

**SECTION 15092**  
**INDUSTRIAL BUTTERFLY VALVES**  
**Addendum No. 3**

PART 1 - GENERAL

1-1. SCOPE. This section covers the furnishing of manual or remote operated industrial butterfly valves as specified herein and as indicated in the Industrial Butterfly Valve Schedule.

Industrial type butterfly valves shall be provided where AWWA type butterfly valves are not required.

Piping, pipe supports, insulation, and accessories that are not an integral part of the valves or are not specified herein are covered in other sections. Powered actuators are covered in the Valve and Gate Operators section.

1-2. GENERAL. Valves furnished under this section shall tolerate the water quality as described in the section 13025 Low Pressure RO System.

1-2.01. General Equipment Stipulations. The General Mechanical and Equipment Provisions section shall apply to all equipment furnished under this section. If requirements in this specification differ from those in the General Mechanical and Equipment Provisions section, the requirements specified herein shall take precedence.

1-2.02. Temporary Number Plates. Each industrial butterfly valve with an identifying number listed in the Industrial Butterfly Valve Schedule, shall be tagged or marked in the factory with the identifying number.

1-2.03. Identification. Valves specified herein shall be tagged in accordance with the Equipment and Valve Identification section.

1-3. SUBMITTALS. Complete drawings, details, and specifications covering the valves and their appurtenances shall be submitted in accordance with the General Conditions, Section F-29 Equipment and Material Items section. Included in the submittal shall be drawings by the valve manufacturer to indicate the position of the valve actuator and valve shaft.

Drawings shall include separate wiring diagrams for each electrically operated or controlled valve and the electrical control equipment. Each drawing shall be identified with the valve number or name as specified in this section.

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### PART 2 - PRODUCTS

2-1. CONSTRUCTION. Unless otherwise specified, industrial butterfly valves shall be the rubber-seat, tight-closing type. Valves specified with an electric, air, or hydraulic actuators shall be the lugged wafer style. Valve discs shall seat at 90 degrees with the pipe axis.

Industrial butterfly valves with center lines more than 7'-6" [2.3m] above the floor shall be provided with chain-wheels and operating chains as specified herein.

Flanged end valves shall be of the short-body type. Where mechanical joint ends are specified, in the valve schedule, either mechanical joint or push-on ends conforming to ANSI/AWWA C111/A21.11 will be acceptable. For buried or submerged service, shaft seals shall be O-ring type.

2-1.01. Valves VBF-1. Not used.

2-1.02. Valves VBF-2. Not used.

2-1.03. Valves VBF-3. Not used..

<p>2-1.04. <u>Valves VBF-4.</u> VBF-4</p> <p>Chemical service plastic piping PVC and CPVC, Hydrogen dilution air (low pressure)</p>	<p>Rating Body Shaft Trim Seat Disc Stem Stem Seal Shaft Bearings End Connection Temperature Limitations  Valve Operator Manufacturer</p>	<p>Class 150 PVC, molded AISI Type 316 stainless steel  FPM (Viton) PVC, or CPVC 316 stainless steel (non-wetted) Synthetic O-rings Upper and lower bearings, reinforced Teflon Flanged, ASME B16.5, Class 150 diameter and drilling 0 to 140 °F  Lever (large diameter, or electric motorized, as applicable.) Asahi American "Type 57", Nibco "Chemtrol Model B", Hayward "BYV Series" or Spears Manufacturing "BF Series"</p>
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2-1.05. Valves VBF-5.

<p>VBF-5</p> <p>General Service. Influent, RO Feed, RO Permeate, RO Blend</p>	<p>Rating Body Shaft Trim Seat Disc Stem Stem Seal Shaft Bearings End Connection Temperature Limitations Manual Valve Operator 4" &amp; smaller 6" &amp; larger Manufacturer</p>	<p>Class 150 ASTM A126, Class B, Cast Iron AISI Type 316 stainless steel  EPDM 316 stainless steel 316 stainless steel Synthetic O-rings Upper and lower bearings, reinforced Teflon Lugged, ASME B16.5, Class 150 diameter and drilling -20 to 250° F  Lever Geared Handwheel Dezurik "BOS", Centerline "Model 200/225", Keystone "Series 622", Bray "Series 31"]</p>
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2-1.06. Valves VBF-6

VBF-6  RO Concentrate and any valves connected to RO concentrate system	Rating	Class 150
	Body	Duplex Stainless steel
	Trim	
	Seat	PTFE
	Disc	Duplex Stainless steel
	Stem	Nickel Alloy (Monel K500 or Nitronic 50 or approved equal)
	Stem Seal	PTFE
	Locator Bearings	Nickel Alloy or PTFE coated stainless steel
	End Connection	Lugged, ASME B16.5, Class 150 diameter and drilling
	Temperature Limitations	-20 to 250° F
Manual Valve Operator		
4" & smaller	Lever	
6" & larger	Geared Handwheel	
Manufacturer	Bray "McCannalok High Performance" or approved equal	

2-1.07. Valves VBF-7.

VBF-7  Ro System, Areas where chemical resistant valves are required.  RO CIP, Flush and Neutralization Systems,	Rating	Class 150
	Body	ASTM A126, Class B, Cast Iron
	Shaft	AISI Type 316 stainless steel or 420 stainless steel
	Trim	
	Seat	PTFE or EPDM
	Disc	PTFE, coated
	Stem	ASTM A276, Type 316, stainless steel
	Stem Seal	PTFE
	Locator Bearings	PTFE coated stainless steel
	End Connection	Lugged.
Temperature Limitations	-20 to 250° F	
Manual Valve Operator		
4" & smaller	Lever	
6" & larger	Geared Handwheel	
Manufacturer	Dezurik "BOS"; Keystone "920"; Bray "Series 22/23"	

2-1.05. Length Tolerance. Unless otherwise specified, the actual length of valves shall be within plus or minus 1/16 inch [1.6 mm] of the specified or theoretical length.

2-1.06. Shop Coatings. All ferrous metal surfaces of valves and accessories, both interior and exterior, shall be shop coated for corrosion protection. The valve manufacturer's standard coating will be acceptable, provided it is functionally equivalent to the specified coating.

<u>Coating Materials</u>	<u>Specification Compliance</u>
Coal Tar Epoxy	High-build coal tar epoxy; Ameron "Amercoat 78HB Coal Tar Epoxy", Carbolite "Bitumastic 300 M", Tnemec "46H-413 Hi-Build Tneme-Tar", or Sherwin-Williams "Hi-Mil Sher-Tar Epoxy".
Rust-Preventive Compound	As recommended by the manufacturer.
Universal Primer	As recommended by the manufacturer.

<u>Surfaces To Be Coated</u>	<u>Material</u>
Unfinished Surfaces	
Exterior Surfaces of Valves To Be Buried, Submerged, or Installed in Manholes or Valve Vaults	Asphalt varnish or coal tar epoxy.
Exterior Surfaces of All Other Valves	Universal primer.
Polished or Machined Surfaces	Rust-preventive compound.
Actuators and Accessories	Universal primer.

2-2. VALVE ACTUATORS. Manual actuated valves 6 inches and smaller, unless chain-wheel actuators are required, shall be provided with levers as specified herein. Valves 8 inches and larger shall have enclosed, geared, hand-wheel or chain-wheel actuators with position indicators as specified herein.

Requirements for automatic valve actuators shall be as specified herein, as indicated in the Industrial Butterfly Valves Schedule, and as specified in the Valve and Gate Actuator section.

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2-2.01. Manual Actuators. Manual actuators of the types listed herein and in the Industrial Butterfly Valves Schedule shall be provided by the valve manufacturer.

Unless otherwise indicated or specified, each geared manual actuator shall be equipped with an operating hand-wheel.

The direction of rotation of the wheel, wrench nut, or lever to open the valve shall be to the left (counterclockwise). Each valve body or actuator shall have cast thereon the word "Open" and an arrow indicating the direction to open.

The housing of traveling-nut type actuators shall be fitted with a removable cover which shall permit inspection and maintenance of the operating mechanism without removing the actuator from the valve. Travel limiting devices shall be provided inside the actuator for the open and closed positions. Travel limiting stop nuts or collars installed on the reach rod of traveling-nut type operating mechanisms shall be field adjustable and shall be locked in position by means of a removable roll pin, cotter pin, or other positive locking device. The use of stop nuts or adjustable shaft collars which rely on clamping force or setscrews to prevent rotation of the nut or collar on the reach rod will not be acceptable.

Each actuator shall be designed so that shaft seal leakage cannot enter the actuator housing.

Valves for throttling service shall be equipped with an infinitely variable locking device or a totally enclosed gear actuator.

Actuators shall produce the required torque with a maximum pull of 80 lbs [356 N] on the lever, hand-wheel, or chain. Actuator components shall withstand, without damage, a pull of 200 lbs [890 N] on the hand-wheel or chain-wheel or an input of 300 foot-lbs [407 J] on the operating nut.

2-2.02. Handwheels. Handwheel diameters shall be as recommended by the valve manufacturer.

2-2.03. Levers. Levers shall be capable of being locked in at least five intermediate positions between fully open and fully closed.

2-2.04. Chain-wheels. All valves with center lines more than 6'0" [2.3 m] above the floor shall be provided with chain-wheels and operating chains, unless otherwise specified in the Industrial Butterfly Valve Schedule. Each chain-wheel operated valve shall be equipped with a chain guide which will permit rapid handling of the operating chain without "gagging" of the wheel and will also permit reasonable side pull on the chain. Suitable extensions shall be provided, if necessary, to prevent interference of the

chain with adjacent piping or equipment. Operating chains shall be hot-dip galvanized carbon steel and shall be looped to extend to within 4 feet [1.2 m] of the floor below the valve.

2-3. ACCESSORIES. Requirements for extension stems and stem guides, position indicators, floor boxes, operating stands, torque tubes, and valves boxes shall be as specified in Valve and Gate Actuator section, and as indicated in the Industrial Butterfly Valves Schedule.

### PART 3 - EXECUTION

3-1. INSTALLATION. Materials furnished under this section shall be installed in accordance with Valve Installation section.

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3-2. VALVE SCHEDULE

Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
<b>Contractor Supplied Valves</b>											
VBF-0050	20	Forebay	VBF-5	M	M	E	150F	70	16	N	EOT
VBF-0053	30	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-0051	16	Forebay	VBF-5	M	M	E	150F	70	16	N	EOT
VBF-0052	30	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-0054	16	Forebay	VBF-5	M	M	E	150F	70	16	N	EOT
VBF-0055	24	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-0056	24	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-0057	20	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-0058	20	Forebay	VBF-5	O-C	HW	E	150F	70	16	N	N/A
VBF-1010	16	RO Transfer Pump No. 1 Discharge	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1020	16	RO Transfer Pump No. 2 Discharge	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1030	16	RO Transfer Pump No. 3 Discharge	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1040	16	RO Transfer Pump No. 4 Discharge	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1055	20	RO Transfer Pump Discharge Header - Perris II	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1056	20	RO Transfer Pump Discharge Header - Perris II	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1057	6	RO Transfer Pump Purge Line	VBF-5	O-C	HW	E	150F	95	16	N	N/A



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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VBF-1058	24	RO Transfer Pump Header – Raw Water	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1060	20	RO Transfer Pump Discharge Header - Perris I	VBF-5	M	M	E	150F	95	16	N	EOT
VBF-1061	20	RO Transfer Pump Discharge Header - Perris I	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1106	10	Cartridge Filter Effluent Purge Line	VBF-5	M	M	IB	150F	95	16	N	EOT
VBF-1107	10	Cartridge Filter Effluent Purge Line	VBF-7	O-C	CW	IB	150F	95	16	N	N/A
VBF-1112	20	Raw Water to Cartridge Filters	VBF-5	O-C	HW	E	150F	95	16	N	N/A
VBF-1110A	12	RO Cartridge Filter No. 1 Isolation	VBF-7	O-C	HW	IB	150F	75	16	N	N/A
VBF-1110B	12	RO Cartridge Filter No. 1 Isolation	VBF-5	O-C	HW	IB	150F	75	16	N	N/A
VBF-1120A	12	RO Cartridge Filter No. 2 Isolation	VBF-7	O-C	HW	IB	150F	75	16	N	N/A
VBF-1120B	12	RO Cartridge Filter No. 2 Isolation	VBF-5	O-C	HW	IB	150F	75	16	N	N/A
VBF-1130A	12	RO Cartridge Filter No. 3 Isolation	VBF-7	O-C	HW	IB	150F	75	16	N	N/A
VBF-1130B	12	RO Cartridge Filter No. 3 Isolation	VBF-5	O-C	HW	IB	150F	75	16	N	N/A
VBF-1210	12	RO Feed to RO Unit Before RO Feed Pump No. 1	VBF-7	M	M	IB	150F	75	16	N	EOT

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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VPF-1220	12	RO Feed to RO Unit Before RO Feed Pump No. 2	VPF-7	M	M	IB	150F	75	16	N	EOT
VPF-1230	12	RO Feed to RO Unit Before RO Feed Pump No. 3	VPF-7	M	M	IB	150F	75	16	N	EOT
VPF-1622	10	CIP Feed	VPF-6	M	M	IB	150F	65	16	N	EOT
VPF-1624	10	CIP Permeate Return	VPF-6	O-C	HW	IB	150 F or L	65	16	N	N/A
VPF-1626	10	CIP Feed	VPF-6	M	M	IB	150 F or L	65	16	N	EOT
VPF-1701	8	Flush Feed	VPF-5	M	M	IB	150 F or L	65	16	N	EOT
VPF-2039	8	Decarbonator No. 1 Drain	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-2040	16	Decarbonator No. 1 Effluent	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-2041	16	Decarbonator No. 1 Bypass	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-2042	16	Decarbonator No. 1 Bypass	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-2045	16	Decarbonator No. 2 Bypass	VPF-5	M	M	E	150F	25	16	N	EOT
VPF-2046	16	Decarbonator No. 1 Influent	VPF-5	M	M	E	150F	25	16	N	EOT
VPF-2047	16	Decarbonator No. 1 Bypass - Forebay	VPF-5	O-C	HW	E	150F	90	16	N	N/A
VPF-2048	16	Decarbonator No. 1 Bypass - Perris I	VPF-5	O-C	HW	E	150F	70	16	N	N/A
VPF-2049	16	Decarbonator No. 2 Bypass	VPF-5	O-C	HW	E	150F	90	16	N	N/A

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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VPF-2050	8	Decarbonator No. 2 Drain	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-2052	16	Decarbonator No. 2 Influent	VPF-5	M	M	E	150F	25	16	N	EOT
VPF-2054	16	Decarbonator No. 2 Effluent	VPF-5	O-C	HW	E	150F	25	16	N	N/A
VPF-9101	4	Brine Receiving Station Influent from Other Sources	VPF-6	M	M	E	150F	110	16	N	EOT
VPF-9102	4	Brine Receiving Station Influent from Other Sources	VPF-6	O-C	HW	E	150F	110	16	N	EOT
VPF-9115	12	Brine Pump No. 1 Discharge	VPF-6	O-C	HW	E	150F	75	16	N	N/A
VPF-9125	12	Brine Pump No. 2 Discharge	VPF-6	O-C	HW	E	150F	75	16	N	N/A
VPF-9135	12	Brine Pump No. 3 Discharge	VPF-6	O-C	HW	E	150F	75	16	N	N/A
VPF-9145	12	Brine Pump Station Discharge	VPF-6	O-C	HW	E	150F	75	16	N	N/A
VPF-7101B	4	Sodium Hypochlorite Storage Tank Discharge	VPF-4	O-C	M	IB	150F	*	5	N	N/A
<b>ROSS Supplied Valves</b>											
VPF-1211	*	RO Flush Feed After RO Feed Pump No. 1	VPF-5	M	M	IB	*	*	*	N	EOT
VPF-1212	*	RO Feed to RO Unit After RO Feed Pump No. 1	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1221	*	RO Flush Feed After RO Feed Pump No. 2	VPF-5	M	M	IB	*	*	*	N	EOT

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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VPF-1222	*	RO Feed to RO Unit After RO Feed Pump No. 2	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1231	*	RO Flush Feed After RO Feed Pump No. 3	VPF-5	M	M	IB	*	*	*	N	EOT
VPF-1232	*	RO Feed to RO Unit After RO Feed Pump No. 3	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1311	*	RO CIP Feed Unit 1	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1312	*	RO CIP Return Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1313	*	RO Concentrate Stage 1 Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1314	*	RO Feed Stage 2 Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1315A	*	RO CIP Feed Stage 2 Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1316	*	RO CIP Return Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1315B	*	RO CIP Feed Stage 3 Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1317	*	RO Permeate from Stage 1 Unit 1	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1318	*	RO Concentrate Stage 2 Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1319	*	RO CIP Return Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1321	*	RO CIP Feed Unit 2	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1322	*	RO CIP Return Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1323	*	RO Concentrate Stage 1 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1324	*	RO Feed Stage 2 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A

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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VPF-1325A	*	RO CIP Feed Stage 2 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1326	*	RO CIP Return Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1325B	*	RO CIP Feed Stage 3 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1327	*	RO Permeate from Stage 1 Unit 2	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1328	*	RO Concentrate Stage 2 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1329	*	RO CIP Return Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1331	*	RO CIP Feed Unit 3	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1332	*	RO CIP Return Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1333	*	RO Concentrate Stage 1 Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1334	*	RO Feed Stage 2 Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1335A	*	RO CIP Feed Stage 2 Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1336	*	RO CIP Return Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1335B	*	RO CIP Feed Stage 3 Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1337	*	RO Permeate from Stage 1 Unit 3	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1338	*	RO Concentrate Stage 2 Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1339	*	RO CIP Return Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1414	*	RO Permeate Unit 1	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1415	*	RO CIP Permeate Return Unit 1	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1416	*	RO Permeate Unit 1	VPF-5	M	M	E	*	*	*	N	EOT

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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VPF-1417	*	RO Permeate to Off Spec Unit 1	VPF-5	M	M	E	*	*	*	N	EOT
VPF-1424	*	RO Permeate Unit 2	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1425	*	RO CIP Permeate Return Unit 2	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1426	*	RO Permeate Unit 2	VPF-5	M	M	E	*	*	*	N	EOT
VPF-1427	*	RO Permeate to Off Spec Unit 2	VPF-5	M	M	E	*	*	*	N	EOT
VPF-1434	*	RO Permeate Unit 3	VPF-5	O-C	HW	IB	*	*	*	N	N/A
VPF-1435	*	RO CIP Permeate Return Unit 3	VPF-7	O-C	HW	IB	*	*	*	N	N/A
VPF-1436	*	RO Permeate Unit 3	VPF-5	M	M	E	*	*	*	N	EOT
VPF-1437	*	RO Permeate to Off Spec Unit 3	VPF-5	M	M	E	*	*	*	N	EOT
VPF-1511	*	RO Concentrate Unit 1	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1512	*	RO Concentrate Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1513	*	RO Concentrate Unit 1	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1517	*	RO Concentrate Unit 1	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1521	*	RO Concentrate Unit 2	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1522	*	RO Concentrate Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1523	*	RO Concentrate Unit 2	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1527	*	RO Concentrate Unit 2	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1531	*	RO Concentrate Unit 3	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1532	*	RO Concentrate Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1533	*	RO Concentrate Unit 3	VPF-6	O-C	HW	IB	*	*	*	N	N/A
VPF-1537	*	RO Concentrate Unit 3	VPF-6	M	M	IB	*	*	*	N	EOT
VPF-1601A	*	CIP Tank Drain	VPF-7	O-C	HW	IB	*	*	*	N	N/A

Industrial Butterfly Valves (Custom)  
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Tag Number	Size (in)	Location	Type of Valve	Service (1)	Actuator Type (4)	Type of Installation (2)	End Connection Class and Type (3)	Max Differential Pressure (psi) (5)	Max Velocity (fps)	Extension Stem	Limit Switch (6)
VBF-1601B	*	CIP Tank Effluent	VBF-7	O-C	HW	IB	*	*	*	N	N/A
VBF-1601C	*	CIP Permeate Feed	VBF-7	M	M	IB	*	*	*	N	EOT
VBF-1601D	*	CIP Tank Concentrate Return	VBF-7	O-C	CW	IB	*	*	*	N	N/A
VBF-1602	*	Neutralization Tank CIP Concentrate Return	VBF-7	O-C	CW	E	*	*	*	N	N/A
VBF-1603	*	Neutralization Tank Drain	VBF-5	O-C	CW	E	*	*	*	N	N/A
VBF-1604	*	Neutralization Tank Concentrate Return	VBF-7	O-C	CW	E	*	*	*	N	N/A
VBF-1605	*	CIP Tank Permeate Return Isolation	VBF-7	O-C	CW	IB	*	*	*	N	N/A
VBF-1610A	*	CIP Feed Pump 1 Isolation	VBF-7	O-C	HW	IB	*	*	*	N	N/A
VBF-1610B	*	CIP Feed Pump 1 Isolation	VBF-7	O-C	HW	IB	*	*	*	N	N/A
VBF-1620A	*	CIP Feed Pump 2 Isolation	VBF-7	O-C	HW	IB	*	*	*	N	N/A
VBF-1620B	*	CIP Feed Pump 2 Isolation	VBF-7	O-C	HW	IB	*	*	*	N	N/A
VBF-1702	*	RO Flush Pump 1 Isolation	VBF-5	O-C	HW	IB	*	*	*	N	N/A
VBF-1704	*	RO Flush Pump 2 Isolation	VBF-5	O-C	HW	IB	*	*	*	N	N/A
VBF-1710	*	RO Flush Pump 1 Isolation	VBF-5	M	M	IB	*	*	*	N	EOT
VBF-1720	*	RO Flush Pump 2 Isolation	VBF-5	M	M	IB	*	*	*	N	EOT

\*Valve Characteristics to be determined by equipment manufacturer in ROSS Shop Drawing Submittal.

## Industrial Butterfly Valves (Custom)

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### Notes:

(1) Actuators designated "O-C" are for "Open-Close" service. Actuators designated "M" are for "Modulating" service

(2) Abbreviations for installation types are as follows:

E	Exterior above grade
B	Buried
IB	Inside Building above grade

(3) Suffix letters define valve ends as follows:

F	Flanged
FF	Flanged, Flat Face
RF	Flanged, Raised Face
W	Wafer
MJ	Mechanical joint
S	Single Flange
L	Lugged

(4) Abbreviations for actuator types are as follows:

WN	Wrench Nut
LVR	Lever
CW	ChainWheel
HW	HandWheel
M	Motor Operated

(5) If a value is indicated, the leakage test shall be performed using this pressure value rather than the pressure indicated by the AWWA class.

(6) Abbreviations for limit switches on manual and cylinder operated valves.

EOT	End of travel (open - close)
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END OF SECTION