Anderson Greenwood Instrumentation Manifolds - Three Valve

A 3-valve differential pressure manifold with integral metal seats or replaceable, roddable soft seats for applications requiring remote mounting from the instrument

General Application

The M1 is designed to mount to the signal lines and an instrument with connections different to 2 1/8" (54 mm) between signal taps. These include recording orifice meters, small differential pressure indicators and some differential pressure switches.

TECHNICAL DATA

Materials:
CS, 316 SS, Monel®, Hastelloy®

Seats:
Metal or soft

Connections:
Instrument: ½" NPT
Process: ½" NPT

Pressure (max):
10,000 psig (689 barg)

Temperature (min-max):
-313°F to 1000°F
(-192°C to 538°C)

Monel® is a registered trademark of Special Metals Corporation.
Hastelloy® is a registered trademark of Haynes International, Inc.

Features

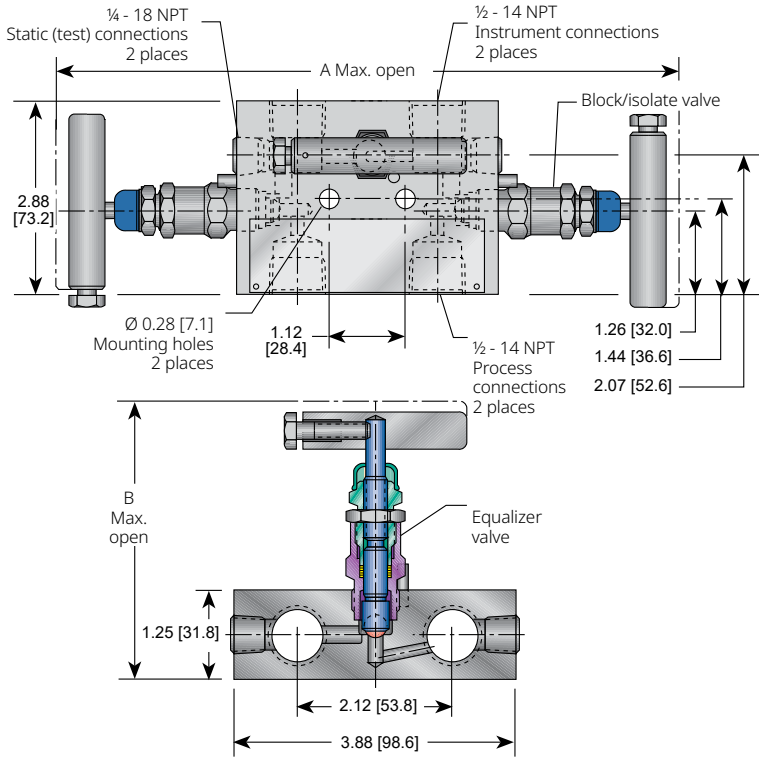
- Cost savings of 20-30% when unitizing the manifolding by eliminating several parts used in conventional methods of 'piping up'.
- Roddable soft seats for services prone to plugging.
- Protective bonnet cap protects against atmospheric contamination; reduces thread galling by containment of stem lubricant and increases valve life.
- Having fewer leak points reduces the chances of leakage from a unitized design.
- All packing is below stem threads, body-to-bonnet seal is below the threads, minimizing process fluid corrosion.
- Replaceable soft seat design is bubble-tight with a 3/16" (4.8 mm) diameter orifice as standard.
- ENC plated rolled stem threads provide a stronger and more-durable thread area, increasing valve life.
- Integral hard-back seat protects against stem blowout and provides a secondary packing seal.
- Adjustable stem packing for leak-proof and long service life.
- ¼" FNPT test ports may be used as test connections.
- AGCO Mount option available.
- Colored caps or ring labels identify valve function.

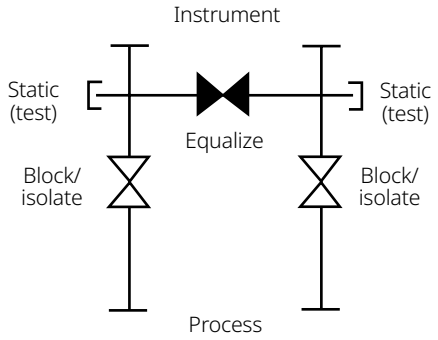
M1 SERIES

Anderson Greenwood Instrumentation Manifolds - Three Valve

M1 Dimensions

M1 metal seat dimensions, Inches [mm]





Dimensions, Inches [mm]

Packing	A	B
Low emissions E	10.38 (263.7)	4.50 (114.3)
PTFE/Graphite	9.18 (233.2)	3.90 (99.1)

Minimum Temperature

Carbon Steel	-20°F (-29°C)
316 SS O-ring seal	-20°F (-29°C)
316 SS, Monel®, Hastelloy® PTFE packed	-70°F (-57°C)
316 SS, Monel®, Hastelloy® Graphite packed	-70°F (-57°C)

Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), 316SS Delrin® seat -40°F (-40°C). 316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar).

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Standard Materials

Valve	Packing	Body/bonnet	Stem/ball
CS[2]	PTFE or O-ring	A108/A108	A276-316/17-4PH
CS[2]	Graphite/Low emissions graphite	A479-316/A105	A276-316/17-4PH
316 SS	PTFE or O-ring	A479-316/A479-316	A276-316/316 SS
316 SS	Graphite/Low emissions graphite	A479-316/A479-316 A	A276-316/316 SS
Monel®	PTFE	Monel® 400/Monel® R405	Monel® 400/Monel® K500
Monel®	Graphite/Low emissions graphite	Monel® 400/Monel® R405	Monel® 400/Monel® K500
SG[3]	PTFE	A479-316/A479-316	Monel® 400/Monel® K500
SG3[4]	PTFE	A479-316/Hastelloy® C276	Hastelloy® C276/Elgiloy®
SG[3]	Graphite/Low emissions graphite	A479-316/A479-316	Monel® 400/Monel® K500
SG3[4]	Graphite/Low emissions graphite	A479-316/Hastelloy® C276	Hastelloy® C276/Elgiloy®

Pressure and Temperature Ratings

Valve[1]	Packing	Ratings
CS[2]	PTFE or O-ring	6000 psig at 200°F [414 barg at 93°C]
		4000 psig at 500°F [276 barg at 260°C]
CS[2]	Graphite/Low emissions graphite	6000 psig at 200°F [414 barg at 93°C]
		1500 psig at 850°F [103 barg at 454°C]
316 SS	PTFE or O-ring	6000 psig at 200°F [414 barg at 93°C]
		4000 psig at 500°F [276 barg at 260°C]
316 SS	Graphite/Low emissions graphite	6000 psig at 200°F [414 barg at 93°C]
		1500 psig at 1000°F [103 barg at 538°C]
Monel®	PTFE	6000 psig at 200°F [414 barg at 93°C]
		4000 psig at 500°F [276 barg at 260°C]
Monel®	Graphite/Low emissions graphite	6000 psig at 200°F [414 barg at 93°C]
		1500 psig at 800°F [103 barg at 427°C]
SG[3]	PTFE	6000 psig at 200°F [414 barg at 93°C]
SG3[4]		4000 psig at 500°F [276 barg at 260°C]
SG[3]	Graphite/Low emissions graphite	6000 psig at 200°F [414 barg at 93°C]
SG3[4]		1500 psig at 1000°F [103 barg at 538°C]

NOTES

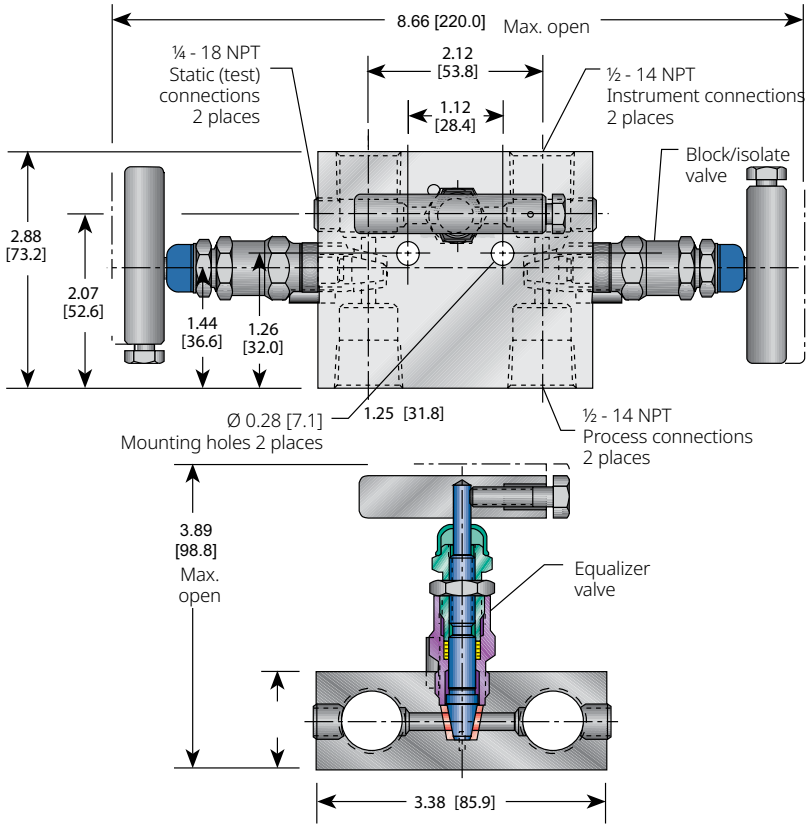
1. Approximate valve weight: 4.0 lb [1.8 kg].
   0.187-inch [4.8 mm] diameter orifice.
   Valve Cv 0.52 maximum.
2. CS parts are zinc TCP plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).
5. Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), 316SS Delrin® seat -40°F (-40°C). 316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar).

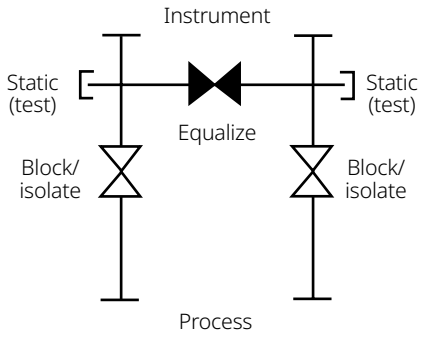
M1 SERIES

Anderson Greenwood Instrumentation Manifolds - Three Valve

M1 Dimensions

M1 soft seat dimensions. Inches [mm]





Minimum Temperature

Carbon Steel	-20°F (-29°C)
316 SS O-ring seal	-20°F (-29°C)
316 SS, Monel®, Hastelloy® PTFE packed Delrin® seats	-70°F (-57°C) -40°F (-40°C)
316 SS, Monel®, Hastelloy® Graphite packed	-70°F (-57°C)

Standard Materials

Valve[1]	Body and Bonnet	Stem	Packing	Seat
CS[2]	A108 CS	A276-316	PTFE or FKM O-ring w/PTFE backup	Delrin®[4]
316 SS	A479-316	A276-316	PTFE or FKM O-ring w/PTFE backup	Delrin®[4]
SG[3]	A479-316	Monel® 400	PTFE	Delrin®[4]
SG3[5]	Hastelloy® C276	Hastelloy® C276	PTFE	Delrin®[4]

Pressure and Temperature Ratings

Seat	Pressure and Temperature Ratings
Delrin®	6000 psig at 200°F [414 barg at 93°C]
PEEK	6000 psig at 200°F [414 barg at 93°C] 2000 psig at 400°F [138 barg at 204°C]
PTFE	1000 psig at 150°F [69 barg at 66°C] 200 psig at 500°F [14 barg at 260°C]

NOTES

1. Approximate valve weight: 4.0 lb [1.8 kg]. 0.187-inch [4.8 mm] diameter orifice. Valve Cv 0.83 maximum.
2. CS parts are zinc TCP plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions ≤ 50 mg/l [ppm]) and NACE MR0103.
4. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).
5. Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), 316SS Delrin® seat -40°F (-40°C). 316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar).

Anderson Greenwood Instrumentation Manifolds - Three Valve

Bonnet Assembly Options

The M1 offers the option of metal or roddable soft seats. The high pressure all stainless M110 has integral metal seats.
All stem threads are rolled and lubricated to prevent galling and reduce operating torque. The stem seal is a PTFE or Graphite packing gland which is adjustable in service. All bonnets are assembled with a bonnet locking pin to prevent accidental removal while in service and a protective dust cap is fitted to contain stem lubricant and prevent the influx of contaminants.

Soft-Seated Bonnet Assemblies

The soft-seated bonnet assemblies have a one-piece rotating stem and plug. In addition to the adjustable PTFE packing gland, the bonnets are available with a FKM O-ring and PTFE back-up ring.

Metal-Seated Bonnet Assemblies

The metal-seated bonnet assemblies have a rotating stem with free swivel ball-type seat for long service life. The specially hardened ball seat is ideal for both gas and liquid service.
The high pressure M110 bonnet assemblies use a strengthened stem and bonnet which is fitted with a larger size T-bar handle.
The M1's high-temperature bonnet assemblies utilize a similarly designed stem and bonnet, incorporating adjustable graphite and back-up pressure rings to ensure a leak-free stem seal.

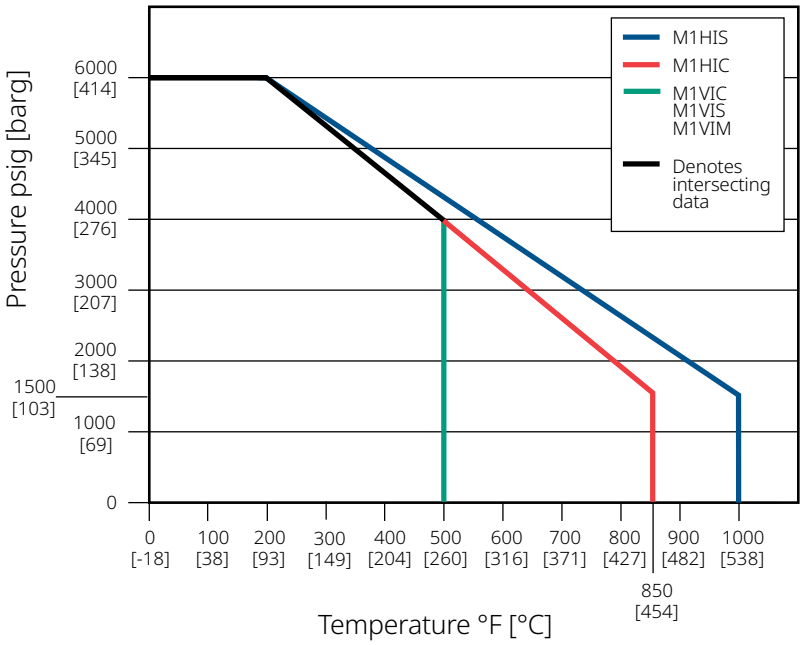
Bonnet Lock (BL)

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.
Tests indicate the minimum torque required to break the collar loose is greater than the torque required to twist off the handle.

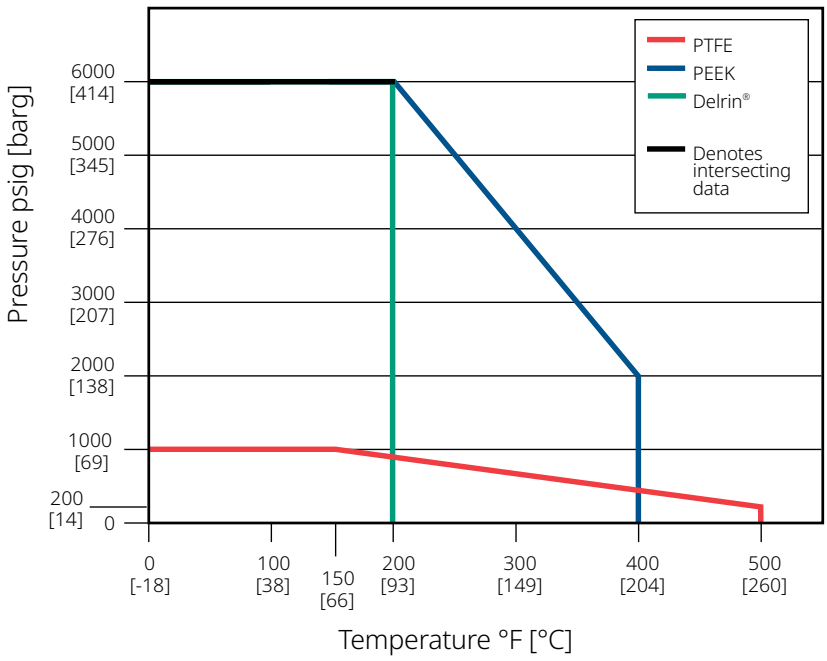
M1 SERIES

Anderson Greenwood Instrumentation Manifolds - Three Valve

Pressure vs. Temperature - Metal Seat



Pressure vs. Temperature - Soft Seat



Minimum temperature -70°F (-57°C). Carbon Steel and O-ring -20°F (-29°C), 316SS Delrin® seat -40°F (-40°C). 316SS integral metal seat minimum temperature (-313°F (-192°C) @ 2500 psi (172 bar)

Anderson Greenwood Instrumentation Manifolds - Three Valve

Selection Guide - M1 Metal Seat; 3⁄16-inch (4.8 mm) Diameter Orifice

M1	H	I	S	-4	-SG
BASIC SERIES	**PACKING**	**SEAT**	**BODY MATERIAL[1]**	**CONNECTION**	**OPTIONS**
M1	**V** PTFE	**I** Integral (body material)	**C** CS, A108 (PTFE packed) CS, A105 (Graphite and Low emissions graphite packed)	**4** ½-inch FNPT	**AM** AGI Mount Kit for 2-inch pipe stand mounting of manifold **AMS** AGI Mount kit for a 2 inch pipe stand mounting of the manifold in 316SS
	H Graphite		**S** 316 SS, A479-316		**BC** Accessory bracket - mount conduit with -AM
	E Low emissions graphite		**M** Monel®		**BL** Bonnet lock
	R O-ring (FKM)		**W** 316L SS - maximum pressure 5000 psig [345 barg]		**BP** Accessory bracket - mount purge meters with -AM
			J Hastelloy®		**HD** Hydrostatic testing (100%) (MSS-SP-61)
					MS Monel® stem
					OC00 Oxygen clean (OC)
					SST 316SS Circular Tag (10 Characters max)
					PMI00 PMI Body
					PMI01 PMI Body and Bonnet
					PMI02 PMI Body, Bonnet and STEM
					SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions <_ 50 mg/l (ppm)) and NACE MRO103-2005
					SG3 (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions > 50 mg/l (ppm)) Hastelloy Material used for all wetted materials
					LT Low Temperature for integral seat 316SS -313°F (-192°C) @ 2500 psi (1782 bar)

NOTES
1.Call factory for optional materials.

M1 SERIES

Anderson Greenwood Instrumentation Manifolds - Three Valve

Selection Guide - M1 Soft Seat Replaceable, Roddable; 3⁄16-inch [4.8 mm] Diameter Orifice

M1	V	D	S	-4	-SG
BASIC SERIES	**PACKING**	**SEAT**	**BODY MATERIAL[2]**	**CONNECTION**	**OPTIONS**
M1	**V** PTFE	**D** Delrin®	**C** A108 CS	**4** 1/2-inch FNPT	**AM** AGI Mount kit for 2-inch pipe stand mounting of manifold
		V PTFE	**S** A479-316 SS		**AMS** AGI Mount kit for a 2 inch pipe stand mounting of the manifold in 316SS
		E PEEK	**W** 316L SS - maximum pressure 5000 psig [345 barg]		**BL** Bonnet Lock
	R O-ring (FKM)		**J** Hastelloy®		**BC** Accessory bracket - mount conduit with -AM
					HD Hydrostatic testing (100%) (MSS-SP-61)
					MS Monel® stem
					OC00 Oxygen clean (OC)
					PMI00 PMI Body
					PMI01 PMI Body and Bonnet
					PMI02 PMI Body, Bonnet and STEM
					SG SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions <_ 50 mg/l (ppm)) and NACE MRO103-2005
					SG3 SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions > 50 mg/l (ppm)) Hastelloy Material used for all wetted materials
					SST 316SS Circular Tag (10 Characters max)

NOTES
1.Call factory for optional materials.

Anderson Greenwood Instrumentation Manifolds - Three Valve

Selection Guide - Power Industry Applications ASME B31.1 and B31.3 Specifications Meets MSS SP-105

M1HP	D	-4	-SG

BASIC SERIES	BODY MATERIAL[1]		CONNECTION		OPTIONS	
M1HP	C	CS, A105	4	1/2-inch FNPT x 1/2-inch FNPT	AM	AGI Mount kit for 2-inch pipe stand mounting of bracket
	S	316 SS, A479-316	3TC4	3/8-inch Tube stub x 1/2-inch FNPT x 1/2-inch FNPT[2]	AMS	AGI Mount kit for a 2 inch pipe stand mounting of the manifold in 316SS
	W	316L SS - maximum pressure 5000 psig [345 barg]	3TB4	3/8-inch Tube S.W. x 1/2-inch FNPT x 1/2-inch FNPT	BC	Accessory bracket - mount conduit with -AM
	J	Hastelloy®	4TC4	1/2-inch Tube stub x 1/2-inch FNPT x 1/2-inch FNPT[3]	BP	Accessory bracket - mount purge meters with -AM
			4TB4	1/2-inch Tube S.W. x 1/2-inch FNPT x 1/2-inch FNPT	HD	Hydrostatic testing (100%) (MSS-SP-61)
			4B	1/2-inch FSW x 1/2-inch FSW	MS	Monel® stem
					OC00	Oxygen clean (OC)
					PMI00	PMI Body
					PMI01	PMI Body and Bonnet
					PMI02	PMI Body, Bonnet and STEM
					SG	SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions <_ 50 mg/l (ppm)) and NACE MRO103-2005
					SG3	SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions > 50 mg/l (ppm)) Hastelloy Material used for all wetted materials
					SST	316SS Circular Tag (10 Characters max)
					XP	ASME B31.1

NOTES

1. All manifolds come standard with Graphite packing, integral seats, bonnet locks, and are subjected to hydrostatic testing.
2. Tube stubs are 6-inch long x 0.065-inch wall.
3. Tube stubs are 6-inch long x 0.095-inch wall.
4. Manifold ratings:

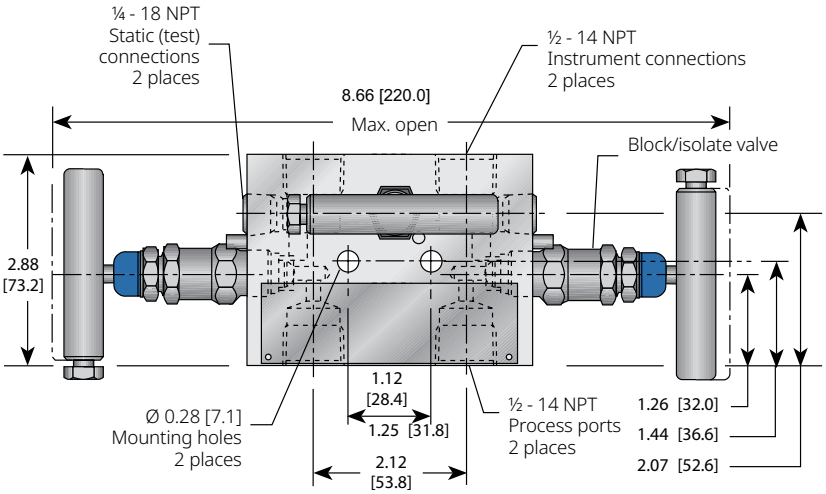
SST
6000 psig at 100°F [414 barg at 38°C]
3030 psig at 1000°F [209 barg at 538°C]
STL
6170 psig at 100°F [425 barg at 38°C]
3430 psig at 800°F [236 barg at 427°C]

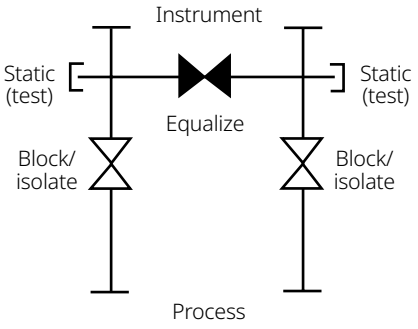
M110 SERIES

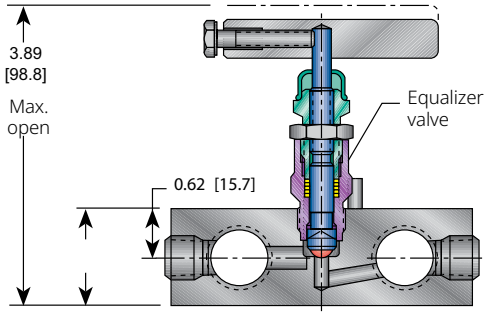
Anderson Greenwood Instrumentation Manifolds - Three Valve

M110 Dimensions

M110 dimensions, Inches [mm]







Standard Materials

Valve[1]	Body and bonnet	Stem and ball	Packing
316 SS	A479-316 body A479-316 bonnet	A276-316 stem 316 SS ball	PTFE
SG[2]	A479-316 body A479-316 bonnet	Monel® 400 stem Monel® K500 ball	PTFE
SG3[3]	Hastelloy® C276 body Hastelloy® C276 bonnet	Hastelloy® C276 stem Elgiloy® ball	PTFE

Minimum Temperature

316 SS, PTFE packed -70°F (-57°C)

Pressure and Temperature Ratings

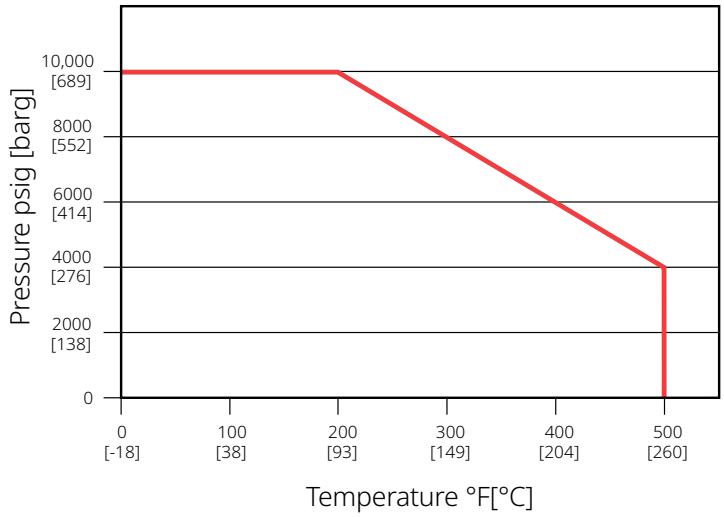
Valve[1]	Packing	Pressure and temperature ratings
316 SS	PTFE	10.000 psig at 200°F [689 barg at 93°C]
		4000 psig at 500°F [276 barg at 260°C]
		10.000 psig at 200°F [689 barg at 93°C]
SG[2], SG3[3]	PTFE	4000 psig at 500°F [276 barg at 260°C]

NOTES

1. Approximate valve weight: 4 lb [1.8 kg].
   0.187-inch [4.8 mm] diameter orifice.
   Valve Cv 0.52 maximum.
2. SG (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for chloride conditions ≤ 50 mg/l (ppm)) and NACE MR0103-2005.
3. SG3 (Sour Gas) meets the requirements of NACE MR0175/ISO 15156 (for Chloride conditions > 50 mg/l [ppm]).

Anderson Greenwood Instrumentation Manifolds - Three Valve

Pressure vs. Temperature



Selection Guide - Metal Seated 10,000 PSI M110

M110	S	-4	-SG
BASIC SERIES	**BODY MATERIAL[1]**	**CONNECTION**	**OPTIONS**
M110	**S** 316 SS, A479-316	**- 4** 1/2-inch FNPT x 1/2-inch FNPT	**AM** AGI Mount kit for 2-inch pipe stand mounting of bracket **AMS** AGI Mount kit for a 2 inch pipe stand mounting of the manifold in 316SS **BC** Accessory bracket - mount conduit with -AM **BP** Accessory bracket - mount purge meters with -AM **HD** Hydrostatic testing (100%) (MSS-SP-61) **MS** Monel® stem **OC00** Oxygen clean (OC) **PM100** PMI body only **SG** SG (Sour Gas) Meets the requirements of NACE MRO175/ISO15156 (for chloride conditions <_ 50 mg/l (ppm)) and NACE MRO103-2005

NOTES

Delrin® is a registered trademark of E.I. du Pont de Nemours and Company.
Hastelloy® is a registered trademark of Haynes International, Inc.
Kel-F® is a registered trademark of 3M Company.
Monel® is a registered trademark of the Special Metals Corporation.