
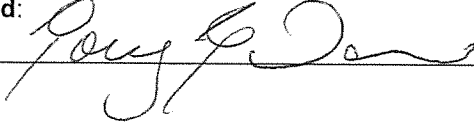


CONTRACTOR SUBMITTAL FORM

Project Name: Navajo Gallup Water Supply Project Reach 26.3	<input checked="" type="checkbox"/> M (Materials)	Submittal No. M007
SMA Project No: 6921307	<input type="checkbox"/> T (Testing)	
Date: 06/27/2019	<input type="checkbox"/> A (Administrative)	
Contractor: Navajo Engineering and Construction Authority	No. of Copies: 1	

Supplier: Core & Main	Manufacturer: Pipestone
Specification No.: 33 12 16-2.5C	Drawing No.: DT-7
Bid Item No(s): 23	
Submittal Checklist No(s): M245	
Product Description: 2" Vacuum Breaker with 1" Air Release Valve	
Are there any deviations from the Contract Documents? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes Explain:	
Contractor's certification that product meets requirements of Contract Documents: <input checked="" type="checkbox"/> Certified <input type="checkbox"/> Certified with variations as noted on shop drawings and/or attached sheets.	
Signed:  Quentin Benally	Date: 06/28/2019

Engineer's Comments: <input type="checkbox"/> No Exception Taken <input checked="" type="checkbox"/> Approved as Corrected <input type="checkbox"/> Exceptions as Noted <input type="checkbox"/> Submittal Rejected <input type="checkbox"/> Revise and Resubmit to Engineer <input type="checkbox"/> Contractor to Submit Specified Information - 1/4" ball valve not approved. - Where does contractor plan on using? - Resubmit ball valve w/ explanation of use <div style="border: 1px solid red; padding: 5px; color: red;">Corrected by Core & Main 7/17/19</div>	<p>Review is limited to check for compliance with design concept. No changes from provisions of Contract Documents are intended and Contractor remains responsible for compliance with revisions therein.</p> <p>The Contractor is solely responsible for quantities; correctness of dimensions; verification of physical interrelation of elements of the work as required by the drawings and specifications and by field determination; fabrication procedures, construction methods, techniques and sequences. This review does not relieve the Contractor from these responsibilities.</p> <p>Non-conformities and errors detected have been noted but such markings, or lack thereof, shall not relieve the Contractor from compliance with all requirements of the contract drawings and specifications.</p>
Signed: 	Date: 7/9/19

6135 2nd Street NW
Albuquerque, NM 87107
Ph 505-344-0223; Fx 505-344-0350

SUBMITTAL SHEET

PROJECT NAME REACH 26.3 **DATE:** 06/25/2019

PROJECT LOCATION _____

CONTRACTOR NECA **ATTN:** AARON

<i>TASK / SECTION</i>	DT7
------------------------------	------------

[illegible]**ENGINEER / ARCHITECT REVIEW**

Core & Main - 7/17/19 Email from Cynthia Mathews - "1/4 valve removed"



676 Moss Street, Unit A
Golden, CO 80401
Phone: 303-579-9658
Fax: 303-567-2861

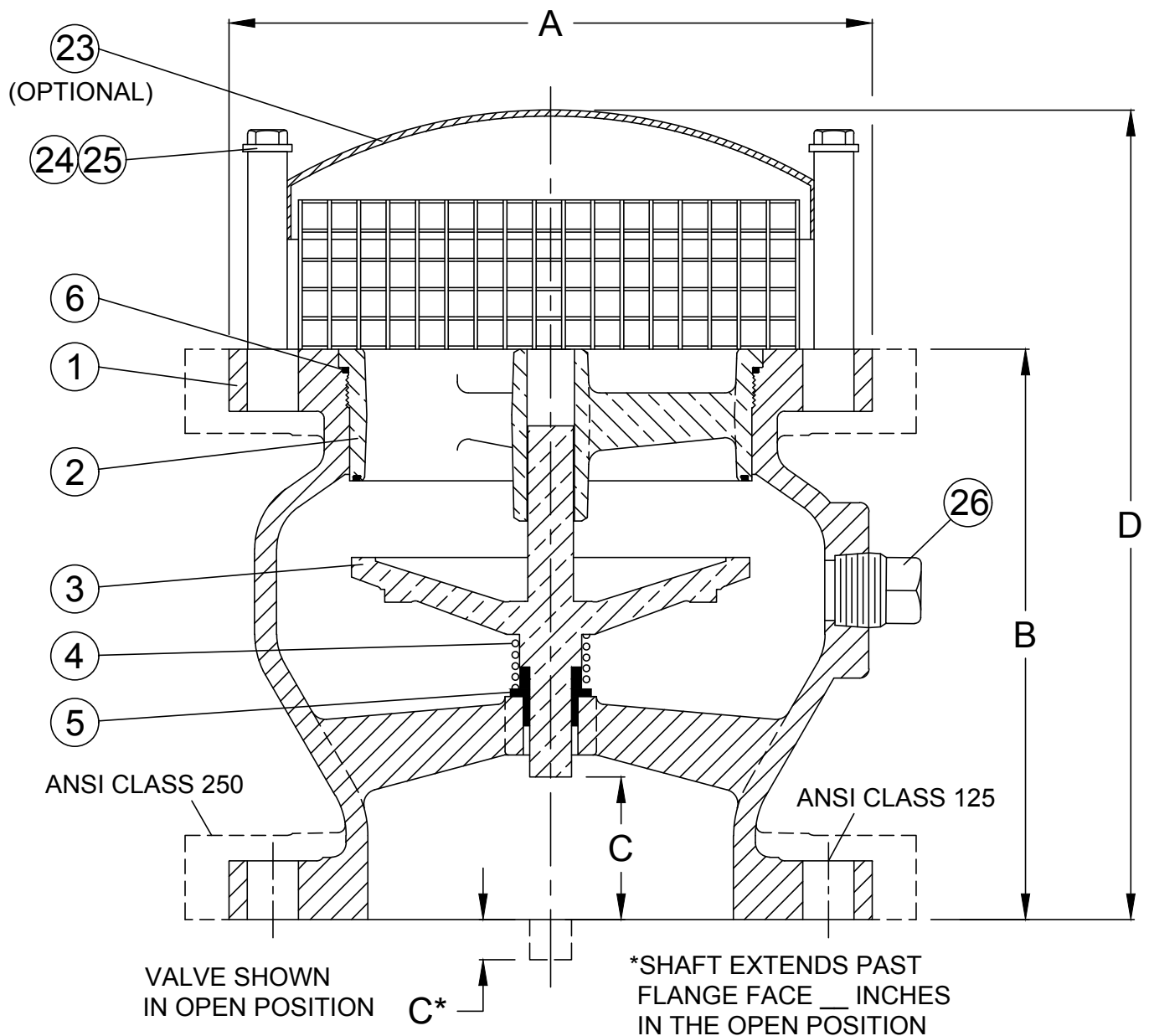
Navajo Gallup Reaches 26.3
Reach 26.3 to Torreon, NM

DT7

Qty

Product Description

37	2" ValMatic 1852VB.3SVH Vacuum Breaker Valve, ANSI Class 250 Flanged Inlet, Cast Iron Body, SST Trim, Fusion Bonded Epoxy Coating, SS Fasteners, Screened Hood, Rated 400psi
37	1" ValMatic 38HPDISVH Water Air Release Valve, Ductile Iron Body, 316SST Trim, EPDM Seating, Fusion Bonded Epoxy Coating, SST Bolts and Pipe Plugs, Screened Hood, Rated 500psi
37	2" Apollo 86A108MG w/Nut Stainless Steel, Full Port, NPT, Ball Valve, Gear Operator, 2" Operating Nut
37	1" Apollo 76F10501A Stainless Steel, Full Port, NPT, Ball Valve
37	1/4" Apollo 76F10101A Stainless Steel, Full Port, NPT, Ball Valve
37	4" ValMatic 1504 FrostSafe Two Way Air Damper, Corrosion Resistant Body with Stainless Steel Bolts
37	4" ValMatic 1604 Vault Safe Vent Pipe and Security Cage, PVC Body with Stainless Steel Screen and Cage



SEE DRAWING NO. VM-1800AVB.1-M FOR STANDARD MATERIALS OF CONSTRUCTION.

PART NO.	NAME
1.	BODY
2.	SEAT W/BUNA-N
3.	DISC
4.	SPRING
5.	BUSHING
6.	O-RING
23.	HOOD ASSEMBLY
24.	HOOD RETAINING SCREWS
25.	HOOD WASHER
26.	$\frac{1}{2}$ " PLUG (2"-2.5") 1" PLUG (3"+)

DIMENSIONS, INCHES									
VALVE SIZE	MODEL NO.				A	A	B	C	D
	125 # CLASS (CWP)	250 # CLASS (CWP)			(125#)	(250#)			
2	1802AVB.1	200	1852AVB.1	400	7.00	7.50	5.50	1.00	8.82
2.5	1825AVB.1	200	1875AVB.1	400	7.00	7.50	5.50	1.00	8.82
3	1803AVB.1	200	1853AVB.1	400	7.50	8.25	6.00	1.38	9.80
4	1804AVB.1	200	1854AVB.1	400	9.00	10.00	7.25	1.75	10.5
5	1805AVB.1	200	1855AVB.1	400	10.00	11.00	8.50	2.00	11.8
6	1806AVB.1	200	1856AVB.1	400	11.00	12.50	9.75	2.50	13.8
8	1808AVB.1	200	1858AVB.1	400	13.50	15.00	12.5	3.25	17.4
10	1810AVB.1	200	1860AVB.1	400	16.00	17.50	15.5	4.25	20.4
12	1812AVB.1	200	1862AVB.1	400	19.00	20.50	14.3	-0.63	20.8

REV 2-7-17

FLANGED VACUUM BREAKER

DATE 9-23-16

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.
VMC-1800AVB

VACUUM BREAKER

2" - 10" SERIES NO. 1800AVB.1 ANSI CLASS 125 & 250 (LEAD FREE)

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	CAST IRON ASTM A126, CLASS B
2	SEAT	SILICON BRONZE ASTM B584, C87600 WITH BUNA-N SEAL
3	DISC	SILICON BRONZE ASTM B584, C87600
4	SPRING	STAINLESS STEEL T316, ASTM A313
5	BUSHING	ALUMINUM BRONZE ASTM B505, C95400
6	O-RING	EPDM (NSF61 AND WRAS APPROVED)
23	HOOD ASSEMBLY (OPTIONAL)	STEEL #1020
24	HOOD RETAINING SCREWS (OPT.)	STEEL GRADE 2-ZINC PLATED
25	HOOD WASHER (OPTIONAL)	STEEL-ZINC PLATED
26	PLUG	STEEL

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

MATERIALS OF CONSTRUCTION

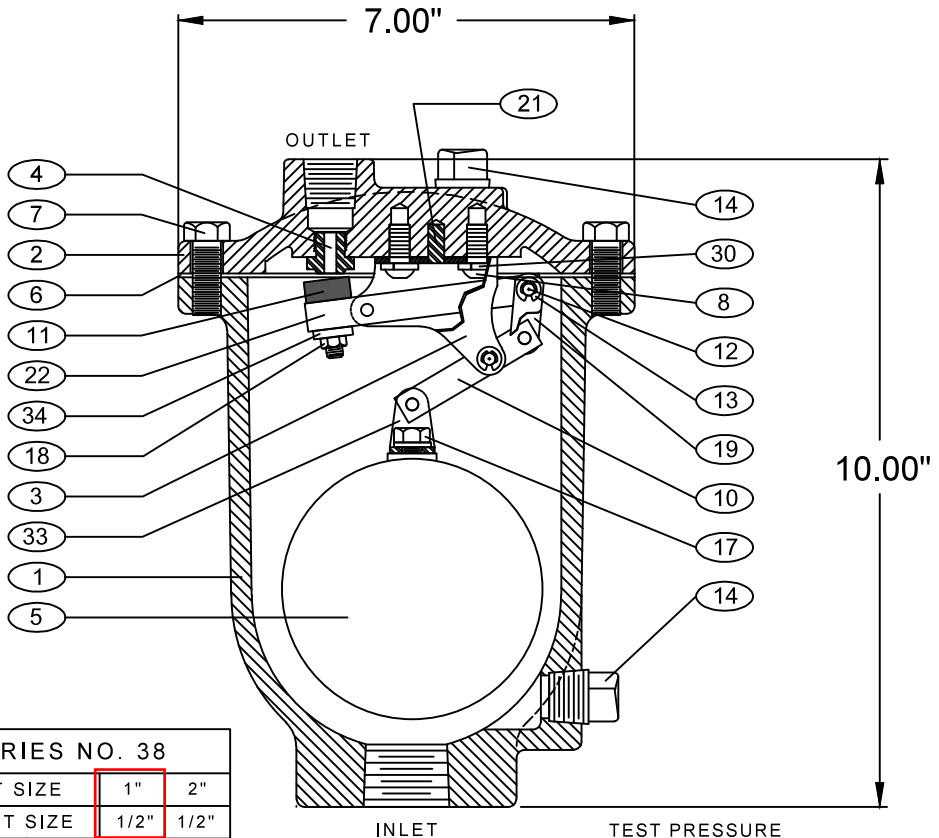
DATE 10/12/16



VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-1800AVB.1-M



SERIES NO. 38				
INLET SIZE		1"	2"	
OUTLET SIZE		1/2"	1/2"	
WORKING PRESSURE	150 PSI CWP	MODEL NO.	38	38.2
		ORIFICE SIZE	3/16"	3/16"
	300 PSI CWP	MODEL NO.	38.5	38.6
		ORIFICE SIZE	5/32"	5/32"
	500 PSI CWP	MODEL NO.	38HP	38HP.2
		ORIFICE SIZE	1/8"	1/8"

SEE DRAWING NO. VM-38-M FOR STANDARD MATERIALS OF CONSTRUCTION
SEE DRAWING NO. VM-38DISV-M FOR SUPER VALVE MATERIALS OF CONSTRUCTION



- | | | |
|----------------|--------------------|------------------------|
| 1. BODY | 8. RETAINING SCREW | 18. LOCK NUT |
| 2. COVER | 10. FLOAT ARM | 19. LINK |
| 3. LEVER FRAME | 11. ORIFICE BUTTON | 21. LOCATING PIN |
| 4. SEAT | 12. PIVOT PIN | 22. ORIFICE BUTTON ARM |
| 5. FLOAT | 13. RETAINING RING | 30. WASHER |
| 6. GASKET | 14. PIPE PLUG | 33. CLEVIS |
| 7. COVER BOLT | 17. FLOAT RETAINER | 34. LOCK WASHER |

Revised 8-19-14 (Rev 1)

AIR RELEASE VALVE

DATE 6-16-10

VAL-MATIC

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VMC-38

AIR RELEASE VALVE

SERIES NO. 38

DI SUPER VALVE MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	DUCTILE IRON ASTM A536, GRADE 65-45-12
2	COVER	DUCTILE IRON ASTM A536, GRADE 65-45-12
3	LEVERAGE FRAME	STAINLESS STEEL T316, ASTM A240
4	SEAT	STAINLESS STEEL T316, ASTM A582
5	FLOAT	STAINLESS STEEL T316, ASTM A240
6	GASKET	COMPRESSED NON-ASBESTOS FIBER
7	COVER BOLT	STAINLESS STEEL T316, ASTM F593
8	RETAINING SCREW	STAINLESS STEEL T316, ASTM F879
10	FLOAT ARM	STAINLESS STEEL T316, ASTM A582
11	ORIFICE BUTTON	STAINLESS STEEL & EPDM
12	PIVOT PIN	STAINLESS STEEL T316, ASTM A276
13	RETAINING RING	STAINLESS STEEL PH 15-7 MO
14	PIPE PLUG	STAINLESS STEEL
17	FLOAT RETAINER	STAINLESS STEEL T316, ASTM F593
18	LOCK NUT	STAINLESS STEEL T316, ASTM F594
19	LINK	STAINLESS STEEL T316, ASTM A240
21	LOCATING PIN	STAINLESS STEEL T420
22	ORIFICE BUTTON ARM	STAINLESS STEEL T316, ASTM A582
30	WASHER	STAINLESS STEEL T316, ASTM A240
33	CLEVIS	STAINLESS STEEL T316, ASTM A240
34	LOCK WASHER	STAINLESS STEEL T316, ASTM A240

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

MATERIALS OF CONSTRUCTION

DATE 8/19/14



VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-38DISV-M

FUSION BONDED EPOXY (FBE) COATING

General Description:

Fusion Bonded Epoxy is a one-part, heat cured, thermosetting epoxy coating that is applied as a dry powder to the sandblasted surface of a pre-heated valve and then fused and cured in a high-temperature oven. The result is a durable coating with exceptional abrasion and chemical resistance ideally suited for valves in water and wastewater applications.

Advantages of FBE:

1. The coating is applied in accordance with AWWA Standard C550 "Protective Epoxy Coatings for Valves and Hydrants" and certified by to the requirements of ANSI/ NSF Standard 61 - "Drinking Water System Components - Health Effects" for coating valves and fittings.
2. FBE coatings are applied in an automated one-part process so that the mixing, surface preparation, and multiple-coat problems associated with liquid paints are eliminated.
3. The electrostatic application process for FBE provides a smooth, even coating thickness with no runs, sags, or thin spots common with applying liquid paints.
4. FBE coatings are durable and provide twice the impact strength of liquid epoxies.
The surface provides high abrasion resistance and has become a standard seating material for resilient gate and check valves.
5. FBE has a long-term performance history in water and sewage environments including salt water, slurries, methane and hydrogen sulfide exposure.

Application Process:

1. FBE is applied in an automated manufacturing process in accordance with the coating manufacturers' procedures and industry standards to assure consistency and high quality.
2. The valve is cleaned, sandblasted, and preheated in an oven.
3. An electrical charge is applied to the body and the powder is deposited over the surfaces of the valve to the specified thickness.
4. The epoxy is post cured in an oven to cure specifications and allowed to air cool to room temperature.
5. The final surface is visually and electrically (when specified) tested to verify thickness and that it is holiday free.

Typical Performance Characteristics:

1. Color:	Blue	
2. Thickness	12-20 mils	1 Coat
3. Gloss at 60 deg:	60-80 units	Din 67 530
4. Impact Resistance	>5 Joule (44 in-lb)	Din 30 677-2
5. Elongation:	>5%	Din 30 671
6. Hardness:	>100	Din 53 153
7. Water Immersion:	No visible change	90C, 672 Hours
8. Salt Spray Test:	>3000 hours	Din 53167
9. Adhesion:	16 Mpa (2320 psi)	7 days, 90C EN 24 624

Revised 2-15-17

FUSION BONDED EPOXY (FBE) COATING

DATE 7-17-02

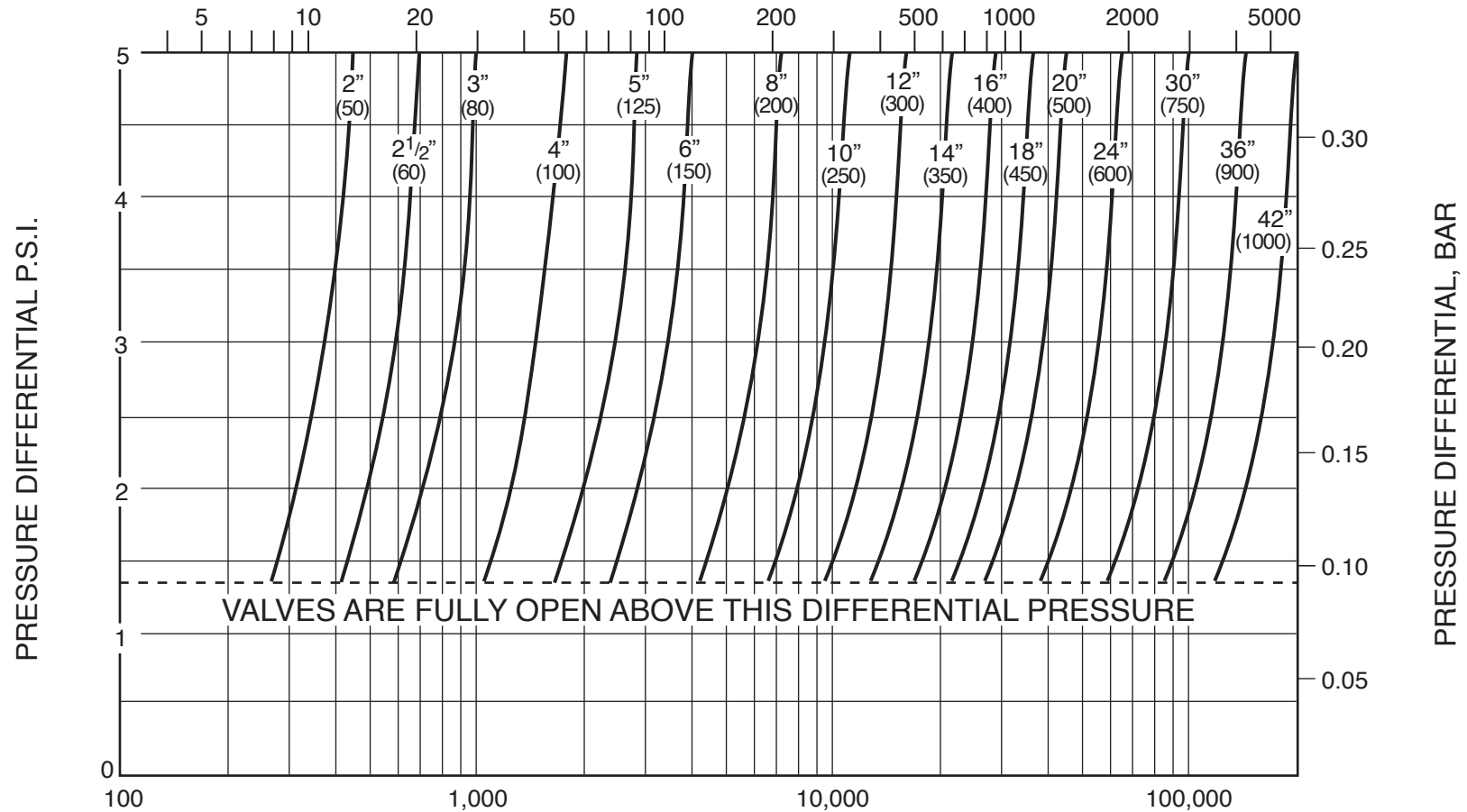


VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1847

FLOW OF AIR IN STANDARD CUBIC METERS PER MINUTE



FLOW OF AIR IN S.C.F.M.
(STANDARD CUBIC FEET OF FREE AIR PER MINUTE)

VENTING CAPACITY FOR VACUUM BREAKERS, IN. (mm)



VALVE AND MANUFACTURING CORP.

Revised 3-4-13

DATE 2-10-04

DRWG. NO.

SS-1971

STANDARD COMPLIANCE

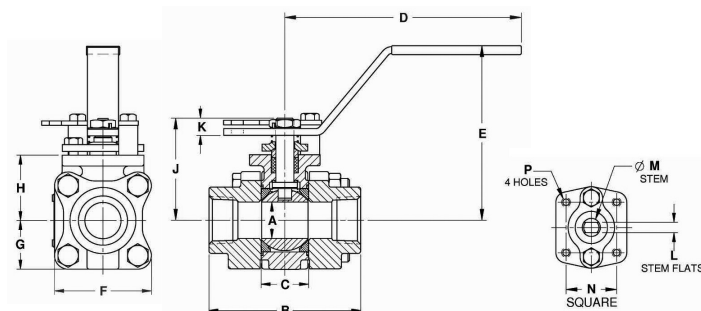
- Valve Design: MSS SP-110, NACE MR0175 (2000) & MR0103 (2012)
- End Connections: NPT per ASME B1.20.1

- Valve Marking: MSS SP-25
- Production Testing: MSS SP-110

FEATURES

- 3-Piece construction w/ enclosed fasteners
- Full port
- Stainless steel trim & hardware
- Swing-out center section
- Pressure balanced solid ball
- Compression controlled RPTFE gaskets

- Anti-blowout one piece bottom entry stem
- Two-position locking
- Adjustable multi-piece PTFE "V" style packing
- Fully machined ISO 5211 mounting
- Cast bosses on the center-section and end caps for bleed & drain ports
- Vacuum service to 29 in of Hg.
- 150 psig saturated steam



STANDARD MATERIAL LIST

	PART	MATERIAL
1	Body	ASTM A351-CF8M
2	End Caps	ASTM A351-CF3M
3	Ball	ASTM A276-316SS
4	Stem	ASTM A276-316SS
5	Seat	Multi-Seal
6	Packing	PTFE
7	Stem Bearing	PEEK/PTFE
8	Body Gasket	RPTFE
9	Body Bolts	18-8 Stainless Steel
10	Body Nuts	18-8 Stainless Steel
11	Stop Bolts	18-8 Stainless Steel
12	Gland Bolts	18-8 Stainless Steel
13	Handle Nut/Screw	300 Series Stainless Steel
14	Packing Gland	ASTM A276-316SS
15	Gland Plate	300 Series Stainless Steel
16	Lever Handle	300 Series Stainless Steel
17	Lock Plate	300 Series Stainless Steel
18	Stops	300 Series Stainless Steel

OPTIONS AVAILABLE

(MORE INFORMATION IN SECTION J)

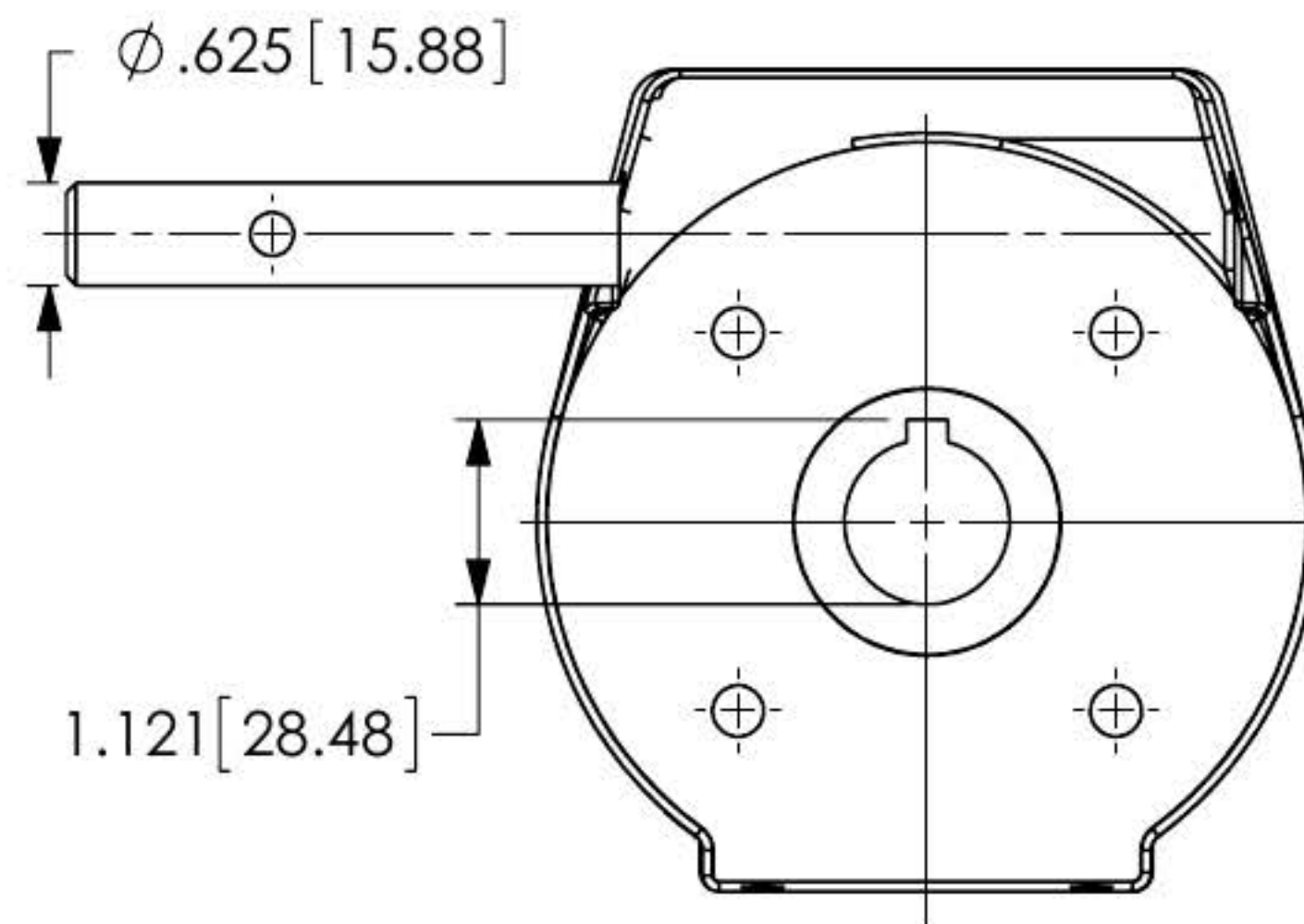
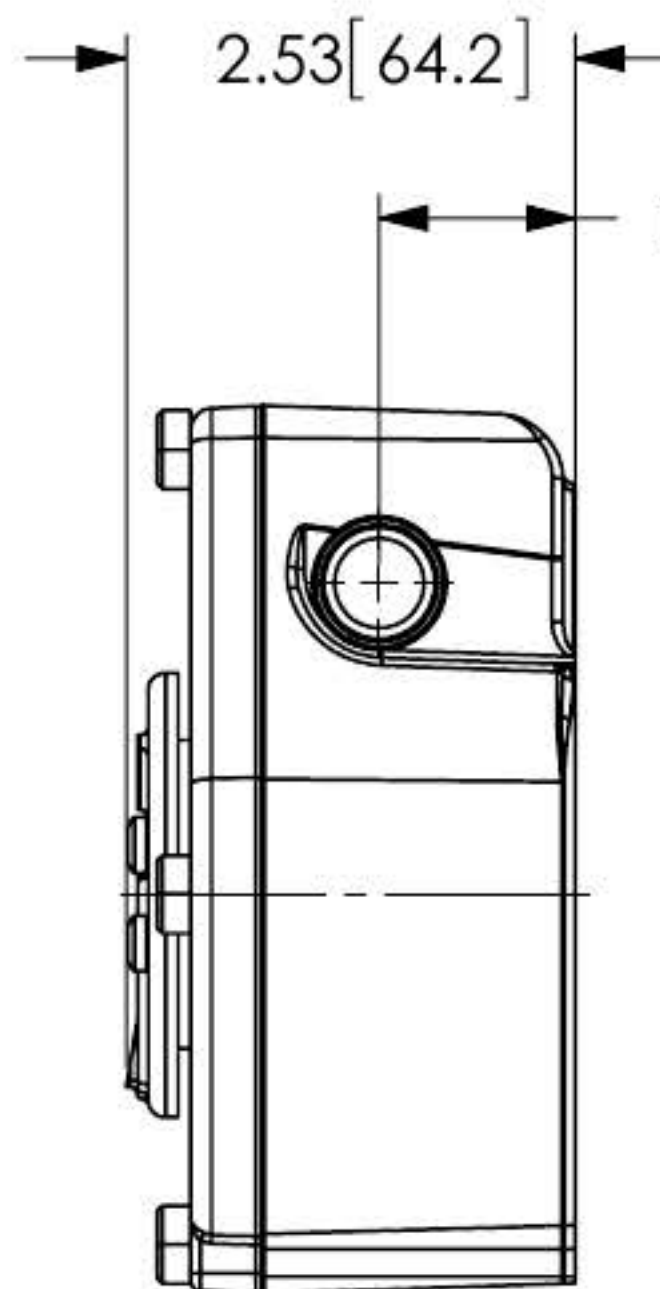
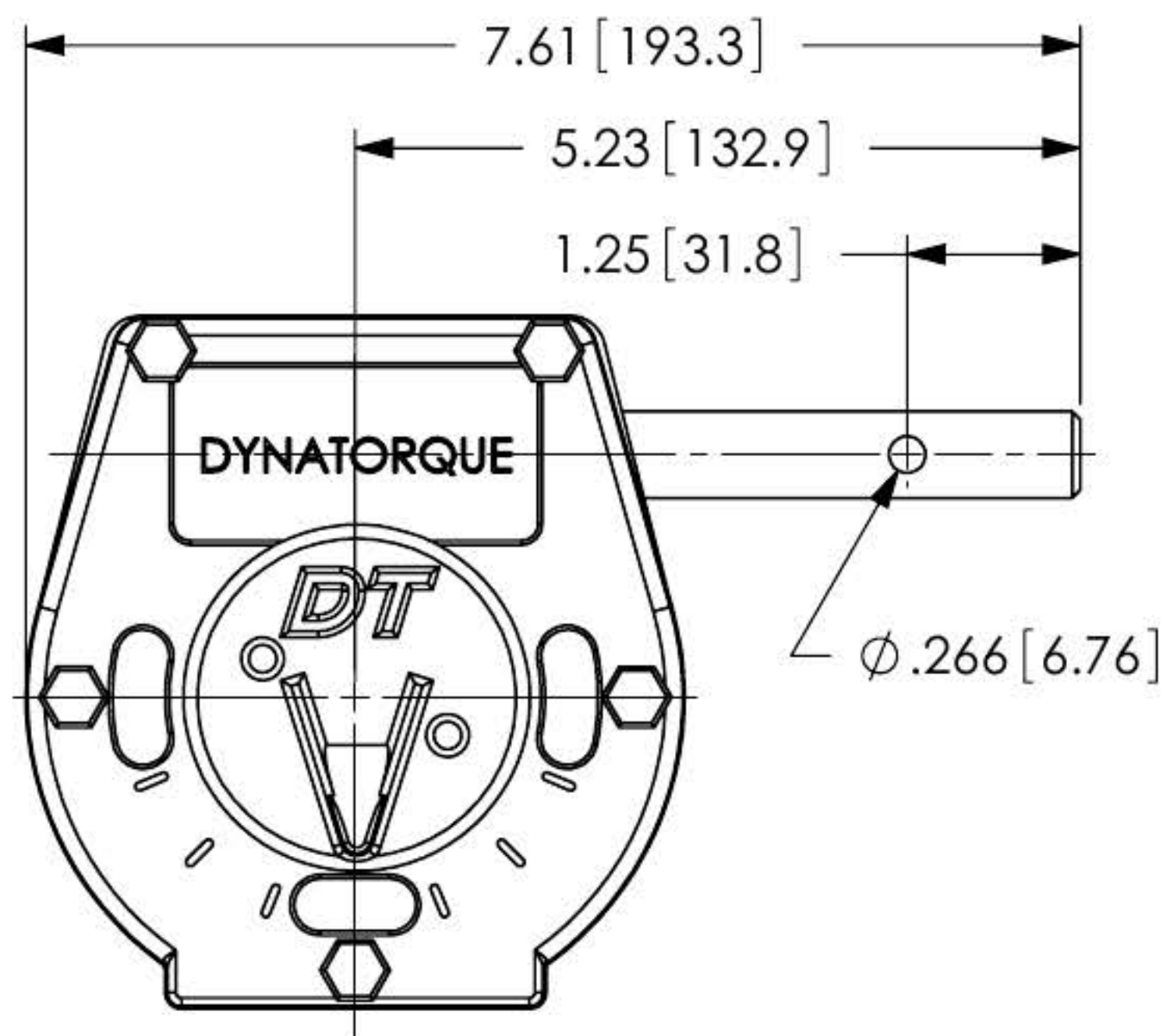
- Minimum quantities apply
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

(SUFFIX)	OPTION	SIZES
-01	Standard Configuration	All
-P -01-	BSPP (Parallel) Thread Connection	1/4" to 2"
-T -01-	BSPT (Tapered) Thread Connection	1/4" to 2"
-04-	2.25" Stem Extension (Carbon Steel, Zinc Plated)	1/4" to 2"
-14-	Vented Ball	1/4" to 2"
-15-	Round Handle	1/4" to 2"
-49-	No Lubrication. Assembled Dry.	1/4" to 2"
-57-	Cleaned for Oxygen Service	1/4" to 2"
-60-	Static Grounding	1/4" to 2"
-62-	Center Section Only	1/4" to 2"
-63-	NPT x Socketweld	1/4" to 2"
-69-	Drilled & Tapped Purge & Drains	1/4" to 2"
-70-	4" Extended Bonnet	1/4" to 2"
-76-	Live Loaded (Lever Operated)	1/4" to 2"
-77-	Live Loaded (Actuated)	1/4" to 2"
-90-	Double Packed 4" Extended Bonnet	1/4" to 2"
-9P-	Double Packed 4" Extended Bonnet w/ Monitoring Port	1/4" to 2"
-KF-	PCTFE Stem Bearing	1/4" to 2"
-SR-	Spring Return Handle	1/4" to 1"

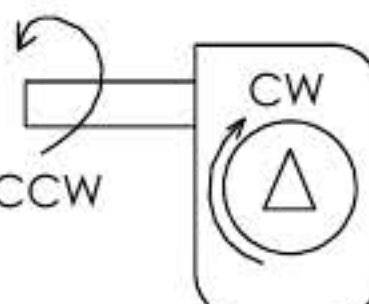
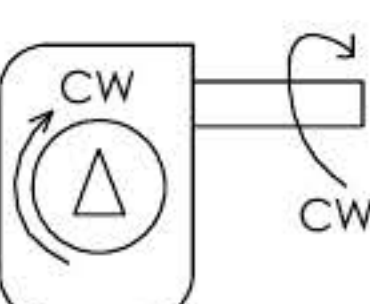
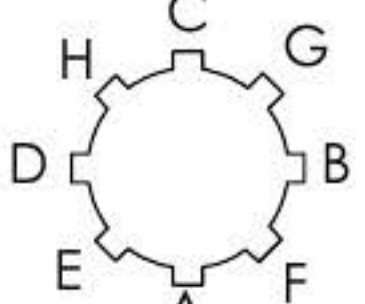
Pressure/Temperature Ratings - Page M-19, Graph No. 24

DIMENSIONS

PRODUCT NO.	SIZE	A	B	C	D	E	F	G	H	J	K	L	M	N	P	WT.
86A-101-01	1/4"	0.37	2.80	0.89	5.12	3.02	2.02	1.01	1.39	1.97	0.23	0.245	0.375	1.00	10-24	2.3
86A-102-01	3/8"	0.50	2.80	0.89	5.12	3.02	2.02	1.01	1.39	1.97	0.23	0.245	0.375	1.00	10-24	2.3
86A-103-01	1/2"	0.50	2.80	0.89	5.12	3.02	2.02	1.01	1.39	1.97	0.23	0.245	0.375	1.00	10-24	2.3
86A-104-01	3/4"	0.75	3.68	1.10	5.53	3.40	2.40	1.20	1.65	2.35	0.24	0.312	0.500	1.392	1/4-20	4.0
86A-105-01	1"	1.00	4.19	1.31	6.53	4.80	2.67	1.34	1.80	2.80	0.48	0.287	0.500	1.392	1/4-20	5.7
86A-106-01	1.25"	1.50	4.50	1.97	6.65	4.70	3.84	1.92	2.49	3.89	0.72	0.412	0.625	1.949	5/16-18	14.2
86A-107-01	1.5"	1.50	4.98	1.97	6.65	4.70	3.84	1.92	2.49	3.89	0.72	0.412	0.625	1.949	5/16-18	14.4
86A-108-01	2"	2.00	5.86	2.56	8.40	5.47	4.56	2.46	3.17	4.74	0.80	0.477	0.750	1.949	5/16-18	24.4



CONSULT FACTORY FOR SPECIAL CONFIGURATIONS.

<div>POS 1</div> 				<div>POS 2 (STD)</div> 				<div>KEYWAY DIAGRAM</div>  <div>IN OPEN POS.</div>				<div>GREASED FOR LIFE</div> <div>PLATED STANDARD SHAFT</div> <div>MAX STEM HEIGHT: 2.12 [53.8]</div> <div>WORM WHEEL RECESS: .10 [2.5]</div>				<div>HANDWHEEL</div> <div>RECOMMENDED ϕ: 14 IN</div> <div>RIM PULL AT MAX TORQUE: 80 LBS</div> <div>TURNS FOR 360°: 30</div>				<div>RATIO: 30:1</div> <div>TORQUE: 4,500 IN LBS [509 N-M]</div> <div>TEMPERATURE: -20° TO 150°F [-29° TO 66°C]</div> <div>EST. WEIGHT: 7 LBS [3.2 KGS]</div>			
HOUSING MOUNTING PATTERN								BORE & KEY				MANUAL MULTI TURN WORM GEAR OPERATOR COMMERCIAL GRADE											
MAX		MAX ON CENTER		STD		MIN		MAX		STD		MIN		<div>DYNATORQUE</div> <div>WWW.DYNATORQUE.COM</div> <div>A BRAND OF CAMERON</div>				DT3					
ϕ 4.019 3/8-16 UNC		ϕ 3.750 3/8-16 UNC		ϕ 3.250 3/8-16 UNC		ϕ 1.968 1/4-20 UNC		ϕ 1.250 .250 X .188 KEY		ϕ 1.000 .250 KEY @C		ϕ .391											

DT3

76F-100-A SERIES

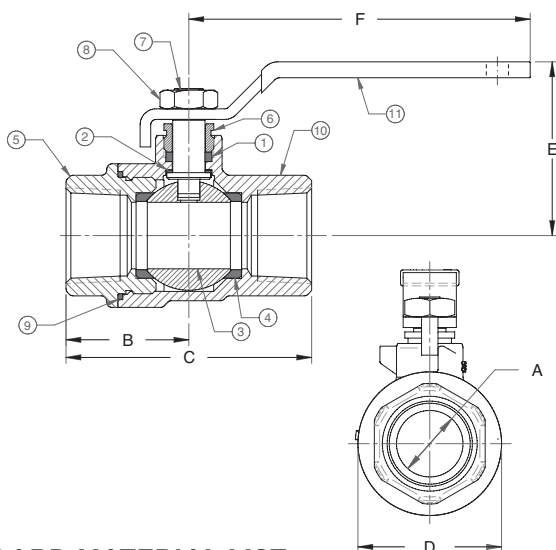
STAINLESS STEEL FULL PORT BALL VALVE



Female NPT Thread, 1/4"-3" 1000 CWP (psig), Cold Non-Shock. (See referenced P/T chart)
150 psig Saturated Steam.
Vacuum Service to 29 inches Hg.
MSS SP-110 Compliant.
Designed, cast, machined, assembled, and 100% factory tested in USA.

FEATURES

- Investment cast components
- Reinforced seats
- Blowout-proof stem design
- Adjustable packing gland
- Stainless steel lever and nut



STANDARD MATERIAL LIST

	PART	MATERIAL
1	Stem packing	MPTFE
2	Stem bearing	RPTFE
3	Ball	A276-316SS (1/4" to 2", except 1.25") A276-316SS or A351-CF8M stainless (1.25") A351-CF8M stainless (3")
4	Seat (2)	RPTFE (2" & smaller); RTFM (3")
5	Retainer	ASTM A276-316SS (1/4" & 3/8") ASTM A351-CF8M stainless (1/2" to 3")
6	Gland	A276-316 Stainless Steel
7	Stem	A276-316 Stainless Steel
8	Lever nut	304 Stainless Steel
9	Body Seal	RPTFE (1/2" to 3")
10	Body	A351-CF8M
11	Lever and grip	SS w/vinyl

DIMENSIONS

PRODUCT NO.	SIZE	A	B	C	D	E	F	WT.
76F-101-01	1/4"	0.37	0.95	1.91	1.12	1.60	3.85	0.47
76F-102-01	3/8"	0.37	0.95	1.91	1.12	1.60	3.85	0.44
76F-103-01A	1/2"	0.50	1.21	2.35	1.27	1.73	3.85	0.57
76F-104-01A	3/4"	0.81	1.39	2.77	1.62	1.96	3.85	0.91
76F-105-01A	1"	1.00	1.67	3.34	2.00	2.27	4.75	1.38
76F-106-01A	1.25"	1.25	1.96	3.92	2.73	3.21	7.77	4.17
76F-107-01A	1.5"	1.50	2.05	4.10	2.92	3.31	7.77	4.69
76F-108-01A	2"	2.00	2.37	4.74	3.75	3.69	7.77	6.90
76F-100-01A	3"	3.00	3.70	7.40	5.68	5.23	10.00	22.40

- Fire safe to API 607 (requires -24 suffix)
- Meets NACE MR0175 (2000) & MR0103 (2012)
- CSA CGA 3.16-M88 (Requires "GS" suffix)
- NSF/ANSI 61 Section 8, Annex G (1/4" to 2")
- NSF/ANSI 372 - Drinking Water System Components - Lead Content

OPTIONS AVAILABLE

(MORE INFORMATION IN SECTION J)

- Minimum quantities apply
- To specify an option, replace the "01" standard suffix with the suffix of the option.
- To specify multiple options, replace the "01" suffix with the desired suffixes in the numerical order shown below. NOTE: Not all suffixes can be combined together.

(SUFFIX)	OPTION	SIZES
-01	Standard Configuration	All
-P -01-	BSPP (Parallel) Thread Connection	1/2" to 2"
-T -01-	BSPT (Tapered) Thread Connection	1/2" to 3"
-02-	Stem Grounded	1/2" to 3"
-04-	2.25" Stem Extension (Carbon Steel, Zinc Plated)	1/2" to 2"
-08-	90° Reversed Stem	1/2" to 2"
-11-	Therma-Seal™ Insulating Tee Handle	1/4" to 2"
-14-	Side Vented Ball (Uni-Directional)	3/8" to 3"
-24-	Graphite packing, PTFE body seal, RPTFE bearing (Fire Safe API 607, 6th edition, ISO 10497:2010)	1/2" to 3"
-27-	SS Latch-Lock Lever & Nut	3/8" to 3"
-30-	Cam-Lock and Grounded	1/2" to 2"
-32-	SS Tee Handle & Nut	1/2" to 2"
-35-	PTFE Trim	3"
-39-	SS Hi-Rise Locking Wheel Handle, SS Nut	1/2" to 2"
-40-	Cyl-Loc and Grounded	1/2" to 2"
-44-	Seal Welded	1/4" to 3"
-45-	Less Lever & Nut	1/2" to 3"
-46-	Latch Lock Lever - Lock in Closed Position Only	1/2" to 2"
-47-	SS Latch Lock Oval Handle	1/2" to 2"
-48-	SS Oval Handle (No Latch) & Nut	1/4" to 2"
-49-	No Lubrication. Assembled Dry.	1/2" to 3"
-50-	2.25" CS Locking Stem Extension	1/2" to 2"
-56-	Multifill Seats & Packing	1/2" to 3"
-57-	Oxygen Cleaned	1/4" to 3"
-60-	Static Grounded Ball & Stem	1/2" to 3"
-GS	CSA CGA 3.16 (RTFE Seat - All sizes)	All

Pressure/Temperature Ratings - Page M-12, Graph No. 8

*LEAD FREE: The wetted surfaces of this product shall contain no more than 0.25% lead by weighted average. Complies with Federal Public Law 111-380. ANSI 3rd party approved and listed.
REV. 14FEB18

The listed C_v "factors" are derived from actual flow testing, at Apollo's Pageland, South Carolina factory. These tests were completed using standard "off the shelf" valves with no special preparation and utilizing standard schedule 40 pipe. It should be understood that these factors are for the valve only and also include the connection configuration. The flow testing is done utilizing water as a fluid media and is a direct statement of the gallons of water flowed per minute with a 1 psig pressure differential across the valve/connection unit. Line pressure is not a factor. Because the C_v is a factor, the formula can be used to estimate flow of most media for valve sizing.

FLOW OF LIQUID

$$Q = C_v \sqrt{\frac{\Delta P}{\text{SpGr}}}$$

$$\text{or } \Delta P = \frac{(Q)^2 (\text{SpGr})}{(C_v)^2}$$

WHERE:

- Q = Flow in US gpm
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity at flowing temperature
- C_v = Valve constant

FLOW OF GAS

$$Q = 1360 C_v \sqrt{\frac{(\Delta P) (P_2)}{(\text{SpGr}) (T)}}$$

$$\text{or } \Delta P = \frac{5.4 \times 10^{-7} (\text{SpGr}) (T) (Q)^2}{(C_v)^2 (P_2)}$$

WHERE:

- Q = Flow in SCFH
- ΔP = Pressure drop (psig)
- SpGr = Specific gravity (based on air = 1.0)
- P_2 = Outlet pressure-psia (psig + 14.7)
- T = (temp. °F + 460)
- C_v = Valve constant

CAUTION: The gas equation shown, is valid at very low pressure drop ratios. The gas equation is NOT valid when the ratio of pressure drop (ΔP) to inlet pressure (P_1) exceeds 0.02.

NOTE: Only use the gas equation shown if $(P_1 - P_2)/P_1$ is less than 0.02.

CV FACTORS FOR APOLLO® VALVES (CONTINUED ON M-4)

VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
70B-140 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-100/200 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-300/400 Series	--	--	15	30	43	48	84	108	--	--	--	--	--	--	--
70-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
70-800 Series	8.4	7.2	15	30	43	48	84	--	--	--	--	--	--	--	--
71-AR Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
71-100/200 Series	--	--	--	30	43	48	84	108	190	370	--	--	--	--	--
72-100/900 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
72-1xx-A/72-9xx-A Series	--	--	26	48	65	125	170	245	--	--	--	--	--	--	--
73A-100 Series	8.4	7.2	15	30	43	48	84	108	--	--	--	--	--	--	--
73-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
74-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
75-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76F-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FJ-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76FK-100 Series	8.1	15	15	51	68	125	177	389	--	--	--	--	--	--	--
76-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76-300/400 Series	--	--	26	48	65	125	170	216	--	--	--	--	--	--	--
76-600 Series	2.3	4.5	5.4	12	14	21	34	47	--	--	--	--	--	--	--
76J-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76J-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
76K-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
76K-AR Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
7K-100 Series	--	--	15	51	68	125	177	389	503	--	--	--	--	--	--
77-AR Series	8.1	15	15	51	68	--	177	389	--	--	--	--	--	--	--

REV. 21APR17

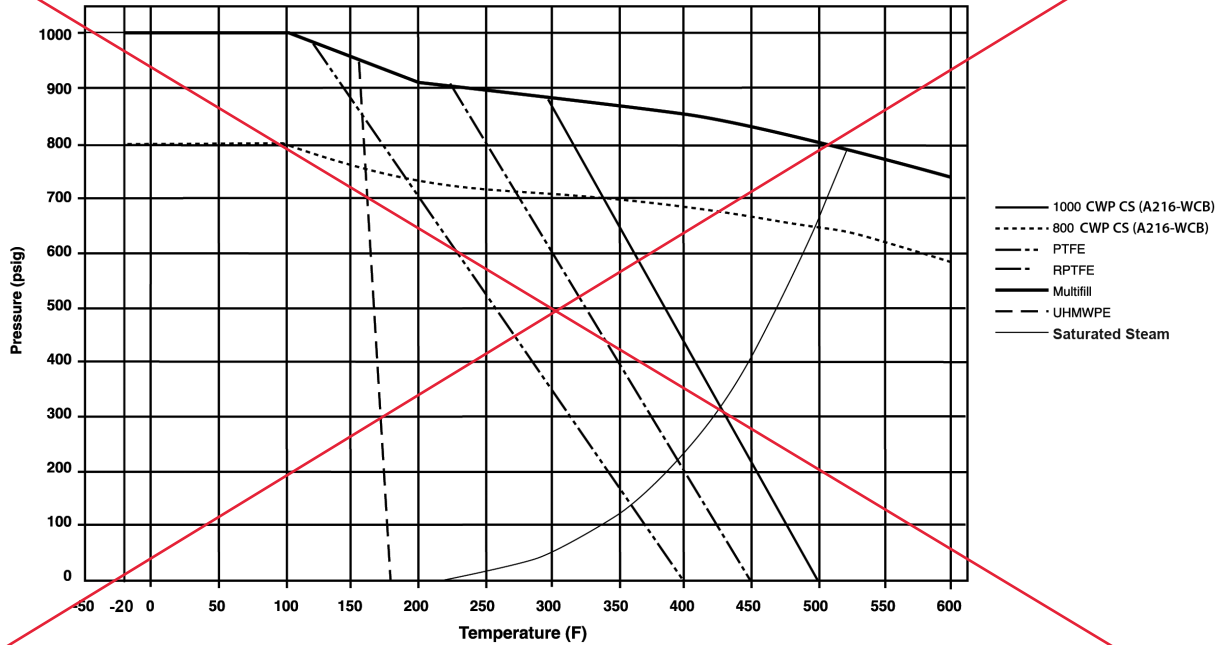
CV FACTORS FOR APOLLO® VALVES (CONTINUED FROM M-3)

VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
77C-100/200 Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77D-140 Series	4.5	7.2	16	36	68	125	177	389	--	--	--	--	--	--	--
77D-640 Series	--	--	--	11	24	35	--	--	--	--	--	--	--	--	--
77G-UL Series	4.5	7.2	16	36	68	125	177	389	503	--	--	--	--	--	--
77W Series	--	--	16	36	68	125	177	389	--	--	--	--	--	--	--
77-100/200 Series	8.1	15	15	51	68	125	177	389	503	--	--	--	--	--	--
79 Series	8.5	8.5	9.8	32	44	66	148	218	440	390	--	--	--	--	--
80 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
82-100/200 Series	8.1	14	26	51	68	120	170	376	510	996	1893	--	--	--	--
83A/83B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
83R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
86A/86B Series	8.1	14	26	51	68	120	170	376	--	--	--	--	--	--	--
86R-100/200 Series	--	--	--	--	--	--	170	376	--	996	1893	--	--	--	--
87A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
87B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
87J-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87J-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87J-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
87K-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
87K-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-100 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-200 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-700 Series	--	--	--	--	--	--	86	104	234	375	673	1099	1902	3890	--
88A-900 Series	--	--	15	19	75	--	195	410	545	1021	2016	4837	9250	15170	22390
88A-F00 Series	--	--	--	--	75	--	195	410	545	1021	2016	4837	--	--	--
88B-100 Series	--	--	--	--	--	--	--	--	--	375	673	1099	1902	3890	--
89-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
9A-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
90-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
92-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
93-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
94A-100/200 Series	6	7	19	34	50	104	268	309	629	1018	1622	--	--	--	--
96-100 Series	8.3	6.7	5.7	10	16	25	40	62	--	--	--	--	--	--	--
399-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--
489-100 Series	8.4	7.2	15	30	43	48	84	108	190	370	--	--	--	--	--

1000 CWP

(CS) ASTM A216-WCB

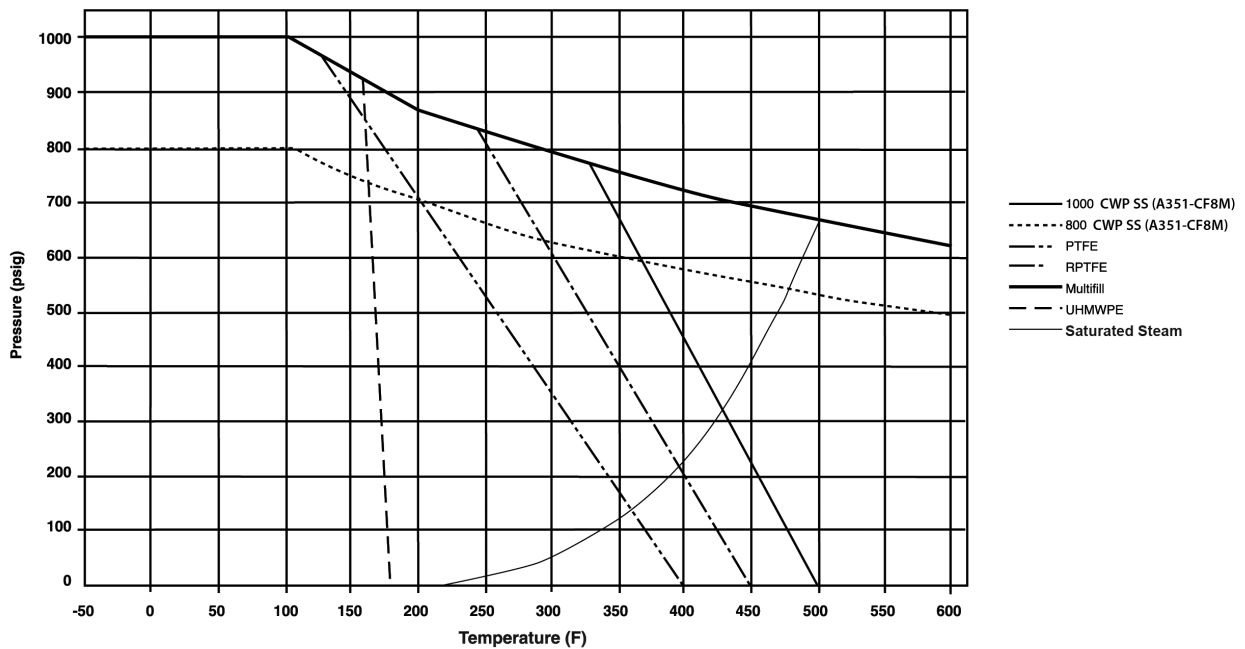
GRAPH 7



1000 CWP

(SS) ASTM A351-CF8M

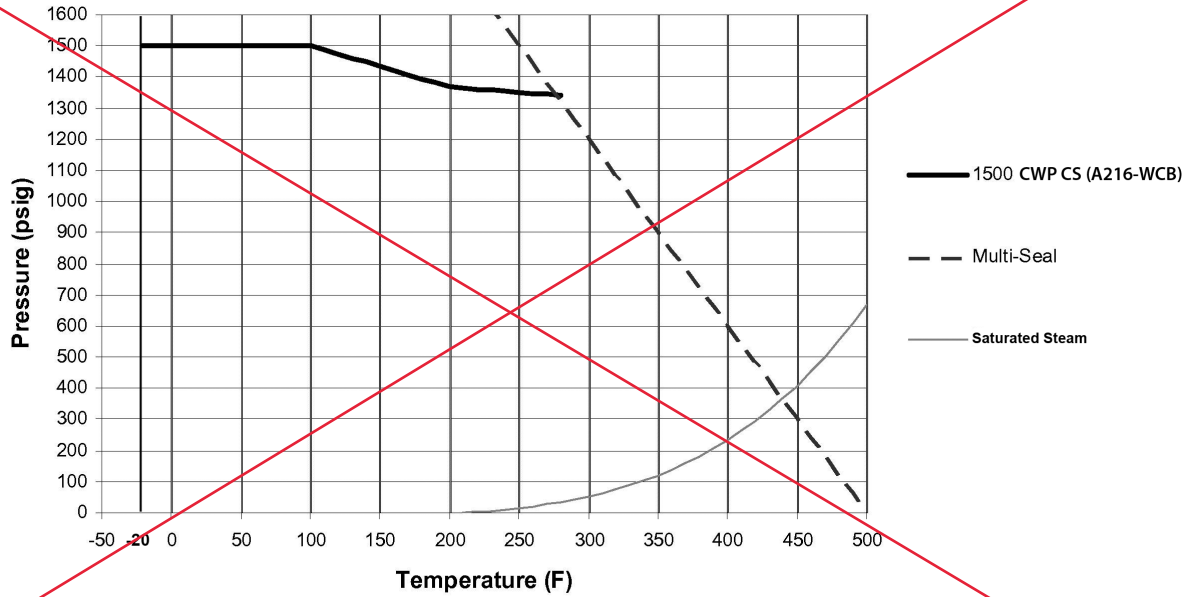
GRAPH 8



1500 CWP

(CS) ASTM A216-WCB

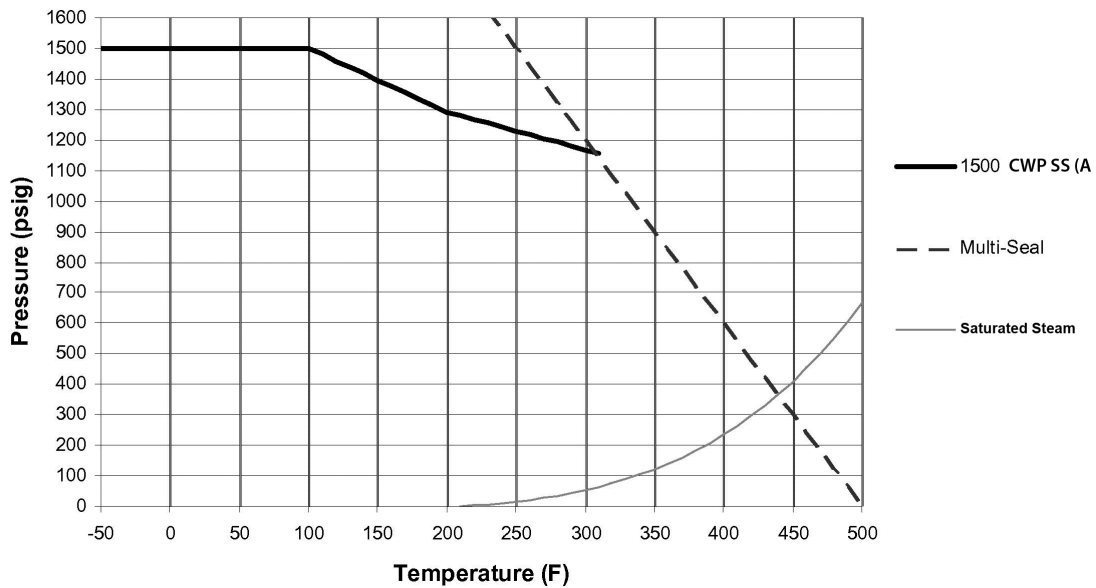
GRAPH 23

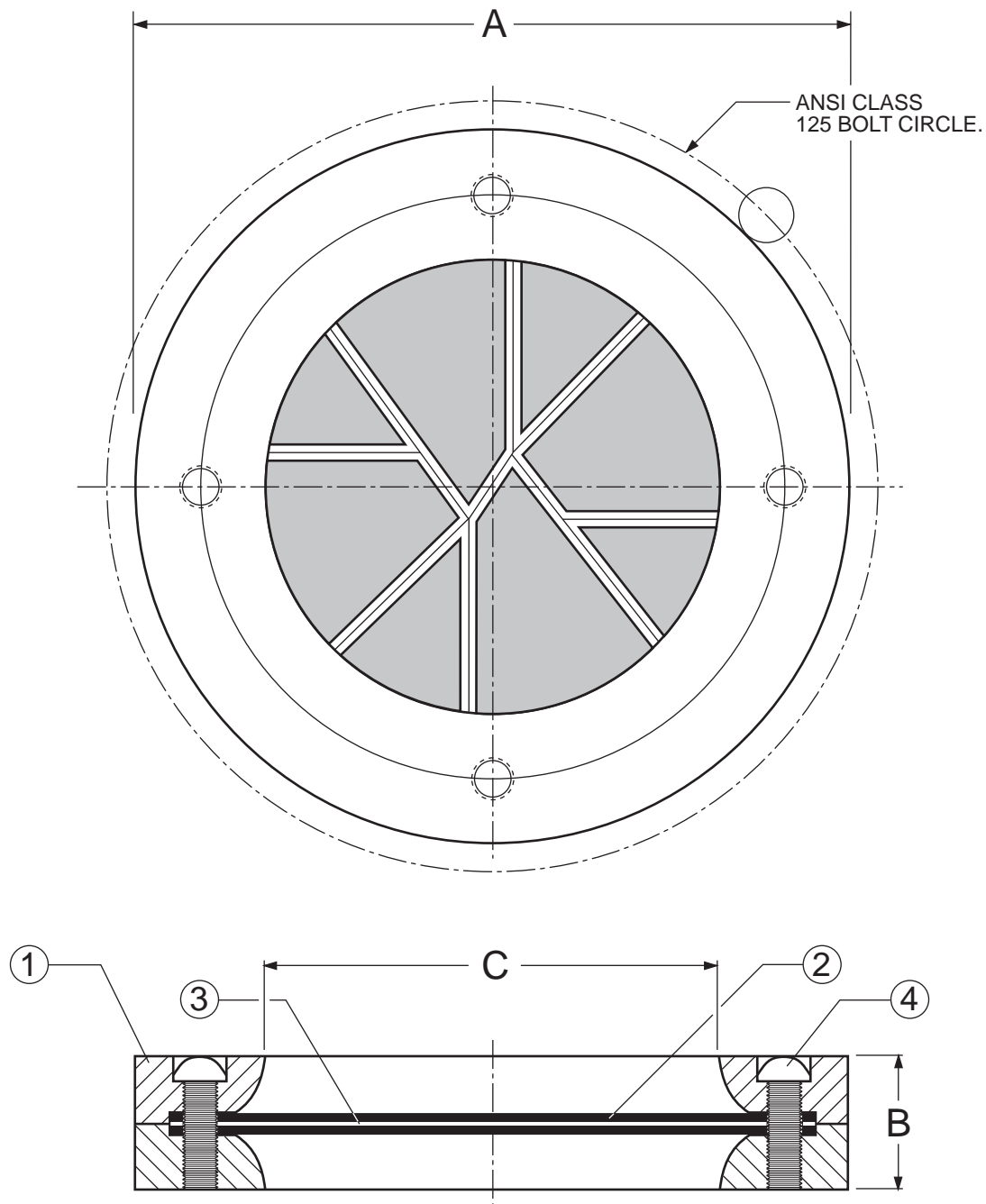


1500 CWP

(SS) ASTM A351-CF8M

GRAPH 24





INSTALLATION DIMENSIONS, INCHES ANSI CLASS 125				
SIZE	MODEL NO.	A	B	C
4	1504	6.75	0.75	4.00
6	1506	8.88	1.00	6.00
8	1508	10.88	1.25	8.00
12	1512	16.00	2.00	12.00

Revised 8-6-07

FROSTSAFE TWO-WAY DAMPER

DATE 11-7-05

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-1500

4", 6, 8",12" FROSTSAFE TWO-WAY DAMPER

SERIES NO. 1500

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	HIGH DENSITY POLYETHYLENE (HDPE)
2	RUBBER MEMBRANE	NYLON REINFORCED HIGH GRADE NEOPRENE
3	DAMPER SEAL	PETG
4	BODY BOLT	316 STAINLESS STEEL

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

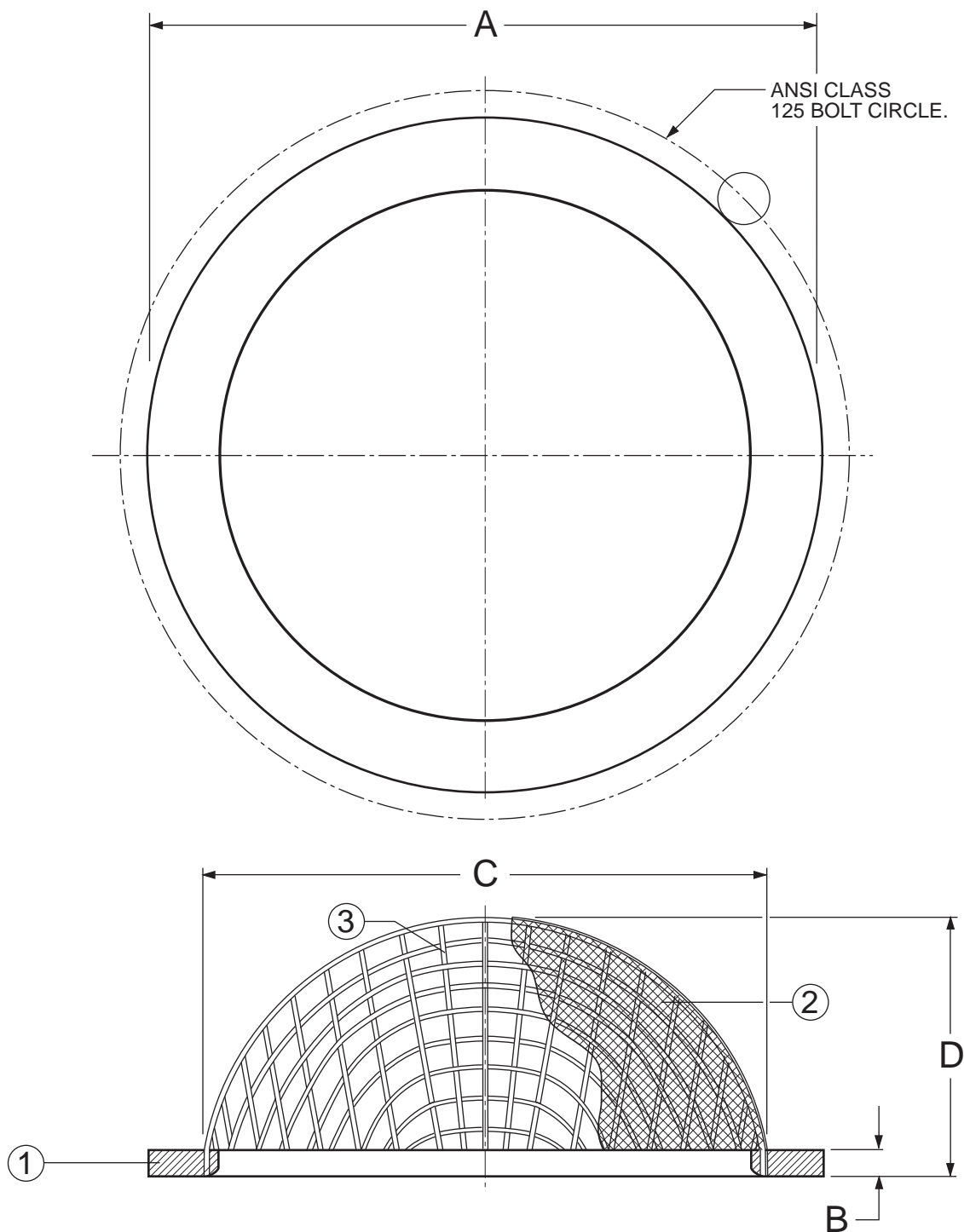
Revised 8-6-07

MATERIALS OF CONSTRUCTION

DATE 11/7/05

VAL-MATIC[®] VALVE AND MANUFACTURING CORP.

DRWG. NO.
VM-1500-M



INSTALLATION DIMENSIONS, INCHES ANSI CLASS 125					
SIZE	MODEL NO.	A	B	C	D
4	1604	6.75	.375	3.76	2.37
6	1606	8.63	.375	5.75	3.37
8	1608	10.88	.375	7.77	4.37
12	1612	16.00	.375	11.75	6.00

Revised 8-6-07

VENTSAFE SECURITY CAGE®

DATE 11-7-05

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-1600

VENTSAFE SECURITY CAGE®

SERIES NO. 1600

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	45 SHORE D PVC
2	SCREEN, 20 MESH	304 STAINLESS STEEL
3	CAGE, 2 MESH	304 STAINLESS STEEL

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

Revised 6-8-06

MATERIALS OF CONSTRUCTION

DATE 11/7/05

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-1600-M