Dondlinger CONSTRUCTION
2656 S. Sheridan, Wichita, Kansas 67217
P.O. Box 398, Wichita, Kansas 67201-0398
Phone: 316.945.0555 Fax: 316.945.9009

SUBMITTAL NO.
~~331216-001~~
003

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: ~~331216-001~~ 003
Submittal Title: ~~PRATT 48, 60, 72" Butterfly Valves w/ EMO~~
Specification: 33 12 16
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 48,60,72 BFV EMA~~	New Item		08/18/2020	1		

Submittal Reference should be 30" Ball Valves with Electric Actuators. Attachment is correct.

DONDLINGER AND SONS CONST. CO., INC.

[✓] Reviewed ES
[ ] Reviewed as Noted
[ ] Revise and Resubmit
[ ] Date 8/18/20
[ ] Submittal No. 331216-003

REVIEW OF ITEMS DOES NOT RELIEVE VENDOR COMPLYING WITH REQUIREMENTS OF CONTRAC PLANS AND SPECIFICATIONS, CONTRACT AND C 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.

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

BY Ryan Glessner DATE 8/19/2020

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

August 12, 2020

Mr. Robert Bollin
Core ans 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: AWWA 150# Rubber Seated Ball Valves

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 rubber seated ball valves 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 - 2.2 RUBBER SEATED BALL VALVES

Sales Order #

2731977 HP

Purchase Order #

9795011

Proposal/Quote #

Q-020-13073

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TABLE OF CONTENTS

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SCOPE OF SUPPLY

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SCOPE OF SUPPLY

LINE	QTY	LOCATION/TAG	DESCRIPTION
3	7	**Location:** Drawing C101, A Valves **Tag #:**	30" Flanged 150# Rubber Seated Ball Valve, Ductile Iron Body, Ductile Iron Rotor with 316 Stainless Steel Edge, 304 Stainless Steel Shaft and Pins, Buna-N Seat, Teflon Lined Fiberglass Bearings, 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Limitorque Electric Motor Open/Close **ESTIMATED WEIGHT:** 11,550 lbs **LEAD TIME:** 26-30 weeks

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CERTIFICATES OF CONFORMANCE

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

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Certificate of Conformance
Ball Valves

We hereby certify that the valves identified herein will be manufactured in accordance with referenced specifications and the applicable sections of AWWA C507-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:	AWWA 150# Rubber Seated Ball 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.

Bob Newkirk
Pratt Quality Assurance Manager

Date: August 12, 2020

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.

F 13413 04/19

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SPECIFICATION SHEETS

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

Line Item #: 3

Location: Drawing C101, A Valves

Part Number: 30BVR1-0630-BO#10153

30" Flanged 150# Rubber Seated Ball Valve, Ductile Iron Body, Ductile Iron Rotor with 316 Stainless Steel Edge, 304 Stainless Steel Shaft and Pins, Buna-N Seat, Teflon Lined Fiberglass Bearings, 8 Mils Amercoat 370 Epoxy Interior, 8 Mils Amercoat 370 Epoxy Exterior, Limitorque Electric Motor Open/Close

Unit Weight: 11,550 lbs

C-020-26572

VALVE DATA

General Information / Material Specification

Product:	Rubber Seated Ball Valve	Center & End Piece Material:	D.I. ASTM A536 (65-45-12)
Valve Size:	30"	Shaft & Pin Material:	S.S. ASTM A276 Type 304
Pressure Class:	150#	Body Bearing Material:	Duralon Teflon Lined Fiberglass
End Connection:	Flanged	Rotor Material:	D.I. ASTM A536 (65-45-12)
Drill Pattern:	125#	Rotor Edge Material:	316 S.S. ASTM A240
Seat Design:	Rubber Seated	Seat Material:	Buna-N
		Exterior Hardware:	Carbon Steel Zinc Plated

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 C507, Latest Version
Cycle/Performance Test:	Per AWWA C507, Latest Version

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

Literature: https://www.henrypratt.com/sites/henrypratt.com/files/uploads/media/prattrubberseatedballvalvebroupdate_f13274_v4.pdf

Notes/Customer Specifications

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Unit Weight: 11,550

C-020-26572

ACTUATOR DATA

General Information

Actuator Type:	Buyout - Limitorque
Operator:	Electric Motor Open/Close
Actuator Position:	Position B3
Mounting Pattern:	FA35
***See vendor model specifications for more information.**	

Exterior Options

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

Literature:

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GENERAL ARRANGEMENTS

VALVE SIZE	A	B	C	D	E	F	G	EH	EJ	EL	EN	EP	ER	HH
4	9-7/8	12-1/4	9	13	1-1/4	8 x 5/8	7-1/2	14-1/4	8-1/8	2-5/16	7/8	2	2-15/16	4-1/2
6	10-1/2	13-1/4	11	16	1	8 x 3/4	9-1/2	16-1/2	9	2-5/16	1-1/8	2-3/8	2-15/16	8
8	11-1/8	13-15/16	13-1/2	18	1-1/8	8 x 3/4	11-3/4	19	10-1/8	2-3/4	1-1/8	2-7/16	3-13/16	8
10	12-7/8	16-1/8	16	18-1/8	1-3/16	12 x 7/8	14-1/4	22	11-7/8	3-3/8	1	3-3/16	4-1/8	8
12	15	18-1/2	19	21	1-1/4	12 x 7/8	17	25-3/4	13-1/2	4-1/16	1-1/8	3-3/16	3-7/8	8
14	17-3/8	20-5/8	21	26-1/4	1-3/8	12 x 1	18-3/4	29-3/4	15-1/2	4-1/2	1-5/16	3-1/4	4-1/2	8
16	20-1/16	23-1/4	23-1/2	27	1-7/16	16 x 1	21-1/4	32-7/8	17-1/8	4-3/4	1-7/16	3-5/16	5	8
18	21-9/16	24-7/8	25	29	1-9/16	16 x 1-1/8	22-3/4	36-5/8	18-3/4	4-7/8	1-9/16	3-15/16	5-9/16	8
20	23-5/8	27-3/4	27-1/2	32	1-11/16	20 x 1-1/8	25	39-7/8	20-1/2	4-9/16	1-5/8	5-1/4	6-1/4	8
24	26-1/2	29-3/4	32	37	1-7/8	20 x 1-1/4	29-1/2	44-3/4	23-7/8	4-15/16	1-15/16	5-15/16	7-3/4	8
30	32-1/2	35-7/16	38-3/4	46	2-1/8	28 x 1-1/4	36	55-5/8	29-1/2	5-15/16	2-3/8	6-11/16	10-7/16	4-1/2
36	36-7/8	41-1/16	46	54	2-3/8	32 x 1-1/2	42-3/4	65-3/8	34-1/2	6-7/16	2-5/8	7-5/8	8-3/4	4-1/2
42	42-1/2	47-3/16	53	59-1/2	2-5/8	36 x 1-1/2	49-1/2	75-1/2	39-7/8	8-3/8	2-7/16	9-1/16	12-7/8	4-1/2
48	50-3/8	58-1/16	59-1/2	72	2-3/4	44 x 1-1/2	56	86-3/4	44-5/8	7-15/16	3-5/8	9-1/2	12-5/8	4-1/2

MOTOR DIMENSIONS

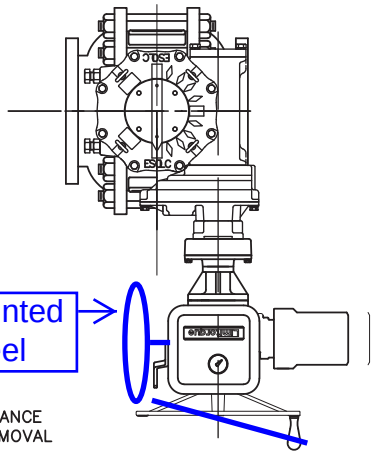
UNIT SIZE	J	M	R	V
L120-10	15-7/16	14-1/4	14-1/8	12
L120-20	16-7/16	16	15-5/8	18
L120-40	17	18-15/16	18-1/8	24

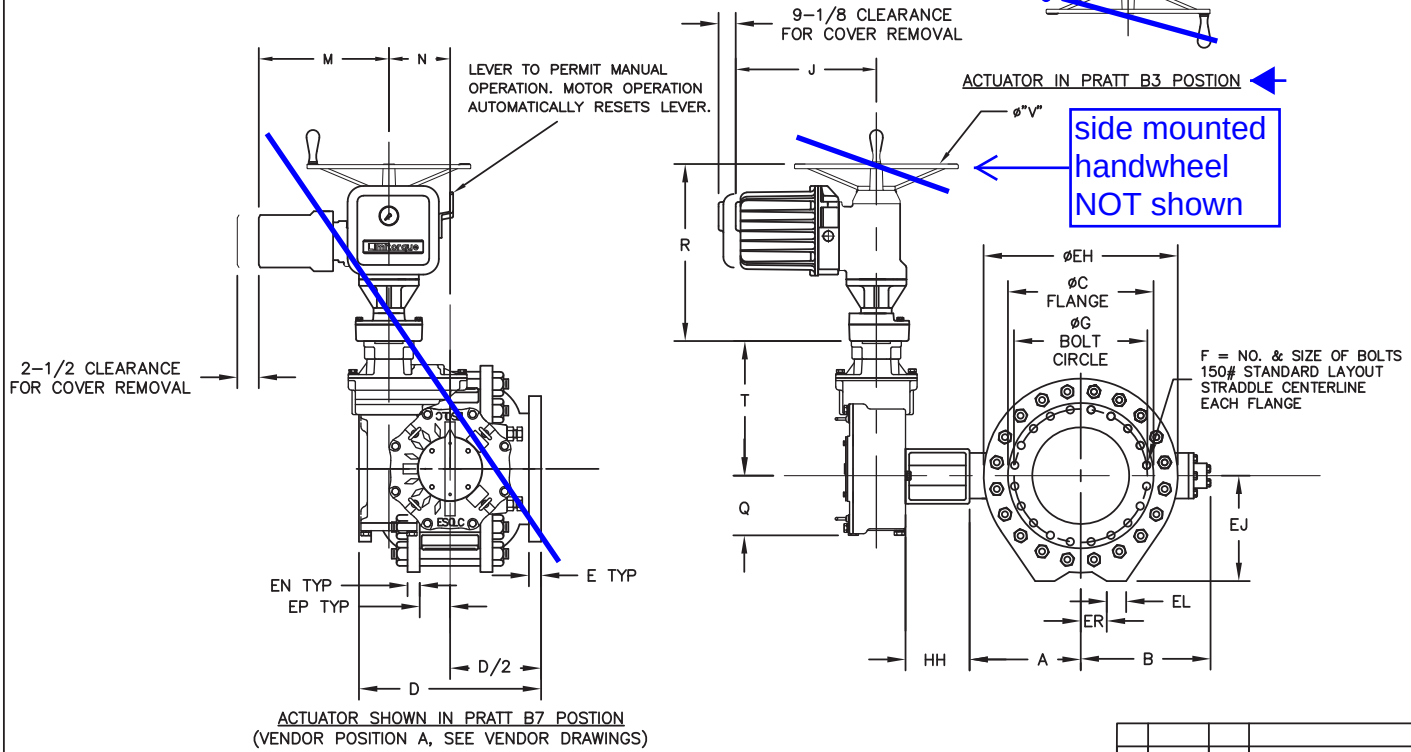
REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS

WORMGEAR DIMENSIONS

UNIT SIZE	L	N	Q	T
WG-03	2-1/2	4-1/2	5	9-7/8
WG-04	2-7/8	6	6-1/8	12-5/8
WG-05	3-1/8	7-1/8	6-1/2	12-5/8
WG-06	4-1/4	9-1/8	8-1/2	18
WG-07	4-1/2	11	9-1/8	20-1/4
WG-35	2-1/2	5	4-7/8	10-3/4
WG-55	3-1/8	8	7-3/8	13-7/8
WG-07-1SD	4-1/2	11	11-3/8	20-1/8

REFER TO VENDOR ACTUATOR DRAWING FOR CERTIFIED DIMENSIONS





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

NOTES:

1. ALL DIMENSIONS SHOWN IN INCHES.
2. "D" DIMENSION ±1/8".
3. 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.~~
4. DIMENSIONS AND DRILLING OF END FLANGES CONFORM TO THE AMERICAN CAST IRON FLANGE STANDARDS, CLASS 125(B16.1).
5. VALVES MANUFACTURED & TESTED IN ACCORDANCE WITH AWWA SPECIFICATION C-507 LATEST REVISION, CLASS 150.
6. 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.
7. VALVE ROTOR SHOWN IN OPEN POSITION.
8. CAUTION: IT IS RECOMMENDED THAT VALVES BE INSTALLED INTO THE PIPING SYSTEM IN ACCORDANCE WITH AWWA M-11 IN ORDER TO PREVENT ANY UNDUE PIPING STRESS, DEFLECTION OR BENDING THAT MAY EFFECT THE PERFORMANCE OF THE VALVE.

REV	DATE	BY	DESCRIPTION	APP.

PRATT

GENERAL ARRANGEMENT DRAWING
150# DOUBLE SEATED BALL VALVE
LIMITORQUE MX/WG ACTUATOR

SCALE NONE DATE 08/03/20
DRAWN BY TT CHECKED BY
APPROVED GA=BORDER
DRWG. NO. GA-12583 REV 0 A/C

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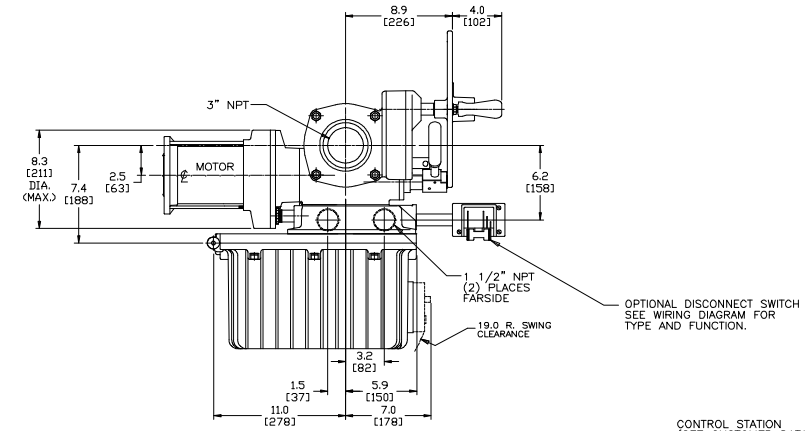
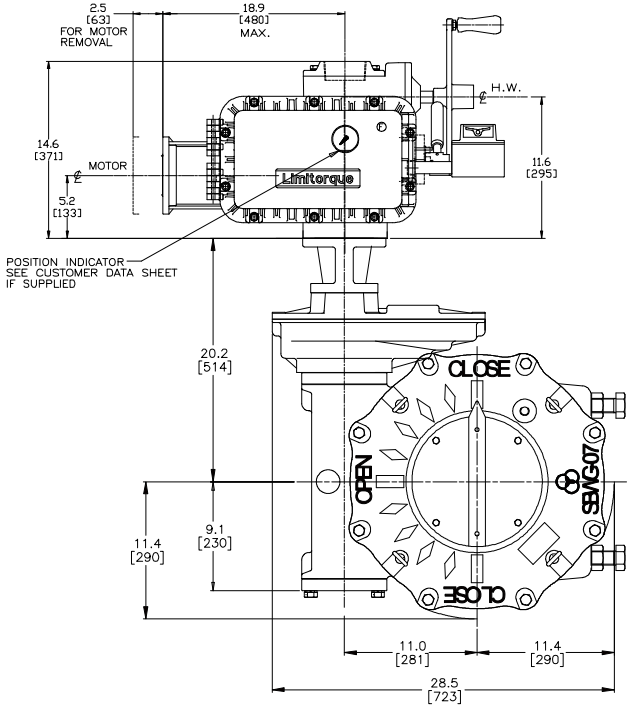
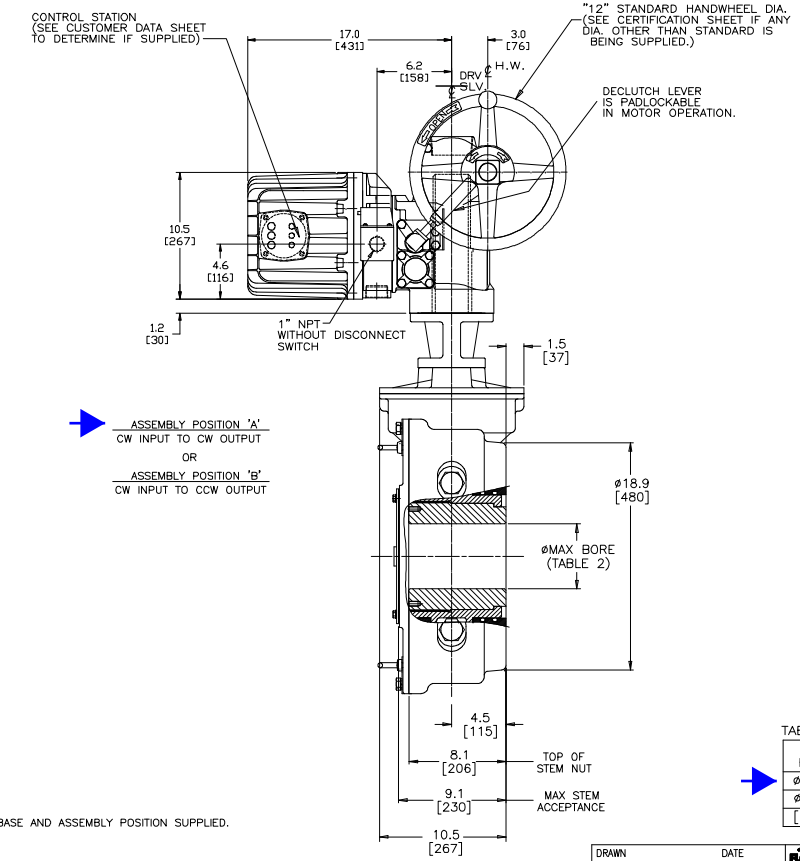
ACTUATOR INFORMATION

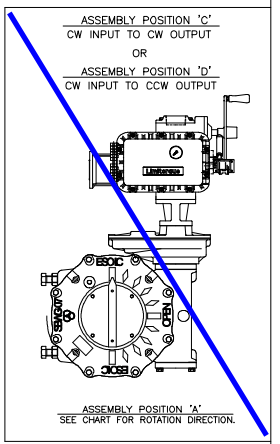
Line Item 3

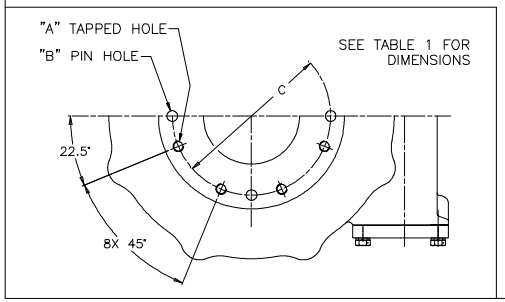
REVISIONS				
REV	DESCRIPTION	BY	DATE	APPVD











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

TABLE 1

MOUNTING BASE		A	B	C
MSS (INCH)	FA30	(8) 3/4-10 UNC TAP X 1.2 DP	N/A	ø11.7
	FA35	(8) 1-8 UNC TAP X 1.8 DP	N/A	ø14.0
	FA40	(8) 1 1/4-7 UNC TAP X 2.1 DP	N/A	ø16.0
ISO (METRIC)	F30	(8) M20 TAP X 30 DP	(4) ø20 PIN X 20 DP	ø298
	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

TABLE 2

MAX BORE	MAX KEYWAY (SQUARE)	MAX KEYWAY (RECTANGLE)
ø6.188	1 1/2 X 1 1/2	–
ø6.438	–	1 1/2 X 1
[ø164]	–	[40 X 22]

DRAWN	RLP 3/17/15
CHECKED	ILY 3/18/15
APPROVED	ILY 3/18/15
[ ] = MILLIMETER VALUE UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	

FLOWSERVE Limitorque Actuation Systems
5114 WOODALL ROAD, LYNCHBURG, VIRGINIA 24506-1316

TITLE: L120-40 STANDARD UNIT WITH:
A) SIDE MOUNTED HANDWHEEL
B) MIN INTEGRAL COVER
C) WG-07-1SD WORM GEAR OPERATOR
D) MSS AND ISO BASE
E) OPTIONAL CONTROL STATION
F) OPTIONAL DISCONNECT SWITCH

SIZE	DWG NO	REV
A	03-652-0093	

SCALE	ORDER NO
NONE	N/A

L1068 3/8/93

Flowserve®

Limitorque

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

Phone: 434-528-4400
Fax:

Customer Data Sheet

SALES ORDER NO.	ORDER LINE	DATE ORDERED
183124 REV 2	001	07/02/20

CUSTOMER PURCHASE ORDER	CUSTOMER NO.
1356592	71750

OPERATOR	CONFIGURATION
LOBRIEN	197494.0

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 3

ACTUATOR INFORMATION	
Electric Actuator Type	L120-40
Enclosure Type	WP-LC LABEL
Position Indication	LCPI
Control Package	CLMSHL
Control Station	CS
LSC Heater	120V/20W
~Output RPM (Electric)	81
Open Direction	CCW
~L120/Gear Box Max Rated Torque	11914 ft lb 16153 Nm
~L120/Gear Box Stall Torque	27289 ft lb 36999 Nm
Valve Torque	11552 ft lb 15665 Nm
Operating Time for 90 degrees	73
Handwheel Diameter	OPT-12"SIDE
L120 Drive Type	1
L120 Base Type	MSS
Gear Box Type	WG-07-15D-D
Gear Box Ratio	350
Gear Box SGA Ratio	NA
Gear Box Position	A
Gear Box Base Type	MSS-FA35
Paint	LPS-130
Outline Drawing	03-652-0093
~Wiring Diagram	16-476-2507
Disconnect Switch Diagram	NA
Warranty	STANDARD
Lube	LUBE-DYNALIFE-L-EPO
MOTOR INFORMATION	
Motor Size	15 Ft· Lbs·
~Motor Voltage	125
~Mtr Phase/Frequency	VDC

Flowserve®

Limitorque

5114 Woodall Road **Phone: 434-528-4400**
Lynchburg, VA 24502-2248 **Fax:**
434-845-9736www.flowserve.com

Customer Data Sheet

SALES ORDER NO.	ORDER LINE	DATE ORDERED
183124 REV 2	**001**	**07/02/20**

CUSTOMER PURCHASE ORDER	CUSTOMER NO.
1356592	**71750**

OPERATOR	CONFIGURATION
LOBRIEN	**197494.0**

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**

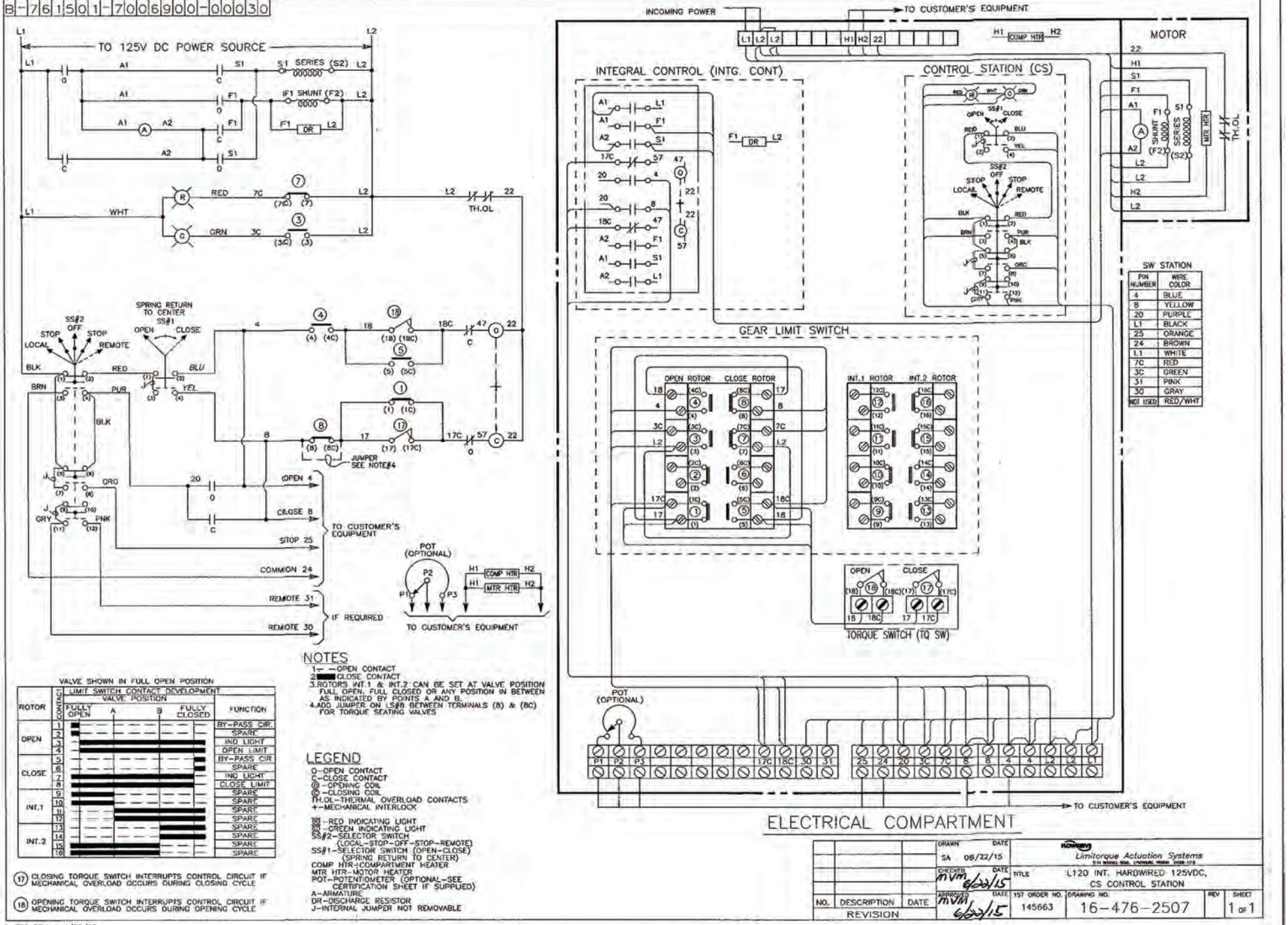
Line Item 3

Motor Horsepower/KW	1·00 / 0·75
~Motor RPM	1900
~Locked Rotor Amps (LRA)	62·00
~Full Load Amps (FLA)	7·50
Motor Heater	120V/10W
~Recommended Discharge Resistor	1000 Ohms, 25 Watts

INSTRUCTION MANUALS: (On the Internet www·limitorque·com)
L120-40 Instruction Manual - LMENIM1201
WG Instruction Manual - LMENIM2101
CLMSHL Instruction Manual - NA

TAGGING AND INFORMATION:
TAG ALL: ZHP2731977003

B-761501-7006900-000330



SW STATION	
PIN NUMBER	WIRE COLOR
4	BLUE
8	YELLOW
20	PURPLE
L1	BLACK
25	ORANGE
24	BROWN
L1	WHITE
7C	RED
3C	GREEN
31	PINK
30	GRAY
NOT USED	RED/WHT

VALVE SHOWN IN FULL OPEN POSITION

ROTOR	CONTACT	LIMIT SWITCH CONTACT DEVELOPMENT — VALVE POSITION: FULLY OPEN / A / B / FULLY CLOSED	FUNCTION
OPEN	1		BY-PASS CIR.
	2		SPARE
	3		IND. LIGHT
	4		OPEN LIMIT
CLOSE	5		BY-PASS CIR.
	6		SPARE
	7		IND. LIGHT
	8		CLOSE LIMIT
INT.1	9		SPARE
	10		SPARE
	11		SPARE
	12		SPARE
INT.2	13		SPARE
	14		SPARE
	15		SPARE
	16		SPARE

(17) CLOSING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE

(18) OPENING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE

NOTES

1- -OPEN CONTACT
2- -CLOSE CONTACT
3. ROTORS INT.1 & INT.2 CAN BE SET AT VALVE POSITION FULL OPEN, FULL CLOSED OR ANY POSITION IN BETWEEN AS INDICATED BY POINTS A AND B.
4. ADD JUMPER ON LS#8 BETWEEN TERMINALS (8) & (8C) FOR TORQUE SEATING VALVES

LEGEND

O-OPEN CONTACT
C-CLOSE CONTACT
Ⓞ-OPENING COIL
Ⓒ-CLOSING COIL
TH.OL-THERMAL OVERLOAD CONTACTS
+-MECHANICAL INTERLOCK

Ⓡ-RED INDICATING LIGHT
Ⓖ-GREEN INDICATING LIGHT
SS#2-SELECTOR SWITCH (LOCAL-STOP-OFF-STOP-REMOTE)
SS#1-SELECTOR SWITCH (OPEN-CLOSE) (SPRING RETURN TO CENTER)
COMP HTR-COMPARTMENT HEATER
MTR HTR-MOTOR HEATER
POT-POTENTIOMETER (OPTIONAL-SEE CERTIFICATION SHEET IF SUPPLIED)
A-ARMATURE
DR-DISCHARGE RESISTOR
J-INTERNAL JUMPER NOT REMOVABLE

NO.	DESCRIPTION	DATE
REVISION		

DRAWN SA 06/22/15
CHECKED mvm 6/22/15
APPROVED mvm 6/22/15

Limitorque Actuation Systems

TITLE: L120 INT. HARDWIRED 125VDC, CS CONTROL STATION

1ST ORDER NO. 145663
DRAWING NO. 16-476-2507
REV
SHEET 1 OF 1

L-782 REV-A 4/26/93

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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

PRATT
Henry Pratt Company

Drawing C101, A Valves

TORQUE TABLE

7/16/2020

VALVE SIZE AND TYPE: 30 INCH RUBBER SEAT BALL CLASS (150)
SEAT MATL. AND BRG. TYPE: Buna-N (Seat: E-Lok Style) - RESILOSEAL R (SERIES 32) TEFLON (0.10)
SHAFT DIAMETER: 4.375 INCHES
SEAT TYPE: DOUBLE
SHUT-OFF DIFF. PRESS.: 150.0 (PSID) OR 346.5 (Ft. of water)
FULL OPEN DELTA P (K): 0.345 (PSIG) OR 0.796 (Ft. of water)
FLOW RATE: 35.00 (FPS) OR 77,109 (GPM) OR 111.04 (MGD)
STATIC BACK PRESSURE: 0 (Ft. of water)
SYSTEM CONSTANT: 18.1

PIPE IN - - 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	149.83	346.09	346.5	2,630	3.79	1.19	36,516	0.10	
10	145.13	335.24	346.5	13,908	20.03	6.31	58,492	0.13	
15	138.71	320.41	346.5	21,178	30.50	9.61	73,132	0.18	
20	130.85	302.25	346.5	27,584	39.72	12.52	98,663	0.25	
25	119.32	275.63	346.5	34,910	50.27	15.85	138,623	0.37	****
30	106.48	245.95	346.5	41,584	59.88	18.87	135,483	0.53	
35	93.34	215.61	346.5	47,445	68.32	21.54	121,291	0.74	
40	75.92	175.37	346.5	54,252	78.12	24.62	94,348	1.10	
45	60.30	139.28	346.5	59,698	85.97	27.10	83,400	1.59	
50	46.01	106.28	346.5	64,277	92.56	29.18	72,954	2.29	**APPROVED**
55	33.70	77.85	346.5	67,974	97.88	30.85	61,178	3.26	**THROTTLING**
60	23.20	53.58	346.5	70,979	102.21	32.22	43,419	4.68	**RANGE**
65	15.62	36.09	346.5	73,068	105.22	33.17	31,942	6.46	
70	9.95	22.99	346.5	74,593	107.41	33.86	31,103	8.74	
75	5.56	12.83	346.5	75,755	109.09	34.39	31,157	9.90	
80	1.98	4.58	346.5	76,687	110.43	34.81	19,891	9.90	
85	0.65	1.50	346.5	77,031	110.92	34.96	5,738	9.90	
90	0.34	0.80	346.5	77,110	111.04	35.00	53	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:	51,994	IN-LBS @	0 DEG.
SEATING + BEARING + HYDROSTATIC TORQUE:	53,428	IN-LBS @	0 DEG.
MAXIMUM DYNAMIC TORQUE (GO):	138,623	IN-LBS @	25 DEG.

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CV VALUES

Full Open CV's
Rubber Seat Ball Valves

Valve Dia.	CV
4	2,346
6	5,250
8	9,334
10	14,585
12	21,003
14	28,587
16	37,338
18	47,256
20	58,341
24	84,012
30	131,268
36	189,027
42	257,287
48	336,048
54	425,311
60	525,075

Rubber Seat Ball Valve
Percent Of
Full Open CV vs. Valve Position

Valve Angle	Percent of Full Open CV
5	.16
10	.88
15	1.4
20	1.8
25	2.4
30	3.1
35	3.7
40	4.7
45	5.9
50	7.2
55	9.0
60	11.2
65	14.1
70	18.0
75	24.5
80	41.5
85	73.0
90	100.0

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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 ft²/US gal for 5.0 mils (5.3 m²/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

AMERCOAT® 370

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).

AMERCOAT® 370

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

AMERCOAT® 370

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)

AMERCOAT® 370

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.

AMERCOAT® 370

LIMITATIONS OF LIABILITY

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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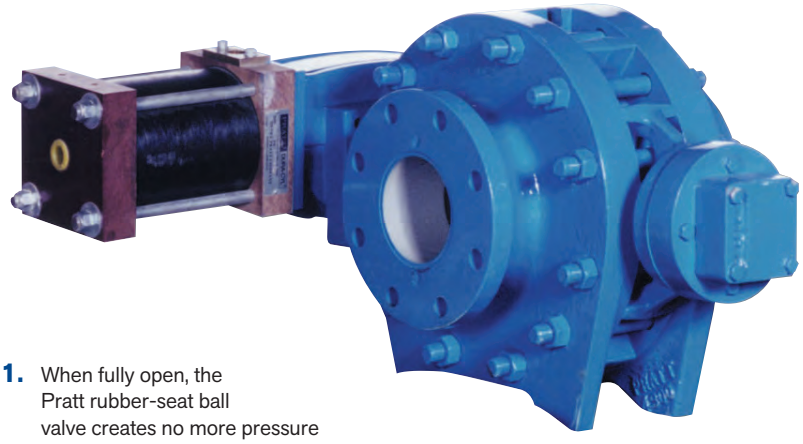
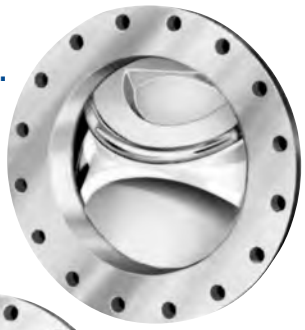
CATAOLG CUT SHEETS

Scope of Line:
Pratt® AWWA Rubber Seat Ball Valves





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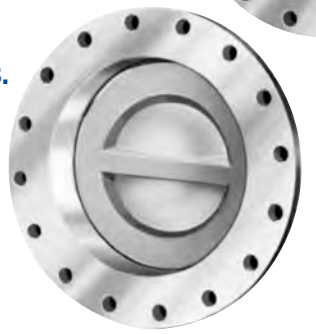


3.

1. When fully open, the Pratt rubber-seat ball valve creates no more pressure drop than an equivalent length of straight pipe.
2. Ideal for throttling service with a streamline flow pattern.
3. When closed, the Pratt rubber-seated ball valve is bubble-tight.

Sizes:
4" through 60"

Body Style:
Flanged ends, three-piece cast construction double seat for bi-directional shutoff.

Pressure Class:
AWWA C507 pressure classes 150 & ~~300 psi~~.

Operators:
Manual: ~~either Pratt MDT (traveling nut type) with nut, handwheel or chainwheel or worm gear operators; Cylinder operators for air, oil or water~~; Electric motor operators and a complete variety of accessories such as limit switches, ~~control valves, positioner~~, push button controls, ~~speed control devices and pressure switches~~.

~~Controls:~~
~~Automatic pump/check; altitude tank regulation; check service, pressure regulating service~~.

New Water and Waste Water Industry Standards:
For extended seat life, long-term drop tight closure, lower seating, unseating torque, lower maintenance, simplified operator controls.

The Pratt rubber-seat ball valve fully complies with AWWA standard C507 for tight-closing, shaft-mounted ball valves. It is a proven, rugged, through-port rotary valve that employs modern design techniques. The Pratt ball valve is suited to throttling and on-off service and is adaptable to a variety of control and shut off applications.

Pratt ball valve superiority begins with the use of a resilient seat and the E-LOK® seat retention system. Thus to the readily recognized advantages of a full-port unobstructed waterway and excellent throttling characteristics, Henry Pratt Company has added greatly extended seat life to the ball valve and at the same time has reduced operating forces and provided drop-tight closure. As a result, the ball valve becomes the ideal choice for a wide variety of applications where before only much heavier, more expensive and costly-to-maintain valve types were available.

In addition to over 100,000 successful E-LOK® seat installations since 1968, several tests by the company and independent laboratories have demonstrated the integrity of the E-LOK seat design.

Pratt ball valves have been tested at 300 psi differential for 10,000 cycles per AWWA C-507 proof-of-design requirements and tested bubble-tight at the conclusion of the cycle tests.

Ball valves have also been tested to prove their resistance to the effects of cavitation. After several free discharge cycles at 200 psi pressure, a test valve was subjected to a 100 hour continuous cavitation test at 95 psi differential pressure and a valve angle of 25 degrees. Line velocities in excess of 70 feet/second and localized velocities across the seat in excess of 100 feet/second were attained during the tests. At the conclusion of the tests, the valve was bubble-tight at 300 psi.

Valve Data

1) Packing
Packing is self-adjusting "V" type located in trunnion of valve body where the shaft protrudes for operator connection. It is readily accessible without having to dismantle the valve.

2) Body
The valve body has integral support legs or pads and consists of two end pieces and a center body piece through-bolted and O-ring-sealed against leakage. The center body casting houses the bearings. Minimum body shell thickness is in strict accordance with AWWA C507 and flanges are drilled in accordance with ANSI B 16.1 for either Class 125 ~~or Class 250~~ flanges.

3) Shaft 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 load does not exceed 2000 psi. Bearing material is Teflon-lined with special non-metallic backing. This type of bearing offers electrical insulation qualities between ball/shaft assembly and the valve body, thereby eliminating concern for effects of galvanic corrosion. In addition, its reduced coefficient of friction requires far less operating torque than bearing materials used in the past.

4) Bearing Seal
An O-ring bearing seal prevents foreign material from scoring bearings. Extra long bearing life is assured.

5) Rubber Seat
Seat has multi-ridge surface of specially compounded rubber that seals a full 360˚ against a stainless steel or nickel-chrome spherical surface on the ball. Because of the laterally spaced grooves, rubber stress is reduced substantially, resulting in less sealing torque and longer seat life. It is mechanically retained by a specially formulated epoxy compound that keeps the seat in uniform contact pressure with the seating surface on the ball when in the closed position. This insures drop-tight sealing. The seat is replaceable in the field.

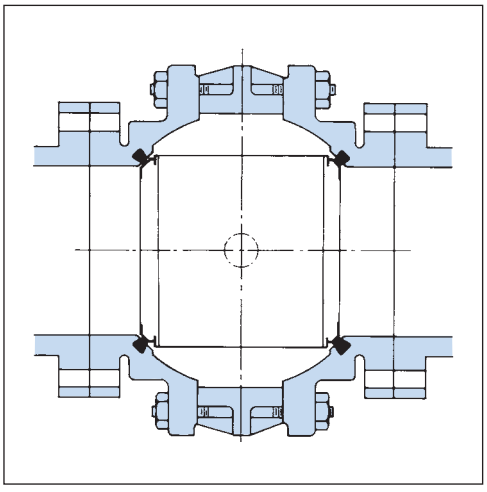
6) Seating Surface
Quarter-turn ball has corrosion-resistant stainless steel ~~or nickel-chrome~~ spherical seating surface mating with the rubber seat in the body end-piece.

7) Ball
Spherically shaped ball features full line-size circular waterway in one direction, and at 90˚ position, provides drop-tight sealing. Absolutely no obstructions in the waterway to cause additional pressure drop.

8) Shafts
The shafts are turned and ground ASTM A-276 type 304 stainless steel generously sized to meet the most adverse conditions of flow and pressure.

9) Taper Pins
Large stainless steel 18-8 type 304 taper pins – threaded at one end and secured with lock washers and nuts – are used to attach shaft to the ball. Fit is such that shaft and ball are, in effect, one piece – with no looseness or vibration possible.

10) Thrust Bearing Assembly
Two-way thrust bearing is preset at the factory and consists of a stainless steel stud fastened to the bottom of the valve shaft. Stud extends beyond the bottom cover. The thrust collar is threaded to the stud and pinned. Bottom cover cap is then bolted to the bottom cover and retains the thrust collar, which in turn retains position of the assembly. The cavity that contains the thrust collar is packed with grease providing lifetime lubrication of thrust bearing assembly. Cap is fully gasketed to prevent leakage.



The cross-section drawing (above) illustrates the closed position utilizing dual seats.

In those cases where flow in only one direction is encountered, a double rubber seat ring would be furnished and the valve can be installed so that either seat would be downstream from the pressure source.

Suggested Specifications

1) General

All ball valves shall be of the tight-closing, shaft-mounted type that fully comply with AWWA Standard C507. Design pressure ratings shall be (150 psi) ~~(300 psi)~~ and provide tight shutoff against flow in ~~(one direction)~~ (both directions). Design of valve shall be such that with the valve in the open position, the full and unobstructed circular inlet and outlet port diameter shall be as specified in Table 1 of AWWA Standard C507. With the valve in the closed position, the rubber-seated valve shall be bubble tight at rated pressure.

2) Valve Body

The valve body shall have integral support legs or pads and shall consist of two body end pieces and a center body piece through-bolted and O-ring sealed against leakage. Minimum body thickness shall be as specified in Table 2 of AWWA Standard C507. Flanges shall be flat-faced and flange drilling shall be in accordance with ANSI B16.1 (Class 125) ~~(Class 250)~~.

3) Valve Ball and Shafts

The valve ball shall be constructed of ductile iron ASTM A536 65-45-12 ~~or cast iron ASTM A48, Class 40~~, and shall be taper-pinned to an upper and lower fitted shaft of Type 304 ~~or 17-4 Type 630~~ stainless steel. Valves employing chromium-plated iron or steel shafts or trunnions shall not be accepted.

4) Valve Bearings and Seals

The center section shall be fitted with sleeve-type bearings contained in the body hubs. Bearings shall be corrosion resistant and self-lubricating. Material shall be Teflon-lined with fiberglass backing. Bearing surfaces shall be isolated from flow by O-ring type seals. The ball assembly shall be supported by a two-way thrust bearing assembly consisting of a stainless steel stud and thrust collar in a grease-packed cavity.

5) Valve Seats – Rubber

All seats shall be of a synthetic rubber compound. 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 seal a full 360˚ without interruption and have a plurality of grooves mating with a spherical stainless steel seating surface on the ball. Valve seats shall be field adjustable around the full 360˚ circumference and replaceable without dismantling the operator, ball or shaft. Where line size permits, seats shall also be capable of being adjusted without removing the valve from the line. Manufacturer shall certify that the rubber seat is field adjustable and replaceable.

6) Valve Actuators

Valve actuators shall conform to the operating requirements of AWWA Standard C507 and shall be designed to hold the valve in any intermediate position between full open and fully closed without creeping or fluttering.

a. ~~Manual actuators shall be of the traveling nut, self-locking type and shall be equipped with mechanical stop-limiting devices to prevent over-travel of the ball in the open or closed positions. Actuators shall be fully enclosed and designed to produce specified torque with a maximum pull of 80 lb. on handwheel or chainwheel and a maximum input of 150 ft.-lbs. on operating nuts. Actuator components shall withstand an input torque of 450 ft.-lbs. at extreme actuator positions without damage.~~

b. ~~Cylinder actuators shall move the valve to any position from full open to fully closed when a maximum of _____psi or a minimum of _____psi is applied to the cylinder. All wetted parts of the cylinder shall be corrosion resistant and cylinder rods shall be chromium-plated stainless steel. Cylinders furnished with enclosed operating mechanisms shall have all wetted parts constructed of non-metallic materials except the cylinder rod that shall be chromium-plated stainless steel. Rod seals shall be of the non-adjustable wear-compensating type. A rod wiper for removing deposits inside the cylinder shall be provided in addition to the external dirt wiper. Cylinder actuators of this type shall be Pratt® MDT with Dura-Cyl® cylinder.~~

7) Valve Testing

All ball valves shall be subjected to hydrostatic, shop leakage and performance tests as specified in Section 5.2 of AWWA Standard C507.

8) Valve Painting

All internal iron surfaces, except finished or bearing surfaces, shall be shop painted, and AWWA C550 compliant. All exterior iron surfaces of each valve, except finished or bearing surfaces, shall be provided with the manufacturer's standard coating unless otherwise specified by contract.

9) Proof of Design

The manufacturer furnishing valves under the specification shall be prepared to show that the valves proposed meet the proof of design requirements of AWWA Standard C507, Section 5.3.

Features and Benefits

Pratt® Ball Valves

Henry Pratt Company introduced the rubber seated ball valve over 30 years ago and this Pratt design has been refined over the years. In addition to replacing most other full port valves, the Pratt® ball valve is used extensively in applications where swing check and globe-type check valves were formerly used.

The Pratt ball valve has also found extensive applications in high velocity service such as hydroelectric and gravity feed lines where line velocities exceed 50 feet per second. In high-pressure shutoff applications, localized velocities across the seat routinely exceed 100 feet per second. The Pratt ball valve is equally effective as a long lasting shutoff device in potable, raw water and raw sewage applications.

Full Port Pratt ball valves offer the following features and benefits to the user:

Feature	Benefit
Low Head Loss	▪ Lower pumping cost ▪ Smaller line sizes ▪ Operates equally well at high or low velocities ▪ Smaller pump nozzles and discharge lines
Unaffected by Line Turbulence	▪ Suitable for free discharge applications ▪ Mount directly on pump nozzle ▪ Mount directly on elbows ▪ No restrictions regarding installation

Ball valve in distribution pump station.

Feature	Benefit
Non-Clogging	▪ Can handle sludge, raw sewage and raw water as well as potable water ▪ Can be pigged

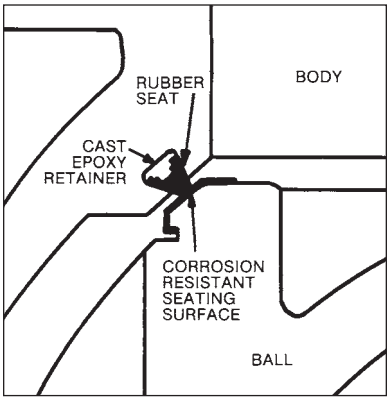
In addition to a full port, the Pratt ball valve offers other major features and benefits to the user.

Pratt E-LOK® Rubber Seat	▪ Seals drop tight at all pressures from zero psi to valve rating ▪ Shutoff not dependent upon line pressure ▪ No hardware to corrode or work loose ▪ Easily field repairable
Non-Metallic Bearings	▪ Corrosion resistant ▪ Die-electric material significantly reduces potential for galvanic corrosion
300 Series Stainless Steel Shaft	▪ Protection against potential shaft corrosion
Chevron Packing	▪ Wear compensating, self-adjusting – No adjustment or replacement necessary

Only the Pratt Rubber Seat Ball Valve Offers These Features

E-LOK® Seating Principle

Pratt® ball valves incorporate the innovative E-LOK® seat-retention system. The rubber seat, which is mounted in the body of the valve, seals a full 360 degrees against a corrosion resistant surface on the ball. The E-LOK® seat design lowers stress and eliminates permanent compression set because of the ridges and grooves molded into the seat surface. In assembly, a specially compounded epoxy is injected into a channel behind the rubber seat with the ball in the closed position. As the epoxy is injected the seat is moved against the ball seat surface with uniform ball-seat interference around the entire periphery. The epoxy compound then hardens without bonding to the metal surfaces in the seat groove or rubber seat. The result is the E-LOK® seat retention system – a standard in drop-tight closure without seat retention hardware that is tamper-prone or can loosen/corrode and potentially damage pumps or other expensive auxiliary equipment. If seat replacement should ever be required, it can be performed in the field. The factory-installed rubber seat can be removed from the valve with ordinary hand tools. A replacement can be installed and the original drop-tight seal restored by utilizing a seal kit available from Henry Pratt Company.



The E-LOK® seat design can assure longer seat life and better sealing action. By mounting the rubber seat in the body rather than on the ball the rubber seat is less likely to be damaged by debris in the flow stream where the valve is used in waste water applications.

Body Design Eliminates Distortion

Heavy pipe loads will have no adverse effects on the Pratt ball valve. The three-piece body design transmits pipe loads from one end section to the other by means of the through-bolts. This reduces stress on the all important middle section, which maintains shaft-ball-seat alignment within very close tolerances.

Resilient Rubber Seat

Only with a Pratt resilient seat is it possible to:

1. Eliminate wedging, binding and excessive wear associated with metal-to-metal seating valves.
2. Eliminate the effects of line distortion. Body stresses (caused by line settling or uneven bolting) will not cause seat binding. Valve will remain tight and easy to operate through thousands of cycles.
3. Provide drop-tight sealing against all pressures from zero to 300 psi.
4. Substantially lower seating/unseating torque requirements.
5. Adjust or replace seat in the field to full factory specifications.
6. Use the ball valve with confidence for a wide variety of applications including pump/check, throttling, altitude, pressure regulating, high-pressure transmission and check service.

Does Not Require Exercising

Operates smoothly and easily even if it has been in one position for long periods.

Fully Protected Seat

By mounting the rubber seat in the body, the possibility of solids damaging the seating surfaces where the valves are used in waste water applications is reduced.

Non-Clogging Design

The Pratt ball valve is designed to give a self-cleaning flow pattern through the ball and body. This is particularly desirable on certain sludge and waste water applications is lessened.

Permanently Lubricated Bearings

Bearing material is Teflon® lined, with special high strength non-metallic backing that provides a permanent low coefficient of friction and controlled shaft support. These electrically non-conductive, conservatively sized sleeve-type bearings are the latest bearing material development for long trouble-free operation. No shaft-to-bearing galvanic reaction resulting in corrosion is possible.

Completely Interchangeable Parts

The Pratt ball valve is not custom produced. The user benefits from the economy of modern production methods and perfectly fitted, completely interchangeable parts.

Low Head Loss

When fully open, the Pratt ball valve creates no more head loss than an equivalent length of straight pipe. Frequently allows the use of “smaller than line size” valves as a cost advantage over line size valves with obstructed waterways.

Less Weight – Smaller Dimensions

Our unique design enables savings in weight and overall dimensions without sacrificing the traditional ruggedness expected from Pratt valves.

Less Complex, More Reliable

The Pratt ball valve operators are totally enclosed and feature a simplified operating mechanism. They are suitable for buried service without the use of expensive vaults. ~~Manual operators, which completely conform to AWWA Standard C507, are furnished with handwheels, chainwheels or AWWA nut and operate so easily that one person can open or close the ball valve against full line pressure~~. Automatic operators are electric motor ~~or cylinder (air, oil or water)~~. When required, it is possible to furnish a locking device that holds the valve shaft in position so that the operator may be removed for inspection or repair while the valve is still on line.

Flowserve Limitorque L120 series: A solid record in demanding applications

Proven performers under the most challenging circumstances, Limitorque's L120 actuators are ideal for valves requiring rotary or linear movement.

With eight unit sizes, L120 electric actuators make it easy to meet or exceed your requirements for positive, dependable valve actuation.

~~Whether used with gate valves, globe valves, penstocks or sluice gates, versatile L120 Series actuators can be direct-mounted or combined with the V or SR series bevel gearboxes for any rising or non-rising stem application.~~ When combined with a Limitorque WG ~~or HBC~~ series quarter-turn worm gearboxes, L120 actuators can also be used to control butterfly, ball ~~and plug valves, as well as damper drives, flop gates~~ or any other device which requires rotary movement.

Rugged, reliable and versatile, L120 actuators are proven performers in challenging applications. Thousands of L120 actuators are at work in some of the world's most demanding conditions, where nothing less than day-after-day dependable operation is acceptable.

L120 actuators are specified for use in petrochemical, power generation, and water and waste treatment applications where failure of a single actuator can be extremely costly … even catastrophic.

Solid design and durable construction qualify the L120 actuator for applications involving harsh environmental conditions. A successful record with challenging requirements and compatibility with advanced process control systems make L120 actuators the best combination of proven and leading-edge technologies. Backed by comprehensive technical support services, product documentation, and spare parts availability, the L120 series is an easy choice for flexible, dependable valve control.

Low-maintenance requirements make the L120 Series ideally suited for water and waste treatment applications.

L120 actuators meet rigid safety requirements and are available in weatherproof, explosion-proof and submersible configurations.

The L120 makes valve control easier for some of the world's most demanding customers.

Petrochemical Installations such as refineries, pipelines, terminals, tank farms, cokers and off-shore platforms rely on the L120's safety, endurance and operational efficiencies. The L120 has network compatibility, explosion-proof certification, and resistance to lightning and EMI.

Power Generation plants value the L120's availability, controls versatility and reliable performance. The L120's rugged design and construction quality stands up to vibration, high-pressure steam and extreme temperatures.

Water and Waste Treatment Facilities benefit from the L120's low-maintenance requirements and modulating control capabilities. L120 actuators meet AWWA standards and easily fit the industry trend toward modern controls networks. The wide range of options in the L120 Series allows specification needs to be met cost-effectively.

Designed to provide positive, dependable actuation

The time-tested design and solid construction of the L120 Series allow these actuators to handle up to 60 000 ft-lb (81 600 Nm) of torque, and up to 500 000 ft-lb (225 000 kg) of thrust. Durable torque overload protection is provided in both directions of valve travel. Rugged enclosures are available in weatherproof, submersible and explosion-proof configurations.

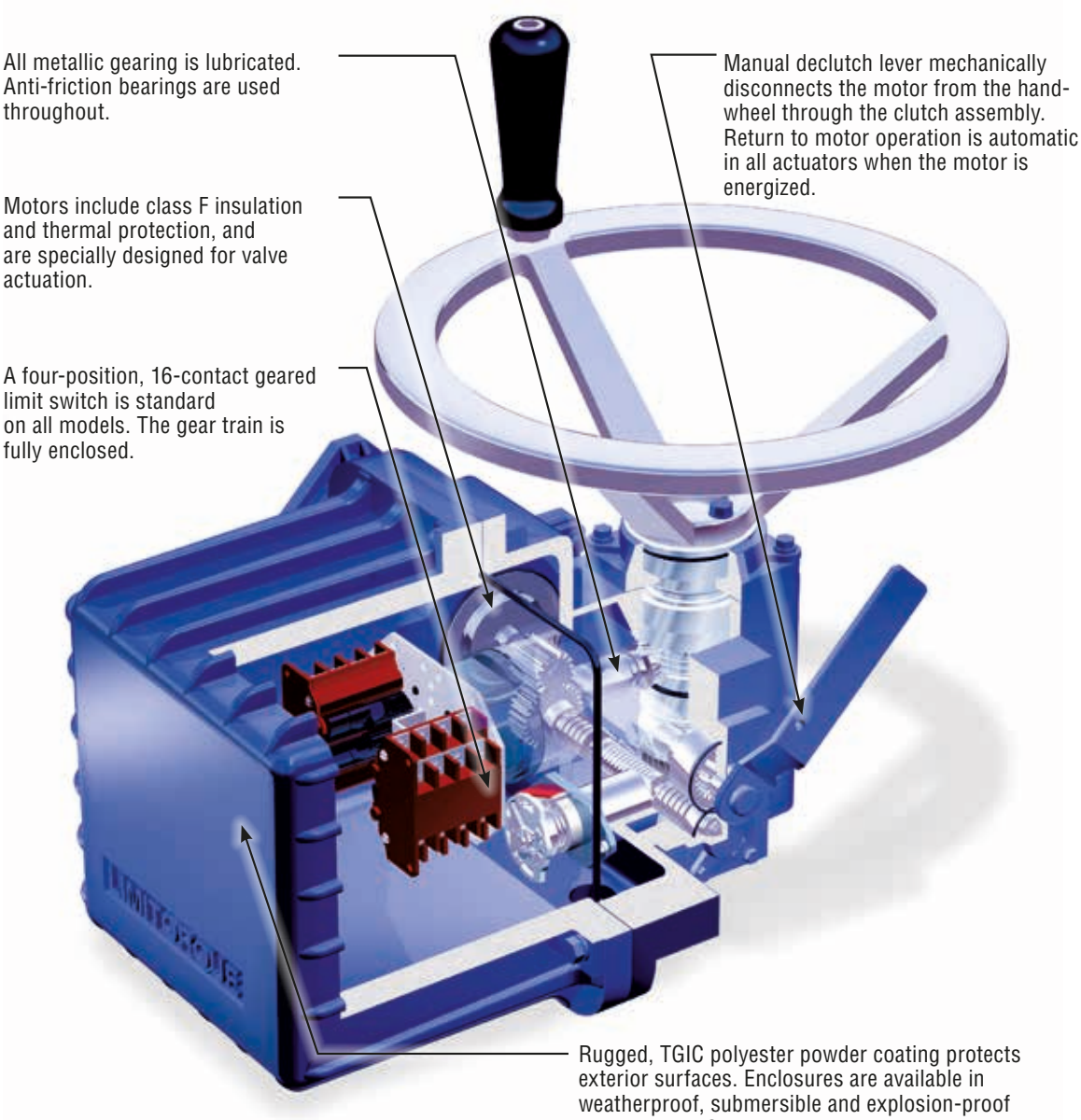
L120 actuators can also be coupled to gearboxes such as Limitorque's ~~V,~~ WG ~~or HBC~~ for motorized operation of valves in ~~quarter-turn operation, or~~ multi-turn applications for increased torque and/or thrust requirements.

Limitorque's factories are certified to ISO 9001 standards and maintain the highest quality of performance throughout the manufacturing processes.

L120 series multi-turn electric valve actuators

L120-10 through -40 series

L120-10 through 40 actuators utilize die-cast aluminum housings and compartment covers to maximize performance in a reduced weight design.



L120-85 series

L120-190 series

L120-85 through 2000 electric actuators utilize iron housing construction for strength and durability.

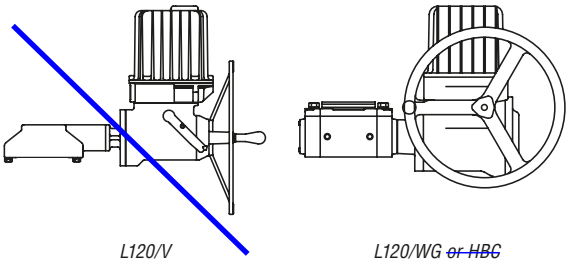
Actuation of valves, gates and dampers

Direct Mounting The L120 series can be directly coupled with valves for torque-only applications. For thrust applications, a separate thrust base is used for the L120-10 through -85.

~~**L120/V, L120/SR** Rising stem valves may be operated by an L120 coupled to a v Series bevel gearbox or SR series spur gearbox. Thrusts to 921 000 lb (4100 kN) and torques to 19 000 ft-lb (26 000 N-m) are available.~~

L120/WG ~~and L120/HBC~~ The L120 series may be coupled to a WG ~~or HBC~~ worm gearbox for operation of ~~quarter-turn valves or dampers,~~ or multi-turn damper applications. Torque outputs to 449 000 lbs-ft (610 000 N-m) are available.

Combinations for torque reduction applications



L120/V *L120/WG ~~or HBC~~*

Mounting bases

~~**Thrust actuator drive bases**~~

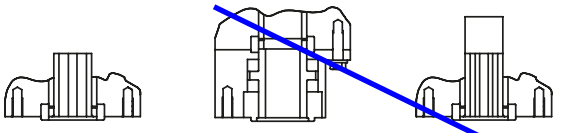
~~Type A1 (drive 2) — Alloy bronze (torque and thrust)~~

Torque-only actuator bases

Type B4 (drive 1) — Standard steel bushing

~~Type BL (drive 3) — Splined steel bushing for rising or rotating stem valves~~

Mounting bases (L120-10 through -85)



Type B4 (drive 1) *Type A1 (drive 2)* *Type BL (drive 3) L120-10 through -40*

From basic controls to digital networks

The L120, with 30+ years of proven performance, continues to deliver reliable operation in a wide range of process control environments. Standard control packages utilize circuit board technology to reduce the need for hard-wiring. Control stations are available with a variety of illuminated indicator and selector switch options. These control stations are available in a standard design for basic integral control packages and an electronic version for use with the UEX electronic controls in network control packages.

Human interfaces

Control stations are available with a variety of illuminated indicator and selector switch options. The control stations offer two lights and padlockable selector switches as standard for use with electronic controllers. Switch stations can be supplied in the compartment cover (standard) or for remote mounting.

Integral package options:

No Controls Unit (NCU) is offered for open/close applications. Actuator controls such as reversing contactors and control transformers are located in motor control centers.

Basic Integral Controls (BIC) include integrally mounted reversing contactors, control transformers, fuses and interlocks.

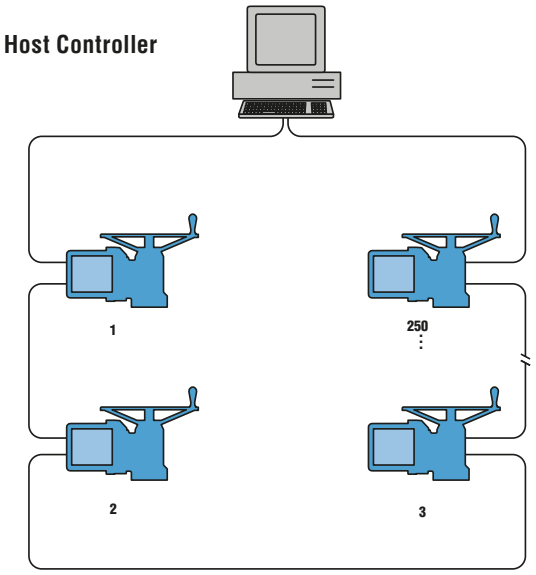
Integral Reversing Controls (IRC) include BIC functionality, plus a plug-in interconnect board and additional options.

Modutronic 20 Controls offer a choice of integral packages for positioning or process control functions in response to analog process signals.

Electronic Controls (UEX) offer state-of-the-art actuator control with advanced diagnostics and configurability. Built on MX technology, UEX features include all of the UEC-3 functionality plus position feedback via an absolute encoder, an on-board LCD display of status and position, and supports any of five network protocols. The UEX can be field-installed to replace UEC-3 control packages.

Network Protocols provided through the UEX Control package include Modbus, Foundation Fieldbus, Profibus DP, Profibus PA and DeviceNet.

L120/DDC direct-to-host networks support up to 250 field units



L120 specifications

Gear housing

- Cast aluminum, L120-10 through -40; cast iron, L120-85 through -2000
- Lubrication — Grade 0 or Grade 00
- Gear reduction — Double-reduction type
  - › Worm gear (alloy bronze) and spur gear (heat-treated steel), L120-10 through 85
  - › Worm gear (alloy bronze) and spur gear (heat-treated steel), and worm (alloy steel) and helical gearing (heat-treated steel), L120-190 through -2000

Electrical compartment covers

- Cast aluminum, O-ring sealed
  - › Hardware is nickel-plated carbon steel, L120-10 through -85, and L120-190 through -2000. ~~Stainless steel optional for non-XP.~~

Motor

- Available as four-pole, 1800 rpm (60 Hz) or 1500 rpm (50 Hz); two-pole, 3600 rpm (60 Hz) or 3000 rpm (50 Hz); eight-pole, 900 rpm (60 Hz) or 750 rpm (50 Hz).
- Squirrel-cage induction for three-phase and capacitor start-induction run for single-phase.
- Power supply — three-phase motors, suitable for 3/60/230, 3/60/460, 3/60/575, 3/50/380 or 3/50/415.
- Nominal duty is 15 minutes. ~~Optional extended duty available.~~
- Dynamic torque is nominal 20% of start torque
- Class F insulation
- Two Class B thermal contacts embedded within motor windings provide thermal protection

Limit switch

- Gear driven, cam operated, snap acting
- Four rotor/16 SPST contact switches (four contacts per rotor — 2 N/O and 2 N/C). Rotors may be set to open or close at any valve position
- Contact rating is 300 volts per ICS-125.6. Current rated 6 amps resistive and 60 amps inrush at 120 VAC

Torque switch

- L120-10 through -85: Heavy-duty inlaid silver contacts, 300 volts, and one SPST contact each for open/closed direction dedicated to actuator torque protection
- L120-190 through -2000: 300 volts per ICS-125.6, 6 amps resistive and 60 amps inrush at 120 VAC. One SPST contact each for open/closed direction dedicated to actuator torque protection.

Reversing contactor

- Available at 12-, 25- or 50-amp ratings, selected according to motor ratings

Enclosure Ratings

L120-10 through 85 actuators are suitable for:

- Explosionproof service
  - › FM Class I, Groups B, C, D, Divisions 1 and 2; Class II, Groups E, F, G, Divisions 1 and 2, Temperature Code TC3
  - › CSA Class I, Groups C, D, Divisions 1 and 2; Class II, Groups E, F, G, Divisions 1 and 2 , Temperature Code TC3
- FM weatherproof, types 3, 4, and 4X
- CSA weatherproof, types 3 and 4

L120-190 through 2000 actuators are suitable for:

- Explosionproof service
  - › FM Class I, Groups B, C, D, Divisions 1 and 2 Class II, Groups E, F, G, Divisions 1 and 2, Temperature Code TC3
  - › CSA Class I, Groups C, D, Divisions 1 and 2 Class II, Groups E, F, G, Divisions 1 and 2, Temperature Code TC3
- FM weatherproof, types 3 And 4
- CSA weatherproof, type 4

L120 submersible actuators are suitable for Nema 6 and IP68. ~~L120 FM- and CSA-approved actuators are also certified for Nema 3 and 4.~~

Thrust and torque output drives

- Torque output only — a removable steel torque bushing is provided
- Thrust and torque output — a removable splined, bronze stem nut is provided, housed in a ductile iron thrust base and supported on thrust bearings.

Handwheel/declutch

- Fabricated steel or ductile iron for side-mounted; ~~cast aluminum for L120-10 top-mounted only~~. Handwheels are connected directly to drive sleeve (L120-10, -20 and -40). L120-85 operates through the worm set. Declutch lever is padlockable in motor position.

Mounting base

- Supplied to MSS (English taps) standard. Optional ~~ISO bases available.~~

Paint

- TGIC polyester powder-coating for L120-10 through -40; Valspar epoxy/polyurethane for L120-85 through -2000. Both coatings are suitable for 500-hour salt spray.

L120 specifications

Temperature rating

- Standard operating temperature range is from -20°F to 150°F (-29°C to 66°C). Optional extended ranges available.
- For explosion-proof applications, the Factory Mutual XP temperature rating is shown on the FM nameplate.

Actuator nameplate

- The stainless steel nameplate includes the Flowserve Limitorque name, point of manufacture, actuator type and size, order number, serial number, and space for customer tag information.

Controls options

- Available controls include BIC (Basic Integral Controls), Mod-20 modulating controls, and UEX (electronic controls).
- **Local Continuous Position Indication** Local position indicator shows continuous valve position in percentage open via dial, and is driven by dedicated gear set selected per application. Window in compartment cover shows indicator.
- **Local/Remote Indication** Includes local continuous position indicator with a 1000-ohm potentiometer. Potentiometers transmit valve position to remote location.
- **R/I Converter** Sends remote valve position indication signal via 4-20 mA signal. Internally powered.
- **Relay Boards** Provide isolated relays (2) or non-isolated relays (3) for interlocking with field equipment. Relay contacts rated at 250 VAC/6.5 A or 30 VDC/5 A.
- **Handwheel Gear Reduction** Bevel gear reductions are available for L120-10 through -40, and spur gear reductions are available for L120-190 through 2000.
- **Double-pole Torque Switch** Provides an additional SPDT contact in each direction that actuates when set torque is exceeded. Used as indication of over-torque condition.
- **Spring Compensation (L120S) (L120-190 through -2000)** SB-type spring-compensated stem nut used on high-speed or high-temperature, torque-seated applications.
- **Position Feedback for DDC** Communicates valve position to remote location via DDC network. Includes local position indication, 1000-ohm potentiometer and DDC analog channel. Used with DDC base actuator.
- **External Analog Feedback for DDC** Allows external analog signals to be connected to DDC field unit, converted to digital signals and transmitted over DDC network. Four signals may be accommodated. Includes DDC analog channel. Used with DDC base actuator.
- **Positioning Control for DDC** Permits positioning of valves over DDC network. Positioning commands valve to any point of travel, in 1% increments. Includes local position indication, 1000-ohm potentiometer and DDC analog channel. Used with DDC base actuator.
- **Two-speed Operation for DDC** Allows the actuator to be pulsed on and off, achieving slower operating speed for all or part of valve stroke. Default pulse rate is 2 seconds on, 10 seconds off, adjustable from 50 ms to 12.75 seconds in 50-ms increments. Configured via RS-232 link and dedicated software.
- **UEX Electronic Control Package** The UEX replaces the UEC-3 with MX technology-based control functionality. The absolute encoder provides position indication and control. Setup is achieved through the LCD display, providing status and fault indication in 11 languages. The UEX offers network control via Modbus, Foundation Fieldbus, Profibus DP, Profibus PA or DeviceNet.

Testing summary

In addition to the Factory Mutual and CSA certifications for XP and WP services, L120 actuators meet the following seismic and vibration criteria: NTS Labs, Acton, MA, Test Report #31437-94M dated 3/28/94 to the following:

- Sine survey; 5 to 200 Hz @ 0.75 g
- Sine cycling; 5 to 200 Hz to 5 Hz @ 0.75 g
- Sine cycling; 2 to 35 to 2 Hz @ 1.0 g; 10 cycles
- Sine dwells; 2 to 35 to 2 Hz @ 1/3-octave intervals, 5.0 g @ 15-second dwells each frequency

NOTE: Standards are applicable to most actuators.

L120 series performance

(Three-phase-50 Hz/380, 400 and 415 V — 60 Hz/230, 460 and 575 V)

Actuator	Maximum Torque Capacity		Maximum Thrust Capacity		Output Speed Range (RPM)	
	ft-lb	N m	lb	kg	60 Hz	50 Hz
L120-10	100	136	10000	4500	12-250	10-210
L120-20	200	272	20000	9000	12-250	10-210
L120-40	400	544	30000	13500	24-250	20-210
L120-85	850	1156	45000	20250	24-192	20-160
L120-190	1900	2584	75000	33750	24-196	20-160
L120-420	4200	5712	140000	63000	19-196	16-165
L120-800	8000	10880	250000	112500	12-168	10-140
L120-2000	20000	27200	500000	225000	12-60	10-50

L120 weights (approx.)

Actuator	Actuator with STD Comp.		Add for Integral Comp.		Add for Max. Comp.		Add for Thrust Base		Add for Side-Mount Handwheel	
	lb	kg	lb	kg	lb	kg	lb	kg	lb	kg
L120-10	90	41	20	9	32	14	7	3	3	1
L120-20	115	52	20	9	32	14	13	6	8	4
L120-40	160	72	20	9	32	14	22	10	16	7
L120-85	285	129	20	9	32	14	67	30	(Note 2)	
L120-190	600	272	85	39	(Note 2)		(Note 2)		(Note 2)	
L120-420	1195	541	215	98	(Note 2)		(Note 2)		(Note 2)	
L120-800	1415	641	215	98	(Note 2)		430	195	(Note 2)	
L120-2000	2550	1155	215	98	(Note 2)		826	375	(Note 2)	

Note 1: Same as overall ratio.
Note 2: Consult factory for weight.
Note 3: Performance ratings and dimensions are also available for the L120-6000. Please consult factory.

Mounting Base and Drive Sleeves

	Previous Designation	Description
Type B4	Drive 1	Bore and key bushing for torque-only applications
Type A1	Drive 2	Threaded for thrust applications
Type BL	Drive 3	Splined steel bushing for rising rotating stem valves

L120 series performance

L120-10, -20 and -40

Drive options	L120-10		L120-20		L120-40	
	inch	mm	inch	mm	inch	mm
Type B4 bore and key	1.000-¼x⅜₁₆ (rect key) .938-¼x¼ (sq key)	25-8x6	1.875-½x⅜ (rect key) 1.813-½x½ (sq key)	48-14x9	~~2.125-½x⅜ (rect key)~~ 2.063-½x½ (sq key)	53-16x10
Type B4 stem nut length	3.25	83	3.50	89	~~3.75~~	95
Type A1 threaded stem	1.25	32.8	2.25	57.2	~~2.63~~	66.8
Type A1 stem length	2.38	60	3.87	98	~~3.84~~	98
Type BL splined	1.25 - 6 and 38 splines	N/A	1.5 - 6 and 1.9 - 36 splines	N/A	~~2 - 6 and 1.5 - 8 splines~~	N/A
Type BL spline length	4.50	114	4.50	114	~~4.50~~	114
Mounting base	**MSS FA-10**	**ISO F-10**	**MSS FA-14**	**ISO F-14**	**MSS FA-14**	**ISO F-14**
Pilot diameter	2.312	70	3.750	100	3.750	100
Mounting holes (Note 1)	(4) ⅜-16x.88	(4) M10x1.5x22.4	(4) ⅝-11x1.25	(4) M16x2x32	(4) ⅝-11x1.25	(4) M16x2x32
Bolt circle	4.016	102	5.500	140	5.500	140
Mounting base diameter	4.92	125	7.000	178	7.000	178
Handwheel ratios						
Standard	1:1 Top Mount		1:1 Top Mount		~~1:1 Top Mount~~	
Optional gear reduction	4.2:1 Side Mount		5.7:1 Side Mount		12:1 Side Mount	

L120-85, -190 and -420

Drive options	L120-85		L120-190		L120-420	
	inch	mm	inch	mm	inch	mm
Type B4 bore and key	2.750-⅝x⁷⁄₁₆ (rect key) 2.625-⅝x⅝ (sq key)	70-20x12	2.875-¾x½ (rect key) 2.750-¾x¾ (sq key)	73-20x12	4.250-1x¾ (rect key) 4.125-1x1 (sq key)	108-28x16
Type B4 stem nut length	6.00	152	8.25	210	9.38	238
Type A1 threaded stem	3.00	76	3.50	89	5.00	127
Type A1 stem length	4.88	124	8.25	210	9.38	238
Mounting base	**MSS FA-16**	**ISO F-16**	**MSS FA-30**	**ISO F-30**	**MSS**	**ISO F-35**
Pilot diameter	5.00	130	7	230	8.5	215.9
Mounting holes (Note 1)	(4) ¾-10x1.0	(4) M20x2.5x24.5	(8) ¾-10x1.13	(8) M20x2.5x32	(8) ⅞-9x1.75	(8) M30x3.5x1.75
Bolt circle	6.50	165	11.75	298	14.00	355.6
Mounting base diameter	8.25	222	13.50	343	16.00	406.4
Handwheel ratios						
Standard	18:1 - 71:1 (Same as overall ratio) Side Mount		9:1, 22.3:1		11.07:1, 28.37:1	
Optional gear reduction	N/A		4:1		6:1	

Note 1: Mounting holes straddle centerline.

Note 2: L120-85, -190, -420 and -800 are suitable for both torque and thrust applications. L120-2000 is suitable for torque as standard; thrust units are optional.

Limitorque WG Series

Worm Gearboxes

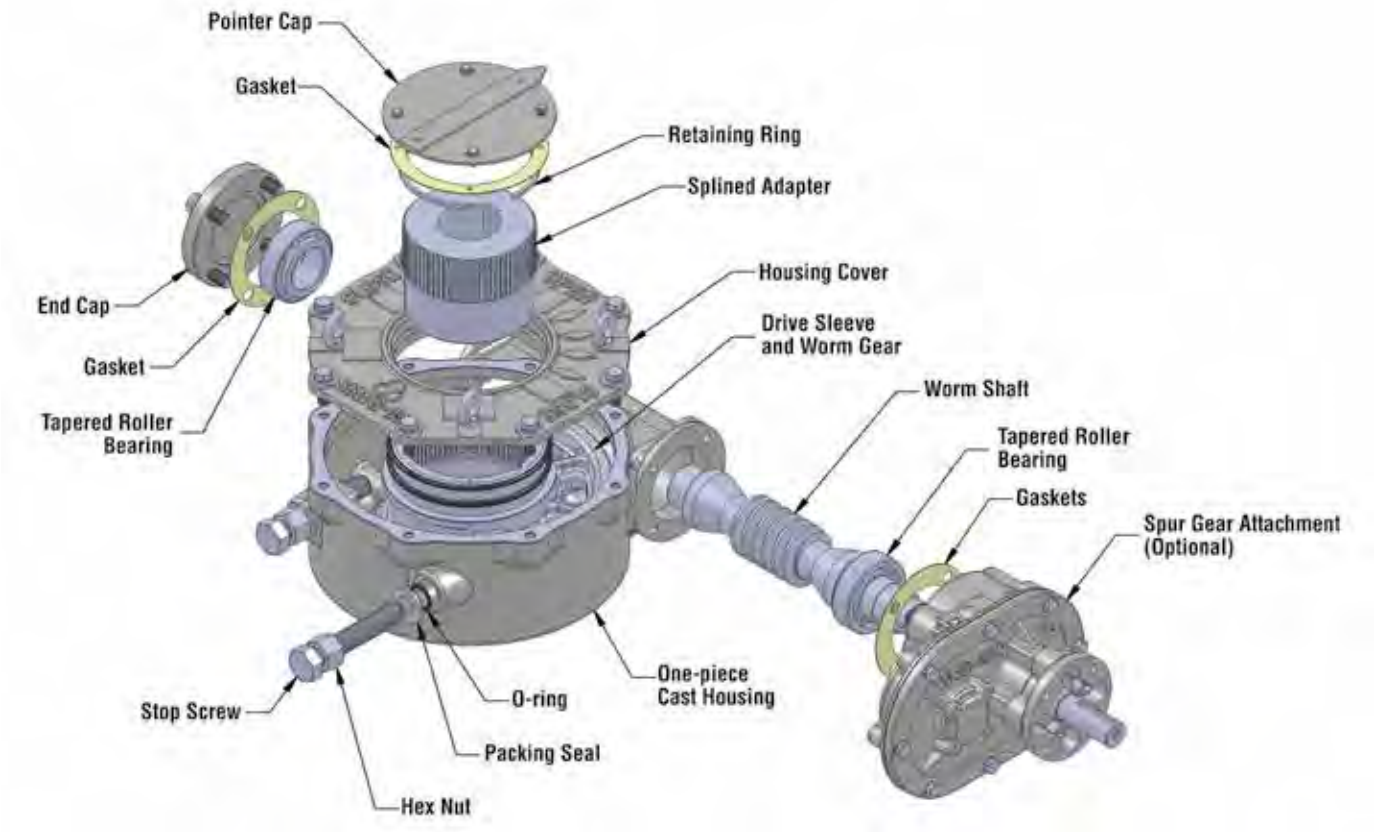
The rugged and reliable WG series worm gearboxes are constructed for manual or motorized operation. With ductile iron housings, bearing-supported shafts, and well-designed sealing, the WG stands up to the environmental challenges of weatherproof, submersible and buried service applications. Alternate 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.

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.

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

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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.