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 or visit our web site at 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 :

ENVIREQUIP

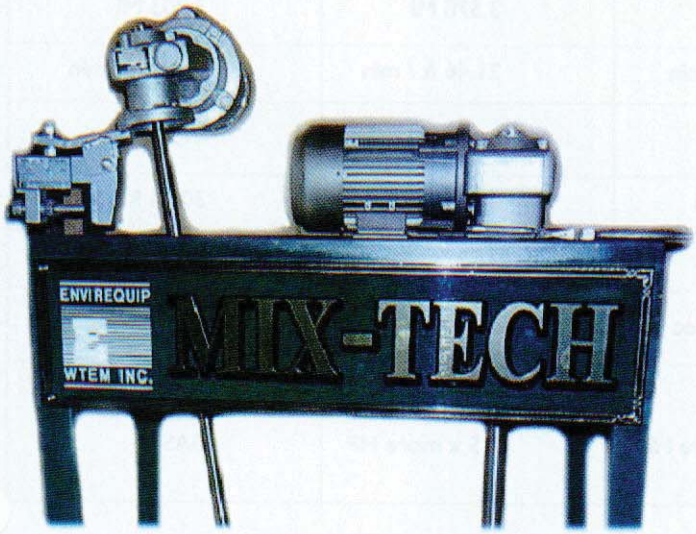
W.T.E.M. INC.

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.

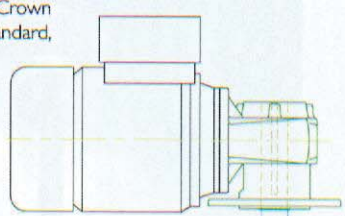
Shafts: 0.75", 1.0", 1.25", 1.4375" diameter.

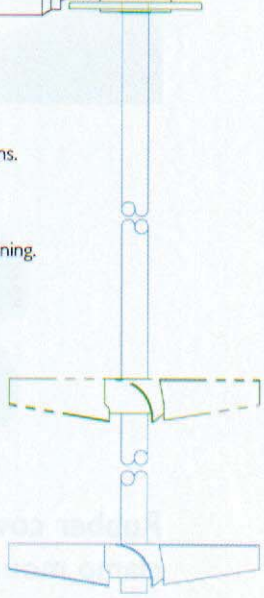
Seals: LRSB, Lip seals, Mechanical Seals including Dry-Running.

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

NORD DRIVESYSTEMS

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]
Offset Parallel (Clincher)												
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
Helical-Bevel Speed Reducer												
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

VL2 & VL3 AGITATOR

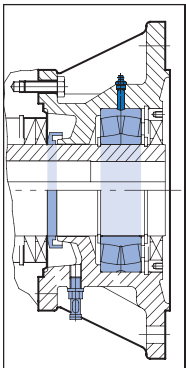
RATIO & SPEED

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 hobbed 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

DRIVESYSTEMS

www.nord.com

NORD Gear Corporation
National Customer Service Toll-Free: 888.314.6673
info.us@nord.com

NORD Gear Limited
Toll-Free in Canada: 800.668.4378
info.ca@nord.com

WEST
Corona, CA (Los Angeles)
Phone: 608.849.0190

MIDWEST
Waunakee, WI (Madison)
Phone: 608.849.7300

EAST
Charlotte, NC
Phone: 608.849.0140

CANADA
Brampton, ON (Toronto)
Phone: 905.796.3606

100200023/1011

Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

appvd: CB

METAL PRECIPITATION REACTOR

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.

PRATT
Henry Pratt Company

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.

PRATT
Henry Pratt Company

401 South Highland Avenue
Aurora, Illinois 60506-5563
www.henrypratt.com
phone: 630.844.4000
fax: 630.844.4160

Table of Contents

Ballcentric® Plug Valve

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

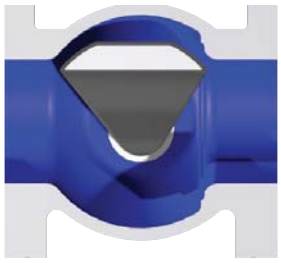
Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Ballcentric® plug valves.

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

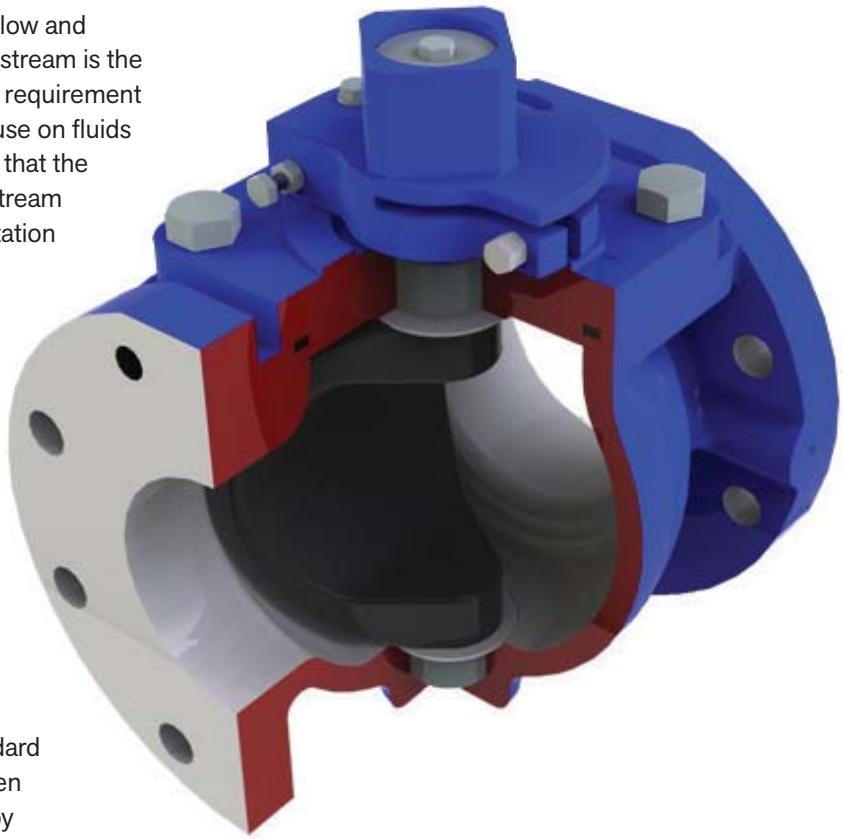
- Design of Ballcentric® plug valve allows modulating control over the full 90˚ travel
- Ideally suited for balancing service
- Standard rotary valve provides control and tight shut off in one valve



- 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	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	
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

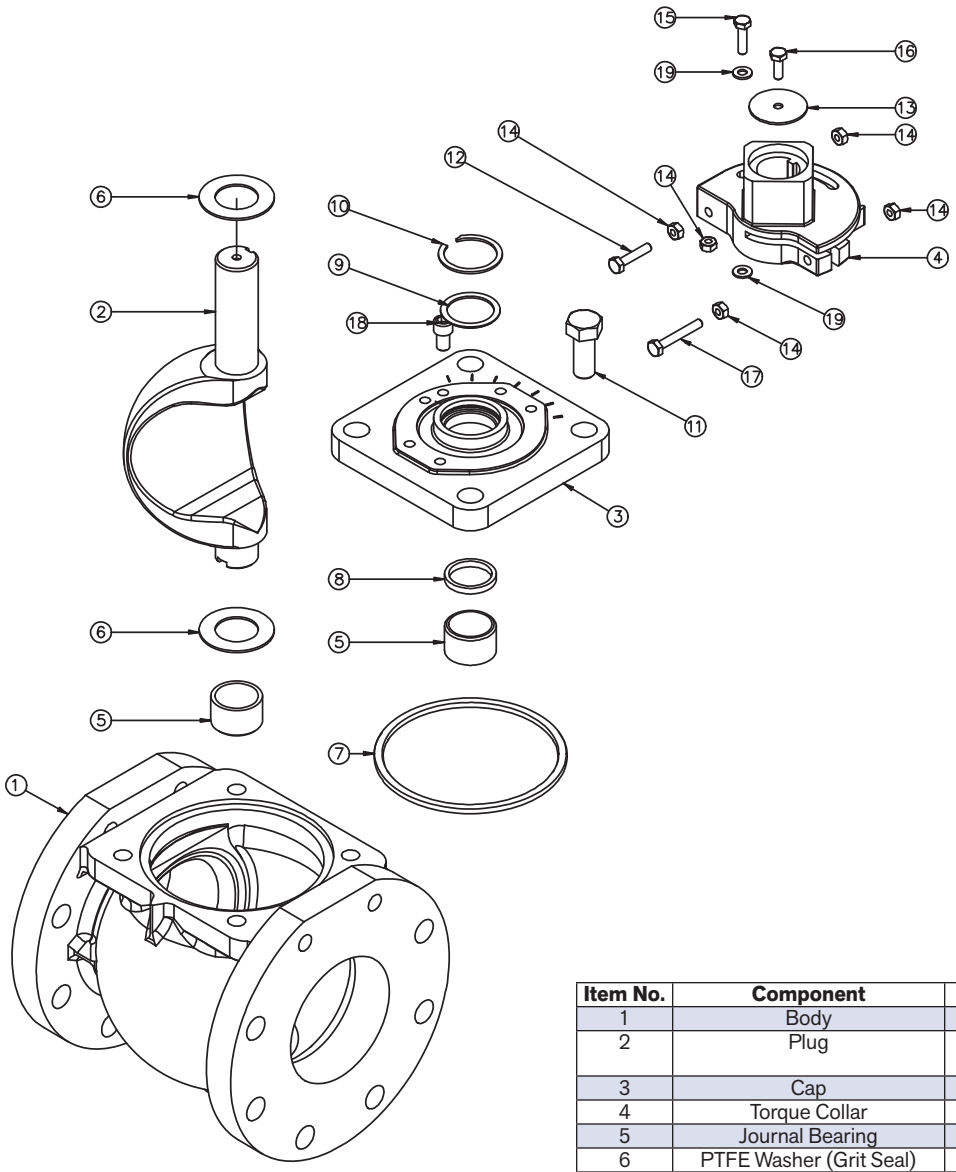
Retention of mechanical properties at high temperature is an important feature of this elastomer: temperature range is –10°F to 300°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.
Note: Not for water or steam applications.

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.

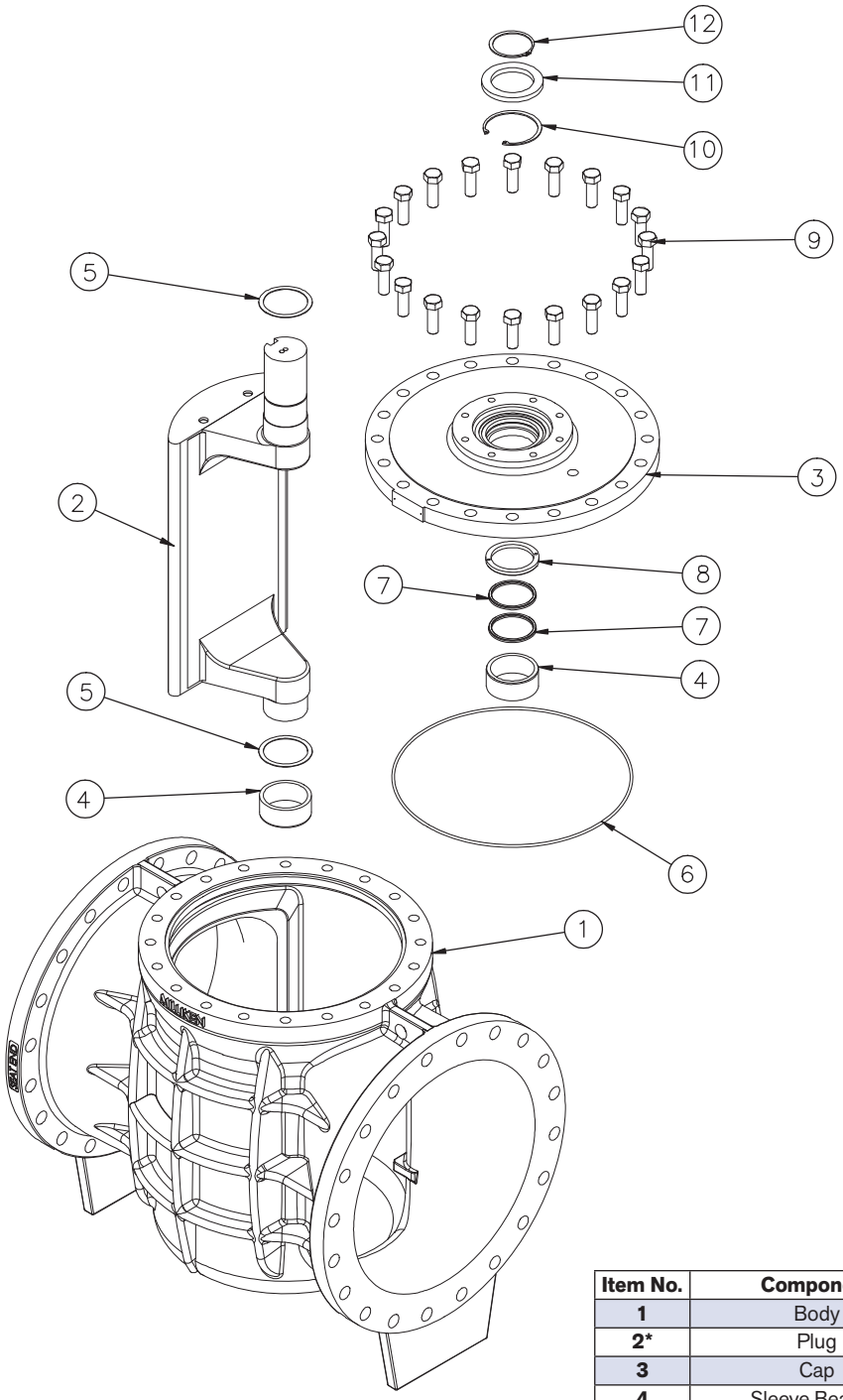
Standard Materials of Construction, Fig. 601/600, 12" & Smaller



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



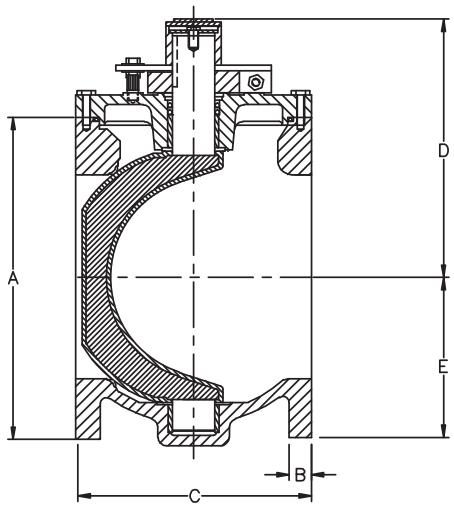
Item No.	Component	Material	Qty.
1	Body	Cast Iron A126 Class B	1
2*	Plug	Rubber Coated See Note 1	1
3	Cap	Cast Iron A126 Class B	1
4	Sleeve Bearing	Stainless Steel/Bronze	2
5	PTFE Washer (Grit Seal)	PTFE	2
6	Cap "O" Ring	Elas. as Spec.	1
7	U Cup Seal	Elas. as Spec.	2
8*	Seal Retaining Ring	See Note 2	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 Seal	1

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

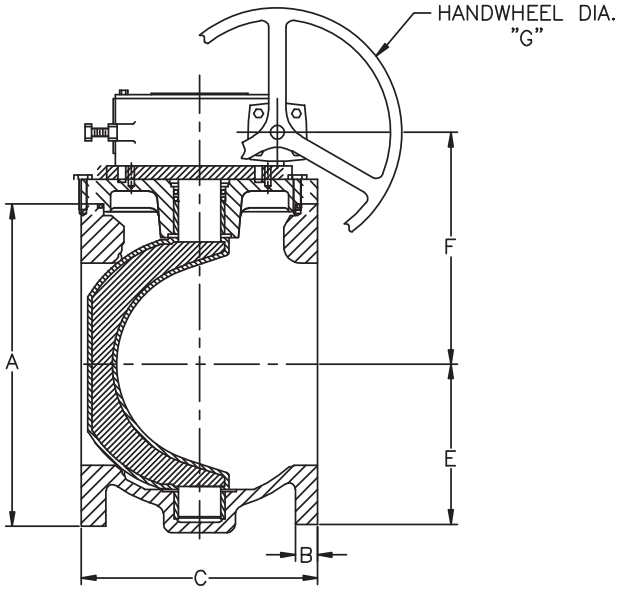
***NOTE 2:** Seal Retaining Ring: Brass – ASTM B-138-675 on 14" – 20" Steel on 24" and larger

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

2½" – 8" VALVES ONLY



2½" – 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**

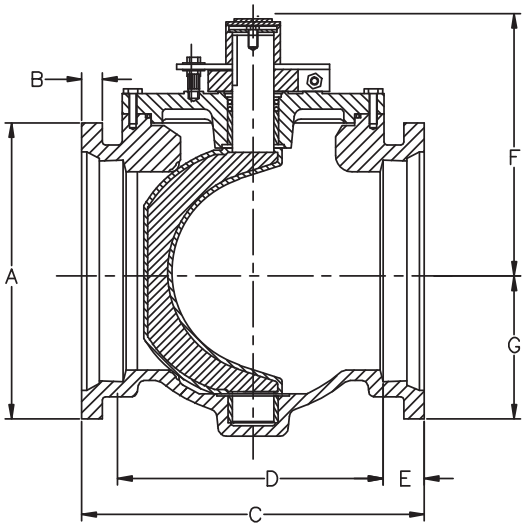
*10" & above have gear operators as standard

**Weight includes gear operator

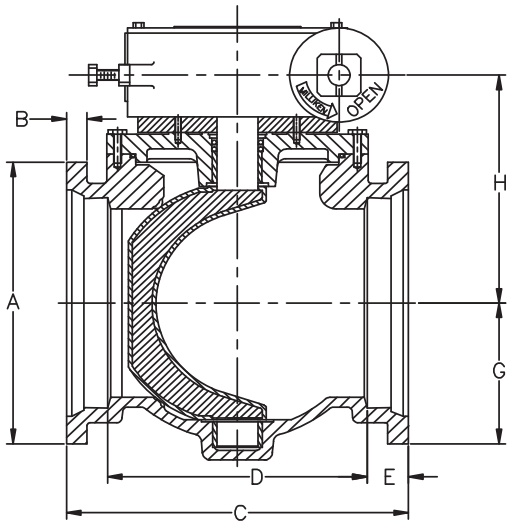
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

3" – 8" VALVES ONLY



3" – 12" VALVES



MECHANICAL JOINT END						
SIZE	**3**	**4**	**6**	**8**	**10***	**12***
A	7.69	9.00	11.13	13.38	15.63	17.94
B	.94	1.00	1.06	1.13	1.19	1.25
C	11.50	14.25	15.75	17.38	15.63	20.75
D	6.00	9.25	10.75	12.39	14.39	15.75
E	2.75	2.50	2.50	2.50	2.50	2.50
F	6.19	7.25	8.38	10.69	–	–
G	3.84	4.50	5.56	6.69	7.81	8.97
H	5.16	6.31	7.56	9.63	11.13	12.81
WEIGHT (approx.)	50	80	125	200	360**	480**

*10" & above have gear operators as standard

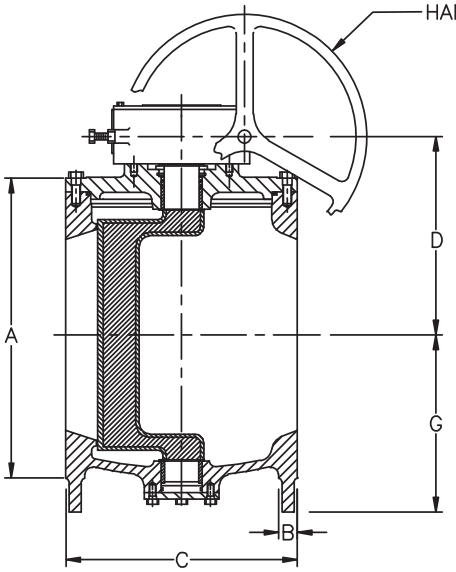
**Weight includes gear operator

We recommend gears on all Mechanical Joint Valves

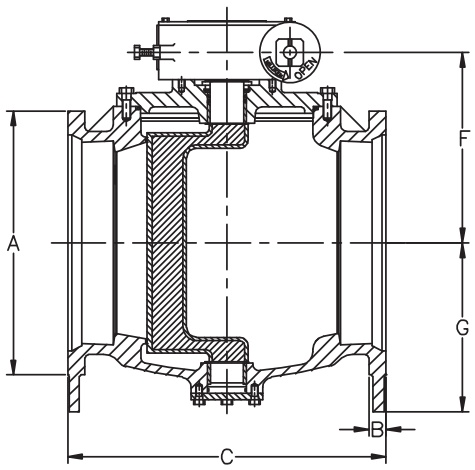
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

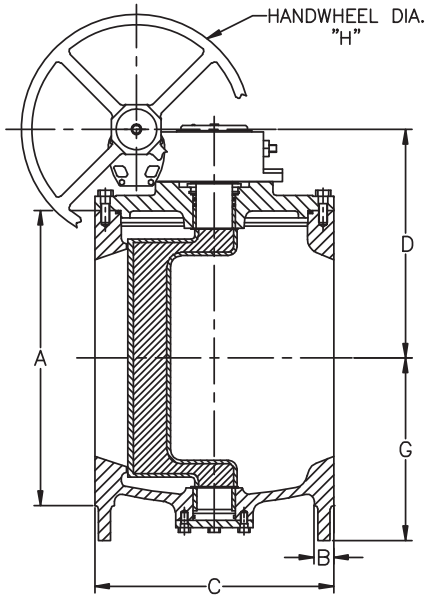
14" –20" VALVES



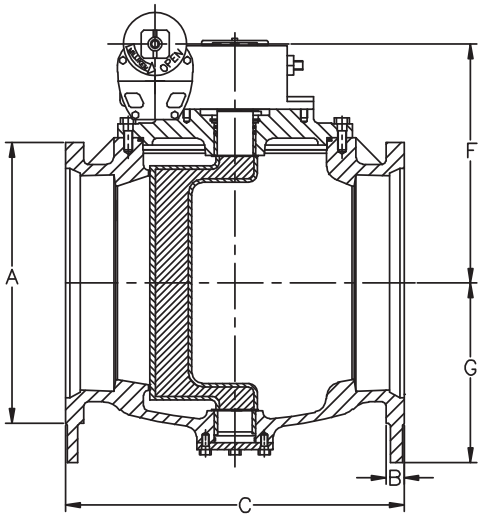
14" –20" VALVES



24" VALVES AND LARGER



24" VALVES AND LARGER



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

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

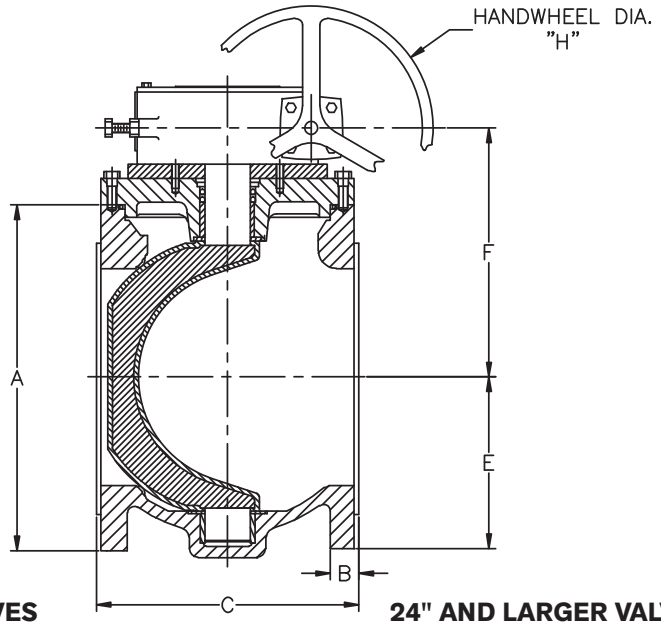
Weight includes gear operator

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

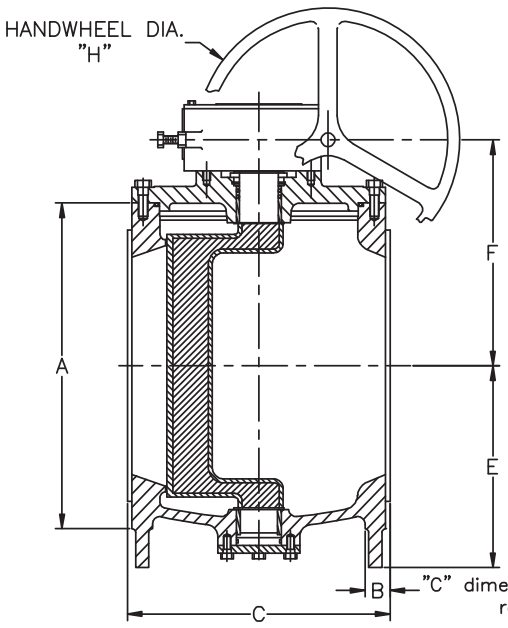
NOTE: Dimensions on 60" and larger available upon request.

Fig. 602 Class 250 Flanged End
2 1/2" – 12", 400 PSI, 14" – 36", 300 PSI

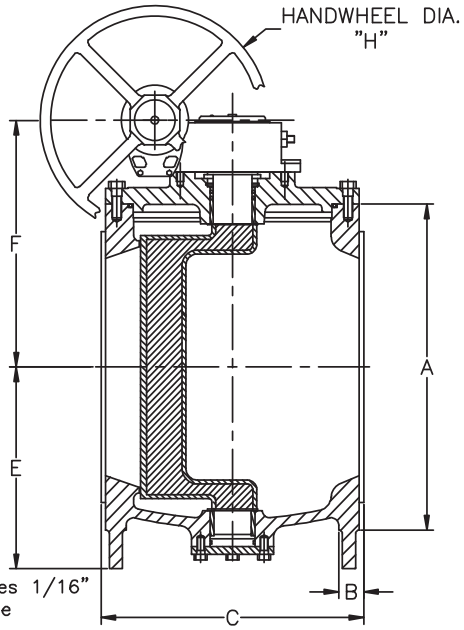
2½" – 12" VALVES



14" – 20" VALVES



24" AND LARGER VALVES



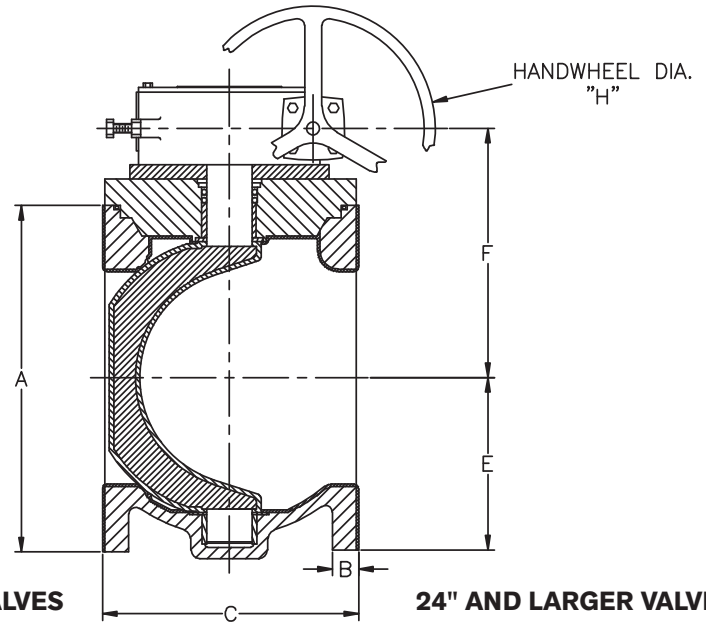
"C" dimen. includes 1/16" raised face

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

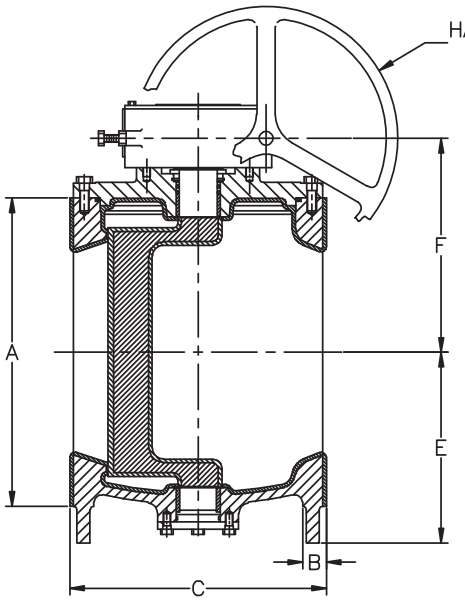
All above have gear operators as standard
Weight includes gear operator
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams
NOTE: Dimensions on 42" and larger available upon request

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

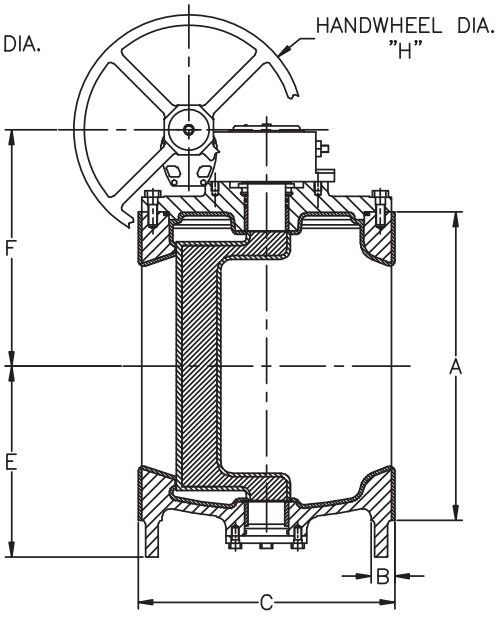
3" – 12" VALVES



14" – 20" VALVES



24" AND LARGER VALVES

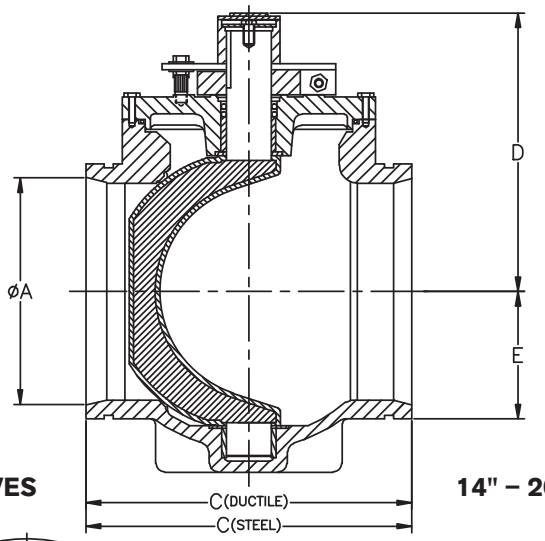


FLANGED END – ANSI 125 RUBBER LINED															
SIZE	**3**	**4**	**5**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**	**30**	**36**	**42**
A	7.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.25	25.00	27.50	32	38.75	46.00	53.00
B	.88	1.07	1.07	1.13	1.26	1.32	1.38	1.26	2.25	2.38	2.50	2.75	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

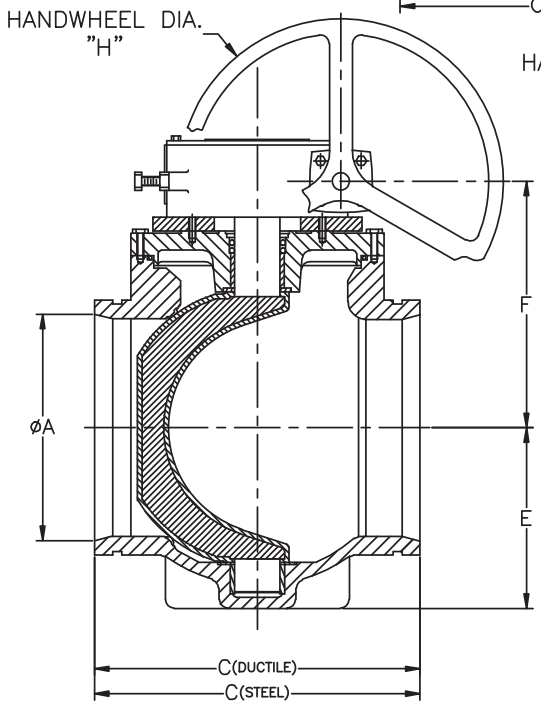
All above have gear operators as standard
Weight includes gear operator
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams
NOTE: Dimensions on 48" and larger available upon request

Fig. 606 Grooved End
2 1/2" – 12", 175 PSI, 14" – 20", 150 PSI

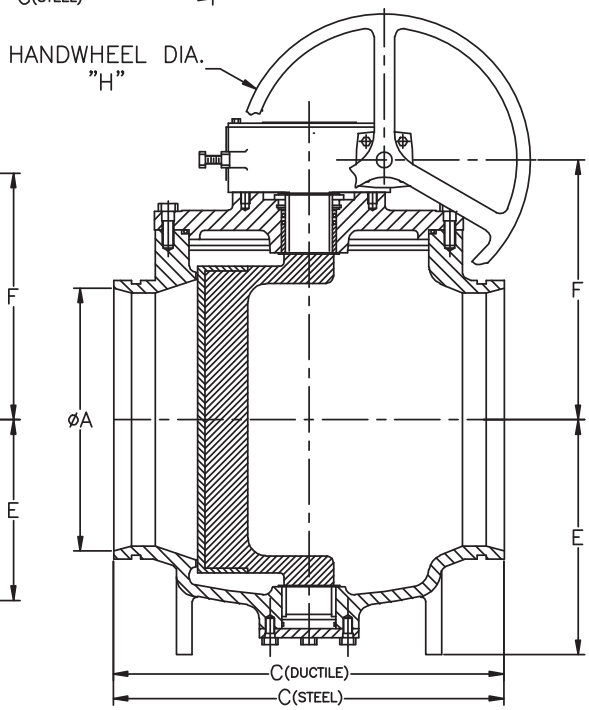
2½" – 8" VALVES



2½" – 12" VALVES



14" – 20" 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

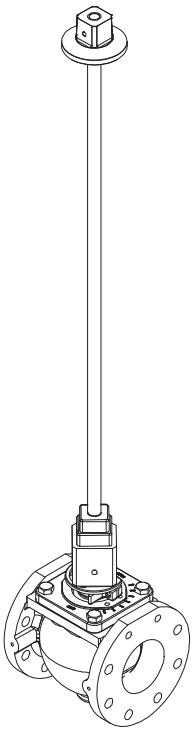
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

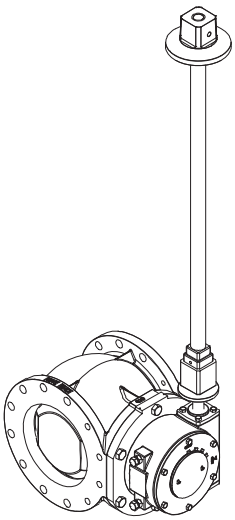
Adaption

**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.**

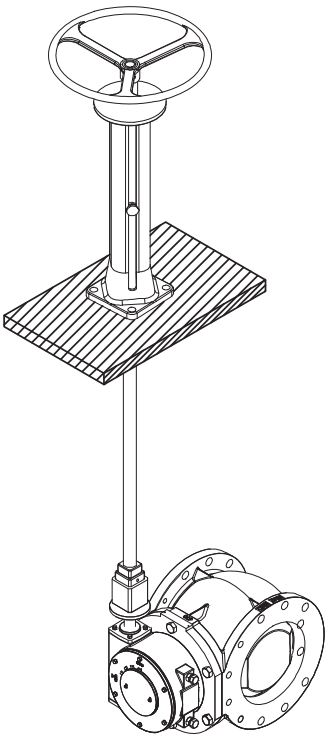
Valve with extended stem & 2" nut (Only for 8" and smaller valves)



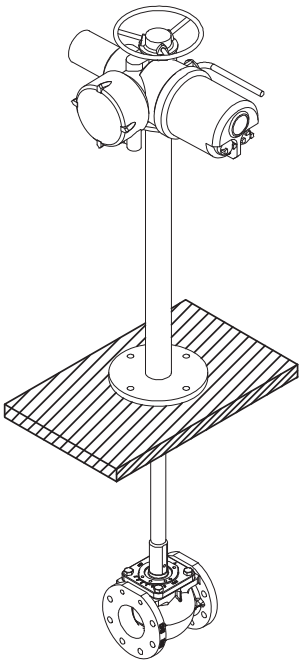
Valve with extended stem, buried gear and 2" nut



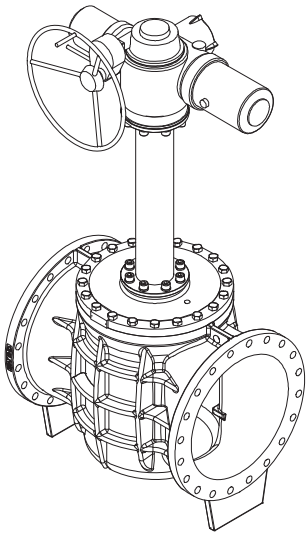
Valve with indicating floorstand



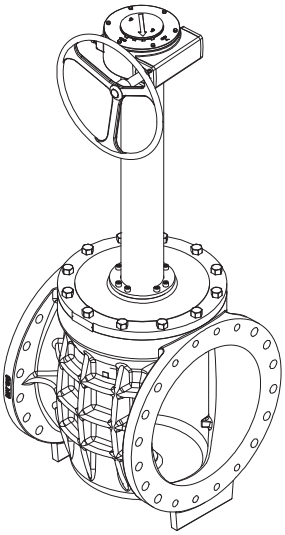
Valve with non-indicating floorstand & motor operator



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 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** 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 form 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 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 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 A**WWA 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.

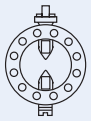
Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

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.

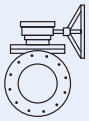
Plug valves shall be Ballcentric® Plug Valve Series **601GL/600GL** as manufactured by Henry Pratt Company of Aurora, Illinois.

PRATT PRODUCT GUIDE

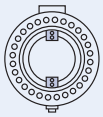


Model
2FII

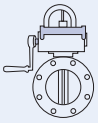
Monoflange
MKII



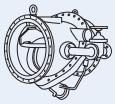
Plug
Valve



Triton®
XR70

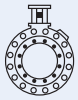


Indicating Butterfly Valve
UL & FM approved

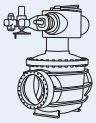


Tilting Disc
Check Valve

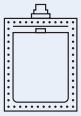
Triton®
XL



N-Stamp Nuclear
Butterfly Valve

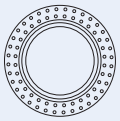


Cone
Valve

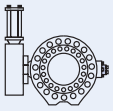


Rectangular

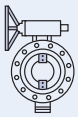
PIVA Post Indicating Valve Assembly
UL & FM approved



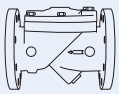
Sleeve
Valve



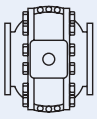
Rubber Seated
Ball Valve



Triton®
HP250

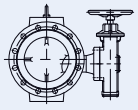


Check
Valve



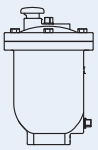
Metal Seated
Ball Valve

Control
Systems



Plunger Valve

PRATT



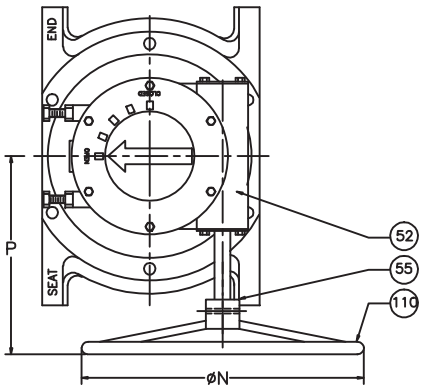
Air Valve

Henry Pratt Company
401 South Highland Avenue
Aurora, Illinois 60506-5563 - US
P: 630-844-4000 F: 630-844-4160
www.henrypratt.com
ISO 9001: 2000 Certified

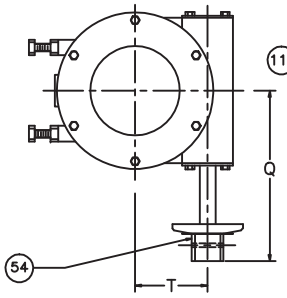
VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	M2 (20:1)	7.5	3.41	3.50	2.5	5.50	7.00	0.75	4	--	–	0.69	2.5	6	4.75	4.75	1.75	2.00
3	M2 (20:1)	8	3.41	3.75	3	6.00	7.50	0.75	4	--	–	0.75	2.5	6	4.75	4.75	1.75	2.00
4	M3 (30:1)	9	4.38	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2.00	2.56
5	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

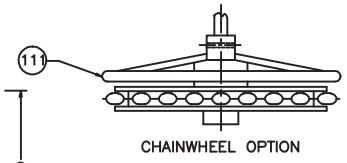
△5 △6 REFERENCE ONLY △6

ABOVE GROUND GEAR W/ HANDWHEEL OPTION



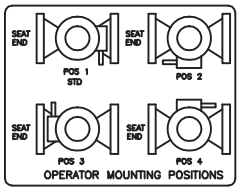
BURIED GEAR W/ 2" NUT OPTION

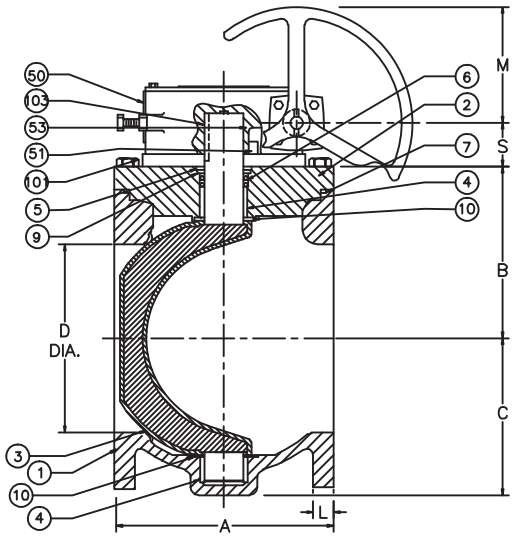


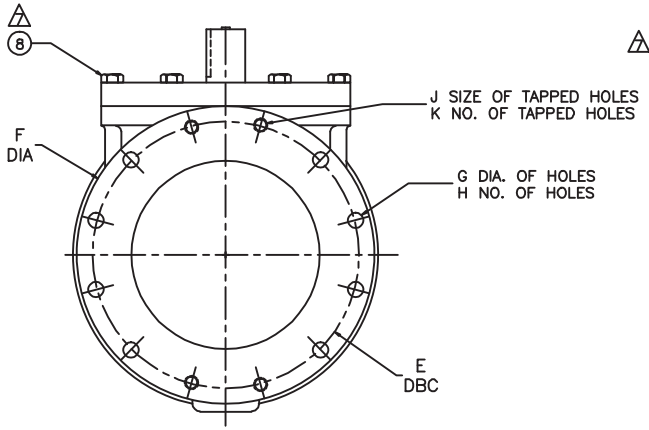


CHAINWHEEL OPTION

SIZE	GEAR	# OF TURNS
2.5"	20:1	5
3"	20:1	5
4"	30:1	7 1/2
5"	30:1	7 1/2
6"	30:1	7 1/2
8"	50:1	12 1/2
10"	80:1	20
12"	80:1	20







*RISER RING IS ONLY ON 2-1/2" TO 8" VALVE

ITEM	QTY	DESCRIPTION	MATERIAL
111	1	CHAINWHEEL	DUCTILE IRON
110	1	SPRING PIN	STEEL
103	1	KEY	STEEL
*101	1	RISER RING	STEEL
55	1	HANDWHEEL	DUCTILE IRON
54	1	2" NUT	DUCTILE IRON
53	2	SLEEVE BEARING	BRONZE
52	1	WORM GEAR	STEEL
51	1	QUAD GEAR	DUCTILE IRON
△4 50	1	HOUSING	
10	2	GRIT SEAL	PTFE
9	1	SEAL RETAINING RING	BRASS
△7 8	AR	H.H. CAP SCREW	☐STEEL ☐STN. STEEL
7	1	O-RING	ELAS AS SPEC.
6	2	U-CUP SEAL	ELAS AS SPEC.
5	1	SNAP RING	SPRING STEEL
4	2	SLEEVE BEARING	STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	CAP	CAST IRON
1	1	BODY	CAST IRON

PRATT®
HENRY PRATT COMPANY
AURORA, ILL.

BY	DATE	SCALE
CR	10/95	NONE
CHK'D: AJ		DIM.: INCHES

ISSUE NUM.	DATE	REVISIONS	BY
1	12/97	REVISED GEAR DIM. FOR 2.5" & 3" WAS M2 NOW ALECTO 232-07	CR
2	11/98	ITEM 8 WAS BRONZE	CR
3	09/07	ADDED MTRL. TYPE	JC
4	02/10	ITEM 50 MATERIAL CHANGED FROM CAST TO DUCTILE IRON [ECR# 252]	JC
5	09/10	REMOVED DATA FOR 14" [ECR # 384]	TF
6	05/12	CORRECTION IN "B" & "S" DIM. [ECN# 584]	AA
7	01/13	ADDED ITEM 10 AND BOM UPDATE	JC
8	01/13	B.O.M. STANDARDIZATION ITEM 10 NOW 8	AA

TITLE:
2-1/2" TO 12"
PLUG VALVE, FLANGED,
GEAR OPERATED,
w/HANDWHEEL, 2" NUT,
OR CHAINWHEEL OPTION

DWG. NO. HP49110

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

appvd: CB

METAL PRECIPITATION REACTOR

INSTRUMENTS

OIM manual section: 4.3.1.5

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Technical
specification

ENM-10 Level regulator

FLYGT
a xylem brand

Table of Contents

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/cm3; 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

Liquid temperature:	min. 0°C (32°F) max. 60°C (140°F)
Liquid density:	min. 0.65 g/cm^3 max. 1.5 g/cm^3
Degree of protection:	IP68, 20 m (65 ft)
Interrupting capacity of micro switch:	AC, resistive load, 250V 10A AC, inductive load, 250V 3A cos ϕ = 0.5 DC, 30V 5A
With gold plated micro switch:	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^3	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^3	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

Cl.I Zone 0, Gr. IIC;

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

Cl.II Gr. E, F&G;

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

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

0080

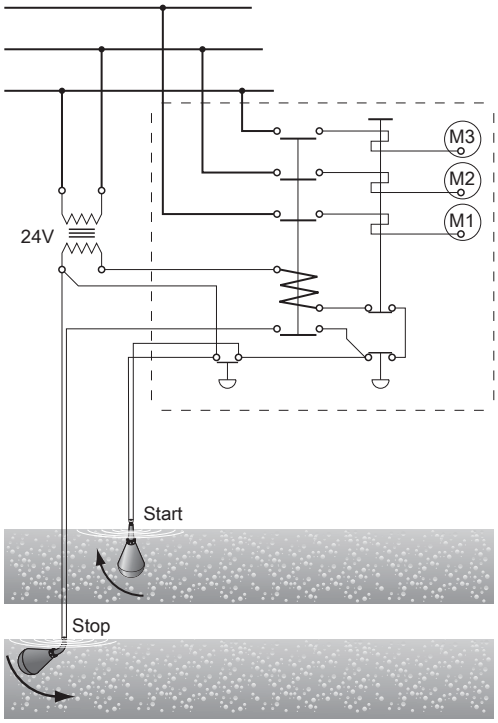
Figure 1

Wiring alternative

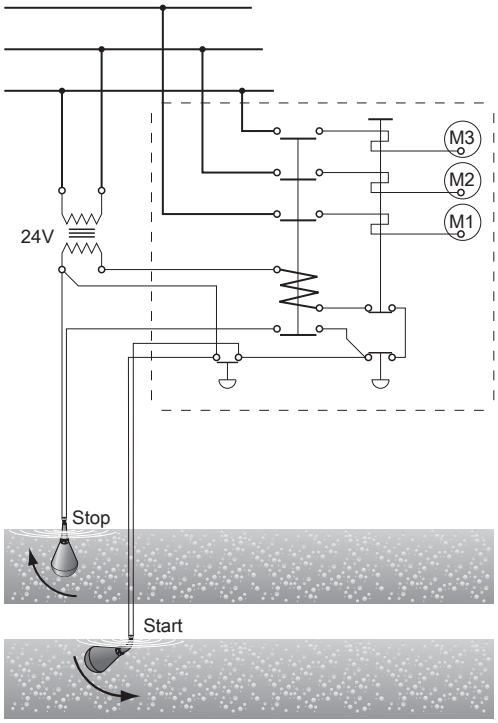
To conform to local regulations, the level regulators are normally connected through a transformer to a low-tension control circuit.

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.



Connect the gray and black leads.



Connect the gray and brown leads.

Insulate the brown lead.
Figure 2: Connected for emptying

Insulate the black lead.
Figure 3: Connected for emptying

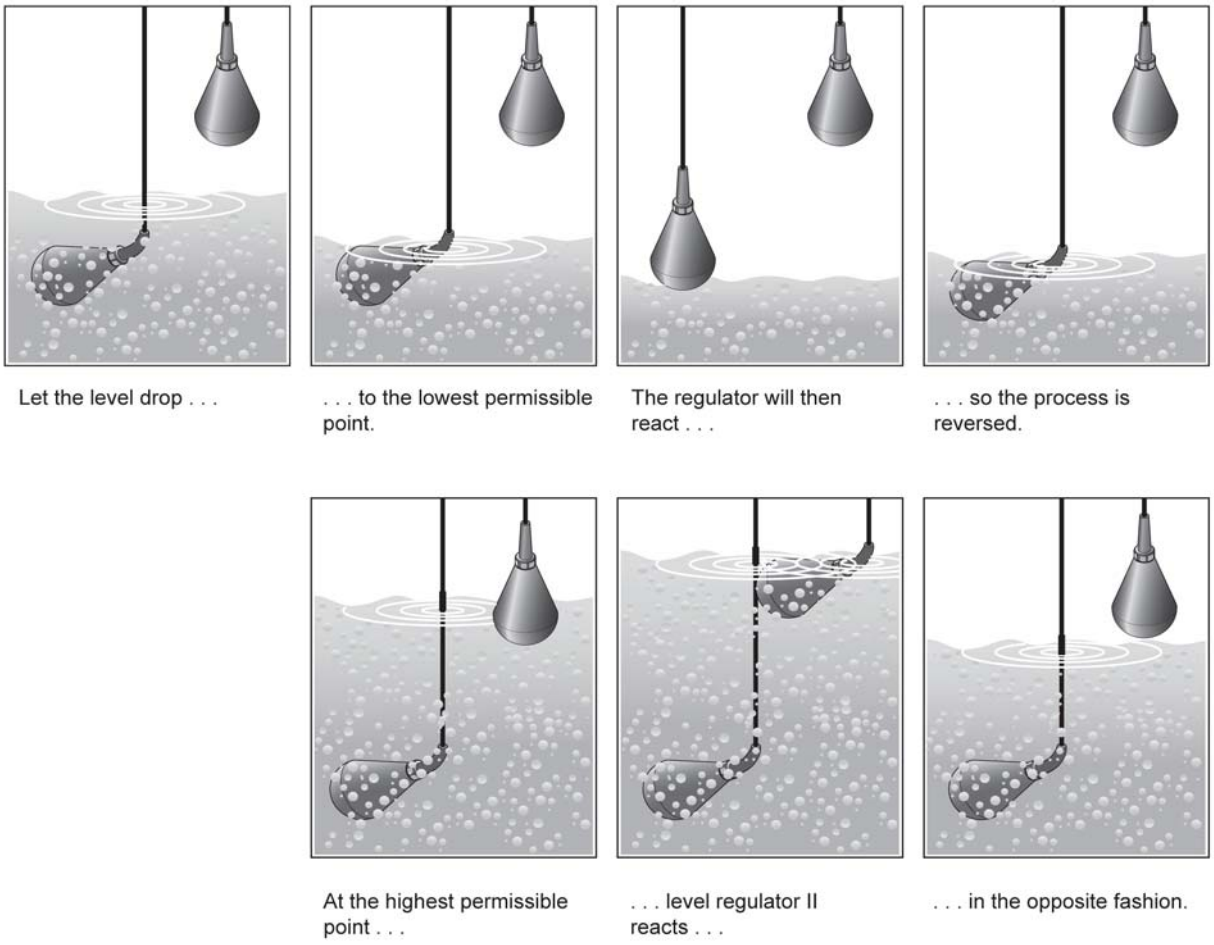


Figure 4

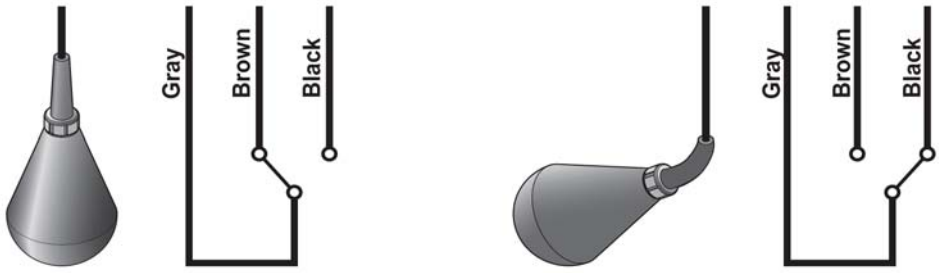


Figure 5: Colour code

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 occular 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	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Acetic Acid 50%	1	2	0	0
Acetic Acid 75%	2	2	0	0
Benzoic Acid	2	2	0	0
Boric Acid 5%	0	—	0	0
Butyric Acid	2	2	2	2
Chromic Acid 10%	0	2	2	2
Citric Acid	0	1	0	0
Hydrobromic Acid 5%	1	2	0	0
Hydrochloric Acid 10%	0	1	0	1
Hydrochloric Acid 37%	1	2	0	2
Hydrocyanic Acid 10%	0	0	1	2
Hydrofluoric Acid 5%	0	2	0	1
Hypochloric Acid	1	2	2	2
Maleic Acid	2	2	2	2
Nitric Acid 5%	1	1	1	1
Nitric Acid 65%	2	2	2	2
Oleic Acid	1	2	2	2
Oxalic Acid 50%	1	1	1	2
Phosphoric Acid 25%	0	0	1	2
Phosphoric Acid 85%	0	0	1	2
Sulphuric Acid 10%	1	2	1	2
Sulphuric Acid 78%	2	2	2	2
Tannic Acid	0	0	0	0
Tartaric Acid	1	1	1	1
Bases				
Ammonium Hydroxide	0	—	0	0
Calcium Hydroxide	0	0	0	0
Potassium Hydroxide	1	2	0	0
Sodium Hydroxide	1	2	0	0

Salts	PVC cable		NBR/PVC nitrile/PVC rubber cable	
	20°C (68°F)	60°C (140°F)	20°C (68°F)	60°C (140°F)
Aluminium Chloride	0	0	0	0
Calcium Sulphate	0	0	0	0
Calcium Chloride	0	0	0	0
Calcium Nitrate	0	0	0	0
Copper Chloride	0	0	0	0
Copper Sulphate	0	0	0	0
Ferric Chloride	0	0	0	0
Ferrous Sulphate	0	0	0	0
Magnesium Chloride	0	0	0	0
Potassium Sulphate	0	0	0	0
Potassium Nitrate	0	0	0	0
Potassium Carbonate	1	1	1	1
Potassium Bicarbonate	0	0	0	0
Sodium Sulphate	0	0	0	0
Sodium Chloride	0	0	0	0
Sodium Nitrate	0	0	0	0
Sodium Bicarbonate	0	0	0	0
Sodium Carbonate	0	0	0	0
Tin Chloride	1	1	1	1
Zinc Sulphate	0	0	0	0
Zinc Chloride	0	0	0	0
Oils				
Castor Oil	1	1	1	1
Cocoanut Oil	0	—	0	2
Corn Oil	2	2	2	2
Diesel Oil	2	2	2	2
Linseed Oil	2	2	2	2
Mineral Oils	2	2	2	2
Olive Oil	1	1	1	1
Silicone Oils	0	0	0	0

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)
Aceton	2	2	2	2
Aniline	2	2	1	2
Benzene	2	2	2	2
Butyl Alcohol	2	2	0	1
Carbon Tetrachloride	2	2	2	2
Chlorobenzene	2	2	2	2
Chloroform	2	2	2	2
Ethyl Alcohol	2	2	0	1
Ethyl Ether	2	2	2	2
Ethyl Acetate	2	2	2	2
Ethylene Dichloride	2	2	2	2
Ethylene Chloride	2	2	2	2
Formaldehyde 37%	1	2	0	0
Gasoline	2	2	2	2
Kerosene	2	2	2	2
Methyl Alcohol	2	2	0	0
Methyl Ethyl Ketone	2	2	2	2
Methylene Chloride	2	2	2	2
Nitrobenzene	2	2	2	2
Phenol	2	2	2	2
Toluene	2	2	2	2
Trichlorethylene	2	2	2	2
Turpentine	2	2	2	2
Xylene	2	2	2	2
Gases				
Carbon Dioxide	0	0	0	0
Carbon Monoxide	0	0	0	0
Chlorine (wet)	2	2	2	2
Hydrogen Sulphide	0	0	1	1
Sulphur Dioxide (wet)	1	1	2	2

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

Figure 6

PRODUCT RANGE

Product range

Part no.	For density [g/cm³]	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

5828858	0,95-1,10	Red	4	6	CE	USA	
5828859	0,95-1,10	Red	4	13	CE	USA	
5828860	0,95-1,10	Red	4	20	CE	USA	
5828870	0,65-0,80	Blue	5	20	CE		
5828871	0,80-0,95	Blue	5	20	CE		
5828872	0,95-1,10	Blue	5	6	CE		
5828873	0,95-1,10	Blue	5	13	CE		
5828874	0,95-1,10	Blue	5	20	CE		
5828875	1,05-1,20	Blue	5	20	CE		
5828876	1,2-1,3	Blue	5	20	CE		
5828877	1,3-1,4	Blue	5	20	CE		
5828878	1,4-1,5	Blue	5	20	CE		
5828879	0,95-1,10	Blue	1	65	CE		
5828880	0,95-1,10	Blue	1	30	CE		
5828881	0,95-1,10	Blue	1	50	CE		
5828882	0,95-1,10	Grey	1	30	CSA/CE	Canada	
5828883	0,95-1,10	Grey	1	50	CSA/CE	Canada	
5828884	0,95-1,10	Blue	2	30	CE	USA	
5828885	0,95-1,10	Blue	2	50	CE	USA	
5828886	0,95-1,10	Red	3	30	CE		
5828887	0,95-1,10	Red	3	50	CE		
5828890	0,95-1,10	Blue	5	30	CE		
5828891	0,95-1,10	Blue	5	50	CE		
5828892	0,95-1,10	Red	3	6	CE	Japan	
5828893	0,95-1,10	Red	3	13	CE	Japan	
5828894	0,95-1,10	Red	3	20	CE	Japan	
5828895	0,95-1,10	Blue	1	6	CE	Japan	
5828896	0,95-1,10	Blue	1	13	CE	Japan	
5828897	0,95-1,10	Blue	1	20	CE	Japan	
5828898	0,95-1,10	Blue	1	50	CE	Japan	
5947919	0,95-1,10	Blue	5	20	CE		Designed for low current and slow movements
5947920	0,95-1,10	Grey	5	20	CSA/CE		Designed for low current and slow movements

Type of cable:

1. Blue PVC jacket with color coding of wires: Grey/Brown/Black
2. Blue PVC jacket with color coding of wires: Red/White/Black
3. Red PVC jacket with color coding of wires: Grey/Brown/Black
4. Red PVC jacket with color coding of wires: Red/White/Black
5. BLACK NBR/PVC jacket with color coding of wires: Grey/Brown/Black (NBR=Nitrile rubber)

Xylem |ˈzīləm|

1) The tissue in plants that brings water upward from the roots
2) A leading global water technology company

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Fax +46-8-475 69 00
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The original instruction is in English. All non-English instructions are translations of the original instruction.

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

appvd: CB

METAL PRECIPITATION REACTOR

PAINT SPECS

OIM manual section: 4.3.1.6

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6.0 TREATMENT

6.1 Internal treatment

- Sandblast as per SSPC-SP-10;
- Brush application on welds and difficult to reach places (inside of holes and openings) of one layer of DURA_PLATE UHS by SHERWIN WILLIAMS, color « light green » and;
- Application of one coat of DURA-PLATE-UHS by SHERWIN WILLIAMS, 20 to 28 mils dft (restricted level 5 as per SSPC-PA 2), color « white NSF»;
- Important note: **Never dilute** the DURA-PLATE-UHS paint.

Only if needed, application of one coat of DURA-PLATE UHS PRIMER by SHERWIN WILLIAMS, 4 to 8 mils dft per coat, color “Gold”, if required depending on atmospheric conditions and delays between sandblast and paint.

6.2 External treatment

- Sandblast as per SSPC-SP-6;
- Spacing between intermittent welds should be filled with an hybrid sealant LOXON H-1 by SHERWIN WILLIAMS before the application of the external coating;
- Brush application on welds and difficult to reach places (inside of holes and openings) of one layer of ENVIROLASTIC 940 by SHERWIN WILLIAMS, color « White »;
- Application of one layer of ENVIROLASTIC 940 by SHERWIN WILLIAMS, 7.0 to 9.0 mils dft, (restricted level 5 as per SSPC-PA 2), color « John Meunier Blue ».

6.3 Piping treatment

Identical to the external coating of the works as stated for tank previously. There is no internal coating to provide for the nozzles of 3" diameter or less (should be made from Stainless Steel). Ensure pipe ends and flanges are covered with paint with the exception of the raised face.

6.4 Extra paint to be supplied

For every equipment, a touch-up paint kit of 1 gallon for both internal and exterior paint must be provided at shipping. Please attach the product label.

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Protective & Marine Coatings

NSF Certified to NSF/ANSI 61

DURA-PLATE® UHS

WITH OPTI-CHECK OAP TECHNOLOGY

PART A	B62-210	SERIES
PART A	B62W211	WHITE OAP (NSF)
PART B	B62V210	STANDARD HARDENER (NSF)
PART B	B62V211	LOW TEMP HARDENER (NSF)

Revised: December 3, 2014

PRODUCT INFORMATION

TRM.35

PRODUCT DESCRIPTION

DURA-PLATE UHS is an ultra high solids epoxy amine engineered specifically for immersion service in ballast tanks, oil tanks, and refined fuel storage tanks. The high build, edge-retentive properties of Dura-Plate UHS provide superior protection compared to conventional epoxies.

- Airless Spray
- One coat protection
- Low VOC
- Low odor
- High flash point, >200°F (93°C)
- Can be used with 1½ oz. fiberglass mat
- Low Temperature Hardener for applications down to 40°F (4.5°C).
- NSF approved to Standard 61 for potable water (tanks of 1000 gallons or greater and pipes of 30" diameter or greater.)

RECOMMENDED USES

For use over prepared steel or concrete surfaces in industrial and marine exposures such as:

- Meets MIL-PRF-23236, Type VII, Class 5, 7, 9 and 11, Grade C (standard hardener only)
- Ballast tank interiors, Oil storage tank interiors, Refined fuel storage tank and potable water tanks interiors and pipe.
- NSF approved for one coat application up to 50.0 mils (1250 microns) dft if required
- Water and waste treatment plants
- Buried Pipe Applications
- Primary and secondary containment areas
- Where edge protection film build properties are required
- Suitable for use with cathodic protection systems
- White B62W211 Contains OAP fluorescent pigment (NSF Approved)
- Suitable for use in the Mining & Minerals Industry

PRODUCT CHARACTERISTICS

Finish	Gloss
Color:	White OAP (NSF), White (NSF), Light Gray (NSF), Light Green (NSF), Black, Haze Gray
Volume Solids:	98% ± 2%, mixed
Weight Solids:	98% ± 2%, mixed
VOC (EPA Method 24):	
(with B62-V210 Hardeners)	<100 g/L; 0.83 lb/gal, mixed
(with B62V211 Hardener)	<100 g/L; 0.84 lb/gal, mixed
Mix Ratio:	4:1 by volume

Recommended Spreading Rate per coat*:

	1 coat system Min.		1 coat system Max.		2 coat system Min.		2 coat system Max.	
Wet mils (microns)	**18.0**	450	**22.0**	550	**10.0**	250	**12.0**	300
Dry mils (microns)	**18.0**	450	**22.0**	550	**10.0**	250	**12.0**	300
Total mils (microns)	**18.0**	450	**22.0**	550	**20.0**	500	**24.0**	600
~Coverage sq ft/gal (m^2/L)	**72**	1.76	**90**	2.2	**130**	3.18	**160**	3.9
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil/25 micron dft	**1568** (38.4)							

* See NSF Systems on next page.

NOTE: Brush or roll application recommended for stripe coating and repair only. Standard hardener preferred for brush & roll due to pot life.

Drying Schedule @ 10.0-22.0 mils wet (250-550 microns):

With B62-V210	@ 55°F/13°C *50% RH*	@ 77°F/25°C	@ 100°F/38°C
To touch:	12 hours	5 hours	3 hours
To handle:	48 hours	14 hours	8 hours
To recoat:			
minimum:	48 hours	14 hours	8 hours
maximum:	21 days	14 days	14 days
Cure to service:	10 days	4 days	24 hours
Heat Cure:	8 hours @ ambient, then 16 hrs @ 140°F (60°C)*		

*Not NSF Approved. See Tips Section.

Pot Life*:	30-45 minutes	30-45 minutes	20-30 minutes
*Dependent upon temperature and mass			
Sweat-in-time:	15 minutes	None	None

PRODUCT CHARACTERISTICS (CONT'D)

With B62V211	@ 40°F/4.5°C	@ 55°F/13°C *50% RH*	@ 77°F/25°C
To touch:	24 hours	5 hours	3 hours
To handle:	48 hours	24 hours	8 hours
To recoat:			
minimum:	48 hours	24 hours	8 hours
maximum:	30 days	21 days	14 days
Cure to service:	7 days	5 days	3 days
Heat Cure:	8 hours @ ambient, then 16 hrs @ 140°F (60°C)*		

Material should be at least 50°F (10°C) for optimal performance.

If maximum recoat time is exceeded, abrade surface before recoating.

Drying time is temperature, humidity, and film thickness dependent.

Sterilize and rinse per AWWA C652.

*Not NSF Approved. See Tips Section.

Pot Life*:	20 minutes	20 minutes	10 minutes
*Dependent upon temperature and mass			
Sweat-in-Time:	5 minutes	None	None

Shelf Life:	36 months Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	>200°F (93°C), PMCC, mixed
Reduction:	Not recommended
Clean Up:	MEK, R6K10 or R7K104 Reducer

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10/NACE 2

System Tested*:

1 ct. Dura-Plate UHS @ 18.0 mils (450 microns) dft with B62GV210 Hardener

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	20.8 mg loss
Adhesion	ASTM D4541; ASTM D3359	800 psi, minimum (ASTM D4541); 5A (ASTM D3359)
Corrosion Weathering	ASTM D5894, 6 cycles, 2016 hours	Rating 10 per ASTM D610 for rusting and Rating 10 per ASTM D714 for blistering
Direct Impact Resistance	ASTM D2794; ASTM G14	30 in. lb. (ASTM D2794); 168 in. lb. (ASTM G14)
Dry Heat Resistance	ASTM D2485	250°F (121°C)
Flexibility	ASTM D522, 180° bend, 1/2" mandrel	Passes, 9.7% elongation
Immersion (Galvapac/1 ct Dura Plate UHS)	5 year potable water	Rating 10 per ASTM D610 for rusting and Rating 10 per ASTM D714 for blistering
Pencil Hardness	ASTM D3363	3H

IMMERSION (Ambient temperature):

- Ballast Tank mix ..... Recommended
- Crude oil ..... Recommended
- Diesel fuel ..... Recommended
- Ethanol or Gasohol ..... Recommended
- Fresh water/Potable Water ..... Recommended
- Fuel oil ..... Recommended
- Methanol or methanol blends ..... Not Recommended
- MTBE, TAME, ETBE ..... Recommended
- Refined petroleum products ..... Recommended
- Sea water ..... Recommended
- Hi-Aromatic Gasolines ..... Recommended

continued on back

Protective & Marine Coatings

NSF Certified to NSF/ANSI 61

DURA-PLATE® UHS

WITH OPTI-CHECK OAP TECHNOLOGY

PART A	B62-210	SERIES
PART A	B62W211	WHITE OAP (NSF)
PART B	B62V210	STANDARD HARDENER (NSF)
PART B	B62V211	LOW TEMP HARDENER (NSF)

Revised: December 3, 2014

PRODUCT INFORMATION

TRM.35

RECOMMENDED SYSTEMS

		Dry Film Thickness / ct. Mils	(Microns)
Steel, NSF Systems:			
1 ct.	Dura-Plate UHS Primer	4.0-8.0*	(100-200)
1 ct.	Dura-Plate UHS	10.0-12.0*	(250-300)
or			
1 ct.	Dura-Plate UHS	16.0-50.0	(400-1250)
or			
2 cts.	Dura-Plate UHS	8.0-25.0	(200-625)
or			
3 cts.	Dura-Plate UHS	8.0-16.0	(200-400)
Steel, OAP Fluorescent Pigment System			
1 ct.	Dura-Plate UHS (B62W211)	12.0-14.0	(300-350)
Steel:			
1 ct.	Dura-Plate UHS Primer	4.0-8.0**	(100-200)
1 ct.	Dura-Plate UHS	10.0-12.0	(250-300)
or			
2 cts.	Dura-Plate UHS	6.0-7.0	(150-175)
or			
1 ct.	Dura-Plate UHS	18.0-22.0	(450-550)
or			
2 cts.	Dura-Plate UHS	10.0-12.0	(250-300)
Steel, with hold primer:			
1 ct.	Macropoxy 5500 Primer (as required for blast hold primer)	1.0-1.5**	(25-40)
2 cts.	Dura-Plate UHS	10.0-12.0	(250-300)
Steel, Laminate System:			
1 ct.	Copoxy Shop Primer (as required for blast hold primer)	1.0-1.5	(25-40)
or			
1 ct.	Dura-Plate UHS Primer	4.0-8.0**	(100-200)
1 ct.	Steel-Seam FT910 as required for filling pits, and transitioning sharp edges, weld seams, etc.		
1 ct.	Dura-Plate UHS Clear Laminate Resin with 1½ oz. glass mat	40.0-45.0	(1000-1125)
1 ct.	Dura-Plate UHS as required to seal fiberglass mat	10.0-12.0	(250-300)
Concrete/Masonry:			
1 ct.	Corobond 100 Epoxy Primer/Sealer	4.0-6.0	(100-150)
	(or 1 ct Dura- Plate UHS Primer (as required for NSF)	4.0-8.0**	(100-200)
1 ct.	Dura-Plate UHS (as required for NSF)	10.0-12.0	(250-300)

* If primer is used, 10 mils (250 microns) dft maximum for primer and 14 mils (350 microns) dft maximum for topcoat.

** When using the B62L210 Primer containing the OAP fluorescent pigment, make sure a non-containing OAP fluorescent pigment Topcoat is used.

Refer to Application Bulletin for treatment of pitted tank bottoms.

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

Minimum recommended surface preparation:

Iron & Steel:
- Atmospheric: SSPC-SP6/NACE 3, 2 mil (50 micron) profile or SSPC-SP12/NACE No. 5, WJ-3/NV-2
- Immersion: SSPC-SP10/NACE2, 2-3 mil (50-75 micron)profile or SSPC- SP12/NACE No. 5, WJ-2/NV-2

Concrete & Masonry:
- Atmospheric: SSPC-SP13/NACE 6, or ICRI No. 310.2R CSP 2-3
- Immersion: SSPC-SP13/NACE 6-4.3.1 or 4.3.2, or ICRI No. 310.2R CSP 2-3

Surface Preparation Standards

Condition of Surface		ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Do not tint Part A.

Clear Hardeners B62V210 and B62V211 may be tinted with up to 1½ oz. per gallon with Maxitoner Colorant, Phthalo Green or Black (both NSF approved) **ONLY**.

APPLICATION CONDITIONS

Temperature (air, surface):
- B62-V210 Hardeners: 50°F (10°C) minimum, 110°F (43°C) maximum
- B62V211 Hardener: 40°F (4.5°C) minimum, 77°F (25°C) maximum

At least 5°F (2.8°C) above dew point

Material should be 70°F (21°C) to 85°F (29°C) or optimal performance.

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:
- Part A: 4 gallon (15.1L) container
- Part B: 1 gallon (3.78L) container

Weight: 10.52 ± 0.2 lb/gal ; 1.26 Kg/L, mixed

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Protective & Marine Coatings

NSF Certified to NSF/ANSI 61

DURA-PLATE® UHS

WITH OPTI-CHECK OAP TECHNOLOGY

PART A	B62-210	SERIES
PART A	B62W211	WHITE OAP (NSF)
PART B	B62V210	STANDARD HARDENER (NSF)
PART B	B62V211	LOW TEMP HARDENER (NSF)

Revised: December 3, 2014

APPLICATION BULLETIN

TRM.35

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel (atmospheric service)
Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3 or SSPC-SP12/NACE No. 5. For surfaces prepared by SSPC SP6/NACE 3, first remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For surfaces prepared by SSPC-SP12/NACE No. 5, all surfaces shall be cleaned in accordance with WJ-3/NV2. Pre-existing profile should be approximately 2 mils (50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Iron & Steel (immersion service)
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Near White Metal Blast Cleaning per SSPC-SP10/NACE 2, or SSPC-SP12/NACE No. 5. For SSPC-SP10/NACE 2 blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2-3 mils / 50-75 microns). For SSPC-SP12/NACE No.5, all surfaces to be coated shall be cleaned in accordance with WJ-2/NV2 standards. Pre-existing profile should be approximately 2 mils (50 microns). Remove all weld spatter. Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Concrete and Masonry
For surface preparation, refer to SSPC-SP13/NACE 6, or ICRI No. 310.2R, CSP 2-3. Surfaces should be thoroughly clean and dry. Concrete and mortar must be cured at least 28 days @ 75°F (24°C). Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement and hardeners. Fill bug holes, air pockets and other voids with Steel-Seam FT910. Primer required.

Follow the standard methods listed below when applicable:
ASTM D4258 Standard Practice for Cleaning Concrete.
ASTM D4259 Standard Practice for Abrading Concrete.
ASTM D4260 Standard Practice for Etching Concrete.
ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete.
SSPC-SP 13/Nace 6 Surface Preparation of Concrete.
ICRI No. 310.2R Concrete Surface Preparation.

Concrete, Immersion Service:
For surface preparation, refer to SSPC-SP13/NACE 6, Section 4.3.1 or 1.3.2 or ICRI No. 310.2R, CSP 2-3.

Surface Preparation Standards

Condition of Surface		ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature (air, surface):

B62-V210 Hardeners	50°F (10°C) minimum, 110°F (43°C) maximum
B62V211 Hardener	40°F (4.5°C) minimum, 77°F (25°C) maximum
	At least 5°F (2.8°C) above dew point

Material should be 70°F (21°C) to 85°F (29°C) or optimal performance.

Relative humidity: 85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reduction .....Not recommended

Clean Up .....MEK, R6K10 or R7K104 Reducer

Airless Spray
Unit.....74:1 Pump, minimum
Pressure.....6000 psi minimum
Hose.....3/8" ID
Tip .....019" - .021"
Filter.....30 mesh

In order to avoid blockage of spray equipment and hose, flush equipment with MEK, R6K10 or R7K104 Reducer at least once every 30 minutes when using the B62V210 Hardener and after each kit when using the Low Temperature Hardener, and before periods of extended downtime.

Plural Component Equipment .....Acceptable

Brush .....For stripe coating and repair only
Brush.....Nylon/Polyester or Natural Bristle

Roller .....For stripe coating and repair only
Cover .....3/8" woven with solvent resistant core

If specific application equipment is not listed above, equivalent equipment may be substituted.

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Protective & Marine Coatings

NSF Certified to NSF/ANSI 61

DURA-PLATE® UHS

WITH OPTI-CHECK OAP TECHNOLOGY

PART A	B62-210	SERIES
PART A	B62W211	WHITE OAP (NSF)
PART B	B62V210	STANDARD HARDENER (NSF)
PART B	B62V211	LOW TEMP HARDENER (NSF)

Revised: December 3, 2014

APPLICATION BULLETIN

TRM.35

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mixing Instructions: Mix contents of each component thoroughly using low speed power agitation. Make certain no pigment remains on the bottom or the sides of the can. Then combine four parts by volume of Part A with one part by volume of Part B. Thoroughly agitate the mixture with power agitation.

To ensure that no unmixed material remains on the sides or bottom of the cans after mixing, visually observe the container by pouring the material into a separate container.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat*:

	1 coat system Min.		1 coat system Max.		2 coat system Min.		2 coat system Max.	
Wet mils (microns)	**18.0**	450	**22.0**	550	**10.0**	250	**12.0**	300
Dry mils (microns)	**18.0**	450	**22.0**	550	**10.0**	250	**12.0**	300
Total mils (microns)	**18.0**	450	**22.0**	550	**20.0**	500	**24.0**	600
~Coverage sq ft/gal (m^2/L)	**72**	1.76	**90**	2.2	**130**	3.18	**160**	3.9
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil/25 micron dft	**1568** (38.4)							

* See NSF Systems on next page.

NOTE: Brush or roll application recommended for stripe coating and repair only. Standard hardener preferred for brush & roll due to pot life.

Drying Schedule @ 10.0-22.0 mils wet (250-550 microns):

With B62-V210	@ 55°F/13°C *50% RH*	@ 77°F/25°C	@ 100°F/38°C
To touch:	12 hours	5 hours	3 hours
To handle:	48 hours	14 hours	8 hours
To recoat:			
minimum:	48 hours	14 hours	8 hours
maximum:	21 days	14 days	14 days
Cure to service:	10 days	4 days	24 hours
Heat Cure:	8 hours @ ambient, then 16 hrs @ 140°F (60°C)*		

*Not NSF Approved. See Tips Section.

Pot Life*:	30-45 minutes	30-45 minutes	20-30 minutes

*Dependent upon temperature and mass

Sweat-in-time:	15 minutes	None	None

With B62V211	@ 40°F/4.5°C	@ 55°F/13°C *50% RH*	@ 77°F/25°C
To touch:	24 hours	5 hours	3 hours
To handle:	48 hours	24 hours	8 hours
To recoat:			
minimum:	48 hours	24 hours	8 hours
maximum:	30 days	21 days	14 days
Cure to service:	7 days	5 days	3 days
Heat Cure:	8 hours @ ambient, then 16 hrs @ 140°F (60°C)*		

Material should be at least 50°F (10°C) for optimal performance.

If maximum recoat time is exceeded, abrade surface before recoating.

Drying time is temperature, humidity, and film thickness dependent.

Sterilize and rinse per AWWA C652.

*Not NSF Approved. See Tips Section.

Pot Life*:	20 minutes	20 minutes	10 minutes

*Dependent upon temperature and mass

Sweat-in-Time:	5 minutes	None	None

Note: Recommended application procedure direct to steel: Apply a 5.0-6.0 mil (125-150 micron) coat to the substrate. Allow material to "wet" the surface. Then apply additional material, to bring total film thickness to the recommended range.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with MEK, R6K10. Clean tools immediately after use with MEK, R6K10. Follow manufacturer's safety recommendations when using any solvent.

PERFORMANCE TIPS

Repair of Pitted Tank Bottoms
Extensive, deep pitting:
Options:
Option 1 ....Apply a full wet coat, by spray application, of Dura-Plate UHS Primer. Follow with rubber squeegee to work material into and fill the pitted areas. After recommended drying time, apply a full coat of Dura-Plate UHS at recommended film thickness.
Option 2 ....Apply Dura-Plate Laminant Resin with 1½ oz fiberglass mat over the pitted areas. After recommended drying time, apply a full coat of Dura-Plate UHS at recommended film thickness.
Option 3 ....Weld new steel plates, or use puddle welds, as required to repair pitted areas. Coat areas as recommended.
Shallow pitting, isolated areas:
Options:
Option 1 ....Same as number 1 above.
Option 2 ....Apply Steel-Seam FT910 as required to fill the pitted areas. Coat areas as recommended.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross-coat spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.
No reduction of material is recommended as this can affect film build, appearance, and adhesion.

Do not mix previously catalyzed material with new.

Do not apply the material beyond recommended pot life.

In order to avoid blockage of spray equipment and hose, flush equipment with MEK, R6K10 or R7K104 Reducer at least once every 30 minutes when using the B62V210 Hardener and after each kit when using the Low Temperature Hardener, and before periods of extended downtime.

For Immersion Service: (if required) Holiday test in accordance with ASTM D5162 for steel, or ASTM D4787 for concrete.

May be applied up to 50.0-60.0 mils (1250-1500 microns) dft in one coat if required.

When using the B62L210 Primer containing the OAP fluorescent pigment, make sure a non-containing OAP fluorescent pigment Topcoat is used.

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

Heat curing is not acceptable for NSF approval.

Guidance on techniques and required equipment to inspect a coating system incorporating Opti-Check OAP Technology can be found in SSPC-TU 11.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

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Protective & Marine Coatings

ENVIROLASTIC® 940 DTM
POLYASPARTIC URETHANE

PART A	B65-940	SERIES
PART B	B65V940	HARDENER

Revised: February 6, 2014

PRODUCT INFORMATION

5.52

PRODUCT DESCRIPTION

ENVIROLASTIC 940 DTM is a single coat, direct-to-metal urethane finish. It is a fast dry, polyaspartic urethane formulated to provide high build, high performance protection and gloss and color retention through airless spray.

- Single coat application
- Direct to metal
- Corrosion resistant
- High film build in one coat
- Cures quickly to improve productivity
- No gassing
- Outstanding application properties

PRODUCT CHARACTERISTICS

Finish: Gloss

Color: Wide range of colors possible

Volume Solids: 68% ± 2%, mixed, may vary by color

Weight Solids: 80% ± 2%, mixed, may vary by color

VOC (EPA Method 24): 265 g/L; 2.21 lb/gal, mixed, may vary by color

Mix Ratio: 2:1 by volume

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**9.0** (225)	**13.0** (325)
Dry mils (microns)	**6.0** (150)	**9.0** (225)
~Coverage sq ft/gal (m^2/L)	**121** (3.0)	**182** (4.5)
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil / 25 microns dft	**1089** (26.7)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 9.0 mils wet (225 microns):

	@ 35°F/1.6°C	@ 50°F/10°C	@ 77°F/25°C 50% RH	@ 120°F/49°C
To touch:	5 hours	3 hours	1 hour	30 minutes
To handle:	16 hours	7 hours	2 hours	1 hour
To recoat:				
minimum:	16 hours	7 hours	2 hours	1 hour
maximum:	3 months	3 months	3 months	45 days
To cure:	7 days	7 days	4 days	2 days
Pot Life:	4 hours	3 hours	2 hours	30 minutes
Sweat-in-Time:	None required			

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

Shelf Life:	Part A - 24 months, unopened Part B - 24 months, unopened Store indoors at 40°F (4.5°C) to 100°F (38°C).
Flash Point:	57°F (14°C), mixed (Seta Flash)
Reducer/Clean Up:	
Below 80°F (27°C):	MEK, R6K10
Above 80°F (27°C):	Reducer R7K216
Brush / Roll:	Reducer R7K216

RECOMMENDED USES

- Direct to properly prepared steel and galvanizing in industrial environments
- Replaces conventional epoxy/urethane systems
- Ideal for maintenance or new construction applications
- Suitable for use in USDA inspected facilities
- Acceptable for use in high performance architectural applications
- Suitable for use in the Mining & Minerals Industry
- Not recommended for electrostatic spray or air-assisted airless spray

PERFORMANCE CHARACTERISTICS

Substrate*: Steel

Surface Preparation*: SSPC-SP10/NACE 2

System Tested*:

1 ct. Envirolastic 940 DTM @ 6.0-9.0 mils (150-225 microns) dft

*unless otherwise noted below

Test Name	Test Method	Results
Abrasion Resistance	ASTM D4060, CS17 wheel, 1000 cycles, 1 kg load	120 mg loss
Adhesion	ASTM D4541	1400 psi
Direct Impact Resistance	ASTM G14	60 in lb
Dry Heat Resistance	ASTM D2485	200°F (93°C)
Flexibility	ASTM D522, 180° bend, 3/4" mandrel	Passes
Pencil Hardness	ASTM D3363	H

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Protective & Marine Coatings

ENVIROLASTIC® 940 DTM
POLYASPARTIC URETHANE

PART A	B65-940	SERIES
PART B	B65V940	HARDENER

Revised: February 6, 2014

PRODUCT INFORMATION

5.52

RECOMMENDED SYSTEMS

	Dry Film Thickness / ct. Mils	(Microns)
Steel:		
1 ct. Envirolastic 940 DTM	6.0-9.0	(150-225)
Galvanizing:		
1 ct. DTM Wash Primer	0.7-1.3	(18-32)
1 ct. Envirolastic 940 DTM	6.0-9.0	(150-225)
Galvanizing:		
1 ct. Envirolastic 940 DTM	6.0-9.0	(150-225)
Steel, if primer is required:		
1 ct. Corothane I GalvaPac Zinc Primer	3.0-4.0*	(75-100)
1 ct. Envirolastic 940 DTM	6.0-9.0	(150-225)
Previously Painted Surfaces:		
1 ct. Envirolastic 940	4.0-7.0	(100-200)
Check Compatibility		

* other acceptable primers
- Fast Clad Zinc HS
- Macropoxy 646 Epoxy
- Steel Spec Epoxy Primer
- Zinc Clad III HS
- Zinc Clad IV

SURFACE PREPARATION

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Refer to product Application Bulletin for detailed surface preparation information.

The systems listed above are representative of the product's use, other systems may be appropriate.

DISCLAIMER

The information and recommendations set forth in this Product Data Sheet are based upon tests conducted by or on behalf of The Sherwin-Williams Company. Such information and recommendations set forth herein are subject to change and pertain to the product offered at the time of publication. Consult your Sherwin-Williams representative to obtain the most recent Product Data Information and Application Bulletin.

Minimum recommended surface preparation:

Iron & Steel: SSPC-SP6/NACE 3, 2 mil (50 micron) profile

Galvanizing: SSPC-SP16, 2 mil (50 micron) profile

Surface Preparation Standards

Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal	Sa 3	Sa 3	SP 5	1
Near White Metal	Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast	Sa 2	Sa 2	SP 6	3
Brush-Off Blast	Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning Rusted	C St 2	C St 2	SP 2	-
Hand Tool Cleaning Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning Rusted	C St 3	C St 3	SP 3	-
Power Tool Cleaning Pitted & Rusted	D St 3	D St 3	SP 3	-

TINTING

Tint with Maxitoner colorants only into Part A Ultra Deep at 100% tint strength and 150% tint strength for Extra White. Five minutes minimum mixing on a mechanical shaker is required for complete mixing of color.

APPLICATION CONDITIONS

Temperature: 35°F (1.6°C) minimum, 120°F (49°C) maximum
(air, surface, and material)
At least 5°F (2.8°C) above dew point

Relative humidity: 85% maximum

Refer to product Application Bulletin for detailed application information.

ORDERING INFORMATION

Packaging:

Part A: 2 qts. (1.9L) gallon can
Part B: 1 qt. (0.95L) quart can

Part A: 3 gallon (12.04L) pail
Part B: short filled 2 gallon (6.28L) pail

Weight: 11.4 ± 0.2 lb/gal ; 1.4 Kg/L
mixed, may vary with color

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.
Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

The Sherwin-Williams Company warrants our products to be free of manufacturing defects in accord with applicable Sherwin-Williams quality control procedures. Liability for products proven defective, if any, is limited to replacement of the defective product or the refund of the purchase price paid for the defective product as determined by Sherwin-Williams. NO OTHER WARRANTY OR GUARANTEE OF ANY KIND IS MADE BY SHERWIN-WILLIAMS, EXPRESSED OR IMPLIED, STATUTORY, BY OPERATION OF LAW OR OTHERWISE, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Protective & Marine Coatings

ENVIROLASTIC® 940 DTM
POLYASPARTIC URETHANE

PART A	B65-940	SERIES
PART B	B65V940	HARDENER

Revised: February 6, 2014

APPLICATION BULLETIN

5.52

SURFACE PREPARATIONS

Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.

Iron & Steel
Remove all oil and grease from surface by Solvent Cleaning per SSPC-SP1. Minimum surface preparation is Commercial Blast Cleaning per SSPC-SP6/NACE 3. For better performance, use Near White Metal Blast Cleaning per SSPC-SP10/NACE 2. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile (2 mils / 50 microns). Prime any bare steel the same day as it is cleaned or before flash rusting occurs.

Aluminum
Remove all oil, grease, dirt, oxide and other foreign material by Solvent Cleaning per SSPC-SP1. Primer required.

Galvanized Steel
Surface Preparation Specification SSPC-SP 16 must be followed obtaining a surface profile of minimum 2.0 mils (50 microns).

Previously Painted Surfaces
If in sound condition, clean the surface of all foreign material. Smooth, hard or glossy coatings and surfaces should be dulled by abrading the surface. Apply a test area, allowing paint to dry one week before testing adhesion. If adhesion is poor, or if this product attacks the previous finish, removal of the previous coating may be necessary. If paint is peeling or badly weathered, clean surface to sound substrate and treat as a new surface as above.

Surface Preparation Standards

	Condition of Surface	ISO 8501-1 BS7079:A1	Swedish Std. SIS055900	SSPC	NACE
White Metal		Sa 3	Sa 3	SP 5	1
Near White Metal		Sa 2.5	Sa 2.5	SP 10	2
Commercial Blast		Sa 2	Sa 2	SP 6	3
Brush-Off Blast		Sa 1	Sa 1	SP 7	4
Hand Tool Cleaning	Rusted	C St 2	C St 2	SP 2	-
	Pitted & Rusted	D St 2	D St 2	SP 2	-
Power Tool Cleaning	Rusted	C St 3	C St 3	SP 3	-
	Pitted & Rusted	D St 3	D St 3	SP 3	-

APPLICATION CONDITIONS

Temperature:	35°F (1.6°C) minimum, 120°F (49°C) maximum (air, surface, and material) At least 5°F (2.8°C) above dew point
Relative humidity:	85% maximum

APPLICATION EQUIPMENT

The following is a guide. Changes in pressures and tip sizes may be needed for proper spray characteristics. Always purge spray equipment before use with listed reducer. Any reduction must be compliant with existing VOC regulations and compatible with the existing environmental and application conditions.

Reducer/Clean Up
- Above 80°F.....Reducer R7K216
- Below 80°F .....MEK, R6K10
- Brush and roll.....Reducer R7K216

Airless Spray
- Pump.....30:1
- Pressure.....2800 - 3000 psi
- Hose.....3/8" ID
- Tip .....017" - .021"
- Filter.....60 mesh
- Reduction.....As needed up to 5% by volume

Conventional Spray
- Gun .....Binks 95
- Cap 63P
- Fluid Tip 67
- Atomization Pressure.....50-70 psi
- Fluid Pressure.....20-25 psi
- Reduction.....As needed, up to 10% by volume

Brush (small areas only)
- Brush.....Natural bristle
- Reduction.....As needed up to 5% by volume

Roller (small areas only)
- Cover .....1/4" woven with solvent resistant core
- Reduction.....As needed up to 5% by volume

If specific application equipment is not listed above, equivalent equipment may be substituted.

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Protective & Marine Coatings

ENVIROLASTIC® 940 DTM
POLYASPARTIC URETHANE

PART A	B65-940	SERIES
PART B	B65V940	HARDENER

Revised: February 6, 2014

APPLICATION BULLETIN

5.52

APPLICATION PROCEDURES

Surface preparation must be completed as indicated.

Mix contents of each component thoroughly with low speed power agitation. Make certain no pigment remains on the bottom of the can. Then combine 2 parts by volume of Part A with 1 part by volume of Part B. Thoroughly agitate the mixture with power agitation.

If reducer solvent is used, add only after both components have been thoroughly mixed.

Apply paint at the recommended film thickness and spreading rate as indicated below:

Recommended Spreading Rate per coat:

	Minimum	Maximum
Wet mils (microns)	**9.0** (225)	**13.0** (325)
Dry mils (microns)	**6.0** (150)	**9.0** (225)
~Coverage sq ft/gal (m^2/L)	**121** (3.0)	**182** (4.5)
Theoretical coverage **sq ft/gal** (m^2/L) @ 1 mil / 25 microns dft	**1089** (26.7)	

NOTE: Brush or roll application may require multiple coats to achieve maximum film thickness and uniformity of appearance.

Drying Schedule @ 9.0 mils wet (225 microns):

	@ 35°F/1.6°C	@ 50°F/10°C	@ 77°F/25°C *50% RH*	@ 120°F/49°C
To touch:	5 hours	3 hours	1 hour	30 minutes
To handle:	16 hours	7 hours	2 hours	1 hour
To recoat:				
minimum:	16 hours	7 hours	2 hours	1 hour
maximum:	3 months	3 months	3 months	45 days
To cure:	7 days	7 days	4 days	2 days
Pot Life:	4 hours	3 hours	2 hours	30 minutes
Sweat-in-Time:	None required			

If maximum recoat time is exceeded, abrade surface before recoating. Drying time is temperature, humidity, and film thickness dependent.

Application of coating above maximum or below minimum recommended spreading rate may adversely affect coating performance.

CLEAN UP INSTRUCTIONS

Clean spills and spatters immediately with MEK, R6K10. Clean tools immediately after use with MEK, R6K10. Follow manufacturer's safety recommendations when using any solvent.

DISCLAIMER

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PERFORMANCE TIPS

Stripe coat all crevices, welds, and sharp angles to prevent early failure in these areas.

When using spray application, use a 50% overlap with each pass of the gun to avoid holidays, bare areas, and pinholes. If necessary, cross spray at a right angle.

Spreading rates are calculated on volume solids and do not include an application loss factor due to surface profile, roughness or porosity of the surface, skill and technique of the applicator, method of application, various surface irregularities, material lost during mixing, spillage, overthinning, climatic conditions, and excessive film build.

Excessive reduction of material can affect film build, appearance, and adhesion.

Do not use Quik-Thane Urethane Accelerator.

Do not apply the material beyond recommended pot life.

Do not mix previously catalyzed material with new.

In order to avoid blockage of spray equipment, clean equipment before use or before periods of extended downtime with MEK, R6K10.

Mixed coating is sensitive to water. Use water traps in all air lines. Moisture contact can reduce pot life and affect gloss and color.

Refer to Product Information sheet for additional performance characteristics and properties.

SAFETY PRECAUTIONS

Refer to the MSDS sheet before use.

Published technical data and instructions are subject to change without notice. Contact your Sherwin-Williams representative for additional technical data and instructions.

WARRANTY

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4 – DETAILED TECHNICAL DOCUMENTATION

4.3 – SHOP DRAWINGS

4.3.2 – SLUDGE TANK – RX75-2

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Project name:	AMARUQ
Project#:	5000218009
Document #:	SPK_0004_RX
by:	LJ
chkd:	GP
appvd:	CB

SUBMITTAL PACKAGE

SLUDGE TANKS RX75-2

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Project name:	AMARUQ
Project#:	5000218009
Document #:	SPK_0004_RX
by:	LJ
chkd:	GP
appvd:	CB

SLUDGE TANKS RX75-2

PROCESS DATASHEET

OIM manual section: 4.3.2.1

REFER TO 5000218009_PSDS_0002_RX_VWT

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Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0004_RX

by: LJ

chkd: GP

appvd: CB

SLUDGE TANKS RX75-2

GENERAL ARRANGEMENT DRAWING

OIM manual section: 4.3.2.2

REFER TO 5000218009_GA_0002_RX75-2_VWT

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Project name:	AMARUQ
Project#:	5000218009
Document #:	SPK_0004_RX
by:	LJ
chkd:	GP
appvd:	CB

SLUDGE TANKS RX75-2

MIXER

OIM manual section: 4.3.2.3

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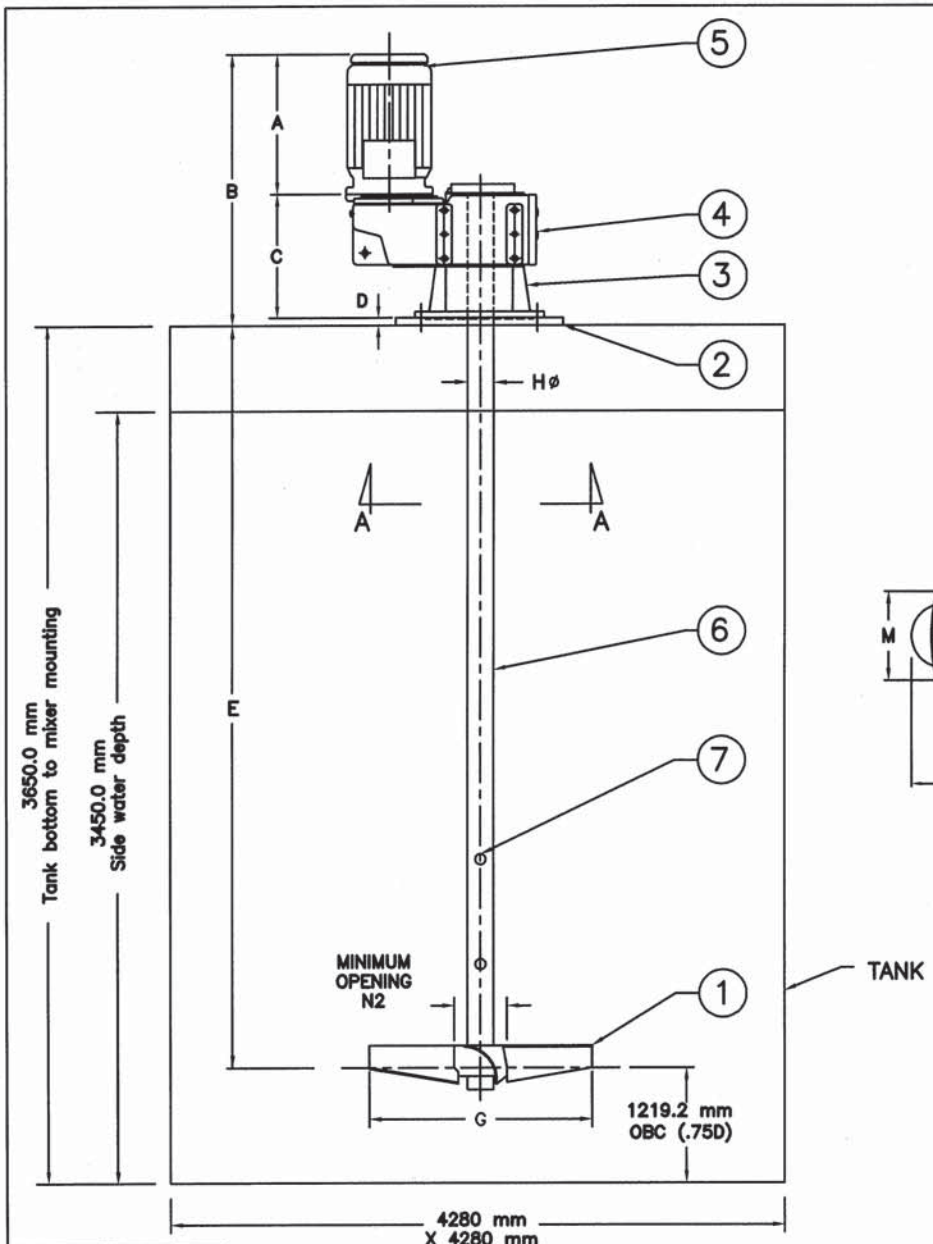

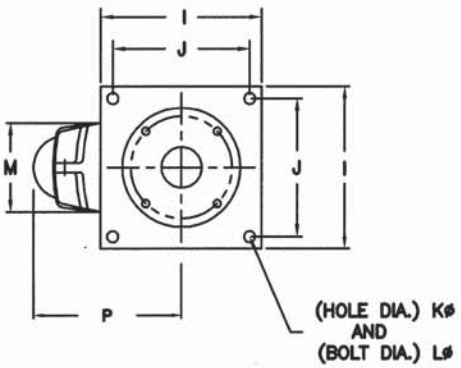

"A–A"

ITEM	DESCRIPTION	MATERIAL
1	Envirofoil Impeller (F–4) 2438.4 mm (96.0")ø ● 22.0 °	304L
2	Base 533.4 mm x 533.4 mm (21.0" x 21.0")	Steel
3	Pedestal c/w dry well (dry well)	
4	NORD reducer 21.72 RPM	
5	NORD 5.0 Hp motor, premium efficiency, 575/3/60, TEFC	
6	Shaft: (1) section 2430.8 mm (95.7") ● 3.0"ø	304L
7	Three pos'n adjustment: 1/2D, 3/4D and 1.0D	

APPL'N: SLUDGE (QTY 2)
MELANGEURS MIX–TECH
MODEL: EVGX6–5.0
3.73 kW ● 21.72 RPM
S/N 04865–4, 5
Sludge tank # 1
Rotation: Clockwise
Thrust: Down
Tag #: M4–011
Reactor # 2
Rotation: Clockwise
Thrust: Down
Tag #: M4–012

Dimensions: Inches

MOD.:	A	B	C	D	E	E2	F	Gø	Hø SHAFT	I	J	Kø	Lø	M	N2	P
EVGX6	12.85	29.8	16.05	.875	95.7	–	–	96.0	3.0	21.0	18.0	1.0	.875	13.8	16.0	16.02

Dimensions: mm

MOD.:	A	B	C	D	E	E2	F	Gø	Hø SHAFT	I	J	Kø	Lø	M	N2	P
EVGX6	326.4	756.9	407.7	22.2	2430.8	–	–	2438.4	76.2	533.4	457.2	25.4	22.2	350.5	406.4	407.0

NO	DATE	REVISION	P/B

PROJET/PROJECT
AGNICO EAGLE – AMARUK

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Fax: (613) 874-2629
E-mail: enviregp@glen-net.ca

TITRE/TITLE
"MIX–TECH" Mixers
Veolia Water Technologies
EVGX SERIES

DESSINÉ PAR: DRAWN BY: PJ	DATE March 8, 2018
DESS. NO: DWG NO: EVGX	ÉCH./SCALE N.T.S
VÉRIFIÉ PAR: CHECKED BY: PJ	PROJ.NO: 04865
APPROUVÉ PAR: APPROVED BY: RJ	REV. 00

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