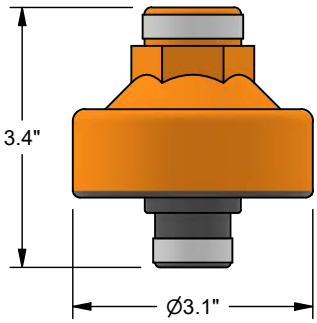
# PLASTIC CHEMICAL SEAL




Reotemp's Model PLS Plastic Chemical Seals provide complete isolation of pressure measurement instruments such as dial pressure gauges, pressure transmitters, and switches from a wide variety of corrosive or ultra pure process fluids. Also know as a Gauge Guard or a Gauge Isolator, the Model PLS features all non-metallic wetted components, offering a robust, durable, and economical solution to pressure measurement applications in Wasterwater, Water Treatment, Chemical Processing, Deslination, and other applications where plastic piping is traditionally used.

## FEATURES / BENEFITS

- High Chemical Resistance
- Easy to Field Mount Instrument; No Special Equipment Necessary
- Choice of Body Materials for a Wide Range of Applications
- Heavy Duty Design; SS Reinforced Process Connections Prevent Fracturing During Installation

## SPECIFICATIONS

| | |
|---|---|
| **Diaphragm** | Teflon (PTFE); Bonded Hypalon |
| **Lower Housing** | PP, PVC, CPVC, PVDF (Kynar) |
| **Upper Housing** | Glass-Filled Polypropylene |
| **Gasket** | EPDM |
| **Stainless Steel Band** | 304 SS |

**Process Temperature Limits**

| | |
|---|---|
| PP | 140°F |
| PVC | 140°F |
| CPVC | 170°F |
| PVDF | 248°F |

**Ambient Temperature Limits** — Determined by the pressure instrument.

**Weight**

| | |
|---|---|
| PP | 0.9 lbs |
| PVC | 1.0 lbs |
| CPVC | 1.2 lbs |
| PVDF | 1.3 lbs |

**Minimum Recommended Span**

| | PLS |
|---|---|
| 2.5" & 3.5" Gauges | 15 psi |
| 4", 4.5", & 6" Gauges | 15 psi |
| Transmitter (Gauge Pressure) | 15 psi |
| Transmitter (Differential Pressure) | n/a |
| Differential Pressure Gauge (D40/42 ONLY) | n/a |

# PLASTIC CHEMICAL SEAL

**HOW TO ORDER: For example: PLS42TZ-DTD-AG-CRN**

| PLS | 4 | 2 | T | Z | -DTD | -AG |
|---|---|---|---|---|---|---|
| **MODEL** | **INSTRUMENT CONNECTION** | **PROCESS CONNECTION** | **DIAPHRAGM MATERIAL (WETTED)** | **LOWER HOUSING (WETTED)** | **INSTRUMENT MOUNT** | **SYSTEM FILL FLUID** |
| **PLS** = Plastic Chemical Seal | **4** = 1/4" FNPT<br>**2** = 1/2" FNPT | **4** = 1/4" FNPT<br>**2** = 1/2" FNPT | **T** = Teflon; PTFE (Bonded Hypalon)<br>Wetted | **Z** = PVC<br>**P** = Polypropylene<br>**K** = PVDF (Kynar)<br>**W** = CPVC<br>Wetted | **-DTD** = Direct Mount; Threaded<br>**-A??** = Armored Capillary; Threaded<br>*See Page 7 for Complete Mounting Guide* | **-AS** = Silicone DC200<br>**-AG** = Glycerin USP<br>**-BN** = Neobee M20<br>**-C2** = Halocarbon 6.3<br>*See Page 14 for Complete Fill Guide* |

| -TS |
|---|
| **OPTIONS** |

**-TS** = SS Tag
**-PP** = Pulse Plus (Pulsation Protection)

**Maximum Working Pressure by Process Temperature and Material**

| Body Material | 50-85°F | 100°F | 125°F | 150°F | 175°F | 200°F | 225°F | 250°F |
|---|---|---|---|---|---|---|---|---|
| PVC | 250 psi | 225 psi | 130 psi | 120 psi | N/A | N/A | N/A | N/A |
| Kynar | 250 psi | 250 psi | 240 psi | 225 psi | 205 psi | 150 psi | 110 psi | 75 psi |
| CPVC | 250 psi | 235 psi | 195 psi | 165 psi | 125 psi | 50 psi | N/A | N/A |
| Polypropylene | 250 psi | 215 psi | 140 psi | 80 psi | 65 psi | N/A | N/A | N/A |

# 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

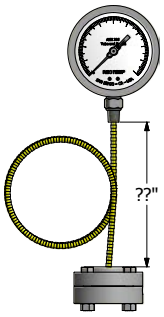
- Tamper Proof
- Rated for High Temps
- Leak Resistant

| 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.



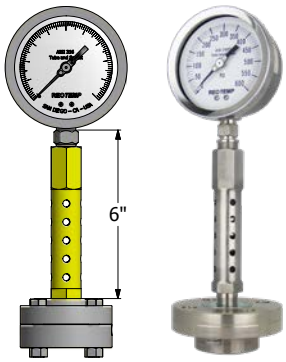

| Code | Description |
|---|---|
| A | Armored, Threaded, 2mm |
| B | Amored, Welded, 2mm |
| W | PVC, Threaded, 2mm |
| P | PVC, Welded, 2mm |
| C | Armored, Threaded, 1mm |
| E | Armored, Welded, 1mm |
| F | PVC, Threaded, 1mm |
| G | PVC, Welded, 1mm |
| H | Armored, Threaded, 0.55mm |
| J | Armored, Welded, 0.55mm |
| K | PVC, Threaded, 0.55mm |
| L | PVC, Welded, 0.55mm |

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

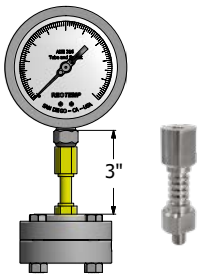
**Assembly Notes:** 2mm, 1mm, and .55mm are capillary inner diameter. Ambient temperature limit of PVC coated armor is 250ºF. Process temperature limit of threaded connections is 400°F. Standard instrument connection is threaded (Smart Transmitters are welded), unless specified by customer.

## 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



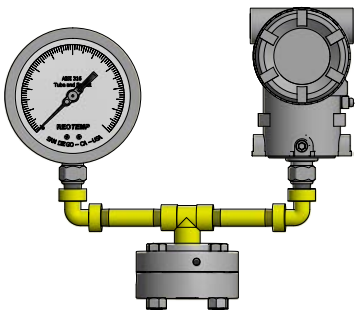

-STW

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

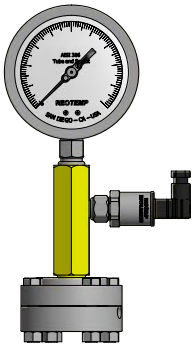
**Assembly Notes:** Cooling elements are welded to diaphragm seal. Instruments are threaded to cooling element unless specified. All lengths are nominal.

## 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 Option for Joints
- ✓ 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 | 1.87 | .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 |
| **CT** | Syltherm XLT[2] | Used for very low process temperatures. | -150ºF to 500ºF (Not Suitable) | No | 1.4 | 0.85 | .00168 |

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.