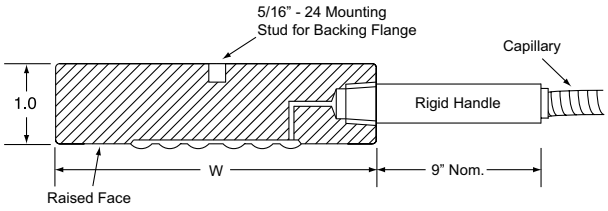
FLUSH PANCAKE (WAFER) DIAPHRAGM SEAL

W9FP

W9FP with Backing Flange

The Flush Pancake (Wafer) Diaphragm Seal is a flange type diaphragm seal with no bolt holes. It mounts between an open process flange and cover flange. Instruments are connected via side capillary connection and it is an ideal seal for transmitters or dP transmitters.



W9FP

Wafer Size	2"	3"	4"
W	3.6"	5.0"	6.2"

SPECIFICATIONS

Wetted Materials	316L SS or Hast C-276
Process Temperature Limits	-110°F to 750°F
Ambient Temperature Limits	Determined by the pressure instrument.

Minimum Recommended Span

	2"	3" & 4"
Transmitter (Gauge Pressure)	100" H_2O	30" H_2O
Transmitter (Differential Pressure)	150" H_2Od	30" H_2Od

HOW TO ORDER: Choose options to build a part number. For example: W9FPWR2SF1-W10-AS-DG // DXFR242S

W9FP W R 2 S F 1

MODEL
W9FP = Flanged Pancake

INSTRUMENT CONNECTION
W = Low-Volume Connection for Smart Transmitters

SEALING FACE
R = Raised Face

PIPE SIZE
2 = 2" Pipe
3 = 3" Pipe
4 = 4" Pipe
6 = 6" Pipe

DIAPHRAGM/WETTED SURFACE MATERIAL
S = 316L SS
***H** = Hastelloy C-276

*Non-wetted body is 316L SS

Wetted

BACKING FLANGE MATERIAL
X = No Backing Flange
S = 316L SS
F = 304 SS
C = Carbon Steel

FLANGE RATING
X = No Backing Flange
1 = 150#
3 = 300#
6 = 600#
5 = 2500#
9 = 900#/1500#
7 = 900#[1]
8 = 1500#[1]

[1]For 3" Pipe Size or Larger

-W10 -AS -DG // DXFR242S

MOUNTING
-B?? = SS Armored Capillary, Welded
-W?? = PVC Coated SS Armored Capillary, Welded
Note: ?? = Length in feet (e.g. 05 = 5 feet)

FILL FLUID
-AS = Silicone DC200
-AG = Glycerin USP
-BH = Silicone DC704
-C1 = Fomblin Y06 (inert)
-C2 = Halocarbon 6.3

See Page 76 for Complete Fill Guide

OPTIONS
-DG = Degreased and Bagged
-OX = Cleaned for Oxygen Service (Shipped in Sealed Bag)
-AU = Gold Plated Diaphragm (20 microns thick)
-TS = SS Tag (1-10 Characters)

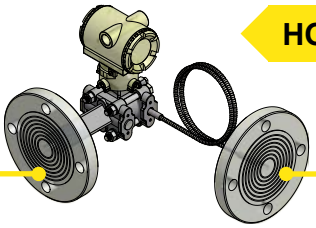
See Page 71 for Smart Transmitter Attachment Codes

FLUSH/CALIBRATION RINGS (OPTIONAL)
DXFR242S = 2" Pipe, Dual 1/4" Port, 316SS
DXFR322S = 3" Pipe, Dual 1/2" Port, 316SS

See Page 119 for a Complete List

Wetted

SMART TRANSMITTER ATTACHMENT



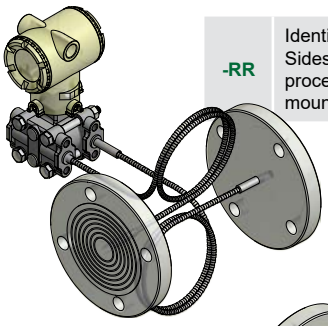
HOW TO ORDER: Unbalanced System Example

W9FFWR31S-DWD-AS-**RB**

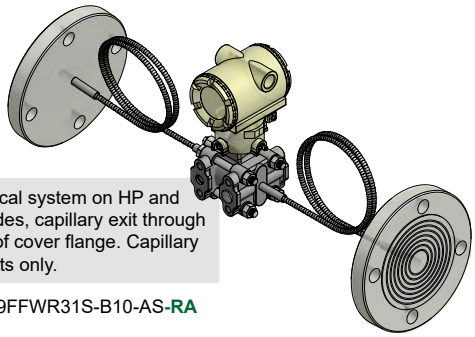
W9FFWR31S-B05-AS-**RL**

DIFFERENTIAL PRESSURE ASSEMBLY

Balanced System A complete assembly with one part number that includes two diaphragm seals, two capillaries, two fills, and one complete assembly calibration certificate.



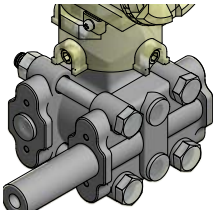
-RR	Identical system on HP and LP Sides, capillary exit through process connections. Capillary mounts only.



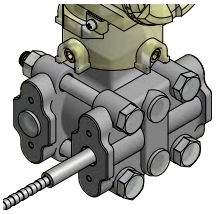
-RA	Identical system on HP and LP sides, capillary exit through face of cover flange. Capillary mounts only.

Example: W9FFWR31S-B10-AS-**RA**

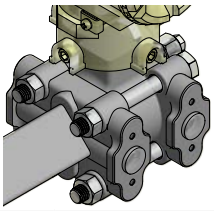
Unbalanced DP System Where seal, mount, capillary, or fill is not identical. A complete assembly includes one diaphragm seal on the HP side AND one diaphragm seal on the LP side.



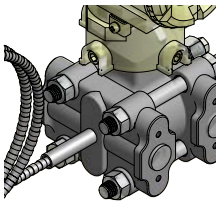
-RH	Mount via Process Connections
Side	High Pressure



-RL	Mount via Process Connections
Side	Low Pressure



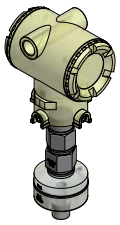
-RB	Mount via Face of Cover Flange
Side	High Pressure



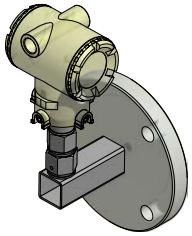
-RC	Mount via Face of Cover Flange
Side	Low Pressure

GAUGE PRESSURE ASSEMBLY

In Line Pressure Transmitter

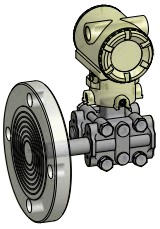


-R1	Mount to In-Line Gauge Pressure Transmitter. Direct or remote mount.

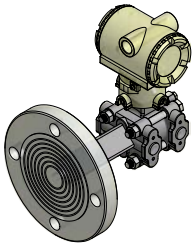


-R4	Horizontal Mount (Tank Mount) to In-Line Gauge Pressure Transmitter. Direct mount only.

Traditional Mount for Gauge Pressure Seal mount on one side only, other side is vented.



-R2	Instrument mount through process connections, HP Side. Use “R3” if mounting to LP side

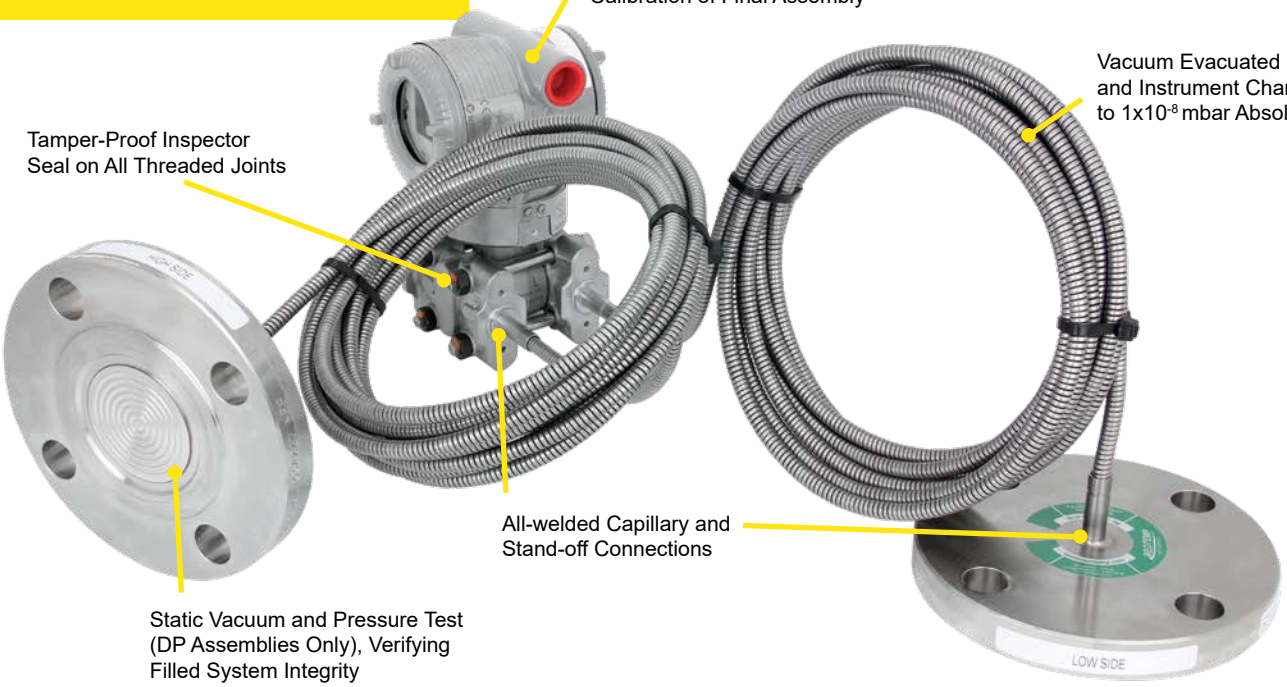


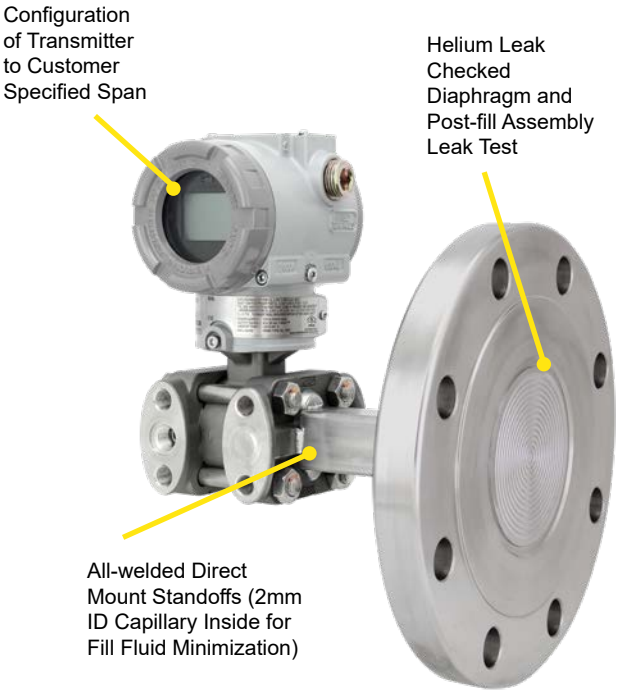
-R8	Instrument mount through face of cover flange, HP Side. Use “R9” if mounting to LP Side

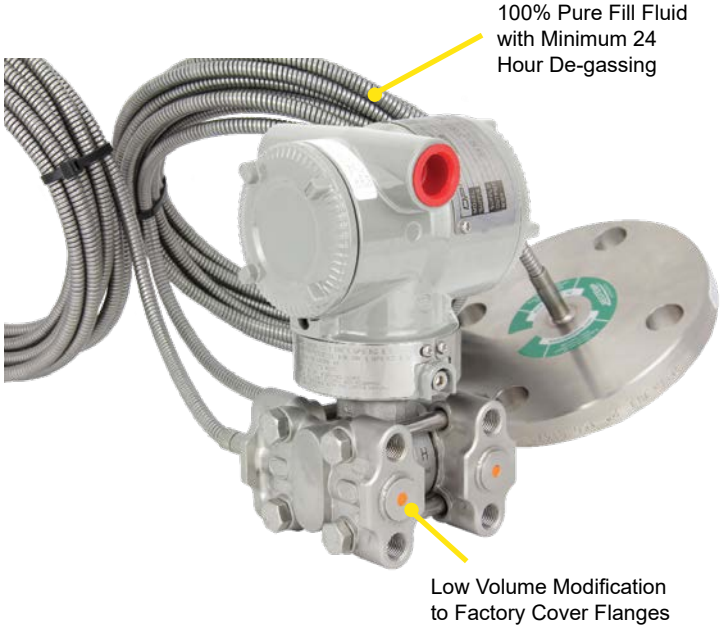
DIAPHRAGM SEAL ASSEMBLY TO SMART TRANSMITTERS

Reotemp specializes in the unique craft of assembling diaphragm seals to field transmitters for the purpose of measuring pressure, differential pressure, level, and flow. As a trusted supplier to many of the world's leading transmitter manufacturers, Reotemp can assemble a diaphragm seal system to virtually any make or model transmitter. Every transmitter mount includes the features below to ensure superior performance and durability for every assembly. Reotemp also offers repair, refurbishment or replacement of used transmitters with remote seals.

STANDARD FEATURES ON ALL REOTEMP ASSEMBLIES







INSTRUMENT MOUNTING CONFIGURATIONS

DIRECT MOUNT

Direct Mounting a pressure gauge, switch, or transmitter is the most common diaphragm seal assembly.

Threaded

- Allows Replaceability
- High Quality Thread Sealant
- Inspector Seal

Welded

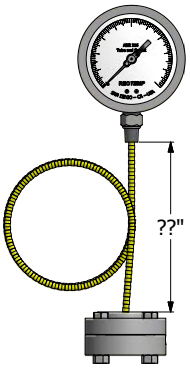
- Tamper Proof
- Rated for High Temps
- Leak Resistant

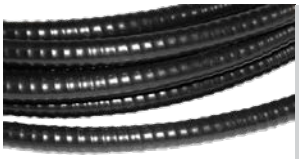
Code	Description	Max. Temp
-DTD	Threaded Instrument Connection	400°F
-DWD	Welded Instrument Connection	600°F

Assembly Notes: Welded connection recommended for pressure exceeding 1,500 psi for purposes of leak prevention.

REMOTE MOUNT

Remote Mounting a pressure instrument using flexible capillary is a common mounting method when the point of measurement is in a hazardous or inconvenient location.





PVC Coated SS Flex Armor

SS Flex Armor

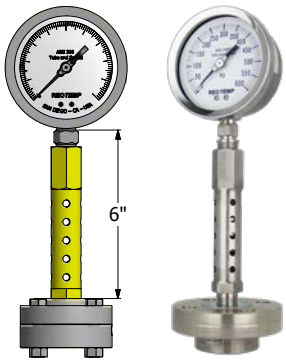
Code	Description	Max. Temp
-P??	PVC Coated SS Armor, Threaded to Seal	400°F
-W??	PVC Coated SS Armor, Welded to Seal	600°F
-A??	SS Flexible Armor, Threaded to Seal	400°F
-B??	SS Flexible Armor, Welded to Seal	750°F

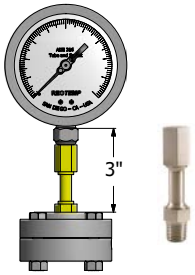
Note: ?? = Length in feet (e.g. 05 = 5 feet)

Assembly Notes: Capillary has a 2mm inner diameter unless specified differently by customer. Ambient temp limit of PVC coated armor is 250ºF. Standard instrument connection is threaded (Smart Transmitters are welded), unless specified by customer.

COOLING ELEMENTS

Used in either high temp or cold temp applications, Cooling Elements mounted above diaphragm seals quickly normalize fluid temperature toward ambient. This protects the pressure instrument while still maintaining the convenience of a direct mount.





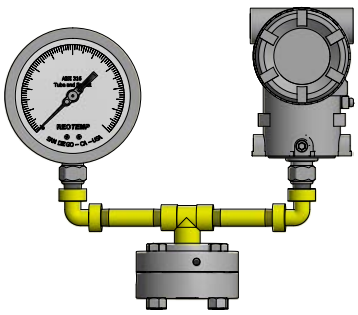
-RTR | -STW

Code	Description	Max. Temp
-RTR	6” Cooling Tower	750°F
-STW	3” Cooling Standoff	600°F

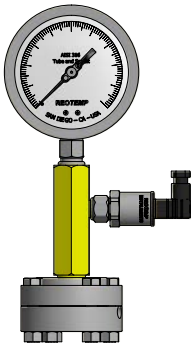
Assembly Notes: Cooling elements are welded to diaphragm seal. Instruments are threaded to cooling element unless specified. All lengths are nominal.

TREE ASSEMBLIES

Tree Assemblies offer the ability to mount two pressure instruments onto one diaphragm seal, allowing the user to gain both a local indication and a remote signal without adding an additional pipe insertion.



-TRE & -TRX



-TRM

Code	Description	Max. Temp
-TRE	Goal Post, Low Pressure Assembly (Max. 150 psi)	400°F
-TRX	Goal Post, Heavy Duty (Max. 3,000 psi)	600°F
-TRM	Compact Tree Assembly (Max. 3,000 psi)	600°F

Assembly Notes: Threaded joints are fully welded for consistent instrument orientation. Instrument connections are threaded unless specified by customer. Diaphragm seal must displace enough fluid to drive both instruments.

FILL GUIDE

Diaphragm seals are designed to protect pressure instruments from hot process media and corrosive chemicals while minimizing any negative effect on instrument accuracy and durability. A well-made diaphragm seal can achieve this goal only if it is properly assembled, filled, and tested. Reotemp's highly trained technicians use state-of-the-art equipment so that every diaphragm seal assembly is filled and tested to assure optimal instrument performance:

- ✓ 24-hour Minimum Fluid De-gassing
- ✓ Evacuated Instrument Chamber Up to 10^{-8} mbar Absolute
- ✓ Complete Fill Integrity Check
- ✓ Fill-port Leak Test
- ✓ Post-fill Static Test
- ✓ Verification of Instrument Calibration
- ✓ High-temp Pipe Sealant Used on All Threaded Joints (Welded Joints Upon Request)
- ✓ Tamper-proof (Inspection Seal) Lacquer used on All Threaded Joints
- ✓ Sturdy Diaphragm Packaging Protection

Part Number Code	Name	Description	Temperature Range (Vacuum Service <5psia)	Pulse+™	Viscosity cst @ ~77°F	Specific Gravity @ ~77°F	Thermal Expansion cc/cc/°C
STANDARD FILL FLUID							
AS	Silicone DC200[1]	This is the standard fill fluid for most diaphragm seal applications.	-40°F to 400°F (-40°F to 250°F)	Yes	20	0.94	.00104
HIGH TEMP SILICONE							
BH	Silicone DC704[1]	Standard for Smart Transmitters and capillary systems. Performs well in applications with high temperature and a deep vacuum.	0°F to 650°F (0°F to 450°F)	No	44	1.07	.00077
B1	Silicone DC710[1]	Highest temperature rating; ideal for gauge seal assemblies. Too thick for capillary assemblies. Response time can become very slow in cold conditions.	50°F to 750°F (50°F to 400°F)	Yes	500	1.11	.00043
C8	Syltherm 800[2]	Low viscosity allows it to perform well in both low and high temperatures. Not recommended for vacuum service or at high temperatures when under low static pressure.	-40°F to 750°F (-40°F to 150°F)	No	9.5	0.93	.00136
B5	Silicone DC705[1]	Performs very well in high temperatures when under vacuum. The high viscosity and freezing point of this fluid makes it a poor choice for cold or outdoor installations without heat tracing.	50°F to 675°F (50°F to 550°F)	Yes	175	1.09	.00096
B2	Silicone DC550[1]	Similar high temperature performance as DC705, however it performs better at lower temperatures.	-40°F to 575°F (-40°F to 400°F)	No	125	1.07	.00076
FOOD GRADE							
AG	Glycerin USP	This is the standard fill fluid for most gauge seal assemblies for food, beverage, and pharmaceutical applications. Its high viscosity will cause very slow response at times in low temperature and outdoor installations.	60°F to 450°F (Not Suitable)	Yes	1100	1.26	.00061
BN	NEOBEE M20[7]	Low viscosity and a wide temperature range makes this the standard sanitary fill fluid for Smart Transmitters and capillary systems.	-10°F to 400°F (-10°F to 200°F)	No	10	0.92	.00101
BS	Food Grade Silicone	Highest temperature limit for food grade fluids. Because of its high viscosity it does not perform well in low temperatures.	20°F to 550°F (20°F to 250°F)	Yes	350	0.97	.00096
BP	Propylene Glycol	This is the fill fluid used when Glycol is called for on the customer specification. It has a very narrow temperature range.	0°F to 200°F (Not Suitable)	No	2.85	1.03	.00073
INERT (TYPICALLY FOR CHLORINE AND OXYGEN APPLICATIONS OR IN SILICONE-FREE ENVIRONMENTS)							
C1	Fomblin Y06[4]	Ideal inert fluid for transmitter applications. Relatively high vapor pressure above 200°F. Not recommended for use in high temperature situations with low static pressure.	-40°F to 450°F (0°F to 250°F)	No	71	1.88	.00086
C2	Halocarbon 6.3[3]	Standard inert fluid used in gauge seal assemblies.	-40°F to 400°F (-40°F to 200°F)	Yes	6.3	1.87	.00084
C3	Halocarbon 1.8[3]	Typically used in low temperature applications because of its low viscosity.	-110°F to 220°F (-100°F to 100°F)	No	1.8	1.82	.00084
C4	Fluorolube FS-5[5]	Similar performance to Halocarbon 6.3, however not suitable for vacuum service.	-40°F to 450°F (Not Suitable)	No	5	1.86	.00087
SPECIALTY							
CK	Krytox 1506[6]	Specialty fill fluid, inert.	-40°F to 350°F (-40°F to 300°F)	No	62	1.88	.00095
BE	Ethylene Glycol	Occasionally used in annular (O-ring) seal assemblies.	-25°F to 320°F (Not Suitable)	No	30	1.10	.00062

1 Trademark Dow Corning
2 Trademark The Dow Chemical Company
3 Trademark Halocarbon Product Corporation
4 Trademark AUSIMONT S.P.A
5 Trademark Hooker Chemical Company
6 Trademark The Chemours Company FC, LLC
7 Trademark Stepan Specialty Products

Note: PulsePlus™ fill fluids may have different physical properties than specified. Chemical composition and temperature ranges do not vary.

DIAPHRAGM SEAL ACCESSORIES

DRY CAPILLARY

- Used When Pressure Instrument Needs to be Removed from Direct Contact of Installation Point
- All-welded 316SS Construction
- Available up to 100 ft. in Length (Max Recommended Length of 40 ft. in DSS)
- Max Working Pressure of 10,000 psig (5,000 psig for 3mm ID) All Pressure Ratings are at 100°F
- 2mm ID Standard
- Note: if capillary is part of a filled diaphragm seal system use 3 digit mounting code per page 73 (Example: "A25" = 25' of armored capillary, threaded to seal)

HOW TO ORDER: Choose options to build a part number. For example: DXC4M4M10A-TS

DXC	4M	4M	10	A	-TS
MODEL	INSTRUMENT CONNECTION	PROCESS CONNECTION	LENGTH IN FEET	PROTECTION	OPTIONS
DXC = Capillary	**4M** = 1/4" Male NPT **4F** = 1/4" Female NPT **2M** = 1/2" Male NPT **2F** = 1/2" Female NPT **8W** = 8mm Male Welded	**4M** = 1/4" Male NPT **4F** = 1/4" Female NPT **2M** = 1/2" Male NPT **2F** = 1/2" Female NPT **8W** = 8mm Male Welded	**05** = 5 ft. **10** = 10 ft. **20** = 20 ft. **??** = Specify, Length in feet	**A** = Stainless Steel Armor **P** = PVC Coated Stainless Steel Armor **B** = Bare Capillary Tubing (Rare)	**-3M** = 3mm ID (10 ft. Max) **-TS** = Stainless Steel Tag (1-10 Characters) **-1M** = 1mm ID

FLUSH RINGS

- Used to Flush Process Fluid or Provide Access for Field Calibrations
- Machined from Solid Bar Stock
- Pressure Ratings Up to ANSI Class 2500
- For Use with W9FF and W9FR Diaphragm Seals (Raised Face)

HOW TO ORDER: Choose options to build a part number. For example: DXFR322S-PM

DXFR	3	2	2	S	-PM
MODEL	PIPE SIZE	PORT SIZE	NUMBER OF PORTS	MATERIAL	OPTIONS
DXFR = Flush Ring	**H** = 1-1/2" ANSI **2** = 2" ANSI **3** = 3" ANSI **4** = 4" ANSI	**4** = 1/4" NPT **2** = 1/2" NPT	**1** = One Port **2** = Two Ports (180° Opposed) **4** = Four Ports (90° Apart)	**S** = 316SS **H** = Hast-C276 **M** = Monel **J** = Titanium **2** = Duplex 2205 **D** = Alloy 20	**-MR** = Mill Certification **-PM** = Positive Material Identification Certification **-GS** = 1/4" NPT SS Plug **-JS** = 1/2" NPT SS Plug

DIAPHRAGM SEAL OPTIONS

Visit reotemp.com

✓ Check Stock ✓ Get Price
✓ Configure Part # ✓ Download PDF Data Sheets

		MS4 MS6 MS8	W5 W6 W7	T5 T6 V5	W9FF W9FR	W9XT	W9FP	DSTC75	DSTC15 AND LARGER	DSTF05	DSTF75 AND LARGER	OR	DXFR
PULSATION PROTECTION (ONLY AVAILABLE WITH REOTEMP PRESSURE GAUGE MOUNTED TO SEAL)													
-PP	Pulse Plus™	✓	✓	✓	✓	✓	N/A	N/A	✓	N/A	✓	✓	N/A
DIAPHRAGM COATING													
-AU	Gold Plated Diaphragm	N/A	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-TC	Teflon Coated Diaphragm PTFE	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	N/A	N/A
-EP	Electropolished Diaphragm	N/A	N/A	N/A	N/A	N/A	N/A	✓	✓	✓	✓	N/A	N/A
FILL													
-FW	Fill Port Welded Closed	STD[1]	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-VF	Fill for Vacuum Service	N/A	✓	N/A	✓	✓	✓	N/A	✓	N/A	✓	N/A	N/A
CLEANING AND FINISH													
-DG	Degreased, Shipped in Sealed Bag	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-OX	Cleaned for Oxygen Service per ASME B40.1	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-OY	Cleaned for Oxygen Service per MIL-STD-1330D	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	✓
PLUG FOR FLUSH PORT													
-GS	1/4” SS Plug Installed	STD	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JS	1/2” SS Plug Installed	N/A	STD	STD	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-GH	1/4” Hast C Plug Installed	✓	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JH	1/2” Hast C Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-GM	1/4” Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
-JM	1/2” Monel Plug Installed	N/A	✓	✓	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	✓
TAG OPTION													
-TS	Stainless Steel Tag (1-10 Characters)							✓					
-TM	Stainless Steel Tag (11-80 Characters)							✓					
-TP	Paper Tag							✓					
CERTIFICATION OPTIONS													
-NC	Certificate of NACE Compliance	✓	✓	N/A	✓	✓	✓	N/A	N/A	✓	✓	N/A	✓
-CM	General Material Conformance	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-MR	MTR - Mill Test Report Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-PM	PMI - Positive Material Identification Certificate	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	✓
-HT	Hydrostatic Test per ASME B31.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	N/A	N/A
-HL	Helium Leak Test Certificate	✓	✓	N/A	✓	✓	✓	✓	✓	✓	✓	N/A	N/A

✓	Indicates that the option is available
N/A	Indicates the option is not available

[1] Standard on MS8, available on MS4 & MS6.