

SUBMITTAL COVER SHEET

Project Name: COW -Hess Pump Station Valve Replacement
 Architect: PROFESSIONAL ENG. CONSULTANTS
 Submittal Date: 08/18/2020
 Revision Number: 0
 Submittal Package: 33000
 Submittal Number: 331216-002
 Submittal Title: PRATT 42, 48, 60, 72 Butterfly Valves w/ Manual
 Specification: 331216-002
 Drawing/Detail:

RECEIVED FROM	SENT TO	RETURNED BY	FORWARDED TO
CORE & MAIN LP	PROFESSIONAL ENG. CONSULTANTS	PROFESSIONAL ENG. CONSULTANTS	CORE & MAIN LP
08/14/2020	08/18/2020		

SUBMITTAL ITEM	STATUS	ACTIVITY DATE	SENT	COPIES	DUE	NOTES
1 : PRATT 42, 48, 60, 72 Butterfly Valves w/ Manual	New Item		08/18/2020	1		

DONDLINGER AND SONS CONST. CO., INC.

Reviewed ES
 Reviewed as Noted _____
 Revise and Resubmit _____
 Date 8/18/20
 Submittal No. 331216-002

REVIEW OF ITEMS DOES NOT RELIEVE VENDOR FROM COMPLYING WITH REQUIREMENTS OF CONTRACT PLANS AND SPECIFICATIONS, CONTRACT AND CITY STATE AND LOCAL CODES.

SUBMITTAL REVIEW FOR ENGINEERED COMPONENTS

APPROVED

APPROVED AS NOTED

If checked above, fabrication MAY be undertaken and re-submittal is not required unless specifically noted in the correction comments. Review does not authorize changes to Contract Sum unless stated in a Change Order.

If checked below, fabrication MAY NOT be undertaken. Resubmit corrected copies for final approval. Correction shall be limited to items marked.

REVISE AND RESUBMIT

REJECTED

5/10

See Contract Documents for Contractor's engineered component responsibility. Approval is only for general conformance with the design criteria of the project. Contractor at all times remains responsible for compliance with the Contract Documents. Deviations are not approved unless Contractor has in writing called Engineer's attention to such deviation at the time of submission and Engineer has in writing approved the specific deviation. No acceptance by Engineer relieves Contractor from responsibility for errors or omissions in Compliance Submittals.



PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

BY Ryan Glessner DATE 8/19/2020

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401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

August 12, 2020

Mr. Robert Bollin
Core and Main LP
8405 Irving Street
Wichita, KS 67209

Subject: Customer PO#: 9795011

Reference Sales Order Number: 2731977 HP

Project Name: Hess Pump Station Valve Replacement

Scope of Supply: 42", 48", 60" & 72" 150B Butterfly Valves (manual)

Lead-time after release to manufacture: 26 - 30 weeks

Submittal response due back by .

Dear Mr. Bollin,

Thank you for your recent purchase order. I look forward to working with you on this project. The attached submittal package for the butterfly valves with manual worm gear operators is being submitted for **APPROVAL. This order will remain on hold pending the engineer's approval and release to manufacture. Once the submittal is approved any changes in scope will result in lead time and/or price adjustments.**

Our submission of this documentation does not constitute an acceptance of any contractual terms or conditions stated on the buyer's purchase order or request for quotation. All contractual terms must be negotiated and agreed to prior to release to manufacturing. The order is subject to approval of our Credit Department and an account in good standing.

Please contact me should there be any additional questions or concerns.

Kind Regards,

Laura Johnson

Project Manager

Phone: 630-844-4115

ljohnson@muellerwp.com

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August 12, 2020 Rev. 0

Project
Hess Pump Station Valve Replacement
Wichita, KS

Equipment
33 12 16 - 2.3 BUTTERFLY VALVES
(manual worm gear operators)

Sales Order #
2731977 HP

Purchase Order #
9795011

Proposal/Quote #
Q-020-13073

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SCOPE OF SUPPLY



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Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

SCOPE OF SUPPLY

LINE	QTY	LOCATION/TAG	DESCRIPTION
1	4	<input checked="" type="checkbox"/> Location: Drawing C102, A Valves Tag #: Pump Valve 1, Pump Valve 4, Pump Valve 5, Pump Valve 8	42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side ESTIMATED WEIGHT: 4,030 lbs LEAD TIME: 26-30 weeks
2	3	<input checked="" type="checkbox"/> Location: Tag #: Pump Valve 2, Pump Valve 6, Pump Valve 7	42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side ESTIMATED WEIGHT: 4,030 lbs LEAD TIME: 26-30 weeks
4	6	<input checked="" type="checkbox"/> Location: Tag #: Valve 30, Valve 31, Valve 32, Valve 37, Valve 38, Valve 39	48" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side ESTIMATED WEIGHT: 5,760 lbs LEAD TIME: 26-30 weeks
6	1	Location: Tag #: Valve 5	72" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side ESTIMATED WEIGHT: 17,660 lbs LEAD TIME: 26-30 weeks
8	3	Location: Tag #: Valve 8, Valve 9, Valve 11	60" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 316SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side ESTIMATED WEIGHT: 10,910 lbs LEAD TIME: 26-30 weeks

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Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

CERTIFICATES OF CONFORMANCE

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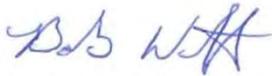
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Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
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Certificate of Conformance Butterfly Valves

We hereby certify that the valves identified herein will be manufactured in accordance with referenced specifications and the applicable sections of:

- 1) For Valves 3" – 72" - AWWA C504 – Latest Edition

The valves will be shop operated three (3) times to verify that the complete assembly is workable.



Bob Newkirk
Quality Assurance Manager
Henry Pratt Company



CERTIFICATE OF CONFORMANCE

Valve Coatings

To: Mr. Robert Bollin
Core & Main

PO Number: 9795011

Project Name: Hess Pump Station Valve Replacement

Pratt Reference: 2731977 HP

Description: Triton XR-70 Series 150B Butterfly Valves

WE HEREBY CERTIFY that the valves identified herein are manufactured and tested under a controlled program and will be in accordance with referenced specifications and applicable sections of AWWA Standards, including C550, and that the coatings applied will be in conformance with ANSI/NSF61 and ANSI/NSF372 for Potable Water Service.

Date: August 12, 2020

Bob Newkirk
Pratt Quality Assurance Manager

CC: Steve Greenwood

Document Prepared By: Laura Johnson

Title: Project Manager

Date: August 12, 2020

For more information about Pratt or to view our full line of water products, please visit www.prattvalve.com or call Pratt customer service at 1.800.423.1323.

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Purchase Order #: 9795011

Sales Order #: 2731977 HP

Proposal/Quote #: Q-020-13073

Project Name: Hess Pump Station Valve Replacement

Project Location: Wichita, KS

Date: August 12, 2020

Revision: 0

SPECIFICATION SHEETS



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TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 1

Location: Drawing C102, A Valves

Tag #: Pump Valve 1, Pump Valve 4, Pump Valve 5, Pump Valve 8

42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 4,030 lbs

C-020-26571

VALVE DATA

General Information

Material Specification

Product:	AWWA Butterfly Valve	Body Material:	C.I. ASTM A126 Cl.B
Valve Size:	42"	Disc Material:	D.I. ASTM A536 (65-45-12)
Pressure Class:	150B	Shaft Material:	304 S.S. ASTM A276
End Connection:	Flange	Disc Edge Material:	316-L
Drill Pattern:	125#	Bearing Material:	Teflon Lined Fiberglass Backing
Seat Design:	Seat in Body	Seat & Seal Material:	Buna-N
Disc/Pin Connection:	Thru Pin Design	Exterior Hardware:	Carbon Steel Zinc Plated
Shaft Packing Design:	Self Adjusting V Type		

Coating

Interior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)
Exterior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)

Valve is NSF 61, drinking water, approved.

Testing Requirements

Leak/Hydro Test:	Per AWWA C504, Latest Version
Cycle/Performance Test:	Per AWWA C504, Latest Version
Bi-Directional Leak Test:	Yes

Actual test reports will be provided at time of shipment, if required.

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/Pratt_Triton_Rubber_Seated_Brochure_Form_13226.pdf

Notes/ Customer Specifications



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Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 1

Location: Drawing C102, A Valves

Tag #: Pump Valve 1, Pump Valve 4, Pump Valve 5, Pump Valve 8

42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 4,030 lbs

C-020-26571

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Wormgear w/ Handwheel
Model:	WG-07-1SD-B
Actuator Position:	Position B7
Mounting Pattern:	FA35
Opening Direction:	Open Left
Method of Operation:	Handwheel
*See vendor model specifications for more information.	

Exterior Options

Actuator Coating:	Vendor, 4 Mils
Exterior Hardware:	Vendor Standard

Literature: [\[Copy Vendor URL Here\]](#)



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TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 2

Tag #: Pump Valve 2, Pump Valve 6, Pump Valve 7

42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 4,030 lbs

C-020-31012

VALVE DATA

General Information

Material Specification

Product:	AWWA Butterfly Valve	Body Material:	C.I. ASTM A126 Cl.B
Valve Size:	42"	Disc Material:	D.I. ASTM A536 (65-45-12)
Pressure Class:	150B	Shaft Material:	304 S.S. ASTM A276
End Connection:	Flange	Disc Edge Material:	316-L
Drill Pattern:	125#	Bearing Material:	Teflon Lined Fiberglass Backing
Seat Design:	Seat in Body	Seat & Seal Material:	Buna-N
Disc/Pin Connection:	Thru Pin Design	Exterior Hardware:	Carbon Steel Zinc Plated
Shaft Packing Design:	Self Adjusting V Type		

Coating

Interior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)
Exterior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)

Valve is NSF 61, drinking water, approved.

Testing Requirements

Leak/Hydro Test:	Per AWWA C504, Latest Version
Cycle/Performance Test:	Per AWWA C504, Latest Version
Bi-Directional Leak Test:	Yes

Actual test reports will be provided at time of shipment, if required.

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/Pratt_Triton_Rubber_Seated_Brochure_Form_13226.pdf

Notes/ Customer Specifications



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Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 2

Tag #: Pump Valve 2, Pump Valve 6, Pump Valve 7

42" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 4,030 lbs

C-020-31012

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Wormgear w/ Handwheel
Model:	WG-07-1SD-B
Actuator Position:	Position B3
Mounting Pattern:	FA35
Opening Direction:	Open Left
Method of Operation:	Handwheel
*See vendor model specifications for more information.	

Exterior Options

Actuator Coating:	Vendor, 4 Mils
Exterior Hardware:	Vendor Standard

Literature: [\[Copy Vendor URL Here\]](#)



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Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 4

Tag #: Valve 30, Valve 31, Valve 32, Valve 37, Valve 38, Valve 39

48" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 5,760 lbs

C-020-26573

VALVE DATA

General Information

Material Specification

Product:	AWWA Butterfly Valve	Body Material:	C.I. ASTM A126 Cl.B
Valve Size:	48"	Disc Material:	D.I. ASTM A536 (65-45-12)
Pressure Class:	150B	Shaft Material:	304 S.S. ASTM A276
End Connection:	Flange	Disc Edge Material:	316-L
Drill Pattern:	125#	Bearing Material:	Teflon Lined Fiberglass Backing
Seat Design:	Seat in Body	Seat & Seal Material:	Buna-N
Disc/Pin Connection:	Thru Pin Design	Exterior Hardware:	Carbon Steel Zinc Plated
Shaft Packing Design:	Self Adjusting V Type		

Coating

Interior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)
Exterior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)

Valve is NSF 61, drinking water, approved.

Testing Requirements

Leak/Hydro Test:	Per AWWA C504, Latest Version
Cycle/Performance Test:	Per AWWA C504, Latest Version
Bi-Directional Leak Test:	Yes

Actual test reports will be provided at time of shipment, if required.

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/Pratt_Triton_Rubber_Seated_Brochure_Form_13226.pdf

Notes/ Customer Specifications



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Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 4

Tag #: Valve 30, Valve 31, Valve 32, Valve 37, Valve 38, Valve 39

48" Flange 150B Butterfly Valve, Buna Seat, CI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 5,760 lbs

C-020-26573

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Wormgear w/ Handwheel
Model:	WG-75-1SD-B
Actuator Position:	Position B5
Mounting Pattern:	FA40
Opening Direction:	Open Left
Method of Operation:	Handwheel
*See vendor model specifications for more information.	

Exterior Options

Actuator Coating:	Vendor, 4 Mils
Exterior Hardware:	Vendor Standard

Literature: [\[Copy Vendor URL Here\]](#)



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Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 6

Tag #: Valve 5

72" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 17,660 lbs

C-020-26575

VALVE DATA

General Information

Material Specification

Product:	AWWA Butterfly Valve	Body Material:	D.I. ASTM A536 (65-45-12)
Valve Size:	72"	Disc Material:	D.I. ASTM A536 (65-45-12)
Pressure Class:	150B	Shaft Material:	304 S.S. ASTM A276
End Connection:	Flange	Disc Edge Material:	316-L
Drill Pattern:	125#	Bearing Material:	Teflon Lined Fiberglass Backing
Seat Design:	Seat in Body	Seat & Seal Material:	Buna-N
Disc/Pin Connection:	Thru Pin Design	Exterior Hardware:	Carbon Steel Zinc Plated
Shaft Packing Design:	Self Adjusting V Type		

Coating

Interior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)
Exterior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)

Valve is NSF 61, drinking water, approved.

Testing Requirements

Leak/Hydro Test:	Per AWWA C504, Latest Version
Cycle/Performance Test:	Per AWWA C504, Latest Version
Bi-Directional Leak Test:	Yes

Actual test reports will be provided at time of shipment, if required.

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/Pratt_Triton_Rubber_Seated_Brochure_Form_13226.pdf

Notes/ Customer Specifications

33 12 16, paragraph 2.3.B.5 - Body is ductile iron, ASTM A536 (65-45-12)



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Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 6

Tag #: Valve 5

72" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 304SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 17,660 lbs

C-020-26575

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Wormgear w/ Handwheel
Model:	WG-10-1SD-B
Actuator Position:	Position B1
Mounting Pattern:	FA60
Opening Direction:	Open Left
Method of Operation:	Handwheel
*See vendor model specifications for more information.	

Exterior Options

Actuator Coating:	Vendor, 4 Mils
Exterior Hardware:	Vendor Standard

Literature: [\[Copy Vendor URL Here\]](#)



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Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 8

Tag #: Valve 8, Valve 9, Valve 11

60" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 316SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 10,910 lbs

C-020-26577

VALVE DATA

General Information

Material Specification

Product:	AWWA Butterfly Valve	Body Material:	D.I. ASTM A536 (65-45-12)
Valve Size:	60"	Disc Material:	D.I. ASTM A536 (65-45-12)
Pressure Class:	150B	Shaft Material:	316 S.S. ASTM A276
End Connection:	Flange	Disc Edge Material:	316-L
Drill Pattern:	125#	Bearing Material:	Teflon Lined Fiberglass Backing
Seat Design:	Seat in Body	Seat & Seal Material:	Buna-N
Disc/Pin Connection:	Thru Pin Design	Exterior Hardware:	Carbon Steel Zinc Plated
Shaft Packing Design:	Self Adjusting V Type		

Coating

Interior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)
Exterior Coating:	Amercoat 370-Red (A-69636A) 2 Coats (8 Mils)

Valve is NSF 61, drinking water, approved.

Testing Requirements

Leak/Hydro Test:	Per AWWA C504, Latest Version
Cycle/Performance Test:	Per AWWA C504, Latest Version
Bi-Directional Leak Test:	Yes

Actual test reports will be provided at time of shipment, if required.

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/Pratt_Triton_Rubber_Seated_Brochure_Form_13226.pdf

Notes/ Customer Specifications

- 33 12 16, paragraph 2.3.B.5 - Body is ductile iron, ASTM A536 (65-45-12)
- 33 12 16, paragraph 2.3.B.6 - Shaft is ASTM A276, Type 316 Stainless Steel



a MUELLER brand

401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

Line Item #: 8

Tag #: Valve 8, Valve 9, Valve 11

60" Flange 150B Butterfly Valve, Buna Seat, DI Body, DI Disc, 316SS Shaft, Teflon Lined Fiberglass Backing Bearing, Limitorque Wormgear w/ Handwheel , 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Leak Test Second Side

Unit Weight: 10,910 lbs

C-020-26577

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Wormgear w/ Handwheel
Model:	WG-09-1SD-B
Actuator Position:	Position B3
Mounting Pattern:	FA48
Opening Direction:	Open Left
Method of Operation:	Handwheel
*See vendor model specifications for more information.	

Exterior Options

Actuator Coating:	Vendor, 4 Mils
Exterior Hardware:	Vendor Standard

Literature: [\[Copy Vendor URL Here\]](#)

PRATT[®]

a **MUELLER** brand

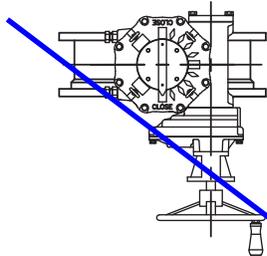
401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

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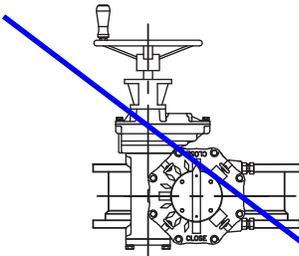
GENERAL ARRANGMENTS

Line Item 1 (Pump Valves 1, 4, 5, 8)

Line Item 2 (Pump Valves 2, 6, 7)



ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B5 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



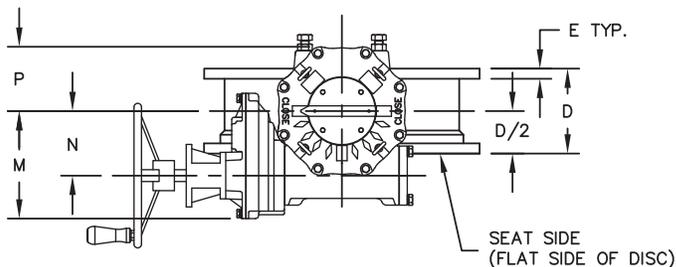
ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B1 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)

VALVE SIZE	A	B	C	D	E	F	G
24	18-5/8	18-5/8	32	8	1-7/8	20--1-1/4	29-1/2
30	21-1/2	24-3/8	38-3/4	12	2-1/8	28--1-1/4	36
36	25-7/16	28-1/4	46	12	2-3/8	32--1-1/2	42-3/4
42	29-7/8	32-7/8	53	12	2-5/8	36--1-1/2	49-1/2
48	34-1/16	37-1/8	59-1/2	15	2-3/4	44--1-1/2	56
54	37-1/2	40-7/8	66-1/4	15	3	44--1-3/4	62-3/4
60	41-3/4	45-1/8	73	15	3-1/8	52--1-3/4	69-1/4
66	46-1/16	49-3/4	80	18	3-3/8	52--1-3/4	76
72	50	53-5/8	86-1/2	18	3-1/2	60--1-3/4	82-1/2

WORMGEAR DIMENSIONS

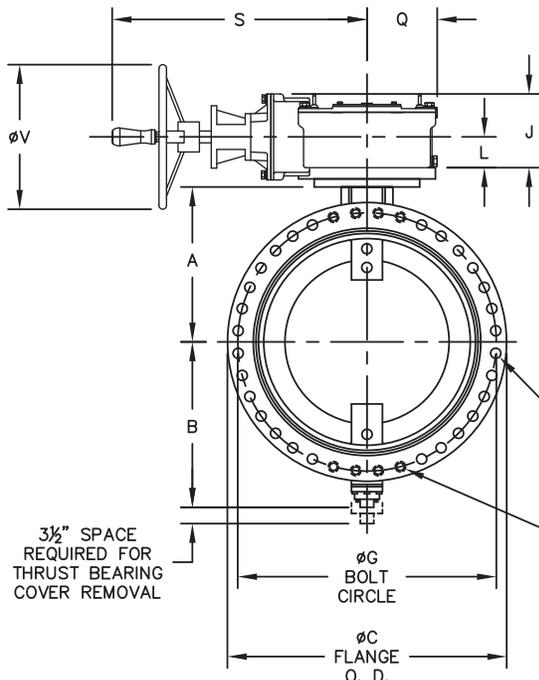
UNIT SIZE	J	L	M	N	P	Q	S	V
WG-04	6-1/8	2-7/8	9-1/2	6	6-7/16	6-1/8	18-1/8	30
WG-04-1SD-B	6-1/8	2-7/8	10	6	67/16	6-1/8	20-7/8	18
WG-07-1SD-B	10-1/2	4-1/2	17-1/8	11	11-7/16	10-3/4	24-5/8	36
WG-75-1SD-B	12-3/8	4-3/4	20-1/2	12-3/4	13-3/8	11	33-1/4	30
WG-09-1SD-B	13-1/8	5-7/16	25-3/8	17-3/4	18-3/8	17-3/4	36-1/4	30
WG-10-1SD-B	16-3/16	6-1/2	30-1/8	20-3/16	20-3/4	20-3/4	42	36

REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS AND ACCESSORIES



See EPS-23-E for position B3 ← LN 2

LN 1 → ACTUATOR SHOWN IN PRATT B7 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



F = TOTAL NO. & SIZE OF BOLTS
125 LB STD LAYOUT
STRADDLE CENTERLINE
EACH FLANGE
(INCLUDES TAPPED HOLES)

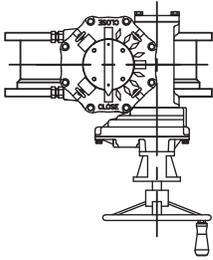
TAPPED HOLES "F" UNC2B X E DEEP
VALVE NO. TAPPED HOLES
SIZE (EACH FLANGE)
24" 2 TOP; 2 BOTTOM
30"-72" 4-TOP; 4-BOTTOM

NOTES:

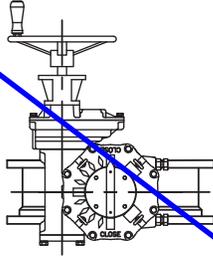
- ALL DIMENSIONS SHOWN IN INCHES.
- "D" DIMENSION ±1/8".
- FOR BOLTS SMALLER THAN Ø1-3/4, BOLT HOLES WILL BE 1/8" LARGER THAN DIAMETER OF BOLT. ~~FOR BOLTS Ø1-3/4 OR LARGER, BOLT HOLES WILL BE 1/4" LARGER THAN DIAMETER OF BOLT.~~
- DIMENSIONS AND DRILLING OF END FLANGES CONFORM TO THE AMERICAN CAST IRON FLANGE STANDARDS, CLASS 125 (B16.1).
- VALVES MANUFACTURED & TESTED IN ACCORDANCE WITH AWWA SPECIFICATION C-504 LATEST REVISION, CLASS 150B.
- RECOMMENDATION FOR MATING FLANGES: WHERE INSULATING BUSHINGS ARE USED, IT IS NECESSARY THAT BOLT HOLES BE DRILLED OVERSIZE BY AN AMOUNT EQUAL TO TWO TIMES THE INSULATING SLEEVE THICKNESS TO MAINTAIN THE SAME MINIMUM CLEARANCE FOR BOLTS.
- CAUTION: IT IS RECOMMENDED THAT VALVES BE INSTALLED INTO PIPING SYSTEM IN ACCORDANCE WITH AWWA M-11 TO PREVENT ANY UNDUE PIPING STRESS, DEFLECTION OR BENDING THAT MAY EFFECT THE PERFORMANCE OF THE VALVE.

REV	DATE	DESCRIPTION	DWN	APP
1	8/1/20	ADDED ALTERNATE ACTUATOR POSITIONS AND ACTUATORS WG-07, WG-75, WG-09 & WG-10	TT	RF
GENERAL ARRANGEMENT DRAWING TRITON XR70 VALVE FLANGED ENDS LIMITORQUE WORMGEARS WITH HANDWHEEL				
SCALE NONE DATE 6/9/20				
DRAWN BY RL CHECKED BY RF				
APPROVED GA=BORDER				
DRWG. NO. GA-12568			REV 1	AYC

Line Item 4 (Valves 30, 31, 32, 37, 38, 39)



ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B5 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



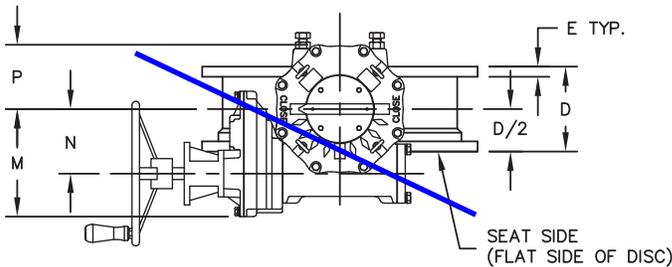
ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B1 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)

VALVE SIZE	A	B	C	D	E	F	G
24	18-5/8	18-5/8	32	8	1-7/8	20--1-1/4	29-1/2
30	21-1/2	24-3/8	38-3/4	12	2-1/8	28--1-1/4	36
36	25-7/16	28-1/4	46	12	2-3/8	32--1-1/2	42-3/4
42	29-7/8	32-7/8	53	12	2-5/8	36--1-1/2	49-1/2
48	34-1/16	37-1/8	59-1/2	15	2-3/4	44--1-1/2	56
54	37-1/2	40-7/8	66-1/4	15	3	44--1-3/4	62-3/4
60	41-3/4	45-1/8	73	15	3-1/8	52--1-3/4	69-1/4
66	46-1/16	49-3/4	80	18	3-3/8	52--1-3/4	76
72	50	53-5/8	86-1/2	18	3-1/2	60--1-3/4	82-1/2

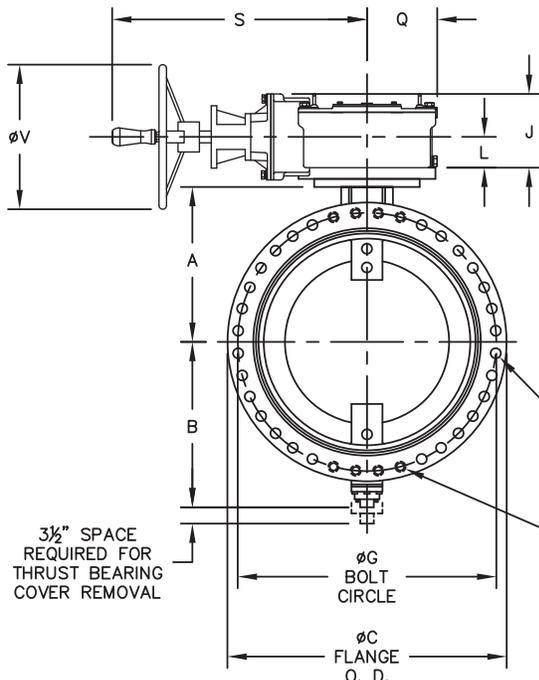
WORMGEAR DIMENSIONS

UNIT SIZE	J	L	M	N	P	Q	S	V
WG-04	6-1/8	2-7/8	9-1/2	6	6-7/16	6-1/8	18-1/8	30
WG-04-1SD-B	6-1/8	2-7/8	10	6	67/16	6-1/8	20-7/8	18
WG-07-1SD-B	10-1/2	4-1/2	17-1/8	11	11-7/16	10-3/4	24-5/8	36
WG-75-1SD-B	12-3/8	4-3/4	20-1/2	12-3/4	13-3/8	11	33-1/4	30
WG-09-1SD-B	13-1/8	5-7/16	25-3/8	17-3/4	18-3/8	17-3/4	36-1/4	30
WG-10-1SD-B	16-3/16	6-1/2	30-1/8	20-3/16	20-3/4	20-3/4	42	36

REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS AND ACCESSORIES



ACTUATOR SHOWN IN PRATT B7 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



F = TOTAL NO. & SIZE OF BOLTS
125 LB STD LAYOUT
STRADDLE CENTERLINE
EACH FLANGE
(INCLUDES TAPPED HOLES)

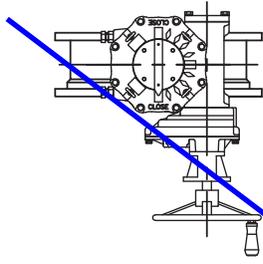
TAPPED HOLES "F" UNC2B X E DEEP
VALVE NO. TAPPED HOLES
SIZE (EACH FLANGE)
24" 2 TOP; 2 BOTTOM
30"-72" 4-TOP; 4-BOTTOM

3/2" SPACE
REQUIRED FOR
THRUST BEARING
COVER REMOVAL

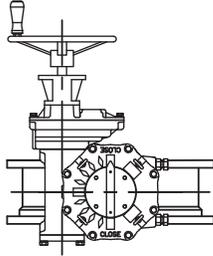
NOTES:

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- "D" DIMENSION ±1/8".
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~~FOR BOLTS Ø1-3/4 OR LARGER, BOLT HOLES WILL BE 1/4" LARGER THAN DIAMETER OF BOLT.~~
- DIMENSIONS AND DRILLING OF END FLANGES CONFORM TO THE AMERICAN CAST IRON FLANGE STANDARDS, CLASS 125 (B16.1).
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REV	DATE	DESCRIPTION	DWN	APP
1	8/1/20	ADDED ALTERNATE ACTUATOR POSITIONS AND ACTUATORS WG-07, WG-75, WG-09 & WG-10	TT	RF
GENERAL ARRANGEMENT DRAWING TRITON XR70 VALVE FLANGED ENDS LIMITORQUE WORMGEARS WITH HANDWHEEL				
SCALE NONE DATE 6/9/20				
DRAWN BY RL CHECKED BY RF				
APPROVED GA=BORDER				
DRWG. NO.	GA-12568	REV 1	A/C	



ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B5 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B1 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)

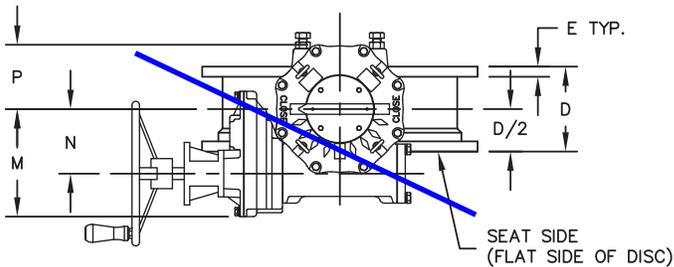
VALVE SIZE	A	B	C	D	E	F	G
24	18-5/8	18-5/8	32	8	1-7/8	20--1-1/4	29-1/2
30	21-1/2	24-3/8	38-3/4	12	2-1/8	28--1-1/4	36
36	25-7/16	28-1/4	46	12	2-3/8	32--1-1/2	42-3/4
42	29-7/8	32-7/8	53	12	2-5/8	36--1-1/2	49-1/2
48	34-1/16	37-1/8	59-1/2	15	2-3/4	44--1-1/2	56
54	37-1/2	40-7/8	66-1/4	15	3	44--1-3/4	62-3/4
60	41-3/4	45-1/8	73	15	3-1/8	52--1-3/4	69-1/4
66	46-1/16	49-3/4	80	18	3-3/8	52--1-3/4	76
72	50	53-5/8	86-1/2	18	3-1/2	60--1-3/4	82-1/2

WORMGEAR DIMENSIONS

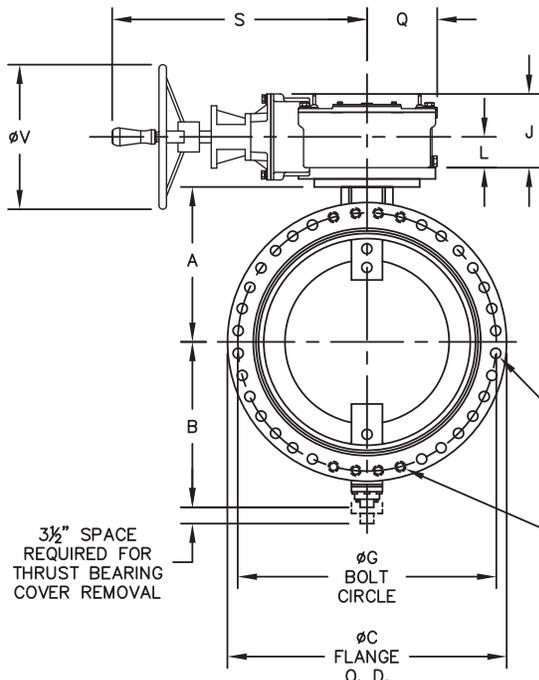
UNIT SIZE	J	L	M	N	P	Q	S	V
WG-04	6-1/8	2-7/8	9-1/2	6	6-7/16	6-1/8	18-1/8	30
WG-04-1SD-B	6-1/8	2-7/8	10	6	67/16	6-1/8	20-7/8	18
WG-07-1SD-B	10-1/2	4-1/2	17-1/8	11	11-7/16	10-3/4	24-5/8	36
WG-75-1SD-B	12-3/8	4-3/4	20-1/2	12-3/4	13-3/8	11	33-1/4	30
WG-09-1SD-B	13-1/8	5-7/16	25-3/8	17-3/4	18-3/8	17-3/4	36-1/4	30
WG-10-1SD-B	16-3/16	6-1/2	30-1/8	20-3/16	20-3/4	20-3/4	42	36

REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS AND ACCESSORIES

LN 6



ACTUATOR SHOWN IN PRATT B7 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



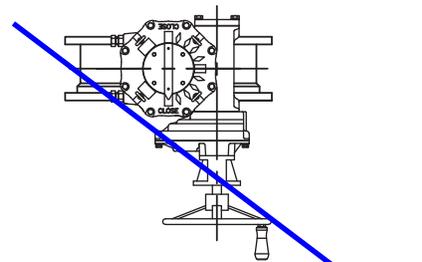
F = TOTAL NO. & SIZE OF BOLTS
125 LB STD LAYOUT
STRADDLE CENTERLINE
EACH FLANGE
(INCLUDES TAPPED HOLES)

TAPPED HOLES "F" UNC2B X E DEEP
VALVE NO. TAPPED HOLES
SIZE (EACH FLANGE)
24" 2 TOP, 2 BOTTOM
30"-72" 4-TOP, 4-BOTTOM

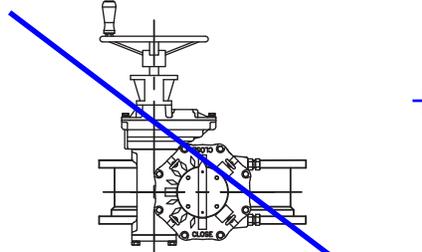
NOTES:

- ALL DIMENSIONS SHOWN IN INCHES.
- "D" DIMENSION ±1/8".
- ~~FOR BOLTS SMALLER THAN 1/2 3/4, BOLT HOLES WILL BE 1/8" LARGER THAN DIAMETER OF BOLT.~~
FOR BOLTS Ø1-3/4 OR LARGER, BOLT HOLES WILL BE 1/4" LARGER THAN DIAMETER OF BOLT.
- DIMENSIONS AND DRILLING OF END FLANGES CONFORM TO THE AMERICAN CAST IRON FLANGE STANDARDS, CLASS 125 (B16.1).
- VALVES MANUFACTURED & TESTED IN ACCORDANCE WITH AWWA SPECIFICATION C-504 LATEST REVISION, CLASS 150B.
- RECOMMENDATION FOR MATING FLANGES: WHERE INSULATING BUSHINGS ARE USED, IT IS NECESSARY THAT BOLT HOLES BE DRILLED OVERSIZE BY AN AMOUNT EQUAL TO TWO TIMES THE INSULATING SLEEVE THICKNESS TO MAINTAIN THE SAME MINIMUM CLEARANCE FOR BOLTS.
- CAUTION: IT IS RECOMMENDED THAT VALVES BE INSTALLED INTO PIPING SYSTEM IN ACCORDANCE WITH AWWA M-11 TO PREVENT ANY UNDUE PIPING STRESS, DEFLECTION OR BENDING THAT MAY EFFECT THE PERFORMANCE OF THE VALVE.

REV	DATE	DESCRIPTION	DWN	APP
1	8/1/20	ADDED ALTERNATE ACTUATOR POSITIONS AND ACTUATORS WG-07, WG-75, WG-09 & WG-10	TT	RF
GENERAL ARRANGEMENT DRAWING TRITON XR70 VALVE FLANGED ENDS LIMITORQUE WORMGEARS WITH HANDWHEEL				
SCALE NONE DATE 6/9/20				
DRAWN BY RL CHECKED BY RF				
APPROVED GA=BORDER				
DRWG. NO.	GA-12568	REV 1	A/C	



ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B5 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



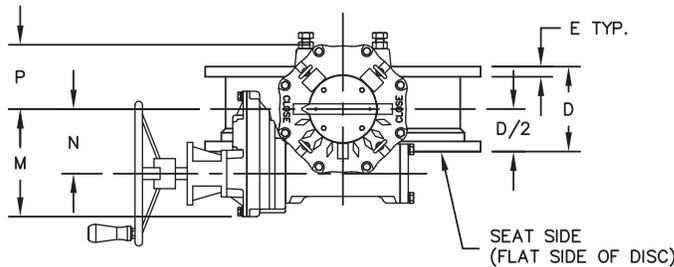
ALTERNATE POSITION
ACTUATOR SHOWN IN PRATT B1 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)

VALVE SIZE	A	B	C	D	E	F	G
24	18-5/8	18-5/8	32	8	1-7/8	20--1-1/4	29-1/2
30	21-1/2	24-3/8	38-3/4	12	2-1/8	28--1-1/4	36
36	25-7/16	28-1/4	46	12	2-3/8	32--1-1/2	42-3/4
42	29-7/8	32-7/8	53	12	2-5/8	36--1-1/2	49-1/2
48	34-1/16	37-1/8	59-1/2	15	2-3/4	44--1-1/2	56
54	37-1/2	40-7/8	66-1/4	15	3	44--1-3/4	62-3/4
60	41-3/4	45-1/8	73	15	3-1/8	52--1-3/4	69-1/4
66	46-1/16	49-3/4	80	18	3-3/8	52--1-3/4	76
72	50	53-5/8	86-1/2	18	3-1/2	60--1-3/4	82-1/2

WORMGEAR DIMENSIONS

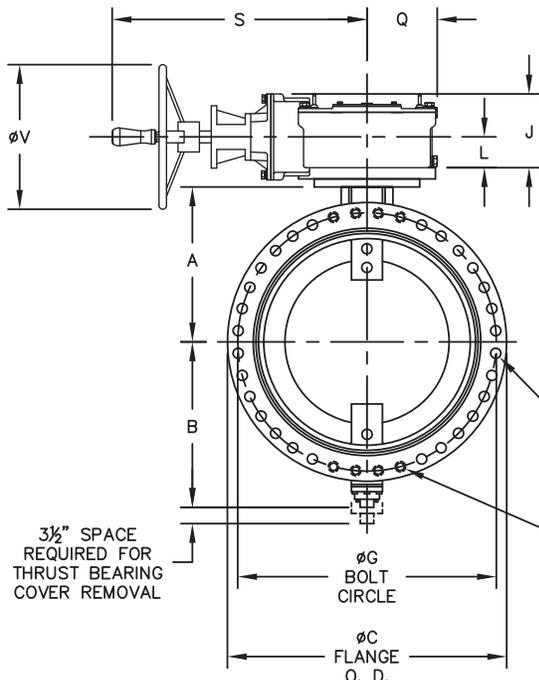
UNIT SIZE	J	L	M	N	P	Q	S	V
WG-04	6-1/8	2-7/8	9-1/2	6	6-7/16	6-1/8	18-1/8	30
WG-04-1SD-B	6-1/8	2-7/8	10	6	67/16	6-1/8	20-7/8	18
WG-07-1SD-B	10-1/2	4-1/2	17-1/8	11	11-7/16	10-3/4	24-5/8	36
WG-75-1SD-B	12-3/8	4-3/4	20-1/2	12-3/4	13-3/8	11	33-1/4	30
WG-09-1SD-B	13-1/8	5-7/16	25-3/8	17-3/4	18-3/8	17-3/4	36-1/4	30
WG-10-1SD-B	16-3/16	6-1/2	30-1/8	20-3/16	20-3/4	20-3/4	42	36

REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS AND ACCESSORIES



See EPS-23-E for position B3 ← LN 8

ACTUATOR SHOWN IN PRATT B7 POSITION
(VENDOR POSITION A, SEE VENDOR DRAWINGS)



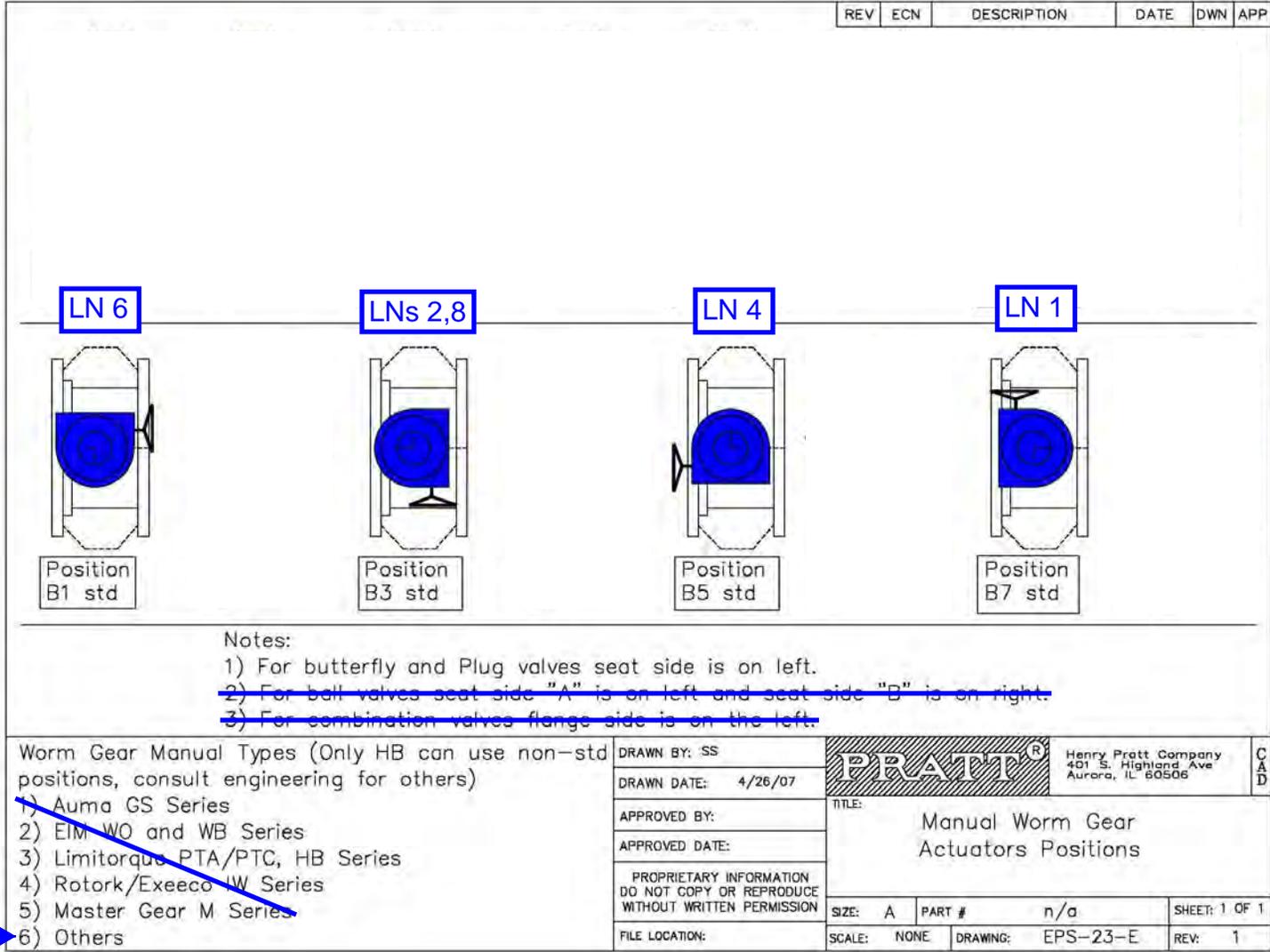
F = TOTAL NO. & SIZE OF BOLTS
125 LB STD LAYOUT
STRADDLE CENTERLINE
EACH FLANGE
(INCLUDES TAPPED HOLES)

TAPPED HOLES "F" UNC2B X E DEEP
VALVE NO. TAPPED HOLES
SIZE (EACH FLANGE)
24" 2 TOP; 2 BOTTOM
30"-72" 4-TOP; 4-BOTTOM

NOTES:

- ALL DIMENSIONS SHOWN IN INCHES.
- "D" DIMENSION ±1/8".
- ~~FOR BOLTS SMALLER THAN 1 3/4, BOLT HOLES WILL BE 1/8" LARGER THAN DIAMETER OF BOLT.~~
FOR BOLTS Ø1-3/4 OR LARGER, BOLT HOLES WILL BE 1/4" LARGER THAN DIAMETER OF BOLT.
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- VALVES MANUFACTURED & TESTED IN ACCORDANCE WITH AWWA SPECIFICATION C-504 LATEST REVISION, CLASS 150B.
- RECOMMENDATION FOR MATING FLANGES: WHERE INSULATING BUSHINGS ARE USED, IT IS NECESSARY THAT BOLT HOLES BE DRILLED OVERSIZE BY AN AMOUNT EQUAL TO TWO TIMES THE INSULATING SLEEVE THICKNESS TO MAINTAIN THE SAME MINIMUM CLEARANCE FOR BOLTS.
- CAUTION: IT IS RECOMMENDED THAT VALVES BE INSTALLED INTO PIPING SYSTEM IN ACCORDANCE WITH AWWA M-11 TO PREVENT ANY UNDUE PIPING STRESS, DEFLECTION OR BENDING THAT MAY EFFECT THE PERFORMANCE OF THE VALVE.

REV	DATE	DESCRIPTION	DWN	APP
1	8/1/20	ADDED ALTERNATE ACTUATOR POSITIONS AND ACTUATORS WG-07, WG-75, WG-09 & WG-10	TT	RF
GENERAL ARRANGEMENT DRAWING TRITON XR70 VALVE FLANGED ENDS LIMITORQUE WORMGEARS WITH HANDWHEEL				
SCALE NONE DATE 6/9/20				
DRAWN BY RL CHECKED BY RF				
APPROVED GA=BORDER				
DRWG. NO.	GA-12568	REV 1	A/C	



PRATT[®]

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401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

ACTUATOR INFORMATION

Line Item 1 (Pump Valves 1, 4, 5, 8)

Line Item 2 (Pump Valves 2, 6, 7)

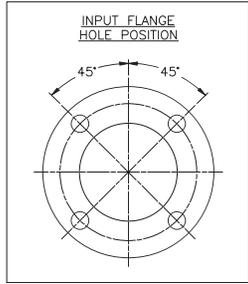


TABLE 3

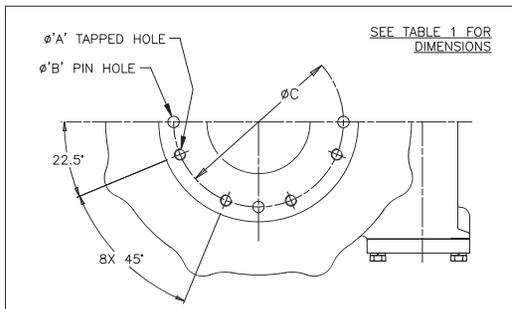
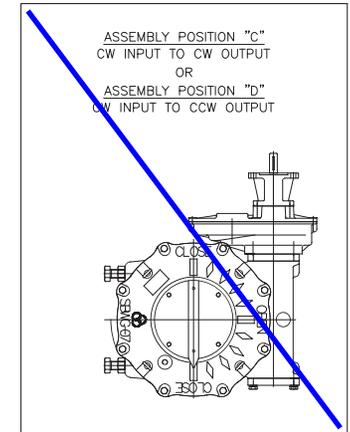
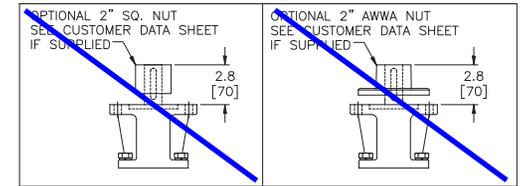
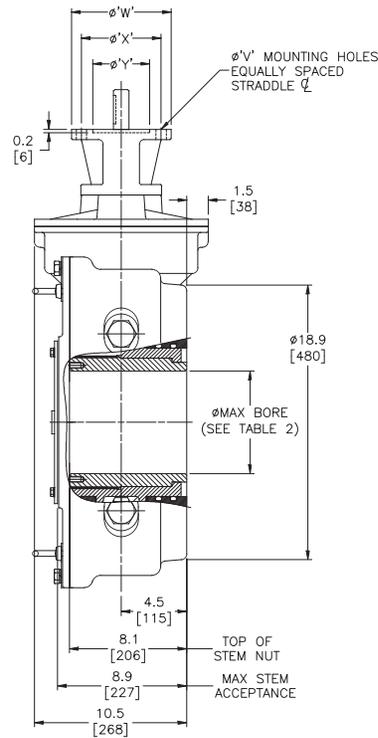
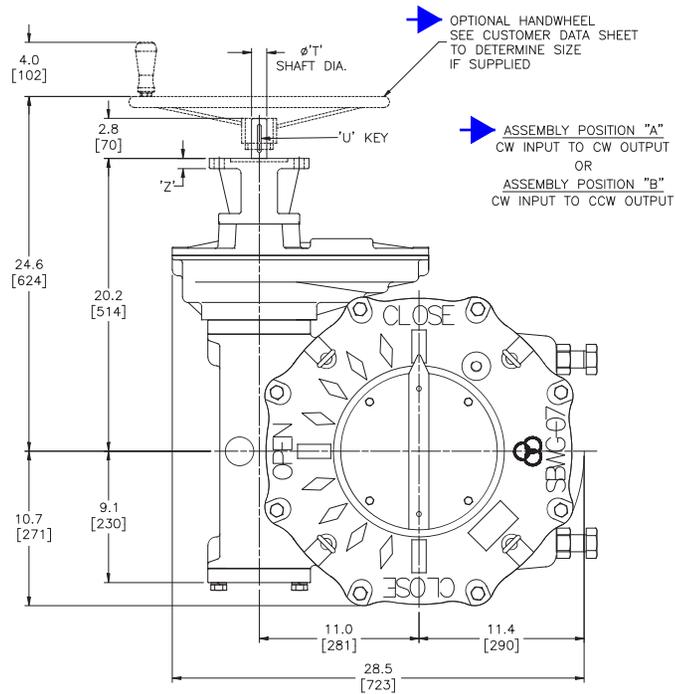
INPUT FLANGE	ϕV	ϕW	ϕX	ϕY	Z
MSS (INCH)	FA10 (4) $\phi 43$	$\phi 4.9$	$\phi 4.02$	$\phi 2.312$.63
	FA14 (4) $\phi 71$	$\phi 6.9$	$\phi 5.51$	$\phi 3.750$.71
	FA16 (4) $\phi 87$	$\phi 8.3$	$\phi 6.50$	$\phi 5.000$.79
ISO (METRIC)	F10 (4) $\phi 11$	$\phi 125$	$\phi 102$	$\phi 70$	16
	F14 (4) $\phi 18$	$\phi 175$	$\phi 140$	$\phi 100$	18
	F16 (4) $\phi 22$	$\phi 210$	$\phi 165$	$\phi 130$	20

TABLE 4

RATIO	ϕT	U
350:1	1.772 [45]	.551 X .354 [14 X 9]
674:1	0.984 [25]	.315 X .276 [8 X 7] *
1088:1	0.984 [25]	.315 X .276 [8 X 7] *

* REQUIRES [8 X 6] KEY IF MOUNTING TO L120-10

REVISIONS		BY	DATE	APPVD
REV	DESCRIPTION			
A	ADDED OPTIONAL HW UPDATED STEM NUT CHART ADDED CHART FOR 2" SQ. NUT & AWWA NUT	TSC	3/19/2015	ILY
B	ADDED NEW TABLE 4 UPDATED TABLE 2	TSC	4/23/2015	KDC
C	ADDED POSITION "B" AND "C" NOTES	RJB	9/9/2016	KDC



NOTE:
1. SEE CUSTOMER DATA SHEET TO DETERMINE INPUT FLANGE, BASE, AND ASSEMBLY POSITION SUPPLIED.

TABLE 1

MOUNTING BASE	ϕA	ϕB	ϕC
MSS (INCH)	FA30 (8) 3/4-10 UNC TAP X 1.2 DP	NA	$\phi 11.73$
	FA35 (8) 1-8 UNC TAP X 1.8 DP	NA	$\phi 14.02$
	FA40 (8) 1 1/4-7 UNC TAP X 2.1 DP	NA	$\phi 15.98$
ISO (MM)	F30 (8) M20 TAP X 30 DP	(4) $\phi 20$ PIN X 20 DP	$\phi 298$
	F35 (8) M30 TAP X 45 DP	(4) $\phi 30$ PIN X 30 DP	$\phi 356$
	F40 (8) M36 TAP X 54 DP	(4) $\phi 36$ PIN X 36 DP	$\phi 406$

TABLE 2

MAX BORE	MAX KEY (SQUARE)	MAX KEY (RECTANGLE)
$\phi 5.875$	1 1/2 X 1 1/2	-
$\phi 6.313$	-	1 1/2 X 1
[$\phi 164$]	-	[40 X 22]

DRAWN	DATE	Limitorque Actuation Systems 5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318	
RJB	9/12/13	TITLE	
CHECKED	DATE	WG-07-1SD WORM GEAR OPERATOR WITH: A) MSS & ISO MOUNTING BASES B) MSS & ISO INPUT FLANGES C) OPTIONAL HW, 2" SQ. NUT, 2" AWWA NUT	
APPROVED	DATE	SIZE	REV
ILY	9/12/13	A	C
1 = MILLIMETER VALUE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		DWG NO	ORDER NO
		04-573-0015	N/A



Customer Data Sheet

Limitorque

5114 Woodall Road
Lynchburg, VA 24502-2248
434-845-9736www.flowserve.com

Phone: 434-528-4400
Fax:

SALES ORDER NO. 183125 REV 0	ORDER LINE 001	DATE ORDERED 07/02/20
CUSTOMER PURCHASE ORDER 1356593		CUSTOMER NO. 71750
OPERATOR LOBRIEN		CONFIGURATION 197496.0
SOLD TO	HENRY PRATT CO 401 S HIGHLAND AVE AURORA, IL 60506-5563 UNITED STATES	

END USER WICHITA, KS
END PROJECT HESS PUMP STATION VALVE REPLACEMENT

ACTUATOR DATA

Gearbox Model WG-07-1SD-B
Enclosure Type WP
Max Rated Torque 37690 ft-lb 51108 Nm
Max 1-time Input Torque 639 ft-lb 866 Nm
Ratio 350:1
Input/Output Rotation Position A - CW input/CW output
Input Flange/Shaft FA14 / 45-14X9
Input Device 36" HANDWHEEL
Mounting Base MSS-FA35
Stem Nut Data MACHINED ETO
Outline Drawing 04-573-0015
Lubricant ZENITH LH2
Paint Polyurethane BLUE
Weight 675 lbs 306 Kg
Instruction Manual LMENIM2101 on internet @ limitorque.com.
TAG ALL: ZHP2731977001

Line Item 1
Pump Valve 1
Pump Valve 4
Pump Valve 5
Pump Valve 8



Customer Data Sheet

Limitorque

5114 Woodall Road
 Lynchburg, VA 24502-2248
 434-845-9736 www.flowserve.com

Phone: 434-528-4400
 Fax:

SALES ORDER NO. 183125 REV 0	ORDER LINE 002	DATE ORDERED 07/02/20
CUSTOMER PURCHASE ORDER 1356593		CUSTOMER NO. 71750
OPERATOR LOBRIEN		CONFIGURATION 197497.0
SOLD TO	HENRY PRATT CO 401 S HIGHLAND AVE AURORA, IL 60506-5563 UNITED STATES	

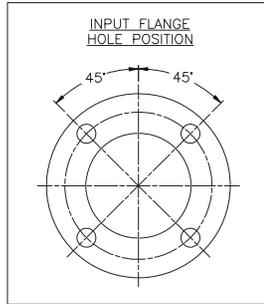
END USER WICHITA, KS
 END PROJECT HESS PUMP STATION VALVE REPLACEMENT

ACTUATOR DATA

Gearbox Model WG-07-1SD-B
 Enclosure Type WP
 Max Rated Torque 37690 ft-lb 51108 Nm
 Max 1-time Input Torque 639 ft-lb 866 Nm
 Ratio 350:1
 Input/Output Rotation Position A - CW input/CW output
 Input Flange/Shaft FA14 / 45-14X9
 Input Device 36" HANDWHEEL
 Mounting Base MSS-FA35
 Stem Nut Data MACHINED ETO
 Outline Drawing 04-573-0015
 Lubricant ZENITH LH2
 Paint Polyurethane BLUE
 Weight 675 lbs 306 Kg
 Instruction Manual LMENIM2101 on internet @ limitorque.com.
 TAG ALL: ZHP2731977002

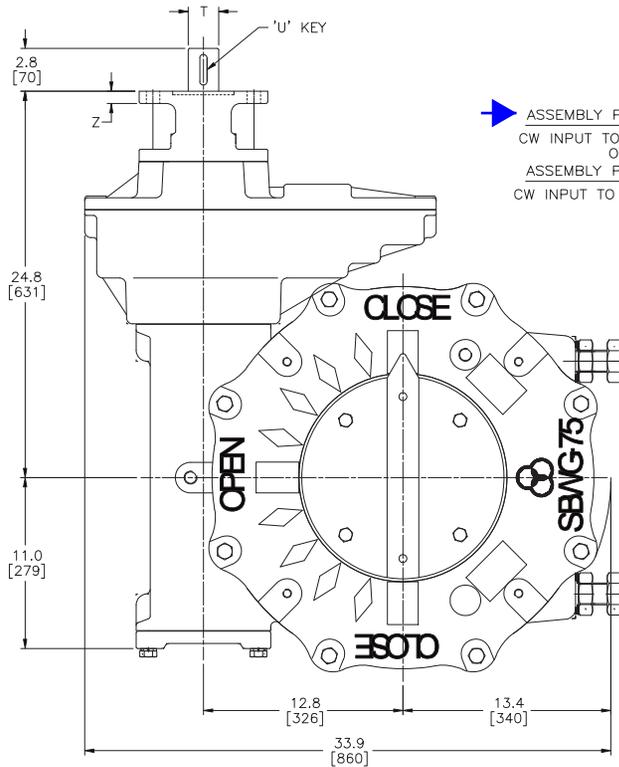
Line Item 2
 Pump Valve 2
 Pump Valve 6
 Pump Valve 7

Line Item 4 (Valves 30, 31, 32, 37, 38, 39)



	INPUT FLANGE	T	U	V	W	X	Y	Z
MSS (INCH)	FA14	Ø1.57	.472 X .315	(4) Ø.71	Ø6.9	Ø5.5	Ø3.750	.79
	FA16	Ø1.97	.630 X .394	(4) Ø.87	Ø8.27	Ø6.5	Ø5.000	.79
ISO (METRIC)	F14	Ø40	12 X 8	(4) Ø18	Ø175	Ø140	Ø100	20
	F16	Ø50	16 X 10	(4) Ø22	Ø210	Ø165	Ø130	20

REVISONS		BY	DATE	APPVD
REV	DESCRIPTION			



ASSEMBLY POSITION "A"
CW INPUT TO CW OUTPUT OR
ASSEMBLY POSITION "B"
CW INPUT TO CCW OUTPUT

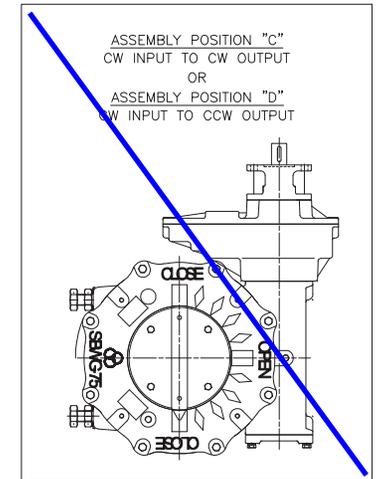
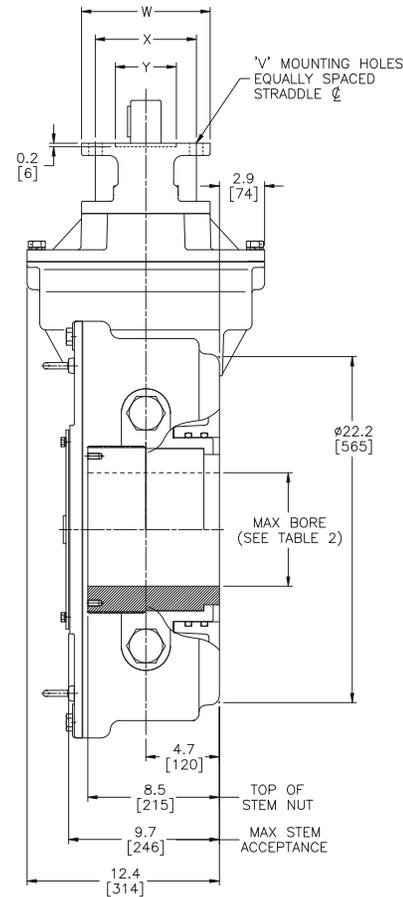
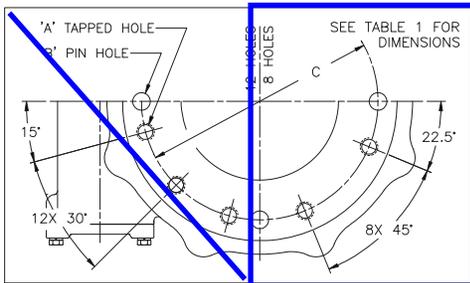


TABLE 2

MAX BORE	MAX KEYWAY (SQUARE)	MAX KEYWAY (RECTANGLE)
Ø7.125	1 3/4 X 1 3/4	-
Ø7.250	-	1 3/4 X 1 1/2
Ø188	-	[45 X 25]



NOTE:
1. SEE CUST. DATA SHEET TO DETERMINE BASE AND ASSEMBLY POSITION SUPPLIED.

TABLE 1

MOUNTING BASE	A	B	C
FA35	(8) 1-8 UNC TAP X 1.8 DP	NA	Ø14.0
FA40	(8) 1 1/4-7 UNC TAP X 2.1 DP	NA	Ø16.0
FA48	(12) 1 1/4-7 UNC TAP X 2.1 DP	NA	Ø19.0
F35	(8) M30 TAP X 45 DP	(4) Ø30 PIN X 30 DP	Ø356
F40	(8) M36 TAP X 54 DP	(4) Ø36 PIN X 36 DP	Ø406
F48	(12) M36 TAP X 54 DP	(4) Ø36 PIN X 36 DP	Ø483

DRAWN RJB	DATE 11/18/13	 Limatorque Actuation Systems <small>5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318</small>
CHECKED ILY	DATE 11/19/13	
APPROVED ILY	DATE 11/19/13	TITLE WG-75-1SD WORM GEAR OPERATOR WITH: A) MSS & ISO MOUNTING BASES B) MSS & ISO INPUT FLANGES
SIZE A DWG NO 04-573-0029		REV
SCALE NONE ORDER NO N/A		



Customer Data Sheet

Limitorque

5114 Woodall Road
 Lynchburg, VA 24502-2248
 434-845-9736 www.flowserve.com

Phone: 434-528-4400
 Fax:

SALES ORDER NO. 183125 REV 0	ORDER LINE 003	DATE ORDERED 07/02/20
CUSTOMER PURCHASE ORDER 1356593		CUSTOMER NO. 71750
OPERATOR LOBRIEN		CONFIGURATION 197498.0
SOLD TO	HENRY PRATT CO 401 S HIGHLAND AVE AURORA, IL 60506-5563 UNITED STATES	

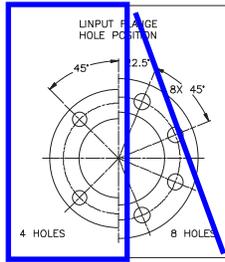
END USER WICHITA, KS
 END PROJECT HESS PUMP STATION VALVE REPLACEMENT

ACTUATOR DATA

Gearbox Model WG-75-1SD-B
 Enclosure Type WP
 Max Rated Torque 60110 ft-lb 81509 Nm
 Max 1-time Input Torque 656 ft-lb 890 Nm
 Ratio 544:1
 Input/Output Rotation Position A - CW input/CW output
 Input Flange/Shaft FA14 / 45-14X9
 Input Device 30" HANDWHEEL
 Mounting Base MSS-FA40
 Stem Nut Data MACHINED ETO
 Outline Drawing 04-573-0029
 Lubricant ZENITH LH2
 Paint Polyurethane BLUE
 Weight 992 lbs 450 Kg
 Instruction Manual LMENIM2101 on internet @ limitorque.com.
 TAG ALL: ZHP2731977004

Line Item 4

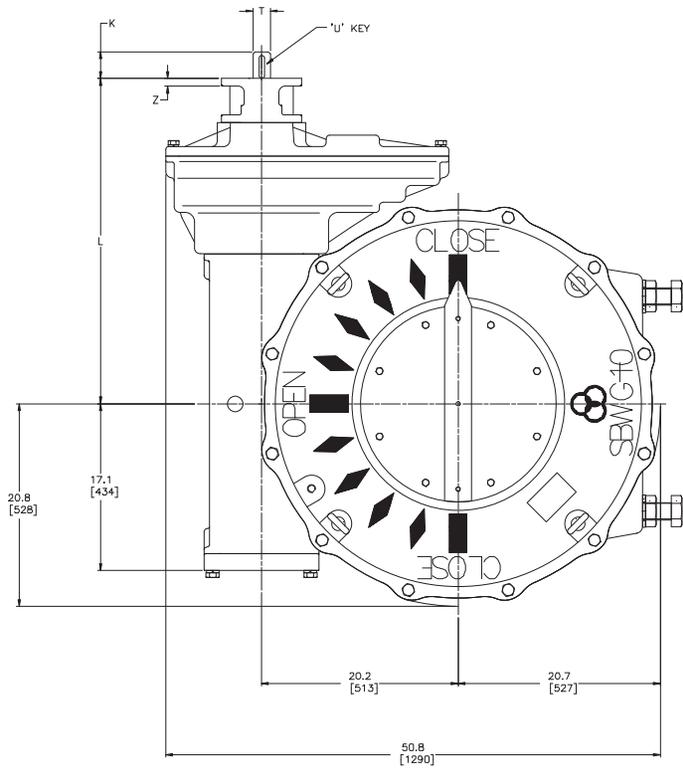
- Valve 30
- Valve 31
- Valve 32
- Valve 37
- Valve 38
- Valve 39



INPUT FLANGE*	K	L	T	U	V	W	X	Y	Z	
MSS (INCH)	FA14	Ø2.8	33.6	Ø1.77	.551 X .354	(4) Ø.71	Ø6.9	Ø5.5	Ø3.750	.79
	FA16	Ø2.8	33.4	Ø1.77	.551 X .354	(4) Ø.87	Ø8.3	Ø6.5	Ø5.000	.79
	FA25	Ø3.5	30.7	Ø2.36	.709 X .433	(8) Ø.71	Ø11.8	Ø10.0	Ø6.000	.87
	FA30	Ø3.5	30.9	Ø2.36	.709 X .433	(8) Ø.87	Ø13.8	Ø11.8	Ø7.000	.94
	FA35	Ø4.3	31.1	Ø2.36	.709 X .433	(8) Ø1.1	Ø16.3	Ø14.0	Ø8.500	1.02
ISO (mm)	F14	Ø70	853	Ø45	14 X 9	(4) Ø18	Ø175	Ø140	Ø100	20
	F16	Ø70	848	Ø45	14 X 9	(4) Ø22	Ø210	Ø165	Ø130	20
	F25	Ø90	779	Ø60	18 X 11	(8) Ø18	Ø300	Ø254	Ø200	22
	F30	Ø90	784	Ø60	18 X 11	(8) Ø22	Ø350	Ø298	Ø230	24
	F35	Ø110	789	Ø60	18 X 11	(8) Ø28	Ø415	Ø356	Ø260	26

* SEE CUSTOMER DATA SHEET FOR FLANGE AND SHAFT SIZE SUPPLIED

REVISIONS		BY	DATE	APPVD
REV	DESCRIPTION			



ASSEMBLY POSITION "A"
CW INPUT TO CW OUTPUT
OR
ASSEMBLY POSITION "B"
CW INPUT TO CCW OUTPUT

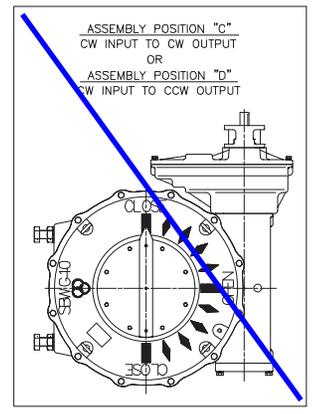
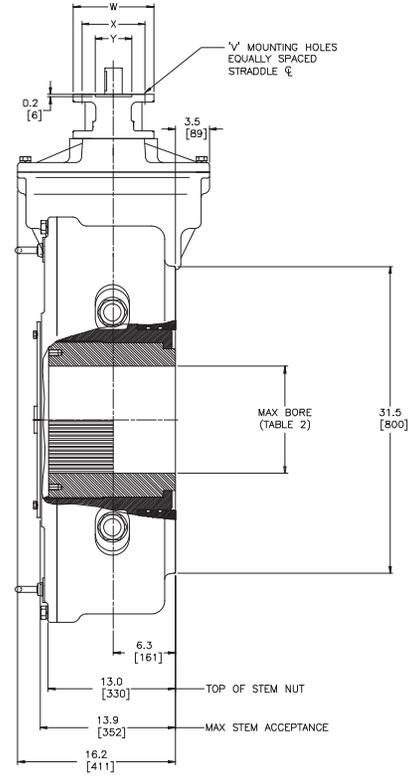
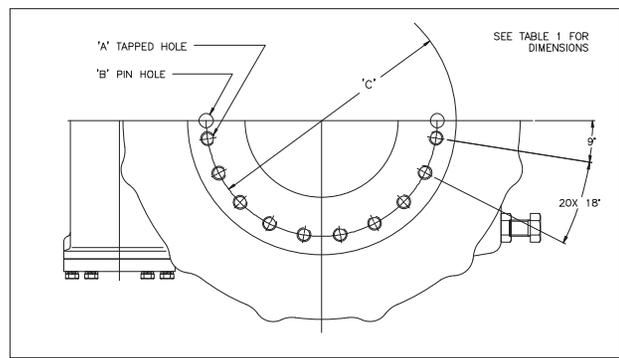


TABLE 2

MAX BORE	MAX KEYWAY (SQUARE)	MAX KEYWAY (RECTANGLE)
Ø10.625	2 1/2 X 2 1/2	-
Ø11.000	-	2 1/2 X 1 3/4
Ø[286]	-	[63 X 32]



NOTE:
1. SEE CUSTOMER DATA SHEET TO DETERMINE BASE AND ASSEMBLY POSITION SUPPLIED.

TABLE 1

MOUNTING BASE	A	B	C
MSS (INCH)	FA60 (20) 1 1/4-7 UNC TAP X 2.1 DP	N/A	Ø23.7
ISO (METRIC)	F60 (20) M36 TAP X 54 DP	(4) Ø36 PIN X 36 DP	Ø60.3

DRAWN HDE	DATE 9/30/14	Limiterque Actuation Systems <small>3114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318</small>
CHECKED ILY	DATE 10/2/14	
APPROVED ILY	DATE 10/2/14	TITLE WG-10-1SD WORM GEAR OPERATOR WITH: A) MSS & ISO MOUNTING BASES B) MSS & ISO INPUT FLANGES
SIZE A	DWG NO 04-573-0059	REV
[] = MILLIMETER VALUE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	SCALE NONE	ORDER NO N/A



Customer Data Sheet

Limitorque

5114 Woodall Road
Lynchburg, VA 24502-2248
434-845-9736www.flowserve.com

Phone: 434-528-4400
Fax:

SALES ORDER NO. 183129	ORDER LINE 001	DATE ORDERED 07/02/20
CUSTOMER PURCHASE ORDER 1356594		CUSTOMER NO. 71750
OPERATOR LOBRIEN		CONFIGURATION 197501.0
SOLD TO	HENRY PRATT CO 401 S HIGHLAND AVE AURORA, IL 60506-5563 UNITED STATES	

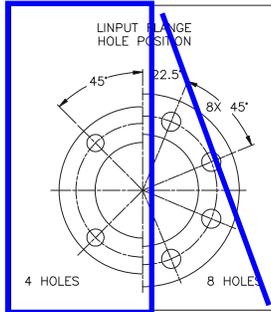
END USER WICHITA, KS
END PROJECT HESS PUMP STATION VALVE REPLACEMENT

Line Item 6
Valve 5

ACTUATOR DATA

Gearbox Model WG-10-1SD-B
Enclosure Type WP
Max Rated Torque 202830 ft-lb 275037 Nm
Max 1-time Input Torque 665 ft-lb 902 Nm
Ratio 1600:1
Input/Output Rotation Position A - CW input/CW output
Input Flange/Shaft FA14 / 45-14X9
Input Device 36" HANDWHEEL
Mounting Base MSS-FA60
Stem Nut Data MACHINED ETO
Outline Drawing 04-573-0059
Lubricant ZENITH LH2
Paint Polyurethane BLUE
Weight 3483 lbs 1581 Kg
Instruction Manual LMENIM2101 on internet @ limitorque.com.
TAG: ZHP2731977006

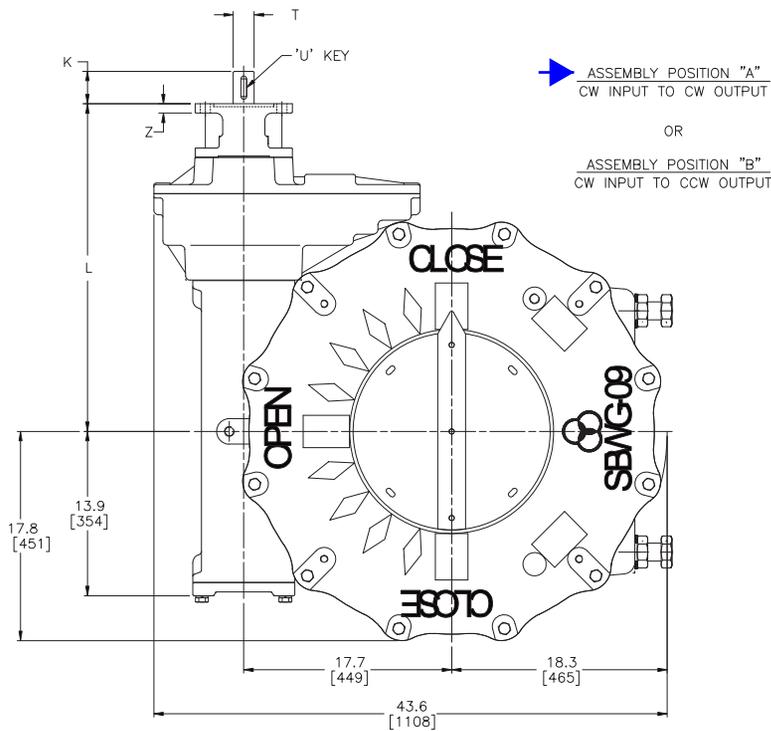
Line Item 8 (Valves 8, 9, 11)



INPUT FLANGE*	K	L	T	U	V	W	X	Y	Z
FA14	ø2.8	27.8	ø1.77	.551 X .354	(4) ø.71	ø6.9	ø5.5	ø3.750	.79
FA16	ø2.8	27.8	ø1.77	.551 X .354	(4) ø.87	ø8.3	ø6.5	ø5.000	.79
FA25	ø3.5	25.2	ø1.97	.551 X .354	(8) ø.71	ø11.8	ø10.0	ø6.000	.87
FA30	ø3.5	25.4	ø1.77 ø1.97	.551 X .354	(8) ø.87	ø13.8	ø11.8	ø7.000	.94
FA35	ø4.3	25.6	ø1.97	.551 X .354	(8) ø1.1	ø16.3	ø14.0	ø8.500	1.02
F14	ø70	706	ø45	14 X 9	(4) ø18	ø175	ø140	ø100	20
F16	ø70	706	ø45	14 X 9	(4) ø22	ø210	ø165	ø130	20
F25	ø90	639	ø50	14 X 9	(8) ø18	ø300	ø254	ø200	22
F30	ø90	644	ø45 ø50	14 X 9	(8) ø22	ø350	ø298	ø230	24
F35	ø110	649	ø50	14 X 9	(8) ø28	ø415	ø356	ø260	26

* SEE CUSTOMER DATA SHEET FOR FLANGE AND SHAFT SIZE SUPPLIED

REV		REVISIONS	BY	DATE	APPVD
		DESCRIPTION			
A		ADDED F/FA- 16, 30, & 35, ADD INPUT FLANGE NOTE, ADD 17.8 DIM	TSC	7/30/14	ILY



NOTES:

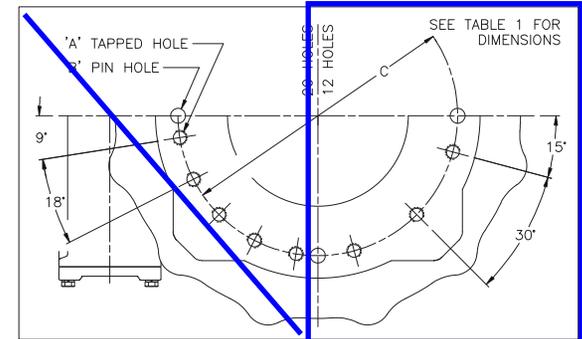
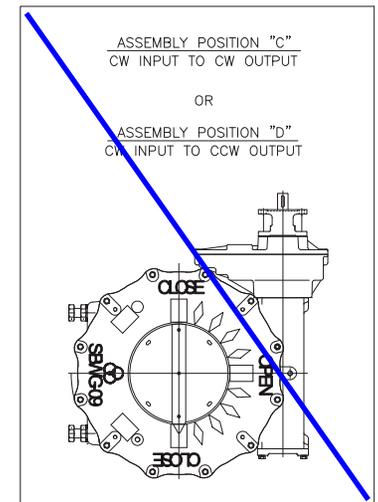
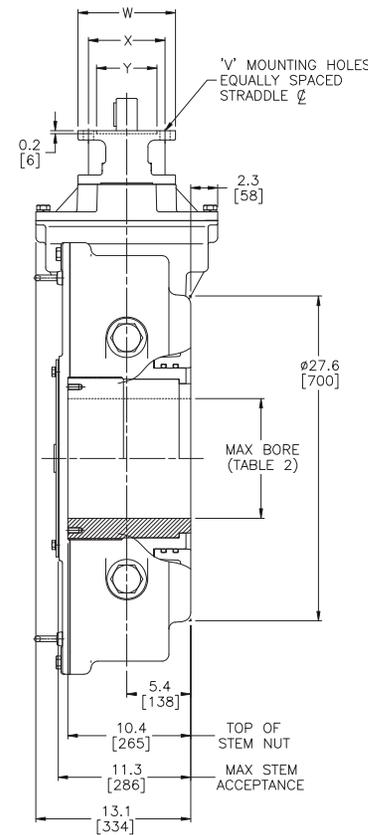
1. SEE CUSTOMER DATA SHEET TO DETERMINE BASE AND ASSEMBLY POSITION SUPPLIED.

TABLE 1

MOUNTING BASE	A	B	C
MSS (INCH)	FA48 (12) 1 1/4-7 UNC TAP X 2.1 DP	N/A	ø19.0
	FA60 (20) 1 1/4-7 UNC TAP X 2.1 DP	N/A	ø23.7
ISO (METRIC)	F48 (12) M36 TAP X 54 DP	(4) ø36 PIN X 36 DP	ø483
	F60 (20) M36 TAP X 54 DP	(4) ø36 PIN X 36 DP	ø603

TABLE 2

MAX BORE	MAX KEYWAY (SQUARE)	MAX KEYWAY (RECTANGLE)
ø9.500	2 1/2 X 2 1/2	-
ø10.000	-	2 1/2 X 1 3/4
[ø258]	-	[56 X 32]



DRAWN RJB	DATE 5/13/14	Limitorque Actuation Systems <small>5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1318</small>	
CHECKED ILY	DATE 5/15/14	TITLE WG-09-1SD WORM GEAR OPERATOR WITH: A) MSS & ISO INPUT FLANGES B) MSS & ISO MOUNTING BASES	
APPROVED ILY	DATE 5/15/14	SCALE NONE	ORDER NO N/A
SIZE A		DWG NO 04-573-0045	
[] = MILLIMETER VALUE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		REV A	



Customer Data Sheet

Limitorque

5114 Woodall Road
Lynchburg, VA 24502-2248
434-845-9736www.flowserve.com

Phone: 434-528-4400
Fax:

SALES ORDER NO. 183125 REV 0	ORDER LINE 004	DATE ORDERED 07/02/20
CUSTOMER PURCHASE ORDER 1356593		CUSTOMER NO. 71750
OPERATOR LOBRIEN		CONFIGURATION 197499.0
SOLD TO	HENRY PRATT CO 401 S HIGHLAND AVE AURORA, IL 60506-5563 UNITED STATES	

END USER WICHITA, KS
END PROJECT HESS PUMP STATION VALVE REPLACEMENT

ACTUATOR DATA

Gearbox Model WG-09-1SD-B
Enclosure Type WP
Max Rated Torque 141980 ft-lb 192525 Nm
Max 1-time Input Torque 645 ft-lb 875 Nm
Ratio 1155:1
Input/Output Rotation Position A - CW input/CW output
Input Flange/Shaft FA14 / 45-14X9
Input Device 30" HANDWHEEL
Mounting Base MSS-FA48
Stem Nut Data MACHINED ETO
Outline Drawing 04-573-0045
Lubricant ZENITH LH2
Paint Polyurethane BLUE
Weight 2346 lbs 1065 Kg
Instruction Manual LMENIM2101 on internet @ limitorque.com.
TAG ALL: ZHP2731977008

Line Item 8

Valve 8
Valve 9
Valve 11

PRATT[®]

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401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

TORQUE TABLES

Drawing C102, A Valves TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 42 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.000 INCHES
FLOW DIRECTION: FLAT
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.646 (PSIG) OR 1.493 (Ft. of water)
FULL OPEN DELTA P (K'): 0.374 (PSIG) OR 0.864 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 69,090 (GPM) OR 99.49 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV	DELTA	DELTA	SUPPLY	FLOW-RATE	FLOW-RATE	VEL	TORQUE	CAV	
ANG	PRESS	HEAD	HEAD	(GPM)	(MGD)	FPS	IN-LBS	CONST	
5	148.22	342.38	346.5	7,537	10.85	1.75	62,540	0.11	
6	147.20	340.03	346.5	9,452	13.61	2.19	59,307	0.12	
7	146.02	337.28	346.5	11,285	16.25	2.61	59,282	0.13	
8	142.98	330.28	346.5	14,976	21.57	3.47	67,426	0.15	
9	139.37	321.93	346.5	18,435	26.55	4.27	70,987	0.18	****
10	136.02	314.18	346.5	21,141	30.44	4.90	65,854	0.21	
15	119.60	276.27	346.5	31,170	44.88	7.22	52,679	0.37	
20	100.13	231.28	346.5	39,925	57.49	9.25	34,680	0.64	
25	76.08	175.73	346.5	48,606	69.99	11.26	44,274	1.15	
* * * * *									
30	59.19	136.73	346.5	53,872	77.58	12.48	23,292	1.74	
35	43.59	100.68	346.5	58,319	83.98	13.51	23,977	2.69	APPROVED
40	30.91	71.41	346.5	61,693	88.84	14.29	27,221	4.13	THROTTLING
45	20.73	47.89	346.5	64,277	92.56	14.89	31,449	6.46	RANGE
50	13.87	32.04	346.5	65,961	94.98	15.28	36,554	9.74	
55	8.87	20.50	346.5	67,160	96.71	15.55	40,418	9.90	
60	5.53	12.78	346.5	67,950	97.85	15.74	43,736	9.90	
65	3.47	8.01	346.5	68,435	98.55	15.85	38,177	9.90	
70	2.15	4.96	346.5	68,742	98.99	15.92	32,434	9.90	
75	1.47	3.39	346.5	68,900	99.22	15.96	25,832	9.90	
80	1.01	2.32	346.5	69,007	99.37	15.98	15,846	9.90	
85	0.76	1.75	346.5	69,064	99.45	15.99	4,422	9.90	
90	0.65	1.49	346.5	69,090	99.49	16.00	7,309	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE:	66,066	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	71,576	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	70,987	IN-LBS @	9 DEG.

Drawing C102, A Valves TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 42 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.000 INCHES
FLOW DIRECTION: ARCH
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.600 (PSIG) OR 1.385 (Ft. of water)
FULL OPEN DELTA P (K'): 0.327 (PSIG) OR 0.756 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 69,090 (GPM) OR 99.49 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV * ANG *	DELTA * PRESS *	DELTA * HEAD *	SUPPLY * HEAD *	FLOW-RATE * (GPM) *	FLOW-RATE * (MGD) *	VEL * FPS *	TORQUE * IN-LBS *	CAV * CONST *	
5	148.28	342.52	346.5	7,406	10.66	1.72	70,036	0.11	
6	147.46	340.62	346.5	9,006	12.97	2.09	72,379	0.11	
7	146.03	337.31	346.5	11,268	16.23	2.61	72,107	0.13	
8	143.46	331.39	346.5	14,451	20.81	3.35	65,421	0.15	
9	141.22	326.21	346.5	16,746	24.11	3.88	63,981	0.16	
10	138.49	319.90	346.5	19,178	27.62	4.44	62,434	0.19	
15	124.98	288.68	346.5	28,276	40.72	6.55	78,657	0.31	
20	105.26	243.15	346.5	37,807	54.44	8.76	72,801	0.56	
25	85.84	198.29	346.5	45,276	65.20	10.49	102,234	0.91	
30	66.31	153.18	346.5	51,709	74.46	11.97	107,472	1.46	****
* * * * *									
35	46.70	107.88	346.5	57,449	82.73	13.30	104,066	2.46	
40	30.69	70.89	346.5	61,742	88.91	14.30	89,525	4.17	APPROVED
45	19.69	45.48	346.5	64,525	92.92	14.94	74,798	6.82	THROTTLING
50	12.53	28.94	346.5	66,275	95.44	15.35	65,684	9.90	RANGE
55	8.21	18.96	346.5	67,307	96.92	15.59	55,701	9.90	
60	5.40	12.48	346.5	67,970	97.88	15.74	68,329	9.90	
65	3.51	8.12	346.5	68,413	98.51	15.84	40,794	9.90	
70	2.32	5.35	346.5	68,692	98.92	15.91	34,271	9.90	
75	1.54	3.56	346.5	68,872	99.18	15.95	29,503	9.90	
80	1.01	2.33	346.5	68,995	99.35	15.98	23,443	9.90	
85	0.71	1.65	346.5	69,064	99.45	15.99	15,669	9.90	
90	0.60	1.39	346.5	69,090	99.49	16.00	4,917	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

**CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.**

**THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.**

SEATING + BEARING TORQUE:	66,066	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	71,576	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	107,472	IN-LBS @	30 DEG.

Pump Valves 2, 6 and 7 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 42 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.000 INCHES
FLOW DIRECTION: FLAT
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.646 (PSIG) OR 1.493 (Ft. of water)
FULL OPEN DELTA P (K'): 0.374 (PSIG) OR 0.864 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 69,090 (GPM) OR 99.49 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV	DELTA	DELTA	SUPPLY	FLOW-RATE	FLOW-RATE	VEL	TORQUE	CAV	
ANG	PRESS	HEAD	HEAD	(GPM)	(MGD)	FPS	IN-LBS	CONST	
5	148.22	342.38	346.5	7,537	10.85	1.75	62,540	0.11	
6	147.20	340.03	346.5	9,452	13.61	2.19	59,307	0.12	
7	146.02	337.28	346.5	11,285	16.25	2.61	59,282	0.13	
8	142.98	330.28	346.5	14,976	21.57	3.47	67,426	0.15	
9	139.37	321.93	346.5	18,435	26.55	4.27	70,987	0.18	****
10	136.02	314.18	346.5	21,141	30.44	4.90	65,854	0.21	
15	119.60	276.27	346.5	31,170	44.88	7.22	52,679	0.37	
20	100.13	231.28	346.5	39,925	57.49	9.25	34,680	0.64	
25	76.08	175.73	346.5	48,606	69.99	11.26	44,274	1.15	
30	59.19	136.73	346.5	53,872	77.58	12.48	23,292	1.74	
35	43.59	100.68	346.5	58,319	83.98	13.51	23,977	2.69	APPROVED
40	30.91	71.41	346.5	61,693	88.84	14.29	27,221	4.13	THROTTLING
45	20.73	47.89	346.5	64,277	92.56	14.89	31,449	6.46	RANGE
50	13.87	32.04	346.5	65,961	94.98	15.28	36,554	9.74	
55	8.87	20.50	346.5	67,160	96.71	15.55	40,418	9.90	
60	5.53	12.78	346.5	67,950	97.85	15.74	43,736	9.90	
65	3.47	8.01	346.5	68,435	98.55	15.85	38,177	9.90	
70	2.15	4.96	346.5	68,742	98.99	15.92	32,434	9.90	
75	1.47	3.39	346.5	68,900	99.22	15.96	25,832	9.90	
80	1.01	2.32	346.5	69,007	99.37	15.98	15,846	9.90	
85	0.76	1.75	346.5	69,064	99.45	15.99	4,422	9.90	
90	0.65	1.49	346.5	69,090	99.49	16.00	7,309	9.90	

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE:	66,066	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	71,576	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	70,987	IN-LBS @	9 DEG.

Pump Valves 2, 6 and 7 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 42 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.000 INCHES
FLOW DIRECTION: ARCH
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.600 (PSIG) OR 1.385 (Ft. of water)
FULL OPEN DELTA P (K'): 0.327 (PSIG) OR 0.756 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 69,090 (GPM) OR 99.49 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV * ANG *	DELTA * PRESS *	DELTA * HEAD *	SUPPLY * HEAD *	FLOW-RATE * (GPM) *	FLOW-RATE * (MGD) *	VEL * FPS *	TORQUE * IN-LBS *	CAV * CONST *	
5	148.28	342.52	346.5	7,406	10.66	1.72	70,036	0.11	
6	147.46	340.62	346.5	9,006	12.97	2.09	72,379	0.11	
7	146.03	337.31	346.5	11,268	16.23	2.61	72,107	0.13	
8	143.46	331.39	346.5	14,451	20.81	3.35	65,421	0.15	
9	141.22	326.21	346.5	16,746	24.11	3.88	63,981	0.16	
10	138.49	319.90	346.5	19,178	27.62	4.44	62,434	0.19	
15	124.98	288.68	346.5	28,276	40.72	6.55	78,657	0.31	
20	105.26	243.15	346.5	37,807	54.44	8.76	72,801	0.56	
25	85.84	198.29	346.5	45,276	65.20	10.49	102,234	0.91	
30	66.31	153.18	346.5	51,709	74.46	11.97	107,472	1.46	****
* * * * *									
35	46.70	107.88	346.5	57,449	82.73	13.30	104,066	2.46	
40	30.69	70.89	346.5	61,742	88.91	14.30	89,525	4.17	APPROVED
45	19.69	45.48	346.5	64,525	92.92	14.94	74,798	6.82	THROTTLING
50	12.53	28.94	346.5	66,275	95.44	15.35	65,684	9.90	RANGE
55	8.21	18.96	346.5	67,307	96.92	15.59	55,701	9.90	
60	5.40	12.48	346.5	67,970	97.88	15.74	68,329	9.90	
65	3.51	8.12	346.5	68,413	98.51	15.84	40,794	9.90	
70	2.32	5.35	346.5	68,692	98.92	15.91	34,271	9.90	
75	1.54	3.56	346.5	68,872	99.18	15.95	29,503	9.90	
80	1.01	2.33	346.5	68,995	99.35	15.98	23,443	9.90	
85	0.71	1.65	346.5	69,064	99.45	15.99	15,669	9.90	
90	0.60	1.39	346.5	69,090	99.49	16.00	4,917	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE: 66,066 IN-LBS @ 0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE: 71,576 IN-LBS @ 0 DEG.
MAXIMUM DYNAMIC TORQUE (GO): 107,472 IN-LBS @ 30 DEG.

Valves 30, 31, 32, 37, 38 and 39 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 48 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.625 INCHES
FLOW DIRECTION: FLAT
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.646 (PSIG) OR 1.493 (Ft. of water)
FULL OPEN DELTA P (K'): 0.374 (PSIG) OR 0.864 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 90,239 (GPM) OR 129.95 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV * ANG *	DELTA * PRESS *	DELTA * HEAD *	SUPPLY * HEAD *	FLOW- RATE * (GPM) *	FLOW- RATE * (MGD) *	VEL * FPS *	TORQUE * IN-LBS *	CAV * CONST *	
5	148.22	342.38	346.5	9,844	14.18	1.75	92,156	0.11	
6	147.20	340.03	346.5	12,346	17.78	2.19	87,339	0.12	
7	146.02	337.28	346.5	14,740	21.23	2.61	87,312	0.13	
8	142.98	330.28	346.5	19,560	28.17	3.47	99,493	0.15	
9	139.37	321.93	346.5	24,078	34.67	4.27	104,837	0.18	****
10	136.02	314.18	346.5	27,613	39.76	4.90	97,202	0.21	
15	119.60	276.27	346.5	40,712	58.63	7.22	77,668	0.37	
20	100.13	231.28	346.5	52,147	75.09	9.25	50,958	0.64	
25	76.08	175.73	346.5	63,486	91.42	11.26	65,474	1.15	
* * * * *									
30	59.19	136.73	346.5	70,364	101.32	12.48	34,290	1.74	
35	43.59	100.68	346.5	76,171	109.69	13.51	35,438	2.69	APPROVED
40	30.91	71.41	346.5	80,579	116.03	14.29	40,384	4.13	THROTTLING
45	20.73	47.89	346.5	83,953	120.89	14.89	46,776	6.46	RANGE
50	13.87	32.04	346.5	86,153	124.06	15.28	54,452	9.74	
55	8.87	20.50	346.5	87,719	126.32	15.55	60,260	9.90	
60	5.53	12.78	346.5	88,751	127.80	15.74	65,240	9.90	
65	3.47	8.01	346.5	89,384	128.71	15.85	56,959	9.90	
70	2.15	4.96	346.5	89,785	129.29	15.92	48,397	9.90	
75	1.47	3.39	346.5	89,992	129.59	15.96	38,547	9.90	
80	1.01	2.32	346.5	90,131	129.79	15.98	23,645	9.90	
85	0.76	1.75	346.5	90,206	129.90	15.99	6,594	9.90	
90	0.65	1.49	346.5	90,240	129.95	16.00	10,906	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

**CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.**

**THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.**

SEATING + BEARING TORQUE:	94,773	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	104,173	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	104,837	IN-LBS @	9 DEG.

Valves 30, 31, 32, 37, 38 and 39 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 48 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 5.625 INCHES
FLOW DIRECTION: ARCH
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.600 (PSIG) OR 1.385 (Ft. of water)
FULL OPEN DELTA P (K'): 0.327 (PSIG) OR 0.756 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 90,239 (GPM) OR 129.95 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV	DELTA	DELTA	SUPPLY	FLOW-RATE	FLOW-RATE	VEL	TORQUE	CAV	
ANG	PRESS	HEAD	HEAD	(GPM)	(MGD)	FPS	IN-LBS	CONST	
5	148.28	342.52	346.5	9,673	13.93	1.72	103,345	0.11	
6	147.46	340.62	346.5	11,763	16.94	2.09	106,849	0.11	
7	146.03	337.31	346.5	14,717	21.19	2.61	106,455	0.13	
8	143.46	331.39	346.5	18,875	27.18	3.35	96,496	0.15	
9	141.22	326.21	346.5	21,872	31.50	3.88	94,364	0.16	
10	138.49	319.90	346.5	25,049	36.07	4.44	92,077	0.19	
15	124.98	288.68	346.5	36,932	53.18	6.55	116,403	0.31	
20	105.26	243.15	346.5	49,380	71.11	8.76	107,821	0.56	
25	85.84	198.29	346.5	59,136	85.16	10.49	151,913	0.91	
30	66.31	153.18	346.5	67,539	97.26	11.97	159,889	1.46	****
35	46.70	107.88	346.5	75,035	108.05	13.30	154,963	2.46	
40	30.69	70.89	346.5	80,643	116.13	14.30	133,386	4.17	APPROVED
45	19.69	45.48	346.5	84,278	121.36	14.94	111,493	6.82	THROTTLING
50	12.53	28.94	346.5	86,563	124.65	15.35	97,946	9.90	RANGE
55	8.21	18.96	346.5	87,912	126.59	15.59	83,079	9.90	
60	5.40	12.48	346.5	88,777	127.84	15.74	101,952	9.90	
65	3.51	8.12	346.5	89,356	128.67	15.84	60,865	9.90	
70	2.32	5.35	346.5	89,720	129.20	15.91	51,138	9.90	
75	1.54	3.56	346.5	89,956	129.54	15.95	44,026	9.90	
80	1.01	2.33	346.5	90,117	129.77	15.98	34,985	9.90	
85	0.71	1.65	346.5	90,206	129.90	15.99	23,383	9.90	
90	0.60	1.39	346.5	90,240	129.95	16.00	7,335	9.90	

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE: 94,773 IN-LBS @ 0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE: 104,173 IN-LBS @ 0 DEG.
MAXIMUM DYNAMIC TORQUE (GO): 159,889 IN-LBS @ 30 DEG.

Valve 5 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 72 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 8.500 INCHES
FLOW DIRECTION: FLAT
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.669 (PSIG) OR 1.544 (Ft. of water)
FULL OPEN DELTA P (K'): 0.396 (PSIG) OR 0.916 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 203,039 (GPM) OR 292.38 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV	DELTA	DELTA	SUPPLY	FLOW-RATE	FLOW-RATE	VEL	TORQUE	CAV	
ANG	PRESS	HEAD	HEAD	(GPM)	(MGD)	FPS	IN-LBS	CONST	
5	148.66	343.39	346.5	19,249	27.72	1.52	346,014	0.11	
6	147.71	341.19	346.5	25,156	36.22	1.98	371,368	0.11	
7	146.60	338.63	346.5	30,651	44.14	2.42	357,632	0.12	
8	145.37	335.79	346.5	35,764	51.50	2.82	305,799	0.13	
9	144.11	332.87	346.5	40,336	58.08	3.18	276,254	0.14	
10	142.60	329.40	346.5	45,185	65.07	3.56	262,729	0.15	
15	129.96	300.20	346.5	74,379	107.11	5.86	249,136	0.26	
20	112.28	259.37	346.5	102,039	146.94	8.04	475,094	0.46	****
25	87.40	201.89	346.5	131,457	189.30	10.36	412,225	0.87	
30	67.55	156.04	346.5	150,869	217.25	11.89	290,861	1.41	
* * * * *									
35	48.18	111.28	346.5	167,662	241.43	13.21	117,526	2.35	
40	33.48	77.34	346.5	179,352	258.27	14.13	144,159	3.76	APPROVED
45	23.01	53.14	346.5	187,239	269.62	14.75	158,318	5.77	THROTTLING
50	14.88	34.36	346.5	193,141	278.12	15.22	155,662	9.09	RANGE
55	9.65	22.30	346.5	196,838	283.45	15.51	158,291	9.90	
60	6.33	14.63	346.5	199,152	286.78	15.69	151,603	9.90	
65	3.83	8.84	346.5	200,880	289.27	15.83	152,397	9.90	
70	2.30	5.31	346.5	201,928	290.78	15.91	146,544	9.90	
75	1.49	3.44	346.5	202,481	291.57	15.96	124,451	9.90	
80	1.03	2.38	346.5	202,794	292.02	15.98	87,634	9.90	
85	0.77	1.79	346.5	202,968	292.27	15.99	25,057	9.90	
90	0.67	1.54	346.5	203,040	292.38	16.00	45,079	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE: 301,030 IN-LBS @ 0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE: 348,619 IN-LBS @ 0 DEG.
MAXIMUM DYNAMIC TORQUE (GC): 475,094 IN-LBS @ 20 DEG.

Valve 5 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 72 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 8.500 INCHES
FLOW DIRECTION: ARCH
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.638 (PSIG) OR 1.473 (Ft. of water)
FULL OPEN DELTA P (K'): 0.365 (PSIG) OR 0.844 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 203,039 (GPM) OR 292.38 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV * ANG *	DELTA * PRESS *	DELTA * HEAD *	SUPPLY * HEAD *	FLOW-RATE * (GPM) *	FLOW-RATE * (MGD) *	VEL * FPS *	TORQUE * IN-LBS *	CAV * CONST *	
5	148.49	343.00	346.5	20,415	29.40	1.61	405,481	0.11	
6	147.88	341.59	346.5	24,194	34.84	1.91	400,501	0.11	
7	147.11	339.81	346.5	28,256	40.69	2.23	398,411	0.12	
8	146.01	337.26	346.5	33,200	47.81	2.62	400,879	0.13	
9	144.94	334.80	346.5	37,370	53.81	2.94	408,231	0.13	
10	143.69	331.91	346.5	41,731	60.09	3.29	436,890	0.14	
15	135.30	312.54	346.5	63,689	91.71	5.02	517,948	0.21	
20	119.02	274.93	346.5	92,470	133.16	7.29	583,555	0.38	
25	96.86	223.74	346.5	121,105	174.39	9.54	583,377	0.69	
30	73.96	170.84	346.5	144,874	208.62	11.42	605,532	1.21	****
35	50.58	116.84	346.5	165,651	238.54	13.05	538,753	2.20	
40	32.56	75.21	346.5	180,041	259.26	14.19	497,478	3.88	APPROVED
45	24.47	56.53	346.5	186,135	268.03	14.67	406,840	5.39	THROTTLING
50	12.85	29.68	346.5	194,564	280.17	15.33	328,198	9.90	RANGE
55	8.13	18.79	346.5	197,879	284.95	15.59	264,257	9.90	
60	5.16	11.93	346.5	199,941	287.91	15.76	219,002	9.90	
65	3.42	7.89	346.5	201,143	289.65	15.85	183,528	9.90	
70	2.35	5.43	346.5	201,873	290.70	15.91	157,089	9.90	
75	1.61	3.71	346.5	202,381	291.43	15.95	139,201	9.90	
80	1.10	2.54	346.5	202,726	291.93	15.98	118,036	9.90	
85	0.78	1.81	346.5	202,942	292.24	15.99	86,244	9.90	
90	0.64	1.47	346.5	203,040	292.38	16.00	35,277	9.90	

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE
CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO
POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE: 301,030 IN-LBS @ 0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE: 348,619 IN-LBS @ 0 DEG.
MAXIMUM DYNAMIC TORQUE (GO): 605,532 IN-LBS @ 30 DEG.

Valves 8, 9 and 11 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 60 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 7.250 INCHES
FLOW DIRECTION: FLAT
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.648 (PSIG) OR 1.497 (Ft. of water)
FULL OPEN DELTA P (K'): 0.376 (PSIG) OR 0.868 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 140,999 (GPM) OR 203.04 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV * ANG *	DELTA * PRESS *	DELTA * HEAD *	SUPPLY * HEAD *	FLOW-RATE * (GPM) *	FLOW-RATE * (MGD) *	VEL * FPS *	TORQUE * IN-LBS *	CAV * CONST *	
5	147.10	339.79	346.5	19,640	28.28	2.23	223,534	0.12	
6	145.65	336.43	346.5	24,071	34.66	2.73	199,930	0.13	
7	144.11	332.88	346.5	28,004	40.33	3.18	229,568	0.14	****
8	142.25	328.58	346.5	32,127	46.26	3.65	169,238	0.15	
9	140.49	324.51	346.5	35,585	51.24	4.04	159,437	0.17	
10	137.96	318.67	346.5	40,036	57.65	4.54	179,245	0.19	
15	123.72	285.78	346.5	59,148	85.17	6.71	171,967	0.33	
20	103.18	238.34	346.5	78,946	113.68	8.96	119,928	0.59	
25	81.38	187.99	346.5	95,571	137.62	10.84	94,595	1.01	
* * * * *									
30	63.89	147.57	346.5	107,066	154.17	12.15	77,182	1.55	
35	44.62	103.07	346.5	118,438	170.55	13.44	70,216	2.61	APPROVED
40	31.13	71.91	346.5	125,790	181.14	14.27	78,914	4.10	THROTTLING
45	20.86	48.18	346.5	131,113	188.80	14.88	58,643	6.42	RANGE
50	13.90	32.10	346.5	134,601	193.82	15.27	70,079	9.72	
55	9.01	20.82	346.5	136,995	197.27	15.55	96,638	9.90	
60	5.55	12.82	346.5	138,667	199.68	15.74	104,828	9.90	
65	3.37	7.78	346.5	139,711	201.18	15.85	103,807	9.90	
70	2.10	4.85	346.5	140,314	202.05	15.92	92,373	9.90	
75	1.39	3.20	346.5	140,652	202.54	15.96	63,368	9.90	
80	1.04	2.39	346.5	140,817	202.78	15.98	43,820	9.90	
85	0.75	1.72	346.5	140,954	202.97	15.99	8,608	9.90	
90	0.65	1.50	346.5	141,000	203.04	16.00	27,255	9.90	
* * * * *									

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

1.5 > CAV CONST > 1.0 = CONTINUOUS THROTTLING NOT RECOMMENDED

CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE: 182,542 IN-LBS @ 0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE: 205,492 IN-LBS @ 0 DEG.
MAXIMUM DYNAMIC TORQUE (GO): 229,568 IN-LBS @ 7 DEG.

Valves 8, 9 and 11 TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 60 INCH TRITON CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N - RESILOSEAL R (SERIES 8) TEFLON (0.10)
SHAFT DIAMETER: 7.250 INCHES
FLOW DIRECTION: ARCH
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.607 (PSIG) OR 1.401 (Ft. of water)
FULL OPEN DELTA P (K'): 0.334 (PSIG) OR 0.772 (Ft. of water)
FLOW RATE: 16.00 (FPS) OR 140,999 (GPM) OR 203.04 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 86.7

PIPE IN - PIPE OUT - WATER SERVICE - AND CONSTANT HEAD SOURCE

VLV	DELTA PRESS	DELTA HEAD	SUPPLY HEAD	FLOW-RATE (GPM)	FLOW-RATE (MGD)	VEL FPS	TORQUE IN-LBS	CAV CONST	
5	147.54	340.79	346.5	18,110	26.08	2.06	200,929	0.11	
6	146.55	338.51	346.5	21,435	30.87	2.43	191,354	0.12	
7	144.85	334.60	346.5	26,171	37.69	2.97	182,884	0.13	
8	143.45	331.37	346.5	29,514	42.50	3.35	183,906	0.15	
9	142.01	328.02	346.5	32,617	46.97	3.70	189,717	0.16	
10	140.26	324.00	346.5	35,995	51.83	4.08	205,266	0.17	
15	129.08	298.17	346.5	52,760	75.97	5.99	280,076	0.27	
20	114.05	263.44	346.5	69,171	99.61	7.85	310,022	0.44	
25	89.99	207.87	346.5	89,366	128.69	10.14	319,651	0.82	
30	67.59	156.12	346.5	104,725	150.80	11.88	342,274	1.41	****
35	46.95	108.45	346.5	117,105	168.63	13.29	305,715	2.44	
40	29.47	68.08	346.5	126,647	182.37	14.37	256,845	4.37	APPROVED
45	19.17	44.27	346.5	131,952	190.01	14.97	219,599	7.02	THROTTLING
50	12.19	28.16	346.5	135,423	195.01	15.37	184,462	9.90	RANGE
55	7.76	17.93	346.5	137,583	198.12	15.61	157,141	9.90	
60	5.16	11.92	346.5	138,834	199.92	15.75	140,214	9.90	
65	3.42	7.89	346.5	139,668	201.12	15.85	114,161	9.90	
70	2.22	5.12	346.5	140,239	201.94	15.91	93,696	9.90	
75	1.48	3.42	346.5	140,588	202.45	15.95	82,629	9.90	
80	0.98	2.26	346.5	140,825	202.79	15.98	67,339	9.90	
85	0.71	1.64	346.5	140,952	202.97	15.99	46,854	9.90	
90	0.61	1.40	346.5	141,000	203.04	16.00	15,034	9.90	

CAV CONST >= 1.5 = GOOD THROTTLING RANGE

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CAV CONST <= 1.0 = SERIOUS CAVITATION AND CAVITATION DAMAGE CAN OCCUR IN CONTINUOUS THROTTLING APPLICATION.

THROTTLING LESS THAN 15 DEGREES OPEN IS NOT RECOMMENDED DUE TO POSSIBILITY OF BODY AND/OR DISC EDGE EROSION.

SEATING + BEARING TORQUE:	182,542	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	205,492	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	342,274	IN-LBS @	30 DEG.

PRATT[®]

a **MUELLER** brand

401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

CV VALUES & GRAPHS



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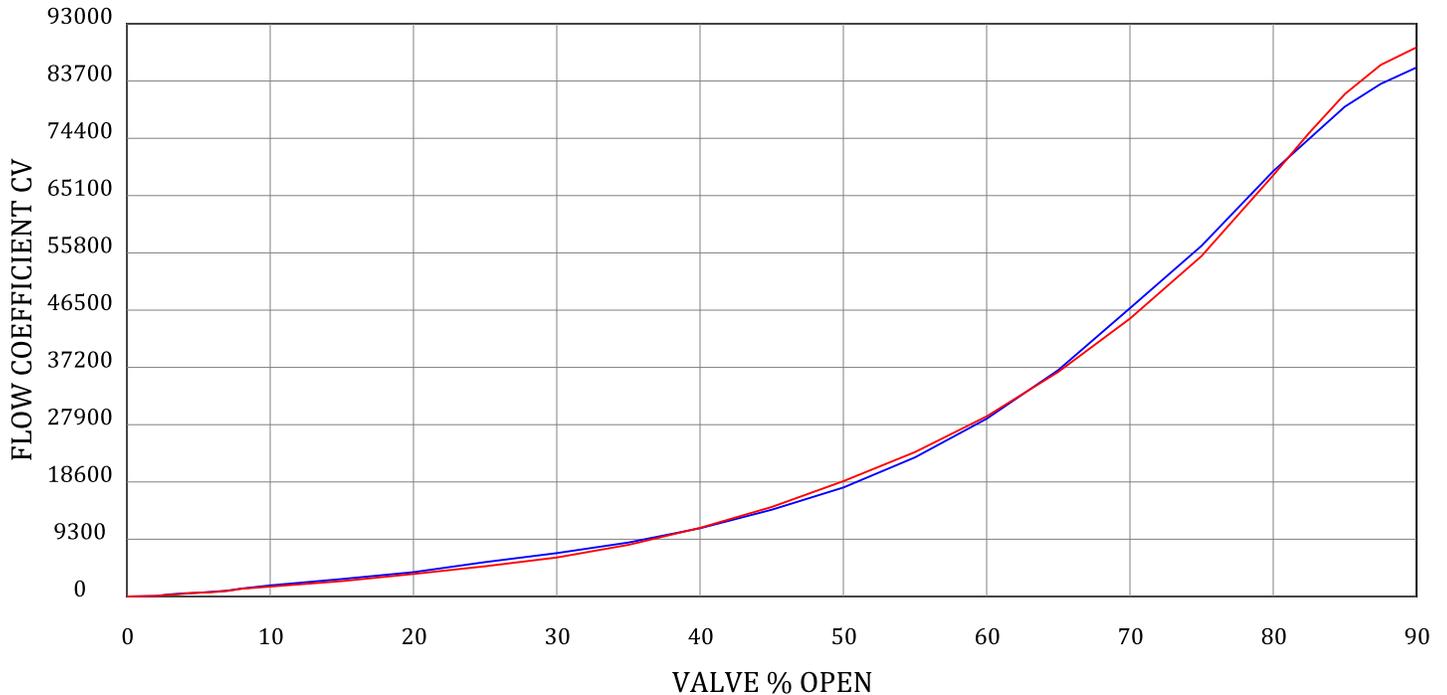
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VALVE ANGLE	FLAT VALUE	ARCH VALUE
0	0	0
2	86	89
3	344	268
4	515	446
5	601	624
6	773	713
7	945	892
8	1288	1248
9	1546	1427
10	1804	1605
15	2835	2497
20	3951	3656
25	5583	4904
30	7044	6331
35	8762	8382
40	11081	11146
45	14087	14535
50	17695	18726
55	22591	23452
60	28862	29248
65	36765	36471
70	46815	45120
75	56951	55285
80	69063	68393
82.5	74303	75259
85	79542	81591
87.5	83236	86317
90	85899	89170

Product: AWWA Butterfly Valve
Item Number: 421FF-0542-SSLHB#01945
Valve Size: 42"
Tag Numbers: Pump Valve 1, Pump Valve 4, Pump Valve 5, Pump Valve 8

Product: AWWA Butterfly Valve
Item Number: 421FF-0542-SSLHB#01946
Valve Size: 42"
Tag Numbers: Pump Valve 2, Pump Valve 6, Pump Valve 7





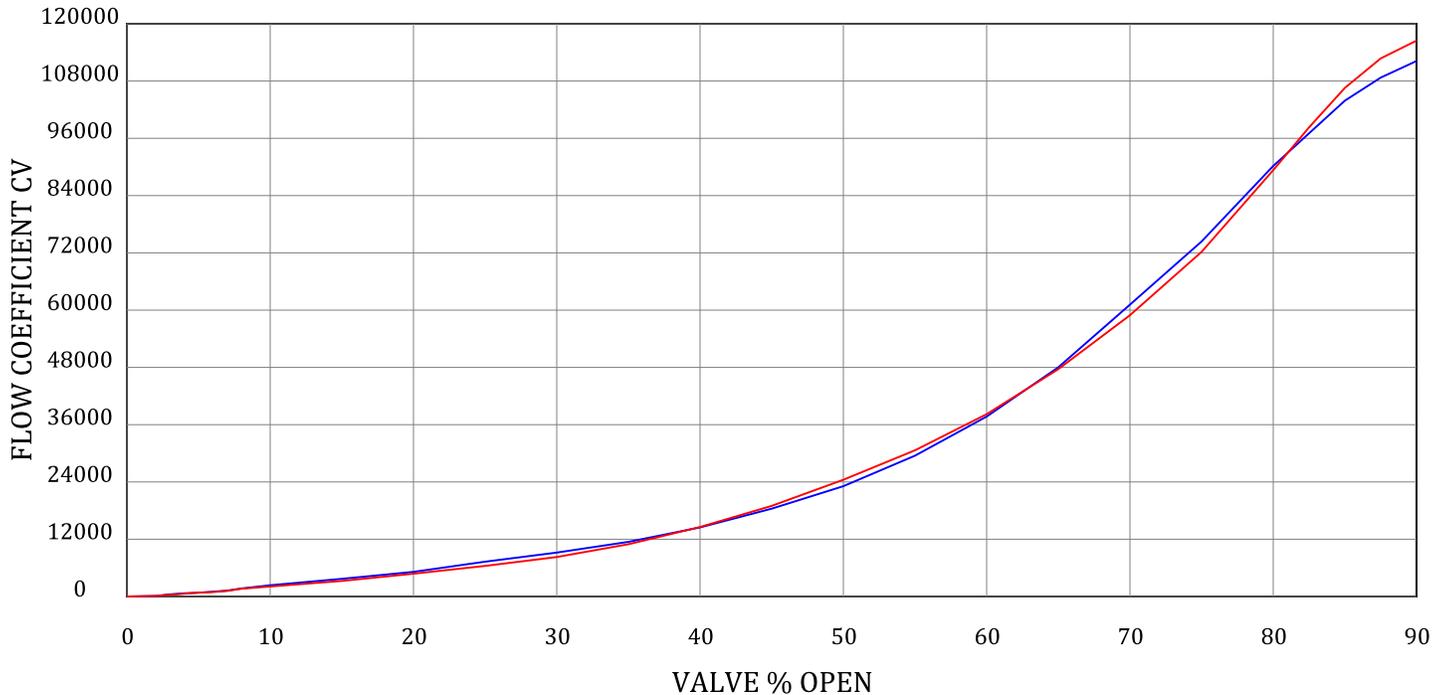
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Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

VALVE ANGLE	FLAT VALUE	ARCH VALUE
0	0	0
2	112	116
3	449	349
4	673	582
5	785	815
6	1010	932
7	1234	1165
8	1683	1631
9	2020	1863
10	2356	2096
15	3702	3261
20	5161	4775
25	7293	6406
30	9200	8269
35	11444	10948
40	14473	14558
45	18400	18984
50	23112	24458
55	29507	30631
60	37698	38201
65	48019	47635
70	61146	58932
75	74385	72209
80	90205	89329
82.5	97049	98297
85	103893	106566
87.5	108717	112739
90	112195	116466

Product: AWWA Butterfly Valve
Item Number: 481FF-0542-SSLHB#01947
Valve Size: 48"
Tag Numbers: Valve 30, Valve 31, Valve 32, Valve 37, Valve 38, Valve 39





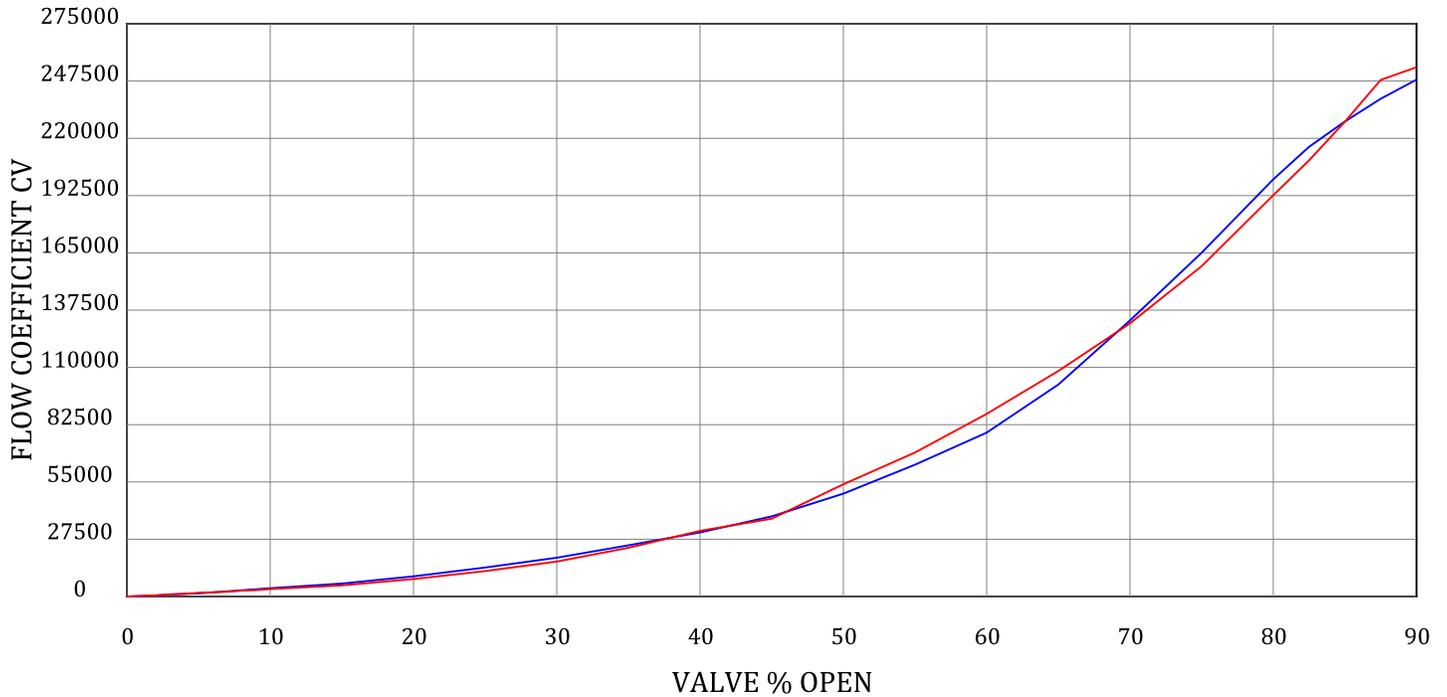
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401 S. HIGHLAND AVENUE, AURORA, IL 60506
TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

VALVE ANGLE	FLAT VALUE	ARCH VALUE
0	0	0
2	496	508
3	993	1017
4	1241	1271
5	1489	1779
6	1985	2033
7	2482	2287
8	2978	2796
9	3474	3050
10	3971	3558
15	6204	5337
20	9679	8387
25	13898	12199
30	18613	16773
35	24569	23381
40	30774	31513
45	38467	37358
50	49387	53877
55	63284	69126
60	78671	87678
65	101751	108263
70	132525	131136
75	165036	158583
80	200276	192637
82.5	215911	209411
85	228072	227963
87.5	238992	248040
90	248174	254139

Product: AWWA Butterfly Valve
Item Number: 721FF-0562-SSLHB#01949
Valve Size: 72"
Tag Numbers: Valve 5





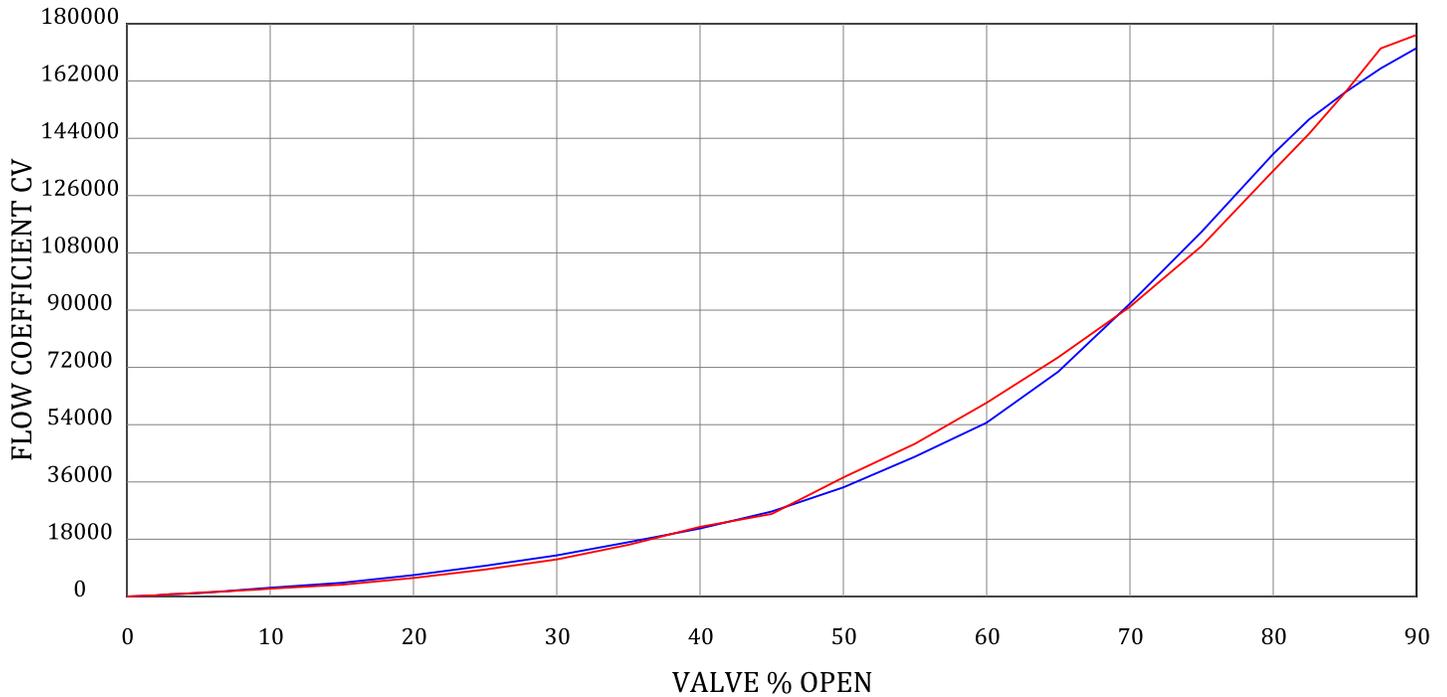
a MUELLER brand

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TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

VALVE ANGLE	FLAT VALUE	ARCH VALUE
0	0	0
2	345	353
3	689	706
4	862	882
5	1034	1235
6	1379	1412
7	1723	1588
8	2068	1941
9	2413	2118
10	2757	2471
15	4309	3706
20	6721	5824
25	9651	8471
30	12926	11648
35	17062	16237
40	21371	21884
45	26713	25943
50	34296	37415
55	43947	48004
60	54633	60888
65	70661	75183
70	92031	91067
75	114608	110127
80	139081	133776
82.5	149938	145424
85	158383	158308
87.5	165966	172250
90	172343	176486

Product: AWWA Butterfly Valve
Item Number: 601FF-1200-SSLHB#01951
Valve Size: 60"
Tag Numbers: Valve 8, Valve 9, Valve 11



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TEL: (630) 844-4000 FAX: (630) 844-4160

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Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

COATING DATA

AMERCOAT® 370

DESCRIPTION

Two-component, fast dry multi-purpose epoxy coating

PRINCIPAL CHARACTERISTICS

- Multi-purpose high build epoxy
- Application over a wide range of surface temperatures
- Suitable for immersion in fresh and salt water
- Class A slip resistance for high strength bolted connections

COLOR AND GLOSS LEVEL

- White, Black, Oxide Red, Light Buff, Pearl Gray
- Flat

Note: Epoxy coatings will characteristically chalk and fade upon exposure to sunlight. Light colors are prone to ambering to some extent

BASIC DATA AT 68°F (20°C)

Data for mixed product	
Number of components	Two
Volume solids	66 ± 2%
VOC (Supplied)	max. 2.5 lb/US gal (approx. 300 g/l)
Temperature resistance (Continuous)	To 200°F (93°C)
Temperature resistance (Intermittent)	To 250°F (121°C)
Recommended dry film thickness	4.0 - 6.0 mils (100 - 150 µm) depending on system
Theoretical spreading rate	212 ft ² /US gal for 5.0 mils (5.3 m ² /l for 125 µm)
Shelf life	Base: at least 24 months when stored cool and dry Hardener: at least 24 months when stored cool and dry

Notes:

- See ADDITIONAL DATA - Overcoating intervals
- See ADDITIONAL DATA - Curing time
- Intermittent temperature resistance should be less than 5% of the time, and maximum 24 hours
- Color will drift at elevated temperatures

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RECOMMENDED SUBSTRATE CONDITIONS AND TEMPERATURES

- Coating performance is, in general, proportional to the degree of surface preparation
- Abrasive blasting is usually the most effective and economical method. When this is impossible or impractical, coating can be applied over mechanically cleaned surfaces
- All surfaces must be clean, dry and free of all contaminants, including salt deposits. Contact PPG for maximum allowable salt containment levels

Mild steel

- Remove all loose rust, dirt, grease or other contaminants by one of the following depending on the degree of cleanliness required: SSPC SP-2, 3, 6, 7 or 10 (ISO 8501-1 St-2, St-3, Sa 1, Sa 2.5). These minimum surface preparation standards apply to steel that has been previously abrasive blasted. The choice of surface preparation will depend on the system selected and end-use service conditions
- For more severe service and immersion, clean to SSPC SP-10 (ISO8501-1 Sa 2.5). Blast to achieve an anchor profile of 2.0 – 4.0 mils (50 – 100 µm) as indicted by a Keane-Tator Surface profile Comparator or Testex Tape. Previously blasted steel may be ultra-high pressure water jetted to SSPC SP WJ-2(L) / NACE WJ-2(L). The wet surface can be dried by blowing with dry compressed air giving special attention to horizontal surfaces and recesses

Concrete

- Prepare in accordance with SSPC SP-13 guidelines
- Abrade surface per ASTM D-4259 to remove all efflorescence and laitance, to expose subsurface voids, and to provide a surface roughness equivalent of 60 grit sandpaper or coarser
- Test for moisture by conducting a plastic sheet test in accordance with ASTM D4263
- Fill voids as necessary with AMERCOAT 114 A epoxy filler

Galvanized steel

- Remove oil or soap film with detergent or emulsion cleaner
- Lightly abrasive blast with a fine abrasive in accordance with SSPC SP-16 guidelines to achieve a profile of 1.5 – 3.0 mils (38 – 75 µm). When light abrasive blasting is not possible, galvanizing can be treated with a suitable zinc phosphate conversion coating.
- Galvanizing that has at least 12 months of exterior weathering and has a rough surface with white rust present may be over-coated after power washing and cleaning to remove white rust and other contaminants
- The surface must have a measurable profile
- A test patch is recommended to determine compatibility and adhesion
- Not recommended over chromate sealed galvanizing without blasting to thoroughly remove chromates. Adhesion problems may occur

Non-ferrous metals and stainless steel

- Abrasive blast in accordance with SSPC SP-16 guidelines to achieve a uniform and dense 1.5-4.0 mil anchor profile. Size and hardness of abrasive should be adjusted as necessary based on the hardness of the substrate
- Aluminum may be treated with a surface treatment compliant with Mil-DTL-5541 or equivalent (non-immersion applications only).



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Aged coatings

- All surfaces must be clean, dry, tightly bonded and free of all loose paint, corrosion products or chalky residue
 - Abrade surface, or clean with PREP 88. This product is compatible over most types of properly applied and tightly adhering coatings, however, a test patch is recommended to confirm compatibility
-

Repair

- Prepare damaged areas to original surface preparation specifications, feathering edges of intact coating. Thoroughly remove dust or abrasive residue before touch-up.
-

Substrate temperature and application conditions

- Surface temperature during application should be between 20°F (-7°C) and 120°F (49°C)
 - Surface temperature during application should be at least 5°F (3°C) above dew point
 - Ambient temperature during application and curing should be between 20°F (-7°C) and 120°F (49°C)
 - Relative humidity during application should not exceed 85%
-

SYSTEM SPECIFICATION

- Primers: Direct to substrate; DIMETCOTE- Series Primers, AMERCOAT 68HS, AMERCOAT 68MCZ
 - Topcoats: AMERCOAT 450-Series Polyurethanes, AMERSHIELD, PSX 700, AMERCOAT 229T, PITTHANE Polyurethanes
-

INSTRUCTIONS FOR USE

Mixing ratio by volume: base to hardener 80:20 (4:1)

- Pre-mix base component with a pneumatic air mixer at moderate speeds to homogenize the container. Add hardener to base and agitate with a power mixer for 1-2 minutes until completely dispersed
-

Induction time

None

Pot life

4 hours at 70°F (21°C)

Note: See ADDITIONAL DATA – Pot life

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Application

- Area should be sheltered from airborne particulates and pollutants
- Avoid combustion gases or other sources of carbon dioxide that may promote amine blush and ambering of light colors
- Ensure good ventilation during application and curing
- Provide shelter to prevent wind from affecting spray patterns

Material temperature

Material temperature during application should be between 40°F (4°C) and 90°F (32°C)

Air spray

- Use standard conventional equipment

Recommended thinner

THINNER 21-06 (AMERCOAT 65) (xylene), THINNER 21-25 (AMERCOAT 101) (recommended for > 90°F (32°C))

Volume of thinner

0 - 20%

Nozzle orifice

Approx. 0.070 in (1.8 mm)

Airless spray

- 45:1 pump or larger
- Can be applied with plural component equipment

Recommended thinner

THINNER 21-06 (AMERCOAT 65) (xylene), THINNER 21-25 (AMERCOAT 101) (recommended for > 90°F (32°C))

Nozzle orifice

0.017 – 0.019 in (approx. 0.43 – 0.48 mm)

Brush/roller

- Use a high quality natural bristle brush and/or solvent resistant, 3/8" nap roller. Ensure brush/roller is well loaded to avoid air entrainment. Multiple coats may be necessary to achieve adequate film-build

Recommended thinner

AMERCOAT 65 (xylene), AMERCOAT 101 (recommended for > 90°F (32°C))

Cleaning solvent

Amercoat 12 Cleaner (Thinner 90-58) or Amercoat 65 Thinner (Thinner 21-06)



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ADDITIONAL DATA

Overcoating interval for DFT up to 4.0 mils (100 µm)						
Overcoating with...	Interval	20°F (-7°C)	32°F (0°C)	50°F (10°C)	70°F (21°C)	90°F (32°C)
urethane and PSX	Minimum	3 hours	2 hours	1.5 hours	45 minutes	30 minutes
	Maximum	2 months	1.5 months	1.5 months	30 days	14 days

Notes:

- Surface must be clean and dry. Any contamination must be identified and removed. A detergent wash with PREP 88 or equivalent is required prior to application of topcoats after 30 days of exposure. However, particular attention must be paid to surfaces exposed to sunlight where chalking may be present. In those situations, a further degree of cleaning may be required. PPG Technical Service can advise on suitable cleaning methods. If maximum recoat/topcoat time is exceeded, then roughen surface.
- Dry times are dependent on air and surface temperatures as well as film thickness, ventilation, and relative humidity. Maximum recoating time is highly dependent upon actual surface temperatures – not simply air temperatures. Surface temperatures should be monitored, especially with sun-exposed or otherwise heated surfaces. Higher surface temperatures shorten the maximum recoat window

Overcoating interval for DFT up to 4.0 mils (100 µm)						
Overcoating with...	Interval	20°F (-7°C)	32°F (0°C)	50°F (10°C)	70°F (21°C)	90°F (32°C)
itself	Minimum	3 hours	2 hours	1.5 hours	45 minutes	30 minutes
	Maximum - immersion	3 months	2 months	30 days	30 days	30 days
	Maximum - non-immersion	6 months	6 months	6 months	6 months	6 months

Notes:

- Surface must be clean and dry. Any contamination must be identified and removed. A detergent wash with PREP 88 or equivalent is required prior to application of topcoats after 30 days of exposure. However, particular attention must be paid to surfaces exposed to sunlight where chalking may be present. In those situations, a further degree of cleaning may be required. PPG Technical Service can advise on suitable cleaning methods. If maximum recoat/topcoat time is exceeded, then roughen surface.
- If the surface is uniformly and freely chalking after 6 months of exterior weathering, the surface is recoatable with itself after thorough cleaning.
- Dry times are dependent on air and surface temperatures as well as film thickness, ventilation, and relative humidity. Maximum recoating time is highly dependent upon actual surface temperatures – not simply air temperatures. Surface temperatures should be monitored, especially with sun-exposed or otherwise heated surfaces. Higher surface temperatures shorten the maximum recoat window

Curing time for DFT up to 4.0 mils (100 µm)			
Substrate temperature	Dry to touch	Dry to handle	Service- water immersion
20°F (-7°C)	2 hours	20 hours	N/A
32°F (0°C)	1.5 hours	9 hours	7 days
50°F (10°C)	45 minutes	4.5 hours	48 hours
70°F (21°C)	30 minutes	1.5 hours	24 hours
90°F (32°C)	20 minutes	75 minutes	12 hours

Note: Adequate ventilation must be maintained during application and curing



AMERCOAT® 370

Pot life (at application viscosity)	
Mixed product temperature	Pot life
50°F (10°C)	6 hours
70°F (21°C)	4 hours
90°F (32°C)	2 hours

Product Qualifications

- ANSI / NSF Standard 61 for drinking water (valves only). For NSF application instructions, please visit our website at: www.ppgamercoatus.ppgpmc.com/NSF/
- AWWA C550-06
- Compliant with USDA Incidental Food Contact Requirements
- Qualified for Class A Slip Resistance per the Research Council on Structural Connections, Appendix A

SAFETY PRECAUTIONS

- For paint and recommended thinners see INFORMATION SHEETS 1430, 1431 and relevant Material Safety Data Sheets
- This is a solvent-borne paint and care should be taken to avoid inhalation of spray mist or vapor, as well as contact between the wet paint and exposed skin or eyes

WORLDWIDE AVAILABILITY

It is always the aim of PPG Protective and Marine Coatings to supply the same product on a worldwide basis. However, slight modification of the product is sometimes necessary to comply with local or national rules/circumstances. Under these circumstances an alternative product data sheet is used.

REFERENCES

• CONVERSION TABLES	INFORMATION SHEET	1410
• EXPLANATION TO PRODUCT DATA SHEETS	INFORMATION SHEET	1411
• SAFETY INDICATIONS	INFORMATION SHEET	1430
• SAFETY IN CONFINED SPACES AND HEALTH SAFETY, EXPLOSION HAZARD – TOXIC HAZARD	INFORMATION SHEET	1431

WARRANTY

PPG warrants (i) its title to the product, (ii) that the quality of the product conforms to PPG's specifications for such product in effect at the time of manufacture and (iii) that the product shall be delivered free of the rightful claim of any third person for infringement of any U.S. patent covering the product. THESE ARE THE ONLY WARRANTIES THAT PPG MAKES AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, UNDER STATUTE OR ARISING OTHERWISE IN LAW, FROM A COURSE OF DEALING OR USAGE OF TRADE, INCLUDING WITHOUT LIMITATION, ANY OTHER WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY PPG. Any claim under this warranty must be made by Buyer to PPG in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life of the product, or one year from the date of the delivery of the product to the Buyer, whichever is earlier. Buyer's failure to notify PPG of such non-conformance as required herein shall bar Buyer from recovery under this warranty.

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LIMITATIONS OF LIABILITY

IN NO EVENT WILL PPG BE LIABLE UNDER ANY THEORY OF RECOVERY (WHETHER BASED ON NEGLIGENCE OF ANY KIND, STRICT LIABILITY OR TORT) FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO, ARISING FROM, OR RESULTING FROM ANY USE MADE OF THE PRODUCT. The information in this sheet is intended for guidance only and is based upon laboratory tests that PPG believes to be reliable. PPG may modify the information contained herein at any time as a result of practical experience and continuous product development. All recommendations or suggestions relating to the use of the PPG product, whether in technical documentation, or in response to a specific inquiry, or otherwise, are based on data, which to the best of PPG's knowledge, is reliable. The product and related information is designed for users having the requisite knowledge and industrial skills in the industry and it is the end-user's responsibility to determine the suitability of the product for its own particular use and it shall be deemed that Buyer has done so, as its sole discretion and risk. PPG has no control over either the quality or condition of the substrate, or the many factors affecting the use and application of the product. Therefore, PPG does not accept any liability arising from any loss, injury or damage resulting from such use or the contents of this information (unless there are written agreements stating otherwise). Variations in the application environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results. This sheet supersedes all previous versions and it is the Buyer's responsibility to ensure that this information is current prior to using the product. Current sheets for all PPG Protective & Marine Coatings Products are maintained at www.ppgpmc.com. The English text of this sheet shall prevail over any translation thereof.

Packaging: Available in 1-gallon and 5-gallon kits; (1-gallon kits have 0.8 gallons of base and 0.2 gallons of hardener; 5 gallon kits have 4-gallons of base and 1-gallon of hardener)

Product code	Description
AT370-112	Light Buff Base
AT370-3	White Base
AT370-9	Black Base
AT370-23	Pearl Gray Base
AT370-72	Oxide Red Base
AT370-B	Hardener

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TEL: (630) 844-4000 FAX: (630) 844-4160

Purchase Order #: 9795011
Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

CATALOG CUT SHEETS

Scope of Line: Triton® XR-70 Butterfly Valve



Pratt® Triton XR-70

Sizes: 24 through 144 inches

Standard Body Styles:

- Flange x flange ends
- ~~Mechanical Joint ends (24" - 48")~~
- ~~Flange and Mechanical Joint ends (24", 30", 36")~~

Standards:

- Conforms to AWWA C504 requirements

Pressure Class:

- AWWA pressure classes ~~75B (54" - 144")~~ and 150B

Seat: Rubber seat-in-body

Actuation Options:

- ~~Pratt MDT manual actuator with AWWA nut, handwheel or chainwheel~~
- Worm gear actuators
- ~~Pratt Dura-Cyl hydraulic or pneumatic cylinder~~

Accessories/Options:

~~Anti-cavitation device, bonnets, floorstands, lantern glands, shaft locking devices, external epoxy injection port, snubbers, expansion joints, rubber lining~~

Consult factory for accessory details.

Optional Body Styles:

- ~~Victaulic Ends~~
- ~~Concrete Pipe Ends~~

Consult factory for lead times.

Features and Benefits: Triton® XR-70 Butterfly Valve

Feature	Benefit
E-Lok seat in design	– No hardware to loosen. Precision rubber seat installation and uniform interference provide long seat life. Foolproof adjustment and/or replacement (in most cases without removing the valve from the line)
Rubber seat located in body	– Reduces performance problems related to corrosive buildup in valve body and pipeline.
Optional external injection port	– E-Lok seat can be adjusted and/or repaired in the field without dewatering the pipeline
Seat material also available in EPDM	– Can accommodate temperatures up to 250 degrees F
Valve cycle tested per AWWA C504 requirements	– Proven reliability over the life of the valve
Flow through disc on 30 inch and larger	– More strength, less weight, greater free flow area. Higher C_v : lower head loss results in energy savings for customer's system
Nonmetallic bearings	– Prevents galvanic corrosion and provides lower coefficient of friction
V-type shaft packing	– Self-adjusting, lasts the life of the valve
Through disc pinning	– Provides a tight disc-to-shaft pin connection, greatly reducing the possibility of loosening through vibration

Specifications for Materials of Construction
Body Material: Cast Iron (24"-48") – ASTM A126, Class B Ductile Iron (54" & Larger) – ASTM A536, Grade 65-45-12
Disc Material: Ductile Iron – ASTM A536, Grade 65-45-12
Disc Edge: Stainless Steel – ASTM A-240 Type 316
Shaft Material: 304 Stainless Steel – ASTM A276 Type 304
Bearing Material: TLFB – Teflon lined, Fiberglass backed

← 60" Type 316

Design Details: Triton® XR-70 Butterfly Valve

60" Type 316

1) Corrosion Resistant Shafts

To prevent corrosion of a vital structural component, shafts are constructed of centerless ground ASTM A276 type 304. This material is superior to carbon steel or similar materials that afford little protection against the harmful effects of corrosion. The Henry Pratt Company's standard line consists of a two-piece, stub-type shaft keyed for the actuator connection.

2) Packing and Packing Gland Assemblies

Packing is self adjusting "V" type. The packing gland or shaft seal is utilized only in the top trunnion of the valve body where the shaft protrudes for actuator connection. The packing assembly incorporates a nylon packing retainer accompanied by several rings of packing. ~~Other available packing gland arrangements include water seals (lantern glands) for positive and negative pressures, and reverse "V" type for vacuum applications. Where access to packing is required, open type bonnets can be provided. When this option is specified, "V" type packing is held in place with a bronze retaining gland which is fastened to the valve trunnion with plated steel cap screws.~~

3) Bearings

Self-lubricating, sleeve-type bearings are used in both trunnions of the valve body. Bearings support the shaft and provide minimum friction during shaft rotation. Bearing material is Teflon-lined with a special fiberglass backing. This type of bearing offers electrical insulating qualities between the disc/shaft assembly and the valve body, thereby diminishing the effects of galvanic corrosion. In addition, its reduced coefficient of friction requires far less torque than the metallic bearing materials.

4) Rubber Seat

The multi-ridge surface of The Henry Pratt Company's E-Lok seat seals a full 360° against a stainless steel spherical disc edge. Because of the laterally spaced grooves, rubber stress is substantially reduced, resulting in less sealing torque. The grooved seat design, coupled with the wide spherically shaped seating edge of the disc, also allows greater disc closure tolerance. Regardless of valve size, angular misposition of the disc can be 1° off center without leakage. The seat is mechanically retained by a unique epoxy injection process which moves the seat against the disc to conform to the exact radius of the disc with uniform contact pressure. It is fully adjustable by local epoxy injection and can be replaced in the field. ~~As an option, valves may be purchased with an external injection port which allows seat adjustment and repair to be performed without removing the valve or dewatering the pipeline.~~ For additional information regarding the E-Lok seat, refer to the "E-Lok Seat Design" section of this brochure.

5) Shaft Connection

Disc-to-shaft connection is accomplished by conservatively sized stainless steel ~~or monel~~ taper pins, threaded at one end and secured with lockwashers and nuts. ~~On 24 inch valves, stainless steel dowel pins are used.~~ The Henry Pratt Company's through-pin design provides the tightest possible connection between the shaft and disc.

6) Valve Disc

Pratt® valve discs are constructed of the highest strength-to-weight ratio materials available. ~~On our 24 inch valve, the arch side of the disc is closed and the flat side is open, forming a slightly concave surface.~~ On valves 30 inches and greater, a flow through disc design is employed to minimize line turbulence and lower head loss. The greater free flow area provides less pressure drop in the full-open position than other disc shapes. For additional information regarding The Henry Pratt Company's flow through disc design, refer to "Flow through Design" section of this brochure.

60" & 72" ASTM A536, Grade 65-45-12

7) Valve Body

The bodies of the XR-70 are constructed of heavy cast iron ASTM A126. On flange end bodies, flange drilling is provided in accordance with ANSI B16.1 for cast iron flanges through 72 inches. ~~Larger sizes where applicable per AWWA C207.~~

8) Thrust Bearing Assembly

The two-way thrust bearing is preset at the factory. On valves 30 inches and larger, the thrust bearing assembly consists of a stainless steel ~~or monel~~ stud fastened to the bottom of the valve shaft. The stud extends beyond the bottom cover. The thrust collar is threaded to the stud and pinned. ~~On the 24 inch valve, the thrust collar is pinned to the shaft and fitted with bronze spacers.~~ The bottom cover cap is then bolted to the bottom cover and retains the thrust collar which, in turn, retains the position of the disc assembly. The cavity containing the thrust collar is packed with grease providing lifetime lubrication of the thrust bearing assembly. The cap is fully gasketed to prevent leakage.

Valve End Connection Options

A wide range of valve end connection options for the Pratt Triton XR-70 are available. See "Valve End Types and Dimensions" section for details.

Actuation Options

See "Actuation" section for Pratt actuators or refer to The Henry Pratt Company's Actuator brochure for the many actuation options available for the Triton XR-70.

E-Lok Seat Design

Years of Reliable Service

The Triton® XR-70 utilizes the unique E-Lok seat-in-body design. With years of reliable performance, the E-Lok's seat retention system still remains one of the most innovative concepts in butterfly valve seat design. This design is often imitated without the superior results that only The Henry Pratt Company experience can deliver.

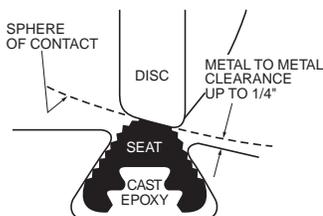
How the E-Lok Seat Provides Bubble Tight Closure

The rubber seat, which is mounted in the valve body, seals a full 360° against a stainless steel disc edge with low torque and high tolerance to seating angle. The ridges molded into the seat surface greatly reduce the possibility of the seat being over compressed and minimizes compression set of rubber. In manufacturing, a two part epoxy compound is injected into a channel behind the rubber seat with the disc in the closed position. This ensures equal interference around the complete circumference of the disc/seat contact area. The epoxy hardens, bonding neither to the metal seat channel nor to the rubber seat, yet mechanically retains the seat in the body. Since the seat is installed and remains in a "relaxed" state, the possibility of damaging the seat is greatly reduced as compared to a seat that is "stressed" when bolted on to a body or disc as in other designs.

During injection, the seat is moved against the disc as the epoxy fills the cavity to provide uniform disc-to-seat interference around the entire seating surface. The result is the bubble tight closure. This system eliminates conventional seat retention hardware that can loosen and corrode, potentially damaging pumps and other costly auxiliary equipment.

Simple Seat Adjustment

Another significant feature of the E-Lok seat is that it can be easily adjusted or replaced in the field while the valve is installed in the line. Adjustment is achieved by local injection of epoxy directly through the seat material into the channel behind the seat. The epoxy travels the circumference of the valve body channel until it finds the void and moves the seat material outward toward the disc edge, bringing the valve back into bubble tight condition. ~~the valve was supplied with the optional external injection~~



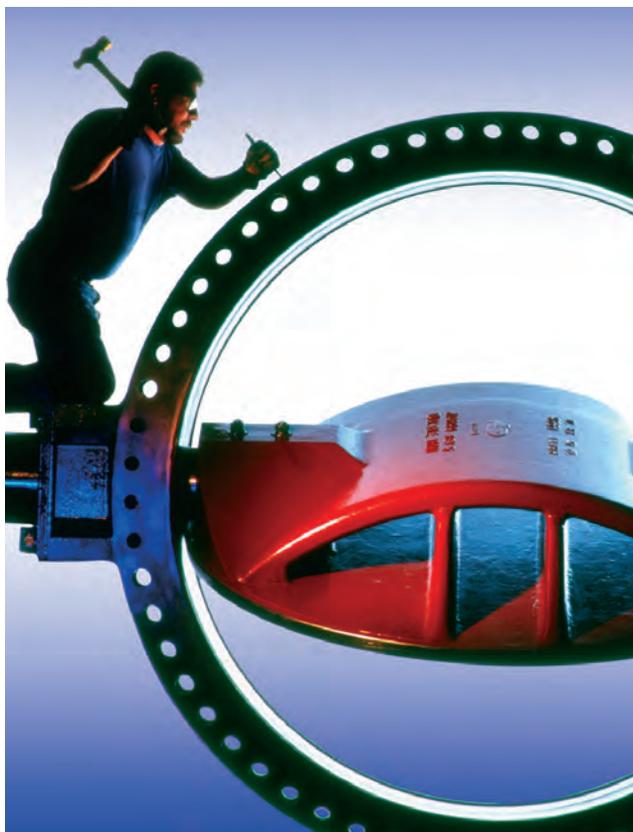
~~port, the seat can be adjusted from the outside of the valve without dewatering the pipeline.~~ The injection process can be achieved by utilizing simple tools and an inexpensive, disposable seat injection kit.

Easy Seat Replacement

In the unlikely event that seat replacement is required, it can be performed on valves 30 inches and larger without removing the valve from the pipeline (as long as a technician can access inside the valve), on all sizes without removing the shaft and/or disc. The original rubber seat and hardened epoxy compound used to retain the seat can be removed from the valve with ordinary hand tools. A replacement seat can then be installed, returning the valve to its original bubble tight condition.

Flow Through Design

The Triton disc design distributes material where it is needed to resist loads, achieving more strength at less weight than any other disc design currently on the market. The flow through disc has a greater free flow area than conventional lens-shaped or offset disc designs, resulting in lower pumping costs.



Coatings and Rubber Linings

Withstanding Harsh Conditions and the Test of Time

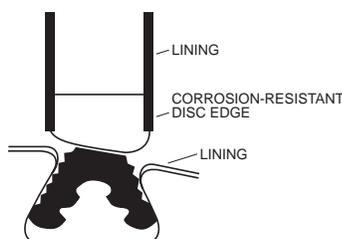
In many industrial facilities, valves are regularly subjected to harsh conditions, including recirculating water loops where corrosiveness increases each time the water passes through the system, and cooling water systems which utilize brackish water or salt water as a medium. This is especially true at fossil and nuclear power generating plants, which frequently use sea water as their main cooling water resource.

To combat the damaging effects of these harsh conditions, The Henry Pratt Company utilizes epoxy coatings and rubber linings in conjunction with superior design features to help ensure that the Triton® XR-70 butterfly valves will withstand the test of time.

The unique construction of the Pratt® Triton rubber seated butterfly valve makes both epoxy coatings and rubber linings much more effective than other butterfly valve designs. Since all surfaces of the Triton disc are exposed, there is no possibility for corrosion to start in hidden, unprotected areas like the inside of a hollow, lens-shaped offset disc. Since there is no seat retention hardware, coating and/or lining breakdown in this area is also eliminated.

In applications involving salt water and/or entrained solids which can cause erosion, the superiority of rubber lining on the valve disc has been clearly demonstrated by Pratt butterfly valves placed in service decades ago that are still providing bubble tight closure today. Both epoxy coating and rubber lining have also successfully protected the valve bodies in these corrosive service conditions as illustrated by The Henry Pratt Company's long track record of quality and reliability at industrial facilities and power plants around the world.

Other rubber lining features include The Henry Pratt Company's shaft-bearing being thoroughly protected by rubber shaft seals to maintain bearing performance throughout the life of the valve. Also, the shaft bore in disc is sealed with a rubber seal. The juncture of the rubber liner to the rubber seat is also protected by a sealant applied under pressure.



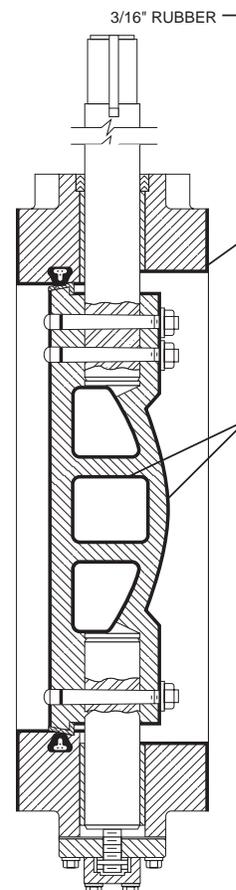
Complete coverage of corrosion susceptible wetted surfaces is demonstrated in these drawings. Body lining in conjunction with the seat creates a water barrier and protects against corrosion.

Rubber Linings

The Henry Pratt Company lines corrosion-susceptible surfaces with a 3/16-inch thick rubber of 60 Shore-A durometer. The surfaces are prepared and blasted to a near-white metal finish. The linings are applied by the "hand-lay-up method" (similar to tank lining techniques) and then cured in an open steam autoclave using 40 to 50 psig steam pressure. Following application and curing, the linings are visually inspected for air bubbles and checked at 7,000 volts with a positive control high-voltage spark tester.

Epoxy Coatings

The Henry Pratt Company has an extensive coating facility which applies and cures coatings in a controlled environment. Prior to application of the epoxy, valves are sandblasted and thoroughly cleaned to ensure a proper bond. The interior and external surfaces of each valve are coated with a Polyamide-cured, rust inhibiting epoxy, NSF approved. A magnetic dry film thickness gauge is used to confirm that the coating thickness matches the project/order specification requirements. Electronic testing for pin holes (holidays) is available. Contact The Henry Pratt Company for options and pricing.



Suggested Specifications: Butterfly Valves 24" and larger Cast Construction

General

All butterfly valves shall be of the tight closing, rubber seated type and fully comply with the latest revision of AWWA Standard C504/~~C516~~ and NSF61, where applicable. Valves shall be bubble-tight at rated pressures in either direction, and shall be satisfactory for applications involving throttling service and for applications requiring valve actuation after long periods of inactivity. Valve discs shall rotate 90° from the full open position to the tight shut position. Regardless of valve size, angular misposition of disc can be up to 1° off center without leakage.

The manufacturer shall have manufactured tight closing, rubber seated butterfly valves for a period of at least ten years. All valves from 24" through 144" shall be the Triton® XR-70 as manufactured by the Henry Pratt Company or an approved equal.

or ASTM A536, Grade 65-45-12

Valve Body

All valve bodies shall be cast iron ASTM A126, Class B, narrow body design. Flange drilling shall be in accordance with ANSI B16.1 standard for cast iron flanges. Body thickness shall be in strict accordance with AWWA C504 where applicable.

Valve Disc

All valve discs shall be constructed of ductile iron ASTM A536 with a stainless steel seating edge. The disc shall not have any hollow chambers that can entrap water. All surfaces shall be visually inspected and measurable to assure all structural members are at full disc strength. Disc and shaft connection shall be made with stainless steel pins.

Typical Applications for Triton XR-70

Thousands of Triton XR-70 butterfly valves have been installed in plants and industrial facilities around the world. Some typical applications include the following:

- Water treatment
- Wastewater treatment
- Cooling water systems
- Circulating water systems
- Nuclear, fossil fuel and cogeneration power plants
- Pumping stations
- Reservoirs
- Pipelines

Valve Shaft

All shafts shall be turned, ground, polished and constructed of ASTM A-276 Type 304 or Type 316 stainless steel. Shafts shall be two-piece, stub type and keyed for actuator connection. Shaft diameters shall meet minimum requirements established by the latest revision of AWWA Standard C504 for their class, where applicable.

Valve Seat

All seats shall be constructed of synthetic rubber compound such as Buna N or EPDM and suitable for bidirectional shutoff at rated pressure. Seats shall be retained in the valve body by mechanical means without retaining rings, segments, screws or hardware of any kind in the flow stream. Seats shall be a full 360° without interruption and have a plurality of grooves mating with a spherical disc edge seating surface. Valve seats shall be field adjustable around the full 360° circumference and replaceable without dismantling the actuator, disc or shaft and without removing the valve from the line.

Valve Bearings

All butterfly valves shall be fitted with sleeve-type bearings. Bearings shall be corrosion resistant and self-lubricating. Bearing load shall not exceed $\frac{1}{5}$ of the compressible strength of the bearing or shaft material.

Valve Actuator

Valve actuators shall conform to AWWA Standard C504 and shall be designed to hold the valve in any intermediate position between full open and fully closed without creeping or fluttering.

Painting

All surfaces of the valve shall be clean, dry and free from grease before applying paint or coating. The valve interior and exterior surfaces, except for the seating surfaces, shall be provided with the manufacturer's standard coating unless otherwise specified by contract.

Testing

Hydrostatic and leakage tests shall be conducted in strict accordance with AWWA Standard C504.

Proof of Design

The manufacturer furnishing the valves under the specification shall be prepared to show proof that the valves provided meet the design requirements of AWWA Standard C504.

The rugged and reliable WG series worm gearboxes are constructed for manual or motorized operation. With ductile iron housings, bearing-supported shafts, and well-designed sealing, the WG stands up to the environmental challenges of weatherproof, submersible and buried service applications. Alternate input shaft assembly positions can be accomplished in the field due to the concentric housing design. The splined adapter is captive in the housing, eliminating the concerns over proper engagement of the adapter on the valve shaft. The range of spur gear reductions allows the WG to meet operating times for virtually any application.

The WG meets AWWA C504 requirements for manual operation and, when motorized, meets AWWA C542 requirements. High-quality, maintenance-free construction will provide years of dependable operation.

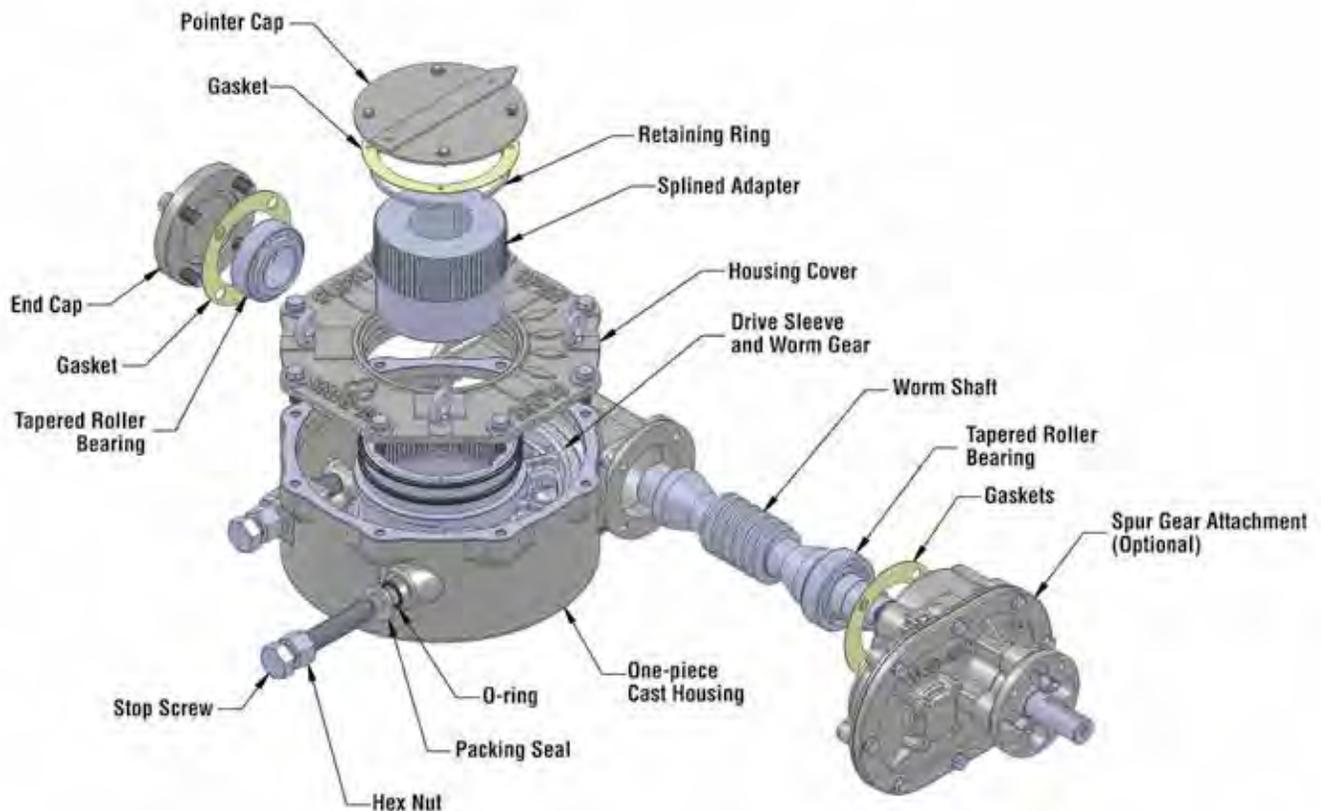
Features and Benefits

- Meets AWWA C504 and C542 when motorized with **MX**, L120 or **SMB** actuators
- Lubricated for life
- Available for 360° operation
- Input flanges machined in accordance with MSS SP-102, with keyed input shaft
- Available for buried service and submersibility to IP 68
- Self-locking gearing
- High mechanical advantage

The WG series, when motorized by **MX**, L120 or **SMB** actuators, provides effective and reliable solutions for ~~quarter-turn or~~ multi-turn process control applications.



- Ductile iron enclosure
- 90° ±5° (adjustable) travel for quarter-turn applications
- Up to 326 000 ft-lb/442 000 N-m torque output
- Worm gears available in bronze or ductile iron
- -35°C to 90°C (-31°F to 194°F) temperature range for continuous operation (options to -50°C)





Ratings

Gearbox	Ratio	Mechanical Advantage	Stem Capacity		Output Torque Rating		Input Torque for Output Torque Rating	
			Inches	MM	ft-lb	N-m	ft-lb	N-m
WG-00	40:1	13.6	1.250 - 5/16 x 5/16 sq key 1.313 - 5/16 x 1/4 rect key	32 - 8x7	885	1200	65	88
WG-02	48:1	15.4	2.125 - 1/2 x 1/2 sq key 2.188 - 1/2 x 3/8 rect key	56 - 12x8	2065	2800	134	182
WG-03	52:1	16.1	2.688 - 5/8 x 5/8 sq key	70 - 16x10	3172	4300	197	267
WG-03-1SD	217:1	52.1	2.750 - 3/4 x 1/2 rect key				61	83
WG-35	52:1	16.6	2.813 - 3/4 x 3/4 sq key	74 - 20x12	4500	6100	270	367
WG-35-1SD	148:1	35.5	2.938 - 3/4 x 1/2 rect key				127	172
WG-04	56:1	19.0	3.313 - 7/8 x 7/8 sq key	88 - 25x14	7670	10 400	404	547
WG-04-1SD	252:1	60.5	3.438 - 7/8 x 5/8 rect key				127	172
WG-05	60:1	20.4	4.000 - 1 x 1 sq key	106 - 28x16	11 720	15 890	575	779
WG-05-1SD	388:1	93.1	4.125 - 1 x 3/4 rect key				126	171
WG-55	62:1	21.7	4.375 - 1 x 1 sq key	115 - 32x18	17 330	23 497	799	1083
WG-55-1S	186:1	52.1	4.500 - 1 x 3/4 rect key				333	451
WG-55-1SD	372:1	89.3					194	263
WG-55-1SD	558:1	133.9					129	175
WG-06	64:1	19.2	4.813 - 1-1/4 X 1-1/4 sq key	128 - 32x18	24 190	32 797	1260	1708
WG-06-1SD	329:1	75.7	5.000 - 1-1/4 X 7/8 rect key				320	433
WG-06-1SD	451:1	103.7					233	316
WG-06-1SD	768:1	176.6					137	186
WG-07	68:1	21.1					1788	2424
WG-07-1SD	350:1	80.5	6.188 - 1-1/2 x 1-1/2 sq key	164 - 40x22	37 690	51 101	468	635
WG-07-1SD	674:1	155.0	6.438 - 1-1/2 x 1 rect key				243	330
WG-07-1SD	1088:1	250.2					151	204
WG-75	66:1	20.5	7.125 - 1-3/4 x 1-3/4 sq key	188 - 45x25	60 110	81 498	2938	3983
WG-75-1S	330:1	89.1	7.250 - 1-3/4 x 1-1/2 rect key				675	915
WG-75-1SD	394:1	90.6					663	899
WG-75-1SD	544:1	125.1					480	651
WG-75-1SD	1084:1	249.3					241	327
WG-08	66:1	21.8	8.500 - 2 x 2 sq key	228 - 50x28	89 240	120 992	4097	5555
WG-08-1S	330:1	92.4	8.750 - 2 x 1-1/2 rect key				966	1309
WG-08-1SD	394:1	98.5					906	1228
WG-08-1SD	770:1	192.5					464	629
WG-08-1SD	1417:1	354.3					252	342
WG-09	66:1	23.1	9.500 - 2-1/2 x 2-1/2 sq key	258 - 56x32	141 980	192 497	6146	8333
WG-09-1S	330:1	99.0	10.000 - 2-1/2 x 1-3/4 rect key				1434	1944
WG-09-1SD	394:1	102.4					1386	1879
WG-09-1SD	1155:1	300.3					473	641
WG-10	64:1	21.8	10.625 - 2-1/2 x 2-1/2 sq key	286 - 63x32	202 830	274 997	9321	12 638
WG-10-1S	320:1	92.8	11.000 - 2-1/2 x 1-3/4 rect key				2186	2963
WG-10-1SD	422:1	109.7					1849	2506
WG-10-1SD	640:1	166.4					1219	1653
WG-10-1SD	1600:1	416.0					488	661
WG-11	68:1	23.1	11.750 - 3 x 3 sq key	318 - 70x36	326 000	441 991	14 100	19 117
WG-11-1S	340:1	102.0	12.250 - 3 x 2 rect key				3196	4333
WG-11-1SD	448:1	116.5					2799	3795
WG-11-1SD	816:1	212.2					1537	2083
WG-11-1SD	994:1	258.4					1261	1710

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Sales Order #: 2731977 HP
Proposal/Quote #: Q-020-13073
Project Name: Hess Pump Station Valve Replacement
Project Location: Wichita, KS
Date: August 12, 2020
Revision: 0

WARRANTY

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MATERIAL WARRANTY

Seller warrants that, at its option, it will repair, replace, or refund the unit purchase price of any products which are non-conforming due to Seller's material or workmanship during the warranty period.

The warranty period shall be twenty four (24) months for parts and all other goods after date of shipment. This shall be Buyer's sole remedy.

In order to maintain this product warranty, Buyer must give written notice to Seller's Field Service Supervisor prior to any work being performed. In no event shall warranty include the cost of valve removal or reinstallation.

IN CONSIDERATION OF THE FOREGOING, SELLER EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES INCLUDING BUT NOT LIMITED TO MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Seller does not warrant water-operated metallic cylinders against damage caused by corrosion, electrolysis or mineral deposits.

In no event shall warranty include valve removal or reinstallation.