LEFT BLANK

4 – DETAILED TECHNICAL DOCUMENTATION

4.2 – PRODUCT DATA SHEETS

LEFT BLANK

	VEOLIA					VWT DOC#		PDS_0001_RX_VWT	
						PROJECT No		5000218009	
						Date		3/2/2018	
						REACTOR STAGE 1			
CLIENT		REV	DESCRIPTION		DATE	By:		CHKD	APP.
AEM		1	For Information		3/2/2018	L.J.		G.P.	C.B.
		2	As noted by client		3/21/2018	L.J.			
PROJECT		3							
AMARUK, NU		4							
		5							
		6							
		7							REV
GENERAL INFORMATION	Technology				-	Metal PRECIPITATION Reactor			
	Number of trains				-	1			
	Type				-	Prefab. Reaction tank			
	TAG								
	Model					RX75-3			
	Number of units				-	1			
ENVIRONMENT CONDITIONS	Equipment Location				-	Indoor			
	Altitude (if blower)				m	N/A			
	Min. Temperature- WATER				°C	1			
	Max. Temperature- WATER				°C	25			
	Min. Temperature- AIR				°C	7			
	Max. Temperature- AIR				°C	35			
	Max. Humidity				%	100			
	Corrosive atmosphere				-	Non Hazardous Area,Non corrosive			
	Freeze conditions				-	Maintain above freezing temperature			
	Comments				-	_			
COMPONENTS APPROVAL AND CERTIFICATIONS	NSF-61		yes/no		-	NO			
	CSA / UL		yes/no			YES			
	Others				-	N/A			
SAFETY	Electrical Classification (according to NFPA 820)				-	N/A			
	Province					NUNAVUT			
REQUIRED PERFORMANCE	Application				-	INDUSTRIAL			
	Design Capacity		Day of 12hr , 2 ACP of 1000m3/hr each.		m^3/d	24000			
	Retention time at design capacity winter		Winter capacity = 84 m^3/hr		min	127.5	or 2hr7.5min.		
	Retention time at design capacity (incl. recirculation)		AT 1600m^3/hr+4x56m^3/hr = 1824 $6m^3/hr$		min	5.8			
	Volume		one tank = 29.53m^3 x 3tanks =		m^3	TOTAL VOLUME 179m^3 at 3.25m Height			
	Effluent Quality				Specs reference (specify)	N/A			
TECHNICAL DESCRIPTION	Tank #1	Basin Dimensions	Length		in (mm)	168.5 in (4 280mm)			
			Width		in (mm)	168.5 in (4 280mm)			
			Water Depth		in (mm)	128 in. (3250 mm)			
			CONTACT TIME nominal		min.	2.3 to 9.4			
		Mixers	Manufacturer		-	ENVIREQUIP W.T.E.M. INC			
			Model		-	Envirequip MIX-TECH EVGX-6-5,0			
			Power		HP	5 HP			
			Weigth		Kg	1415 lb (642 kg)			
			Rotation/direction of thrust		-	ccw up			
			Material and Grade			304 stainless steel			
	Tank #2	Basin Dimensions	Length		in (mm)	168.5 in (4 280mm)			
			Width		in (mm)	168.5 in (4 280mm)			
			Water Depth		in (mm)	128 in. (3250 mm)			
			CONTACT TIME		min.	2.3 to 9.4			
		Mixers	Manufacturer		-	ENVIREQUIP W.T.E.M. INC			
			Model		-	Envirequip MIX-TECH EVGX-6-5,0			
			Power		HP	5 HP			
			Weigth		Kg	1415 lb (642 kg)			
			Rotation/direction of thrust		-	cw down			
			Material and Grade		-	304 stainless steel			
	Tank #3	Basin Dimensions	Length		in (mm)	168.5 in (4 280mm)			
			Width		in (mm)	168.5 in (4 280mm)			
			Water Depth		in (mm)	128 in. (3250 mm)			
			CONTACT TIME		min.	2.3 to 9.4			
		Mixers	Manufacturer		-	ENVIREQUIP W.T.E.M. INC			
			Model		-	Envirequip MIX-TECH EVGX-6-5,0			
			Power		HP	5 HP			
			Weigth		Kg	1415 lb (642 kg)			
			Rotation/direction of thrust		-	ccw up			
			Material and Grade			304 stainless steel			
	Chemical Dosage		Chemical Product		-	TBD			
			Dosage min/average/max		mg/L				
			Chemical Product		-				
			Dosage min/average/max		mg/L				

	A	B	C	D	E	F	G	H	J
87		Recirculation flow			Origin	-	NA		
88					Dosage min/average/max	m3/h			
89	OTHERS CONSTRUCTION MATERIALS	Inside Walls (if applicable)					Painted Steel		
90		Anti-rotation Baffle (if applicable)				-	304 stainless steel (std)		
91		Others				-	NA		
92		Hardware (immerged)				-	304 stainless steel (std)		
93		Hardware (non-immerged)				-	Galvanized Steel		
94	CONNECTIONS	Inlet diameter				in (mm)	24 in (600 mm)		
95		Drain Diameter				in (mm)	4 in (100 mm)		
96		Outlet diameter				in (mm)	2 X 20 in (500 mm)		
97	VALVES			Inlet modulating Valve	Manufacturer	-	N/A		
98					Valve Type	-	N/A		
99					Model | Diam.	-	N/A		
100					Quantity	-	N/A		
101			X	Isolation valve - Drain	Manufacturer	-	PRATT (former MILLIKEN)		
102					Valve Type	-	ECCENTRIC PLUG | Cl.125		
103					Model | Diam.	-	601N1-L	100 mm	
104					Quantity	-	1		
105	INSTRUMENTATION		N/A	Raw water Flowmeter	Manufacturer	-	TBD		
106					Model | Diam.		TBD		
107				Zone : *Non Hazardous*	Quantity	-	TBD		
108			X	Level Switch (High High)	Manufacturer	-	TBD		
109					Model | Diam.				
110				Zone : *Non Hazardous*	Quantity	-	TBD		
111			X	pH Clarified Water	Manufacturer	-	TBD		
112					Model | Diam.		TBD		
113				Zone : *Non Hazardous*	Quantity	-	TBD		
114				pH Clarified Water Controller	Manufacturer	-	TBD		
115					Model | Diam.		TBD		
116				Zone : *Non Hazardous*	Quantity	-	TBD		
117			N/A	Turbidimeter Clarified Water	Manufacturer	-	NA		
118					Model | Diam.		NA	NA	
119				Zone : *Non Hazardous*	Quantity	-	NA		
120				Turbidity Controller (specify of common controller)	Manufacturer	-	NA		
121					Model | Diam.		NA	NA	
122				Zone : *Non Hazardous*	Quantity	-	NA		
123			N/A	Pressure transmitter (recirculation)	Manufacturer	-	NA		
124					Model | Diam.		NA	NA	
125				Zone : *Non Hazardous*	Quantity	-	NA		
126			N/A	Pressure gauge (recirculation)	Manufacturer	-	NA		
127					Model | Diam.		NA	NA	
128				Zone : *Non Hazardous*	Quantity	-	NA		2
129			x	Others (specify)	Manufacturer	-	NA		2
130					Model | Diam.		NA		2
131					Quantity	-	NA		2
132				Comments		-	NA	NA	
133	METAL WORKS	Grating			Dimensions/Type	-	FIBERGRATE Square Mesh 1¼ x 1¼ x 1½		
134					Material	-	FRP		
135		Handrails			Dimensions/Type	-	Square Tubing 1½"		
136					Material	Saftey Yellow	Painted Steel		
137		Access (ladder/stairs)			Dimensions/Type	-	by the Actiflo tank		
138					Material	-	Other		
139		Others				-	N/A		
140		-				-	-		
141	POWER FEED	Motors				V/ph/Hz	575/3/60		
142		Panels				V/ph/Hz	575/3/60		
143		Others				V/ph/Hz	NA		
144	OTHER	Tank height				in (mm)	143.7 in (3650 mm)		
145		Recommended Headroom				in (mm)	Refer to GA dwg		
146		Recommended overall width				in (mm)	Refer to GA dwg		
147		Recommended overall length				in (mm)	Refer to GA dwg		
148		Weight (dry)				Lbs (Kg)	47 300 lbs (21 500 Kg)		
149		Weight (full of water)				Lbs (Kg)	510 840 lbs (232 200 Kg)		
150	COMMENTS	TANK INSTALL ON A TBD mm HEIGHT for hydraulic							
151									

	VEOLIA					VWT DOC#		PDS_0002_RX_VWT	
						PROJECT No		5000218009	
						Date		3/19/2018	
						Sludge Recirculation			
CLIENT		REV	DESCRIPTION			DATE	By:	CHKD	APP.
AEM		1	For Information			3/19/2018	L.J.	G.P.	C.B.
		2							
PROJECT		3							
AMARUK, NU		4							
		5							
		6							
		7							REV
GENERAL INFORMATION	Technology					-	Sludge Recirculation Reactor		
	Number of trains					-	1		
	Type					-	Prefab. Reaction tank		
	TAG								
	Model						RX75-2		
	Number of units					-	1		
ENVIRONMENT CONDITIONS	Equipment Location					-	Indoor		
	Altitude (if blower)					m	N/A		
	Min. Temperature- WATER					°C	1		
	Max. Temperature- WATER					°C	25		
	Min. Temperature- AIR					°C	7		
	Max. Temperature- AIR					°C	35		
	Max. Humidity					%	100		
	Corrosive atmosphere					-	Non Hazardous Area,Non corrosive		
	Freeze conditions					-	Maintain above freezing temperature		
	Comments					-	_		
COMPONENTS APPROVAL AND CERTIFICATIONS	NSF-61			yes/no		-	NO		
	CSA / UL			yes/no			YES		
	Others					-	N/A		
SAFETY	Electrical Classification (according to NFPA 820)					-	N/A		
	Province						NUNAVUT		
REQUIRED PERFORMANCE	Application					-	INDUSTRIAL		
	Design Capacity					m^3/d	4320		
	Nominal capacity per unit					m^3/d			
	Retention time at design capacity (incl. recirculation)				180 m^3/hr	min	19.8	by tank	
	Volume					m^3	VOLUME 59m^3X 2tank at 3.25m Height		
	Effluent Quality					Specs reference (specify)	N/A		
TECHNICAL DESCRIPTION	Tank # 1		Basin Dimensions	Length		in (mm)	168.5 in (4 280mm)		
				Width		in (mm)	168.5 in (4 280mm)		
				Water Depth		in (mm)	128 in. (3250 mm)		
				CONTACT TIME for 180 m3/hr		min.	19.80		
			Mixers	Manufacturer		-	ENVIREQUIP W.T.E.M. INC		
				Model		-	Envirequip MIX-TECH EVGX-6-5,0		
				Power		HP	5 HP		
				Weigth		Kg	1415 lb (642 kg)		
				Rotation/direction of thrust		-	cw down		
				Material and Grade			304 stainless steel		
	Tank # 2		Basin Dimensions	Length		in (mm)	168.5 in (4 280mm)		
				Width		in (mm)	168.5 in (4 280mm)		
				Water Depth		in (mm)	128 in. (3250 mm)		
				CONTACT TIME		min.	19.80		
			Mixers	Manufacturer		-	ENVIREQUIP W.T.E.M. INC		
				Model		-	Envirequip MIX-TECH EVGX-6-5,0		
				Power		HP	5 HP		
				Weigth		Kg	1415 lb (642 kg)		
				Rotation/direction of thrust		-	cw down		
				Material and Grade		-	304 stainless steel		
	Chemical Dosage			Chemical Product		-	TBD		
				Dosage min/average/max		mg/L			
				Chemical Product		-			
				Dosage min/average/max		mg/L			

	A	B	C	D	E	F	G	H	J
87		Recirculation flow			Origin	-	NA		
88					Dosage min/average/max	m3/h			
89	OTHERS CONSTRUCTION MATERIALS	Inside Walls (if applicable)					Painted Steel		
90		Anti-rotation Baffle (if applicable)				-	304 stainless steel (std)		
91		Others				-	NA		
92		Hardware (immerged)				-	304 stainless steel (std)		
93		Hardware (non-immerged)				-	Galvanized Steel		
94	CONNECTIONS	Inlet diameter				in (mm)	10 in (2500 mm) to 6''		
95		Drain Diameter				in (mm)	4 in (100 mm)		
96		Outlet diameter				in (mm)	6 in (150 mm) or 10''		
97	VALVES			Inlet modulating Valve	Manufacturer	-	N/A		
98					Valve Type	-	N/A		
99					Model | Diam.	-	N/A		
100					Quantity	-	N/A		
101			X	Isolation valve - Drain	Manufacturer	-	PRATT (former MILLIKEN)		
102					Valve Type	-	ECCENTRIC PLUG | Cl.125		
103					Model | Diam.	-	601N1-L	100 mm	
104					Quantity	-	1		
105	INSTRUMENTATION		N/A	Raw water Flowmeter	Manufacturer	-	TBD		
106					Model | Diam.		TBD		
107				Zone : *Non Hazardous*	Quantity	-	TBD		
108			X	Level Switch (High High)	Manufacturer	-	TBD		
109					Model | Diam.				
110				Zone : *Non Hazardous*	Quantity	-	TBD		
111			X	pH Clarified Water	Manufacturer	-	TBD		
112					Model | Diam.		TBD		
113				Zone : *Non Hazardous*	Quantity	-	TBD		
114				pH Clarified Water Controller	Manufacturer	-	TBD		
115					Model | Diam.		TBD		
116				Zone : *Non Hazardous*	Quantity	-	TBD		
117			N/A	Turbidimeter Clarified Water	Manufacturer	-	NA		
118					Model | Diam.		NA	NA	
119				Zone : *Non Hazardous*	Quantity	-	NA		
120				Turbidity Controller (specify of common controller)	Manufacturer	-	NA		
121					Model | Diam.		NA	NA	
122				Zone : *Non Hazardous*	Quantity	-	NA		
123			N/A	Pressure transmitter (recirculation)	Manufacturer	-	NA		
124					Model | Diam.		NA	NA	
125				Zone : *Non Hazardous*	Quantity	-	NA		
126			N/A	Pressure gauge (recirculation)	Manufacturer	-	NA		
127					Model | Diam.		NA	NA	
128				Zone : *Non Hazardous*	Quantity	-	NA		2
129			x	Others (specify)	Manufacturer	-	NA		2
130					Model | Diam.		NA		2
131					Quantity	-	NA		2
132				Comments		-	NA	NA	
133	METAL WORKS	Grating			Dimensions/Type	-	FIBERGRATE Square Mesh 1¼ x 1¼ x 1½		
134					Material	-	FRP		
135		Handrails			Dimensions/Type	-	Square Tubing 1½"		
136					Material	Saftey Yellow	Painted Steel		
137		Access (ladder/stairs)			Dimensions/Type	-	by the Actiflo tank		
138					Material	-	Other		
139		Others				-	N/A		
140		-				-	-		
141	POWER FEED	Motors				V/ph/Hz	575/3/60		
142		Panels				V/ph/Hz	575/3/60		
143		Others				V/ph/Hz	NA		
144	OTHER	Tank height				in (mm)	143.7 in (3650 mm)		
145		Recommended Headroom				in (mm)	Refer to GA dwg		
146		Recommended overall width				in (mm)	Refer to GA dwg		
147		Recommended overall length				in (mm)	Refer to GA dwg		
148		Weight (dry)				Lbs (Kg)	46 560 lbs (21 160 Kg)		
149		Weight (full of water)				Lbs (Kg)	352 550 lbs (160 250 Kg)		
150	COMMENTS	TANK INSTALL ON A TBD mm HEIGHT for hydraulic							
151									

	VEOLIA					VWT CANADA #		PSDS_0004_PCH			
						Project #		5000218009			
						Date		2018-03-27			
						SULFURIC ACID WINTER / SUMMER DOSING SKID					
	CLIENT	**REV**	**DESCRIPTION**			**DATE**	**By**	**Chkd**		**App.**	
		0									
	AGNICO EAGLE MINES	**1**	For approval			2018-03-28	G.H.	G.P.		C.B.	
		2	Name revised, flow rate revised & flange connection			2018-04-12	G.H.	G.P.		C.B.	
	PROJECT	**3**									
	AEM AMARUQ	**4**									
		5									
		6									
		TAG:									REV
	GENERAL	**Dosed Chemical**					Sulfuric Acid - (H2SO4)				
		Number of skids					1				
		Pumps type					Solenoid Driven Diaphragm Pump				
		Model Serie					Grundfos				
		Total number of pumps					2				
		Number of pumps in duty					1				
		Number of pumps in standby					1				
		Number of dosing points					1				
	PROCESS REQUIREMENT	**Min Flowrate**				**lph**	0.17				2
		Avg Flowrate				**lph**	9				
		Max Flowrate				**lph**	17				2
	ENVIRONMENT	**Equipment Location**					Indoor				
		Min. Temperature				**°C**	5				
		Max . Temperature				**°C**	30				
		Max. Humidity				**%**	95				
		Corrosive Atmosphere					Non Corrossive				
		Freeze					N/A				
		Comments									
	SAFETY	**Electrical Classification**					Non Hazardous				
		Province/State					Nunavut				
	PUMP(S) CAPACITY	**Max Flowrate**				**lph**	17				2
		Min Flowrate				**lph**	0.17				2
	TECHNICAL DESCRIPTION	**Skid Frame**			**Material**		Polypropylene				
					Type		Stand Alone				
					Option #1		Safeguarding Shield				
					Option #2						
		Pump		X	**Dosing Pumps**		DDA 17-7 AR-PV/T/C-F-31U7U7BG				
					Variable Frequency Drive	**N/A**					
		Components			**Foot valve c/w flexible hose**						
			Valves	x	**Isolation Valves (common suction)**	**Chemline**	21K005VCf		1		
				x	**Isolation Valves (suction)**	**Chemline**	21K005VCf		2		
				x	**Isolation Valves (discharge)**	**Chemline**	21K005VCf		4		
				x	**Backpressure Valves**	**Chemline**	SB12K005VCfx (BPVG)		1		
				x	C/w Isolator & Press. Gauge	**Chemline**	SGK-005-002-P-G + P025-160-BM	Config. L-U	0		
				x	**Relief Valves**	**Chemline**	SB12K005VCfx (RV)		2		
					W/o Press. Gauge	**N/A**	N/A	N/A			
					Globe Valve - Carrier water	**Chemline**	N/A		0		
					Check Valves - Carrier water	**Chemline**	N/A		0		
					ON/OFF Valves - Carrier water	**ASCO**	N/A	N/A	0		
				x	**Cleaning valves**	**Chemline**	21K005VCf		4		
			Misc.	x	**Calibration Cylinder**	**PFS**	ACS#2-250-GKV-F	250 ml	1		2
					Variable Area Flowmeter	**Chemline**	N/A		0		
					Flow switch	**N/A**			0		
					Flowmeter	**N/A**			0		
				x	**Pulsation Dampener**	**PFS**	API-PVDF-V-1-F	10 in3	1		2
		Piping			**VWS Piping spec code**		*A073C*				
					Pipe Material		*PFA Tubing*				
					Common Suction Nominal Pipe Size	**in**	*1/2"*				
					Suction Pipe Nominal Pipe Size	**in**	*1/2"*				
					Discharge Pipe Nominal Pipe Size	**in**	*1/2"*				
	UTILITIES	**Service Water for Chemical Transport**			**Flowrate (per injection line)**	**lph**	*N/A*				
					Pressure	**psig**	*N/A*				
					Transport Water Nominal Pipe Size	**in**	*N/A*				

1	VEOLIA					VWT CANADA #	PSDS_0004_PCH		
2						Project #	5000218009		
3						Date	2018-03-27		
4						SULFURIC ACID WINTER / SUMMER DOSING SKID			
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.
6		0							
7	AGNICO EAGLE MINES	1	For approval			2018-03-28	G.H.	G.P.	C.B.
8		2	Name revised, flow rate revised & flange connection			2018-04-12	G.H.	G.P.	C.B.
9	PROJECT	3							
10	AEM AMARUQ	4							
11		5							
12		6							
13		TAG:							REV
65	DESIGN CRITERIA	Design Pressure				psig	100		
66		Design Temperature				°C	35		
67		Operating Pressure				psig	50		
68		Test Pressure				psig	150		
69		Test duration				min	60		
70		Test Fluid				-	Air		
71	CONNECTIONS	Inlet		Diameter (NPS)		in	1/2"		
72				Type			Socket union		
73		Outlet		Diameter (NPS)		in	1/2"		
74				Type			Socket union		
75		Transport Water		Diameter (NPS)		in	N/A		
76				Type			N/A		
77	ELECTRICITY	Main Power					120V/1Ph/60 Hz		
78		Controls		(by others)			4-20 mA (direct)		
79		Frame Grounding							
80		Wiring		Pre wired (Y or N | details)			Prewired / NEMA 4X JB		
81				Cable Type					
82		Anchors		Qty			4		
83				Supply			No		
84	CODE, APPROVAL & CERTIFICATIONS	Design Code					ASME B31.3 Non Certified		
		Glueing					Glueing B31.3 non certified / Non Certified Shop		
85		Mandatory Registration					*No*		
87									
88	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)		Final		kg	Refer to GA drawing		
89		Overall Length		Final		mm	Refer to GA drawing		
90		Overall Width				mm	Refer to GA drawing		
91		Overall Heigth				mm	Refer to GA drawing		

	VEOLIA				VWT CANADA #		PDS_0005_HYDP		
					Project #		5000218009		
					Date		2018-03-08		
					HYDRA-POL CATIONIC POLYMER				
CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.	
	1	For Approval			2018-03-08	G.H.	G.P.	C.B.	
AGNICO EAGLE MINES	2	Revised Process Requirement section			2018-03-12	G.H.	G.P.	C.B.	
	3	Revised Process Requirement section			2018-03-28	G.H.	G.P.	C.B.	
PROJECT	4	24 Volt Instruments & Valves, Name revised			2018-04-12	G.H.	G.P.	C.B.	
AEM AMARUQ	5								
	6								
	7								
	TAG:	APPLICATION : Polymer System Preparation							REV
GENERAL	Manufacturer					VEOLIA WATER TECHNOLOGIES CANADA			
	Model Serie					HP3500			
	VEOLIA Model Number					HP3500-CT-MBF-BF025F-AB575T-S2B-AAS-SSCEP-Z6Z			
PROCESS REQUIREMENT	Polymer Type				-	Cationic			2
	Liquid Polymer Concentration				%	0.50%			3
	Polymer Density				kg/L	0.8			
	Recommended Maturation Time				min	60			
	Min Flowrate				lph	60			3
	Avg Flowrate				lph	300			3
	Max Flowrate				lph	1600			3
ENVIRONMENT	Equipment Location					Indoor			
	Min. Temperature				°c	2			
	Max . Temperature				°c	38			
	Max. Humidity				%	95			
	Corrosive Atmosphere					Non Corrosif			
	Freeze					N/A			
	Comments								
SAFETY	Electrical Classification					Non Hazardous Area			
	Province					Nunavut			
OPERATING CONDITIONS	Batch size				L	*3200*			
	Kg / batch				Kg	*16.00*			
	Feeder cap/rev				Kg/rev	*0.099*			
	Feeder rpm				rpm	*86.8*			
	Mass Flowrate				kg/min	*8.56*			
	Pre-rinsing time				min	*11.6*			
	Dosing time				sec	*82.8*			
	Maturing time (incl transf)				min	60			
	Emptying time				min	3.26			
	Total time				min	69.7			
TECHNICAL DESCRIPTION	Mechanical Components	Skid Frame		Manufacturer | Model	- | -	VWTC	LATIS#		
				Material	-	Painted Carbon Steel			
				Color	-	Blue Grey RAL 7031			
				Dry Polymer Storage Type	-	Bulk Bag Frame with a Yoke for Fork Lift			
		-		-	- | -				
		-		-	- | -				
		Dry Feeder		Manufacturer | Model	- | -	*WAM*	MBF 073 I:20 4-5-D-		
				Motor's Manufacturer |Type	-	*Baldor*	*NEMA*		
				Horsepower	HP	0.75	0.5		
		Eductor		Manufacturer | Model	- | -	SHUTTE&KOERTING	2"- Fig264 PVC Eductor		
				Material		PVC			
		Maturation Mixer		Manufacturer | Model	- | -	ENVIREQUIP / NORD	EVG1-0.75		
				Motor's Manufacturer |Type	-	NORD			
				Horsepower	HP	0.75			
		Maturation Tank		Manufacturer | Model	- | -	VWTC			
				Material |Nominal Capacity	- | L	304L S.S.	3 502		
				Transfer Type		Stacked Maturation Tank			
		Storage Tank		Manufacturer | Model	- | -	VWTC			
				Material |Nominal Capacity	- | L	304L S.S.	3 502		
		Tanks Location / Feeder				Right (Standard)			
		Isolation Valve - Driving Water		Manufacturer | Model	-	CHEMLINE	21A015EC		
				Diameter | Quantity	-	*1 1/2"*	*1*		
		Solenoid Valve - Driving Valve		Manufacturer | Model	120 VAC	ASCO	8210G022-120VAC		4
				Diameter | Quantity	-	*1 1/2"*	*1*		
		Metering Valve- Wetting Cone		Manufacturer | Model	-	CHEMLINE	SM2A005ES		
				Diameter | Quantity	-	*1/2"*	*2*		
		Solenoid Valve - Feeder		Manufacturer | Model	120 VAC	ASCO	8345G001-120VAC		4
				Diameter | Quantity	-	*1/4"*	*1*		
		Actuated Transfer Valve		Manufacturer | Model	120VAC	CHEMLINE	57A020AEL-A / ER20.12		4
				Diameter | Quantity	-	*2"*	*1*		
		Check Valve- Liquid Polymer		Manufacturer | Model	-	CHEMLINE	BTA020EC		
				Diameter | Quantity	-	*2"*	*1*		
		Isoaltion Valve- Tank Outlet		Manufacturer | Model	-	CHEMLINE	21A030ES		
				Diameter | Quantity	-	*3"*	*1*		
		Isolation Valves- Tanks Drains		Manufacturer | Model	-	CHEMLINE	21A030ES		
				Diameter | Quantity	-	*3"*	*2*		
		Static Mixer		Manufacturer | Model	-	KOFLO	2-40C-4-6-2		
				Diameter | Quantity	-	*2"*	*1*		
		Tuyauterie		VWTC Piping Class Code	-	*A050C*			
				Pipe Material	-	*PVC sh80*			
				Design Pressure	psig	60			
				Design Temperature	°C	38			
				Operating Pressure	psig	65			
				Test Pressure	psig	90			
				Test duration	min	60			
				Test Fluid	-	Water			

1	VEOLIA					VWT CANADA #		PDS_0005_HYDP		
2						Project #		5000218009		
3						Date		2018-03-08		
4						HYDRA-POL CATIONIC POLYMER				
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.	
6		1	For Approval			2018-03-08	G.H.	G.P.	C.B.	
7	AGNICO EAGLE MINES	2	Revised Process Requirement section			2018-03-12	G.H.	G.P.	C.B.	
8		3	Revised Process Requirement section			2018-03-28	G.H.	G.P.	C.B.	
9	PROJECT	4	24 Volt Instruments & Valves, Name revised			2018-04-12	G.H.	G.P.	C.B.	
10	AEM AMARUQ	5								
11		6								
12		7								
13		TAG:	APPLICATION :		Polymer System Preparation					REV
89	TECHNICAL DESCRIPTION	ELECTRICITY, INSTRUMENTATION & CONTROLS	INSTRUMENTS	Hopper Low Level Switch	Manufacturer | Model	24 VDC	*Endress&Hauser*	*FTE31-C6DB11-A*		
90					Diameter | Quantity		*MNPT 1-1/2*	*1*		
91				Service Water Pressure Switch	Manufacturer | Model	24 VDC	*Allen-Bradley*	*836T-T253J*		
92					Diameter | Quantity		*3/8''*	*1*		
93				Service Water Pressure Gauge	Manufacturer | Model		*Ashcroft 2.5"*	*25-1009SWL-02L-0/160PSIG + Glycerine*		
94					Diameter | Quantity		*1/2''*	*1*		
95				Tanks Level Transmitter	Manufacturer | Model	24 VDC	*Endress&Hauser (Pressure)*	*PMC131-C22F1D12*		
96					Diameter | Quantity		*1/2''*	*2*		
97										
98			CONTROL PANEL	PLC	Manufacturer | Model		*Scheinder*	*M340*		
99				HMI	Manufacturer | Model		*Scheinder*	*HMI-STU655*		
100					HMI Screen Size		*6"*			
101				Panel Enclosure	Material | Enclosure Rating		*Fiberglass*	*NEMA-4X*		
102			ELECTRICITY	Power Supply	Voltage | Amps		*575V/3Ph/60Hz*	15 Amps		
103				Frame Grounding			*By others*			
104				Wiring	Pre wired (Yes/No)		*Yes*			
105					Cable Type		*TECK 90-Armoured Cable*			
106	UTILITIES	Service Water for Chemical Transport		Required Driving Water Flowrate		m^3/h	*8*			
107				Min. Pressure (in operation at Qmax)		psig	70			
108				Residual Chlorine Concentration		mg Cl_2/L	<0.5 mg Cl2/L			
109				Driving Water Temperature Range		Deg C	10 deg C <T<25 deg C			
110	CONNECTIONS	Driving Water Inlet			Diameter (NPS)	in	1-1/2"			
111					Type		Socket Union			
112		Storage Tank Outlet			Diameter (NPS)	in	2"			
113					Type		Socket Union			
114		Drain			Diameter (NPS)	in	3''			
115					Type		Socket Union			
116		Overflow			Diameter (NPS)	in	4''			
117					Type		By others			
118		Anchors			Qty		See General Arrangement DWG			
119					Supply		By others			
120	CODE, APPROVAL & TESTS	Piping Design Code					ASME B31.3 Non Certified			
121		Control Panel Approval					CSA/cUL			
122										
123	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)				kg	*See General Arrangement DWG*			
124		Overall Length				mm				
125		Overall Width				mm				
126		Overall Heigth				mm				

	VEOLIA					VWT CANADA #		PDS_0006_HYDP		
						Project #		5000218009		
						Date		2018-03-26		
						HYDRA-POL KMnO4				
CLIENT	REV	DESCRIPTION				DATE	By	Chkd	App.	
	1	For Approval				2018-03-26	G.H.	G.P.	C.B.	
AGNICO EAGLE MINES	2	Revised model #				2018-04-12	G.H.	G.P.	C.B.	
	3									
PROJECT	4									
AEM AMARUQ	5									
	6									
	7									
	TAG:	APPLICATION : KMnO4 System Preparation								REV
GENERAL	Manufacturer						VEOLIA WATER TECHNOLOGIES CANADA			
	Model Serie						HP500			
	VEOLIA Model Number						HP500-CT-MBF-VC100F-AB575T-B2B-AAS-SSCEP-SC6Z			
PROCESS REQUIREMENT	Powder Type					-	KMnO4			
	Liquid Concentration					%	1.00%			
	Powder Density					kg/L	1.52			
	Recommended Maturation Time					min	30			
	Min Flowrate					lph	30			
	Avg Flowrate					lph	300			
	Max Flowrate					lph	320			
ENVIRONMENT	Equipment Location						Indoor			
	Min. Temperature					°C	10			
	Max . Temperature					°C	35			
	Max. Humidity					%	95			
	Corrosive Atmosphere						Non Corrosif			
	Freeze						N/A			
	Comments									
SAFETY	Electrical Classification						Non Hazardous Area			
	Province						Nunavut			
OPERATING CONDITIONS	Batch size					L	*470*			
	Kg / batch					Kg	*4.70*			
	Feeder cap/rev					Kg/rev	*0.187*			
	Feeder rpm					rpm	*24.8*			
	Mass Flowrate					kg/min	*3.48*			
	Pre-rinsing time					min	*2.6*			
	Dosing time					sec	*108.4*			
	Maturing time (incl transf)					min	40			
	Emptying time					min	0.69			
	Total time					min	43.7			
TECHNICAL DESCRIPTION	Mechanical Components	Skid Frame		Manufacturer | Model		- | -	VWTC	LATIS#		
				Material		-	SS304			
				Color		-	Grey Blue			
				Dry Polymer Storage Type		-	Vacuum Conveyor & Hopper			
		Vacuum Conveyor		Manufacturer | Model		- | -	Hapman	16" pneumatic receiver		2
		-		Manufacturer | Model		- | -				
		Dry Feeder		Manufacturer | Model		- | -	WAM	MBF 073 I:70 4-5-D-		
				Motor's Manufacturer |Type		-	Baldor	NEMA		
				Horsepower		HP	0.75	0.5		
		Eductor		Manufacturer | Model		- | -	SHUTTE&KOERTING	1,5"- Fig264 PVC Eductor		
				Material			PVC sh80			
		Maturation Mixer		Manufacturer | Model		- | -	ENVIREQUIP / NORD	EVG01-0.5		
				Motor's Manufacturer |Type		-	BALDOR			
				Horsepower		HP	0.5			
		Maturation Tank		Manufacturer | Model		- | -	VWTC			
				Material |Nominal Capacity		- | L	304L S.S.	508		
				Transfer Type			Stacked Maturation Tank			
		Storage Tank		Manufacturer | Model		- | -	VWTC			
				Material |Nominal Capacity		- | L	304L S.S.	508		
		Tanks Location / Feeder					Right (Standard)			
		Isolation Valve - Driving Water		Manufacturer | Model		-	CHEMLINE	21A010EC		
				Diameter | Quantity		-	*1"*	*1*		
		Solenoid Valve - Driving Valve		Manufacturer | Model		**120 VAC**	ASCO	EF8210G004-120VAC		2
				Diameter | Quantity		-	*1"*	*1*		
		Metering Valve- Wetting Cone		Manufacturer | Model		-	CHEMLINE	SM2A005ES		
				Diameter | Quantity		-	*1/2"*	*2*		
		Solenoid Valve - Feeder		Manufacturer | Model		**120 VAC**	ASCO	EF8345G001-120VAC		2
				Diameter | Quantity		-	*1/4"*	*1*		
		Actuated Transfer Valve		Manufacturer | Model		**120 VAC**	CHEMLINE	57A020AEL / ER20.12		2
				Diameter | Quantity		-	*2"*	*1*		
		Check Valve- Liquid Polymer		Manufacturer | Model		-	CHEMLINE	BTA015EC		
				Diameter | Quantity		-	*11/2"*	*1*		
		Isoaltion Valve- Tank Outlet		Manufacturer | Model		-	CHEMLINE	21A015EC		
				Diameter | Quantity		-	*11/2"*	*1*		
		Isolation Valves- Tanks Drains		Manufacturer | Model		-	CHEMLINE	21A015EC		
				Diameter | Quantity		-	*1 1/2"*	*2*		
		Static Mixer		Manufacturer | Model		-	KOFLO	1,5-40C-4-6-2		
				Diameter | Quantity		-	*1.5"*	*1*		
		Tuyauterie		VWTC Piping Class Code		-	*A050C*			
				Pipe Material		-	*PVC sh80*			
				Design Pressure		psig	60			
				Design Temperature		°C	35			
				Operating Pressure		psig	65			
				Test Pressure		psig	90			
				Test duration		min	60			
				Test Fluid		-	Eau			

1	VEOLIA						VWT CANADA #		PDS_0006_HYDP			
2							Project #		5000218009			
3							Date		2018-03-26			
4							HYDRA-POL KMnO4					
5	CLIENT	REV	DESCRIPTION				DATE	By	Chkd		App.	
6		1	For Approval				2018-03-26	G.H.	G.P.		C.B.	
7	AGNICO EAGLE MINES	2	Revised model #				2018-04-12	G.H.	G.P.		C.B.	
8		3										
9	PROJECT	4										
10	AEM AMARUQ	5										
11		6										
12		7										
13		TAG:		APPLICATION :	KMnO4 System Preparation							REV
89	TECHNICAL DESCRIPTION	ELECTRICITY, INSTRUMENTATION & CONTROLS	INSTRUMENTS	Hopper Low Level Switch	Manufacturer | Model		24 VDC	*Endress&Hauser*	*FTE31-C6DB11-A*			2
90					Diameter | Quantity			*MNPT 1-1/2*	*1*			
91				Service Water Pressure Switch	Manufacturer | Model		24 VDC	*Allen-Bradley*	*836T-T253J*			
92					Diameter | Quantity			*3/8''*	*1*			
93				Service Water Pressure Gauge	Manufacturer | Model			*Ashcroft 2.5''*	*25-1009SWL-02L-0/160PSIG + Glycerine*			
94					Diameter | Quantity			*1/2''*	*1*			
95				Tanks Level Transmitter	Manufacturer | Model		24 VDC	*Endress&Hauser (Pressure)*	*PMC71-UCC1E3RABAA*			2
96					Diameter | Quantity			*1/2''*	*2*			
97												
98			CONTROL PANEL	PLC	Manufacturer | Model			*Schneider*	*M241 (TM241CE24T)*			
99				HMI	Manufacturer | Model			*Schneider*	*HMI-STU655*			
100					HMI Screen Size			*6''*				
101				Panel Enclosure	Material | Enclosure Rating			*Custom*	*NEMA-4X*			
102			ELECTRICITY	Power Supply	Voltage | Amps			*575V/3Ph/60Hz*	15 Amps			
103				Frame Grounding				*By others*				
104				Wiring	Pre wired (Yes/No)			*Yes*				
105					Cable Type			*TECK 90-Armoured Cable*				
106	UTILITIES	Service Water for Chemical Transport		Required Driving Water Flowrate			m^3/h	*5.2*				
107				Min. Pressure (in operation at Qmax)			psig	70				
108				Residual Chlorine Concentration			mg Cl_2/L	<0.5 mg Cl2/L				
109				Driving Water Temperature Range			Deg C	10 deg C <T<25 deg C				
110	CONNECTIONS	Driving Water Inlet			Diameter (NPS)		in	1"				
111					Type			Socket Union				
112		Storage Tank Outlet			Diameter (NPS)		in	1-1/2"				
113					Type			Socket Union				
114		Drain			Diameter (NPS)		in	1-1/2"				
115					Type			Socket Union				
116		Overflow			Diameter (NPS)		in	2"				
117					Type			By others				
118		Anchors			Qty			See General Arrangement DWG				
119					Supply			By others				
120	CODE, APPROVAL & TESTS	Piping Design Code						ASME B31.3 Non Certified				
121		Control Panel Approval						CSA/cUL				
122												
123	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)					kg	*See General Arrangement DWG*				
124		Overall Length					mm					
125		Overall Width					mm					
126		Overall Heigth					mm					

	VEOLIA					VWT CANADA #		PSDS_0007_PCH		
						Project #		5000218009		
						Date		2018-03-26		
						KMnO4 SUMMER / WINTER DOSING SKID				
CLIENT	REV	DESCRIPTION			DATE	By		Chkd	App.	
	0									
AGNICO EAGLE MINES	1	For approval			2018-03-26	G.H.		G.P.	C.B.	
	2	Name revised, min flow rate			2018-04-12	G.H.		G.P.	C.B.	
PROJECT	3									
AEM AMARUQ	4									
	5									
	6									
	TAG:									REV
GENERAL	Dosed Chemical					Potassium permanganate (KMnO4)				
	Number of skids					1				
	Pumps type					Mechanical Diaphragm Pump				
	Model Serie					Shadow				
	Total number of pumps					2				
	Number of pumps in duty					1				
	Number of pumps in standby					1				
	Number of dosing points					1				
PROCESS REQUIREMENT	Min Flowrate				lph	30				
	Avg Flowrate				lph	250				
	Max Flowrate				lph	320				
ENVIRONMENT	Equipment Location					Indoor				
	Min. Temperature				°C	5				
	Max . Temperature				°C	25				
	Max. Humidity				%	95				
	Corrosive Atmosphere					Non Corrossive				
	Freeze					N/A				
	Comments									
SAFETY	Electrical Classification					Non Hazardous				
	Province/State					Nunavut				
PUMP(S) CAPACITY	Max Flowrate				lph	400				
	Min Flowrate				lph	15				2
TECHNICAL DESCRIPTION	Skid Frame			Material		Polypropylene				
				Type		Stand Alone				
				Option #1		N/A				
				Option #2		N/A				
	Pump		X	Dosing Pumps		Shadow 55BF-EZ000234U1				
			X	Motors	N/A	Baldor Class 2 Div 1 Gr. F & G				
			X	Variable Frequency Drive	N/A	See electrical package				
	Components			Foot valve c/w flexible hose						
		Valves	X	Isolation Valves (common suction)	Chemline	21A010EC		1		
			X	Isolation Valves (suction)	Chemline	21A010EC		4		
			X	Isolation Valves (discharge)	Chemline	21A010EC		4		
			X	Backpressure Valves	Chemline	SB12A010EU (BPVG)		1		
			X	C/w Isolator & Press. Gauge	Chemline	SGA-005-002-P-G + P025-160-BM	Config. L-U	0		
			X	Relief Valves	Chemline	SB12A010EU (RV)		2		
				W/o Press. Gauge	N/A	N/A	N/A			
				Globe Valve - Carrier water	Chemline	N/A		0		
				Check Valves - Carrier water	N/A	N/A		0		
				ON/OFF Valves - Carrier water	ASCO	N/A	N/A	0		
			X	Cleaning valves	Chemline	21A005EC		4		
		Misc.	X	Calibration Cylinder	PFS	PV#2-4000	4000 ml	1		
				Variable Area Flowmeter	Chemline	N/A		0		
				Flow switch	N/A			0		
				Flowmeter	N/A			0		
			X	Pulsation Dampener	PFS	APII-PVC-E-2	85 in3	1		
	Piping			VWS Piping spec code		*A050C*				
				Pipe Material		*PVC Sh 80 ASTM D1784*				
				Common Suction Nominal Pipe Size	in	1"				
				Suction Pipe Nominal Pipe Size	in	1"				
				Discharge Pipe Nominal Pipe Size	in	1"				
UTILITIES	Service Water for Chemical Transport			Flowrate (per injection line)	lph	N/A				
				Pressure	psig	0				
				Transport Water Nominal Pipe Size	in	N/A				

1	VEOLIA					VWT CANADA #		PSDS_0007_PCH		
2						Project #		5000218009		
3						Date		2018-03-26		
4						KMnO4 SUMMER / WINTER DOSING SKID				
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.	
6		0								
7	AGNICO EAGLE MINES	1	For approval			2018-03-26	G.H.	G.P.	C.B.	
8		2	Name revised, min flow rate			2018-04-12	G.H.	G.P.	C.B.	
9	PROJECT	3								
10	AEM AMARUQ	4								
11		5								
12		6								
13		TAG:								REV
65	DESIGN CRITERIA	Design Pressure				psig	80			
66		Design Temperature				°C	35			
67		Operating Pressure				psig	50			
68		Test Pressure				psig	120			
69		Test duration				min	60			
70		Test Fluid				-	Water			
71	CONNECTIONS	Inlet		Diameter (NPS)		in	1"			
72				Type			Flange			
73		Outlet		Diameter (NPS)		in	1"			
74				Type			Flange			
75		Transport Water		Diameter (NPS)		in	N/A			
76				Type			N/A			
77	ELECTRICITY	Main Power					575V/3Ph/60 Hz			
78		Controls					VFD c/w 4-20 mA			
79		Frame Grounding					By-others			
80		Wiring		Pre wired (Y or N | details)			Prewired / NEMA 4X JB			
81				Cable Type			Teck 90			
82		Anchors		Qty			4			
83				Supply			No			
84	CODE, APPROVAL & CERTIFICATIONS	Design Code					ASME B31.3 Non Certified			
		Glueing					Glueing B31.3 non certified / Non Certified Shop			
85		Mandatory Registration					No			
87										
88	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)		Final		kg	Refer to GA Drawing			
89		Overall Length				mm	Refer to GA Drawing			
90		Overall Width		Final		mm	Refer to GA Drawing			
91		Overall Heigth				mm	Refer to GA Drawing			

1	VEOLIA					VWT CANADA #		PSDS_0008_PCH		
2						Project #		5000218009		
3						Date		2018-03-27		
4						**COAGULANT WINTER / SUMMER DOSING SKID**				
5	**CLIENT**	**REV**	**DESCRIPTION**			**DATE**	**By**	**Chkd**	**App.**	
6		**0**								
7	AGNICO EAGLE MINES	**1**	For approval			2018-03-28	G.H.	G.P.	C.B.	
8		**2**	Revised name			2018-04-12	G.H.	G.P.	C.B.	
9	**PROJECT**	**3**								
10	AEM AMARUQ	**4**								
11		**5**								
12		**6**								
13		**TAG:**								REV
14	**GENERAL**	**Dosed Chemical**					Ferric Sulfate - (Fe2(SO4)3)			
15		**Number of skids**					1			
16		**Pumps type**					Mechanical Diaphragm Pump			
17		**Model Serie**					Shadow			
18		**Total number of pumps**					2			
19		**Number of pumps in duty**					1			
20		**Number of pumps in standby**					1			
21		**Number of dosing points**					1			
22	**PROCESS REQUIREMENT**	**Min Flowrate**				**lph**	36			
23		**Avg Flowrate**				**lph**	225			
24		**Max Flowrate**				**lph**	450			
25	**ENVIRONMENT**	**Equipment Location**					Indoor			
26		**Min. Temperature**				**°C**	10			
27		**Max . Temperature**				**°C**	30			
28		**Max. Humidity**				**%**	95			
29		**Corrosive Atmosphere**					Non Corrossive			
30		**Freeze**					N/A			
31		**Comments**								
32	**SAFETY**	**Electrical Classification**					Non Hazardous			
33		**Province/State**					Nunavut			
34	**PUMP(S) CAPACITY**	**Max Flowrate**				**lph**	500			
35		**Min Flowrate**				**lph**	36			
36	**TECHNICAL DESCRIPTION**	**Skid Frame**			**Material**		Polypropylene			
37					**Type**		Stand Alone			
38					**Option #1**		N/A			
39					**Option #2**		N/A			
40		**Pump**		**X**	**Dosing Pumps**		Shadow 55BF-EZ000234U6			
41				**x**	**Variable Frequency Drive**	**N/A**	See Electrical Package			
42		**Components**	**Valves**		**Foot valve c/w flexible hose**					
43				**x**	**Isolation Valves (common suction)**	**Chemline**	21A010EC		1	
44				**x**	**Isolation Valves (suction)**	**Chemline**	21A010EC		4	
45				**x**	**Isolation Valves (discharge)**	**Chemline**	21A010EC		5	
46				**x**	**Backpressure Valves**	**Chemline**	SB12A010EU (BPVG)		1	
				x	C/w Isolator & Press. Gauge	**Chemline**	SGA-005-002-P-G + P025-160-BM	Config. L-U	0	
47				**x**	**Relief Valves**	**Chemline**	SB12A010EU (RV)		2	
					W/o Press. Gauge	**N/A**	N/A	N/A		
48					**Globe Valve - Carrier water**	**Chemline**	N/A		0	
49					**Check Valves - Carrier water**	**Chemline**	N/A		0	
50					**ON/OFF Valves - Carrier water**	**ASCO**	N/A	Brass	0	
51				**x**	**Cleaning valves**	**Chemline**	21A005EC		4	
52			**Misc.**	**x**	**Calibration Cylinder**	**PFS**	PV#2-4000	4000 ml	1	
53					**Variable Area Flowmeter**	**Chemline**	N/A		0	
54					**Flow switch**	**N/A**			0	
55					**Flowmeter**	**N/A**			0	
56				**x**	**Pulsation Dampener**	**PFS**	APII-PVC-N-2	85 in3	1	
57		**Piping**			**VWS Piping spec code**		*A050C*			
58					**Pipe Material**		*PVC Sh 80 ASTM D1784*			
59					**Common Suction Nominal Pipe Size**	**in**	*1"*			
60					**Suction Pipe Nominal Pipe Size**	**in**	*1"*			
61					**Discharge Pipe Nominal Pipe Size**	**in**	*1"*			
62	**UTILITIES**	**Service Water for Chemical Transport**			**Flowrate (per injection line)**	**lph**	*N/A*			
63					**Pressure**	**psig**	*N/A*			
64					**Transport Water Nominal Pipe Size**	**in**	*N/A*			

1	VEOLIA					VWT CANADA #	PSDS_0008_PCH		
2						Project #	5000218009		
3						Date	2018-03-27		
4						COAGULANT WINTER / SUMMER DOSING SKID			
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.
6		0							
7	AGNICO EAGLE MINES	1	For approval			2018-03-28	G.H.	G.P.	C.B.
8		2	Revised name			2018-04-12	G.H.	G.P.	C.B.
9	PROJECT	3							
10	AEM AMARUQ	4							
11		5							
12		6							
13		TAG:							REV
65	DESIGN CRITERIA	Design Pressure				psig	80		
66		Design Temperature				°C	35		
67		Operating Pressure				psig	50		
68		Test Pressure				psig	120		
69		Test duration				min	60		
70		Test Fluid				-	Water		
71	CONNECTIONS	Inlet			Diameter (NPS)	in	1"		
72					Type		Socket union		
73		Outlet			Diameter (NPS)	in	1"		
74					Type		Socket union		
75		Transport Water			Diameter (NPS)	in	N/A		
76					Type		N/A		
77	ELECTRICITY	Main Power					575V/3Ph/60 Hz		
78		Controls			(by others)		VFD c/w 4-20 mA		
79		Frame Grounding							
80		Wiring			Pre wired (Y or N | details)		Prewired / NEMA 4X JB		
81					Cable Type		Teck 90		
82		Anchors			Qty		4		
83					Supply		No		
84	CODE, APPROVAL & CERTIFICATIONS	Design Code					ASME B31.3 Non Certified		
		Glueing					Glueing B31.3 non certified / Non Certified Shop		
85		Mandatory Registration					*No*		
87									
88	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)			Final	kg	Refer to GA drawing		
89		Overall Length				mm	Refer to GA drawing		
90		Overall Width			Final	mm	Refer to GA drawing		
91		Overall Heigth				mm	Refer to GA drawing		

1	VEOLIA							VWT CANADA #		PSDS_0010_PCH			
2								Project #		5000218009			
3								Date		2018-03-29			
4								ANIONIC POLYMER WINTER / SUMMER CENTRIFUGE					
5	CLIENT	REV	DESCRIPTION					DATE	By	Chkd		App.	
6		0											
7	AGNICO EAGLE MINES	1	For approval					2018-03-29	G.H.	GP		C.B.	
8		2	Revised name & min flow rate					2018-04-12	G.H.	GP		C.B.	
9	PROJECT	3											
10	AEM AMARUQ	4											
11		5											
12		6											
13		TAG:											REV
14	GENERAL	Dosed Chemical							Polymer				
15		Number of skids							3				
16		Pumps type							Cavity Progressive Pump				
17		Model Serie							Seepex BN				
18		Total number of pumps							1				
19		Number of pumps in duty							1				
20		Number of pumps in standby							1				
21		Number of dosing points							1				
22	PROCESS REQUIREMENT	Min Flowrate						lph	60				
23		Avg Flowrate						lph	300				
24		Max Flowrate						lph	600				
25	ENVIRONMENT	Equipment Location							Indoor				
26		Min. Temperature						°C	10				
27		Max . Temperature						°C	30				
28		Max. Humidity						%	95				
29		Corrosive Atmosphere							Non Corrossive				
30		Freeze							N/A				
31		Comments											
32	SAFETY	Electrical Classification							Non Hazardous				
33		Province/State							Nunavut				
34	PUMP(S) CAPACITY	Max Flowrate						lph	670				
35		Min Flowrate						lph	30				2
36	TECHNICAL DESCRIPTION	Skid Frame			Material				Stainless Steel				
37					Type				Stand Alone				
38					Option #1				N/A				
39					Option #2								
40		Pump		X	Dosing Pumps				SEEPEX BN				
41				x	Variable Frequency Drive			N/A	See Electrical Submital Package				
42		Components			Foot valve c/w flexible hose								
43			Valves	x	Isolation Valves (common suction)			Chemline	21A015ES		1		
44				x	Isolation Valves (suction)			Chemline	21A015ES		3		
45				x	Isolation Valves (discharge)			Chemline	21A010EC		5		
46					Backpressure Valves			Chemline	N/A		0		
					W/o Press. Gauge			N/A	N/A	N/A	0		
47				x	Relief Valves			Chemline	SB12A010EU (RVG)		3		
				x	C/w Isolator & Press. Gauge			Chemline	SGA-005-002-P-G + P025-160-BM	Config. L-U			
48				x	Globe Valve - Carrier water			Chemline	GVA010S		2		
49				x	Check Valves - Carrier water			Chemline	BTA010EC		2		
50				x	ON/OFF Valves - Carrier water			ASCO	8210G089	304 SS	2		
51				x	Cleaning valves			Chemline	21A005EC		6		
52			Misc.	x	Calibration Cylinder			PFS	PV#2-10000	10000 ml	1		
53				x	Variable Area Flowmeter			Chemline	FSA02500		2		
54					Flow switch			N/A			0		
55					Flowmeter			N/A			0		
56					Pulsation Dampener			PFS	N/A		0		
57		Piping			VWS Piping spec code				*A050C*				
58					Pipe Material				*PVC Sh 80 ASTM D1784*				
59					Common Suction Nominal Pipe Size			in	*1 1/2"*				
60					Suction Pipe Nominal Pipe Size			in	*1 1/2"*				
61					Discharge Pipe Nominal Pipe Size			in	*1"*				
62	UTILITIES	Service Water for Chemical Transport			Flowrate (per injection line)			lph	*1800*				
63					Pressure			psig	65				
64					Transport Water Nominal Pipe Size			in	*1"*				

1	VEOLIA					VWT CANADA #		PSDS_0010_PCH	
2						Project #		5000218009	
3						Date		2018-03-29	
4						ANIONIC POLYMER WINTER / SUMMER CENTRIFUGE			
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.
6		0							
7	AGNICO EAGLE MINES	1	For approval			2018-03-29	G.H.	GP	C.B.
8		2	Revised name & min flow rate			2018-04-12	G.H.	GP	C.B.
9	PROJECT	3							
10	AEM AMARUQ	4							
11		5							
12		6							
13		TAG:							REV
65	DESIGN CRITERIA	Design Pressure				psig	80		
66		Design Temperature				°C	35		
67		Operating Pressure				psig	50		
68		Test Pressure				psig	120		
69		Test duration				min	60		
70		Test Fluid				-	Water		
71	CONNECTIONS	Inlet		Diameter (NPS)		in	1 1/2"		
72				Type			Socket union		
73		Outlet		Diameter (NPS)		in	1"		
74				Type			Socket union		
75		Transport Water		Diameter (NPS)		in	N/A		
76				Type			N/A		
77	ELECTRICITY	Main Power					575V/3Ph/60 Hz		
78		Controls		(by others)			VFD c/w 4-20 mA		
79		Frame Grounding							
80		Wiring		Pre wired (Y or N | details)			Prewired / NEMA 4X JB		
81				Cable Type			Teck 90		
82		Anchors		Qty			6		
83				Supply			No		
84	CODE, APPROVAL & CERTIFICATIONS	Design Code					ASME B31.3 Non Certified		
		Glueing					Glueing B31.3 non certified / Non Certified Shop		
85		Mandatory Registration					*No*		
87									
88	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)		Final		kg	Refer to GA drawings		
89		Overall Length		Final		mm	Refer to GA drawings		
90		Overall Width				mm	Refer to GA drawings		
91		Overall Heigth				mm	Refer to GA drawings		

	VEOLIA					VWT CANADA #		PSDS_0010_PCH			
						Project #		5000218009			
						Date		2018-03-29			
						ANIONIC POLYMER SUMMER DOSING SKID					
	CLIENT	REV	DESCRIPTION			DATE	By	Chkd		App.	
		0									
	AGNICO EAGLE MINES	1	For approval			2018-03-29	G.H.	G.P.		C.B.	
		2	Revised name & min flow rate				G.H.	G.P.		C.B.	
	PROJECT	3									
	AEM AMARUQ	4									
		5									
		6									
		TAG:									REV
	GENERAL	Dosed Chemical					Polymer				
		Number of skids					3				
		Pumps type					Cavity Progressive Pump				
		Model Serie					Seepex BN				
		Total number of pumps					1				
		Number of pumps in duty					1				
		Number of pumps in standby					1				
		Number of dosing points					1				
	PROCESS REQUIREMENT	Min Flowrate				lph	60				
		Avg Flowrate				lph	300				
		Max Flowrate				lph	600				
	ENVIRONMENT	Equipment Location					Indoor				
		Min. Temperature				°C	10				
		Max . Temperature				°C	30				
		Max. Humidity				%	95				
		Corrosive Atmosphere					Non Corrossive				
		Freeze					N/A				
		Comments									
	SAFETY	Electrical Classification					Non Hazardous				
		Province/State					Nunavut				
	PUMP(S) CAPACITY	Max Flowrate				lph	670				
		Min Flowrate				lph	30				2
	TECHNICAL DESCRIPTION	Skid Frame			Material		Stainless Steel				
					Type		Stand Alone				
					Option #1		N/A				
					Option #2						
		Pump		X	Dosing Pumps		SEEPEX BN				
				x	Variable Frequency Drive	N/A	See Electrical Submital Package				
		Components			Foot valve c/w flexible hose						
			Valves	x	Isolation Valves (common suction)	Chemline	21A015ES		1		
				x	Isolation Valves (suction)	Chemline	21A015ES		3		
				x	Isolation Valves (discharge)	Chemline	21A010EC		5		
				x	Backpressure Valves	Chemline	SB12A010EU (BPVG)		3		
				x	C/w Isolator & Press. Gauge	Chemline	SGA-005-002-P-G + P025-160-BM	Config. L-U	0		
				x	Relief Valves	Chemline	SB12A010EU (RV)		3		
					W/o Press. Gauge	N/A	N/A	N/A			
				x	Globe Valve - Carrier water	Chemline	GVA010S		2		
				x	Check Valves - Carrier water	Chemline	BTA010EC		2		
				x	ON/OFF Valves - Carrier water	ASCO	8210G089	304 SS	2		
				x	Cleaning valves	Chemline	21A005EC		6		
			Misc.	x	Calibration Cylinder	PFS	PV#2-10000	10000 ml	1		
				x	Variable Area Flowmeter	Chemline	FSA02500		2		
					Flow switch	N/A			0		
					Flowmeter	N/A			0		
					Pulsation Dampener	PFS	N/A		0		
		Piping			VWS Piping spec code		*A050C*				
					Pipe Material		*PVC Sh 80 ASTM D1784*				
					Common Suction Nominal Pipe Size	in	*1 1/2"*				
					Suction Pipe Nominal Pipe Size	in	*1 1/2"*				
					Discharge Pipe Nominal Pipe Size	in	*1"*				
	UTILITIES	Service Water for Chemical Transport			Flowrate (per injection line)	lph	*1800*				
					Pressure	psig	65				
					Transport Water Nominal Pipe Size	in	*1"*				

1	VEOLIA					VWT CANADA #		PSDS_0010_PCH		
2						Project #		5000218009		
3						Date		2018-03-29		
4						ANIONIC POLYMER SUMMER DOSING SKID				
5	CLIENT	REV	DESCRIPTION			DATE	By	Chkd	App.	
6		0								
7	AGNICO EAGLE MINES	1	For approval			2018-03-29	G.H.	G.P.	C.B.	
8		2	Revised name & min flow rate				G.H.	G.P.	C.B.	
9	PROJECT	3								
10	AEM AMARUQ	4								
11		5								
12		6								
13		TAG:								REV
65	DESIGN CRITERIA	Design Pressure				psig	80			
66		Design Temperature				°C	35			
67		Operating Pressure				psig	50			
68		Test Pressure				psig	120			
69		Test duration				min	60			
70		Test Fluid				-	Water			
71	CONNECTIONS	Inlet			Diameter (NPS)	in	1 1/2"			
72					Type		Socket union			
73		Outlet			Diameter (NPS)	in	1"			
74					Type		Socket union			
75		Transport Water			Diameter (NPS)	in	N/A			
76					Type		N/A			
77	ELECTRICITY	Main Power					575V/3Ph/60 Hz			
78		Controls			(by others)		VFD c/w 4-20 mA			
79		Frame Grounding								
80		Wiring			Pre wired (Y or N | details)		Prewired / NEMA 4X JB			
81					Cable Type		Teck 90			
82		Anchors			Qty		6			
83					Supply		No			
84	CODE, APPROVAL & CERTIFICATIONS	Design Code					ASME B31.3 Non Certified			
		Glueing					Glueing B31.3 non certified / Non Certified Shop			
85		Mandatory Registration					*No*			
87										
88	OVERALL DIMENSIONS AND WEIGTH	Weight (dry)			Final	kg	Refer to GA drawings			
89		Overall Length			Final	mm	Refer to GA drawings			
90		Overall Width				mm	Refer to GA drawings			
91		Overall Heigth				mm	Refer to GA drawings			

VWT CANADA #	5000218009_PSDS_0018_AU_VWT
Project #	5000218009
Date	2018-04-26

Automation System

CLIENT	REV	DESCRIPTION	DATE	By	Chkd	App.
	1	Initial release	2018-04-26	PLG	XM	CB
AEM Amaruq	2					
PROJECT	3					
	4					
	5					
	6					

						REV
General	Voltage		Volts	120		
	Panel Enclosure	Material		Nema 4	Carbon steel	
	Control Panel Approval			CSA		
	Wires color			Client specification		
	Junction boxes	Pre-wiring		Yes	Yes	
	Pre-Wire cable type			Teck 90		
	UPS			Yes		
	Motor control			Client MCC		
	Remote Access			N/A		
Environnement	Panel Location			Indoor		
	Min. Temperature		°C	5		
	Max . Temperature		°C	25		
	Max. Humidity		%	80	non-condensing	
	Corrosive Atmosphere			Non Corrosive		
	Freeze			No		
	Comments					
Safety	Electrical Classification			Non Hazardous		
	Province/State			Nunavut		
Process Controller	Brand			Schneider		
	Model			M580	BMEP582040	
	Memory					
	Estimated memory consumption			50%		
	Spare I/O			20%		
	Digital inputs cards			BMXDDI6402K	BMXDDI3202K	
	Digital outputs cards			BMXDDO6402K	BMXDDO3202K	
	Analog inputs cards			BMEAHI0812		
	Analog outputs cards			BMEAHO0412		
	Communication cards			BMENOC0301		
	Power supply			BMXCPS3500		
	Remote I/O	Model				
HMI	Brand			Schneider		
	Model			HMIDT732	HMIG3U	
	Size		in	15		
	Resolution		Pixels	1024x768		
SCADA Hardware	Brand			N/A		
	Model			N/A		
	Screen size	Screen Quantity	in	N/A		
	Resolution		Pixels	N/A		
	Printer			N/A		
	MS Office			N/A		
	Reporting			N/A		
Software	PLC Software	Version		Unity	12.00	
	HMI Software	Version		Vijeo Designer	6.20	
	SCADA Software	Version		N/A		

LEFT BLANK

4 – DETAILED TECHNICAL DOCUMENTATION

4.3 – SHOP DRAWINGS

4.3.1 – PRECIPITATION REACTOR – RX75-3

LEFT BLANK

Project name:	AMARUQ
Project#:	5000218009
Document #:	SPK_0001_RX
by:	LJ
chkd:	GP
appvd:	CB

SUBMITTAL PACKAGE

METAL PRECIPITATION REACTOR

This page is intentionally left blank

Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

appvd: CB

METAL PRECIPITATION REACTOR

PROCESS DATASHEET

OIM manual section: 4.3.1.1

REFER TO 5000218009_PSDS_0001_RX_VWT

This page is intentionally left blank

Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

appvd: CB

METAL PRECIPITATION REACTOR

GENERAL ARRANGEMENT DRAWING

OIM manual section: 4.3.1.2

REFER TO 5000218009_GA_0001_RX75-3_VWT

This page is intentionally left blank

Project name: AMARUQ

Project#: 5000218009

Document #: SPK_0001_RX

by: LJ

chkd: GP

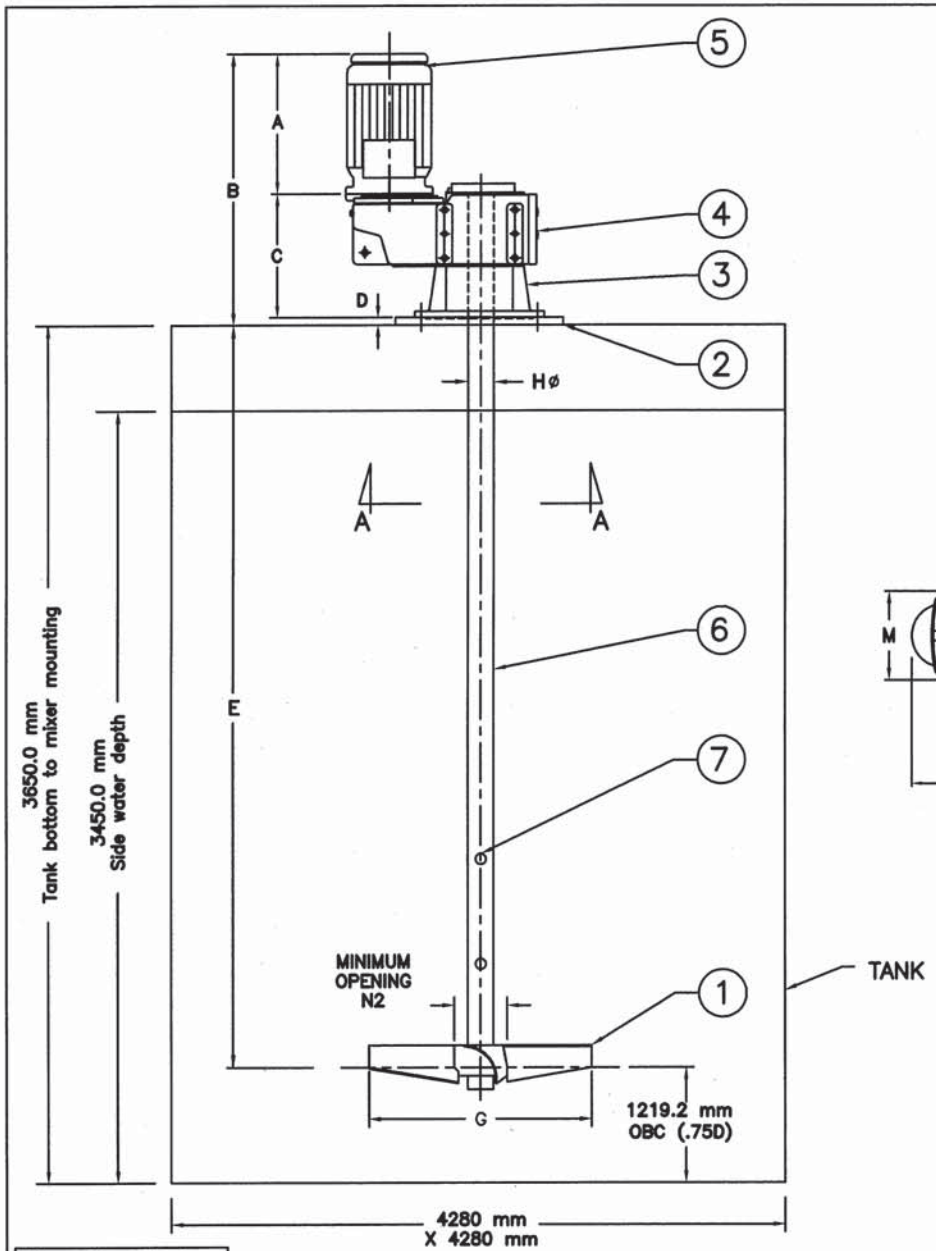
appvd: CB

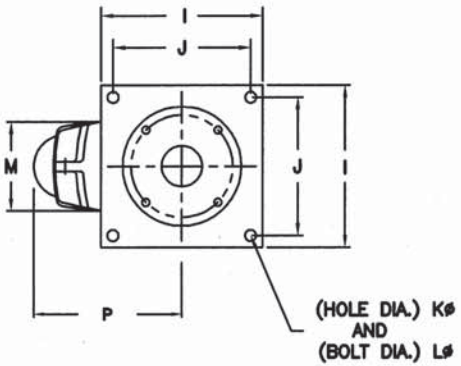
METAL PRECIPITATION REACTOR

MIXER

OIM manual section: 4.3.1.3

This page is intentionally left blank





"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: REACTOR (QTY 3)
MELANGEURS MIX–TECH
MODEL: EVGX6–5.0
3.73 kW ⊙ 21.72 RPM
S/N 04865–1, 2, 3
Reactor # 1
Rotation: Counter clocwise
Thrust: Up
Tag #: M1–011
Reactor # 2
Rotation: clocwise down
Thrust: U
Tag #: M1–012
Reactor # 3
Rotation: Counter clocwise
Thrust: Up
Tag #: M1–013

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

ENVIREQUIP WTEM INC.
490 Bord du Lac – Suite 2
Dorval, QC H9S 2A8
Montreal Tel: (514) 338-1043
RR1 (21404 Little Russels Rd.)
Glen Robertson, Ont K0B 1H0
Ontario Tel: (613) 874-2016
Fax: (613) 874-2629
E-mail: enviroqp@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

This page is intentionally left blank

ENVIREQUIP

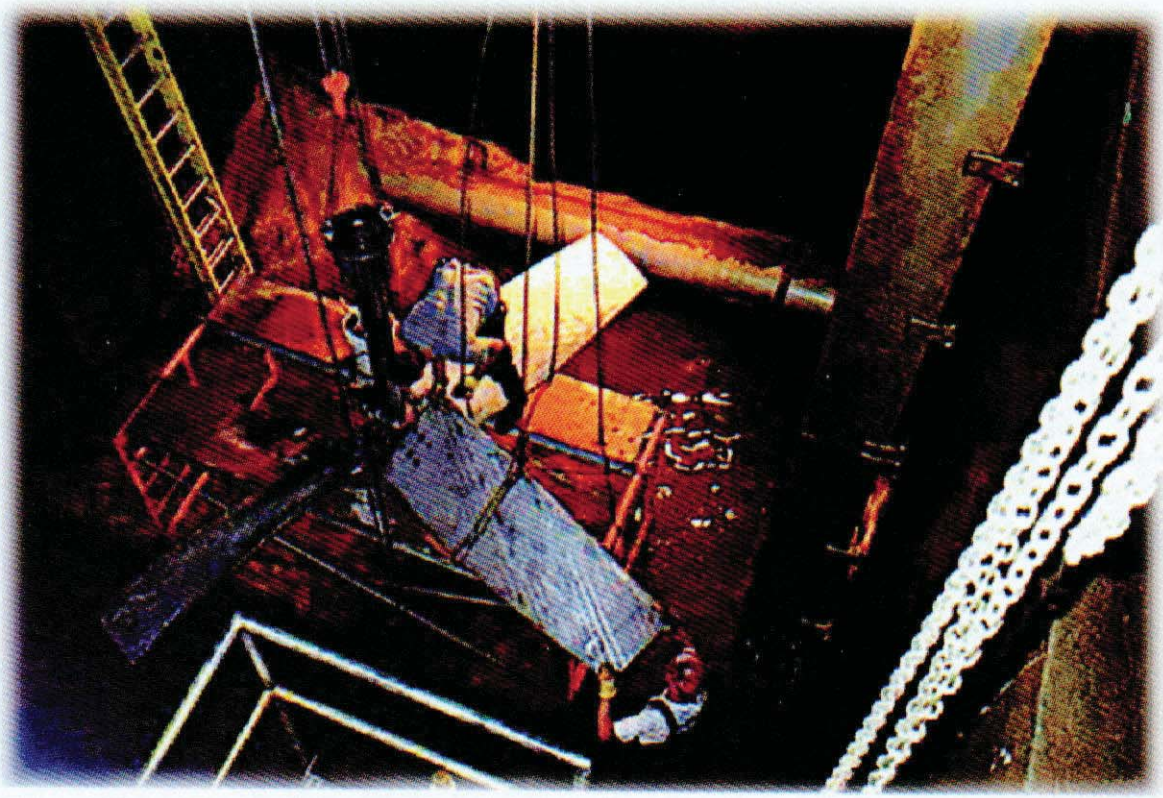
W.T.E.M. INC.

MIX-TECH

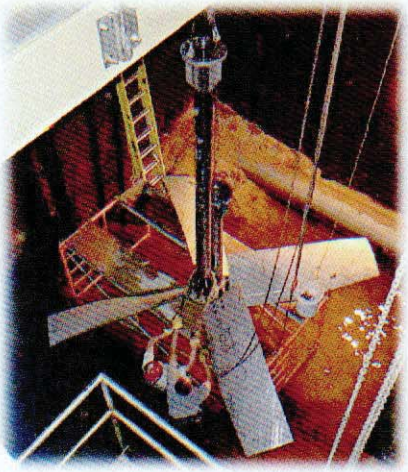
DYNAMIC MIXERS

EVG & EVG-FP SERIES

1/4 TO 200 HP



MIX-TECH FEATURES:



- Large service factors on gear drives - minimum 2.5.
- Shaft stress to 9000 psi maximum.
- Impeller / Hub / Coupling 6000 psi maximum.
- All drives are capable of reverse rotation.
- Optional pedestal with shaft catcher design, that allows removal of the gear drive without disturbing the wet end.
- "FP" Option: The reducer is totally isolated from the random hydraulic loads imposed by the shaft & impeller assembly.
- Large shaft capability operating at 65% of the shaft's 1st Harmonic frequency or Critical Speed.
- Mounting options: Steel base, pedestals and custom.
- Seal options: HPLRSB, LPSB, Lip seals, Single, Double, Dry-Running or Cartridge seals.
- Motor options: Nord integral Standard; Nema motors, hydraulic & pneumatic motors also available.
- Full range of impellers including **ENVIROFOIL**.

MIX-TECH... GOOD PEOPLE TO MIX WITH

ENVIREQUIP

W.T.E.M. INC.

EVG & EVG-FP SERIES
1/4 TO 200HP

MIX-TECH
DYNAMIC MIXERS

Isolating the gear drive 100% from the random hydraulic loads generated by the mixer's shaft and impeller assembly.

FEATURES:

- Elegant parallel design shaft-helical gears.
- AGMA 13 on high speed gears and AGMA 11 minimum for other gears.
- Large service factors - minimum 2,5.
- Oversized roller bearings B10 life, 100,000 hours minimum.
- Double output shaft seals and leakproof dry-well design option.
- Available with hollow quill output shaft for easy maintenance.

MIX-TECH... GOOD PEOPLE TO MIX WITH

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

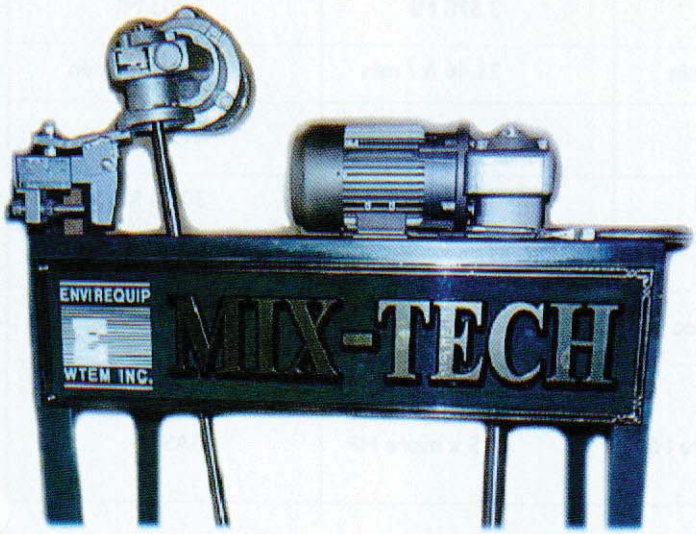
W.T.E.M. INC.

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.

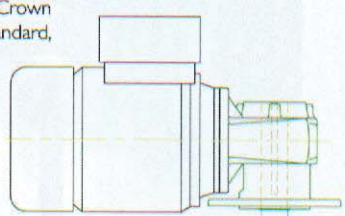
Shafts: 0.75", 1.0", 1.25", 1.4375" diameter.

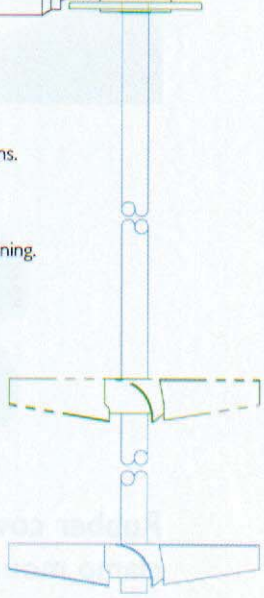
Seals: LRSB, Lip seals, Mechanical Seals including Dry-Running.

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

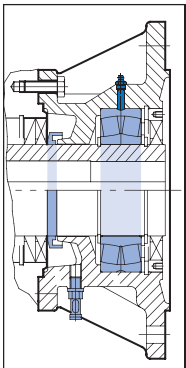
RATIO & SPEED

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

OIM manual section: 4.3.1.4

This page is intentionally left blank

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

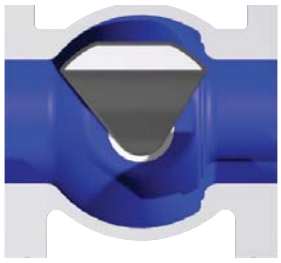
Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Ballcentric® plug valves.

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

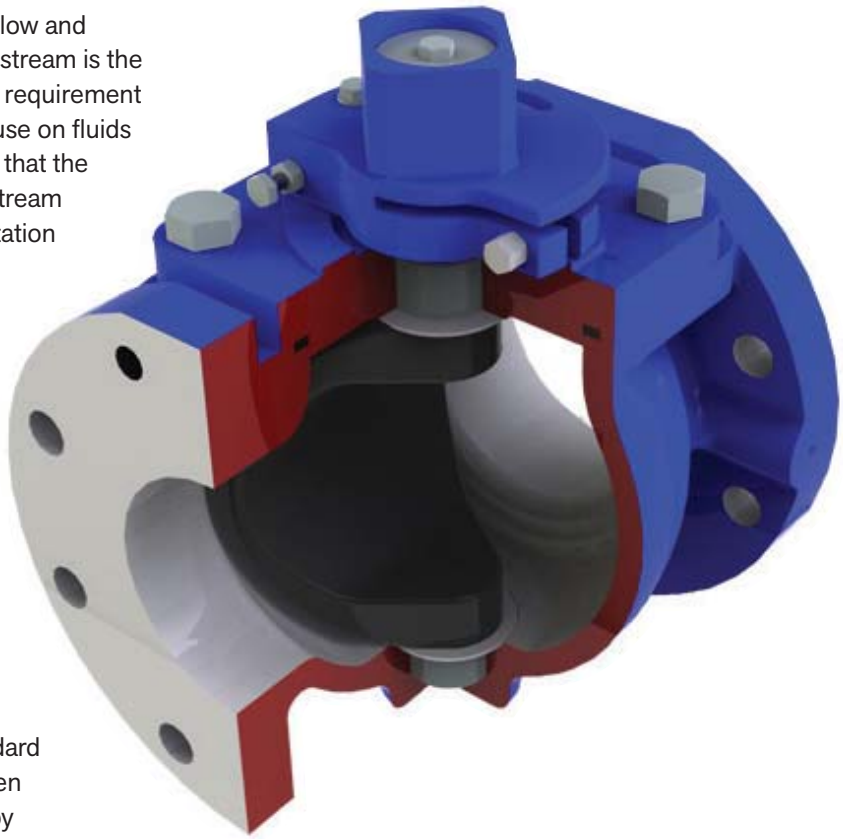
- Design of Ballcentric® plug valve allows modulating control over the full 90˚ travel
- Ideally suited for balancing service
- Standard rotary valve provides control and tight shut off in one valve



- 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

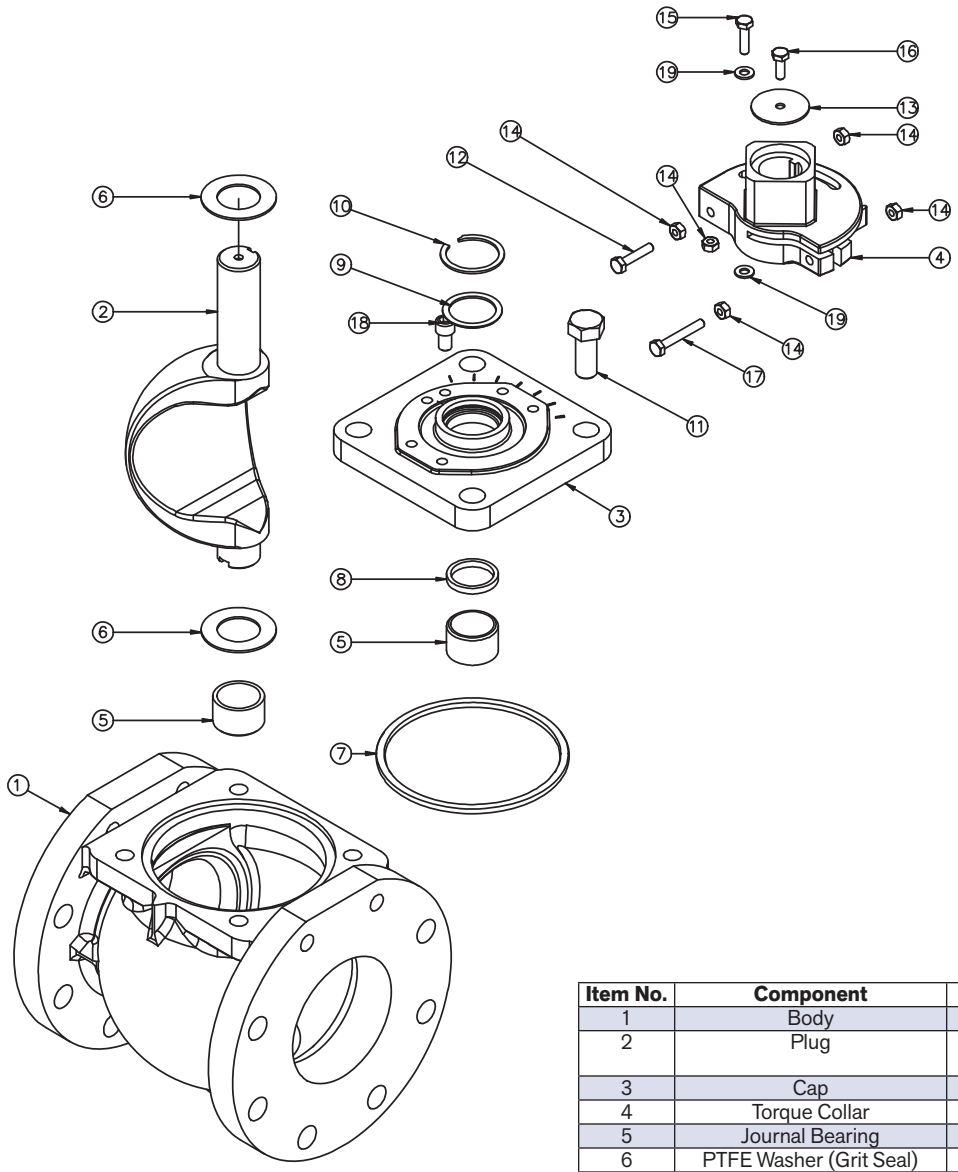
Retention of mechanical properties at high temperature is an important feature of this elastomer: temperature range is –10°F to 300°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.
Note: Not for water or steam applications.

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.

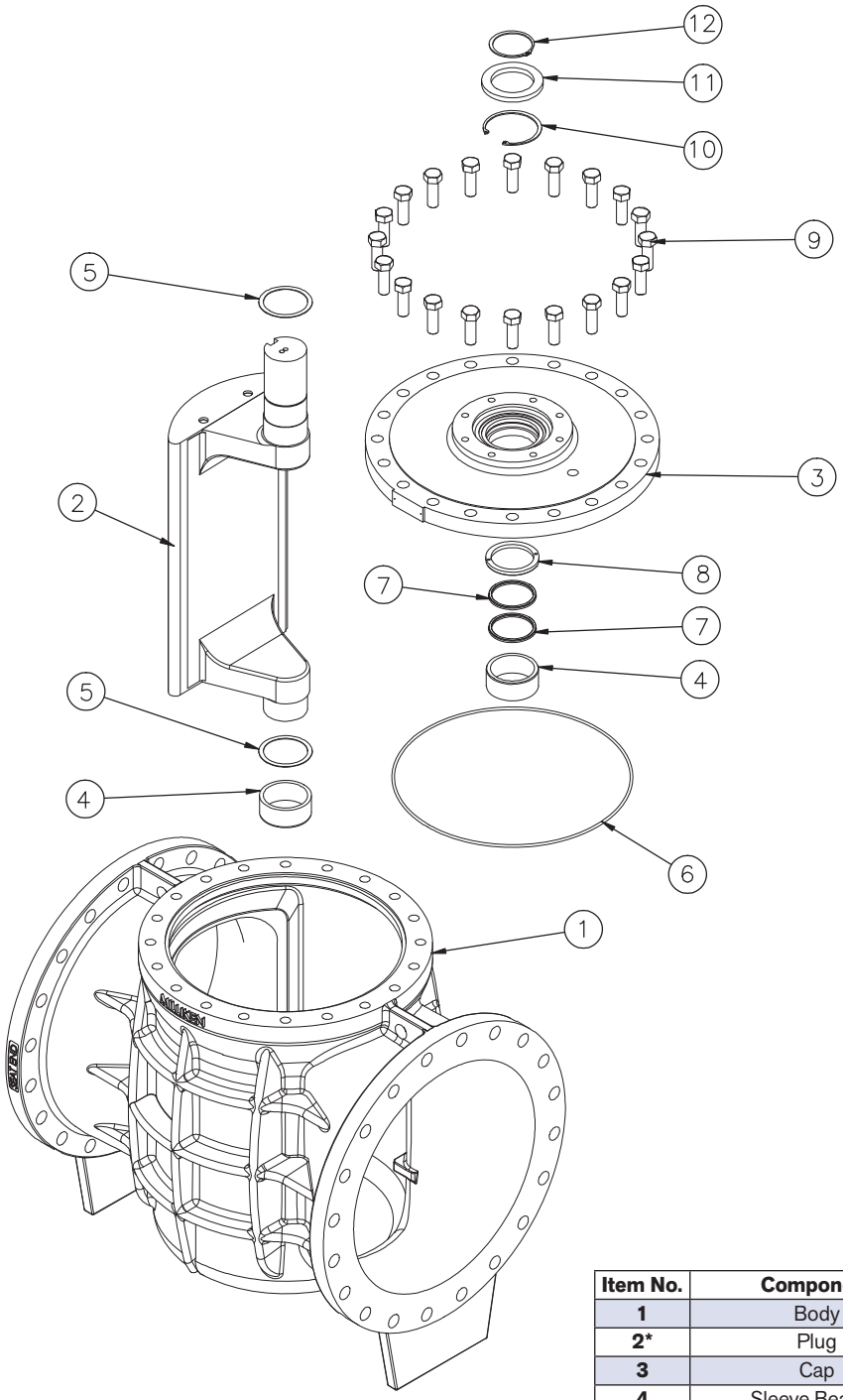
Standard Materials of Construction, Fig. 601/600, 12" & Smaller



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



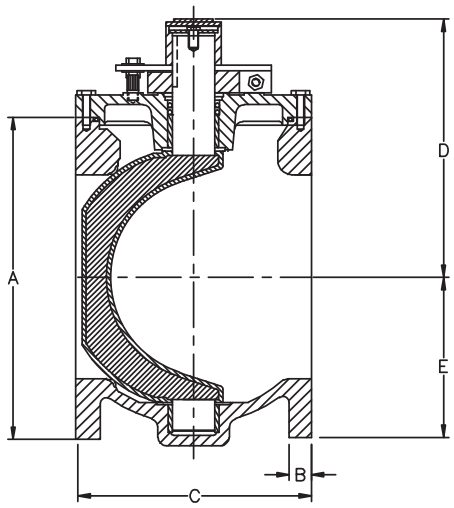
Item No.	Component	Material	Qty.
1	Body	Cast Iron A126 Class B	1
2*	Plug	Rubber Coated See Note 1	1
3	Cap	Cast Iron A126 Class B	1
4	Sleeve Bearing	Stainless Steel/Bronze	2
5	PTFE Washer (Grit Seal)	PTFE	2
6	Cap "O" Ring	Elas. as Spec.	1
7	U Cup Seal	Elas. as Spec.	2
8*	Seal Retaining Ring	See Note 2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

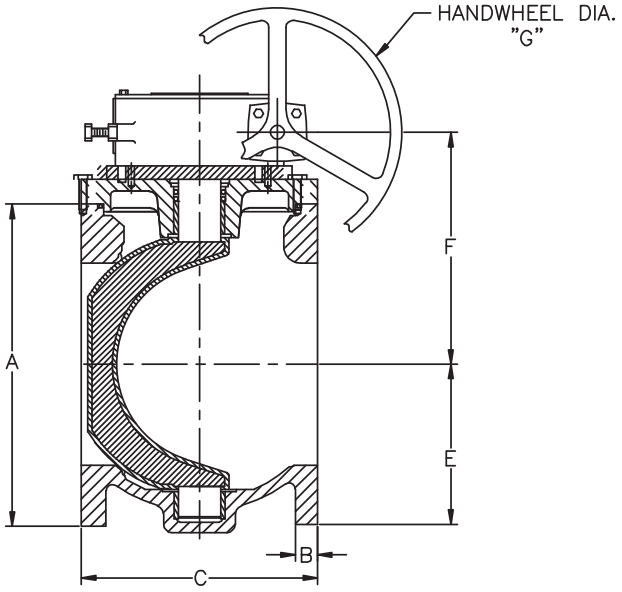
***NOTE 2:** Seal Retaining Ring: Brass – ASTM B-138-675 on 14" – 20" Steel on 24" and larger

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**

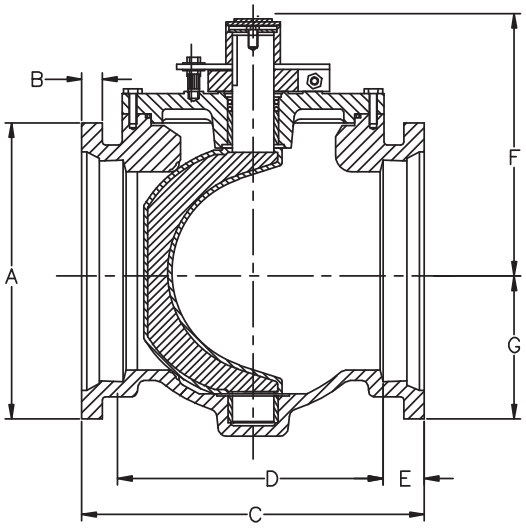
*10" & above have gear operators as standard

**Weight includes gear operator

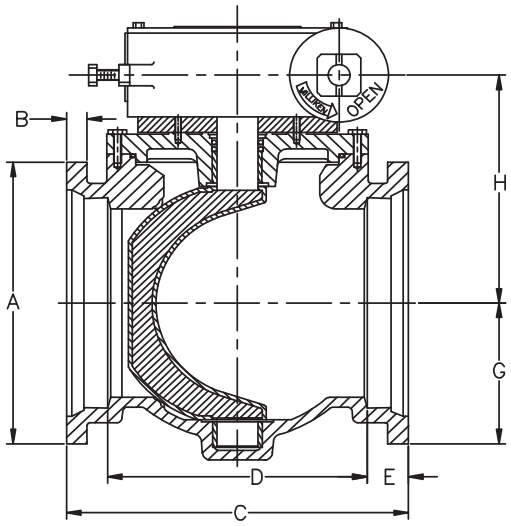
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

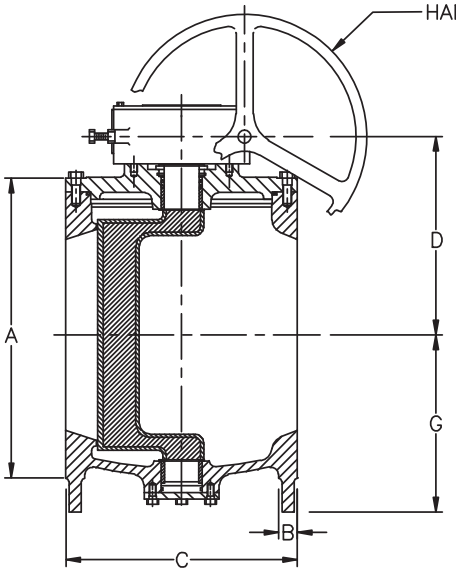
**Weight includes gear operator

We recommend gears on all Mechanical Joint Valves

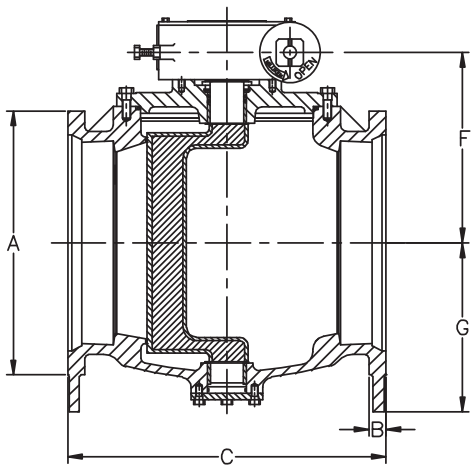
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

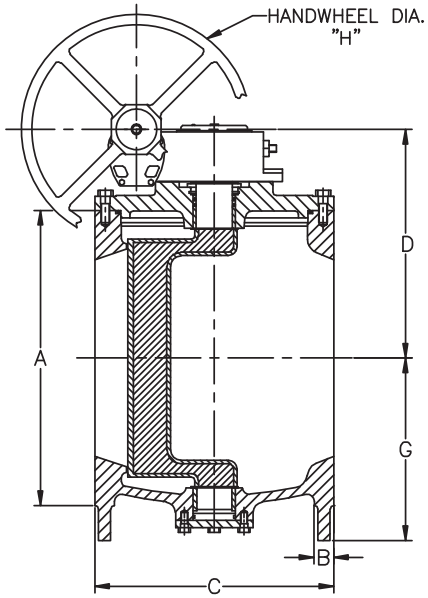
14" –20" VALVES



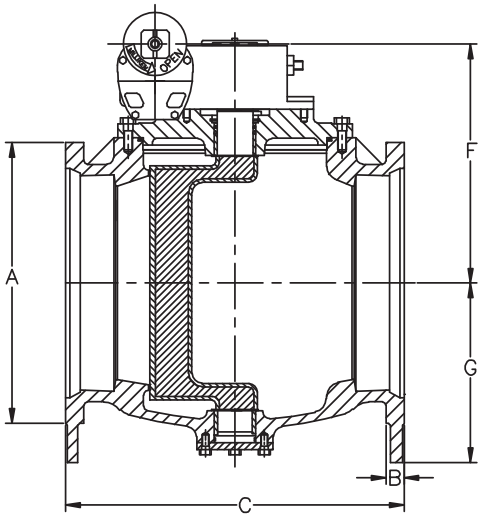
14" –20" VALVES



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

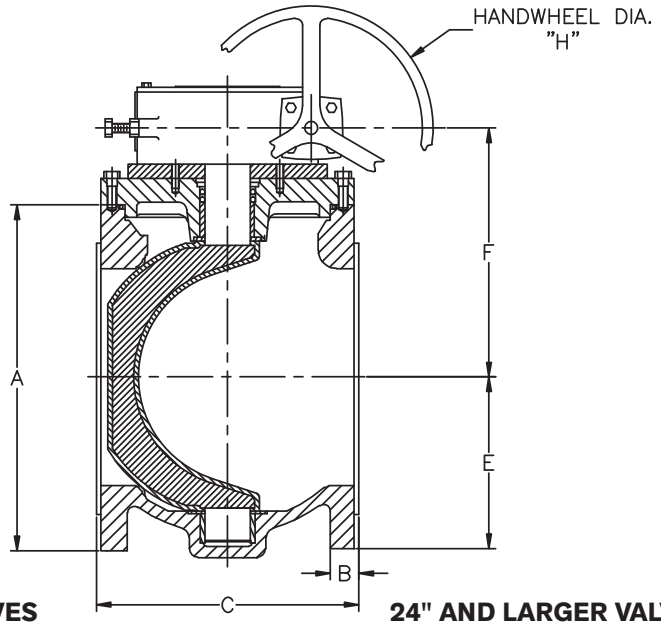
Weight includes gear operator

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

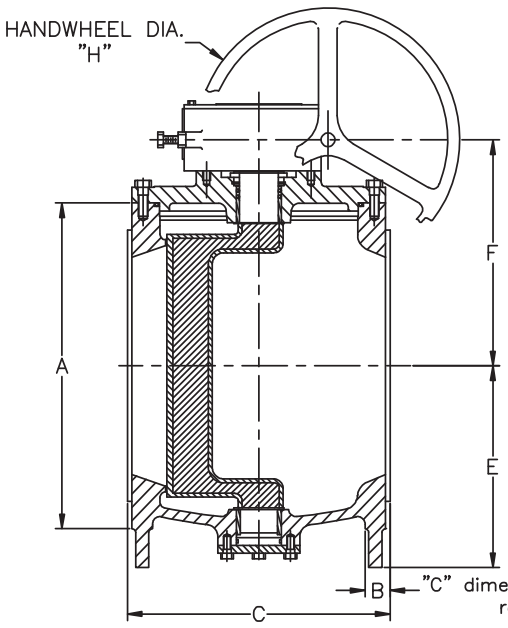
NOTE: Dimensions on 60" and larger available upon request.

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

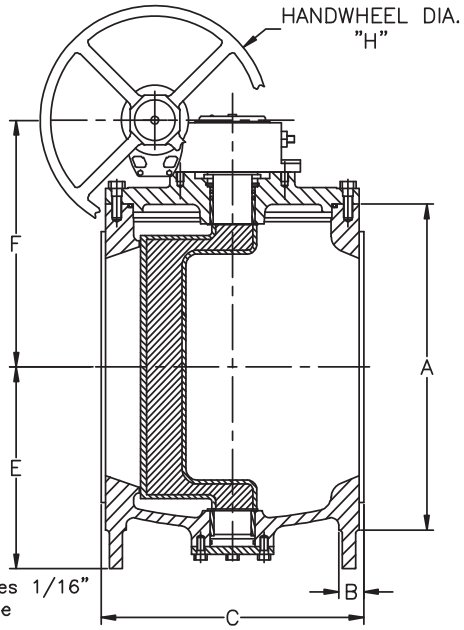
2½" – 12" VALVES



14" – 20" VALVES



24" AND LARGER VALVES



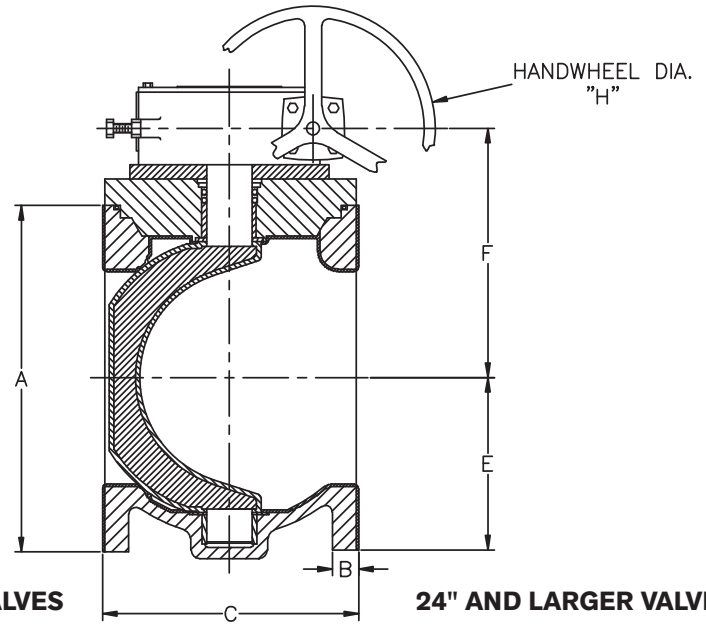
"C" dimen. includes 1/16" raised face

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

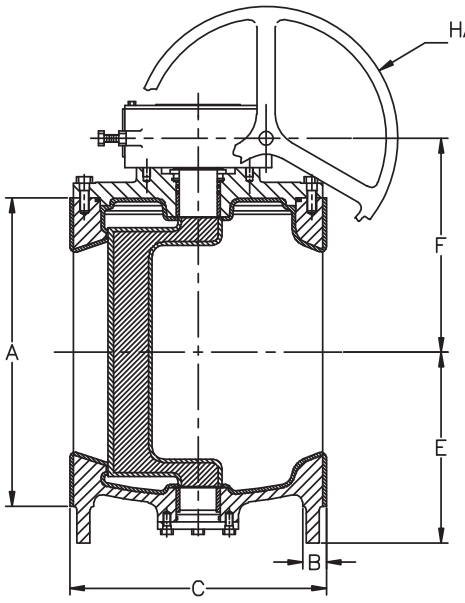
All above have gear operators as standard
Weight includes gear operator
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams
NOTE: Dimensions on 42" and larger available upon request

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

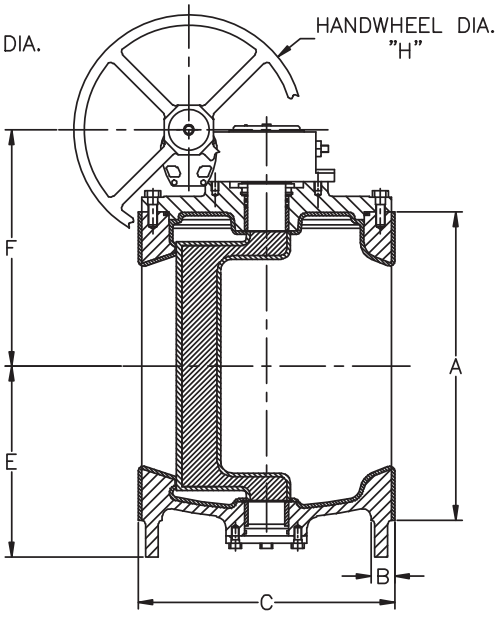
3" – 12" VALVES



14" – 20" VALVES



24" AND LARGER VALVES

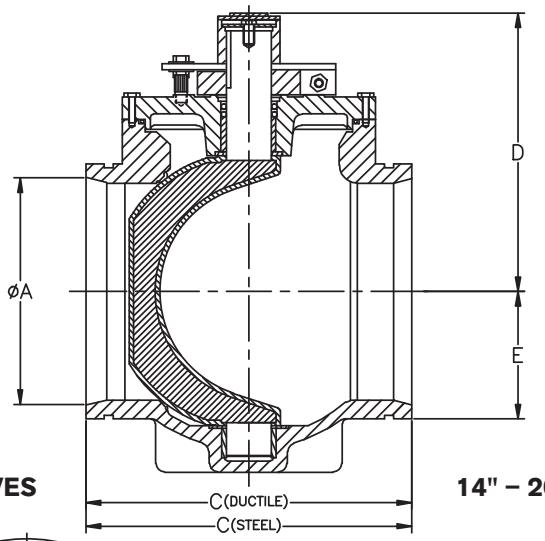


FLANGED END – ANSI 125 RUBBER LINED															
SIZE	**3**	**4**	**5**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**	**30**	**36**	**42**
A	7.50	9.00	10.00	11.00	13.50	16.00	19.00	21.00	23.25	25.00	27.50	32	38.75	46.00	53.00
B	.88	1.07	1.07	1.13	1.26	1.32	1.38	1.26	2.25	2.38	2.50	2.75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

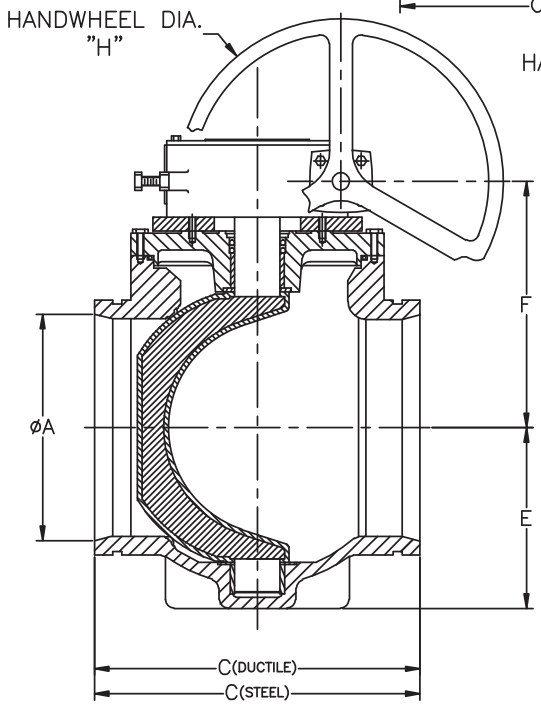
All above have gear operators as standard
Weight includes gear operator
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams
NOTE: Dimensions on 48" and larger available upon request

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

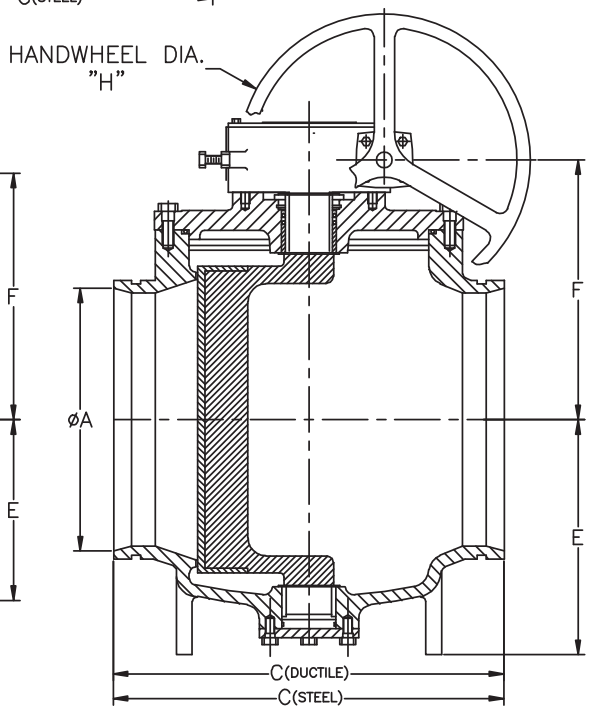
2½" – 8" VALVES



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

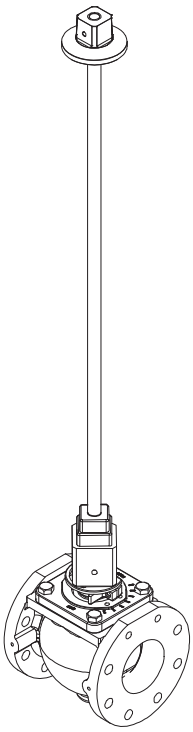
NOTE: Drawings are for information purposes only; please request certified drawings before preparing piping diagrams

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

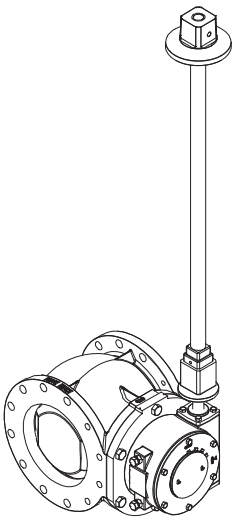
Adaption

**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.**

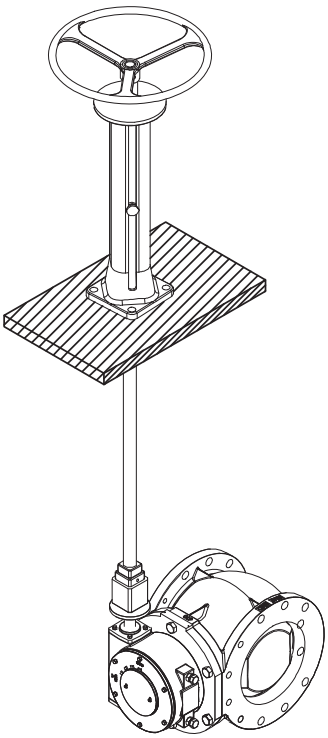
Valve with extended stem & 2" nut (Only for 8" and smaller valves)



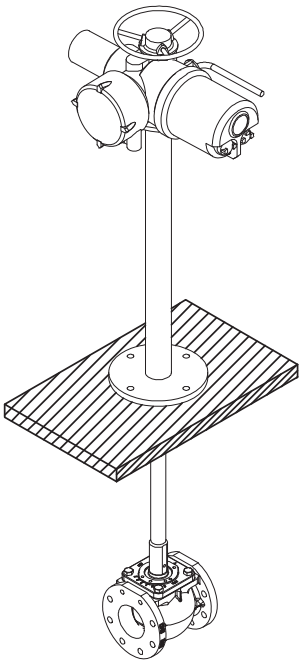
Valve with extended stem, buried gear and 2" nut



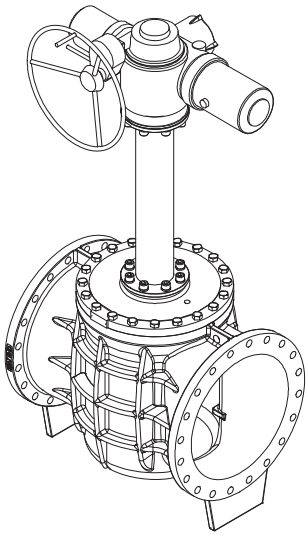
Valve with indicating floorstand



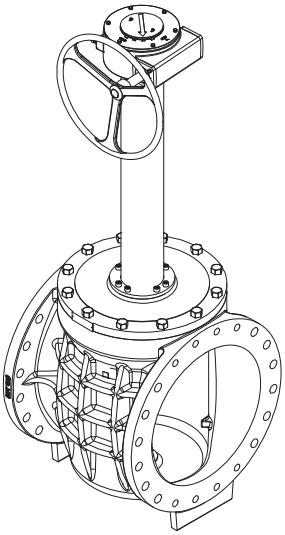
Valve with non-indicating floorstand & motor operator



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.

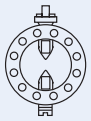
Wrench operated valves 2½"-8" shall be capable of being converted to worm gear or automated operation without removing the bonnet or plug from the valve. All wrench operated valves shall be equipped with a 2" square nut for use with removeable levers or extended "T" handles.

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.

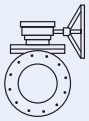
Plug valves shall be Ballcentric® Plug Valve Series **601GL/600GL** as manufactured by Henry Pratt Company of Aurora, Illinois.

PRATT PRODUCT GUIDE

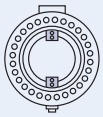


Model
2FII

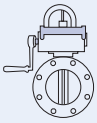
Monoflange
MKII



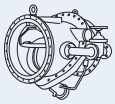
Plug
Valve



Triton®
XR70

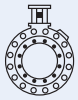


Indicating Butterfly Valve
UL & FM approved

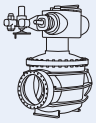


Tilting Disc
Check Valve

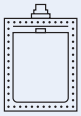
Triton®
XL



N-Stamp Nuclear
Butterfly Valve

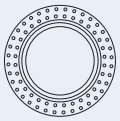


Cone
Valve

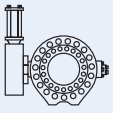


Rectangular

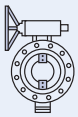
PIVA Post Indicating Valve Assembly
UL & FM approved



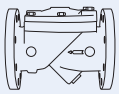
Sleeve
Valve



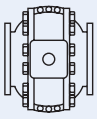
Rubber Seated
Ball Valve



Triton®
HP250

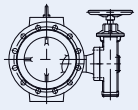


Check
Valve



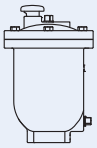
Metal Seated
Ball Valve

Control
Systems



Plunger Valve

PRATT



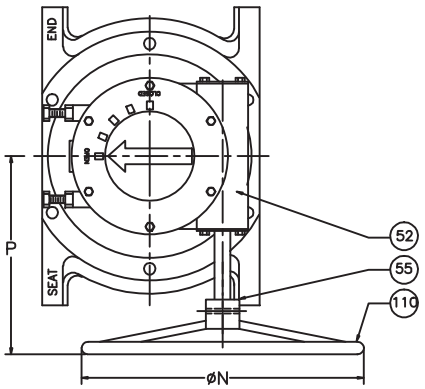
Air Valve

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

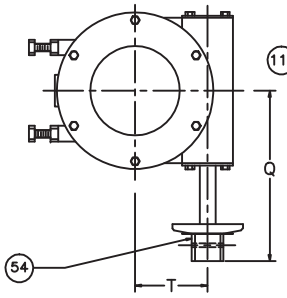
VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	M2 (20:1)	7.5	3.41	3.50	2.5	5.50	7.00	0.75	4	--	–	0.69	2.5	6	4.75	4.75	1.75	2.00
3	M2 (20:1)	8	3.41	3.75	3	6.00	7.50	0.75	4	--	–	0.75	2.5	6	4.75	4.75	1.75	2.00
4	M3 (30:1)	9	4.38	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2.00	2.56
5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

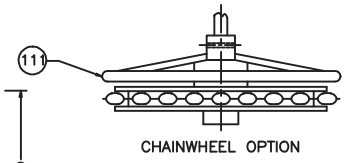
△5 △6 REFERENCE ONLY △6

ABOVE GROUND GEAR W/ HANDWHEEL OPTION



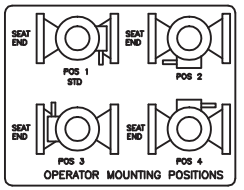
BURIED GEAR W/ 2" NUT OPTION

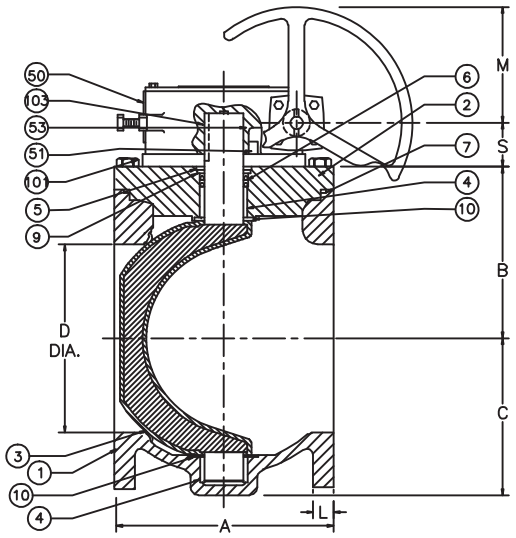


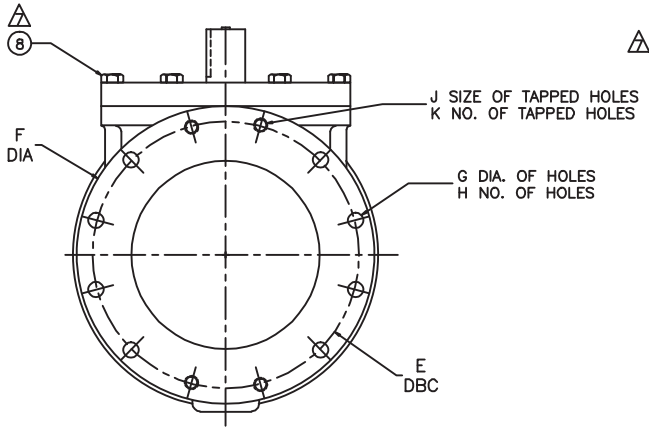


CHAINWHEEL OPTION

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

This page is intentionally left blank

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

This page is intentionally left blank

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)