



## Submittal Review Response

Project Name: **Hilo WWTP Rehabilitation and Replacement Project Phase 1**  
Submittal No.: **15116-001.0**  
Date: **9/22/2025**

Client: County of Hawai'i Carollo Project No.: 203975  
Contractor: Nan, Inc.  
Submittal Name: Dezurik Product Data  
Reviewed By: Adria Nyarko, Adrienne Fung

### SUBMITTAL REVIEW

Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.

Approved	<input type="checkbox"/> No Exceptions
	<input type="checkbox"/> Make Corrections Noted - See Comments
	<input type="checkbox"/> Make Corrections Noted - Confirm
Not Approved	<input checked="" type="checkbox"/> Correct and Resubmit
	<input type="checkbox"/> Rejected - See Remarks
Receipt Acknowledged	<input type="checkbox"/> Filed for Record
	<input type="checkbox"/> With Comments - Resubmit

### Review Comments:

1. The submittal also does not include model PEF for full port valves as per Section 15116.2.02.A.1. Provide full port valves for the pipe services described in Section 15116.2.02.B.9.a.1 and 15116.2.02.B.9.a.1.
2. Per Section 15116.2.02.B.2, confirm that the pressure rating is for a minimum working pressure of 150 psig.
3. Per Section 15116.2.02.B.3, specify whether the valve is for compressed air or digester gas. Please confirm the service use and corresponding operating temperature limits.
4. The submittal does not identify material of the compression washer (part A36 on page 15 of the PDF) in the Materials of Construction. Confirm material complies with Section 15116.2.02.B.4.
5. The submittal does not confirm stem seal operation as specified in Section 15116.2.02.B.5. Confirm that the stem seals can be operated per Section 15116.2.02.5.
6. Confirm that the valves will have grooved ends, per Section 15116.2.02.B.8.
7. Glass lining information is provided in the submittal. Provide other lining as required by Section 15116.2.02.B.10.b.
8. Confirm the material and thickness of the overlay contacting the plug face, per Section 15116.2.02.C.2.
9. The submittal does not detail all materials of construction for all internal parts, for example, A10 friction cone and A20 grease fitting. Please include the missing information.
10. Not all internal parts, such as the bonnet, are Type 316 stainless steel, as required by Section 15116.2.02.C.4. Provide internal parts, except the body and plug, of Type 316 stainless steel per Section 15116.2.02.C.4.

High Priority

**CONTRACTOR SUBMITTAL TRANSMITTAL FORM REV. A**

**Owner:** County of Hawaii  
**Contractor:** Nan, Inc. **Project No.:** WW-4705R  
**Project Name:** Hilo WWTP Phase 1 **Submittal Number:**  
**Submittal Title:** For Information Only  
**TO:**  
**From:** Nan Inc.

<b>Specification No. and Subject of Submittal / Equipment Supplier</b>	
<b>Spec:</b>	<b>Paragraph:</b>
<b>Authored By:</b>	<b>Date Submitted:</b>

<b>Submittal Certification</b>	
<b>Check Either (A) or (B):</b>	
<input type="checkbox"/> (A)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with <u>no exceptions</u> .
<input type="checkbox"/> (B)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings <u>except</u> for the deviations listed.
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.	

<b>General Contractor's Reviewer's Signature:</b>	Nitesh. N	
<b>Printed Name and Title:</b>		
In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
<b>Firm:</b>	<b>Signature:</b>	<b>Date Returned:</b>

<b>PM/CM Office Use</b>	
Date Received GC to PM/CM:	
Date Received PM/CM to Reviewer:	
Date Received Reviewer to PM/CM:	
Date Sent PM/CM to GC:	

Nan, Inc

PROJECT: HILO WWTP REHABILITATION  
AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY  
THIS CONTRACTOR. IT IS CERTIFIED  
CORRECT, COMPLETE, AND IN  
COMPLIANCE WITH CONTRACT  
DRAWINGS AND SPECIFICATIONS. ALL  
AFFECTED CONTRACTORS AND  
SUPPLIERS ARE AWARE OF, AND WILL  
INTEGRATE THIS SUBMITTAL (UPON  
APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED \_\_\_\_\_  
SPECIFICATION SECTION # \_\_\_\_\_  
SPECIFICATION \_\_\_\_\_  
PARAGRAPH \_\_\_\_\_  
DRAWING \_\_\_\_\_  
SUBCONTRACTOR \_\_\_\_\_  
SUPPLIER \_\_\_\_\_  
MANUFACTURER \_\_\_\_\_

CERTIFIED BY CQCM or Designee : *[Signature]*

## **SECTION 15116**

### **PLUG VALVES**

#### **PART 1 GENERAL**

##### **1.01 SUMMARY**

- A. Section includes:
  - 1. Non-lubricated plug valves.
  - 2. Multi-port plug valves.
  - 3. Multi-port plug valves for digester gas service shall be as specified in Section 11381 - Digester Appurtenances.
- B. Where electric actuators are specified or indicated on the Drawings, the valve manufacturer's responsibility shall extend to sizing, selection, and furnishing of the electric actuator. Electric actuator shall be as specified in Section 13447 – Electric Actuators.
- C. As specified in Section 15110 - Common Work Results for Valves.

##### **1.02 REFERENCES**

- A. American Water Works Association (AWWA):
  - 1. C517 - Resilient-Seated Cast Iron Eccentric Plug Valves.
  - 2. C606 - Grooved and Shouldered Joints.
- B. ASTM International (ASTM):
  - 1. A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
  - 2. A536 - Standard Specification for Ductile Iron Castings.

##### **1.03 SUBMITTALS**

- ✓ A. Submit as specified in Section 01330 - Submittal Procedures and 15110 - Common Work Results for Valves:
  - ✓ 1. Product data.
  - 2. Shop drawings.
  - 3. Calculations.
- n/a B. For valves specified to have electric actuators, provide letters from both the valve manufacturer and the electric actuator manufacturer confirming that they have coordinated the electric actuator selection with the specified valve design requirements, including operating speed.
- C. Product data as defined in 01600 - Product Requirements.
- D. Shop drawings showing installation arrangement of major component assemblies.
- E. Calculations.

- ✓F. Vendor operation and maintenance manual as specified in Section 01782 - Operation and Maintenance Manuals.
- G. Commissioning submittals:
1. Provide Manufacturer's Certificate of Source Testing as specified in Section 01756 - Commissioning:
    - a. Interior coating.
  2. Provide Manufacturer's Certificate of Installation and Functionality Compliance as specified in Section 01756 - Commissioning.

## 1.04 WARRANTY

- A. Provide warranty as specified in Section 01783 - Warranties and Bonds.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. As specified in Section 01600 - Product Requirements and Section 15110 - Common Work Results for Valves.

### 2.02 NON-LUBRICATED PLUG VALVES (PV00)

- ✓A. Manufacturers: One of the following or equal:
1. DeZurik, Model "PEC" for standard port valves; Model "PEF" for full port valves.
  2. Clow Valve.
  3. Milliken Valve, Model 600/601.
- ✓B. Design:
1. Type: Non-lubricated eccentric type, in accordance with AWWA C517.
  2. Pressure Rating: Suitable for service under minimum working pressures of 150 pounds per square inch gauge.
  3. Plug face: Resilient material that operates satisfactorily at a temperature of 180 degrees Fahrenheit continuous and 215 degrees Fahrenheit intermittent, except for valves in compressed air or digester gas service:
    - a. Valves in compressed air service: Resilient material suitable for continuous duty at 250 degrees Fahrenheit.
    - b. Valves in digester gas service: Resilient material suitable for petroleum or digester gas at continuous duty at 180 degrees Fahrenheit.
  4. Compression washer: Provide flat compression washer made of Teflon™, or of a material having equal physical characteristics on valve stem between plug and bonnet.
  5. Stem seals: Provide stem seals serviceable without unbolting the valve bonnet assembly.
  6. Grit excluders: Provide PTFE grit excluders at upper plug journals to prevent entry of foreign solids in bearing area.
  7. Clearly mark valves to indicate their open and closed positions.

- ✓ 8. Provide valves with ends as required by piping details indicated on the Drawings:
  - a. Grooved end body valves:
    - ✓ Usage: Plug valves with grooved ends may be used in piping systems specified in the Piping Schedule to have grooved end joints and as indicated on the Drawings.
    - ✓ 2) Grooved end joint design: In accordance with AWWA C606.
- ✓ 9. Provide full (100%) port valves for the following pipe services:
  - a. BSL:
    - 1) Except for Valves: 12-FCV-3312, 3412, 3512.
  - b. CSL.
  - c. DSL:
    - 1) Except for Valves: 12-FCV-4100, 4200.
  - d. FM.
  - e. HSL.
  - f. MSL.
  - g. PS.
  - h. PSC.
  - i. RSS.
  - j. SSC.
  - k. TSL.
  - l. WSS.
- ✓ 10. Interior lining:
  - a. Provide glass lining for valves installed in pipe services scheduled to receive glass lining. Refer to Section 15052 - Piping Schedule.
  - b. For all other applications, provide lining as specified in Section 15110 – Common Work Results for Valves.
- ✓ C. Materials:
  - ✓ 1. Body and plug: ASTM A126, Class B, cast-iron, with plug face of neoprene or Buna N material suitable for the intended service as specified under paragraph "Design" above.
  - ✓ 2. Body seats in valves 3 inch size and larger: Provide with overlay of not less than 90-percent nickel and minimum thickness of 1/8-inch on surfaces contacting the plug face.
  - ✓ 3. Stem bearing and bottom bearing: Type 316 stainless steel.
  - ✓ 4. Internal parts, except the body and plug: Type 316 stainless steel.
  - ✓ 5. Exposed nuts, bolts, and washers: Zinc plated. Exception: Exposed nuts, bolts, and washers for buried service: Stainless steel.

## 2.03 MULTI PORT PLUG VALVES(PV80)

- A. Manufacturers: One of the following or equal:
1. DeZurik, PTW, for 3 way valve, and PFW for 4 way valve.
  2. Milliken, equivalent product.

- ~~B. Design: Non-lubricated tapered plug type including Type 316 stainless steel plugs faced with neoprene, body of cast iron, and Type 316 stainless steel bearings in the upper and lower journal areas.~~
- ~~C. Furnish valves with single, double, or transfer style plug as indicated on the Drawings or as required.~~

## ✓ 2.04 VALVE OPERATORS

- ✓ A. ~~Furnish valves with an operating wrench or worm gear operator:~~
- ✓ 1. Equip valves 4-inch nominal size and smaller with a lever operator.
  - ✓ 2. Equip valves 6-inch nominal size and larger with a worm gear operator.

This will be provided at a later date.

✓ B. Furnish valves with electric actuator where specified or indicated on the Drawings:

1. Electric actuator shall be as specified in Section 13447 - Electric Actuators.

## ✓ 2.05 COATING

- ✓ A. Coat and test interior metal surfaces as specified in Section 15110 - Common Work Results for Valves.
- ✓ B. Coat exterior metal surfaces as specified in Section 09960 - High-Performance Coatings.
- ✓ C. Field applied coating of valve exterior:  
✓ 1. Match color and be compatible with manufacturer's coating system and as specified in Section 09960 - High-Performance Coatings:
  - ✓ a. When shop applied finish coating matches field applied coating on adjacent piping, touch up shop coating in damaged areas in accordance with instructions recommended by the paint manufacturer.
  - ✓ b. When shop applied coating does not match field coating on adjacent piping, or when damage has occurred to the shop applied coating that requires more than touchup, blast clean valve surfaces or utilize other surface preparation recommended by the manufacturer of the coating material and apply the coating system used for coating adjacent piping.

## ✓ 2.06 SHIPMENT, SPARE PARTS, MAINTENANCE PRODUCTS, AND SPECIAL TOOLS

- ✓ A. As specified in Section 01600 - Product Requirements.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install all plug valves in strict accordance with the manufacturer's published recommendations and the applicable provisions of Section 15110 - Common Work Results for Valves.
- B. For buried plug valves, provide with valve boxes, operating nuts, and tee-wrench handles. Install as specified in Section 15110 - Common Work Results for Valves.

- C. Install valve so that valve stem is in horizontal position.
- D. Unless otherwise directed, observe the following rules for installation of eccentric plug valves on sewage, grit, sludge, or other liquid systems containing solids, silt, or fine sand:
  1. Install valves so that in closed position the pressure in the pipeline applies a seating head on the valves, except as noted in Item 4 below.
  2. In vertical pipelines, install valve with the seat side up.
  3. In horizontal pipelines, the plug shall swing upwards when opening, to permit flushing out of solids.
  4. Orient the valve to prevent the valve body from filling up with solids, when closed. However, when the pressure differential through the valve exceeds 25 psi, the higher pressure for valves without worm gear, electric, or air operators, shall be through the valve, to force the plug against the seat.
  5. For special applications, or when in doubt, consult with the manufacturer prior to installation.

### **3.02 COMMISSIONING**

- A. As specified in Section 01756 - Commissioning and this Section.
- B. Manufacturer services:
  1. Provide certificates:
    - a. Manufacturer's Certificate of Installation and Functionality Compliance.
- B. Functional testing:
  2. Valves:
    - a. Conduct pressure and leak test as specified in Section 15110 - Common Work Results for Valves.

END OF SECTION



# DeZURIK

July 25, 2025

## APPROVAL DRAWINGS

### PROJECT NAME

MM11520

### PURCHASE ORDER

50501

### VALVE TYPE

Eccentric Plug Valve, Rectangular Port (AWWA C517) (PEC)

CUSTOMER: HAWAII ENGINEERING SERVICES INC  
1082 MAKEPONO STREET  
HONOLULU HI 96819  
United States

LOCAL SUPPLIER: HAWAII ENGINEERING SERVICES  
1082 MAKEPONO ST  
HONOLULU HI 96819  
United States

MANUFACTURER: DeZURIK US  
250 Riverside Ave North  
Sartell MN 56377

Factory Quote

QUO231733



250 Riverside Avenue North  
Sartell, MN 56377 USA  
Ph: 320-259-2000

July 25, 2025

**To:** CUST065449 Hawaii Engineering Services, Inc. HAWAII ENGINEERING SERVICES INC 1082 MAKEPONO STREET HONOLULU HI 96819 United States

**SUBJECT:** American Iron and Steel Step Certification for Project **MM11520**

**Transaction Number # QUO231733**

I, Rachael Nieland, certify that the (melting, bending, galvanizing, cutting, etc.) processes for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with AIS requirement as mandated by Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference.

**Item, Products and/or materials:**

Style	City, State
Model PEC, Eccentric Plug Valve, Rectangular Port (AWWA C517) (PEC)	Sartell, MN

**Manufacturing processes of the above products take place at the following location(s):**

**Sartell, MN**

DeZURIK 250 Riverside Ave North Sartell MN 56377 United States

This certification is to be submitted upon request to interested parties (e.g. municipalities, consulting engineers, general contractors, etc.)

If any of the above compliance statements change while providing materials to this project, please immediately notify the person(s) who is requesting to use your product(s).

**Rachael Nieland**

Project Management &  
Order Administration Manager  
320-259- 2137

# EQUIPMENT DATA FORM

(MAINTENANCE SUMMARY FORM)

<b>PROJECT:</b> MM11520	
<b>PURCHASE ORDER:</b> 50501	
<b>EQUIPMENT ITEM:</b> Eccentric Plug Valve, Rectangular Port (AWWA C517) (PEC)	
<b>EQUIPMENT / TAG NUMBERS:</b>	
<b>WEIGHT(APPROX.):</b> 168 lbs/ 77 kgs	
<b>MANUFACTURER:</b> DeZURIK	
<b>PART NUMBER:</b> 9660377 (PEC,6,F1,CI,NBR,NBR,AIS*GS-6-HD8)	
<b>MANUFACTURERS LOCAL REPRESENTATIVE:</b>	
HAWAII ENGINEERING SERVICES 1082 MAKEPONO ST HONOLULU HI 96819 United States	<b>Telephone:</b> 808.841.0033
<b>MOTOR DATA PLATE (HP, Voltage, Speed, etc.):</b>	

## MAINTENANCE REQUIREMENTS

- DeZURIK recommends exercising your valve every 30 days.
- Valve lubrication required upon disassembly only.
- For valve maintenance and lubrication refer to instruction manual(s):D10021
- For actuator maintenance and lubrication refer to instruction manual(s):D10063

## REPLACEABLE WEAR PARTS

See Drawings : A46423,A20730,A22553,D10021

Part No	Description	Quantity	Line
1403152	5&6" PLUG NBR (RS24) CI USA	1	A03
1013465	WASHER TFE/GRIT EXCLUDER 2.265 ID	1	A04
1013460	GASKET 6-7/8ODX6-3/8IDX1/16TH	1	A05
1055749	PACKING ADPT MALE 2-1/4 ID	1	A09
1055763	PACKING PRESS RING 2-1/4 ID	4	A09
1055778	PACKING ADPT FEMALE 2-1/4 ID	1	A09
1004994	SEAL ROD TRANSCOM 32392TM 3.940ODX3.250IDX.250THK	1	B03
1004994	SEAL ROD TRANSCOM 32392TM 3.940ODX3.250IDX.250THK	1	B03
1036629	GASKET 6-29/32X6-13/32IDX1/32TH	2	B09
1013989	SEAL ROD TRANSCOM 07091VM .750ODX1.000IDX.125THK	1	B17
1222435	PIN SPIROL 1/4X1-1/2 HD302	1	B19

1013701	PKG STR 8909 1/16 DIA	0	B23
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For current parts pricing, contact local manufacturers representative listed above.



Submittal Data Sheet  
Date:July 25, 2025

HAWAII ENGINEERING SERVICES INC  
1082 MAKEPONO STREET  
HONOLULU HI 96819  
United States

P.O. 50501  
FACTORY QUOTE QUO231733  
PROJ. NAME MM11520

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LINE #	Cust LINE #	QTY	PART NO.	DESCRIPTION
2		1	9660377	PEC,6,F1,CI,NBR,NBR,AIS*GS-6-HD8

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<b>Style</b>	PEC	Eccentric Plug Valve, Rectangular Port (AWWA C517) (PEC)
<b>Size</b>	6	6 Inch (150mm); SST Bearings; Welded-in Nickel Seat (Except Rubber Lined or Stainless Steel Bodies)
<b>End Connection</b>	F1	Flanged Drilling; ASME Class 125/150
<b>Body Material</b>	CI	Cast Iron
<b>Packing</b>	NBR	.5" - 3" Acrylonitrile-Butadiene Reinforced filler in a PTFE U-ring, -20 to 180° F. (-29 to 83° C.); 4" & Larger Acrylonitrile-Butadiene Reinforced V-type , -20 to 250° F. (-29 to 121° C.)
<b>Plug Facing</b>	NBR	Acrylonitrile-Butadiene; -20 to 180° F. (-29 to 83° C.)
<b>Options</b>	AIS	USA Iron & Steel
<b>Coating</b>	SB0	Exterior: 4 mils minimum of Blue DeZURIK Epoxy with Standard (SP10) surface prep
<b>Actuator</b>	GS-6-HD8	G-Series Handwheel; 8 In Dia

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<b>Valve Weight (Approx)</b>	168 lbs/ 77 kgs
<b>Temperature Range</b>	-20 to 180 Degrees F.
<b>Valve Pressure</b>	to 175 psig

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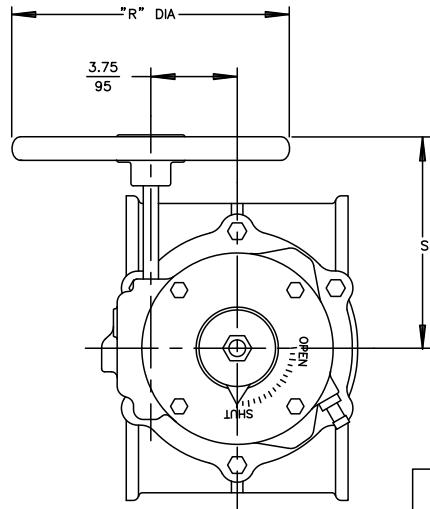
#### RELATED DOCUMENTS

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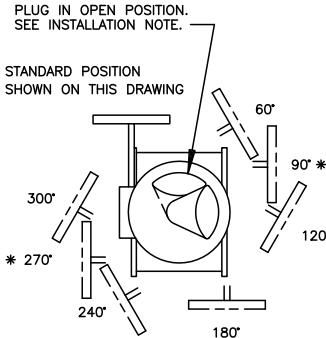
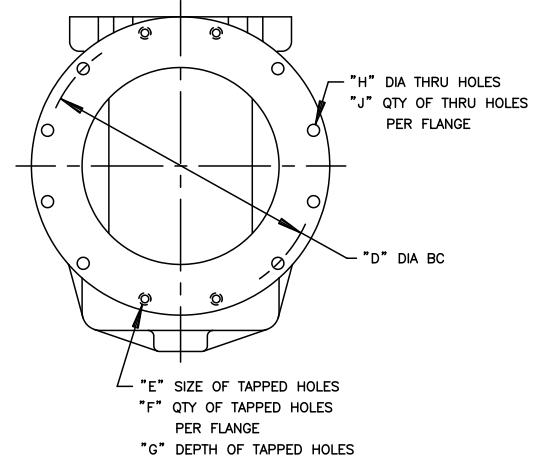
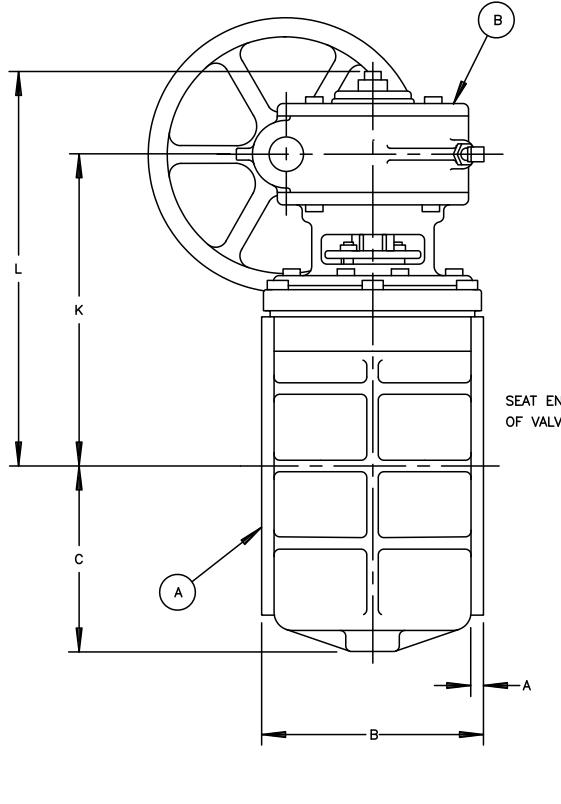
A46423: DWG INST PEC F GR1 GS-6-HD 4-12"  
A20730: DWG VALVE FLG 0350-20IN  
A22553: DWG ACT G6/G12 MAN  
D10021: IM VALVE ECC  
D10063: IM ACT G-SERIES MANUAL ECCENTRIC 4-36"

VALVE SIZE INCH MM	DIMENSIONS INCHES MILLIMETERS										
	A	B	C	D	E	F	G	H	J	K	L
4 100	.69 18	9.00 229	5.38 137	7.50 191	NONE	NONE	-.75 19	8	9.62 244	13.27 337	
5 125	.75 19	10.50 267	6.50 165	8.50 216	3/4-10UNC	4	1.00 25	.88 22	4	11.81 300	15.46 393
6 150	.75 19	10.50 267	6.50 165	9.50 241	NONE	NONE	-.88 22	8	11.81 300	15.46 393	
8 200	.81 21	11.50 292	8.25 210	11.75 298	3/4-10UNC	4	.81 21	.88 22	4	13.63 346	17.28 439
10 250	.88 22	13.00 330	10.28 261	14.25 362	7/8-9UNC	4	.88 22	1.00 25	8	15.12 384	18.77 477
12 300	.94 24	14.00 356	11.69 297	17.00 432	7/8-9UNC	4	.94 24	1.00 25	8	16.75 425	20.40 518

VALVE SIZE	ACTUATOR NUMBER	DIMENSIONS IN MM	
		R	S
4 GS-6-HD8	8.00 203	6.88 175	
5 & 6 GS-6-HD8	8.00 203	8.75 222	
5 & 6 GS-6-HD12	12.00 305	8.75 222	
5 & 6 GS-6-HD16	16.00 406	9.12 232	
5 & 6 GS-6-HD20	20.00 508	9.38 238	
8 GS-6-HD8	8.00 203	8.75 222	
8 GS-6-HD12	12.00 305	9.38 238	
8 GS-6-HD16	16.00 406	9.75 248	
8 GS-6-HD20	20.00 508	9.38 238	
10 GS-6-HD8	8.00 203	11.12 282	
10 GS-6-HD12	12.00 305	11.62 295	
10 GS-6-HD16	16.00 406	12.00 305	
10 GS-6-HD20	20.00 508	11.62 295	
12 GS-6-HD8	8.00 203	11.88 302	
12 GS-6-HD12	12.00 305	12.88 327	
12 GS-6-HD16	16.00 406	13.25 337	
12 GS-6-HD20	20.00 508	12.88 327	



**NOTICE**  
THIS DRAWING DOES NOT SHOW ACTUATOR ACCESSORIES. IF ACCESSORIES ARE REQUIRED, REFER TO THE APPROPRIATE ACCESSORY INSTALLATION DRAWING FOR DIMENSIONS AND OTHER RELATED INFORMATION.



ACTUATOR MOUNTING POSITIONS AS VIEWED FROM TOP OF VALVE. DOTTED LINES SHOW OPTIONAL MOUNTING POSITIONS.

\* THE 90° AND 270° POSITIONS REQUIRE DIFFERENT INTERNAL GEARING. THESE POSITIONS MUST BE NOTED ON THE PURCHASE ORDER.

A	VALVE
B	ACTUATOR

NOTE:

1. FLANGES ARE FLAT FACED WITH DIAMETER AND DRILLING TO CLASS 125 ANSI STANDARD B16.1, EXCEPT FOR TAPPED HOLES AS INDICATED. SEE A-16368 FOR NON-ANSI FLANGE DATA.

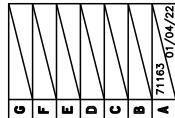
2. 13 TURNS OF HANDWHEEL ARE REQUIRED TO OPEN VALVE.

3. INSTALLATION NOTE:

- FOR LIQUIDS & GASES:  
INSTALL VALVE WITH HIGHER PRESSURE AGAINST END OPPOSITE SEAT.

- FOR SUSPENDED SOLIDS, SLURRIES, ETC:  
INSTALL VALVE WITH HIGHER PRESSURE AGAINST SEAT END. IN HORIZONTAL PIPELINES, VALVE SHOULD BE INSTALLED ON IT'S SIDE SO PLUG ROTATES TO THE TOP OF THE PIPELINE WHEN OPEN.  
(SEE DIAGRAM BELOW).

4. ACTUATORS WITH 16" AND 20" HANDWHEEL MAY BE MOUNTED IN THE STANDARD AND 180° POSITIONS ONLY.



PEC ECCENTRIC VALVES SIZE 4-12 FLANGED MATERIAL GROUP 1

GS-6-HD\_ HANDWHEEL ACT'D

DOC'D. CODE	DRAWN BMP	APPROVED TPK
C1	CHECKED TPK	DATE 02/08/99

A46423



# DeZURIK

## Materials Of Construction

**DRAWING(S):** A20730(A00), A22553(B00)

**QUOTE:** QUO231733

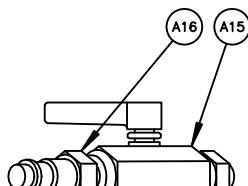
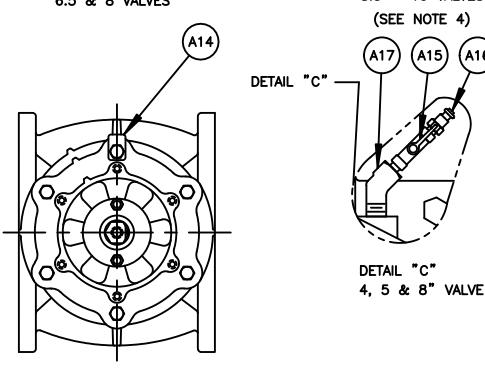
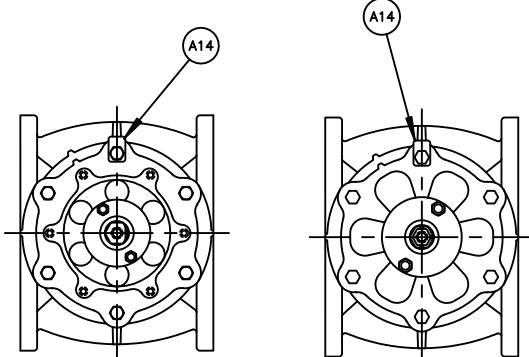
**DESCRIPTION:** PEC,6,F1,CI,NBR,NBR,AIS\*GS-6-HD8

ITEM	MATERIAL
A01	IRON, ASTM A126, CLASS B, USA FOUNDRY
A02	STAINLESS STEEL, TYPE 316L, SINTERED
A03	IRON, ASTM A126, CLASS B, USA FOUNDRY
A03	ACRYLONITRILE-BUTADIENE (NBR)
A04	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
A05	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
A06	IRON, ASTM A126, CLASS B, USA FOUNDRY
A07	STAINLESS STEEL, TYPE 316L, SINTERED
A08	CARBON STEEL, ZINC PLATED
A09	ACRYLONITRILE-BUTADIENE (NBR)
A11	IRON, ASTM A126, CLASS B
A12	CARBON STEEL, ZINC PLATED
A13	CARBON STEEL, ZINC PLATED
A14	STAINLESS STEEL, SERIES 300
A18	PTFE, TYPE II, ASTM D3294 OR D3308, GRADE 1
B00	IRON, ASTM A126, CLASS B
B01	CARBON STEEL, ZINC PLATED
B02	IRON, ASTM A126, CLASS B
B03	SEAL, STEEL CASE WITH ACRYLONITRILE-BUTADIENE (NBR) LIP

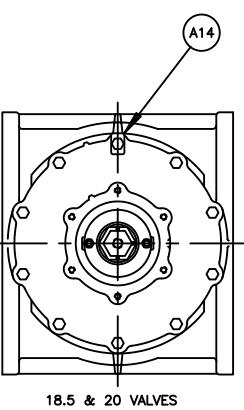
B03	SEAL, STEEL CASE WITH ACRYLONITRILE-BUTADIENE (NBR) LIP
B05	OIL IMPREGNATED BRONZE
B05	OIL IMPREGNATED BRONZE
B08	IRON, ASTM A126, CLASS B
B09	GASKET, NON-ASBESTOS COMPRESSED SHEET GASKET MATERIAL
B11	OIL IMPREGNATED BRONZE
B12	IRON, ASTM A126, CLASS B
B13	1141 STEEL, EN8 OR EN9 OR APPROVED EQUAL
B14	CARBON STEEL, ZINC PLATED
B15	STEEL
B16	OIL IMPREGNATED BRONZE
B17	SEAL, STEEL CASE WITH ACRYLONITRILE-BUTADIENE (NBR) LIP
B18	CARBON STEEL, ASTM A311, GRADE 1144
B19	STAINLESS STEEL, TYPE 302
B20	IRON, ASTM A126, CLASS B
B21	STEEL
B22	CARBON STEEL, ZINC PLATED
B23	GRAPHITE
B24	CARBON STEEL, ZINC PLATED
B25	CARBON STEEL, ZINC PLATED
B29	IRON, ASTM A126, CLASS B
B30	CARBON STEEL, ZINC PLATED
B31	CARBON STEEL, ZINC PLATED
B33	IRON, ASTM A126, CLASS B
B35	CARBON STEEL, ZINC PLATED
B36	CARBON STEEL, ZINC PLATED
B37	STAINLESS STEEL, TYPE 316
B38	STAINLESS STEEL, TYPE 18-8

NO	PART NAME	QTY
A1	BODY	1
A2	BEARING (3.5 - 8 VALVES)	1
A2	BEARING (8.5 - 18 VALVES)	2
A2	BEARING (18.5 & 20 VALVES)	1
A3	PLUG	1
A4	GRIT EXCLUDER	1
A5	GASKET (BODY)	1
A6	BONNET	1
A7	BEARING	1
A8	SCREW (3.5 - 18 VALVES)	6
A8	SCREW (18.5 & 20 VALVES)	10
A9	PACKING	-
A10	CONE, 3.5 - 8 NT (EXCEPT LOW FRICTION CAT. CHAR. NBRL & SQ. PACKING)	1
A11	GLAND	1
A12	STUD (3.5 - 20 GS_- HD_ & GS_- CW_)	2
A12	STUD (3.5 - 20 GS_- C_-)	2
A12	STUD (8.5 - 12 MNA)	NOT RECD
A12	STUD (8.5 - 12 LV)	NOT RECD
A12	STUD (3.5 - 20 GS_- ML_)	2
A12	STUD (3.5 - 8 NT)	2
A13	NUT (3.5 - 20 GS_- HD_ & GS_- CW_)	2
A13	NUT (3.5 - 20 GS_- C_-)	2
A13	NUT (8.5 - 12 MNA)	NOT RECD
A13	NUT (8.5 - 12 LV)	NOT RECD
A13	NUT (3.5 - 12 GS_- ML_)	2
A13	NUT (3.5 - 8 NT)	4
A14	CAUTION TAG	1
A15	PIPE PLUG (PU, PD OR PDU)	-
A15	TIRE FITTING (BV1)	2
A15	MANUAL VALVE (BV2)	2
A16	ADAPTOR (BV2)	2
A17	STREET ELBOW 45 DEG (4.5 & 8 VALVE) (BV2)	2
A18	GRIT EXCLUDER	-
A20	GREASE FITTING (OPTION GR ONLY)	1
A21	GREASE FITTING (OPTION GR ONLY)	1
A22	NIPPLE (EXCEPT LV & NT) (OPTION GR ONLY)	1
A36	WASHER (FUSION COATING)(3.5-18 VALVES)	6
A36	WASHER (FUSION COATING)(18.5-20 VALVES)	10

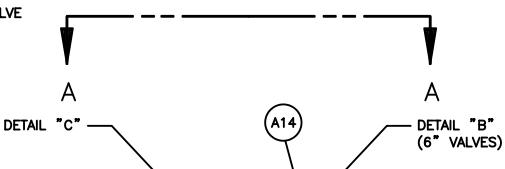
- NOTE:
- REPLACEABLE WEAR PARTS ARE ITEMS NUMBER A3, PLUG(IF RUBBER FACED), A4, A5 AND A9.
  - WHEN ORDERING PARTS, INCLUDE VALVE SIZE AND PART NUMBER FROM DATA PLATE. ALSO INCLUDE THIS DRAWING NUMBER WITH PART NAME, NUMBER AND QUANTITY.
  - CLOCKWISE ROTATION OF PLUG STEM CLOSES VALVE.
  - ON THE SIZE 3.5, 4, 4.5, 5, 6, 8.5, & 10 VALVES BONNET SCREWS ARE USED FOR MOUNTING ACTUATOR.
  - VALVE MAY BE FURNISHED WITH EITHER THE UPPER JOURNAL GREASE FITTING, THE LOWER JOURNAL GREASE FITTING OR BOTH.



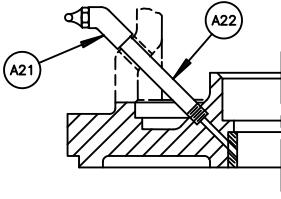
ENLARGED VIEW  
DETAIL "B"



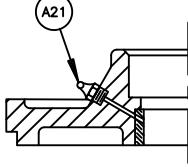
18.5 & 20 VALVES



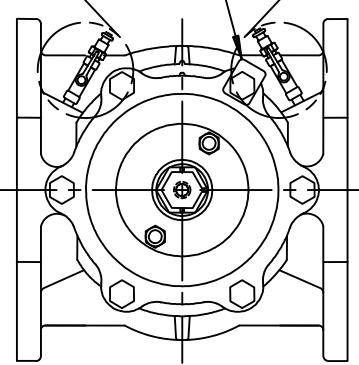
3.5 - 6 VALVES PETCOCKS AND  
(SEE NOTE 4) QUICK DISCONNECTS



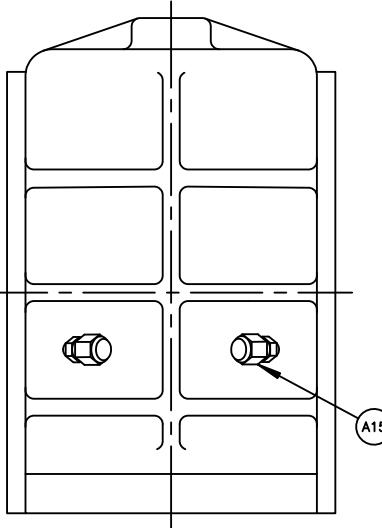
GREASE FITTING IN BONNET,  
ALL ACTUATORS EXCEPT LV & NT



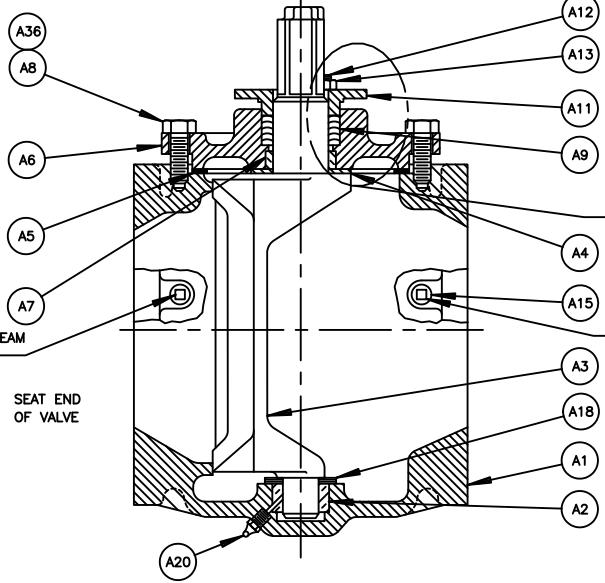
GREASE FITTING IN BONNET,  
LV & NT ACTUATORS



SEAT SIDE



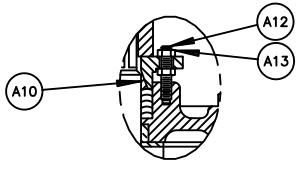
VIEW A-A  
TIRE FITTING



1/4 NPT UPSTREAM  
(PU/PDU)

1/4 NPT DOWNSTREAM  
(PD/PDU)

SEAT END OF VALVE



DETAIL "A"  
3.5 - 8 NT CONSTRUCTION

V	71280	09/28/22
U	70449	02/08/20
T	70338	11/20/18
S	65460	09/04/17
R	62359	04/25/12
C	62347	07/29/11
P	61945	11/14/09
H	61912	06/10/08
M	61602	04/02/08
L	61371	11/22/05
K	60295	10/19/05
J	54453	03/30/05
E	53376	09/03/04
F	50312	02/11/04
D	51172	03/05/04
C	15276	02/02/04
B	14470	09/29/03
A		

**DeZURIK**

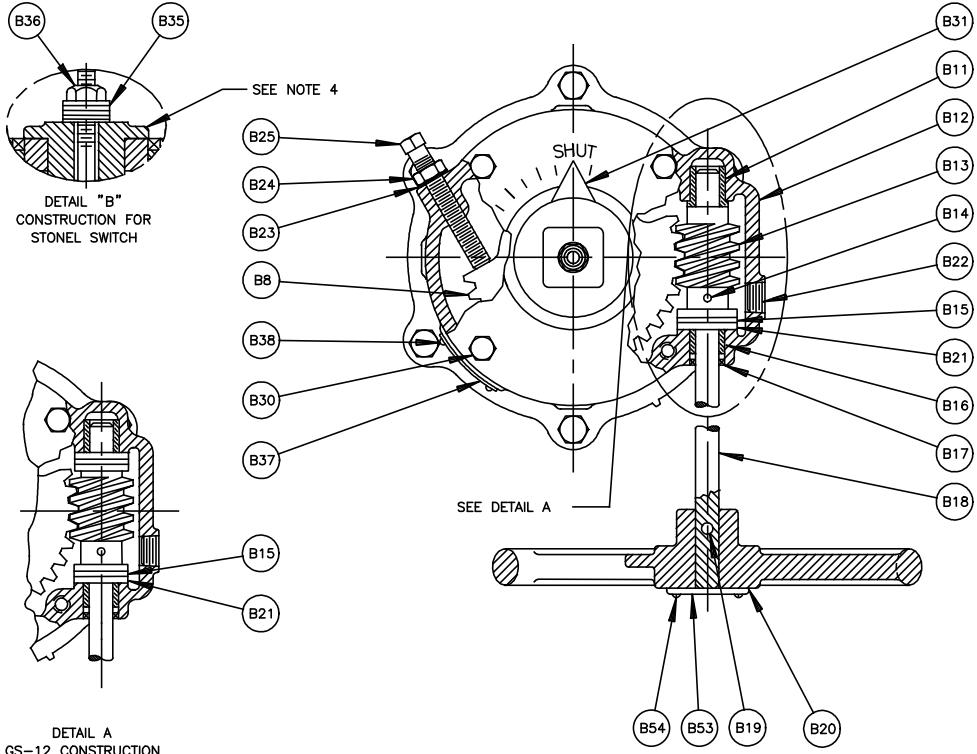
www.dezurik.com

PEC ECCENTRIC VALVE ASSEMBLY  
3.5 - 20, FLANGED, EXCEPT BODY MATERIAL CIS, DIS & CIH

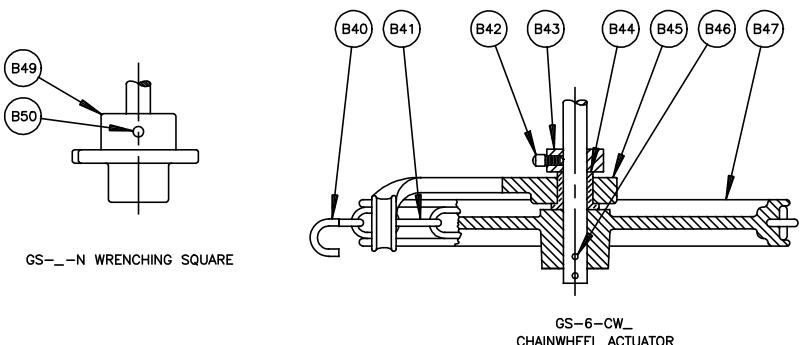
DOCT. CODE	DRAWN BY	APPROVED
C1	BENNY TNB	RJP

A20730

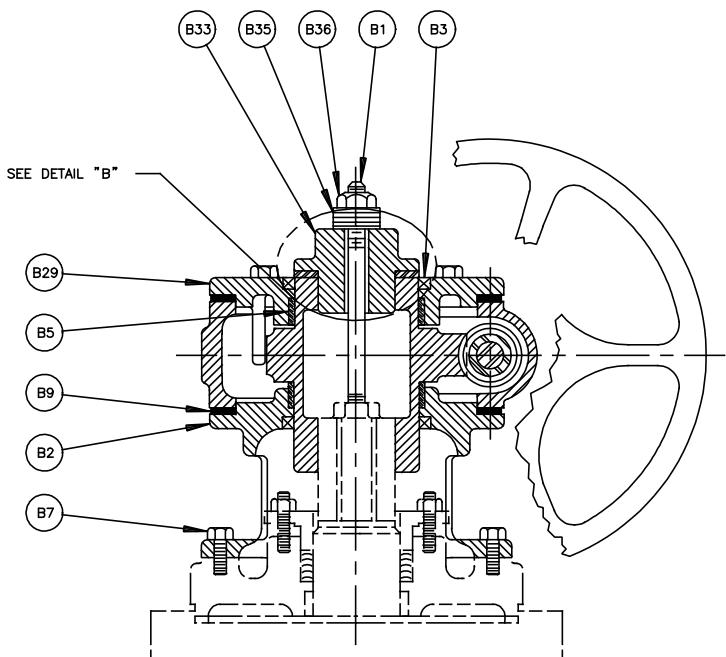
10-13-83



DETAIL A  
GS-12 CONSTRUCTION



GS-6-CW  
CHAINWHEEL ACTUATOR



NO	PART NAME	QTY
B1	STUD	1
B2	ADAPTOR	1
B3	SEAL (GEAR SECTOR)	2
B4		
B5	BEARING	2
B6		
B7	SCREW (3.5, 4, 4.5, 5, 6, 8.5 & 10 VALVES SEE NOTE 3)	NOT REQD
B7	SCREW (6.5, 8, 10.5, 12, 12.5, 14, 14.5, 16, 16.5, 18, 18.5 & 20 VALVES)	6
B8	GEAR SECTOR	1
B9	GASKET (HOUSING)	2
B10		
B11	BEARING	1
B12	HOUSING	1
B13	WORM	1
B14	PIN	1
B15	THRUST BEARING (GS-6)	1
B15	THRUST BEARING (GS-12)	2
B16	BEARING	1
B17	SEAL (HOUSING)	1
B18	DRIVE SHAFT	1
B19	PIN	1
B20	HANDWHEEL	1
B21	BEARING RACE (GS-6)	2
B21	BEARING RACE (GS-12)	4
B22	PIPE PLUG	1
B23	SEAL (HOUSING)	
B24	JAM NUT	1
B25	SET SCREW	1
B26		
B27		
B28		
B29	COVER	1
B30	SCREW	8
B31	POINTER	1
B32		
B33	WRENCHING SQUARE (SEE NOTE 4)	1
B34		
B35	SPRING WASHER	5
B36	LOCK NUT	1
B37	DATA PLATE	1
B38	DRIVE SCREW	2
B39		
B40	CLOSING LINK	1
B41	CHAIN	—
B42	SET SCREW (SB16 OPTION ONLY)	1
B43	COLLAR & SET SCREW (CHAINWHEEL)	1
B44	BEARING	1
B45	CHAIN GUIDE	1
B46	PIN	2
B47	CHAINWHEEL (GS-6)	1
B48		
B49	WRENCHING SQUARE	1
B50	PIN	1
B51		
B52		
B53	OPEN TAG (24" HANDWHEELS ONLY)	1
B54	DRIVE SCREW (24" HANDWHEELS ONLY)	2

NOTE:

1. RECOMMENDED SPARE PARTS ARE ITEMS NUMBER B3, B9 & B17.
2. WHEN ORDERING PARTS, SPECIFY VALVE SIZE AND MODEL NUMBER FROM DATA PLATE, ALSO GIVE DRAWING NUMBER WITH PART NAME ITEM NUMBER AND QUANTITY.
3. ITEM NUMBER B7 IS NOT REQUIRED ON THE 3.5, 4, 4.5, 5, 6, 8.5 & 10 VALVES USE BONNET SCREWS ON BODY ASSEMBLY TO MOUNT ACTUATOR TO VALVE.
4. WHEN STONEL SWITCH IS USED, ITEM B33, WRENCHING SQUARE IS REPLACED BY A STUD SUPPORT.

H	7/16	60/10/21
L	61/64	10/13/68
K	61/32	0/24/68
J	60/75	0/22/61
H	54/60	0/28/68
G	54/30	0/09/68
F	53/49	12/23/68
E	53/32	0/0/23/68
D	52/31	12/01/64
C	52/29	0/25/64
B	51/44	0/15/62
A	51/12	0/04/61

 **DeZURIK**  
Sartell, MN USA 56377  
[www.dezurik.com](http://www.dezurik.com)

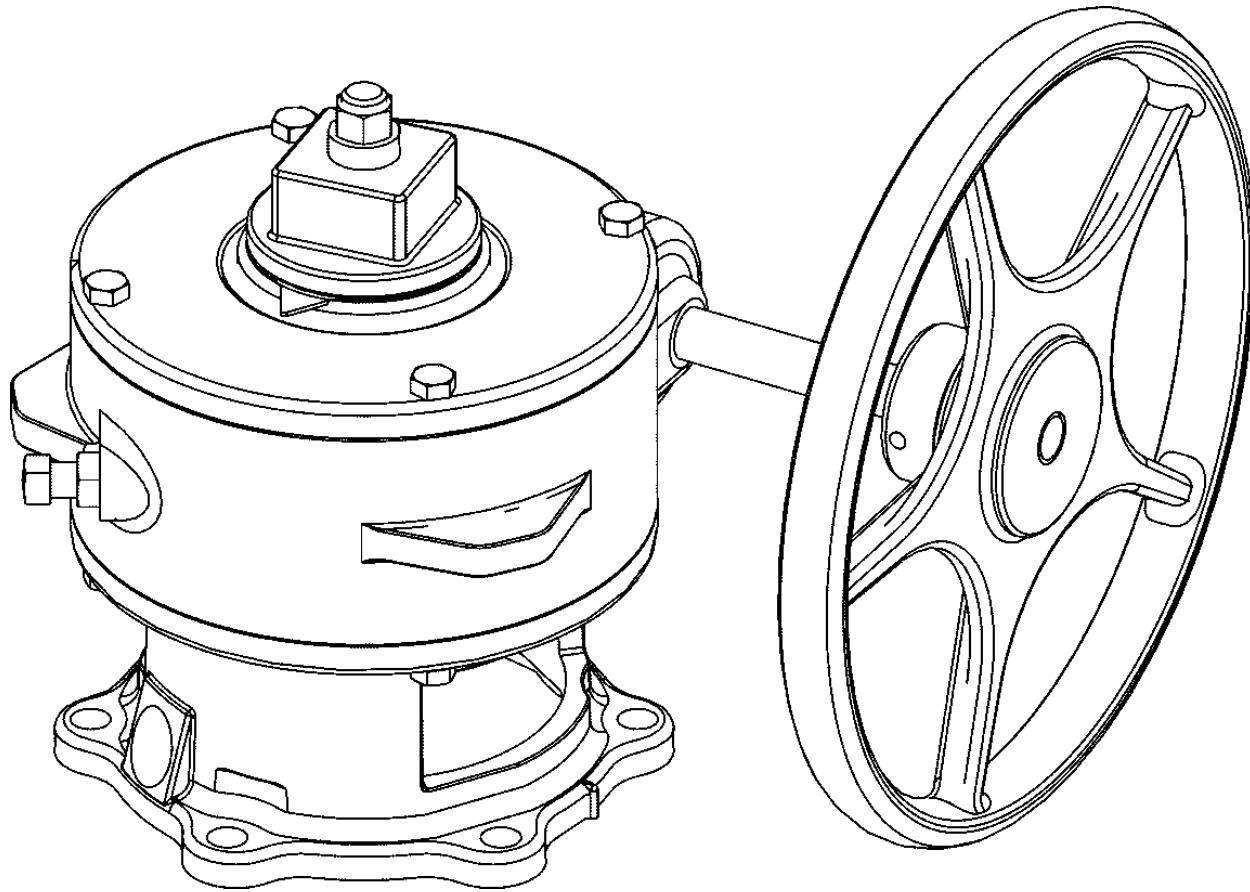
GS-6 WITH HANDWHEEL, CHAINWHEEL AND NUT ACTUATORS OR  
GS-12 WITH HANDWHEEL AND NUT  
FOR USE WITH ECCENTRIC VALVES

DOCT. CODE	DRAWN	APPROVED
C1	RBA	BOOS
CHECKED	RJP	DATE
		10-30-81

A22553



# DEZURIK MANUAL G-SERIES ACTUATORS USED ON PEC ECCENTRIC VALVES



Instruction D10063  
August 2012

## Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

## Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

### **WARNING**

**Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.**

## Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

## Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

**If the valve has a data plate:** please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

**If there isn't any data plate visible on the valve:** please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

## DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at [DeZURIK.com](http://DeZURIK.com).

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## Description

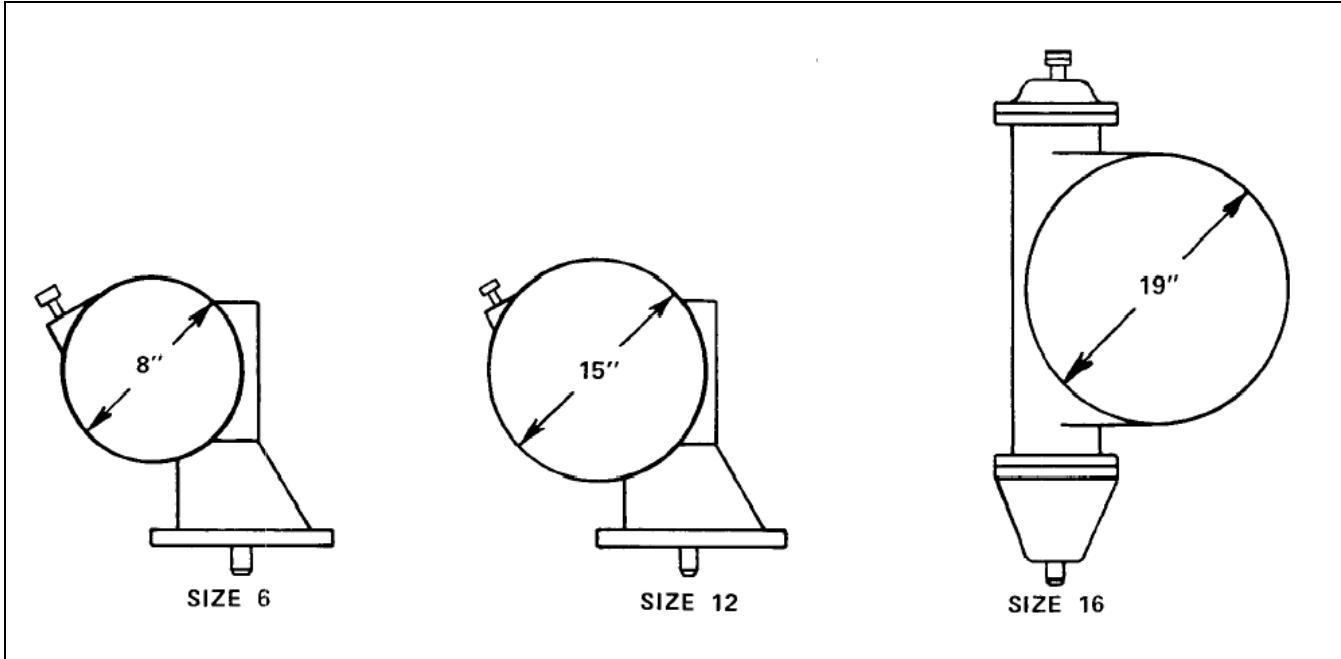
The manual operated G-Series actuator is designed to operate a PEC Eccentric valve. Integral stops limit actuator stroke for both the open and closed valve positions. This actuator is available in three sizes: Size 6, Size 12 and Size 16. See Figure 1 to identify which unit you have.

**CAUTION!**

This actuator can be furnished with either cast iron or ductile iron gears.

**The ductile iron gear is necessary for submerged or buried service valves or when a 2" operating nut is installed on the input shaft. Breakage of the gear teeth will occur if cast iron gears are torqued above 200 ft-lb's.**

Cast Iron & Ductile Iron are similar in appearance: To determine if the gear material is ductile iron, remove the cover as described in the ACTUATOR DISASSEMBLY Section. Size 6 gears have "M199" cast in raised letters on the round surface opposite the teeth. Size 12 & Size 16 gears have "M199" cast in raised letters on either the top or under side of the web between the hub and the teeth, removal of the gear is necessary to see the marking. If there is no "M199" on the gear, the material is cast iron.



**Figure 1—G-Series Actuator Identification**

## Operation

Rotating the operator (handwheel or chainwheel) clockwise closes the valve. To actuate the valve from full open to full closed (or vice-versa), the Size 6 requires 13 revolutions, the Size 12 requires 19 revolutions and the Size 16 requires 33 revolutions of the operator.

## Required Tools

This actuator is assembled using only SAE fasteners. To service this unit, you should have a full set of combination wrenches, Allen wrenches, a flat tipped screwdriver, a pin punch and a dead blow hammer.

## Lubrication

The G-Series actuator has been lubricated at the factory and requires no routine maintenance lubrication. If the actuator is disassembled, apply a liberal amount of lubricant to the gear sector, bearings and worm gear (size 6 and Size 12) or the rack (Size 16) using one of these lubricants:

- Keystone Zeniplex-1 (**recommended**)
- Amoco Amolith Grease #1-EP (alternate)
- Amsoil GHD (alternate)
- Mobil Mobilux EP 1 (alternate)
- Petro-Canada Vultrex MPG EP 1 (alternate)
- Shell Alvania EP 1 (alternate)
- Texaco Multifak EP 1 (alternate)

## Stop Adjustments

This actuator has a stop to limit valve stroke at each end of the cycle. The open position stop is an integral, non-adjustable stop in the actuator cover; the closed position stop is an adjustable stop screw located in the side of the actuator housing (Size 6 and Size 12) or in the end of the extension cap (Size 16). To adjust the closed position stop, follow these steps:

1. Relieve pipeline pressure.
2. Loosen the jam nut on the closed position stop screw, then turn the closed position stop screw counterclockwise about 1 ½".
3. Close the valve with the torque specified in Table A.
4. While maintaining the torque from Table A, turn the closed position stop adjusting screw in just until resistance is felt as it contacts the gear.
5. Lock the stop in this position by tightening the jam nut against the actuator.

**Table A: Valve Closing Torques**

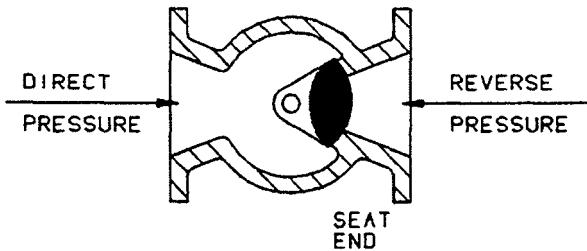
Valve Size	Actuator Size	Seating Torque (ft lbs)									
		Direct Pressure Drop (psi)	Reverse Pressure Drop								
			25	50	75	100	125	150	175	200	230
4	G6	4	4	4	5	5	5	5	5	5	5
5	G6	8	8	9	10	11	11	11	11	11	11
6	G6	8	8	9	10	11	11	11	11	11	11
8	G6	15	15	17	19	20	21	21	21	21	21
10	G6	22	22	25	29	33	36	N/A	N/A	N/A	N/A
10	G12	11	11	18	18	18	18	18	18	18	18
12	G6	29	29	29	29	N/A	N/A	N/A	N/A	N/A	N/A
12	G12	15	15	15	15	15	15	15	15	15	15
14	G12	18	18	24	29	34	34	34	34	34	34
16	G12	22	22	29	37	45	45	45	45	N/A	N/A
16	G16	19	19	26	26	26	26	26	26	26	26
18	G12	26	26	35	45	55	55	N/A	N/A	N/A	N/A
18	G16	21	21	29	29	29	29	29	29	29	29
20	G12	29	29	44	55	55	N/A	N/A	N/A	N/A	N/A
20	G16	22	22	32	32	32	32	32	32	32	32
24.00	G16	24	24	29	34	39	N/A	N/A	N/A	N/A	N/A
24.50 & 30.00	G16	26	26	35	42	49	N/A	N/A	N/A	N/A	N/A
30.50 & 36.00	G16	57	57	72	N/A						

*Note: The "N/A" designation in Table A indicates that the Valve/Actuator combination cannot be used for that particular reverse pressure.*

## Stop Adjustments (*continued*)

**Direct Pressure** - When the higher pressure is at the end opposite the seat. See Figure 2.

**Reverse Pressure** - When the higher pressure is at the seat end of the valve. See Figure 2.



**Figure 2 – Pressure Direction**

## Actuator Removal

The actuator removal procedure is dependent upon whether or not the actuator is built for submerged service. Follow the correct section to properly and safely remove the actuator.



### **WARNING!**

**When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the actuator is removed. To avoid this hazard, place the plug in the lowest position before removing the actuator.**

## **Submerged Service Actuators**

1. Discontinue flow and relieve pipeline pressure.



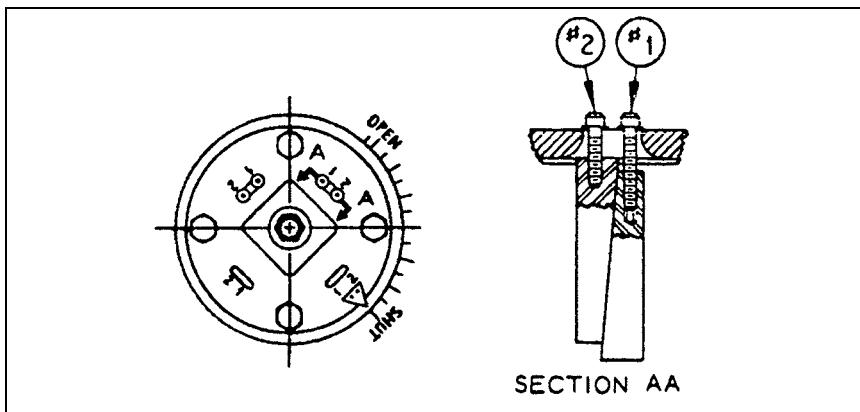
### **WARNING!**

**The valve is a pressure vessel. Pressure must be completely released before removing the bonnet bolts on the 4", 5", 6" and 10" valves.**

2. Scribe corresponding lines on the valve and actuator to be used for alignment during actuator installation.

**Actuator Removal (Continued)**

3. Scribe corresponding lines on the actuator housing and top cover so the cover can be reinstalled in the correct position.
4. Remove the screws attaching the top cover on the actuator and lift the cover from the housing.
5. If the valve is a size 4" thru 20", remove the lock nut, spring washers and flat washers from the plug stud and go to Step 9. If the valve is a size 24" thru 36", do not remove anything, go to the next step.
6. Loosen lockscrew #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 3.



**Figure 3 – 24" thru 36" Key and Lockscrew Arrangement**

7. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
8. Remove the four screws holding the washer to the gear sector, then remove the stud, locknut, spring washers and the washer with the keys attached.
9. Remove the 6 screws fastening the adaptor to the valve. On the 4", 5", 6" and 10" valves, these screws also hold the bonnet to the valve body.
10. Lift the actuator and adaptor off the valve.
11. Scrape the old gasket material from the valve bonnet and the bottom of the adaptor.
12. Scrape the gasket material from the actuator cover and housing.

**Non-Submerged Service Actuators**

1. Discontinue flow and relieve pipeline pressure.



**WARNING!**

**The valve is a pressure vessel. Pressure must be completely released before removing the bonnet bolts on the 4", 5", 6" and 10" valves.**

2. Scribe corresponding lines on the valve and actuator to be used for alignment during actuator installation.
3. If the valve is a size 4" thru 20", remove the lock nut, spring washers, wrenching nut and pointer from the plug stud, then go to Step 7. If the valve is a size 24" thru 36", do not remove anything and go to the next step.

**Actuator Removal (Continued)**

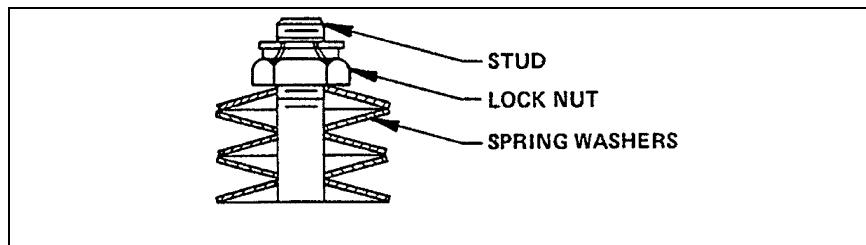
4. Loosen lockscrew #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 3.
5. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
6. Remove the four screws holding the wrenching nut to the gear sector, then remove the stud, locknut, spring washers and the wrenching nut with the keys attached.
7. Remove the 6 screws fastening the adaptor to the valve. On the 4", 5", 6" and 10" valves, these screws also hold the bonnet to the valve body.
8. Lift the actuator and adaptor off the valve.

**Actuator Installation**

The actuator installation procedure is dependent upon whether or not the actuator is built for submerged service. Follow the correct section to properly install the actuator.

**Submerged Service Actuators**

1. Place the valve in the position it was in when the actuator was removed. Normally this will be so the plug is in the lowest position in the valve body.
2. Place a new gasket on the valve bonnet, lining up the holes in the bonnet and gasket.
3. Line up the scribe marks on the valve and actuator made during actuator removal, then set the actuator on the valve so the valve shaft slides into the actuator gear sector.
4. Fasten the actuator adaptor to the valve with six screws.
5. Slide the flat washer down the plug stud so it rests on top of the gear sector. If the valve is a size 24" thru 36", hold the keys in position when you slide the washer over the plug stud and guide the keys into the gear sector and stem slots. Then install the four screws fastening the washer to the gear sector.
6. Place the spring washers on the plug stud as shown in Figure 4.



**Figure 4—Spring Washer Stackup**

7. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
8. If the valve is a size 24" thru 36", tighten the #2 lockscrews and then the #1 lockscrews to hold the keys in place. Skip this step if the valve is a size 4" thru 20".
9. Line up the scribe marks on the cover and housing, then set the cover on the actuator. Fasten the cover in place.
10. Check the closed position stop setting and readjust if necessary.
11. Pipeline flow may now be restored.

**Actuator Installation (Continued)****Non-Submerged Service Actuators**

1. Place the valve in the position it was in when the actuator was removed. Normally this will be so the plug is in the lowest position in the valve body.
2. Line up the scribe marks on the valve and actuator made during actuator removal, then set the actuator on the valve so the valve shaft slides into the actuator gear sector.
3. Fasten the actuator adaptor to the valve with six screws.
4. Slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position. If the valve is a size 24" thru 36", hold the keys in position when you slide the wrenching nut over the plug stud and guide the keys into the gear sector and stem slots. Then install the four screws fastening the wrenching nut to the gear sector.
5. Place the spring washers on the plug stud as shown in Figure 4.
6. Screw the lock nut down the plug stud until the spring washers are completely compressed, then back the nut off until the washers return to their normal unstressed shape.
7. If the valve is a size 24" thru 36", tighten the #2 lockscrews and then the #1 lockscrews to hold the keys in place. Skip this step if the valve is a size 4" thru 20".
8. Pipeline flow may now be restored.

**Recommended Spare Parts Replacement**

Follow these steps to replace the recommended spare parts in this actuator. This procedure is dependent upon the actuator size (see Figure 1); make sure you are using the correct section for your actuator.

**WARNING!**

**When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the actuator is removed. To avoid this hazard, place the plug in the lowest position before removing the actuator.**

**Size 6 and Size 12 Actuators**

1. Remove the actuator from the valve as described in the ACTUATOR REMOVAL Section of this Instruction.
2. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator (non-submerged units).
3. Note the position of the gear sector in the housing, then lift the gear sector out.
4. Remove the pipe plug in the side of the housing.
5. Reaching in thru the hole where the pipe plug was, drive out the pin connecting the worm gear to the actuator drive shaft. Take the pin out of the housing.

**Recommended Spare Parts Replacement (Continued)**

6. Slide the drive shaft (complete with operator) out of the actuator.
7. Reach into the housing and remove the worm gear, thrust bearing(s) and bearing races. The Size 6 actuator has one thrust bearing and two bearing races; the Size 12 has two bearings and four bearing races.
8. Remove the gear sector seals from the top cover and adaptor.
9. Remove the drive shaft seal from the housing.
10. Scrape the gasket material from the top cover and actuator housing.
11. Grease the new seals and press them into the top cover and adaptor.
12. Push a new drive shaft seal into the housing.
13. **Size 6 Actuators** - Slide the drive shaft into the housing and thru these components in the following order: bearing race, bearing, bearing race, worm gear, and then into the bearing in the housing.

**Size 12 Actuators** - Slide the drive shaft into the housing and thru these components in the following order: bearing race, bearing, bearing race, worm gear, bearing race, bearing, bearing race, and then into the bearing in the housing.

14. Turn the drive shaft and worm gear until the holes in them line up with the pipe plug hole in the housing.
15. Reaching in thru the pipe plug hole, insert the pin to connect the drive shaft and worm gear.
16. Screw the pipe plug into the hole in the housing.
17. Place the gear sector on the valve shaft in the same position noted before it was removed.
18. Apply a liberal amount of grease to the gear sector, bearings and worm gear.
19. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up (non-submerged units only).
20. Install the actuator on the valve as described in the ACTUATOR INSTALLATION Section of this Instruction.

**Size 16 Actuators**

1. Remove the actuator from the valve as described in the ACTUATOR REMOVAL Section of this Instruction.
2. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator (non-submerged units).
3. Note the position of the gear sector in the housing, then lift the gear sector out.
4. Mark one tooth on the rack with a center punch, then mark two adjacent teeth on the gear so the rack and gear can be re-installed in the correct position.
5. Remove the four screws that hold the drive shaft housing assembly to the actuator housing.
6. Turn the operator clockwise to remove the drive shaft housing assembly from the actuator housing.
7. Lift the gear sector and rack from the housing.
8. Drive the pin out that holds the rack guide in place, then remove the rack guide and pin from the housing.

**Recommended Spare Parts Replacement (Continued)**

9. Remove the gear sector seals from the top cover and adaptor.
10. Scrape the gasket material from the top cover, actuator housing and drive shaft housing.
11. Rebuild the drive shaft housing assembly as follows:
  - a. Remove the set screw inside the housing and turn the threaded collar out. The bearing and two bearing faces will also come out.
  - b. Remove the pin securing the operator to the drive shaft and slide the operator off the shaft.
  - c. Push the housing off the operator end of the drive shaft. The remaining bearing and two races will come out at this time.
  - d. Pull the seal out of the drive shaft housing.
  - e. Lightly grease the new seal and slide it into the drive shaft housing.
  - f. Sandwich the bearing between the two races and slide them down the operator end of the drive shaft until they sit on the sleeve.
  - g. Apply a liberal amount of grease to the bearing and races.
  - h. Carefully push the operator end of the drive shaft thru the seal from inside the housing.
  - i. Slide the operator onto the shaft, line up the holes in the operator and shaft, then install the pin.
  - j. Sandwich the bearing between the two races and slide them against the sleeve inside the housing.
  - k. Apply a liberal amount of grease to the bearings.
  - l. Screw the threaded collar into place and secure with the set screw.
12. Grease the new seals and press them into the top cover and adaptor.
13. Pin the rack guide in position in the housing.
14. Place the gear sector and rack in the housing, carefully aligning the teeth marked during disassembly.
15. Place a new gasket on the drive shaft housing, then push the drive shaft housing assembly into the actuator housing.
16. Turn the operator counterclockwise to screw the drive shaft into the rack until the drive shaft housing is tight against the actuator housing.
17. Fasten the drive shaft housing to the actuator housing with four screws.
18. Apply a liberal amount of grease to the gear sector and rack.
19. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up (non-submerged units only).
20. Install the actuator on the valve as described in the ACTUATOR INSTALLATION Section of this Instruction.

## Changing Actuator Mounting Position

On **4–20" (100–500mm)** valves, the actuator can be mounted in 60° increments around the valve shaft. 90° or 270° position changes require changing the gear sector on Size 6 & Size 12 actuators or the timing between the gear sector and the rack on Size 16 actuators; 60° position changes do not require changing the gear sector or timing.

On **24–36" (600–900mm)** valves, handwheel/chainwheel sizes will limit actuator mounting positions. However, the actuator can be mounted in 45° increments around the valve shaft. 45° position changes require changing the timing between the gear sector and the rack; 90° position changes do not require changing the timing.

### ***Mounting Actuator in 60° Increments on 4–20" (100–500mm) Valves and 90° Increments on 24–36" (600–900mm) Valves***

1. Remove the actuator from the valve. See “*Removing Actuator*” section.



#### **WARNING!**

This valve is a pressure vessel. On 4, 5, 6 and 10" (100, 125, 150 and 250mm) valves, the same bolts hold both the actuator and the bonnet.

Removing the bolts on 4, 5, 6 and 10" (100, 125, 150 and 250mm) valves before relieving pipeline pressure can result in personal injury or equipment damage.

**Always relieve pipeline pressure before removing the actuator.**

2. Rotate the actuator into position.
3. Install the actuator on the valve. See “*Installing Actuator*”.

### ***Changing Actuator to 90°/270° Positions on 4–20" (100–500mm) Valves with Size 6 & Size 12 Actuators Only (Requires a different gear sector)***

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.
2. If possible, put the valve in the closed position just so the plug is touching the valve seat.
3. Remove the lock nut, spring washers, wrenching nut and pointer from the plug stud.
4. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
5. Note that one edge of the gear is either against or close to the stop screw in the side of the gear housing, this is where the other gear should be after the actuator has been rotated 90° and the new gear installed. Now lift the gear sector out of the actuator.
6. Remove the 4 screws fastening the gear housing to the adaptor.
7. Pry the gear housing loose from the valve adaptor and turn it 90°clockwise or counterclockwise to suit your need. Line up the bolt holes and install and tighten the 4 screws.

**Changing Mounting Positions (Continued)**

8. Make sure the plug is still touching the valve seat, then using the new gear, liberally grease the teeth and journals then drop the gear in over the plug hex making sure the edge of the gear is close to or will touch the stop screw.  
NOTE: The gear has two different length journals. The longer journal must engage the plug and the shorter journal must stick up thru the actuator cover.
9. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up.
10. Test actuate the valve by turning the handwheel to open the valve. The valve plug must go 90° from the seat and stop as the gear sector hits the stop lug that is cast in the cover. Now turn the handwheel to close the valve, the plug should contact the seat before the gear hits the stop screw. If the valve does not operate as described, remove the cover from the gear housing and make sure the edge of the gear is touching or very close to the stop screw when the plug is in the closed position.
11. When you are satisfied that the valve is operating properly, put the valve in the closed position. With the cover bolted in place, slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position.
12. Place the spring washers on the plug stud as shown in Figure 5.
13. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
14. Adjust the position stops. See "Position Stops" section.

**Changing Actuator to 90°/270° Positions on 12"-20" (300–500mm) Valves with Size 16 Actuator Only**

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.
2. Remove the lock nut, spring washers, wrenching nut and pointer from the plug stud.
3. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
4. Mark which teeth of the rack and gear are engaged and lift the gear sector out of the actuator.
5. Remove the screws fastening the adapter to the valve.
6. Take out the screws fastening the actuator housing to the adapter.
7. Rotate the adapter on the valve, and the actuator on the adapter until the holes line up and the actuator is in the desired position. Replace all of the screws.
8. Find the tooth that was marked on the gear sector and count over clockwise five teeth. This is the tooth that will engage with the marked tooth on the rack. Install the gear sector using the new tooth engagement, and be sure the gear sector fits on the plug stem properly.

## Changing Mounting Positions (*Continued*)

9. Set a new cover gasket on the housing, then install and fasten the top cover on the housing; make sure the scribe marks line up.
10. Slide the pointer and wrenching nut down the plug stud so it rests on top of the gear sector; the pointer should point to indicate the correct valve position.
11. Place the spring washers on the plug stud as shown in Figure 5.
12. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
13. Adjust the position stops. See "Position Stops" section.

### **Mounting Actuator in 45° Increments on 24–36" (600–900mm) Valves Only**

When eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, gravity can cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this problem, place the plug in the lowest position before removing the gear sector.

1. Discontinue flow and relieve pipeline pressure.



#### **WARNING!**

**When Eccentric valves are mounted in a vertical pipeline, or mounted in a horizontal pipeline with the plug stem horizontal, there is a chance that gravity will cause the plug to swing to a lower position in the valve body when the gear sector is removed. To avoid this hazard, place the plug in the lowest position before removing the gear sector.**

2. Loosen lockscrews #1 about 6 to 8 turns. Loosen lockscrews #2 about 3 turns. See Figure 4.
3. Using a soft hammer, tap the heads of the #1 lockscrews to loosen the keys.
4. Remove the four screws that hold the wrenching nut to the gear sector, then remove the stud locknut, spring washers and the wrenching nut with the keys.
5. Scribe corresponding lines on the actuator cover and housing, then remove the cover screws and cover from the top of the actuator.
6. Mark which teeth of the rack and gear are engaged, and lift the gear sector out of the actuator.
7. Remove the screws fastening the adapter to the valve.
8. Remove the screws fastening the actuator housing to the adapter.
9. Rotate the adapter on the valve and the actuator on the adapter until the holes line up and the actuator is in the desired position. Replace all of the screws.
10. Note the tooth that was marked on the gear sector and count clockwise five teeth on the size 16 actuator. This is the tooth that will engage with the marked tooth on the rack. Install the gear sector using the new tooth engagement, and be sure the keyways in the gear sector match the keyways in the plug stem.
11. Set a new cover gasket on the housing, then install the top cover on the housing, making sure the scribe marks line up.

**Changing Mounting Positions (Continued)**

12. Hold the keys in position and slide the wrenching nut over the plug stud, then guide the keys into the gear sector and stem slots.
13. Install the four screws fastening the wrenching nut to the gear sector.
14. Place the spring washers on the plug stud as shown in Figure 5.
15. Screw the lock nut down the plug stud until it is tight and the spring washers are completely compressed, then back the nut off one full turn.
16. Tighten the #2 lockscrews, and then the #1 lockscrews to hold the keys in place.
17. Adjust the position stops—see “Position Stops” section.

## Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller may provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product or part, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to; an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING, BUT NOT LIMITED TO, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER'S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS. NEITHER ANY PERFORMANCE OR OTHER CONDUCT, NOR ANY ORAL OR WRITTEN INFORMATION, STATEMENT, OR ADVICE PREPARED BY SELLER OR ANY OF OUR EMPLOYEES OR AGENTS WILL CREATE A WARRANTY, OR IN ANY WAY INCREASE THE SCOPE OR DURATION OF THE LIMITED WARRANTY.

## Disclaimer

Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK's Manufacturer's Conditions apply.

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## Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: [www.dezurik.com](http://www.dezurik.com) E-Mail: [info@dezurik.com](mailto:info@dezurik.com)

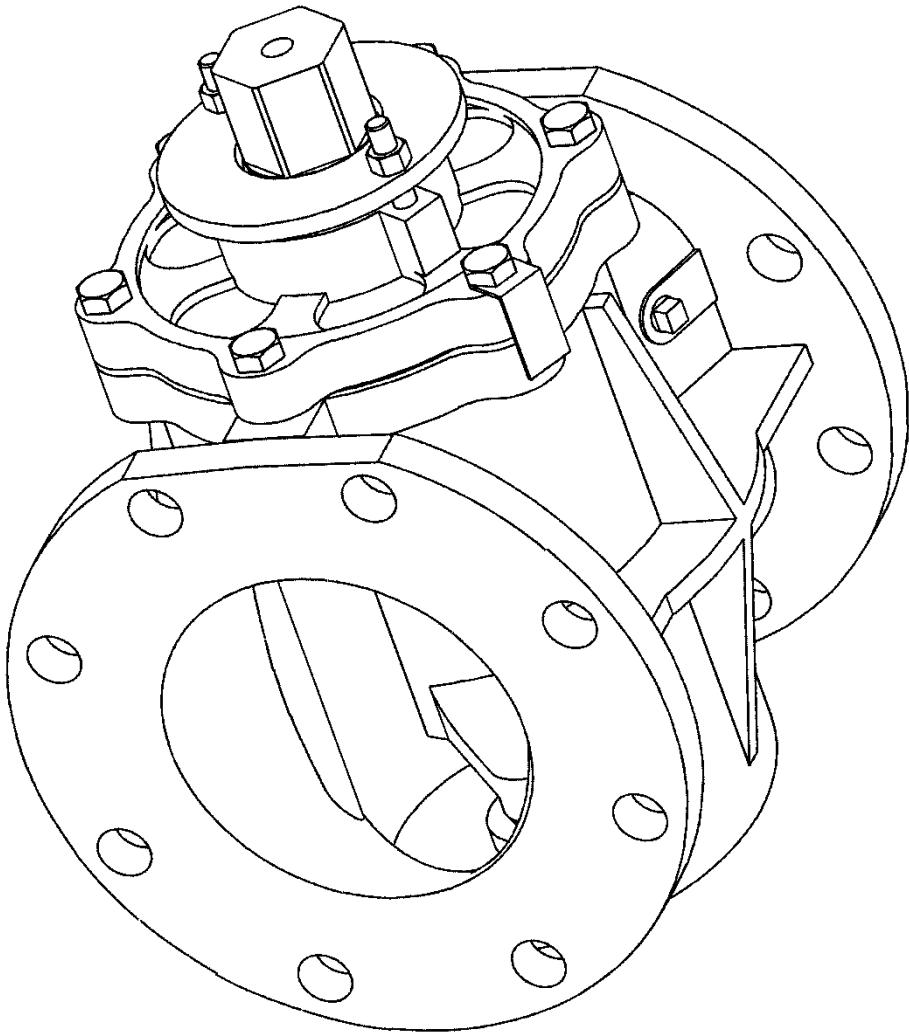


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# DeZURIK 4-20" PEC ECCENTRIC VALVES



Instruction **D10021**  
June 2021

## Instructions

These instructions are for use by personnel who are responsible for the installation, operation and maintenance of DeZURIK valves, actuators or accessories.

## Safety Messages

All safety messages in the instructions are identified by a general warning sign and the signal word CAUTION, WARNING or DANGER. These messages indicate procedures to avoid injury or death.

Safety label(s) on the product indicate hazards that can cause injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).

### **WARNING**

**Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves which have been removed from service with suitable protection for any potential pipeline material in the valve.**

## Inspection

Your DeZURIK product has been packaged to provide protection during shipment; however, items can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

## Parts

Replaceable wear parts are listed on the assembly drawing. These parts can be stocked to minimize downtime. Order parts from your local DeZURIK sales representative or directly from DeZURIK. When ordering parts please provide the following information:

**If the valve has a data plate:** please include the 7-digit part number with either 4-digit revision number (example: 9999999R000) or 8-digit serial number (example: S1900001) whichever is applicable. The data plate will be attached to the valve assembly. Also, include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

**If there isn't any data plate visible on the valve:** please include valve model number, part name, and item number from the assembly drawing. You may contact your local DeZURIK Representative to help you identify your valve.

## DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services. For more information, contact your local DeZURIK sales representative or visit our website at [DeZURIK.com](http://DeZURIK.com).

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## Description

The 4 – 20" PEC Eccentric Valves have welded nickel seats that provide excellent resistance to corrosion and damage, and prolong the life of the resilient plug facing. The valve rotates 90 degrees from full open to full closed. Clockwise rotation of the valve stem closes the valve. If an actuator other than a DeZURIK is to be mounted, the actuator must be capable of maintaining the valve plug position with flow in the pipeline.



### WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

## Handling

Lifting the valve improperly may damage it. Do not fasten lifting devices to the actuator, plug or through the seat opening in the body. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

## Required Tools

This valve is assembled using only SAE fasteners. To service this valve, you should have a full set of combination wrenches, Allen wrenches, a large flat tipped screwdriver, a flat pry bar, a pin punch and a dead blow hammer.

**Note:** You may want to machine a shaft to aid you in removing the lower bearing from the body. See "Disassembly" section.

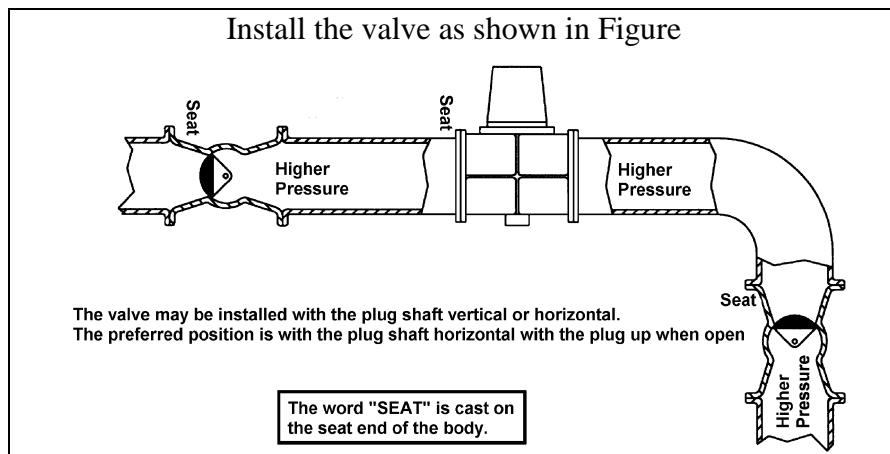
## Installation

The type of materials carried in the pipeline and the location of the valve determine the correct installation procedure. Proper installation of PEC Eccentric Valves with rubber lining and rubber faced flanges is without gaskets. The rubber facing on the valve flanges is an integral flange seal.

Rust Veto may be removed with the use of Houghton Kleensol #4 or petroleum solvent.

## Liquids and Gases

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.



**Figure 1—Liquids and Gases**

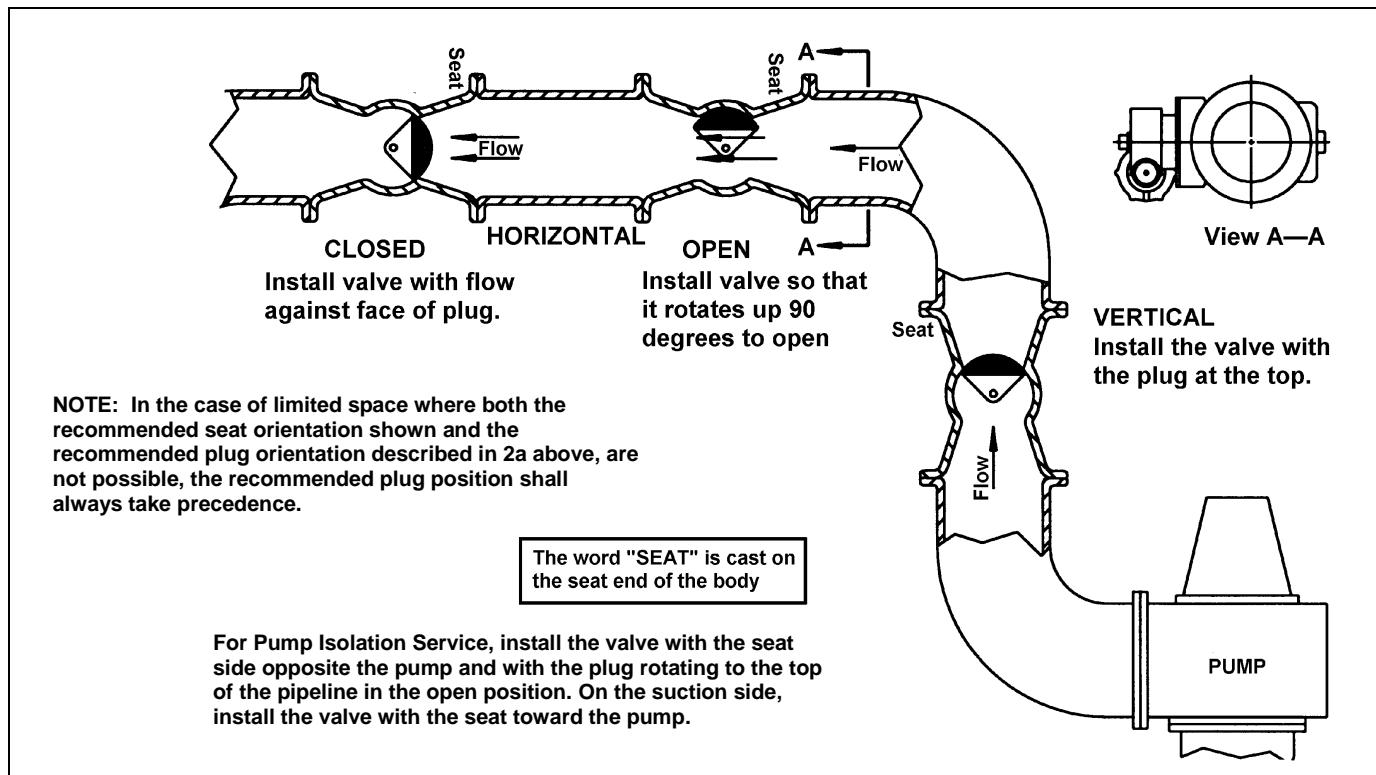
**Installation (continued)**

2. Ensure the valve and flanges are concentric to ensure proper flange sealing.
3. Tighten the flange bolts or studs in a crisscross pattern.

**Suspended Solids**

If the pipeline carries suspended solids such as paper stock of 2 percent or higher consistency, mining slurry, or raw sewage:

1. Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the valve and pipeline.
2. Install the valve as shown in Figure 2.
  - a. In HORIZONTAL pipelines, install the valve so that the plug is horizontal and rotates upward as the valve opens.
  - b. For VERTICAL pipelines, install the valve with the end marked "SEAT" at top of valve.



**Figure 2 — Liquids with Suspended Solids**

3. Tighten the flange bolts or studs in a crisscross pattern.
4. Ensure the valve and flanges are concentric to ensure proper flange sealing.

## **Fusion/Powder Coated Valves**

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**CAUTION!**

**Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.**

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## **Closed Position**

Because of the eccentric action of this valve, the closed position of the valve is dependent upon the pressure drop expected when the valve is closed.

To adjust the valve closed position, follow these steps:

---



**WARNING!**

**This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Completely release pressure before disassembling the valve.**

---

1. Relieve pipeline pressure.
- 



**WARNING!**

**Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.**

---

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Back off the actuator closed position stop as described in the Actuator Instructions.
4. Close the valve with the torque specified in the Actuator Instructions.

**Note:** This torque is the amount required to seat the plug for a given pressure drop across the valve. To avoid excessive plug and seat wear caused by over torquing, use the actual pressure drop across the valve when determining correct closing torque.

5. After the valve has been closed using the correct amount of torque, set the actuator closed position stop to limit actuator travel at this position.

## **Lubrication**

This valve does not require routine maintenance lubrication. If the valve is disassembled, lubricate the packing and the plug journals as follows:

**Lubrication (continued)****Packing**

Packing lubrication requirements are dependent upon the packing material.

- **PTFE PACKING:**

Requires no lubrication.

- **ALL PACKING OTHER THAN PTFE:**

Apply a light coat to the inside and outside diameters of the packing rings using one of these lubricants.

- Lubriplate Clearplex-2 (**recommended**)
- Amoco FG (alternate)
- Mobilgrease FM 101 (alternate)
- Petro-Canada Purity FG 2 (alternate)
- Phillips Philube PF (alternate)

**Note:** Ensure lubricant is compatible with flow media.

**Plug Journals and Lubrication**

Plug journal lubrication is dependent upon the materials used in construction of the valve.

- CAST IRON, DUCTILE IRON, NI-RESIST, BRONZE AND ACID BRONZE VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Lubriplate Clearplex-2 (**recommended**)
  - Amoco FG (alternate)
  - Mobilgrease FM 101 (alternate)
  - Petro-Canada Purity FG 2 (alternate)
  - Phillips Philube PF (alternate)
- ALL VALVES EXCEPT CAST IRON, DUCTILE IRON, NI-RESIST, BRONZE, & ACID BRONZE: Coat the journals on the plug with a light coat using one of these lubricants.
  - Molykote G Rapid paste (**recommended**)
  - Shell Retinax AM (alternate)
  - Shell Lithall MDS (alternate)

Then lubricate with a mixture of powdered graphite and one of these lubricants.

- Standard Oil #140 Gear Lube (**recommended**)
- Mobil Mobilgear 634 (alternate)
- Shell Omala 460 (alternate)
- Texaco Meropa 460 (alternate)
- Amoco MP (alternate)
- HARD RUBBER LINED VALVES: Lubricate the journals on the plug using one of these lubricants.
  - Molykote #44 (**recommended**)
  - Magnalube G (alternate)
  - Texaco Molytex E.P. Grade 2 (alternate)

## Lubrication (*continued*)

### Grit Excluders/ Thrust Washer

Apply a light coat to all surfaces of grit excluders and thrust washer using one of these lubricants.

- Lubriplate Clearplex-2 (**recommended**)
- Amoco FG (alternate)
- Mobilgrease FM 101 (alternate)
- Petro-Canada Purity FG 2 (alternate)
- Phillips Philube PF (alternate)

**Note:** Ensure lubricant is compatible with flow media

## Packing Adjustment

The stem seal tightening procedure is dependent upon the type of actuator on the valve. If a packing leak should occur, tighten the packing as follows:

### 4 – 8" Lever and Nut Operated Valves

1. Loosen the nuts under the packing gland
2. While actuating the valve with a torque wrench, tighten the nuts on top of the packing gland until the torque required to actuate the valve matches the torque shown in Table A.

**Table A: Actuating Torque**

Valve Size		Actuating Torque			
		Standard Packing		Low Friction Packing	
in	mm	ft lbs	Nm	ft lbs	Nm
4	100	28	37	14	18
5-6	125-150	60	81	30	40
8	200	104	141	52	70

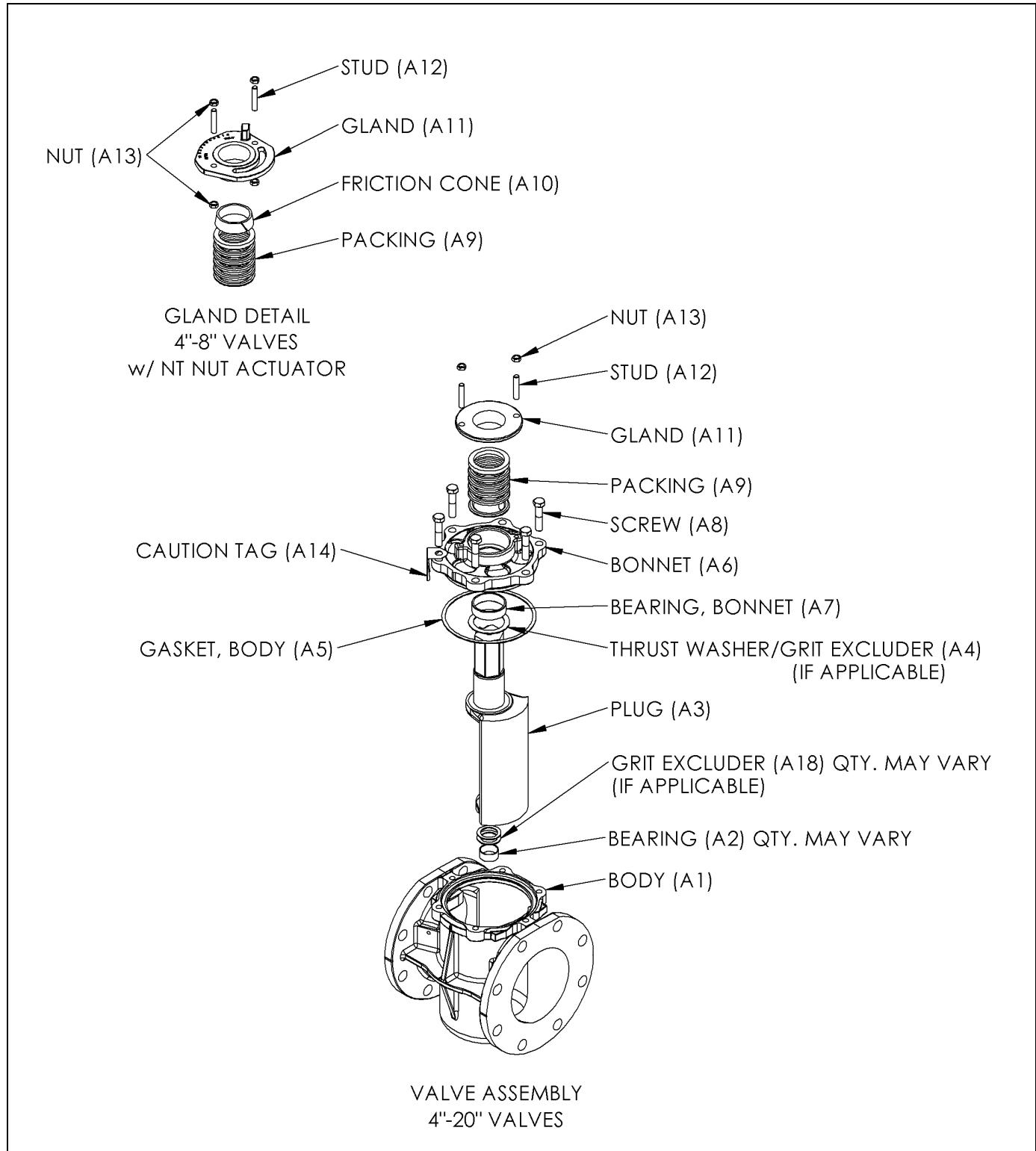
3. Once the torque is matched, tighten the nuts under the packing gland.

**Note:** If the packing leaks following this adjustment, replace the packing.

## All Other Actuators

Tighten the gland nuts evenly only until the leak stops.

**Note:** Do not continue tightening after leak stops. If packing leak cannot be stopped by tightening the gland nuts, the packing must be replaced.

**Figure 3 – Parts Identification**

## Packing Replacement

### Replacing Packing with Actuator Removed

To replace the packing without removing actuator, see “Replacing Packing Without Removing Actuator” section.

1. Discontinue pipeline flow and relieve pipeline pressure.
2. Scribe the actuator and valve bonnet for alignment when reassembling.



#### **WARNING!**

**Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.**

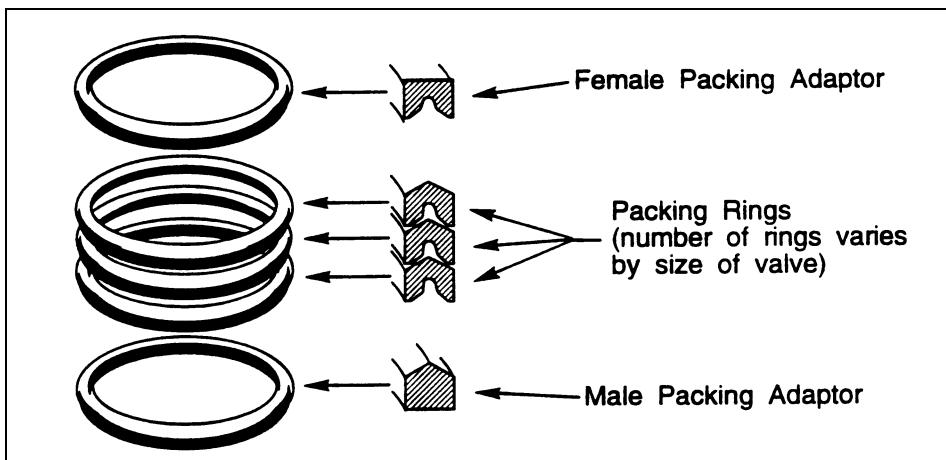
3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.



#### **WARNING!**

**When an eccentric valve is mounted in a vertical pipeline—or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.**

4. Remove the actuator from the valve. See Actuator Instructions.
5. Remove the actuator adaptor (when used) from the valve.
6. Remove the packing gland nuts (A13), then slide the packing gland (A11) off the plug shaft (A3).
7. Pull the packing (A9) out of the bonnet (A6).
8. For valves with low friction packing, lubricate the new packing (A9), then install it one ring at a time in the sequence shown in Figure 4.

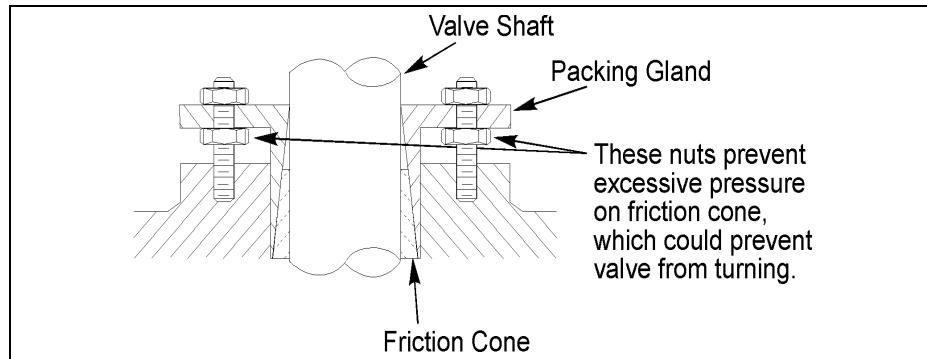


**Figure 4 — Correct Packing Installation Sequence**

**Packing Replacement (continued)**

**Note:** 4 - 8" lever and nut operated valves without low-friction packing have a friction cone (A10) and standard packing (A9). Before installing the gland (A11), set the cone on top of the packing. Do not lubricate the outside of the cone or the inside of the gland. See Figure 5.

9. Slide the packing gland (A11) down the plug shaft (A3) and over the studs (A12). If the valve has a friction cone (A10), bring the gland nuts (A13) under the gland (A11) up finger tight.



**Figure 5 — Friction Cone Adjustment**

10. Adjust gland nuts (A13).
  - a. **4 - 8" LEVER AND NUT OPERATED VALVES ONLY:**  
Turn packing gland nuts (A13) onto the studs (A12) until they touch the gland (A11).
  - b. **ALL REMAINING VALVES EXCEPT 10" AND 12" LEVER OPERATED:**  
Turn the packing gland nuts (A13) onto the studs until they touch the packing gland (A11), then one more turn.  
**Note:** This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts (A13) after the valve is pressurized. See "Packing Adjustment" section.
11. Fasten the adaptor (when used) to the valve, lining up the scribe marks made during disassembly.
12. Install the actuator as described in the Actuator Instructions.
13. If the actuator is a powered actuator, reconnect power to the actuator.

## Packing Replacement (*continued*)

### Replacing Packing Without Removing Actuator

**Note:** Lever and nut operated valves require that the actuator be removed before packing can be replaced. See “Replacing Packing with Actuator Removed” section to replace the packing in these valves.

1. This process can be done with or without pressure in the pipeline.
- 



#### **WARNING!**

**Caustic, toxic, or hot material in the pipeline can cause personal injury or death if leakage occurs. Confirm that the material is not harmful.**

---

2. Ensure that the material in the pipeline will not cause injury if leakage occurs.
3. Remove the packing gland nuts (A13) from the studs (A12), and slide the packing gland (A11) up the stem of the plug (A3).
4. Remove the studs (A12) from the bonnet (A6).
5. Cut and completely remove all of the old packing (A9) from the packing chamber in the bonnet (A6).
6. Cut each new packing ring (A9) radially in one place with a razor-sharp knife.
7. Place each new packing ring (A9)—one at a time with the joints staggered—around the plug stem (A3) and into position in the packing chamber.
8. Replace the studs (A12) in the bonnet (A6).
9. Push the packing rings (A9) down into position with the packing gland (A11), and replace the packing gland nuts (A13) on the studs (A12).
10. Turn the packing gland nuts (A13) onto the studs (A12) until they touch the packing gland (A11), then one more turn.
11. Restore the pipeline pressure if it was relieved, and check for packing leakage. If leakage occurs, tighten each packing nut just enough to stop the leakage. Excessive tightening will cause reduced packing life and higher valve operating torque.

## Disassembly

---

**WARNING!**

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

---

Follow these steps to disassemble valve:

1. Relieve pipeline pressure and close the valve.
- 

**WARNING!**

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

---

2. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.
3. Close the valve.
4. Remove the valve from the pipeline (if desired).

**Note:** The valve can be disassembled while still in the pipeline.

**WARNING!**

When an eccentric valve is mounted in a vertical pipeline—or mounted in a horizontal pipeline with the plug stem horizontal—gravity can cause the plug to swing to a lower position in the valve body when the actuator is removed. Place the plug in the lowest position before removing the actuator.

---

5. Remove actuator from valve—see Actuator Instructions.
6. Scribe a line on the body (A1), bonnet (A6) and plug stem (A3) to help align these parts during re-assembly.
7. Remove the screws (A8) that hold the bonnet (A6) in place, then pry the bonnet loose from the valve body (A1).

**Note:** Note the location of the **WARNING TAG** (A14) on bonnet (A6) and do not misplace tag. This tag must be attached to the valve at reassembly.

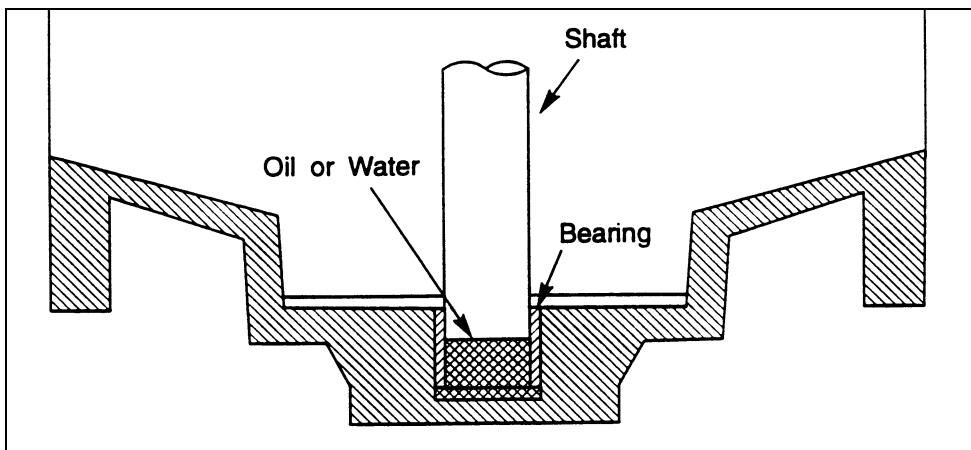
8. Remove the plug (A3) from the valve body (A1). Remove the grit excluder (A18) (If applicable).
9. Remove the gland nuts (A13) and gland (A11) from the bonnet (A6).
10. Remove the packing (A9) from the bonnet (A6).
11. Reaching through the packing chamber in the bonnet (A6), drive the upper bearing (A7) out of the bonnet using a hammer and pin punch.
12. Remove the lower bearing (A2) from the valve body (A1).

**Note:** The bearing can be chiseled out; or, it can be hydraulically forced out. See Figure 6.

## Disassembly (continued)

To hydraulically force the bearing (A2) out:

1. Fill the interior diameter of the bearing (A2) with water.
2. Pound a shaft with the same outside diameter as the lower journal of the valve plug into the bearing (A2).



**Figure 6 — Hydraulically Removing the Lower Bearing**

## Reassembly

1. Push a new lower bearing (A2) into the valve body (A1), then lubricate the bearing as described in the "Lubrication" section.
2. Place the grit excluder (A18) (If applicable) on the bottom shoulder of the plug shaft (A3) and place the thrust washer (A4) on the top shoulder of the plug shaft (A3). Lubricate grit excluder and thrust washer as described in the "Lubrication" section.
3. Place the plug (A3) into the valve body (A1) so the lower journal slides into the bearing (A2). Turn the plug so it is almost closed.
4. Set a new gasket (A5) in the body (A1).
5. Push a new bearing (A7) into the bonnet (A6), then lubricate the bearing. See "Lubrication" section.
6. Place bonnet (A6) on body (A1), align scribe marks, then fasten bonnet in place with screws (A8).
7. Turn the plug (A3) to the closed position. See "Closed Position" section.
8. For valves with low friction packing, lubricate the new packing (A9), then install it one ring at a time. See Figure 4.
- Note:** 4 - 8" valves use a friction cone (A10) with a wrenching nut or hand lever actuator, and standard packing. Before installing the gland (A11), set the cone on top of the packing (A9). Do not lubricate the outside of the cone or the inside of the gland. (See Figure 5)
9. Slide the packing gland (A11) down the plug shaft (A3) and over the studs (A12). If the valve has a friction cone (A10), bring the gland nuts (A13) under the gland up finger tight.

## Reassembly (*continued*)

10. Adjust gland nuts (A13).

- a. 4 – 8" LEVER AND NUT OPERATED VALVES ONLY: Turn packing gland nuts (A13) onto the studs (A12) until they contact the gland (A11). It will be necessary to adjust the packing gland nuts after the valve is pressurized; see the "*Packing Adjustment*" section.
- b. ALL VALVES EXCEPT 10" AND 12" LEVER OPERATED: Turn the packing gland nuts (A13) onto the studs (A12) until they contact the packing gland (A11), then one additional turn.

**Note:** This is a preliminary adjustment, it will be necessary to adjust the packing gland nuts after the valve is pressurized. See "*Packing Adjustment*" section.

11. Install the actuator—see Actuator Instructions.

12. After pipeline flow is restored, check the packing for leakage.

**Note:** If packing leaks, tighten the packing gland nuts (A13) only enough to stop the leak. Over tightening the packing will cause premature packing failure and higher valve operating torque.

13. If the actuator is a powered actuator, reconnect power to the actuator.

## Removing Valve from Pipeline

To remove the entire valve assembly from the pipeline, follow these steps.

---



### WARNING!

This valve is a pressure vessel. The bonnet will blow off the actuator if the bonnet bolts are removed with pressure in the valve. Pressure must be completely released before disassembly.

---

1. Relieve pipeline pressure and drain portion of system where valve is located.

2. Close the valve.

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### WARNING!

Moving parts from accidental operation of power actuator can cause personal injury or equipment damage. Disconnect and lock out power to actuator before servicing.

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3. If the actuator is powered, disconnect and lock out the pneumatic, hydraulic, or electrical power to prevent accidental operation of the actuator.

4. Support the valve assembly, then remove the flange bolts.

5. Remove the valve from the pipeline.

## **Field Test**

Stroke the valve between the fully open and fully closed positions to verify that the valve and actuator are functioning properly.

## **Emergency Operation**

Operate the valve as under normal conditions, taking care to bring the plug to the position required by the particular emergency condition.

## **Predicted Wear of Parts**

Length of service for parts subject to wear is dependent on service conditions.

## **Troubleshooting**

Symptom	Possible Cause	Corrective Action
Packing Leaks.	Packing is loose.	Adjust Packing. (See " <i>Packing Adjustment</i> " section)
	Packing is worn.	Replace Packing. (See " <i>Packing Replacement</i> " section)
Valve does not close.	Object is wedged between plug and seat.	Open the valve completely to flush object. If this doesn't work, remove valve from the pipeline. (See " <i>Removing Valve from Pipeline</i> " section)
	Actuator closed position is out of adjustment.	Adjust the closed position stop as described in the Actuator instructions.
Valve leaks when closed.	Plug is worn or damaged.	Replace plug. (See " <i>Disassembly</i> " section)
	Rubber on plug is torn.	

## Limited Warranty

DeZURIK, Inc. ("Seller") manufactured products, auxiliaries and parts thereof that we manufacture for a period of twenty-four (24) months from date of shipment from Seller's factory, are warranted to the original purchaser only against defective workmanship and material, but only if properly stored, installed, operated, and serviced in accordance with Seller's recommendations and instructions.

For items proven to be defective within the warranty period, your exclusive remedy under this limited warranty is repair or replacement of the defective item, at Seller's option, FCA Incoterms 2020 Seller's facility with removal, transportation, and installation at your cost.

Products or parts manufactured by others but furnished by Seller are not covered by this limited warranty. Seller may provide repair or replacement for other's products or parts only to the extent provided in and honored by the original manufacturer's warranty to Seller, in each case subject to the limitations contained in the original manufacturer's warranty.

No claim for transportation, labor, or special or consequential damages or any other loss, cost or damage is being provided in this limited warranty. You shall be solely responsible for determining suitability for use and in no event shall Seller be liable in this respect.

This limited warranty does not warrant that any Seller product or part is resistant to corrosion, erosion, abrasion or other sources of failure, nor does Seller warrant a minimum length of service.

Your failure to give written notice to us of any alleged defect under this warranty within twenty (20) days of its discovery, or attempts by someone other than Seller or its authorized representatives to remedy the alleged defects therein, or failure to return product or parts for repair or replacement as herein provided, or failure to store, install, or operate said products and parts according to the recommendations and instructions furnished by Seller shall be a waiver by you of all rights under this limited warranty.

This limited warranty is voided by any misuse, modification, abuse or alteration of Seller's product or part, accident, fire, flood or other Act of God, or your failure to pay entire contract price when due.

The foregoing limited warranty shall be null and void if, after shipment from our factory, the item is modified in any way or a component of another manufacturer, such as but not limited to; an actuator is attached to the item by anyone other than a Seller factory authorized service personnel.

All orders accepted shall be deemed accepted subject to this limited warranty, which shall be exclusive of any other or previous warranty, and this shall be the only effective guarantee or warranty binding on Seller, despite anything to the contrary contained in the purchase order or represented by any agent or employee of Seller in writing or otherwise, notwithstanding, including but not limited to implied warranties.

THE FOREGOING REPAIR AND REPLACEMENT LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, OBLIGATIONS AND LIABILITIES, INCLUDING, BUT NOT LIMITED TO, ALL WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY OR OTHERWISE, EXPRESSED OR IMPLIED IN FACT OR BY LAW, AND STATE SELLER'S ENTIRE AND EXCLUSIVE LIABILITY AND YOUR EXCLUSIVE REMEDY FOR ANY CLAIM IN CONNECTION WITH THE SALE AND FURNISHING OF SERVICES, GOODS OR PARTS, THEIR DESIGN, SUITABILITY FOR USE, INSTALLATION OR OPERATIONS. NEITHER ANY PERFORMANCE OR OTHER CONDUCT, NOR ANY ORAL OR WRITTEN INFORMATION, STATEMENT, OR ADVICE PREPARED BY SELLER OR ANY OF OUR EMPLOYEES OR AGENTS WILL CREATE A WARRANTY, OR IN ANY WAY INCREASE THE SCOPE OR DURATION OF THE LIMITED WARRANTY.

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Metric fasteners should not be used with ASME Class 150/300 bolt holes and flange bolt patterns. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, it may lead to product failure, injury, and loss of life. DeZURIK Inc. disclaims all liability associated with the use of metric fasteners with ASME Class 150/300 bolt holes and flange patterns, including but not limited to personal injury, loss of life, loss of product, production time, equipment, property damage, lost profits, consequential damages of any kind and environment damage and/or cleanup. Use of metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns is a misuse that voids all warranties and contractual assurances. If you use metric fasteners with ASME Class 150/300 bolt holes and flange bolt patterns, you do so at your sole risk and any liability associated with such use shall not be the responsibility of DeZURIK, Inc. In addition to the foregoing, DeZURIK's Manufacturer's Conditions apply.

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IN NO EVENT SHALL SELLER BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, PUNITIVE, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO; DAMAGE TO OR LOSS OF OTHER PROPERTY OR EQUIPMENT, BUSINESS INTERRUPTION, COST OF SUBSTITUTE PRODUCTS, LOSS OF TIME, LOSS OF PROFITS OR REVENUE, COST OF CAPITAL, LOSS OF USE, OR DIMINUTION IN VALUE) WHATSOEVER, AND SELLER'S LIABILITY, UNDER NO CIRCUMSTANCES, WILL EXCEED THE CONTRACT PRICE FOR THE GOODS AND/OR SERVICES FOR WHICH LIABILITY IS CLAIMED. ANY ACTION FOR BREACH OF CONTRACT BY YOU, OTHER THAN RIGHTS RESPECTING OUR LIMITED WARRANTY DESCRIBED ABOVE, MUST BE COMMENCED WITHIN 12 MONTHS AFTER THE DATE OF SALE.

## Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

Web site: [www.dezurik.com](http://www.dezurik.com) E-Mail: [info@dezurik.com](mailto:info@dezurik.com)



250 Riverside Ave. N., Sartell, MN 56377 • Phone: 320-259-2000 • Fax: 320-259-2227

*DeZURIK, Inc. reserves the right to incorporate our latest design and material changes without notice or obligation. Design features, materials of construction and dimensional data, as described in this manual, are provided for your information only and should not be relied upon unless confirmed in writing by DeZURIK, Inc. Certified drawings are available upon request.*

**RECOMMENDED SHORT & LONG TERM STORAGE PROCEDURES****SHORT TERM STORAGE (LESS THAN 6 MONTHS)**

1. All valves shall be stored in the position in which they were shipped. Do not stack (or store) items on top of the rubber components.
2. Valves shall be protected from dirt, debris, excessive moisture and UV exposure. Store at temperatures ranging from 35°F to 95°F (2°C to 35°C) with humidity levels not exceeding 50%.

**LONG TERM STORAGE (6 MONTHS +)**

1. All valves shall be stored in the position in which they were shipped. Do not stack (or store) items on top of the rubber components.
2. Valves shall be stored fully enclosed in a crate or on a skid. It is acceptable to store the valves uncrated but protected from any dirt, debris or UV exposure as long as the environmental conditions as described in item 3 are met. Any desiccant packages received with the original shipment should be replaced before putting valves into long term storage. Please follow your desiccant manufacturer's recommended usage of any desiccant based on the volume of the enclosed area.
3. Valves shall be stored in a well ventilated, clean, dry indoor facility on skids or raised racks with temperatures ranging from 35°F to 95°F (2°C to 35°C) with humidity levels not exceeding 50%. Rubber components shall be stored within temperature range 59°F to 77°F (15°C to 25°C)
4. If the above conditions cannot be met, valves shall be separately packaged inside sealed heavy duty plastic sheeting and a weather resistant enclosure, or a standard crate lined with moisture proof paper, to protect the valves from dirt, debris and UV exposure. Desiccant packages shall be used to control moisture both inside the enclosure and the sealed heavy duty plastic covering. Please follow your desiccant manufacturer's recommended usage of any desiccant based on the volume of the enclosed area.
5. Do not store valves next to operating electric motors or equipment which may emit ozone, which can cause deterioration of valve elastomers. Store in an environment with less than 0.1 ppm concentration, at least 25 feet from ozone emitting devices, with ventilation.
6. Valves with cylinder actuators and control valves which are stored for extended periods may be subject to cylinder blow-by caused by permanent distortion of any of the seals. Valves should be operated prior to installation and damaged seals replaced. If possible, it is recommended that cylinders be cycled every 4-6 months to maintain seals.
7. Valves with electric motor operators shall be stored in accordance with the individual motor manufacturer's recommended long term storage procedures.
8. All electrical components shall be visually inspected prior to valve installation.

**SHELF LIFE (RUBBER COMPONENTS)**

For rubber components or elastomers stored for longer than the time shown below contact the manufacturer to coordinate a visual inspection.

- Three (3) years for Natural (Pure Gum) Rubber and Styrene-Butadiene (SBR) components.
- Five (5) years for Chloroprene (Neoprene), Acrylonitrile-Butadiene (Nitrile, Buna-N), Chlorosulfonated Polyethylene (Hypalon), Chloro-Isobutylene-Isoprene (Chlorobutyl), EPDM, and Fluoroelastomer components.

# CBGL911 GLASS LINING

## APPLICATION

Glass lining inside of ductile iron pipe has been used successfully for over 40 years. Most commonly used for its "non stick" characteristics to convey fluids containing higher solids concentration such as sludge, scum, and grease in sewage service and wastewater treatment plant applications.



## CBGL911 LINING MATERIAL

The standard of quality for glass lining shall be CBGL911. The glass powder shall be specifically formulated and shall be vitreous and inorganic. The lining must be proven to be successful in conveying sludge, scum, and grease in sewage service and wastewater treatment plant applications.

Any request for substitution of material must be accompanied by a successful history of lining ductile iron pipe and fittings which are used in these applications. The lining Applicator must be an ISO 9001:2000 certified company and must be able to provide recent third party, independent test reports verifying the following results. The lining Applicator must have a minimum of 5 years proven experience in production of glass lined ductile iron piping.

These physical and chemical tests must have been performed on coupons from the applicators regular production lined ductile iron pipe and/or fittings.

1. ASTM D-792 test for density in the range of 2.5 to 3.0 grams per cubic centimeter.
2. Immersion testing using ASTM C-283-97 (2002) in a solution of 8% sulfuric acid at a temperature of 148 degrees F. (64 degrees C) for a period of 10 minutes minimum. The glass shall have a minimum loss of surface gloss and a weight loss of no more than 2 milligrams per square inch (.31 mg per square centimeter).
3. Glass shall have no observed evidence of corrosion when exposed to an HCl solution of 3 pH and separately to a Na OH solution of 1 OpH; both elevated in temperature to 125 degrees F. (52 degrees C) for 10 minutes minimum.
4. Glass shall be capable of withstanding an instantaneous thermal shock of 350 degrees F. (176 degrees C) without cracking, crazing, blistering or spalling.
5. Glass lining have a minimum hardness of 6 on the MOHS scale.

## WHY USE GLASS LINING?

Glass Lined ductile iron pipe assists in keeping your systems clean and free from clogging. Glass lining also helps protect the pipe from abrasion present in grit removal and other sewer process systems.

Glass lining is a porcelain material and common sewer materials resist sticking to it like they do with epoxy lining materials.

CBGL911 glass lining is also excellent for high temperature requirements where other protective linings cannot remain in service.

Did you know that you can get process valves with CBGL911 glass lining? Many valve manufacturers currently supply CBGL911 glass lined valves



Struvite buildup in sludge piping system

# CBGL911 GLASS LINING

## CBGL911 LINING APPLICATION

### A. Surface Preparation

The entire surface area to receive the glass compound shall be inspected for the presence of oil, grease, or any other soluble substances. Any areas found with contamination shall be solvent cleaned to completely remove these substances. After cleaning, all surface areas shall be mechanically ground so as to remove any casting imperfections leaving only a smooth surface with no raised projections. Finally, the entire surface area to be lined shall be struck with a blast media so that all remaining impurities from the cleaning operations are removed. Only tightly adhering cast-in oxides may be left on the surface.

### B. Lining

After surface preparation, the interior of the pipe or fitting shall receive an application of base glass compound which has been suspended in a water carrier. After the water has evaporated, the pipe or fitting shall be oven-fired at a temperature of 1375 degrees F. (746 degrees C) in order to fuse the glass to the metal surface. The subsequent finish coats are similarly processed with a resultant lining thickness of 10 mils (.25mm) minimum.



Surface grinding prep for a ductile iron casting

## INSPECTION



CBGL911 Glass Lined Valve Components

1. All ductile iron pipe and fittings shall be checked for thickness using a magnetic film thickness gage by the method outlined in SSPC-PA2 Film Thickness Rating.
2. The lining shall be in accordance with the Applicator's industry standard tolerance for coverage and continuity. All pipe and fittings shall be visually inspected after lining at the Applicator's facility. Each and every pipe or fitting shall be tested with a 67.5 volt Tinker Rasor electronic device with a wetted sponge to determine the presence of pinholes or voids. Excessive pinholes shall be cause for rejection at the Applicator's facility.
3. Each and every pipe or fitting shall be marked on the interior glass surface using a permanent marker; the date of application and tests, the facility location and the number of acceptable pinholes detected. Quality Assurance reports will be maintained at the Applicator's facility evidencing all work performed and data recorded.
4. The Owner/or his Representative may witness at the Applicator's facility; the glass application process, review the Quality Assurance Reports and witness the actual tests conducted upon his product, all prior to the product leaving the facility. This may be done by written Specification or by sufficient notice to the Applicator to allow coordination of the visit.

## CERTIFICATION

The Applicator must be able to supply a notarized Certificate of Compliance attesting to the fact that the glass lining has met all of the requirements of this specification and that the material lined has met the applicable standards of AWWA and ANSI where noted.

# CBGL911 GLASS LINING

## HANDLING

Glass lined pipe and fittings must be handled only from the exterior surfaces; no forks, straps, hooks, etc; shall come into contact with the interior surface of glass. Pipe and fittings that have been altered after it left the Applicator's facility, such as field cuts or further fabrication, may not exhibit the same tested results as was documented at the Applicator's facility.



## FIELD REPAIR

CBGL911 Glass repair Epoxy shall be used for touch-up or repair in accordance with the Manufacturer's recommendation below.

1. Remove burrs caused by field cutting of ends or handling damage and smooth out the edge of the lining if rough.
2. Remove all traces of oil, grease, asphalt, dust,dirt, etc.
3. Remove any damaged lining caused by field cutting operations' or handling and clean any exposed metal by sanding or scraping. Sandblasting or power tool cleaning roughening is also acceptable. It is recommended that any loose lining be removed by chiseling, cutting, or scraping into well-adhered lined area before patching. Be sure to overlap at least 1" of lining in the area to be repaired.
4. With the area to be sealed or repaired absolutely clean and suitably roughened, apply a coat of CBGL Glass Repair Epoxy using the following procedure:
  - a. Mixing procedure - The Repair Kit for CBGL 911 Glass Lining contains two small cans of CBGL 911 Glass Repair Epoxy. CBGL 911 Glass Repair Epoxy is a two-component epoxy and the contents of the small container shall be mixed with the contents of the large container. If less than the full contents of each can is to be mixed, the material may be mixed using the mixing ratio printed on the labels. Add Q4-5311 Part B to A4-5311 Part A. Mix thoroughly with enclosed paddle. All activated material must be used within one hour of mixing.
  - b. Application of Material- After the material has been thoroughly mixed, it can be applied to the properly prepared surface by brush. Brushing is usually best due to the fact that the areas to be repaired are usually small.
5. It is important to coat the entire freshly cut exposed metal surface of the cut pipe end. To ensure proper sealing, overlap at least one inch of the lining with this repair material.

## TECHNICAL DATA CBGL 911 GLASS REPAIR EPOXY



<input type="checkbox"/>	<b>DESCRIPTION:</b>	A brushable polyamidoamine epoxy designed for sealing cut ends and repairs when pipes are lined with CBGL 911 Glass Lining.
<input type="checkbox"/>	<b>LIMITATIONS:</b>	CBGL911 Glass Repair Epoxy should be used over glass or bare metal for repairing cut ends of pipe or damaged areas in CBGL Glass Lining. The Glass Repair Epoxy must be used over properly prepared ductile iron surfaces or roughened glass lining.
<input type="checkbox"/>	<b>SURFACE PREPARATION</b>	The surface preparation shall be equal to the specifications for the project or as outlined in the touch-up procedure. Do not apply glass repair epoxy over wet or frozen surfaces,or over glass surfaces that have not been roughened.
<input type="checkbox"/>	<b>DRY FILM: THICKNESS:</b>	As outlined in specifications, usually 3.0 to 5.0 mils per coat in two coats for 6.0 to 10.0 mils dry film thickness.
<input type="checkbox"/>	<b>APPLICATION:</b>	Brush
<input type="checkbox"/>	<b>THINNING:</b>	Thin or cleanup with Methyl Ethyl Ketone.
<input type="checkbox"/>	<b>PHYSICAL DATA:</b>	VOLATILE ORGANIC CONTENTS: 2.90 lbs. per gallon
<input type="checkbox"/>	<b>SAFETY DATA:</b>	See individual product label for safety and health data information. Individual Material Safety Data Sheets are available upon request.

11. Exposed nuts, bolts, and washers for buried service shall be stainless steel, per Section 15116.2.02.C.5. The Materials of Construction lists studs (A12) and nuts (A13) as carbon steel, zinc plated, which would not comply with buried service requirements in Section 15116.2.02.C.5. Please specify where valves will be buried so that the required materials can be confirmed, per Section 15116.2.02.C.5.
12. Why is Section 15116.2.03 crossed out? Why is the footer of pg. 4 of Section 15116 also crossed out? Additionally, the markups are in red. Please use green to designate Contractor markups.
13. There is a note that the submittal for Section 15116.2.05 will be provided at a later date. Please use green for Contractor notes or markups. Since the submittal for Section 15116.2.05 has not been provided yet, the green checkmarks for Section 15116.2.05.A through C should be deleted.