

Rev.	By	Rev. Description	Rev. Date	PROJECT INFORMATION										NOTE #	NOTE				
				Customer: INTI Power Inc. Customer PO: 20090811-002 End User: ~ Project: EDC Tacoa Skid Tag: TBD Duplex Gas Fuel Filter Skid IFS Job Number: 24877 IFS Document: VL-2877-01										1	One (1) Unit shown,Two (2) units required.				
A	AP	For Approval	3-Sep-09																
VALVE LIST																			
Seq.	Qty.	Tag Number	Valve Type	Connections			Body Materials of Construction	Trim Materials of Construction	Seats/ Seals/ Packing	Manual Operator Type	Rated Pressure (psig)	Rated Temp. (deg F)	Operating Pressure (psig)	Operating Temp. (deg F)	Service	Reference P&ID	Manufacturer	Model Number	Comments
				(inches)	Type	Class													
1	2	V01	Butterfly Lug Style	3'	RF	300	WCB CARBON STEEL	316SS DISC	17/4 PH SS STEM / RTFE SEAT	Handle	500	250	400	140	Gas Fuel	P-24877	ABZ	422-100-3"	
2	2	V02	Butterfly Lug Style	3"	RF	300	SS	316SS DISC	17/4 PH SS STEM / RTFE SEAT	Handle	500	250	400	140	Gas Fuel	P-24877	ABZ	422-102-3"	
3	20	V03	Ball Valve	3/4"	SW	1973 #	CS	316 SS	R-PTFE SEAT / GRAPHITE SEAL	Handle	500	250	400	140	Gas Fuel	P-24877	QUADRANT	M2RCSRGLWW075	
4	3	V04	Gauge	1/2"	MNPT x FNPT	6000#	A479-316 SS	316 SS	Integral seat,Grafoil Packing	Handle	500	250	400	140	Gas Fuel	P-24877	AGCO	M5 HIS-44	
5	3	V-05	Needle	1/2"	MNPT x FNPT	6000#	316 SS	316 SS	Integral seat,Grafoil Packing	Handle	500	250	400	140	Gas Fuel	P-24877	AGCO	H7 HIS-44Q	
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# Series M2-CS & SS

## 3-Piece Steel Ball Valve



### FEATURES

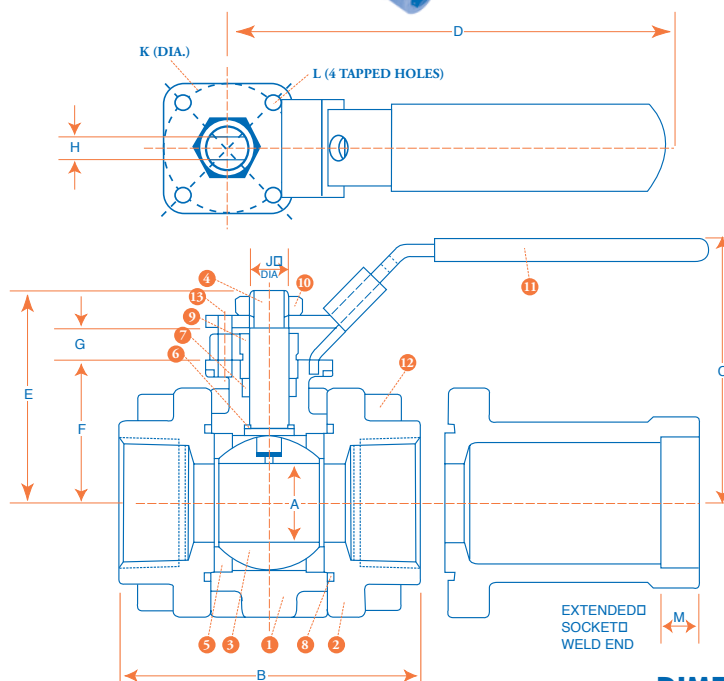
- 3-Piece, 8 Bolt Construction
- ASME B16.34, Class 800 Compliant
- API 608 Compliant
- Fire Safe to API 607 4th Edition & ISO 10497
- NACE MR01-75 Compliant
- ISO 5211 4 Bolt Mounting
- Standard 316SS Ball & Stem
- Standard 304SS Latch Lock Handles
- 1/4"-2" Full Port, 1/2"-2-1/2" Reduced Port
- Extended Socket Weld & Butt Weld Ends Available

### RATINGS

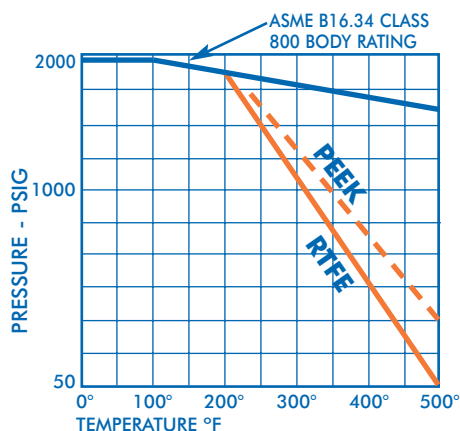
**WCB/T316: 1973 PSIG @ 100°F**  
**CF8M/T316: 1920 PSIG @ 100°F**  
**All Sizes: 250 PSIG WSP**

### MATERIALS OF CONSTRUCTION

PART	QTY.	DESCRIPTION	STANDARD MATERIAL
1	1	BODY	ASTM A351 GR CF8M OR A216 WCB
2	2	TAILPIECE	ASTM A351 GR CF3M OR A216 WCB
3	1	BALL	ASTM A276 GR 316 OR CF8M
4	1	STEM	ASTM A276 GR 316 OR CF8M
5	2	SEAT	TFM (RTFE)
6	1	THRUST WASHER	TFM (RTFE)
7	1	PACKING SET	GRAPHITE
8	2	BODY SEAL	GRAPHITE
9	1	PACKING NUT	ASTM A276 GR 316 SS
10	1	HANDLE NUT	304SS
11	1	HANDLE ASSY	304SS
12	8	BODY BOLT	A193 B8(M2-SS) OR A193 B7(M2-CS)
13	1	HANDLE STOP	304SS



### DIMENSIONS, WEIGHTS, CV FACTORS & MAXIMUM OPERATING TORQUE



SIZE	A (PORT)	B NPTF & STD. SW	B EXTEND SW	C	D	E	F	G	H	J	K DIA	L	M	ISO PATTERN	WT. LBS.	CV	Torque RTFE IN-LBS	Torque PEEK IN-LBS
1/2" RP	0.43	2.7	6.0	2.5	4.0	1.71	1.08	0.31	0.197	0.31	1.42	1/4"-20UNC	0.38	F03	1.7	10	100	
3/4" RP	0.57	3.0	7.0	2.6	4.0	1.83	1.24	0.31	0.197	0.31	1.42	1/4"-20UNC	0.50	F03	2.2	25	200	V03
1" RP	0.81	3.5	7.5	3.0	4.8	2.34	1.50	0.37	0.276	0.44	1.65	1/4"-20UNC	0.50	F04	3.8	42	230	
1-1/4" RP	0.98	3.9	8.0	3.4	5.8	2.69	1.81	0.40	0.315	0.50	1.65	1/4"-20UNC	0.50	F04	5.1	55	250	
1-1/2" RP	1.25	4.5	8.0	3.7	7.5	2.91	1.95	0.43	0.394	0.62	1.97	1/4"-20UNC	0.50	F05	7.1	85	380	
2" RP	1.50	5.0	9.0	3.9	7.5	3.15	2.26	0.35	0.394	0.62	1.97	1/4"-20UNC	0.62	F05	9.8	120	520	
2-1/2" RP	2.00	6.9	N/A	5.3	11.7	4.37	3.11	0.49	0.472	0.75	2.76	5/16"-18UNC	N/A	F07	20.8	300	660	950
1/4"-3/8" FP	0.43	2.7	N/A	2.5	4.0	1.71	1.08	0.31	0.197	0.31	1.42	1/4"-20UNC	N/A	F03	1.7	10	100	
1/2" FP	0.57	2.8	7.0	2.6	4.0	1.83	1.24	0.31	0.197	0.31	1.42	1/4"-20UNC	0.38	F03	2.2	16	200	
3/4" FP	0.81	3.2	7.5	3.0	4.8	2.34	1.50	0.37	0.276	0.44	1.65	1/4"-20UNC	0.50	F04	3.8	40	230	
1" FP	1.00	3.8	8.0	3.4	5.8	2.69	1.81	0.40	0.315	0.50	1.65	1/4"-20UNC	0.50	F04	5.1	62	250	
1-1/4" FP	1.25	4.3	8.0	3.7	7.5	2.91	1.95	0.43	0.394	0.62	1.97	1/4"-20UNC	0.50	F05	7.1	115	380	
1-1/2" FP	1.50	4.8	9.0	3.9	7.5	3.15	2.26	0.35	0.394	0.62	1.97	1/4"-20UNC	0.50	F05	9.8	140	520	
2" FP	2.00	5.7	10.0	5.3	11.7	4.37	3.11	0.49	0.472	0.75	2.76	5/16"-18UNC	0.62	F07	20.8	360	660	950



## SERIES M2-CS & SS

REV. 3/05

### NUMBERING SYSTEM ... HOW TO ORDER:

**M2 F C S R G SL TI 100**

SERIES	PORT SIZE	BODY & TAILPIECE MATERIAL	BALL/STEM MAT'L	SEAT MAT'L	SEAL MAT'L	HANDLE TYPE	ENDS	SIZE
M2	F = FULL R = REDUCED	C = CARBON S = STAINLESS A = ALLOY-20 I = NICKEL	S = 316 STAINLESS A = ALLOY 20 H = HASTELLOY M = MONEL I = NICKEL	R = R-PTFE P = PEEK U = UHMW	R = R-PTFE P = PEEK G = GRAPHITE	SL = STAINLESS LATCH LOCK SO = STAINLESS OVAL LO = STAINLESS LOCKING OVAL PA = DOUBLE ACTING PNEUMATIC SA = SPRING RETURN PNEUMATIC SR = DEADMAN HANDLE XH = EXTENDED TOPWORKS	TT = FNPT MT = MxF NPT MM = MXM NPT WW = SOCKET WELD WT = SOCKET WELD x FNPT BB = SCH. 80 BUTT WELD XX = EXTENDED SOCKET WELD XT = EXTENDED SW x FNPT	025 = 1/4" 038 = 3/8" 050 = 1/2" 075 = 3/4" 100 = 1" 125 = 1-1/4" 150 = 1-1/2" 200 = 2" 250 = 2-1/2"

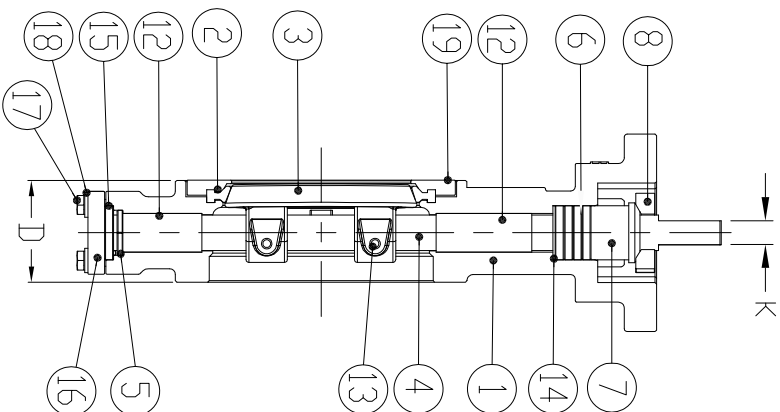
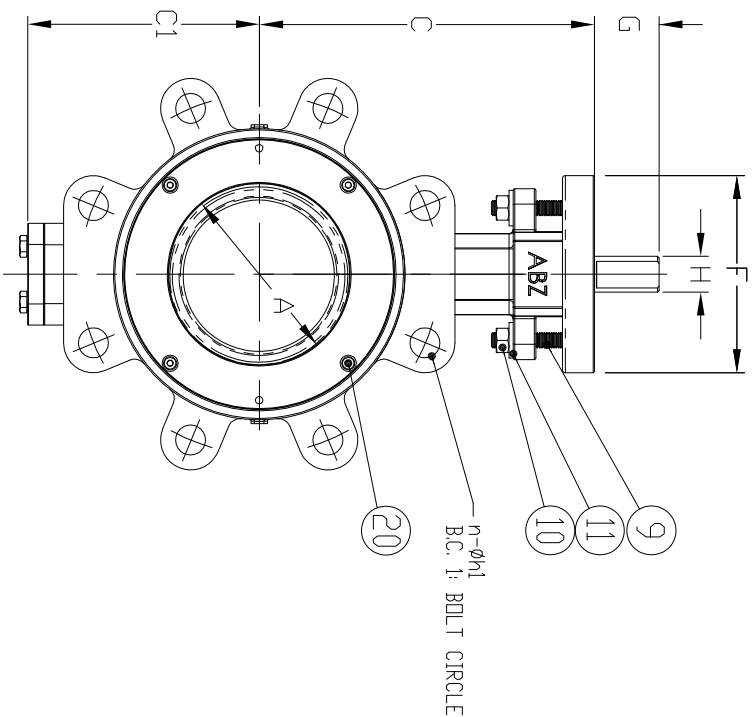
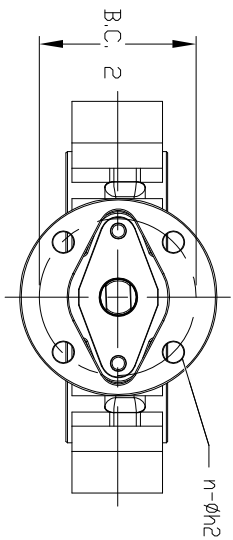


**2" Full Port  
M2-SS**

**1" Full Port  
M2-SS Extended  
Socket Weld  
with C-Series  
Actuator**



**Complete Range  
of Extended  
Socket Weld Tailpieces**



# PARTS SCHEDULE

ITEM NO.	NAME	MATERIAL	QTY.
1	BODY		1
2	SEAT RING		1
3	DISC		1
4	STEM		1
5	RETAINER RING		1
6	PACKING		1 SET
7	PACKING GLAND		1
8	GLAND FLANGE		1
9	GLAND BOLT		2
10	NUT		2
11	SPRING WASHER		2
12	BUSH BEARING		2
13	DISC PIN		2
14	PACKING RETAINER		1
15	CAP PACKING		1
16	CAP		1
17	CAP BOLT		4
18	SPRING WASHER		4
19	SEAT RETAINER		1
20	RETAINER BOLT		4

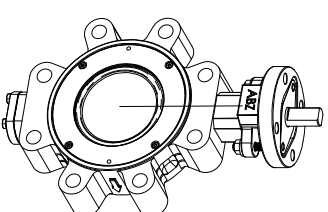
# DIMENSIONS

VALVE SIZE			FLANGE DIMENSION										MOUNTING BASE		
INCH	MM	ØA	C	C1	D	ØF	G	ØH	K	B.C. 1	n	Øh1	B.C. 2	n	Øh2
2	50	1.85	4.92	3.94	1.69	4.02	1.26	.551	.374	5.00	8	5/8"-11 UNC	3.25	4	.43
2.5	65	2.36	5.87	4.02	1.85	4.02	1.26	.626	.437	5.88	8	3/4"-10 UNC	3.25	4	.43
3	80	2.87	6.30	4.41	1.89	4.02	1.26	.626	.437	6.62	8	3/4"-10 UNC	3.25	4	.43
4	100	3.74	7.01	4.88	2.13	4.02	1.26	.748	.500	7.88	8	3/4"-10 UNC	3.25	4	.43
5	125	4.69	7.60	5.55	2.25	4.02	1.26	.748	.500	9.25	8	3/4"-10 UNC	3.25	4	.43
6	150	5.47	8.66	6.93	2.32	4.02	1.26	.748	.500	10.62	12	3/4"-10 UNC	3.25	4	.43
8	200	7.36	10.24	8.46	2.88	5.98	2.01	1.126	.25x.25 KEY	13.00	12	7/8"-9 UNC	5.00	4	.55
10	250	9.21	11.42	9.53	3.27	5.98	2.01	1.126	.25x.25 KEY	15.25	16	1"-8 UNC	5.00	4	.55
12	300	10.83	12.80	10.75	3.62	5.98	2.01	1.374	.31x.31 KEY	17.75	16	1 1/8"-8 UNC	5.00	4	.55

V01  
V02

ABZ Valves & Controls

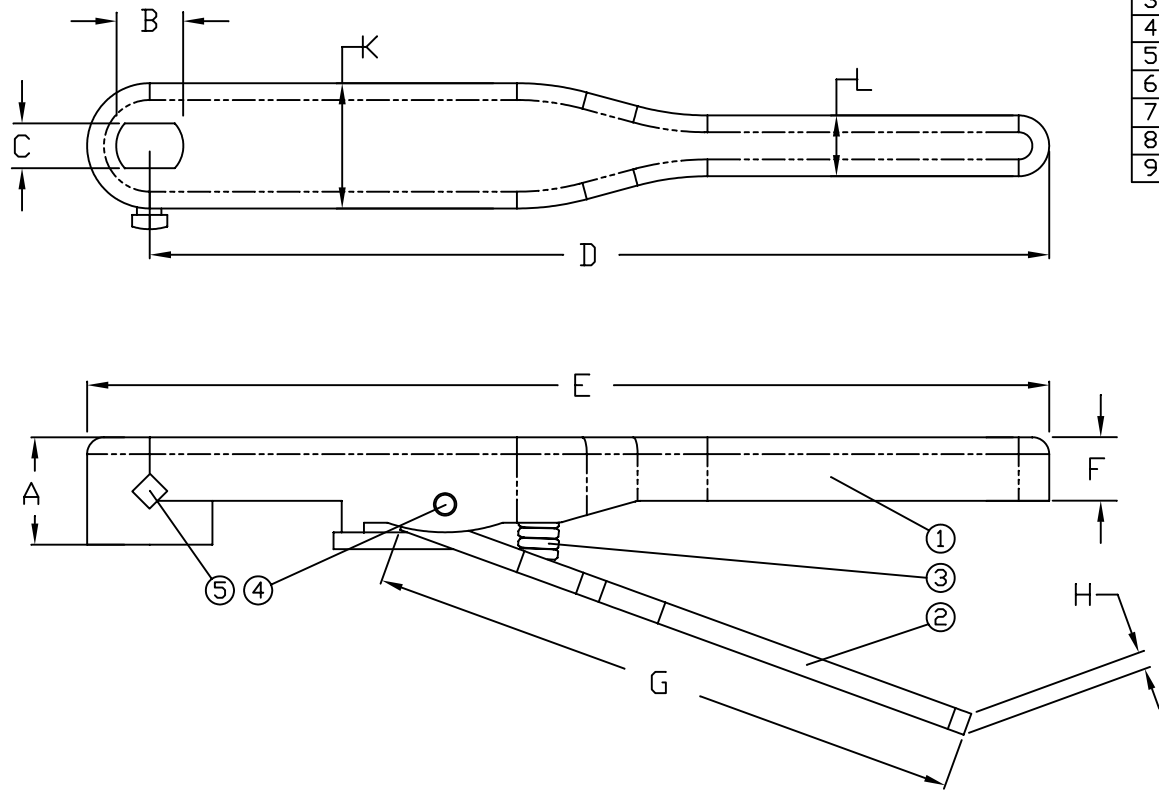
HIGH PERFORMANCE  
2"-12" FIGURE 422 VALVE  
DOUBLE OFFSET  
CLASS 300  
STANDARD LUGGED PATTERN  
DIMENSIONS SUBJECT TO  
CHANGE WITHOUT NOTICE



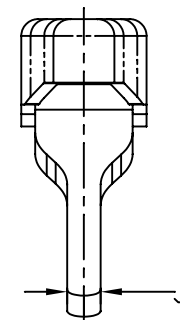
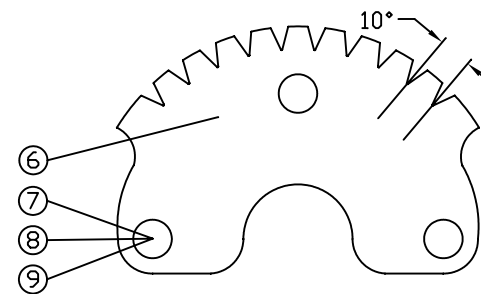
DATE: 06-01-07

REV:2

DRAWING NO. 2-12 300# 422



HANDLE PARTS					
ITEM NO.	NAME	NO. REQ'D	PART NO.	MATERIAL	REMARKS
1	HANDLE	1	202-321	DI	
2	LEVER	1	202-322	DI	
3	SPRING	1	204-323	316 SS	
4	PIN	1	204-324	316 SS	
5	SIDE BOLT	1	211-325	C.P. STEEL	
6	90° NOTCH PLATE	1	211-326	C.P. STEEL	
7	BOLTS	2	211-327	C.P. STEEL	
8	NUTS	2	211-327	C.P. STEEL	
9	WASHERS	2	211-327	C.P. STEEL	



HANDLE DIMENSIONS

HANDLE SUBASSEMBLY NUMBER	A	B	C	D	E	F	G	H	J	K	L	WEIGHT
800-320-020-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-025-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-030-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-040-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-050-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-060-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-060-090-000	1.25	3/4	1/2	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-080-101-000	1.25	3/4	1/2	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS
800-320-080-090-000	1.25	7/8	5/8	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS
800-320-100-101-000	1.25	7/8	5/8	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS
800-320-100-090-000	1.25	1 1/8	RD.	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS
800-320-120-101-000	1.25	1 1/8	RD.	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS
800-320-120-090-000	1.25	1 1/8	RD.	13.77	14.77	0.60	9.38	0.325	0.375	1.72	0.85	4.0 LBS

V01

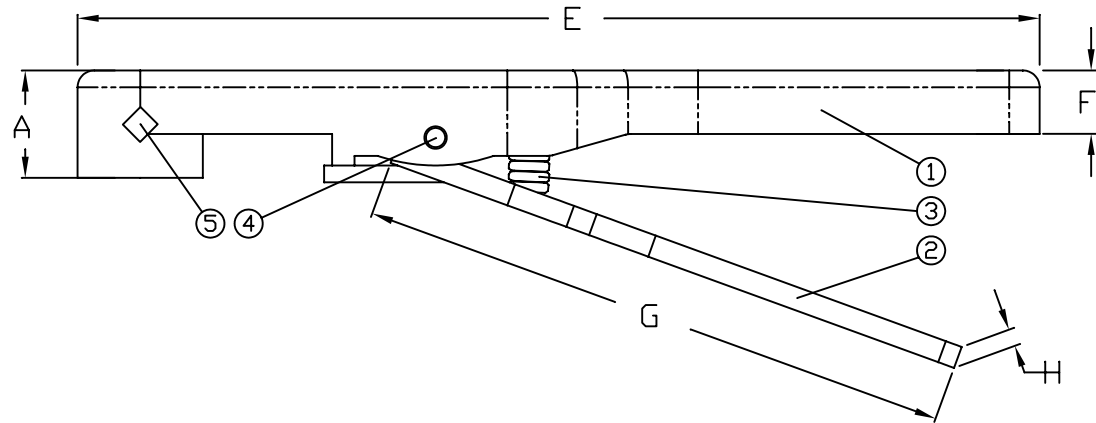
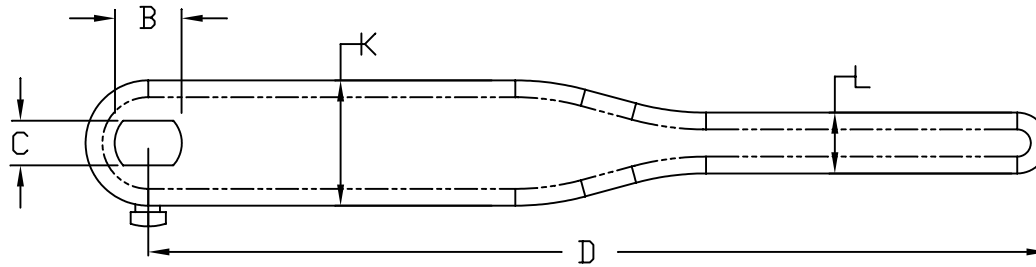


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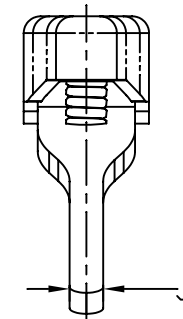
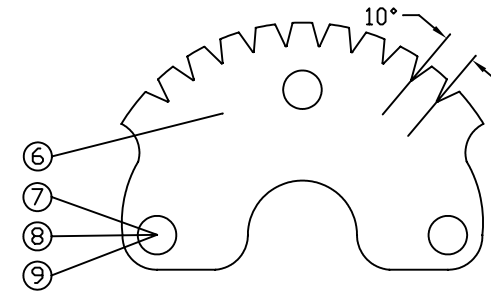
ABZ VALVES & CONTROLS

TITLE:  
STANDARD HANDLE  
ASSEMBLY  
DRIVE HOLE VARIES

SIZE	DWG. NO.	REV
C	HANDLE 1	
DATE:	03-07-05	SHEET 1 OF 1



HANDLE PARTS					
ITEM NO.	NAME	NO. REQ'D	PART NO.	MATERIAL	REMARKS
1	HANDLE	1	202-321	316 SS	
2	LEVER	1	202-322	316 SS	
3	SPRING	1	204-323	316 SS	
4	PIN	1	204-324	316 SS	
5	SIDE BOLT	1	211-325	316 SS	
6	90° NOTCH PLATE	1	211-326	316 SS	
7	BOLTS	2	211-327	316 SS	
8	NUTS	2	211-327	316 SS	
9	WASHERS	2	211-327	316 SS	



HANDLE DIMENSIONS

HANDLE SUBASSEMBLY NUMBER	A	B	C	D	E	F	G	H	J	K	L	WEIGHT
800-320-020-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-025-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-030-101-000	1.25	9/16	3/8	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-040-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-050-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-060-101-000	1.25	5/8	7/16	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS
800-320-060-090-000	1.25	3/4	1/2	10.05	10.75	0.71	6.70	0.26	0.375	1.40	0.68	2.50 LBS



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ABZ VALVES & CONTROLS

TITLE:  
STAINLESS STEEL HANDLE  
ASSEMBLY  
DRIVE HOLE VARIES

SIZE DWG. NO. REV  
C STAINLESS HANDLE

DATE: 06-06-05 SHEET 1 OF 1

V02

## Hard Seated Hand Valves – H7 and H71

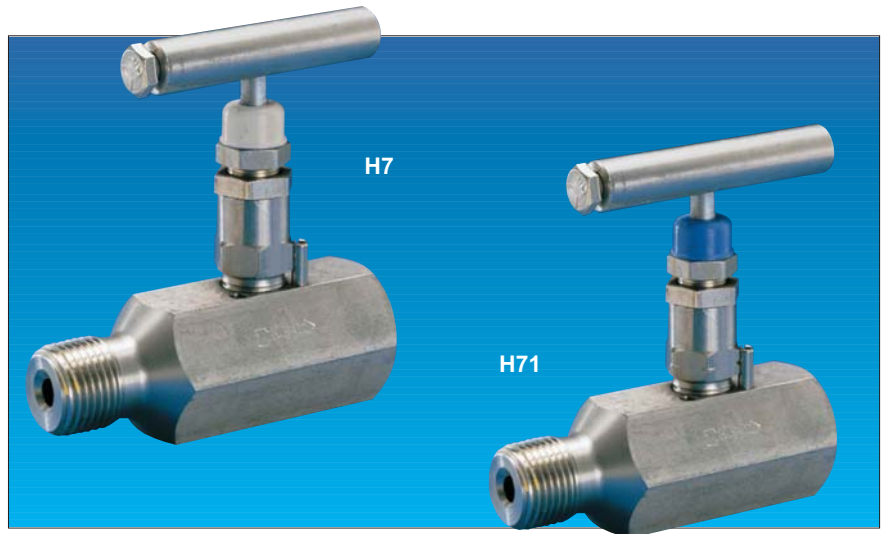
<sup>3</sup>/<sub>16</sub>-inch [4.8 mm], 6000 and 10,000 psig [414 and 689 barg]

### Product Overview

The H7 Series valves are designed for safe, repetitive bubble-tight closure, simple maintenance, and a long, trouble-free life. A free-swiveling ball end stem is incorporated for bubble-tight closure.

A variety of standard end connections and stem packing is available, along with trim to meet the requirements of NACE MR-01-75-latest revision. All valves are 100 percent pressure tested. Material traceability of the body is available on request.

Increasing pressures in oil and gas production have led to the development of the H71 valve. Rated to 10,000 psig [689 barg] @ 200°F [93°C], this valve provides long life and bubble-tight shutoff in severe operating conditions.



### Features and Benefits

- **Ball end stem** eliminates seat galling, provides bubble-tight shutoff and long life. The hardened, non-rotating ball ensures perfect alignment closure.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering the thread area, which can cause galling. It also prevents process contamination.
- **Adjustable packing** adjusts easily – loosen jam nut, tighten bushing slightly, then retighten jam nut. Decreases packing replacement downtime and increases valve life.
- **Dust cover** prevents lubricant washout and keeps contaminants (dirt, rain, etc.) out of bonnet assembly.
- **Safety back seating** prevents stem blowout or accidental removal while in operation and provides a metal-to-metal secondary stem seal while in the full open position.
- **Panel mount** (optional) affords opportunity to use high quality products in racks or panels.
- **Chrome plating of 316 SS** prevents galling or freezing of stem threads when similar metals mate. CS valves use a 303 SS stem.
- **Rolled threads** provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area enables smooth stem operation and extends packing life.
- **Body-to-bonnet seal** is metal-to-metal in constant compression, isolating the bonnet threads from process fluid corrosion. Eliminates possible tensile breakage of bonnet, and gives a reliable seal point.
- **Bonnet lock pin** is another safety feature which prevents the accidental separation of the bonnet from the body. However, normal valve maintenance and repair are still easily accomplished.

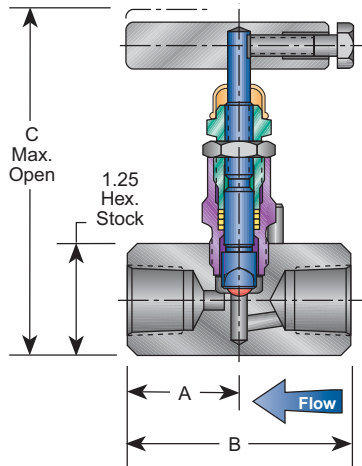


## H7 and H71 Specifications

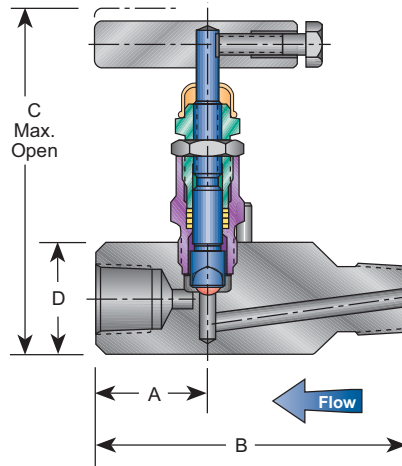
$\frac{3}{16}$ -inch [4.8 mm]: 6000 and 10,000 psig [414 and 689 barg]

### Dimensions, inches [mm]

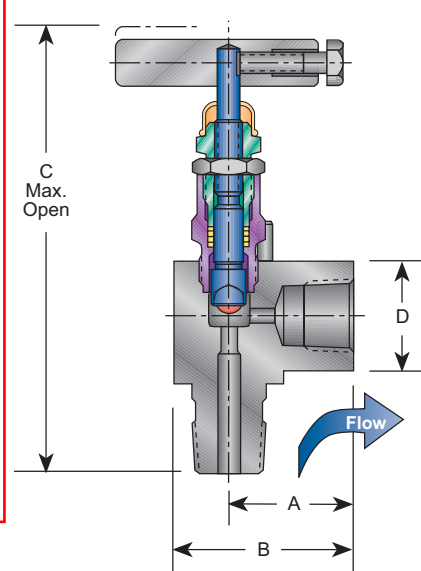
#### FNPT by FNPT



#### FNPT by MNPT



#### FNPT by MNPT (Angle)



#### FNPT by FNPT

Valve <sup>1</sup>	A	B	C <sup>2</sup> Teflon®	C <sup>2</sup> GRAFOIL®
$\frac{1}{4}$ " F x $\frac{1}{4}$ " F	1.25 [31.8]	2.50 [63.5]	3.92 [99.6]	4.57 [116.1]
$\frac{1}{2}$ " F x $\frac{1}{2}$ " F SS	1.50 [38.1]	3.00 [76.2]	3.92 [99.6]	4.57 [116.1]
$\frac{1}{2}$ " F x $\frac{1}{2}$ " F CS	1.25 [31.8]	2.50 [63.5]	3.92 [99.6]	4.57 [116.1]

#### FNPT by MNPT

Valve <sup>1</sup>	A	B	C <sup>2</sup> Teflon®	C <sup>2</sup> GRAFOIL®	D
$\frac{1}{4}$ " F x $\frac{1}{2}$ " M	1.25 [31.8]	3.50 [88.9]	3.85 [97.8]	4.50 [114.3]	1.25 [31.8]
$\frac{1}{2}$ " F x $\frac{1}{2}$ " M	1.25 [31.8]	3.50 [88.9]	3.85 [97.8]	4.50 [114.3]	1.25 [31.8]
$\frac{3}{4}$ " F x $\frac{3}{4}$ " M	1.50 [38.1]	4.50 [114.3]	4.10 [104.1]	4.75 [120.7]	1.50 [38.1]

#### FNPT by MNPT (Angle)

Valve <sup>1</sup>	A	B	C <sup>2</sup> Teflon®	C <sup>2</sup> GRAFOIL®	D
$\frac{1}{2}$ " F x $\frac{1}{2}$ " M	1.40 [35.6]	2.03 [51.6]	5.00 [127.0]	5.50 [139.7]	1.75 [44.5]

#### Notes

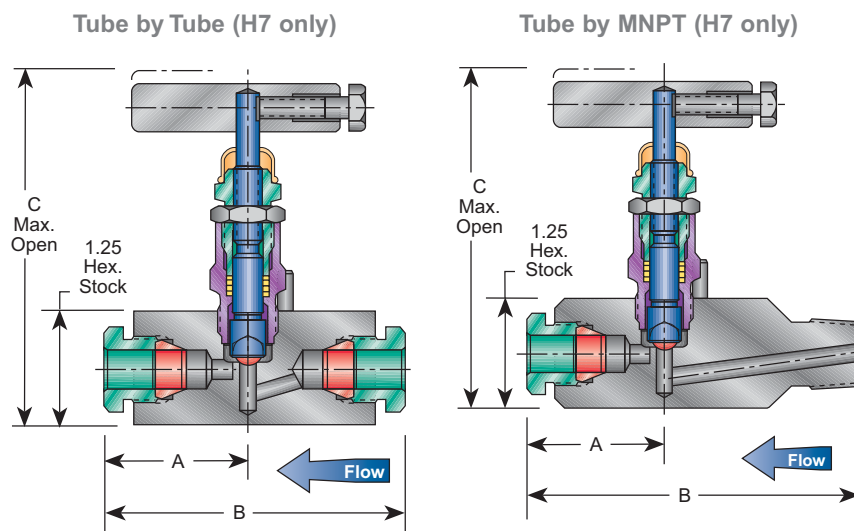
1. Approximate valve weight: 1.5 lb [0.7 kg].
2. Valve C<sub>v</sub> 0.52 maximum.



## H7 and H71 Specifications

<sup>3</sup>/<sub>16</sub>-inch [4.8 mm]: 6000 and 10,000 psig [414 and 689 barg]

### Dimensions inches [mm]



### Notes

1. Approximate valve weight: 1.5 lb [0.7 kg].
2. Valve  $C_v$  0.52 maximum.
3. H7 only.
4. SG (Sour Gas) meets the requirements of NACE MR-01-75-latest revision.
5. CS is zinc cobalt plated to prevent corrosion.

### Tube by Tube (H7 only)

Valve <sup>1</sup>	A	B	C <sup>2</sup> Teflon®	C <sup>2</sup> GRAFOIL®
1/4" T x 1/4" T	1.68 [42.7]	3.35 [85.1]	3.85 [97.8]	4.50 [114.3]
3/8" T x 3/8" T	1.63 [41.4]	3.25 [82.6]	3.85 [97.8]	4.50 [114.3]
1/2" T x 1/2" T	1.88 [47.8]	3.75 [95.3]	3.85 [97.8]	4.50 [114.3]

### Tube by MNPT (H7 only)

Valve <sup>1</sup>	A	B	C <sup>2</sup> Teflon®	C <sup>2</sup> GRAFOIL®
3/8" T x 1/2" M	1.63 [41.4]	3.88 [98.6]	3.85 [97.8]	4.50 [114.3]
1/2" T x 1/2" M	1.88 [47.8]	4.13 [104.9]	3.85 [97.8]	4.50 [114.3]

### Standard Materials

#### Teflon® Packing (H7 and H71)

Valve	Body and Bonnet <sup>5</sup>	Stem	Ball
CS	A108	A581 303	17-4 PH
SS	A479-316	A276-316	316 SS
Monel® <sup>3</sup>	Monel® R405	Monel® 400	Monel® K500
SG <sup>4</sup>	A479-316	Monel® 400	Monel® K500

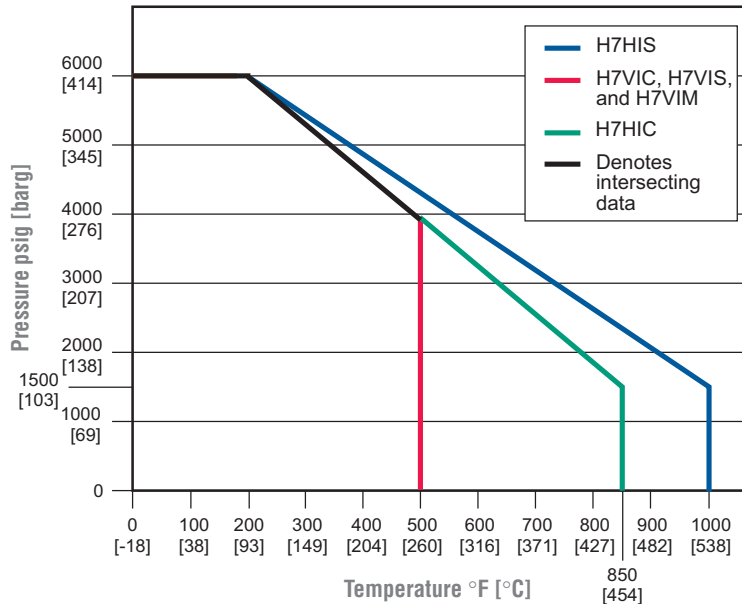
#### GRAFOIL® Packing (H7 Only)

Valve	Body and Bonnet <sup>5</sup>	Stem	Ball
CS	A105	A581 303	17-4 PH
SS	A479-316	A276-316	316 SS
SG <sup>4</sup>	A479-316	Monel® 400	Monel® K500

## H7 and H71 Specifications

<sup>3</sup>/<sub>16</sub>-inch [4.8 mm] Orifice: 6000 and 10,000 psig [414 and 689 barg]

### Pressure vs. Temperature – H7



### Pressure and Temperature Ratings

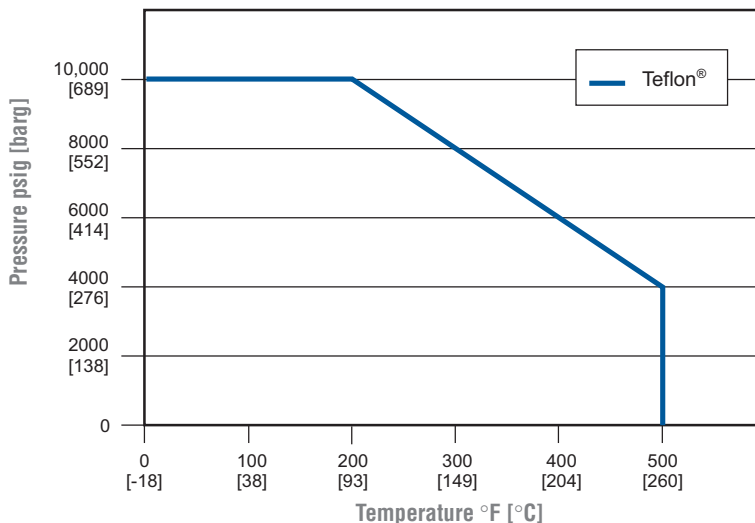
#### Valve Teflon® Packed Bonnet

CS	6000 psig @ 200°F [414 barg @ 93°C]
SS	6000 psig @ 200°F [414 barg @ 93°C]
Monel®	4000 psig @ 500°F [276 barg @ 260°C]

#### Valve GRAFOIL® Packed Bonnet and Low Emissions Graphite Packed Bonnet

CS	6000 psig @ 200°F [414 barg @ 93°C]
SS	1500 psig @ 850°F [103 barg @ 454°C]
SS	6000 psig @ 200°F [414 barg @ 93°C]
SS	1500 psig @ 1000°F [103 barg @ 538°C]

### Pressure vs. Temperature – H71



### Pressure and Temperature Ratings

#### Valve Teflon® Packed Bonnet

CS,	10,000 psig @ 200°F [689 barg @ 93°C]
SS,	10,000 psig @ 200°F [689 barg @ 93°C]
SG,	4000 psig @ 500°F [276 barg @ 260°C]

## H7 and H71 Options

<sup>3</sup>/<sub>16</sub>-inch [4.8 mm] Orifice: 6000 and 10,000 psig [414 barg]

### AGCO Tube<sup>1</sup>

#### Integral Tube

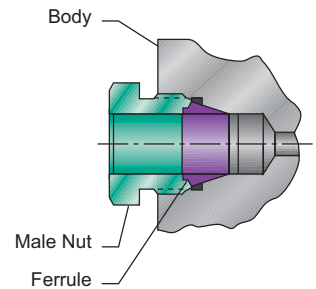
##### Fitting Design (H7 only)

- Proven design performance
- No tube twist on makeup
- Low torque assembly
- Male nut
  - Silver-plated to prevent galling
  - Threads are rolled for additional strength
  - Gives superior tubing support for vibration resistance
- Bubble-tight seal on make and remakes
- Fitting will hold to the burst of the tubing
- Makeup is industry standard 1<sup>1</sup>/<sub>4</sub> turns from finger tight.
- Remake is 1/4 turn from finger tight which brings you back to original position, then snug slightly to respring the ferrule(s) into a sealing position.

Available with single or dual ferrule design:

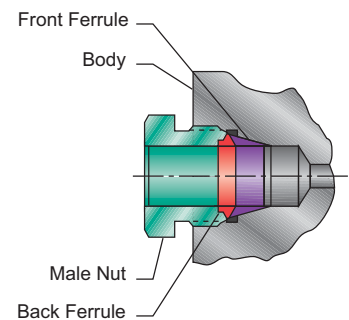
#### Single Ferrule Design

Option is '-( ) AT'



#### Dual Ferrule Design

Option is '-( ) ATD'

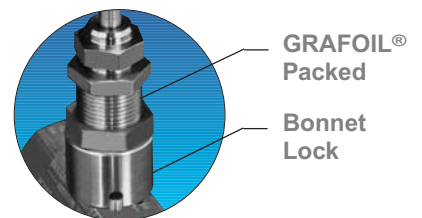
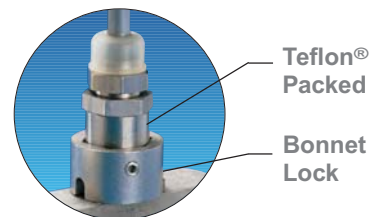


#### Note

1. AGCO Tube option meets the requirements of NACE MR-01-75-latest revision.

### Bonnet Lock (BL)<sup>1</sup>

The Anderson Greenwood Bonnet Lock prevents accidental loosening of the bonnet-to-body seal. A high-strength, short bonnet pin aligns a hex collar over the bonnet. A standard panel nut (GRAFOIL®) or hollow-point set-screw (Teflon®) then locks the collar against the valve. Tests indicate the minimum torque required to break the collar loose is greater than the torque required to twist off handle. Available with Teflon®- or GRAFOIL®-packed bonnets.



#### Note

1. Patent protected.

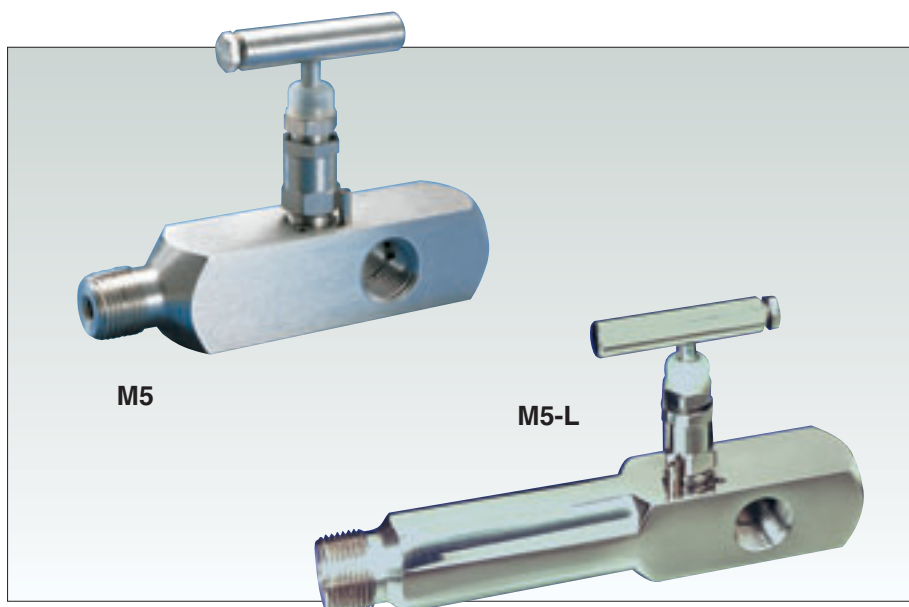
## H7 and H71 Specifications

<sup>3</sup>/<sub>16</sub>-inch [4.8 mm] Orifice: 6000 psig [414 barg]

### Ordering Information

	H7	V	I	S	- 44Q	- SG
<b>Packing</b>						
V – Teflon® (patent protected)						
H – GRAFOIL®						
E – Low Emissions Graphite						
<b>Seat</b>						
I – Integral						
<b>Material</b>						
C – CS						
S – 316 SS						
M – Monel® (-2, -4Q, -44Q with Teflon® packing only)						
<b>Connections (Inlet/Outlet)</b>						
2 – 1/4-inch FNPT x 1/4-inch FNPT						
2AT – 1/4-inch Tube x 1/4-inch Tube						
24 – 1/2-inch MNPT x 1/4-inch FNPT						
3AT – 3/8-inch Tube x 3/8-inch Tube						
3AT4Q – 1/2-inch MNPT x 3/8-inch Tube						
4Q – 1/2-inch FNPT x 1/2-inch FNPT						
44Q – 1/2-inch MNPT x 1/2-inch FNPT						
46Q – 3/4-inch MNPT x 1/2-inch FNPT						
44QA – 1/2-inch MNPT x 1/2-inch FNPT Angle						
4AT – 1/2-inch Tube x 1/2-inch Tube						
4AT4Q – 1/2-inch MNPT x 1/2-inch Tube						
66Q – 3/4-inch MNPT x 3/4-inch FNPT						
<b>Option/Descriptions</b>						
SG – Sour Gas meets the requirements of NACE MR-01-75-latest revision (316 SS only)						
BL – Bonnet Lock (patent protected) (page 21)						
PHB – Phenolic Round Black Handle						
SP – Special Requirements - please specify						

## Multi-Port Gauge Valves – M5 and M51



### Product Overview

The M5 and M51 are multi-port gauge valves allowing the versatile positioning of gauges or pressure switches without requiring additional penetration of the main piping. For high-pressure applications, the M51 is a metal seat version of the lightweight, compact instrument isolation valve.

The standard configuration has a male or female inlet and three 1/2-inch FNPT outlet ports. All valves with male inlet connections are available threaded or prepared for welding and with either standard or extended inlets. The M5 is available with an integral metal seat or as a soft seated plug type allowing the valve to be rodded out.

### Features and Benefits

- **Cost savings** are realized with multi-port design by reducing the number of components and process penetrations required for multiple instrument installations. Possible leak points are decreased.
- **Compact design** requires minimum space for operation and installation. Lower valve weight increases strength at the process connection and reduces gauge whip.
- **Long body configuration** allows for a maximum of 4-inch [102 mm] pipe insulation.
- **Roddable seat design** is supplied with replaceable seats, providing easy clean-out and seat replacement.
- **Replaceable soft seat** allows replacement of the soft seat insert without removing the valve from the line. It operates in dirty service with repetitive bubble-tight shutoff.
- **Mirror stem finish** burnished to a 16 RMS finish in the packing area enables smooth stem operation and extends packing life.
- **Body-to-bonnet seal** is metal-to-metal in constant compression below the bonnet threads. Prevents bonnet thread corrosion, eliminates possible tensile breakage of bonnet, and gives a reliable seal point.
- **Ball end stem** eliminates seat galling, provides bubble-tight shutoff and long life. The hardened, non-rotating ball ensures perfect alignment closure.
- **Packing below threads** prevents lubricant washout, thread corrosion, and keeps solids from entering the thread area, which can cause galling. It also prevents process contamination.
- **Adjustable packing** adjusts easily – loosen jam nut, tighten bushing slightly, then retighten jam nut. Decreases packing replacement downtime and increases valve life.

- **Dust cover** prevents lubricant washout and keeps contaminants (dirt, rain, etc.) out of bonnet assembly.
- **Safety back seating** prevents stem blowout or accidental removal while in operation and provides a metal-to-metal secondary stem seal while in the full open position.
- **Chrome plating of 316 SS** prevents galling or freezing of stem threads when similar metals mate. CS valves use a 303 SS stem.
- **Rolled threads** provide additional thread strength. The stem, bonnet, and male NPT threads are rolled, not cut.
- **Bonnet lock pin** is another safety feature which prevents the accidental separation of the bonnet from the body. However, normal valve maintenance and repair are still easily accomplished.

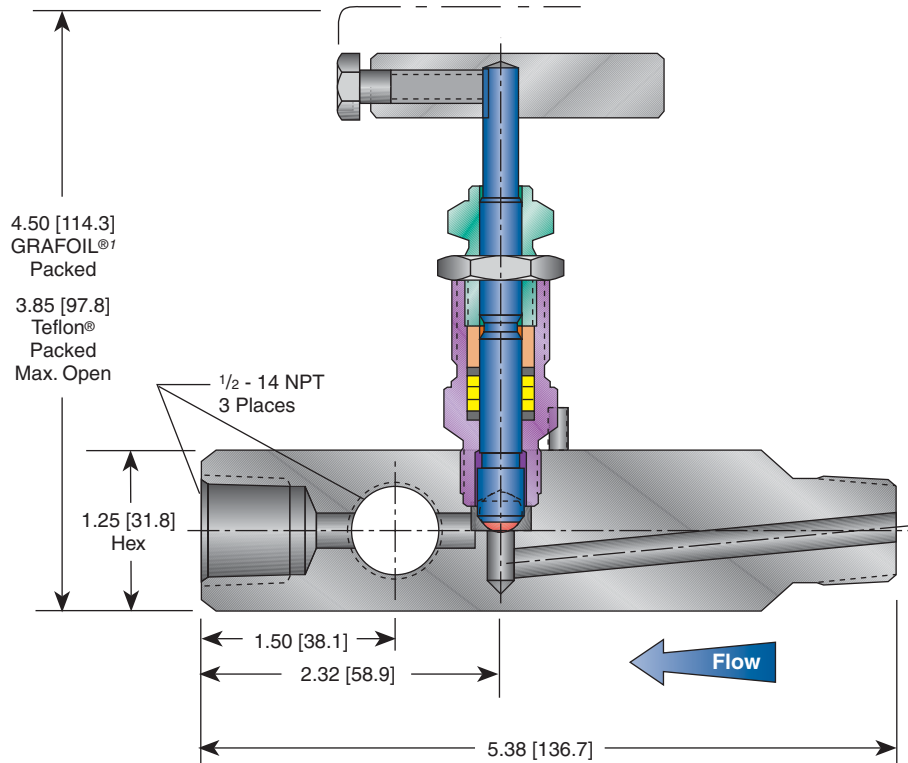
## Multi-Port Gauge Valves – M5 and M51 Specifications<sup>3</sup>

### Notes

1. M5 metal seat only.
2. Approximate valve weight:  
standard 2.5 lb [1.1 kg].  
long 3.0 lb [1.4 kg].  
Orifice Size: 0.187-inch [4.8 mm] diameter.  
Valve  $C_v$  0.523 maximum.  
Long body length 7.25-inch [184.2 mm] for  
4-inch [102.0 mm] insulation.
3. For Hastelloy® and SG3 call factory for  
dimensions and weights.

1/2" MNPT x 1/2"  
FNPT

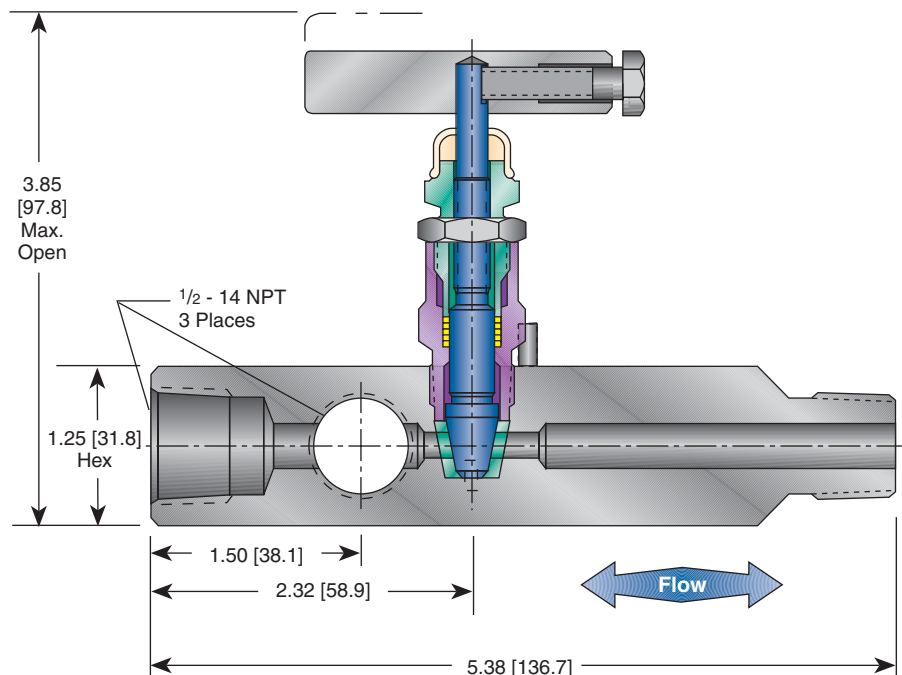
### M5 and M51 Metal Seat Dimensions, inches [mm]



### Notes

1. Approximate valve weight:  
standard 2.5 lb [1.1 kg].  
Orifice Size: 0.187-inch [4.8 mm] diameter.  
Valve  $C_v$  0.83 maximum.
2. For Hastelloy® and SG3 call factory for  
dimensions and weights.

### M5 Soft Seat Dimensions, inches [mm]



## Multi-Port Gauge Valves – M5 and M51 Specifications

### Standard Materials

#### M5 Metal Seat

Valve	Body	Bonnet	Stem	Ball	Packing
CS <sup>1</sup>	A105 CS	A105 CS	A581 303 SS	17-4 PH	GRAFOIL®, Low Emission Graphite
CS <sup>1</sup>	A105 CS	A108 CS	A581 303 SS	17-4 PH	Teflon®
SS	A479 316 SS	A479 316 SS	A276 316 SS	316 SS	GRAFOIL®, Low Emission Graphite
SS	A479 316 SS	A479 316 SS	A276 316 SS	316 SS	Teflon®
Monel®	Monel® R405	Monel® R405	Monel® 400	Monel® K500	Teflon®
SG <sup>2</sup>	A479 316 SS	A479 316 SS	Monel® 400	Monel® K500	GRAFOIL®, Low Emission Graphite
SG <sup>2</sup>	A479 316 SS	A479 316 SS	Monel® 400	Monel® K500	Teflon®
SG3 <sup>5</sup>	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Stellite	GRAFOIL®, Low Emission Graphite
SG3 <sup>5</sup>	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Monel®	Teflon®

#### M51 Metal Seat

Valve	Body	Bonnet	Stem	Ball
SS	A479 316 SS	A479 316 SS	A276 316 SS	A151 316 SS
SG <sup>2</sup>	A479 316 SS	A479 316 SS	Monel® 400	Monel® K500
SG3 <sup>5</sup>	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Stellite

#### M5 Soft Seat

Valve	Body	Bonnet	Stem	Packing	Seat <sup>3</sup>
CS <sup>1</sup>	A108 CS	A108 CS	A581 303 SS	Teflon®	Delrin®
SS	A479 316 SS	A479 316 SS	A276 316 SS	Teflon®	Delrin®
Monel®	Monel® R405	Monel® R405	Monel® 400	Teflon®	PCTFE <sup>4</sup>
SG <sup>2</sup>	A479 316 SS	A479 316 SS	Monel® 400	Teflon®	Delrin®
SG3 <sup>5</sup>	Hastelloy® C-276	Hastelloy® C-276	Hastelloy® C-276	Teflon®	Delrin®

### Pressure and Temperature Ratings

#### M5 Metal Seat

Valve	Packing	Ratings	
CS	GRAFOIL®, Low Emission Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
		1500 psig @ 850°F	[103 barg @ 454°C]
SS, SG, SG3	GRAFOIL®, Low Emission Graphite	6000 psig @ 200°F	[414 barg @ 93°C]
		1500 psig @ 1000°F	[103 barg @ 454°C]
CS, SS, Monel®, SG, SG3	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]

#### M51 Metal Seat

CS, SS, SG, SG3	—	10,000 psig @ 200°F	[689 barg @ 93°C]
		4000 psig @ 500°F	[276 barg @ 260°C]

#### M5 Soft Seat

CS, SS, Monel®, SG, SG3	Teflon®	6000 psig @ 200°F	[414 barg @ 93°C]
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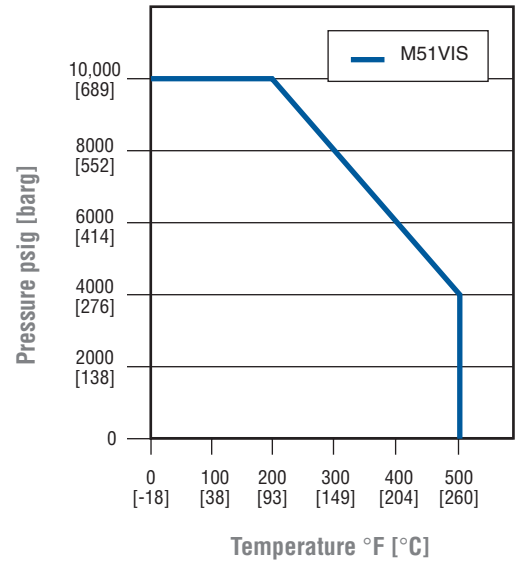
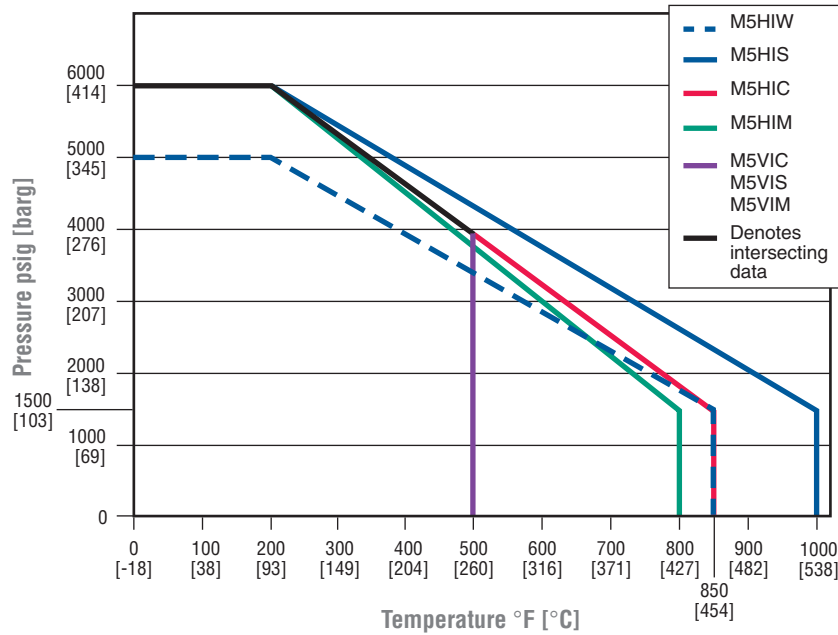
### Notes

1. CS is zinc-cobalt plated to prevent corrosion. Plain end valves are black oxide coated.
2. SG (Sour Gas) meets the requirements of NACE MR0175-2002.
3. PEEK and Teflon® also available.
4. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
5. SG3 (Sour Gas) meets the requirements of NACE MR0175-2003.

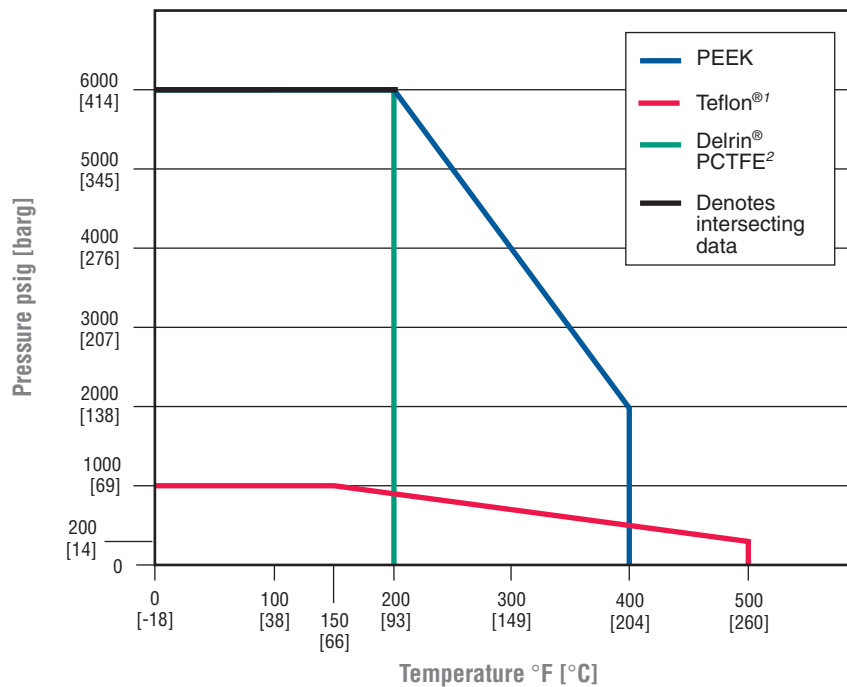


## Multi-Port Gauge Valves – M5 and M51 Specifications

Pressure vs. Temperature<sup>1</sup> – M5 and M51 Metal Seat



Pressure vs. Temperature – M5 Soft Seat



### Notes

1. O-ring packed soft seat valve 400°F [204°C] maximum.
2. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.

## Multi-Port Gauge Valves – M5 Specifications

### Ordering Information – Metal Seat

**M5 H I S – 44L –SG**

#### Packing

- H – GRAFOIL®
- V – Teflon®
- E – Low Emission Graphite

#### Seat

- I – Integral

#### Body Material<sup>1</sup>

- C – CS, A105
- S – SS, A479-316
- M – Monel®
- W – 316L
- J – Hastelloy®

#### Connections (Inlet/Outlet)<sup>1</sup>

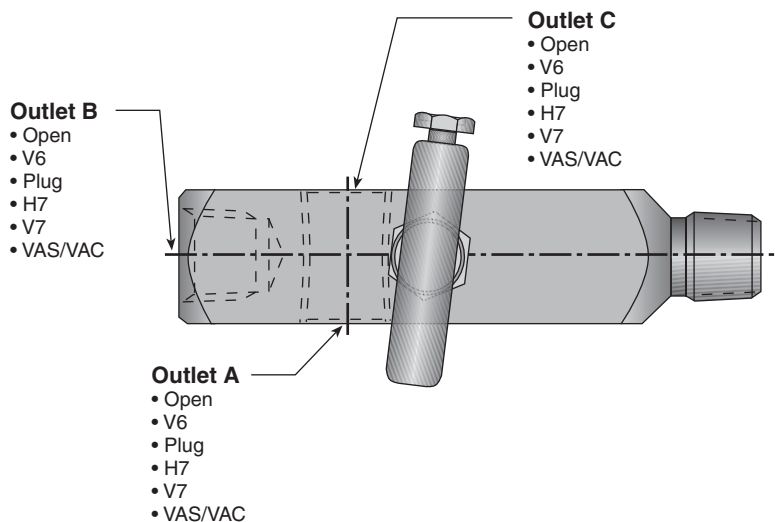
- 44 – 1/2-inch MNPT x (3) 1/2-inch FNPT
- 46 – 3/4-inch MNPT x (3) 1/2-inch FNPT
- C – Male plain end (CS is black oxide coated)
- L – Long body extension (4-inch insulation)

#### Options

- BL – Bonnet Lock Device (patent protected)
- CLC – Chlorine Cleaning
- HD – Hydrostatic Testing (100%)(MSS-MSP-61)
- OC – Oxygen Cleaning
- SG – Sour Gas meets the requirements of NACE MR0175-2002 (SS only)
- SP – Special Requirements - please specify
- SG3 – Sour Gas meets the requirements of NACE MR0175-2003

### Note

1. Call factory for optional material, or other sizes.



## Multi-Port Gauge Valves – M5 Specifications

### Notes

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
2. Call factory for optional material or other sizes.

### Ordering Information – Soft Seat

**M5 V D S – 44L –SG**

#### Packing

- V – Teflon®
- R – Viton® O-ring

#### Seat

- V – Teflon®
- D – Delrin® (standard)
- E – PEEK
- K – PCTFE<sup>1</sup>

#### Body Material<sup>2</sup>

- C – CS, A108
- S – SS, A479-316
- M – Monel®
- W – 316L
- J – Hastelloy®

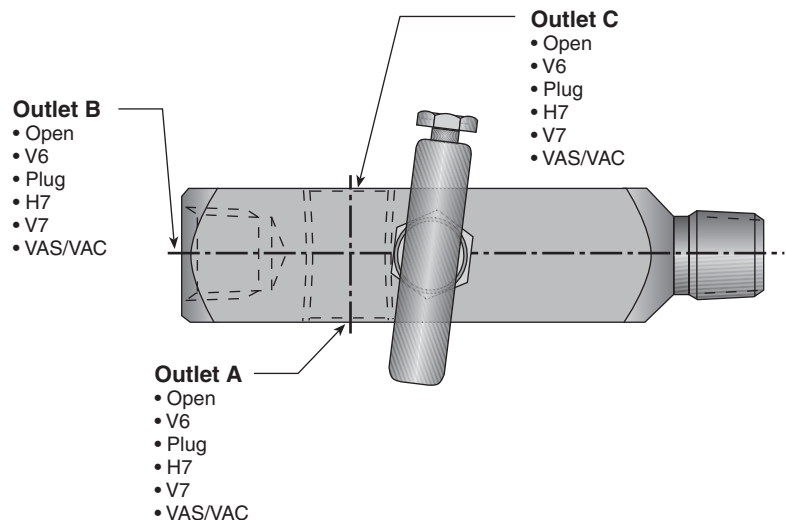
#### Connections (Inlet/Outlet)<sup>2</sup>

- 44 – 1/2-inch MNPT x (3) 1/2-inch FNPT
- 46 – 3/4-inch MNPT x (3) 1/2-inch FNPT

- C – Male plain end (CS is black oxide coated)
- L – Long body extension (4-inch insulation)

#### Options

- BL – Bonnet Lock Device (patent protected)
- CLC – Chlorine Cleaning
- HD – Hydrostatic Testing (100%)(MSS-MSP-61)
- OC – Oxygen Cleaning
- SG – Sour Gas meets the requirements of NACE MR0175-2002 (SS only)
- SP – Special Requirements - please specify
- SG3 – Sour Gas meets the requirements of NACE MR0175-2003



## Multi-Port Gauge Valves – M5 ASME B31.1 and B31.3 Specifications (meets MSS-SP-105)

### Ordering Information – Power Industry Applications<sup>1</sup>

M5HP S – 44 LC – XP – SP

#### Body Material

- C – CS, A105
- S – SS, A479-316

#### Connections (Inlet/Outlet)

- 44 – 1/2-inch MNPT x (3) 1/2-inch FNPT
- 46 – 3/4-inch MNPT x (3) 1/2-inch FNPT

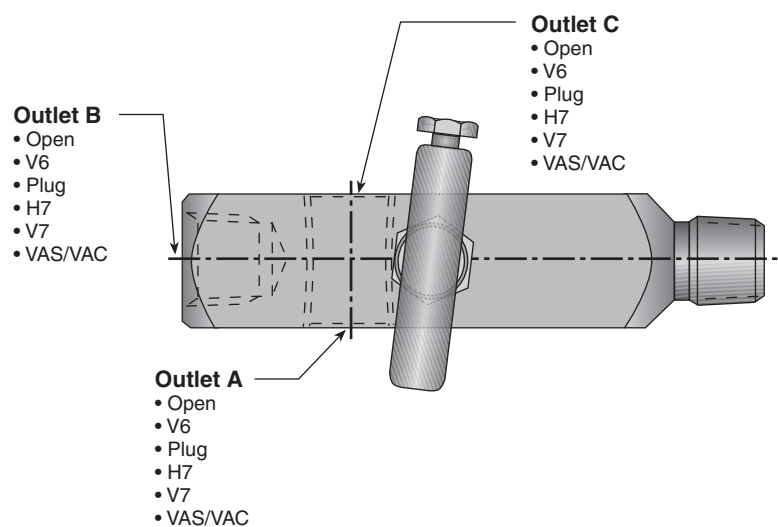
- C – Male plain end (CS is black oxide coated)
- L – Long body (4-inch insulation)

#### Options

- SP – Special Requirements - please specify

#### Note

1. All Power M5 Gauge Valves come standard with GRAFOIL® packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.



## Multi-Port Gauge Valves – M51 Specifications

### Ordering Information

**M51**

**V**

**I**

**S**

**– 44LC**

**– SG**

### Packing

V – Teflon® (patent protected)  
Not available in GRAFOIL®

### Seat

I – Integral

### Body Material<sup>1</sup>

S – SS, A479-316  
J – Hastelloy®

### Connections (Inlet/Outlet)<sup>1</sup>

44 – 1/2-inch MNPT x (3) 1/2-inch FNPT  
46 – 3/4-inch MNPT x (3) 1/2-inch FNPT

C – Male plain end (CS is black oxide coated)  
L – Long body extension (4-inch insulation)

### Options

BL – Bonnet Lock Device (patent protected)  
CLC – Chlorine Cleaning  
HD – Hydrostatic Testing (100%)(MSS-MSP-61)  
OC – Oxygen Cleaning  
SG – Sour Gas meets the requirements of NACE MR0175-2002 (SS only)  
SP – Special Requirements - please specify  
SG3 – Sour Gas meets the requirements of NACE MR0175-2003

### Note

1. Call factory for optional material, or other sizes and end connections.

