REOTEMP INSTRUMENTS

Series W51/W61

THREADED OFFLINE WELDED DIAPHRAGM SEALS

DIAPHRAGM SEALS

REOTEMP's Threaded Offline Welded Diaphragm Seals are designed with an upper and lower housing bolted together with a diaphragm welded to the upper housing. This removable design allows for easy cleanout of the seal chamber, while still maintaining the system fill. The threaded offline diaphragm seal can be adapted to fit almost any pressure instrument and process application.

W51

W61

W5K

SPECIFICATIONS

Diaphragm	316/316L SS, Hast C-276, Tantalum, Monel A400, Nickel 201, or Others
Lower Housing	316/316L SS, Hast C-276, Monel A400, Alloy 20, Hast B, 304/304L SS, or Others
Gasket	Klinger C-4401, PTFE Durlon 9600, Grafoil, Kalrez, or Virgin PTFE
Upper Housing	316/316L SS, 304/304L SS or Others

Process Temperature Limits

		W51/W61	W5K/W6M/W5H
Metallic Lower	PTFE Gasket	-110/350ºF	-110/400ºF
	Klinger Gasket	-110/450ºF	-110/500ºF
	Grafoil Gasket	-40/600ºF	-40/750ºF
Non-Metallic Lower		140ºF	N/A

Ambient Temperature Limits — Determined by the pressure instrument.

Minimum Recommended Span

	W5	W6
2.5" & 3.5" Gauges	15 psi	200" H_2O
4", 4.5", & 6" Gauges	30 psi	200" H_2O
Transmitter (Gauge Pressure)	150" H_2O	60" H_2O
Transmitter (Differential Pressure)	300" H_2Od	60" H_2Od
Differential Pressure Gauge (D40/42 Only)	N/A	N/A

Weight

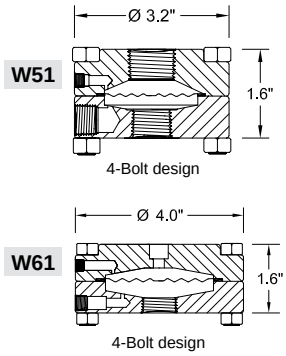
Note: Weights are approximate.

	Metallic Lower	Non-Metallic Lower
W51/W5K	3.5 lbs	2.5 lbs
W5H	11.0 lbs	N/A lbs
W61/W6M	5.2 lbs	4.2 lbs

FEATURES / BENEFITS

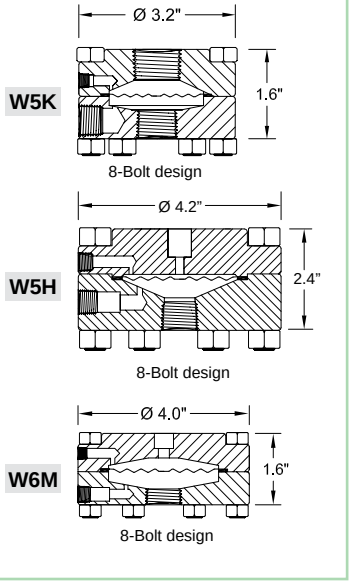
- Welded Diaphragm for Maximum Durability
- Wide Variety of Diaphragm and Material Options
- Continuous-duty Disc Protects from Process Fluid Leaking in the Event of a System Breach
- Easy Cleanout of Diaphragm Cavity without Compromising Filled System

Standard Pressure



Note: All drawings depict a single 1/4" NPT Flush Port (optional). Drawing are not to scale.

Heavy Duty



Maximum Working Pressure at 100ºF:

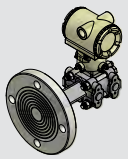
	Bolts	Grade 5	Grade 8	18/8SS	316SS
Metallic Lower	W51	2,500 psi	2,500 psi	1,500 psi	1,500 psi
	W5K	5,000 psi	5,000 psi	3,000 psi	2,500 psi
	W5H	-	10,000 psi	-	-
	W61	1,500 psi	1,500 psi	1,000 psi	750 psi
	W6M	2,500 psi	2,500 psi	2,000 psi	2,000 psi
Non-Metallic Lower		300 psi	300 psi	300 psi	300 psi

THREADED OFFLINE WELDED DIAPHRAGM SEALS

HOW TO ORDER: Choose options to build a part number. For example: W51622HSS-TGRTR-BH-PP

W51	6	2	2	H	S	S
SEAL TYPE	FLUSH PORT	INSTRUMENT CONNECTION	PROCESS CONNECTION	DIAPHRAGM MATERIAL	LOWER HOUSING	UPPER HOUSING
W51 = 2.2" Diaphragm **W5K** = 2.2" Diaphragm Heavy Duty **W5H** = 2.2" Diaphragm High Pressure **W61** = 2.9" Diaphragm **W6M** = 2.9" Diaphragm Heavy Duty	**5** = No Flush Port **6** = Single 1/4" NPT **7** = Dual 1/4" NPT **C** = Single 1/2" NPT[4] **D** = Dual 1/2" NPT[4] [4]Only Available with W51 and W61 Seal Types. Note: SS Plugs Included in Flush Ports.	**2** = 1/2" Female NPT **4** = 1/4" Female NPT **W** = Low-Volume Connection for Smart Transmitters (316 upper only)	**1** = 1" NPT Female **2** = 1/2" NPT Female **3** = 3/4" NPT Female **4** = 1/4" NPT Female **5** = 1.5" NPT Female (W6 ONLY) **M** = 1/2" NPT Male* **6** = 1.25" NPT Female **7** = 3/8" NPT Female **8** = 1/8" NPT Female **9** = 2" NPT Female (W6 ONLY) *Welded adapter, not available in all materials.	**S** = 316L/316L SS **H** = Hast C-276 **U** = Tantalum **M** = Monel A400 **N** = Nickel 201 **2** = Duplex 2205 **J** = Titanium Grade 2[1] **D** = Alloy 20 **F** = 304/304L SS **Y** = Inconel 625 [1]Requires Titanium upper housing. Wetted	**S** = 316/316L SS **H** = Hast C-276 **M** = Monel A400 **D** = Alloy 20 **G** = Hast B **F** = 304/304L SS **C** = Carbon Steel **J** = Titanium **2** = Duplex 2205 **N** = Nickel **T** = Teflon (PTFE) ⚠ **Z** = PVC ⚠ **W** = CPVC ⚠ **K** = Kynar ⚠ ⚠ Important: see choosing a lower housing note below. Wetted	**S** = 316/316L SS **F** = 304/304L SS **M** = Monel A400[2] **J** = Titanium[3] [2]Option upper housing material with Monel diaphragm only. [3]Required with Titanium Diaphragm.

-T	G	RTR	-BH	-PP
BOLTS/FASTENERS	GASKET	INSTRUMENT MOUNT	SYSTEM FILL FLUID	OPTIONS
-5 = Carbon Steel Grade 5, Zinc Plated **-8** = Carbon Steel Grade 8, Yellow Chromate **-T** = Stainless Steel 18/8 **-S** = Stainless Steel 316	**K** = Klinger C-4401 **T** = PTFE Durlon 9600 **G** = Grafoil **Z** = Kalrez **P** = Virgin PTFE Wetted	*Direct Mount* **DTD** = Direct Mount, Threaded **DWD** = Direct Mount, Welded **RTR** = 6" Cooling Tower **STW** = 3" Cooling Standoff *Remote Mount* **A??** = Armored Capillary, Threaded **B??** = Armored Capillary, Welded **P??** = PVC Coated Armor, Threaded **W??** = PVC Coated Armor, Welded Note: ?? = Length in feet (e.g. 05 = 5 feet) *Tree Mount* **TRE** = Goal Post, Low Pressure **TRX** = Goal Post, Heavy Duty **TRM** = Compact Tree Assembly *See Page 57 for Complete Mounting Guide* **YYY** = Dry Seal, No Instrument	*Common Fills* **-AS** = Silicone DC200 **-AG** = Glycerin USP **-BH** = Silicone DC704 **-C1** = Fomblin Y06 (inert) **-C2** = Halocarbon 6.3 *See 58 for Complete Fill Guide* **-XX** = No Fill Fluid	**-PP** = Pulse Plus™ (Pulsation Protection) **-OX** = Cleaned for Oxygen Service **-AU** = Gold-Plated Diaphragm **-TC** = Teflon-Coated Diaphragm **-TS** = SS Tag (1-10 Character) **-FW** = Fill Port Welded Closed **-MR** = Mill Test Report **-NC** = NACE Certification **-PM** = Positive Material Identification Certification *See Page 83 for Additional Options*



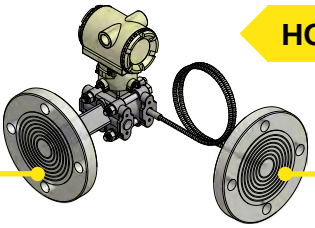
See Page 55 for Smart Transmitter Attachment Codes

⚠ **Important Note on Choosing a Lower Housing:** Reotemp recommends the use of metallic lower housings when process compatibility allows. Before specifying a non-metallic lower housing, users should be familiar with the material characteristics and risks of non-metallic materials including leaking, cracking, flowing and other issues that can affect durability and performance.

REOTEMP INSTRUMENTS

Diaphragm Seals

SMART TRANSMITTER ATTACHMENT



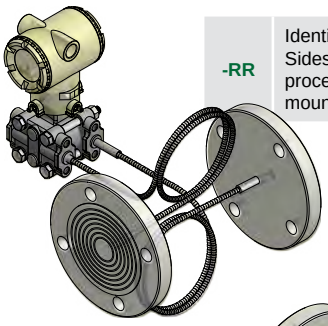
HOW TO ORDER: Unbalanced System Example

W9FFWR31S-DWD-AS-**RB**

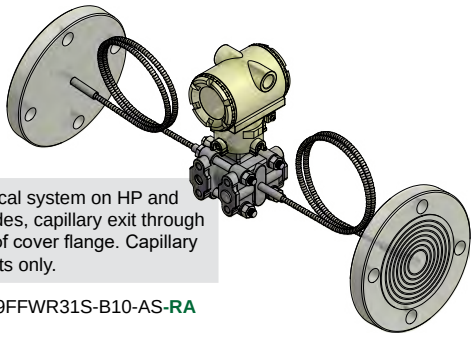
W9FFWR31S-B0S-AS-**RL**

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.



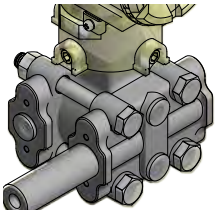
-RR	Identical system on HP and LP Sides, capillary exit through process connections. Capillary mounts only.



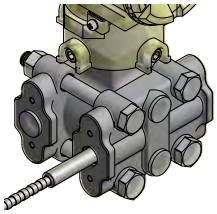
-RA	Identical system on HP and LP sides, capillary exit through face of cover flange. Capillary mounts only.

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

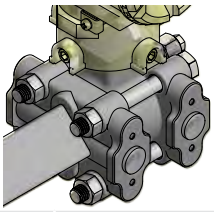
Unbalanced DP System Where seal, mount, capillary, or fill is not identical. A complete assembly includes one diaphragm seal on the HP side AND one diaphragm seal on the LP side.



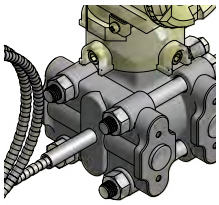
-RH	Mount via Process Connections
Side	High Pressure



-RL	Mount via Process Connections
Side	Low Pressure



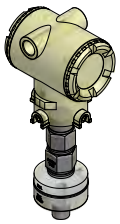
-RB	Mount via Face of Cover Flange
Side	High Pressure



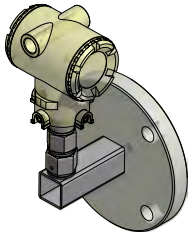
-RC	Mount via Face of Cover Flange
Side	Low Pressure

GAUGE PRESSURE ASSEMBLY

In Line Pressure Transmitter

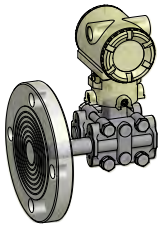


-R1	Mount to In-Line Gauge Pressure Transmitter. Direct or remote mount.

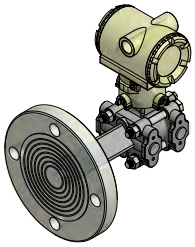


-R4	Horizontal Mount (Tank Mount) to In-Line Gauge Pressure Transmitter. Direct mount only.

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

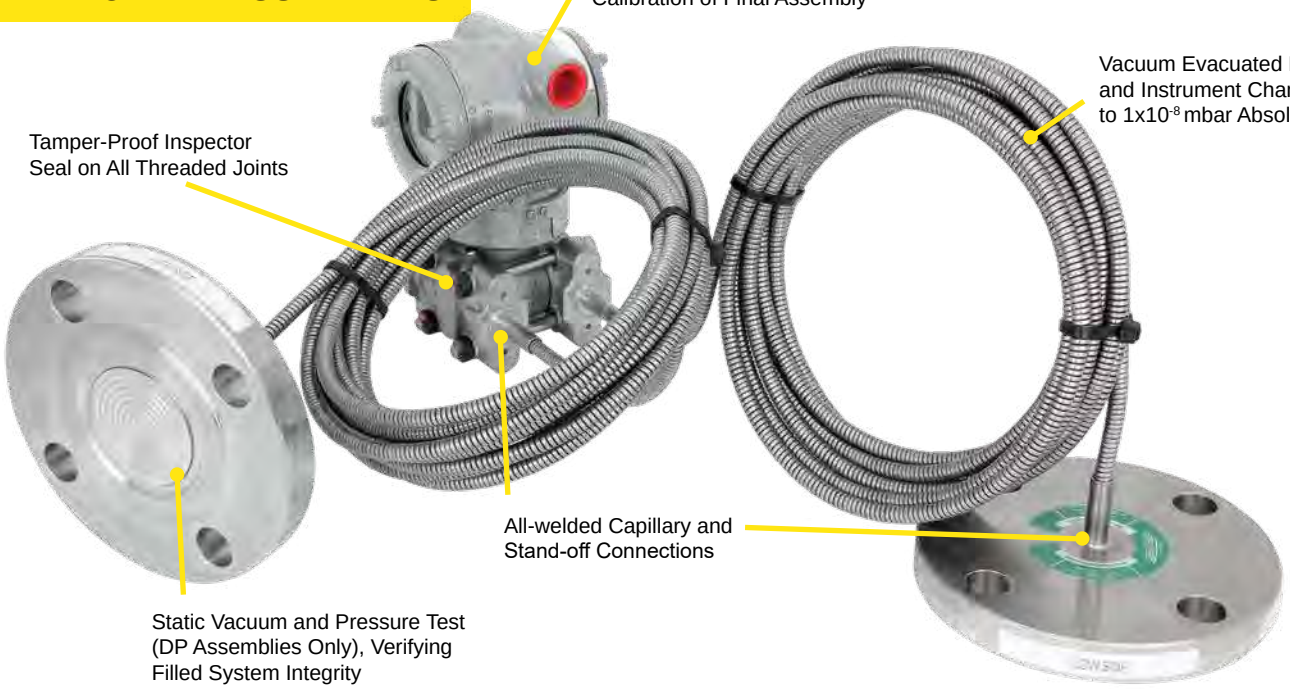


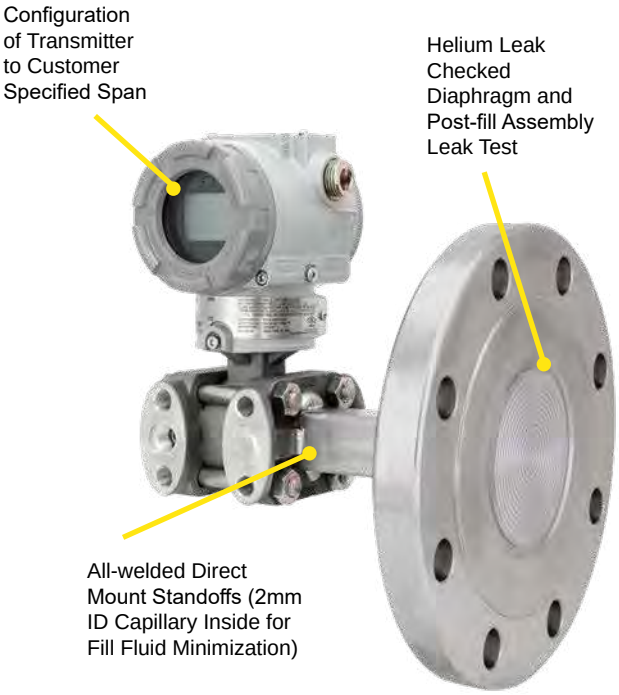
-R8	Instrument mount through face of cover flange, HP Side. Use “R9” if mounting to LP Side

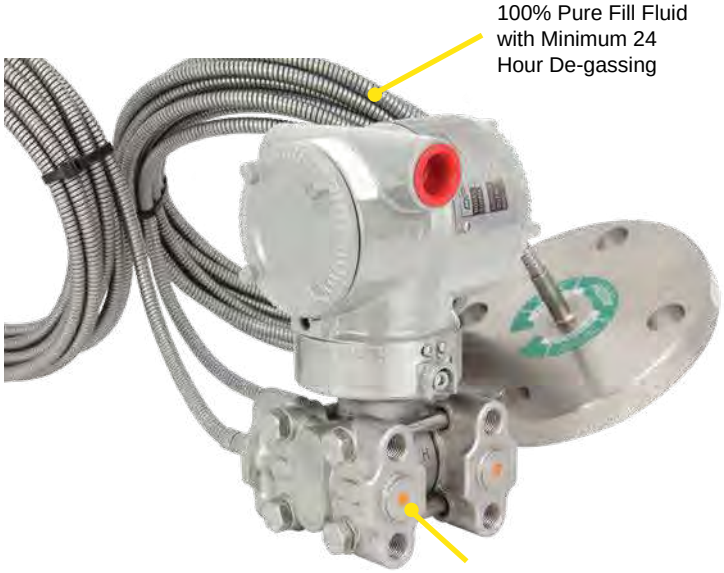
DIAPHRAGM SEAL ASSEMBLY TO SMART TRANSMITTERS

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







Diaphragm Seals

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

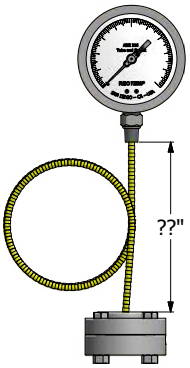
- Tamper Proof
- Rated for High Temps
- Leak Resistant

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

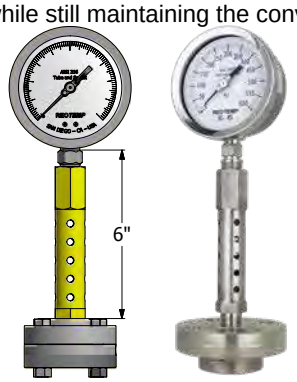
Code	Description	Max. Temp
-P??	PVC Coated SS Armor, Threaded to Seal	400°F
-W??	PVC Coated SS Armor, Welded to Seal	600°F
-A??	SS Flexible Armor, Threaded to Seal	400°F
-B??	SS Flexible Armor, Welded to Seal	750°F

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

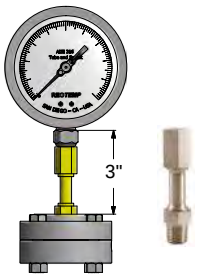
Assembly Notes: Capillary has a 2mm inner diameter unless specified differently by customer. Ambient temp limit of PVC coated armor is 250ºF. Standard instrument connection is threaded (Smart Transmitters are welded), unless specified by customer.

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



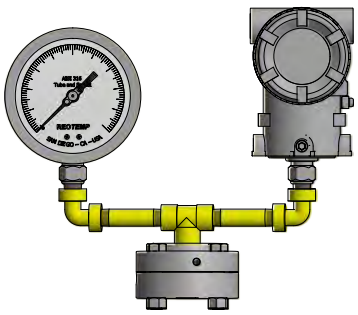
-STW

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

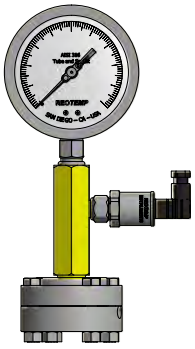
Assembly Notes: Cooling elements are welded to diaphragm seal. Instruments are threaded to cooling element unless specified. All lengths are nominal.

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 @ ~77ºF	Specific Gravity @ ~77ºF	Thermal Expansion cc/cc/ºC
STANDARD FILL FLUID							
AS	Silicone DC200[1]	This is the standard fill fluid for most diaphragm seal applications.	-40ºF to 400ºF (-40ºF to 250ºF)	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.	0ºF to 650ºF (0ºF to 450ºF)	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.	50ºF to 750ºF (50ºF to 400ºF)	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.	-40ºF to 750ºF (-40ºF to 150ºF)	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.	50ºF to 675ºF (50ºF to 550ºF)	Yes	175	1.09	.00096
B2	Silicone DC550[1]	Similar high temperature performance as DC705, however it performs better at lower temperatures.	-40ºF to 575ºF (-40ºF to 400ºF)	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.	60ºF to 450ºF (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.	-10ºF to 400ºF (-10ºF to 200ºF)	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.	20ºF to 550ºF (20ºF to 250ºF)	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.	0ºF to 200ºF (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 200ºF. Not recommended for use in high temperature situations with low static pressure.	-40ºF to 450ºF (0ºF to 250ºF)	No	71	1.88	.00086
C2	Halocarbon 6.3[3]	Standard inert fluid used in gauge seal assemblies.	-40ºF to 400ºF (-40ºF to 200ºF)	Yes	6.3	1.97	.00084
C3	Halocarbon 1.8[3]	Typically used in low temperature applications because of its low viscosity.	-110ºF to 220ºF (-100ºF to 100ºF)	No	1.8	1.82	.00084
C4	Fluorolube FS-5[5]	Similar performance to Halocarbon 6.3, however not suitable for vacuum service.	-40ºF to 450ºF (Not Suitable)	No	5	1.86	.00087
SPECIALTY							
CK	Krytox 1506[6]	Specialty fill fluid, inert.	-40ºF to 350ºF (-40ºF to 300ºF)	No	62	1.88	.00095
BE	Ethylene Glycol	Occasionally used in annular (O-ring) seal assemblies.	-25ºF to 320ºF (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 OPTIONS

		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.