
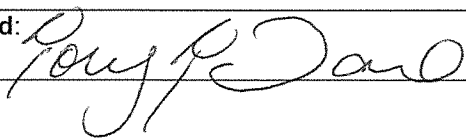


CONTRACTOR SUBMITTAL FORM

Project Name: Navajo Gallup Water Supply Project Reach 26.3	<input checked="" type="checkbox"/> M (Materials)	Submittal No. M009
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.: 33-13-00 22 11 05	Drawing No.: DT-23
Bid Item No(s): 42	
Submittal Checklist No(s):	
Product Description: Chlorination Building	
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 - Per 22 11 05 Part 2.10.9, factory provided hood shall not be used. Plumb ventillation of valves outside of the building as shown on dwgs. - Contractor ensure check valve is AWWA C500 & ASTM A126. - Handwheel of ball valve shall open left & close right - 1/2" SS Apollo Ball valve can also be used	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. 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. 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.
Signed: 	Date: 7/9/19



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

Navajo Gallup Reaches 26.3

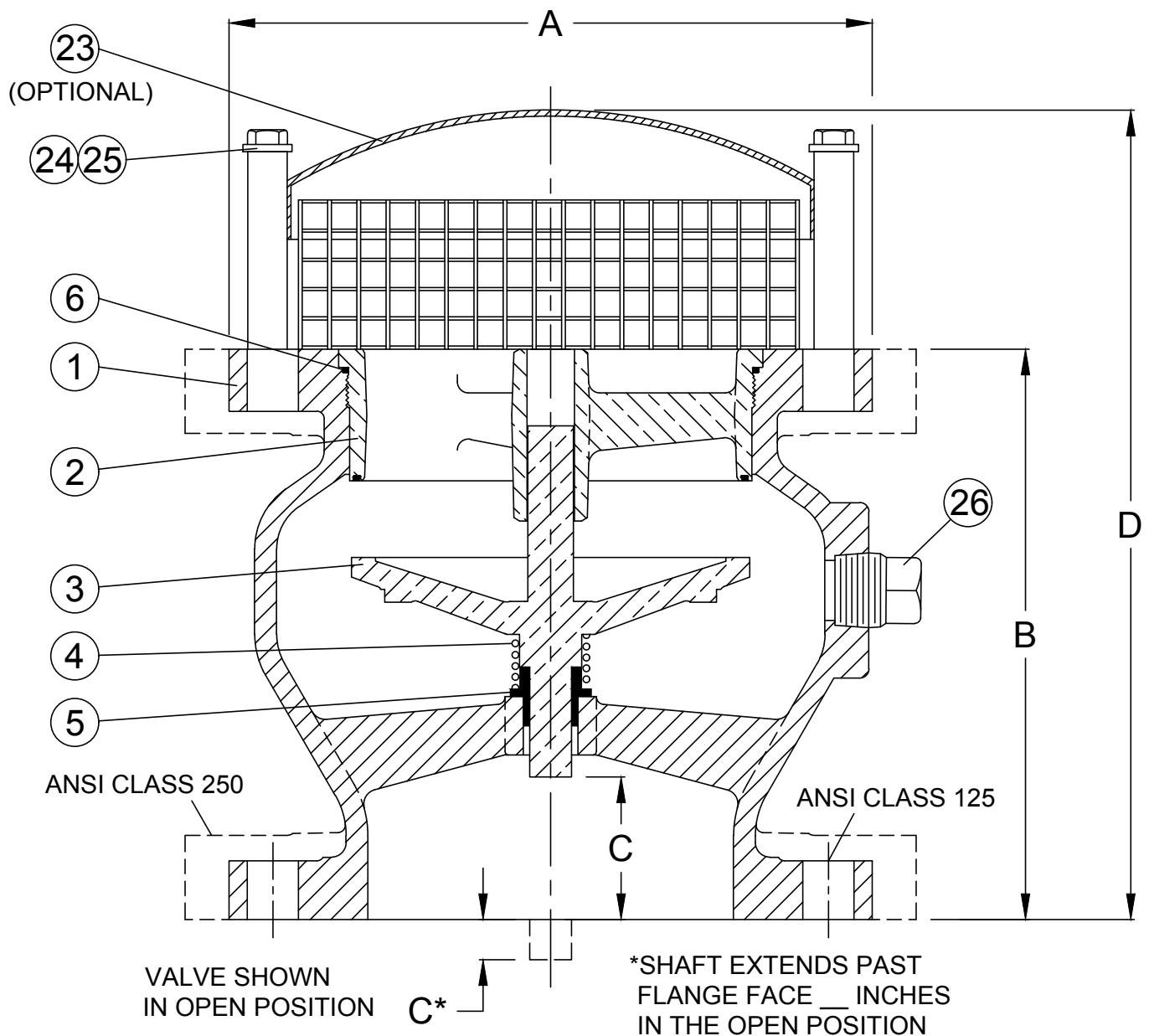
Reach 26.3 to Torreon, NM

DT23

Qty

Product Description

1	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
1	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
1	6" ValMatic 7206C Surgebuster Check Valve, ANSI Class 125, CWP 250psi, Ductile Iron Body, BunaN Disc, Stainless Steel Disc Accelerator, Fusion Bonded Epoxy Coating, SST Bolts
1	6" ValMatic Series 4200 Ball Valves, AWWA C507 NSF61, Rated to 150psi Full Differential Working Pressure, Ductile Iron Body, Shell Test at 300psi, ANSI B16.1 Class 125 Flanges, Stainless Steel Stem, Double Resilient Seats, Fusion Bonded Epoxy Coating, SS Body Fasteners, Mounted to AUMA GS100.3 Quarter-Turn Manual Gearbox, 126:1 Ratio, 31 Turns to Close, Limit Switch, 2" AWWA Nut Orientation - Handwheel Perpendicular to Pipe
1	2" Apollo 76F10801A Stainless Steel, Full Port, NPT, Ball Valve
1	1" Apollo 76F10501A Stainless Steel, Full Port, NPT, Ball Valve
1	3/4" Apollo 76F10401A Stainless Steel, Full Port, NPT, Ball Valve
1	1/4" Apollo 76F10101A Stainless Steel, Full Port, NPT, Ball Valve



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

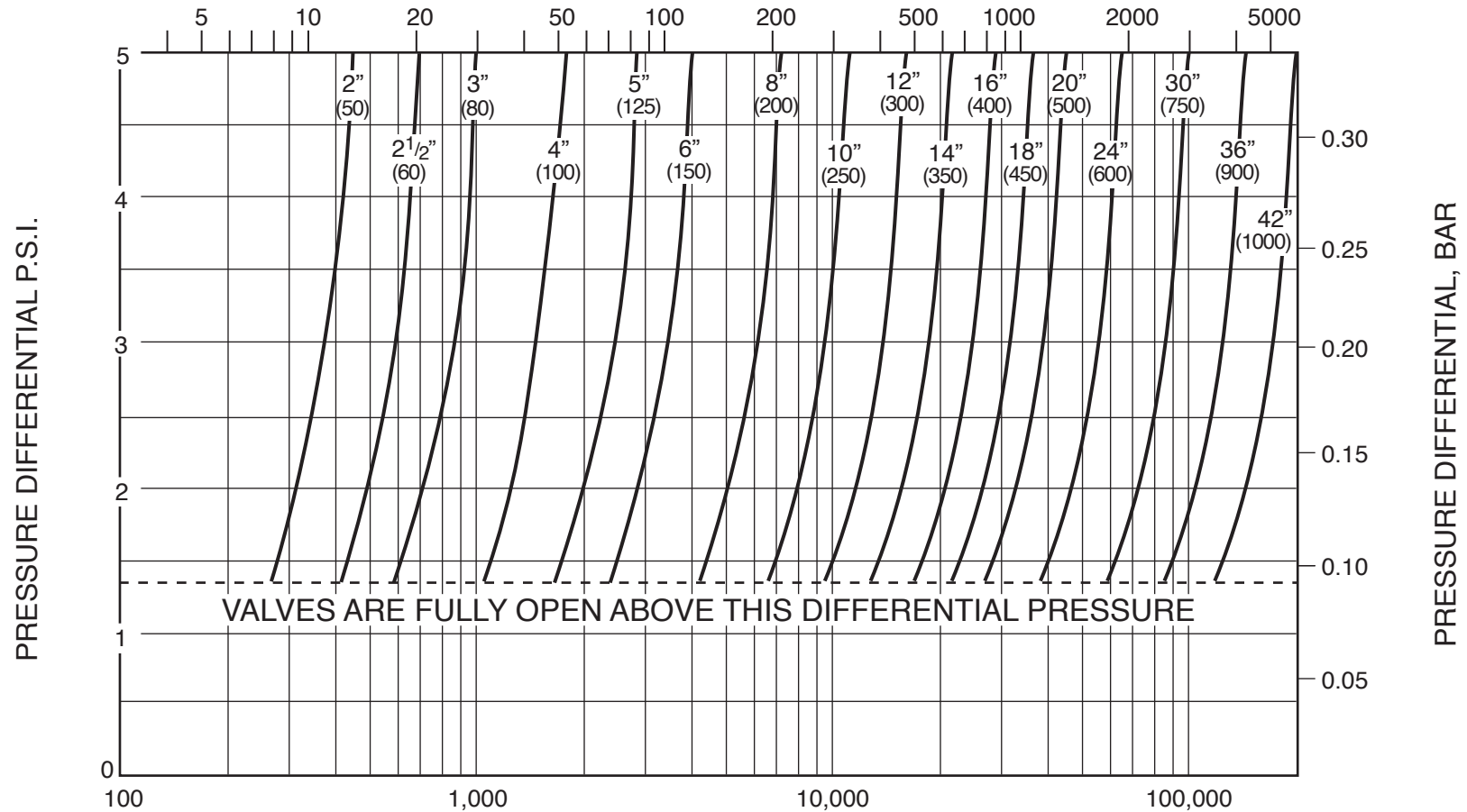


VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-1800AVB.1-M

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)



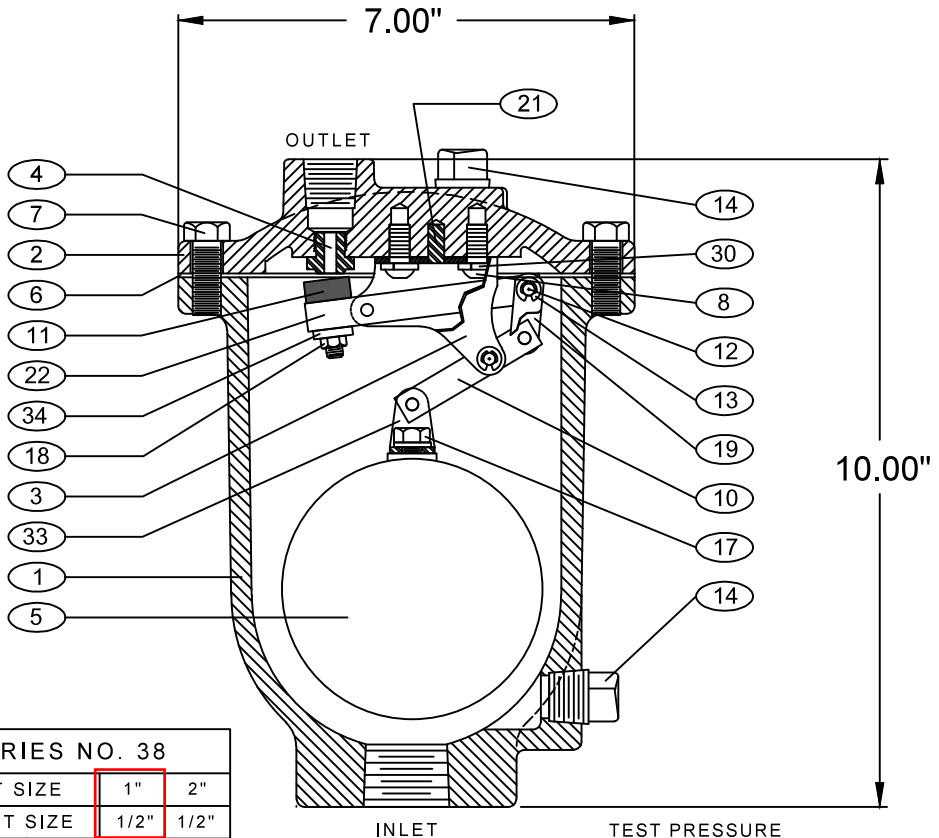
VALVE AND MANUFACTURING CORP.

Revised 3-4-13

DATE 2-10-04

DRWG. NO.

SS-1971



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

VAT-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

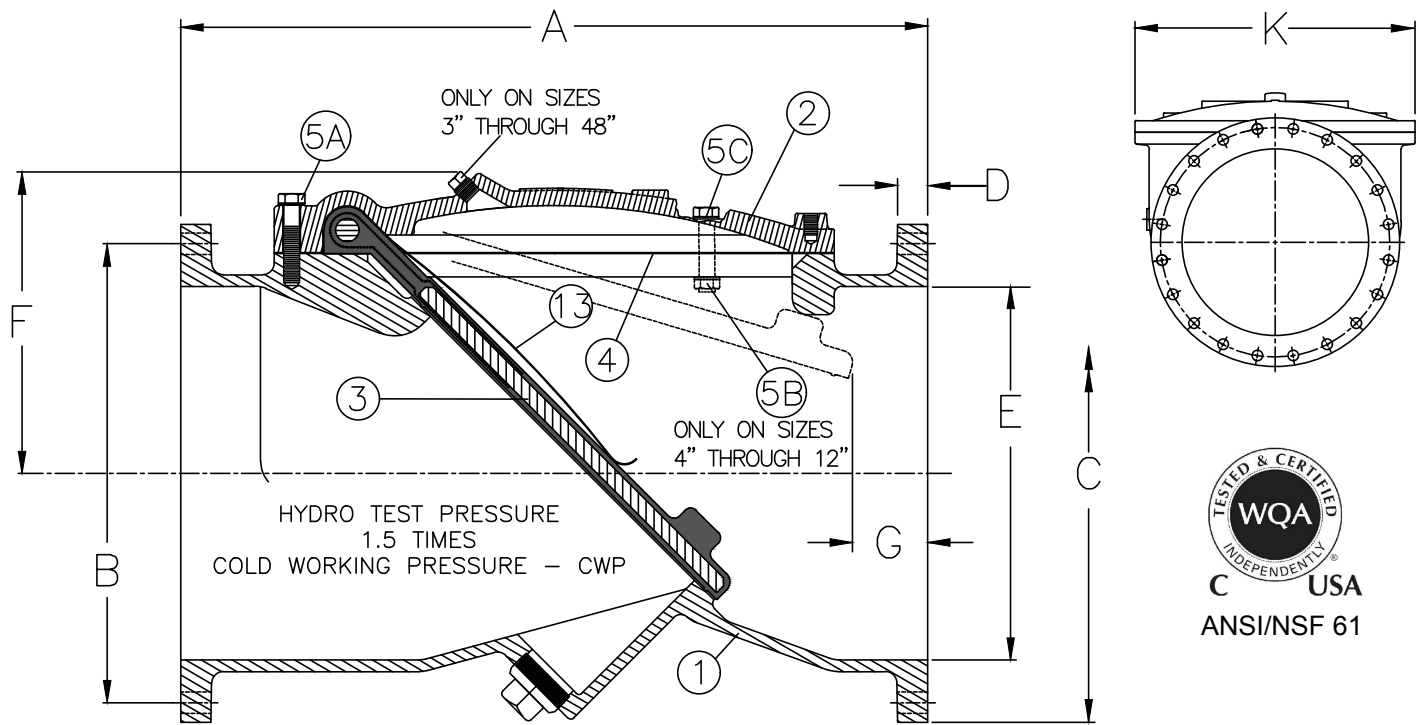
DATE 8/19/14



VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-38DISV-M



SEE DRAWING NO. VM-7202-M FOR STANDARD MATERIALS OF CONSTRUCTION.

DRAWING DEPICTS 24" SIZE TO SCALE.

ANSI CLASS 125

VALVE SIZE	MODEL NO.	CWP (PSI)	A	B	C	D	E	F	G	K	BOLT SIZE	NO. OF BOLTS	NO. BOLTS TAPPED
2	7202	250	8.00	4.75	6.00	0.69	2.00	3.38	1.63	5.18	5/8	4	--
2 1/2	7225	250	8.50	5.50	7.00	0.75	2.50	3.38	1.63	5.18	5/8	4	--
3	7203	250	9.50	6.00	7.50	0.81	3.00	5.13	1.63	7.50	5/8	4	--
4	7204	250	11.50	7.50	9.00	0.75	4.00	5.75	2.13	8.25	5/8	8	--
6	7206C	250	14.00	9.50	11.00	0.75	6.00	6.88	1.63	11.13	3/4	8	--
8	7208	250	19.50	11.75	13.50	0.88	8.00	8.38	2.88	16.00	3/4	8	--
10	7210	250	24.50	14.25	16.00	1.18	10.00	10.75	3.13	21.00	7/8	12	--
12	7212	250	27.50	17.00	19.00	1.25	12.00	12.50	3.43	24.00	7/8	12	--
14	7214	250	31.00	18.75	21.00	1.38	14.00	13.00	3.63	23.25	1	12	--
16	7216C	250	36.00	21.25	23.50	1.43	16.00	14.25	5.25	25.25	1	16	--
18	7218C	250	40.00	22.75	25.00	1.56	18.00	15.25	5.13	28.25	1 1/8	16	--
20	7220	250	40.00	25.00	27.50	1.68	20.00	16.88	3.50	30.63	1 1/8	20	--
24	7224	250	48.00	29.50	32.00	1.88	24.00	19.25	5.00	36.00	1 1/4	20	--
30	7230	150	56.00	36.00	38.75	2.13	30.00	23.00	5.75	45.88	1 1/4	28	--
30	7230A	250	56.00	36.00	38.75	2.13	30.00	23.00	5.75	45.88	1 1/4	28	--
36	7236	150	63.00	42.75	46.00	2.38	36.00	27.38	3.88	55.00	1 1/2	32	4
36	7236A	250	63.00	42.75	46.00	2.38	36.00	27.38	3.88	55.00	1 1/2	32	8
42	7242	150	70.00	49.50	53.00	2.63	42.00	36.88	0.13	60.18	1 1/2	36	10
42	7242A	250	70.00	49.50	53.00	2.63	42.00	36.88	0.13	60.18	1 1/2	36	10
48	7248	150	76.00	56.00	59.50	2.75	48.00	40.66	0.13	68.00	1 1/2	44	12
48	7248A	250	76.00	56.00	59.50	2.75	48.00	40.66	0.13	68.00	1 1/2	44	12

Revised 7-28-17 (Rev 10)

SURGEBUSTER CHECK VALVE

DATE 10-17-08

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VMC-7202

SURGEBUSTER® SWING CHECK VALVE

SERIES NO. 7200 & 7200A ANSI CLASS 125

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1	BODY	DUCTILE IRON ASTM A536, GRADE 65-45-12 (250 CWP)
	BODY	CAST IRON ASTM A126, CLASS B (150 CWP)
2	COVER	DUCTILE IRON ASTM A536, GRADE 65-45-12 (250 CWP)
	COVER	CAST IRON ASTM A126, CLASS B (150 CWP)
3	DISC	BUNA-N W/ ALLOY STEEL & NYLON REINFORCEMENT
4	COVER SEAL (4"-48")	BUNA-N ASTM D2000
	COVER SEAL (2"-3")	COMPRESSED NON-ASBESTOS FIBER
5A	COVER BOLT	STAINLESS STEEL ASTM F593, T316
5B	COVER BOLT NUT (4"-12")	STAINLESS STEEL ASTM F594, T316
5C	WASHER	STAINLESS STEEL, T316
13	DISC ACCELERATOR	STAINLESS STEEL, TYPE 302

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

Revised 7-29-16

MATERIALS OF CONSTRUCTION

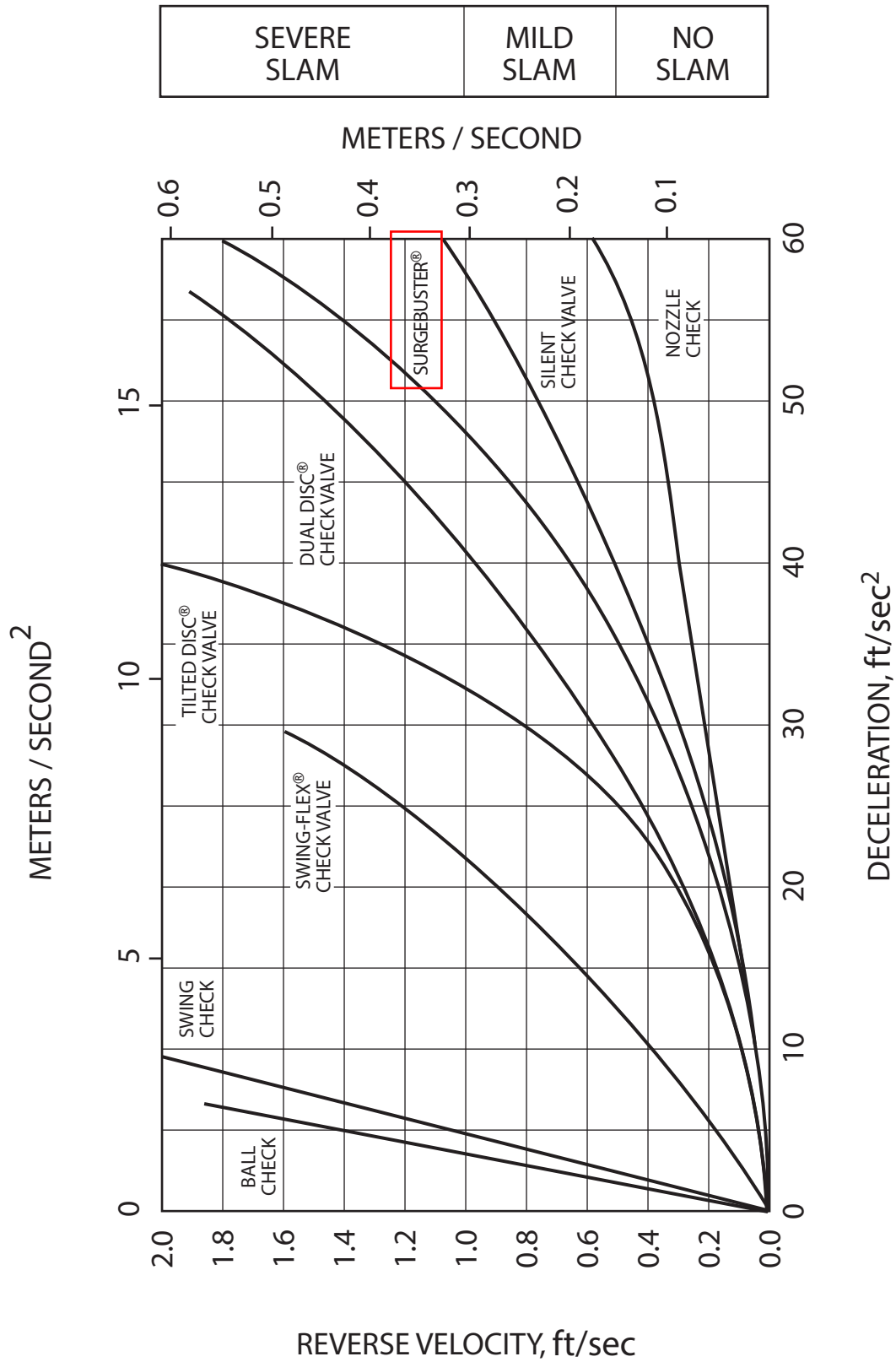
DATE 5/21/03



VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-7202-M



THE ABOVE GRAPHS ARE BASED ON INDEPENDENT LABORATORY TEST DATA ON 8" VALVES.
 THE BALL AND SWING GRAPHS ARE FROM "FLUID TRANSIENTS IN PIPELINE SYSTEMS", THORLEY (1991)
 THE NOZZLE GRAPH IS FROM A NOREVA DN 200 NRV-ZK-1.50.

Revised 6-25-15

DYNAMIC CHARACTERISTICS OF VARIOUS CHECK VALVES

DATE 3-7-03

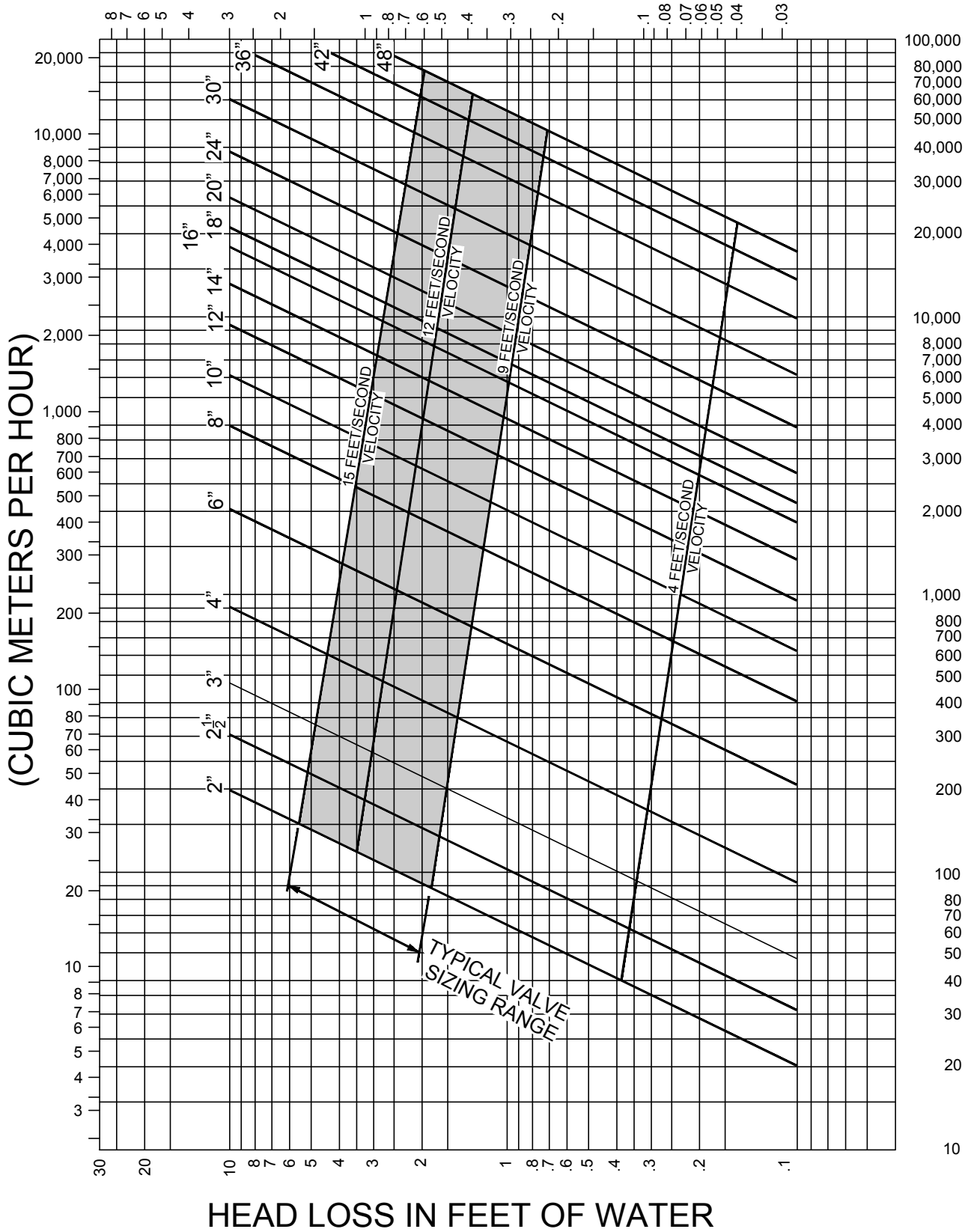


VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-1886

(METERS OF WATER)



SIZE	2	2 1/2	3	4	6	8	10	12	14	16	18	20	24	30	36	42	48
Cv	95	155	225	440	1,040	1,900	3,050	4,600	6,600	8,700	11,200	14,200	21,000	33,500	50,000	68,000	88,800

Revised 9-12-17

HEAD LOSS CHART FOR SURGEBUSTER CHECK VALVES

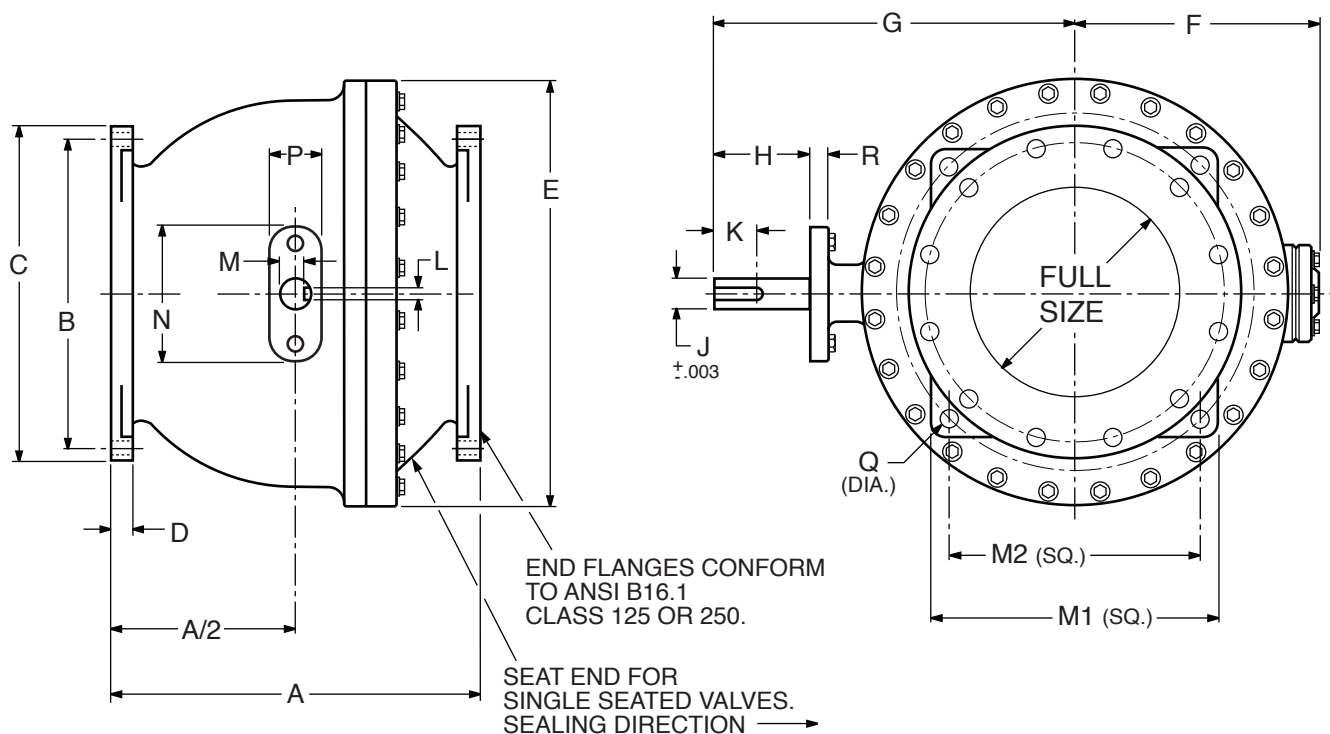
DATE 8-18-06



VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-2196



FOR VALVE CONSTRUCTION SEE DRWG. VM-4106

DIMENSIONS, INCHES

VALVE SIZE	AWWA PRESS. CLASS	A	B	C	D	E	F	G	H	J	K	L	M1	M2	M	N	P	Q	R	SHPG. WT.
4	150	12.38	7.50	9.00	0.94	11.75	7.25	9.56	2.18	1.125	1.25	.250	8.25	7.11	0.986	4.00	1.88	0.75	1.00	129
	300	13.00	7.88	10.00	1.25	11.75	7.25	10.81	3.18	1.125	2.25	.250	9.25	7.87	0.986	4.00	1.88	0.88	1.00	146
6	150	15.75	9.50	11.00	1.00	14.63	8.50	11.56	2.41	1.125	1.25	.250	10.13	8.57	0.986	5.75	2.25	0.88	1.00	202
	300	16.00	10.63	12.50	1.25	14.88	9.50	13.18	3.44	1.125	2.25	.250	11.31	9.63	0.986	5.75	2.25	0.88	1.00	245
8	150	18.00	11.75	13.50	1.13	17.75	10.38	13.25	2.75	1.500	1.50	.375	12.00	10.34	1.289	5.75	2.25	0.88	1.00	337
	300	18.00	13.00	15.00	1.63	18.00	11.75	15.68	3.88	1.500	2.25	.375	13.25	11.49	1.289	8.00	—	1.00	1.00	394
10	150	19.50	14.25	16.00	1.19	21.13	12.38	16.56	3.69	2.000	2.00	.500	14.25	12.20	1.718	8.00	3.50	1.00	1.00	538
	300	21.13	15.25	17.50	1.88	21.63	13.88	16.81	3.69	2.000	2.00	.500	15.25	13.34	1.718	8.00	3.50	1.13	1.00	655
12	150	21.00	17.00	19.00	1.25	24.13	14.38	17.94	3.69	2.000	2.00	.500	16.63	14.32	1.718	8.00	3.50	1.00	1.00	730
	300	24.00	17.75	20.50	2.00	24.63	16.50	20.63	4.94	2.000	3.00	.500	17.68	15.55	1.718	11.00	—	1.25	1.00	898
14	150	26.25	18.75	21.00	1.38	27.50	16.38	21.31	4.06	2.000	2.00	.500	18.50	15.82	1.718	11.00	—	1.13	1.00	1084
	300	27.75	20.25	23.00	2.13	27.75	18.75	22.25	4.50	2.500	2.50	.625	19.75	17.32	2.148	11.00	—	1.38	1.00	1251
16	150	27.00	21.25	23.50	1.44	30.60	18.63	23.25	4.50	2.500	2.50	.625	20.25	17.59	2.148	11.00	—	1.13	1.00	1395
	300	28.13	22.50	25.50	2.25	31.44	21.75	26.38	5.75	2.500	3.75	.625	21.68	19.18	2.148	11.00	—	1.38	1.00	1678
18	150	30.00	22.75	25.00	1.56	33.88	20.38	24.00	4.88	2.500	2.50	.625	21.75	18.74	2.148	11.00	4.38	1.25	1.00	1818
	300	31.00	24.75	28.00	2.38	34.50	23.63	26.44	3.69	3.000	3.00	.750	23.88	20.94	2.577	10.50	—	1.38	2.25	2214
20	150	32.00	25.00	27.50	1.69	36.75	21.88	27.50	6.13	2.500	3.75	.625	23.68	20.50	2.148	11.00	4.38	1.25	1.12	2348
	300	34.00	27.00	30.50	2.50	37.38	25.81	29.81	4.44	3.000	3.75	.750	25.75	22.71	2.577	10.50	—	1.38	2.25	2804

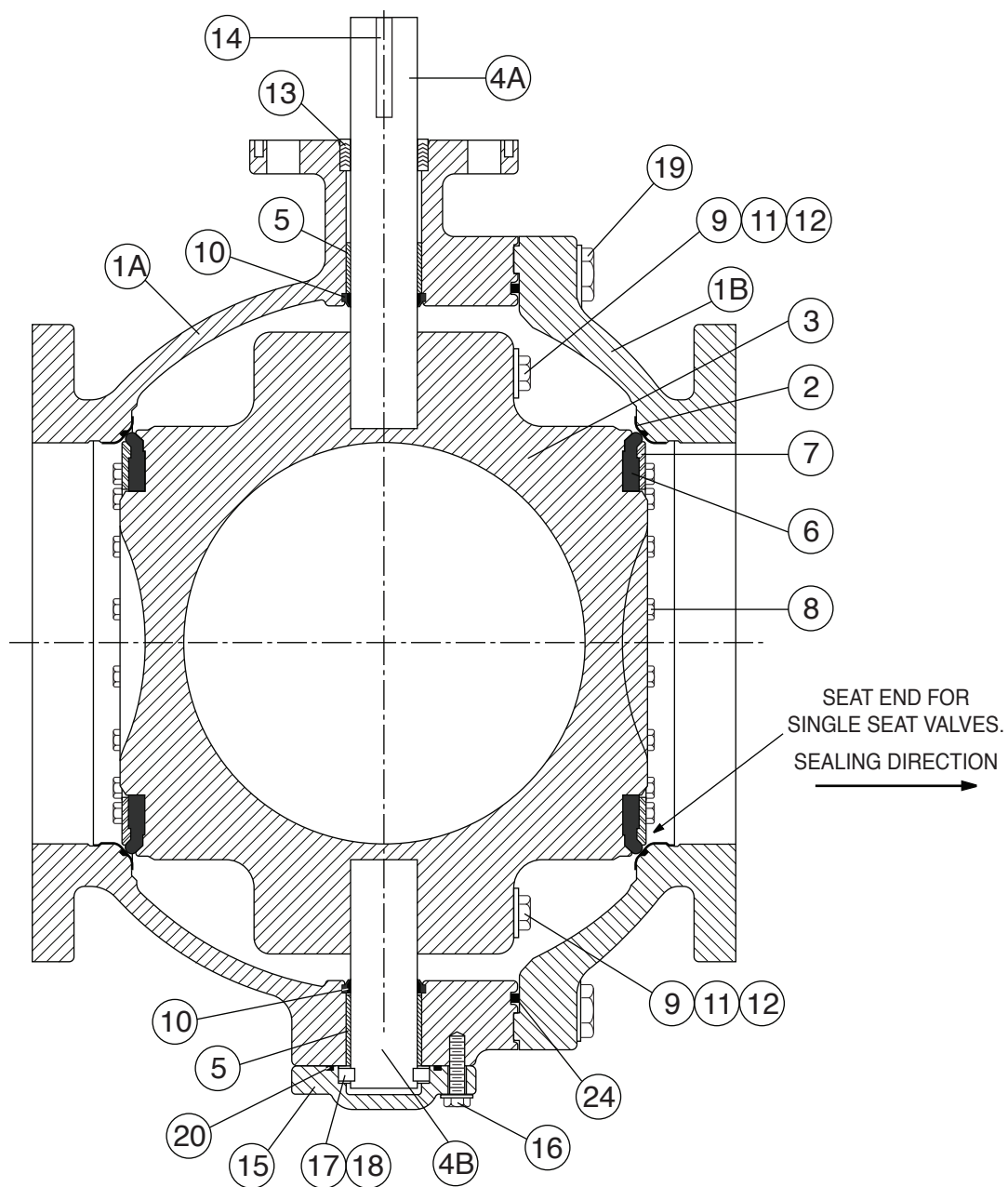
Revised 1-16-15 (Rev 2)

AWWA FLANGED BALL VALVE WITH BARE STEM

DATE 2-8-10

VAL-MATIC® VALVE AND MANUFACTURING CORP.

DRWG. NO. VM-4104/BS



1. VALVES CONFORM TO AWWA STANDARD C-507, LATEST EDITION.
2. SEE DRAWING VM-4104-M FOR STANDARD MATERIALS OF CONSTRUCTION.

Revised 4-26-12

4" - 48" AWWA FLANGED BALL VALVE CONSTRUCTION

DATE 5-6-11

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-4104

BALL VALVE

4"- 48" AWWA CLASS 150 AND 300 SERIES 4000

STANDARD MATERIALS OF CONSTRUCTION

<u>PART NO.</u>	<u>PART NAME</u>	<u>MATERIAL</u>
1A, 1B	BODY (CLASS 150) BODY (CLASS 300)	CAST IRON ASTM A126, CLASS B DUCTILE IRON ASTM A536, GRADE 65-45-12
2	BODY SEAT	STAINLESS STEEL ASTM A240, T316
3	BALL (CLASS 150) BALL (CLASS 300)	CAST IRON ASTM A126, CLASS B DUCTILE IRON ASTM A536, GRADE 65-45-12
4A, 4B	SHAFT (CLASS 150) SHAFT (CLASS 300)	STAINLESS STEEL ASTM A276, T304 OR STAINLESS STEEL ASTM A564, T630
5	SLEEVE BEARING	TEFLON-LINED, FIBERGLASS BACKED
6	RESILIENT SEAT	RESILIENT, ASTM D2000
7	SEAT RETAINING RING	STAINLESS STEEL ASTM A743, GRADE CF8M
8	NYLOK [®] CAP SCREWS	STAINLESS STEEL ASTM F593, T316
9	TAPER PIN	STAINLESS STEEL ASTM A582, T416
10	GRIT SEAL	MOLYTHANE
11	TAPER PIN NUT	STAINLESS STEEL ASTM F593, T316
12	TAPER PIN WASHER	STAINLESS STEEL ASTM A276, T316
13	PACKING, V-TYPE	BUNA-N
14	KEY	CARBON STEEL
15	THRUST BEARING CAP	CAST IRON ASTM A126, CLASS B
16	CAP SCREWS	CARBON STEEL, ZINC PLATED
17	THRUST BEARING SHIMS	BRASS
18	THRUST BEARING	BRONZE ASTM B763, ALLOY C99500
19	BODY BOLTS	CARBON STEEL, ZINC PLATED
20	CAP O-RING	RESILIENT, ASTM D2000
24	BODY O-RING	RESILIENT, ASTM D2000

NYLOK IS A REGISTERED TRADE MARK OF THE NYLOK FASTENER CORPORATION.

NOTE: ALL SPECIFICATIONS AS
LAST REVISED.

MATERIALS OF CONSTRUCTION

DATE 5/6/11

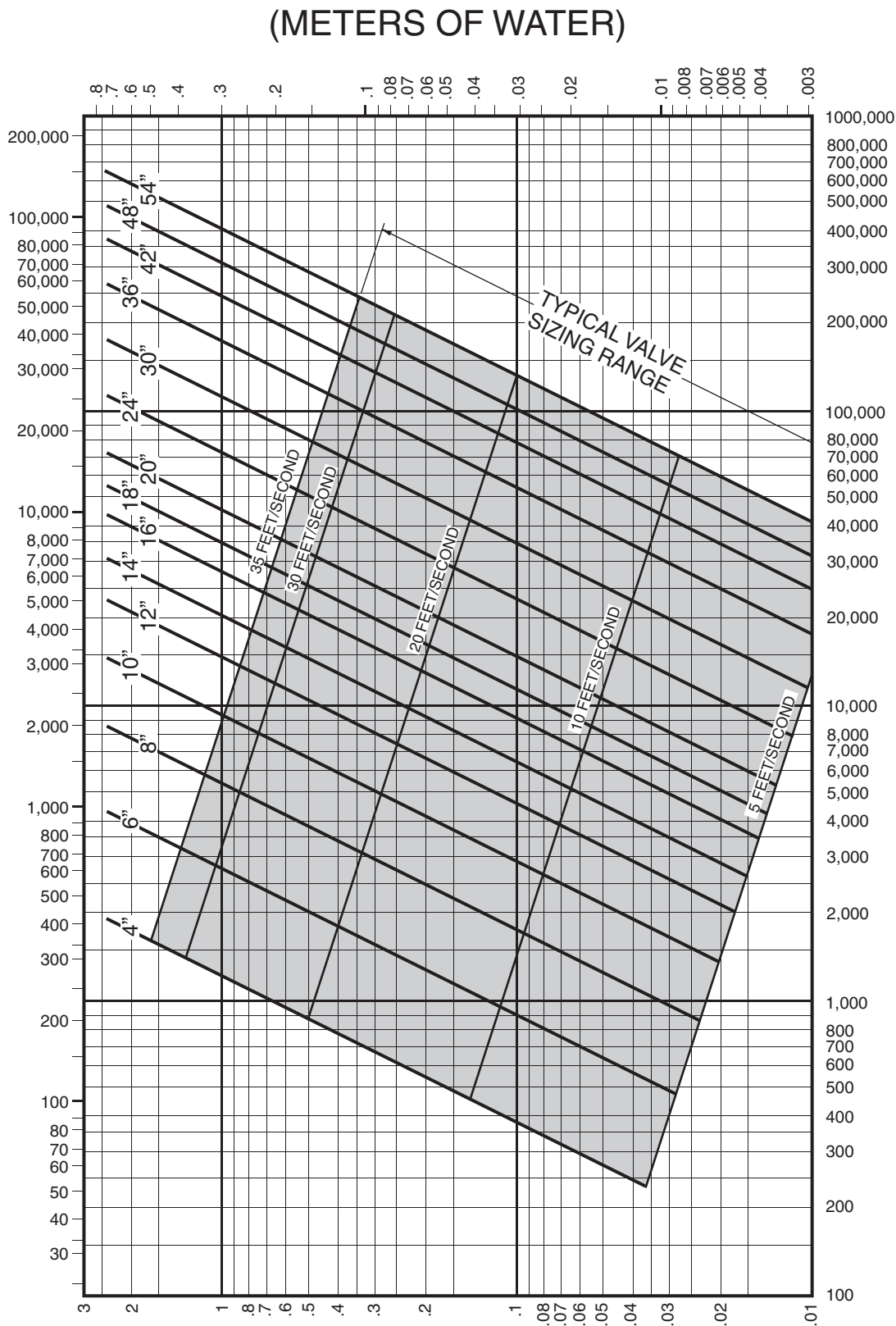


VALVE AND MANUFACTURING CORP.

DRWG. NO.

VM-4104-M

(CUBIC METERS PER HOUR)



FLOW OF WATER IN GALLONS PER MINUTE

SIZE	4	6	8	10	12	14	16	18	20	24	30	36	42	48	54
Cv	1,910	4,310	8,520	14,700	22,800	30,500	42,700	56,100	70,500	106,000	172,000	257,000	369,000	480,000	620,000

Revised 8-19-16

HEAD LOSS CHART FOR CLASS 150 AND 300 BALL VALVE

DATE 4-23-08

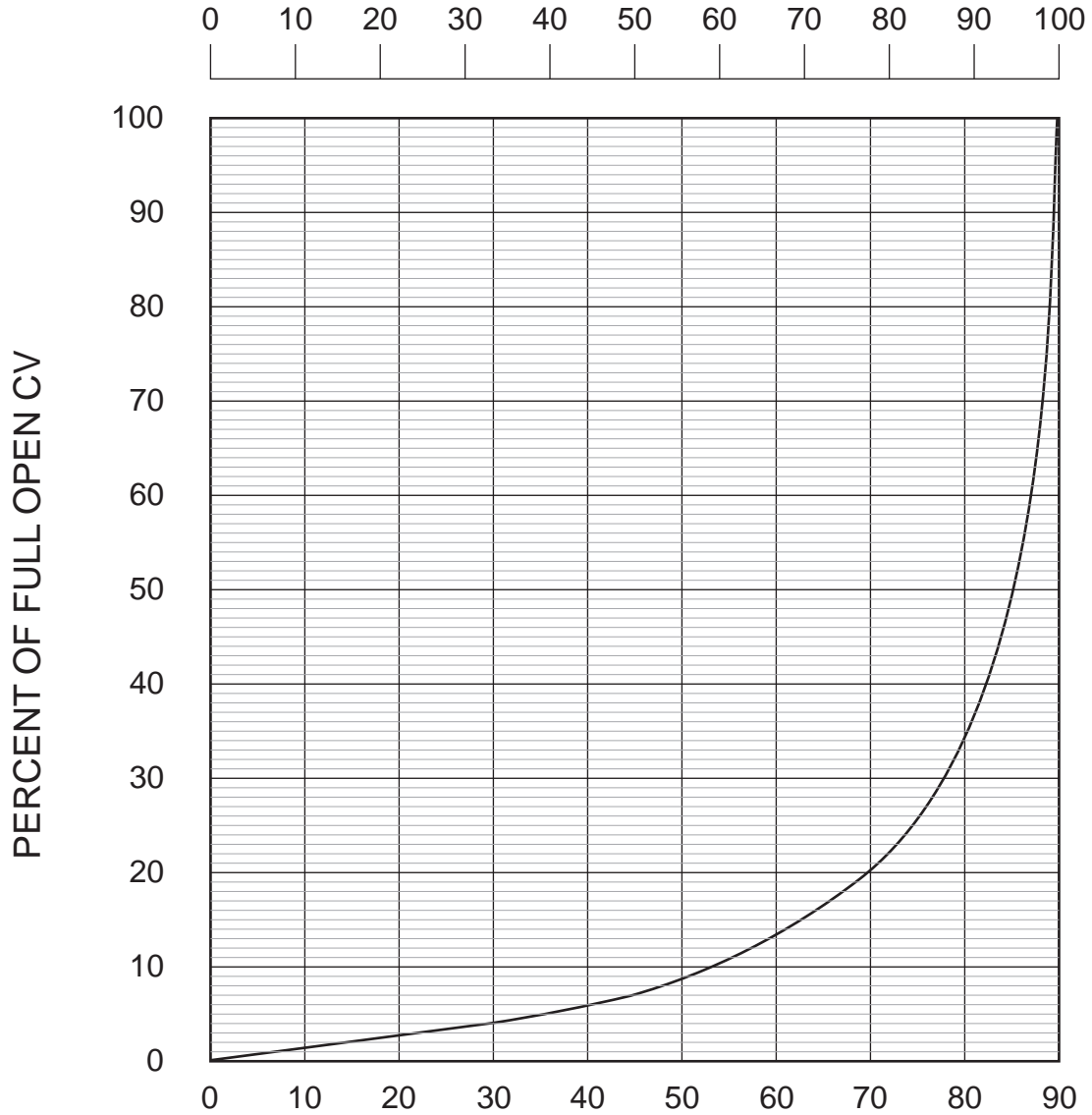
VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-2285

BALL POSITION (PERCENT OPEN)



BALL POSITION (DEGREES FROM CLOSED POSITION)

THE ABOVE GRAPH IS BASED ON INDEPENDENT LABORATORY TEST DATA.

FLOW CHARACTERISTICS OF SERIES 4000 BALL VALVES

DATE 6-17-08

VAL-MATIC®

VALVE AND MANUFACTURING CORP.

DRWG. NO.

SS-2298

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

Quotation

Customer Reference: **RFQ**

AUMA Quote: **Q000062611** Rev: **0**

Item: 1 - GS100.3/

QUOTATION

AUMA product	Quarter-turn manual gearbox
Rated output torque [lbs.ft.]	3,685
Rated output torque [inch.lbs.]	44,220
Rated output torque [Nm]	5,000
Approximate weight (lbs.)	85

SERVICE CONDITIONS

Version	Weather-proof (non-hazardous location)
Operating mode	Manual operation
Enclosure protection	IP68
Color	AUMA silver-grey (similar to RAL 7037)
Ambient temperature	-40 °C to +80 °C (-40 °F to +176 °F)
Nameplates	English - aluminum (US-AL)
Corrosion protection	KS

GS GEARBOX

GS model	GS 100.3
Reduction ratio i	126:1
Mechanical adv.	42.8
Valve coupling	Machined valve shaft coupling, bore plus one keyway
Explosion protection	(M000) without
Swing angle	92 degrees, adjusted at factory
Turns for 90°	31.5
Version	RR: input shaft clockwise, clockwise rotation of the valve shaft
Valve attachment	FA16 according to MSS SP-101 without spigot
Housing material	Cast iron housing GJL-250
Worm wheel material	Spheroidal ductile cast iron worm wheel
Duty class	DC2
Gearbox input	(F10-EW30) F10, input shaft Ø=30mm
Manual operator	Without
Lubricant	F15 Shell ALVANIA 1029, or F26 Renolit AR
Enclosure	IP68-8 - continuous submersible duty, max. 26' (8m) head of water, with pointer cover

DRAWINGS

ACTUATOR DIMENSIONAL DWG	DDS00E41000120000
OUTPUT DRIVE/MOUNTING FLANGE DWG	SK099241

OPERATION MANUALS

GEARBOX OPERATION MANUAL	(click here)
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Quotation

Customer Reference: **RFQ**

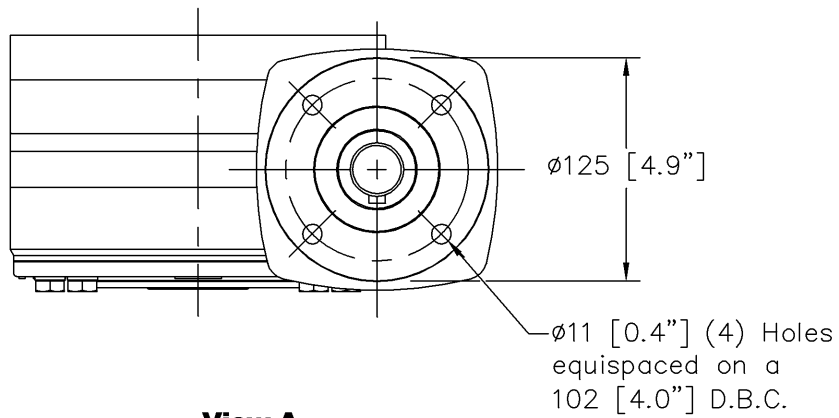
AUMA Quote: **Q000062611** Rev: **0**

Item: 2 - WSH10.2 LIMIT SWITCH

WSH10.2
2 limit switches
F10 output drive.
B3D drive
2" operating nut
KS protection
120/1/60 externally supplied

Notes:

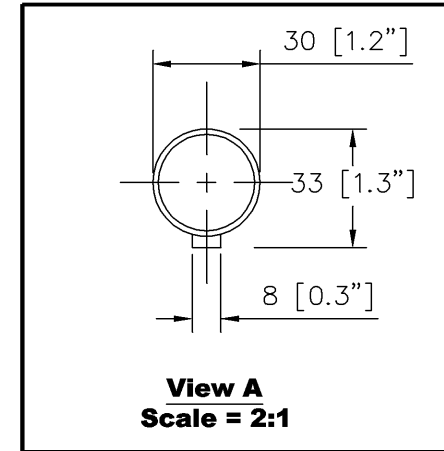
1. Metric tolerance per ISO 2768-m.
Dimensions in brackets [] are in inches and rounded to one decimal place.
2. See appropriate mounting flange drawing for detail.
3. Buried service cover - 154mm [6.1"].
4. See appropriate drawing for manual operator details.



View A

Note 4

Handwheel Base



259 [10.2"]

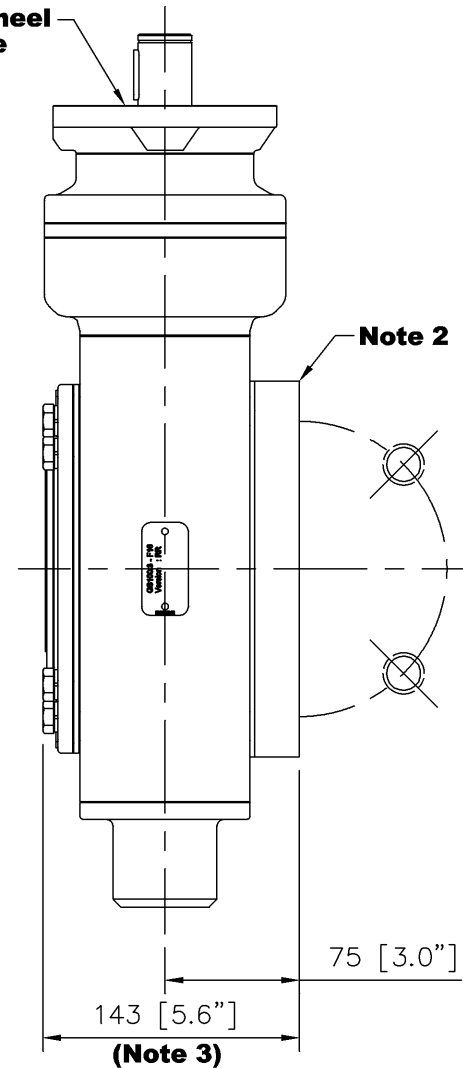
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189 [7.4"]

105 [4.1"]

100 [3.9"]

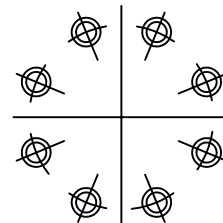
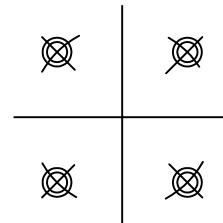
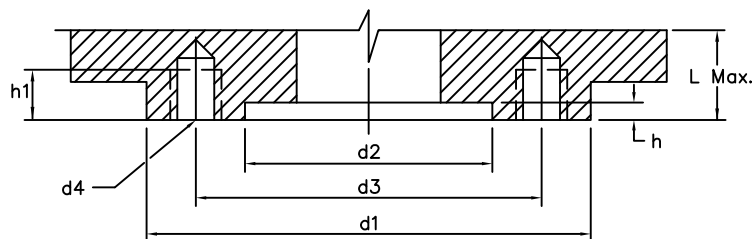
148 [5.8"]



75 [3.0"]

143 [5.6"]

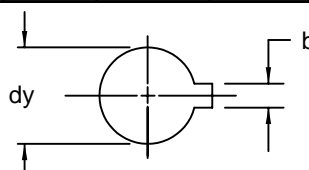
FA10 – FA40



GEARBOX MODEL	FLANGE TYPE	d1	d2 (H8)	d3 ± 0.01	(qty.)d4	h	h1	L MAX.	SQ. KEY		RECT. KEY	
									b	dy max.	b	dy max.
GS50.3	FA10	4.9	3.346	4.00	(4) 3/8-16	0.157	0.63	2.48	3/8	1 7/16	3/8 X 1/4	1 1/2
GS63.3 ⁽⁵⁾	FA10	4.9	3.346	4.00	(4) 3/8-16	0.157	0.63	2.95	1/2	1 7/8	1/2 X 3/8	2
GS63.3	FA12	5.9	4.134	4.92	(4) 1/2-13	0.157	0.75	3.07	1/2	1 7/8	1/2 X 3/8	2
GS80.3 ⁽⁵⁾	FA12	5.9	4.134	4.92	(4) 1/2-13	0.157	0.75	3.15	5/8	2 3/8	5/8 X 7/16	2 1/2
GS80.3	FA14	6.9	4.527	5.51	(4) 5/8-11	0.197	0.98	3.54	5/8	2 3/8	5/8 X 7/16	2 1/2
GS100.3 ⁽⁵⁾	FA14	6.9	4.528	5.51	(4) 5/8-11	0.197	0.98	4.92	3/4	3	3/4 X 1/2	3 1/8
GS100.3	FA16	8.3	5.512	6.50	(4) 3/4-10	0.197	1.26	4.92	3/4	3	3/4 X 1/2	3 1/8
GS125.3 ⁽⁵⁾	FA16	8.3	5.512	6.50	(4) 3/4-10	0.197	1.26	5.04	7/8	3 3/8	7/8 X 5/8	3 5/8
GS125.3	FA25	11.8	8.858	10.00	(8) 5/8-11	0.197	0.98	5.04	7/8	3 3/8	7/8 X 5/8	3 5/8
GS160.3	FA25	11.8	7.874	10.00	(8) 5/8-11	0.236	1.00	5.24	1	4	1 X 3/4	4 3/16
GS125.3 ⁽⁵⁾	FA30	13.8	9.055	11.75	(8) 3/4-10	0.236	1.26	5.83	1	4	1 X 3/4	4 3/16
GS160.3 ⁽⁵⁾								6.30	1 1/4	5	1 1/4 X 7/8	5 1/4
GS200.3								7.50	1 1/4	5	1 1/4 X 7/8	5 1/4
GS200.3 ⁽⁵⁾	FA35	16.3	10.236	14.00	(8) 1-8	0.236	1.57	9.20	1 1/2	5 3/4	1 1/2 X 1	6
GS250.3								9.20	1 1/2	5 3/4	1 1/2 X 1	6
GS250.3 ⁽⁵⁾	FA40	18.7	11.811	16.00	(8) 1 1/4-7	0.393	2.00	9.65	1 1/2	5 3/4	1 1/2 X 1	6
GS315	FA40	18.7	11.811	16.00	(8) 1 1/2-6 ⁽⁴⁾	0.393	2.00	9.10	1 3/4	7 1/8	1 3/4 X 1 1/2	7 1/4

Notes:

1. All dimensions are in inches.
2. Unless specified tolerance per ISO 2768-m.
3. FA Flange per MSS STANDARD SP-101 unless otherwise noted.
4. FA40 Thread size 1 1/2-6 not per MSS STANDARD SP-101.
5. Optional FA Mounting Flange.



DIMENSIONS 'b' BASED
ON ANSI B17.1
AT MAX. BORE 'dy'

STANDARD FA MOUNTING FLANGE DIMENSIONS

GS50.3 - GS315

BY/DATE
JP
05/04/17

APP/DATE
MS
05/04/17

DWG. NO.

SK099241

REV
8

Type	Output torque	Valve attachment		Handwheel	
	max. Nm	Standard EN ISO 5210	Option DIN 3210	Diameter mm	Reduction ratio
WSH/WSHEx 10.2	170	F10	G0	400	1 : 1
WSH/WSHEx 14.2	400	F14	G1/2	400/500	1 : 1
WSH/WSHEx 16.2	800	F16	G3	630	1 : 1

Limit switches

Versions		
	Application/description	Type of contact
Single switch	Standard	One NC and one NO contact
Tandem switch (option)	For switching two different potentials. The switches have two compartments with galvanically isolated switches in a common sealed housing. The two switches are operated together; one switch is leading and should be used for signalisation.	Two NC and two NO contacts
Triple switches (option)	For applications where three different potentials are to be switched. The switch consists of one single and one tandem switch.	Three NC and three NO contacts

Rated power			
Type of current	Switch rating I_{max}		
	30 V	125 V	250 V
AC (inductive load) $\cos \varphi = 0.8$	5 A	5 A	5 A
DC (resistive load)	2 A	0.5 A	0.4 A
With gold-plated contacts (recommended for controls with low voltages < 30 V/100 mA)			
Voltage	min 5 V, max. 50 V		
Current	min 4 mA, max. 400 mA		

Contacts - other features	
Operation	Via lever
Contact element	Two snap action contacts

Contacts - other features	
Contact material	Silver (standard), gold (option)

Remote position transmitter

Precision potentiometer		
	Single	Tandem
Linearity	$\leq 1\%$	
Power	0.5 W	
Resistance (standard)	0,2 k Ω	0.2/0.2 k Ω

Precision potentiometer		
	Single	Tandem
Resistance (option)	0.1 k Ω , 0.5 k Ω , 1.0 k Ω , 5.0 k Ω	0.5/0.5 k Ω , 1,0/1.0 k Ω , 5.0/5.0 k Ω , 0.2/5.0 k Ω

Electronic remote position transmitter RWG		
Output signal		Power supply
2-wire 4 – 20 mA	3/4-wire 0/4 – 20 mA	
		24 V DC, $\pm 15\%$ smoothed

Electrical connection

AUMA plug/socket connector - not Ex

	Protective earth	Control contacts
No. of contacts max.	1 (leading contact)	50 pins/sockets
Designation	PE	1 to 50
Connecting voltage max.	–	250 V
Type of customer connection	Screw for ring lug	Screw, crimping (option)
Cross section max.	6 mm ²	2.5 mm ²
Material - pin socket carrier	Polyamide	Polyamide
Material - contacts	Brass	Brass, tin plated or gold plated (option)

Terminal frame with terminal blocks - explosion-proof

	Protective earth	Terminals
No. of contacts max.	1 (leading contact)	36
Designation	PE	1 to 36
Connecting voltage max.	–	250 V
Type of customer connection	Screw for ring lug	Cage clamp
Cross section max.	10 mm ²	2,5 mm ² flexibel, 4 mm ² massiv

Thread dimensions of cable entries (selected choice)

	Plug cover S	Plug cover SH
M-threads (standard)	1 x M20 x 1.5/1 x M25 x 1.5/1 x M32 x 1.5	1 x M20 x 1.5/2 x M25 x 1.5/1 x M32 x 1.5
Pg-threads (option)	1 x Pg 13.5; 1 x Pg 21; 1 x Pg 29	1 x Pg 13.5; 2 x Pg 21; 1 x Pg 29
NPT-threads (option)	2 x ¾" NPT; 1 x 1¼" NPT	1 x ¾" NPT; 2 x 1" NPT; 1 x 1¼" NPT
G-threads (option)	2 x G ¾"; 1 x G 1¼"	1 x G ¾"; 2 x G 1"; 1 x G 1¼"

Heater

Heater in control unit to reduce condensation (standard)

Heating element	Self-regulating PTC element
Voltage ranges	110 V – 250 V DC/AC 24 V – 48 V DC/AC (option)
Power	5 W – 20 W

76F-100-A SERIES

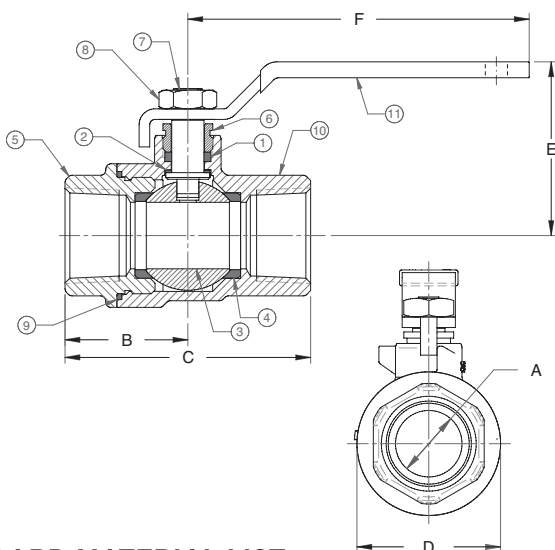
STAINLESS STEEL FULL PORT BALL VALVE



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)

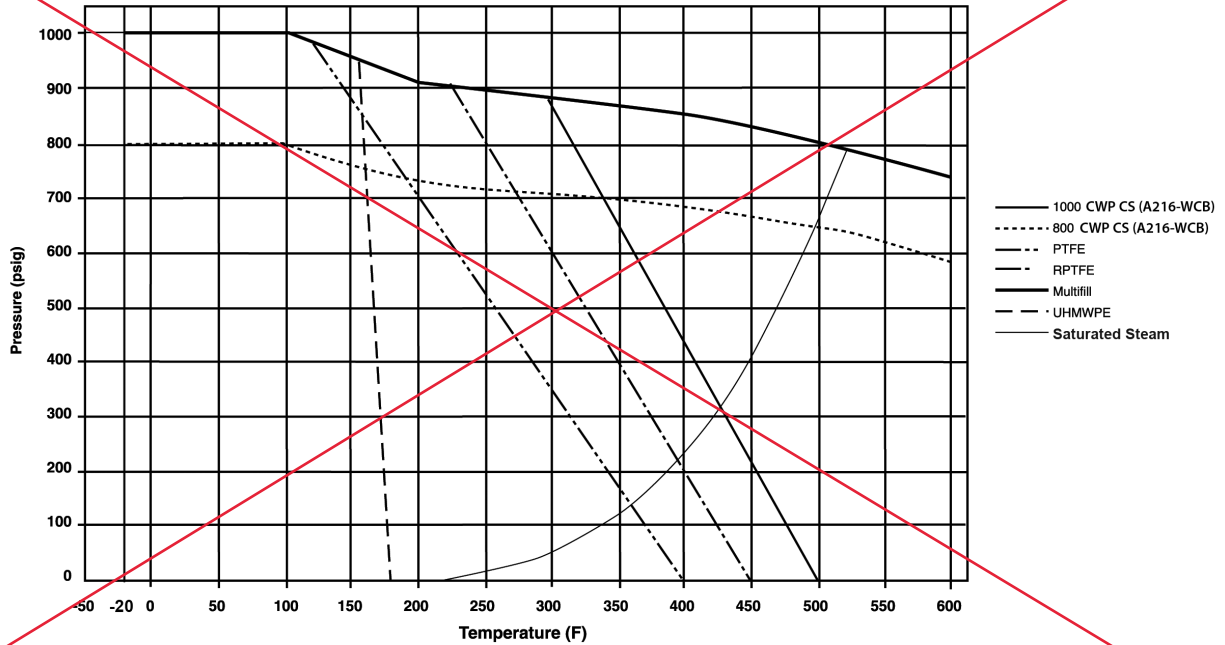
VALVE	SIZE (IN.)														
	1/4	3/8	1/2	3/4	1	1.25	1.5	2	2.5	3	4	6	8	10	12
70B-140 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-100/200 Series	8.4	7.2	15	30	43	48	84	108	190	370	670	--	--	--	--
70-300/400 Series	--	--	15	30	43	48	84	108	--	--	--	--	--	--	--
70-600 Series	2.3	4.5	5.4	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

1000 CWP

(CS) ASTM A216-WCB

GRAPH 7



1000 CWP

(SS) ASTM A351-CF8M

GRAPH 8

