

OS&Y Root Valves – M5K, M5AK, and M5YK

Root Isolation Valves with Outside Screw and Yoke, Bolted Bonnet Construction



Product Overview

M5K Gauge Valve

The M5K gauge valve is a multi-ported root/primary instrument isolation valve, designed for use with gauge mountings and other pressure instruments in refineries and chemical plants. The M5K facilitates installation of multiple measurement devices without additional penetrations of the main piping.

The M5K is available in metal seat design with integral seat, or with various replaceable, roddable soft seats ($\frac{1}{4}$ -inch [6.4 mm] diameter orifice).

M5AK Gauge Valve

The M5AK gauge valve is a multi-ported root/primary instrument isolation valve, designed for use with gauge mounting and other instrument ties in refineries and chemical plants. Additional penetrations of the main piping are not required.

The M5AK is available with a variety of replaceable, roddable, metal or soft seats, with $\frac{3}{8}$ -inch [9.5 mm] diameter orifice. The unique metal seat design offers bubble-tight shutoff with straight-through flow characteristics.

M5YK Gauge Valve

The M5YK gauge valve is a versatile, dual outlet valve for use in gauge mounting or as root/primary isolation valve in differential pressure transmitter installations. In-line construction of body and OS&Y bonnet allows installation and replacement of valves in orifice taps without removal of bonnet assembly.

The valve is designed for safety, service, and economy. The long-necked inlet provides room for insulation and the dual $\frac{1}{2}$ -inch NPT outlet ports provide an extra outlet for bleeder or sampling valves.

The M5YK is standard with $\frac{1}{4}$ -inch [6.4 mm] integral seat. Available with seat insert and stem ball of selected metals to match process requirements.

Features and Benefits

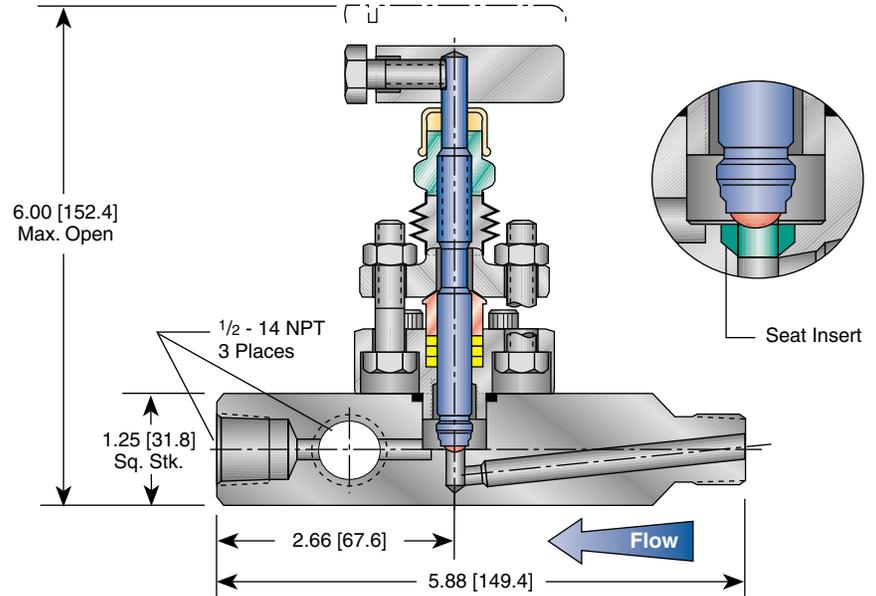
- **Four-bolt outside screw and yoke (OS&Y) bonnet** provides easy access to the packing gland. Stem threads are completely isolated from the process.
- **Protective stem bellows and cap** protects against atmospheric contamination and increases the valve life. Bellows and cap help contain stem lubricant (unlike most OS&Y designs) which reduces possible thread galling.
- **Compact design** requires minimum space for operation and installation. Lower valve weight improves strength at the process connection and reduces induced bending moments.
- **Multi-port outlet** means fewer fittings, fewer leak points, and reduced installation cost.
- **Standard SS investment cast yoke** improves valve life by resisting corrosion. Material used is A351-CF8M.
- **Single-piece yoke design** means binding of the stem does not occur as with OS&Y bonnets that use bolts to hold and position the yoke.
- **GRAFOIL® or Teflon® flange gasket ring** offers wide compatibility to process fluids without deteriorating flange gasket (bonnet-to-body).
- **Non-rotating plug design (M5AK)** provides bubble-tight valve closure without metal seat galling and low seating torque.
- **Free-swiveling ball end stem design (M5K, M5YK)** makes for bubble-tight valve closure without seat galling.
- **Integral hard back seat (M5K, M5YK)** protects against stem blowout and provides alternate sealing for longer packing life.
- **Replaceable, roddable soft seat design (M5K, M5AK)** can be specified with the time-proven bubble-tight seat with a fully roddable, bi-directional flow. Standard for the M5K - soft seat orifice diameter is $\frac{1}{4}$ -inch [6.4 mm] and standard for the M5AK is $\frac{3}{8}$ -inch [9.5 mm].

OS&Y Root Valves – M5K Specifications

Note

1. Approximate valve weight:
standard 3.5 lb [1.6 kg].
long 4.0 lb [1.8 kg].
 $\frac{3}{16}$ -inch [4.8 mm] diameter orifice.
Valve C_v 0.52 maximum

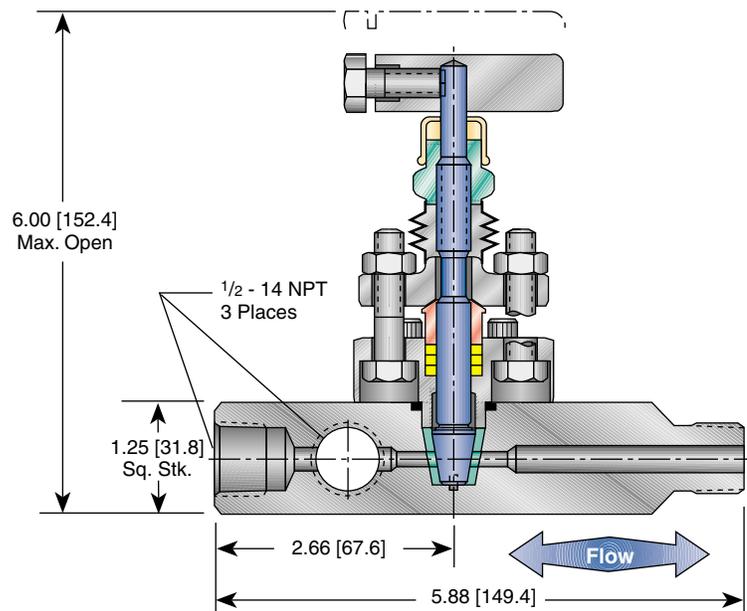
Metal Seat Dimensions, inches [mm]



Note

1. Approximate valve weight:
standard 3.5 lb [1.6 kg].
long 4.0 lb [1.8 kg].
 $\frac{1}{4}$ -inch [6.4 mm] diameter orifice.
Valve C_v 0.52 maximum

Soft Seat Dimensions, inches [mm]



OS&Y Root Valves – M5K Specifications

Standard Materials

Metal Seat

Valve	Body	Stem	Ball	Yoke	Bolt
CS ¹	A105 CS	A581-303 SS	17-4 PH	A351-CF8M	A574
316 SS	A479-316 SS	A276-316 SS	A276-316 SS	A351-CF8M	A574
316L SS	A479-316L SS	A276-316 SS	A276-316 SS	A351-CF8M	A574
SG ²	A479-316 SS	Monel [®] 400	Monel [®] K500	A351-CF8M	A574

Soft Seat

Valve	Body	Stem	Yoke	Bolt	Seat
CS ¹	A105 CS	A582-303 SS	A351-CF8M	A574	Delrin [®]
316 SS	A479-316 SS	A276-316 SS	A351-CF8M	A574	Delrin [®]
316L SS	A479-316L SS	A276-316 SS	A351-CF8M	A574	Delrin [®]
SG ²	A479-316 SS	Monel [®] R405	A351-CF8M	A574	Delrin [®]

Pressure and Temperature Ratings

Metal Seated

Valve	Packing	Pressure and Temperature Rating	
CS ¹	GRAFOIL [®]	6000 psig @ 200°F 1500 psig @ 850°F	[414 barg @ 93°C] [103 barg @ 454°C]
316 SS, SG ²	GRAFOIL [®]	6000 psig @ 200°F 1500 psig @ 1000°F	[414 barg @ 93°C] [103 barg @ 538°C]
316L SS	GRAFOIL [®]	5000 psig @ 200°F 1500 psig @ 850°F	[345 barg @ 93°C] [103 barg @ 454°C]
CS, 316 SS	Teflon [®]	6000 psig @ 200°F 4000 psig @ 500°F	[414 barg @ 66°C] [276 barg @ 260°C]

Soft Seated

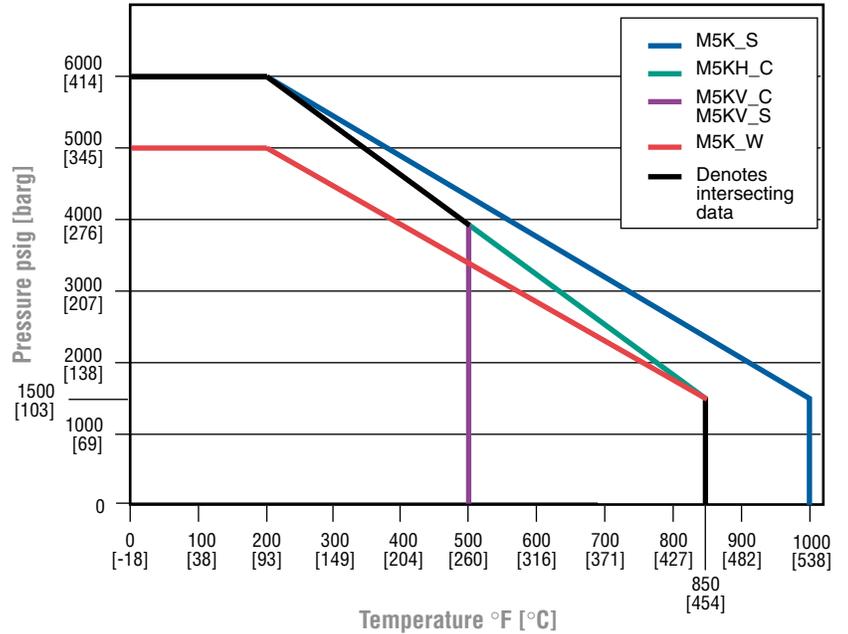
Valve	Packing	Seat Material	Pressure and Temperature Rating	
CS ¹	GRAFOIL [®]	Delrin [®] and PCTFE ³	6000 psig @ 200°F	[414 barg @ 93°C]
316 SS	GRAFOIL [®]	PEEK	6000 psig @ 200°F 2000 psig @ 400°F	[414 barg @ 93°C] [138 barg @ 93°C]
316L SS	GRAFOIL [®]	Teflon [®]	1000 psig @ 150°F 200 psig @ 500°F	[69 barg @ 66°C] [14 barg @ 260°C]

Notes

1. CS is zinc-cobalt plated to prevent corrosion (except male plain end is black oxide coated).
2. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.
3. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F[®].

OS&Y Root Valves – M5K Specifications

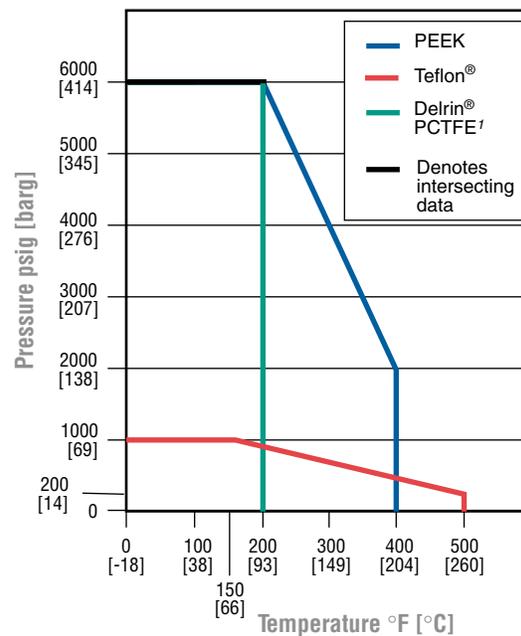
Pressure vs. Temperature – Metal Seat



Note

- PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.

Pressure vs. Temperature – Soft Seat



Max. temperature	CS	1500 psig @ 850°F	[103 barg @ 454°C]
	SS	1500 psig @ 1000°F	[103 barg @ 538°C]
Max. pressure	316L SS	5000 psig @ 200°F	[345 barg @ 93°C]

OS&Y Root Valves – M5K Specifications

M5K Ordering Information – Metal Seat

M5K H I S – 44LC – SG

Packing

- H – GRAFOIL®
- V – Teflon®

Seat¹

- I – Integral (standard)
- S – 316 SS Insert
- M – Monel® Insert
- T – Stellite Insert/Stellite Ball

Body Material²

- C – CS, A105³
- S – SS, A479-316
- W – SS, A479-316L

Connections (Inlet/Outlet)⁴

- 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

- CLC – Chlorine Cleaning
- HD – Hydrostatic Testing (100%) (MSS-SP-61)
- OC – Oxygen Cleaning
- SG – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)
- SP – Special Requirements - please specify

Notes

1. 3/16 inch [4.8 mm] diameter orifice.
2. Call factory for optional materials.
3. CS is zinc-cobalt plated to prevent corrosion (except male plain end is black oxide coated).
4. Call factory for optional connection sizes.

OS&Y Root Valves – M5K Specifications

M5K Ordering Information – Soft Seat

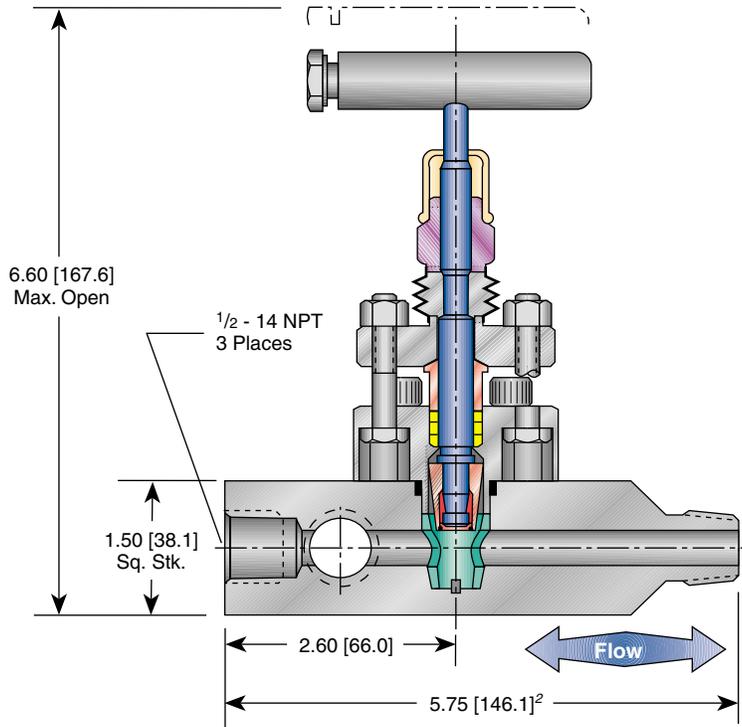
	M5K	V	D	S	- 44LC	- SG
Packing						
H – GRAFOIL®						
V – Teflon®						
Seat¹						
V – Teflon®						
K – PCTFE ²						
E – PEEK						
D – Delrin®						
Body Material³						
C – CS, A105 ⁴						
S – SS, A479-316						
W – SS, A479-316L						
Connections (Inlet/Outlet)⁵						
44 – 1/2-inch MNPT x (3) 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						
CLC – Chlorine Cleaning						
HD – Hydrostatic Testing (100%) (MSS-SP-61)						
OC – Oxygen Cleaning						
SG – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)						
SP – Special Requirements - please specify						

Notes

1. 1/4-inch [6.4 mm] diameter orifice.
2. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
3. Call factory for optional materials.
4. Call factory for optional connection sizes.
5. CS is zinc-cobalt plated to prevent corrosion (except Male plain end is black oxide coated).

OS&Y Root Valves – M5AK Specifications

M5AK Metal and Soft Seat Dimensions, inches [mm]



Notes

1. Approximate valve weight:
standard 4.0 lb [1.8 kg].
long 4.5 lb [2.0 kg].
 $\frac{3}{8}$ -inch [9.5] diameter orifice.
Valve C_v 3.0 maximum.
2. Long body length 7.75-inch [196.8 mm]
4-inch insulation.

Standard Materials

Metal Seat

Valve	Body	Stem	Yoke	Bolt
CS ¹	A105 CS	A581-303 SS	A351-CF8M	A574
316 SS	A479-316 SS	A276-316 SS	A351-CF8M	A574
316L SS	A479-316L SS	A276-316 SS	A351-CF8M	A574
SG ²	A479-316 SS	Monel [®] R405	A351-CF8M	A574

Soft Seat

Valve	Body	Stem	Yoke	Bolt	Seat ³
CS ¹	A105 CS	A581-303 SS	A351-CF8M	A574	Delrin [®]
316 SS	A479-316 SS	A276-316 SS	A351-CF8M	A574	Delrin [®]
316L SS	A479-316L SS	A276-316 SS	A351-CF8M	A574	Delrin [®]
SG ²	A479-316 SS	Monel [®] R405	A351-CF8M	A574	Delrin [®]

Notes

1. CS is zinc-cobalt plated to prevent corrosion (except male plain end is black oxide coated).
2. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.
3. Teflon[®], PCTFE and PEEK are available.

OS&Y Root Valves – M5AK Specifications

Notes

1. CS is zinc-cobalt plated to prevent corrosion (except male plain end is black oxide coated).
2. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.
3. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.

Pressure and Temperature Ratings

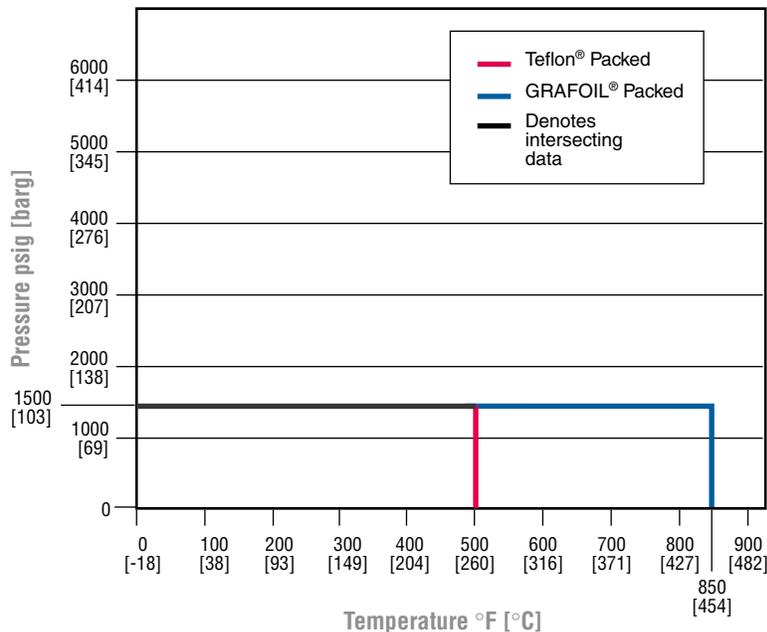
Metal Seat

Valve	Teflon® Packed	GRAFOIL® Packed
CS ¹	1500 psig @ 500°F [103 barg @ 260°C]	1500 psig @ 850°F [103 barg @ 454°C]
316 SS	1500 psig @ 500°F [103 barg @ 260°C]	1500 psig @ 850°F [103 barg @ 454°C]
316L SS	1500 psig @ 500°F [103 barg @ 260°C]	1500 psig @ 850°F [103 barg @ 454°C]
SG ²	1500 psig @ 500°F [103 barg @ 260°C]	1500 psig @ 850°F [103 barg @ 454°C]

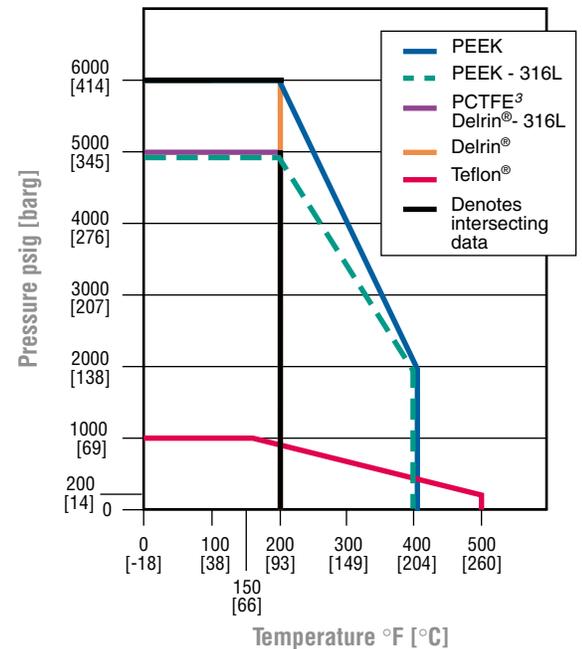
Soft Seat

Valve	Delrin®	PCTFE ³	PEEK	Teflon®
CS ¹				
316,SS, SG ²	6000 psig @ 200°F [414 barg @ 93°C]	5000 psig @ 200°F [345 barg @ 93°C]	6000 psig @ 200°F [414 barg @ 93°C] 2000 psig @ 400°F [138 barg @ 204°C]	1000 psig @ 150°F [69 barg @ 66°C] 200 psig @ 500°F [14 barg @ 260°C]
316L SS	5000 psig @ 200°F [345 barg @ 93°C]	5000 psig @ 200°F [345 barg @ 93°C]	5000 psig @ 200°F [345 barg @ 93°C] 2000 psig @ 400°F [138 barg @ 204°C]	1000 psig @ 150°F [69 barg @ 66°C] 200 psig @ 500°F [14 barg @ 260°C]

Pressure vs. Temperature – Metal Seat



Pressure vs. Temperature – Soft Seat



OS&Y Root Valves – M5AK Specifications

M5AK Ordering Information – Metal Seat

M5AK

H

S

S

– 44C

– SG

Packing

- H – GRAFOIL®
- V – Teflon®

Seat

- S – 316 SS
- M – Monel®

Body Material¹

- C – CS, A105
- S – SS, A479-316
- W – SS, A479-316L

Connections (Inlet/Outlet)²

- 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 (inlet) (CS is black oxide coated)

Options

- CLC – Chlorine Cleaning
- HD – Hydrostatic Testing (100%) (MSS-SP-61)
- OC – Oxygen Cleaning
- SC – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)
- SP – Special Requirements - please specify

Notes

1. Call factory for optional materials.
2. Call factory for optional connection sizes.

OS&Y Root Valves – M5AK Specifications

M5AK Ordering Information – Soft Seat

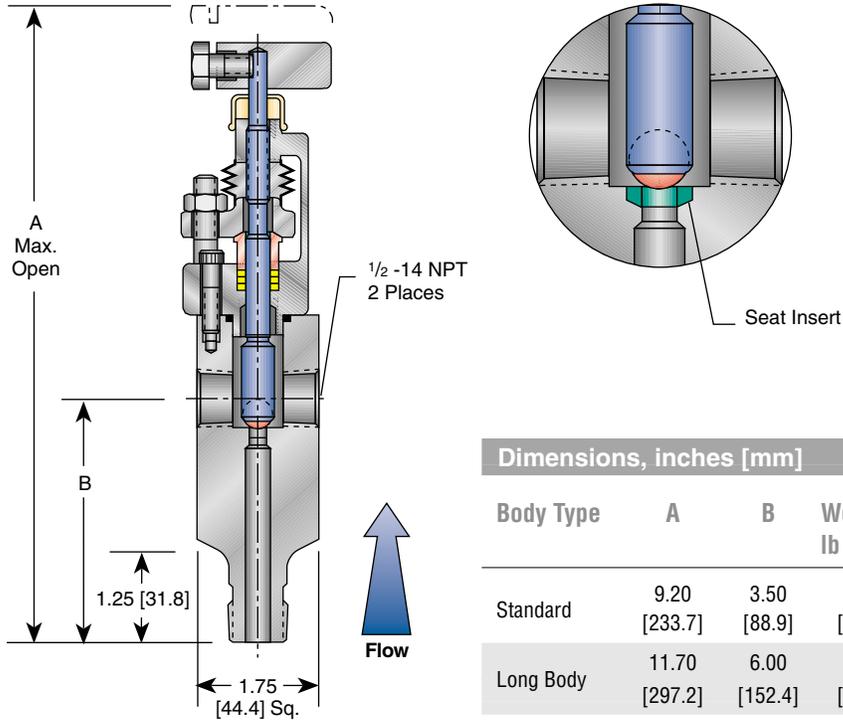
	M5AK	V	V	S	- 44C	- SG
Packing						
	H – GRAFOIL®	V – Teflon®				
Seat						
	V – Teflon®	D – Delrin®	E – PEEK	K – PCTFE ¹		
Body Material²						
	C – CS, A105	S – SS, A479-316	W – SS, A479-316L			
Connections (Inlet/Outlet)³						
	44 – 1/2-inch MNPT x (3) 1/2-inch FNPT	46 – 3/4-inch MNPT x (3) 1/2-inch FNPT				
	C – Male plain end (inlet) (CS is black oxide coated)					
Options						
	CLC – Chlorine Cleaning	HD – Hydrostatic Testing (100%) (MSS-SP-61)	OC – Oxygen Cleaning	SC – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)	SP – Special Requirements - please specify	

Notes

1. PCTFE (Polychlorotrifluoroethylene) is the exact equivalent of Kel-F®.
2. Call factory for optional materials.
3. Call factory for optional connection sizes.

OS&Y Root Valves – M5YK Specifications

Dimensions, inches [mm]



Dimensions, inches [mm]

Body Type	A	B	Weight lb [kg]
Standard	9.20 [233.7]	3.50 [88.9]	4.5 [2.0]
Long Body	11.70 [297.2]	6.00 [152.4]	7.0 [3.2]

Standard Materials

Valve ¹	Body ⁴	Stem	Ball	Yoke	Bolt
CS ²	A696-Gr C	A276-316 SS	17-4PH	A351-CF8M	A574
316 SS	A479-316 SS	A276-316 SS	A276-316 SS	A351-CF8M	A574
316L SS	A479-316L SS	A276-316 SS	A276-316 SS	A351-CF8M	A574
SG ³	A479-316 SS	Monel [®] R405	Monel [®] K500	A351-CF8M	A574

Notes

1. Orifice size 1/4-inch [6.4 mm].
Valve C_v 1.4 maximum.
2. CS is zinc-cobalt plated to prevent corrosion.
3. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.
4. Call factory for optional materials.

OS&Y Root Valves – M5YK Specifications

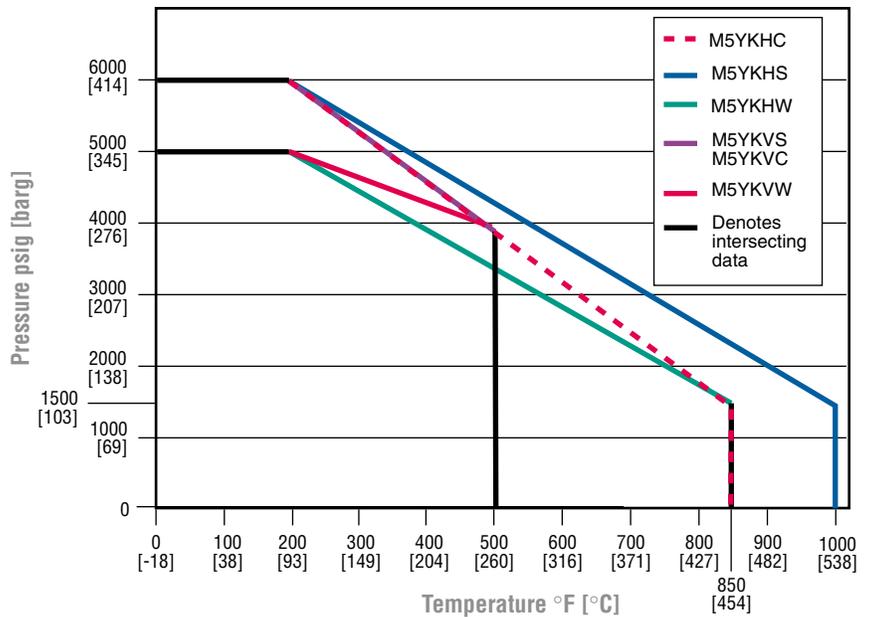
Pressure and Temperature Ratings

Valve	GRAFOIL® Packing		Teflon® Packing	
CS	6000 psig @ 200°F	[414 barg @ 93°C]	6000 psig @ 200°F	[414 barg @ 93°C]
	1500 psig @ 850°F	[103 barg @ 454°C]	4000 psig @ 500°F	[276 barg @ 260°C]
316 SS	6000 psig @ 200°F	[414 barg @ 93°C]	6000 psig @ 200°F	[414 barg @ 93°C]
	1500 psig @ 1000°F	[103 barg @ 538°C]	4000 psig @ 500°F	[276 barg @ 260°C]
316L SS	5000 psig @ 200°F	[345 barg @ 93°C]	5000 psig @ 200°F	[345 barg @ 93°C]
	1500 psig @ 850°F	[103 barg @ 454°C]	4000 psig @ 500°F	[276 barg @ 260°C]
SG ¹	6000 psig @ 200°F	[414 barg @ 93°C]	6000 psig @ 200°F	[414 barg @ 93°C]
	1500 psig @ 1000°F	[103 barg @ 538°C]	4000 psig @ 500°F	[276 barg @ 260°C]

Note

1. SG (Sour Gas) meets the requirements of NACE MR0175-latest revision.

Pressure vs. Temperature



OS&Y Root Valves – M5YK Specifications

Ordering Information

M5YK H I S - 44LC - SG

Packing

- H – GRAFOIL®
- V – Teflon®

Seat (Orifice diameter 1/4-inch [6.4 mm])

- I – Integral (standard)
- S – 316 SS Insert
- M – Monel® Insert
- T – Stellite Insert/Stellite Ball

Body Material¹

- C² – CS, A696 Gr C (A105)
- S – SS, A479-316
- W – SS, A479-316L

Connections (Inlet/Outlet)

- 44 – 1/2-inch MNPT x (2) 1/2-inch FNPT
- 46 – 3/4-inch MNPT x (2) 1/2-inch FNPT
- 48 – 1-inch MNPT x (2) 1/2-inch FNPT

- C – Male plain end (inlet) (CS is black oxide coated)
- L – Long body extension (4-inch [102 mm] insulation) (not available as -44L)

Options

- P – Power, ASME B31.1 (GRAFOIL® packing with Integral seat only)
(consult factory for ratings)
- SG – Sour Gas meets the requirements of NACE MR0175-latest revision (SS only)
- SP – Special Requirements - please specify

Notes

1. Call factory for optional materials.
2. A696 Gr C is the bar stock equivalent to A105 carbon steel.