



**Air Valve**

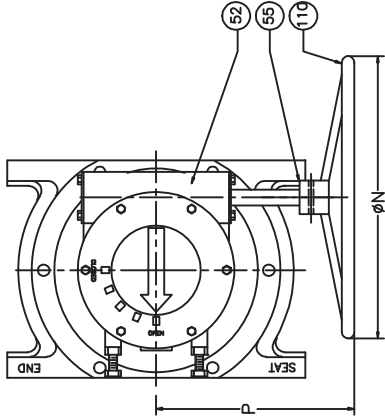
## Henry Pratt Company

401 South Highland Avenue  
Aurora, Illinois 60506-5563 - US  
P: 630-844-4000 F: 630-844-4160  
[www.henrypratt.com](http://www.henrypratt.com)  
ISO 9001: 2000 Certified

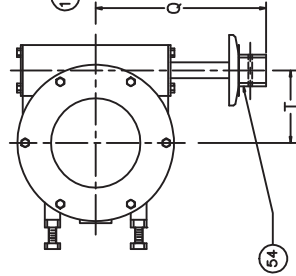


VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	M2 (20:1)	7.5	3.41	3.50	2.5	5.50	7.00	0.75	4	---	---	0.69	2.5	6	4.75	4.75	1.75	2.00
3	M2 (20:1)	8	3.41	3.75	3	6.00	7.50	0.75	4	---	---	0.75	2.5	6	4.75	4.75	1.75	2.00
4	M3 (30:1)	9	4.38	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2.00	2.56
5	M3 (30:1)	10	5.63	5.75	5	8.50	10	0.88	6	0.75	2	0.94	3	6	9.50	8	2.00	2.56
6	M3 (30:1)	10.50	5.63	5.75	6	9.50	11	0.88	6	0.75	2	1	3	6	9.50	8	2.00	2.56
8	M5 (50:1)	11.50	7.56	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13	6	12	11.25	8	2.25	3.16
10	M8 (80:1)	13	9.25	8.88	10	14.25	16	1	8	0.88	4	1.19	6	12	11.63	10	2.00	4.63
12	M8 (80:1)	14	10.88	10	12	17.00	19	1	8	0.88	4	1.25	6	12	11.63	10	2.00	4.63

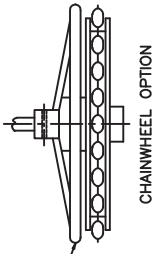
ABOVE GROUND GEAR  
W/ HANDWHEEL  
OPTION



BURIED GEAR  
W/ 2" NUT  
OPTION



CHAINWHEEL OPTION



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**Project name:** AMARUQ

**Project#:** 5000218009

**Document #:** SPK\_0004\_RX

**by:** LJ

**chkd:** GP

**appvd:** CB



# SLUDGE TANKS RX75-2

## INSTRUMENTS

**OIM manual section:** 4.3.2.5

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## ENM-10 Level regulator

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# PRODUCT DESCRIPTION

## Product description

The simplest possible method for level control! A mechanical switch in a plastic casing, freely suspended at the desired height from its own cable. When the liquid level reaches the regulator, the casing will tilt and the mechanical switch will close or break the circuit, thereby starting or stopping a pump or actuating an alarm device. No wear, no maintenance! In sewage pumping stations, for ground water and drainage pumping – in fact, for most level control applications – the ENM-10 is the ideal solution.

The regulator casing is made of polypropylene and the cable is sheathed with a special PVC or Nitrile/PVC rubber compound. The plastic components are welded and screwed together. Adhesive is never used. Impurities and deposits will not adhere to the smooth casing.

This level regulator is available in different versions, depending upon the medium in which it is to be used. As standard, the regulator can be obtained with 6, 13, 20, 30 or 50 metres (20, 42, 65, 100 or 167 feet) of cable for liquids with specific density between 0.95 and 1.10 g/cm<sup>3</sup>; for other specific densities and for the Ex-version, the regulator is only available with 20 metres (65 ft) of cable. The regulator can withstand up to 60°C (140°F).

## Technical data

<b>Liquid temperature:</b>	min. 0°C (32°F) max. 60°C (140°F)
<b>Liquid density:</b>	min. 0.65 g/cm <sup>3</sup> max. 1.5 g/cm <sup>3</sup>
<b>Degree of protection:</b>	IP68, 20 m (65 ft)
<b>Interrupting capacity of micro switch:</b>	AC, resistive load, 250V 10A AC, inductive load, 250V 3A cos $\phi$ = 0.5 DC, 30V 5A
<b>With gold plated micro switch:</b>	same as above, except: DC, 24V 10mA

Note that local regulations may limit the voltage.

## Materials

Body:	Body:
Bending relief:	EPDM rubber
Cable:	special compound PVC or NBR/PVC nitrile/PVC rubber

## Dimensions

**Table 1**

For density g/cm <sup>3</sup>	Regulator length mm (in.)	Diameter mm (in.)
0.65–0.80	194 (7 10/16)	100 (4)
0.80–0.95	177 (7)	100 (4)
0.95–1.10	162 (6 3/8)	100 (4)
1.05–1.20	142 (5 9/16)	100 (4)
1.20–1.30	133 (5 1/4)	100 (4)

For density g/cm <sup>3</sup>	Regulator length mm (in.)	Diameter mm (in.)
1.30–1.40	130 (5 2/16)	100 (4)
1.40–1.50	126 (5)	100 (4)

**Weight:** approx. 2 kg (4.5 lb) for a standard density regulator with 20 m cable.

**Approvals:** CE, CSA, SEMKO, NEMKO, DEMKO

**LVD approval** according to EN61058

**CSA approval:** Cert no. 1330172

CI.I Zone 0, Gr. IIC;

CL.I Div.1 Gr A, B, C&D;

CI.II Gr. E, F&G;

CI.III when installed to the certified Intrinsically Safe relay, Ex ia, rated for the locations per submitter controll drawing and installation manual.

Intrinsically safe circuits are required for the automatic control system. - Use a EX-safety barrier (e.g. Prod. no. 84 01 07).



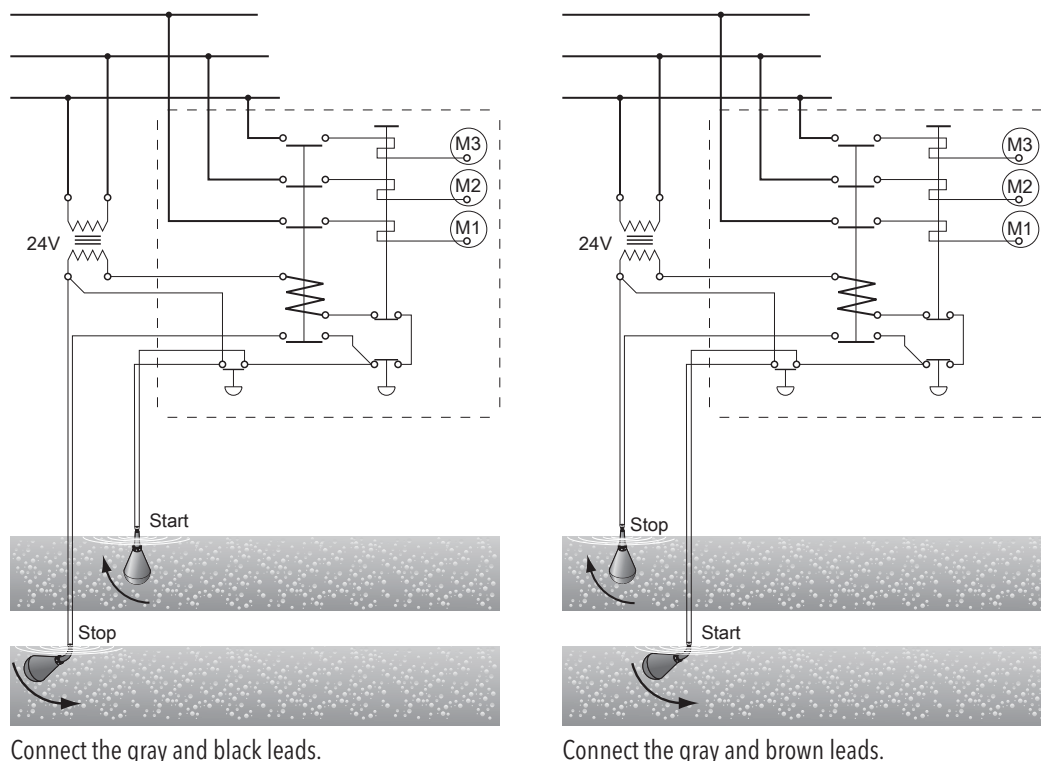
Figure 1

### Wiring alternative

To conform to local regulations, the level regulators are normally connected through a transformer to a low-tension control circuit.

Two regulators are used; one for starting and one for stopping. A third regulator can be connected if an alarm is required at a given level.

Identical regulators can be used for all functions.





Insulate the brown lead.

Figure 2: Connected for emptying

Insulate the black lead.

Figure 3: Connected for emptying

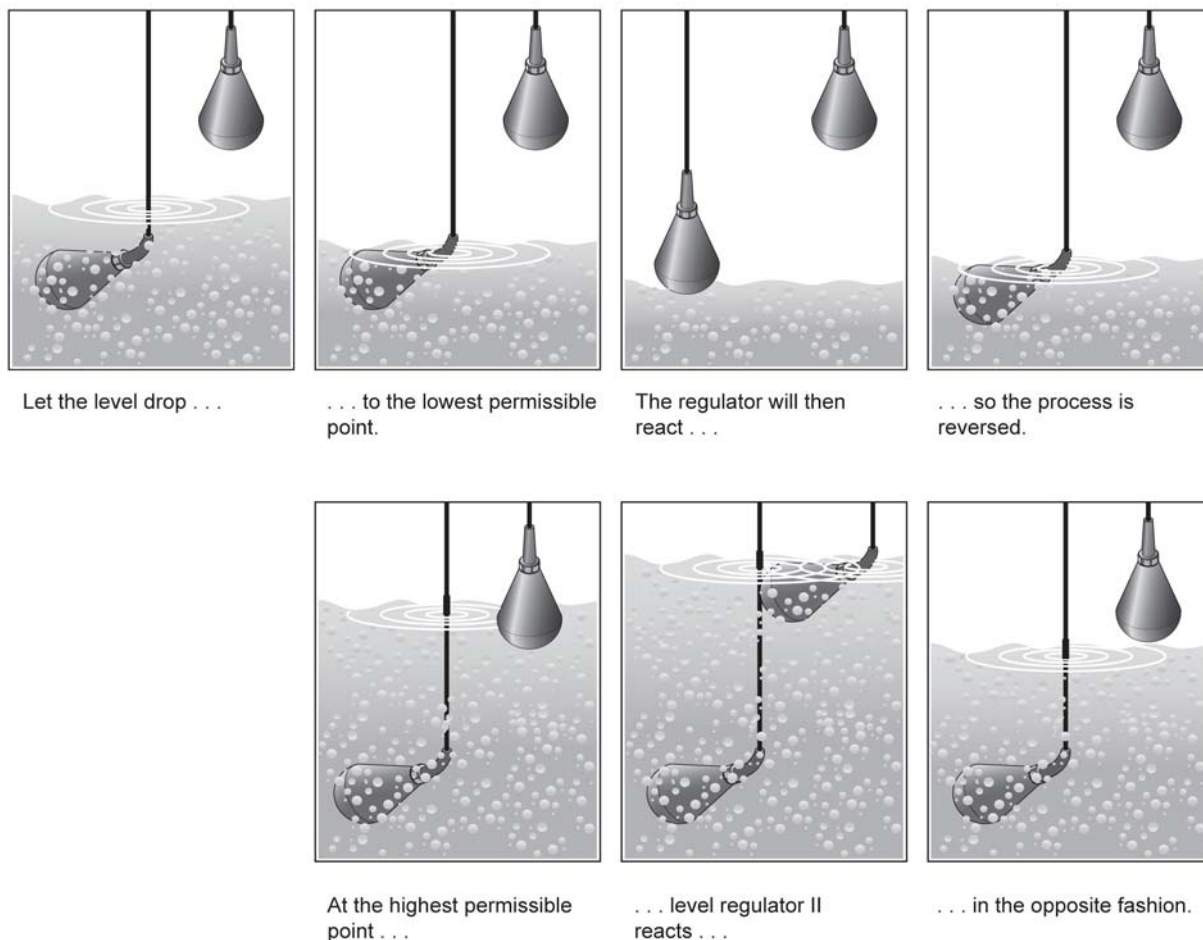


Figure 4

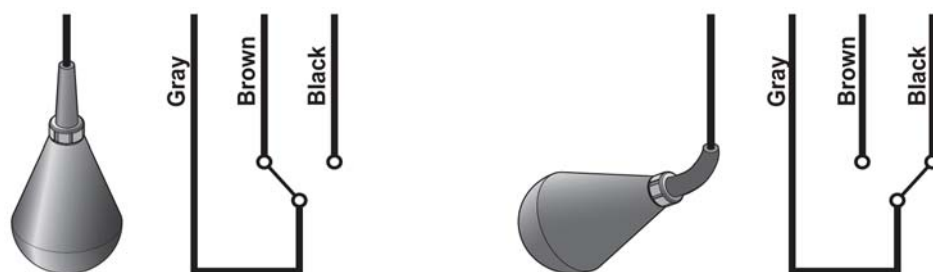


Figure 5: Colour code

## Maintenance and repair

ENM-10 is very durable and practically maintenance free. You only have to check on it occasionally, to ensure its continual operation.

- It is recommended to occasionally clean ENM-10, and especially when fat/grease covers the plastic surface.
- At the same time, make an ocular inspection of the regulator to make sure neither cable, protective sleeve or plastic casing show any signs of damage.

- A damaged ENM-10 cannot be repaired in any way, due to the hermetic encapsulation. If the unit is found to be damaged, replace it with a new one.
- For Ex-installations, also make absolutely sure that the Ex-barrier (e.g. Prod. no. 84 01 07) is operating correctly - The LED changes when the switch is toggled.

The manufacturers reserve the right to alter performance specification or design without notice.

# CHEMICAL RESISTANCE LIST

## Chemical resistance list

The liquid in which level regulation is practiced most frequently is, of course, water. Of the millions of regulators in use all over the world today, it is estimated that nine out of ten work in water.

However, with a float body of polypropylene, a cable of PVC or NBR/PVC nitrile/PVC rubber and a bending relief of EPDM rubber, the ENM-10 is virtually insensitive to many aggressive liquids.

The table shows how resistant the ENM-10 equipped with either PVC or NBR/PVC nitrile/PVC rubber cable, is to different chemicals at two different temperatures.

The classification is broken down into the following categories:

0 = No effect, 1 = Minor to moderate and 2 = Severe effect. The sign – means that information is not available.

Keep in mind also that the density of the liquid determines the bouyancy of the regulator. The ENM-10 is made for seven different densities. See [Product description](#) (page 2).

Always observe local regulations:

Take particular note of:

- risk of fire/explosion
- hygiene requirements

Acids	PVC cable		NBR/PVC nitrile/PVC rubber cable		Salts	PVC cable		NBR/PVC nitrile/PVC rubber cable		Solvents and miscellaneous	PVC cable		NBR/PVC nitrile/PVC rubber cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)		20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)		20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Acetic Acid 50%	1	2	0	0	Aluminium Chloride	0	0	0	0	Aceton	2	2	2	2
Acetic Acid 75%	2	2	0	0	Calcium Sulphate	0	0	0	0	Aniline	2	2	1	2
Benzoic Acid	2	2	0	0	Calcium Chloride	0	0	0	0	Benzene	2	2	2	2
Boric Acid 5%	0	—	0	0	Calcium Nitrate	0	0	0	0	Butyl Alcohol	2	2	0	1
Butyric Acid	2	2	2	2	Copper Chloride	0	0	0	0	Carbon Tetrachloride	2	2	2	2
Chromic Acid 10%	0	2	2	2	Copper Sulphate	0	0	0	0	Chlorobenzene	2	2	2	2
Citric Acid	0	1	0	0	Ferric Chloride	0	0	0	0	Chloroform	2	2	2	2
Hydrobromic Acid 5%	1	2	0	0	Ferrous Sulphate	0	0	0	0	Ethyl Alcohol	2	2	0	1
Hydrochloric Acid 10%	0	1	0	1	Magnesium Chloride	0	0	0	0	Ethyl Ether	2	2	2	2
Hydrochloric Acid 37%	1	2	0	2	Potassium Sulphate	0	0	0	0	Ethyl Acetate	2	2	2	2
Hydrocyanic Acid 10%	0	0	1	2	Potassium Nitrate	0	0	0	0	Ethylene Dichloride	2	2	2	2
Hydrofluoric Acid 5%	0	2	0	1	Potassium Carbonate	1	1	1	1	Ethylene Chloride	2	2	2	2
Hypochloric Acid	1	2	2	2	Potassium Bicarbonate	0	0	0	0	Formaldehyde 37%	1	2	0	0
Maleic Acid	2	2	2	2	Sodium Sulphate	0	0	0	0	Gasoline	2	2	2	2
Nitric Acid 5%	1	1	1	1	Sodium Chloride	0	0	0	0	Kerosene	2	2	2	2
Nitric Acid 65%	2	2	2	2	Sodium Nitrate	0	0	0	0	Methyl Alcohol	2	2	0	0
Oleic Acid	1	2	2	2	Sodium Bicarbonate	0	0	0	0	Methyl Ethyl Ketone	2	2	2	2
Oxalic Acid 50%	1	1	1	2	Sodium Carbonate	0	0	0	0	Methylene Chloride	2	2	2	2
Phosphoric Acid 25%	0	0	1	2	Tin Chloride	1	1	1	1	Nitrobenzene	2	2	2	2
Phosphoric Acid 85%	0	0	1	2	Zinc Sulphate	0	0	0	0	Phenol	2	2	2	2
Sulphuric Acid 10%	1	2	1	2	Zinc Chloride	0	0	0	0	Toluene	2	2	2	2
Sulphuric Acid 78%	2	2	2	2						Trichlorethylene	2	2	2	2
Tannic Acid	0	0	0	0						Turpentine	2	2	2	2
Tartaric Acid	1	1	1	1						Xylene	2	2	2	2
<b>Bases</b>					<b>Oils</b>					<b>Gases</b>				
Ammonium Hydroxide	0	—	0	0	Castor Oil	1	1	1	1	Carbon Dioxide	0	0	0	0
Calcium Hydroxide	0	0	0	0	Cocoanut Oil	0	—	0	2	Carbon Monoxide	0	0	0	0
Potassium Hydroxide	1	2	0	0	Corn Oil	2	2	2	2	Chlorine (wet)	2	2	2	2
Sodium Hydroxide	1	2	0	0	Diesel Oil	2	2	2	2	Hydrogen Sulphide	0	0	1	1
					Linseed Oil	2	2	2	2	Sulphur Dioxide (wet)	1	1	2	2
					Mineral Oils	2	2	2	2					
					Olive Oil	1	1	1	1					
					Silicone Oils	0	0	0	0					

0 = No effect, 1 = Minor to moderate, 2 = Severe effect. — = No information available.

Figure 6

# PRODUCT RANGE

## Product range

Part no.	For density [g/cm <sup>3</sup> ]	Color of level switch	Type of cable	Cable length [m]	Approvals	For market	Notes
5828800	0,65-0,80	Blue	1	20	CE		
5828801	0,80-0,95	Blue	1	20	CE		
5828802	0,95-1,10	Blue	1	6	CE		
5828803	0,95-1,10	Blue	1	13	CE		
5828804	0,95-1,10	Blue	1	20	CE		
5828805	1,05-1,20	Blue	1	20	CE		
5828806	1,2-1,3	Blue	1	20	CE		
5828807	1,3-1,4	Blue	1	20	CE		
5828808	1,4-1,5	Blue	1	20	CE		
5828809	0,65-0,80	Grey	5	20	CSA/CE	Canada	
5828810	0,80-0,95	Grey	5	20	CSA/CE	Canada	
5828811	0,95-1,10	Grey	5	6	CSA/CE	Canada	
5828812	0,95-1,10	Grey	5	13	CSA/CE	Canada	
5828813	0,95-1,10	Grey	5	20	CSA/CE	Canada	
5828814	1,05-1,20	Grey	5	20	CSA/CE	Canada	
5828815	1,2-1,3	Grey	5	20	CSA/CE	Canada	
5828816	1,3-1,4	Grey	5	20	CSA/CE	Canada	
5828817	1,4-1,5	Grey	5	20	CSA/CE	Canada	
5828818	0,65-0,80	Grey	1	20	CSA/CE	Canada	
5828819	0,80-0,95	Grey	1	20	CSA/CE	Canada	
5828820	0,95-1,10	Grey	1	6	CSA/CE	Canada	
5828821	0,95-1,10	Grey	1	13	CSA/CE	Canada	
5828822	0,95-1,10	Grey	1	20	CSA/CE	Canada	
5828823	1,05-1,20	Grey	1	20	CSA/CE	Canada	
5828824	1,2-1,3	Grey	1	20	CSA/CE	Canada	
5828825	1,3-1,4	Grey	1	20	CSA/CE	Canada	
5828826	1,4-1,5	Grey	1	20	CSA/CE	Canada	
5828827	0,65-0,80	Blue	2	20	CE	USA	
5828828	0,80-0,95	Blue	2	20	CE	USA	
5828829	0,95-1,10	Blue	2	6	CE	USA	
5828830	0,95-1,10	Blue	2	13	CE	USA	
5828831	0,95-1,10	Blue	2	20	CE	USA	
5828832	1,05-1,20	Blue	2	20	CE	USA	
5828833	1,2-1,3	Blue	2	20	CE	USA	
5828834	1,3-1,4	Blue	2	20	CE	USA	
5828835	1,4-1,5	Blue	2	20	CE	USA	
5828836	0,95-1,10	Grey	5	30	CSA/CE	Canada	
5828837	0,95-1,10	Grey	5	50	CSA/CE	Canada	
5828838	0,95-1,10	Grey	5	100	CSA/CE	Canada	
5828839	0,95-1,10	Grey	5	150	CSA/CE	Canada	
5828851	0,95-1,10	Red	3	65	CE		
5828852	0,95-1,10	Red	3	6	CE		
5828853	0,95-1,10	Red	3	13	CE		
5828854	0,95-1,10	Red	3	20	CE		
5828855	0,95-1,10	Red	3	6	CSA/CE	Canada	
5828856	0,95-1,10	Red	3	13	CSA/CE	Canada	
5828857	0,95-1,10	Red	3	20	CSA/CE	Canada	

Cont. 

Figure 7