

Rosemount 3159 Nuclear Qualified Remote Diaphragm Seal for Use with 3152N, 3153N, 3154N and 3155N

- Qualified per:
 - IEEE Std 323™-1974/1983/2003
 - IEEE Std 344™-1975/1987/2004
- 607 Mrad (6.07 MGy) TID Gamma Radiation
- 8.5g ZPA Seismic
- Mild, Harsh and Severe Accident Steam/Temperature



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Rosemount 3159

Introduction

Rosemount has combined nuclear qualified pressure transmitters with remote diaphragm seals to provide the nuclear power industry with a proven design for safety-related applications. The 3159 Remote Diaphragm Seal was qualified per IEEE Std 323™-1974/1983/2003 and IEEE Std 344™-1975/1987/2004 with radiation exposure up to 112 Mrads TID gamma radiation (up to 607 Mrad for severe accident applications), seismic levels to 8.5g ZPA, and for steam pressure/temperature performance. Stringent quality control during the manufacturing process includes traceability of pressure-retaining parts, special nuclear cleaning, and hydrostatic testing.

Product Description

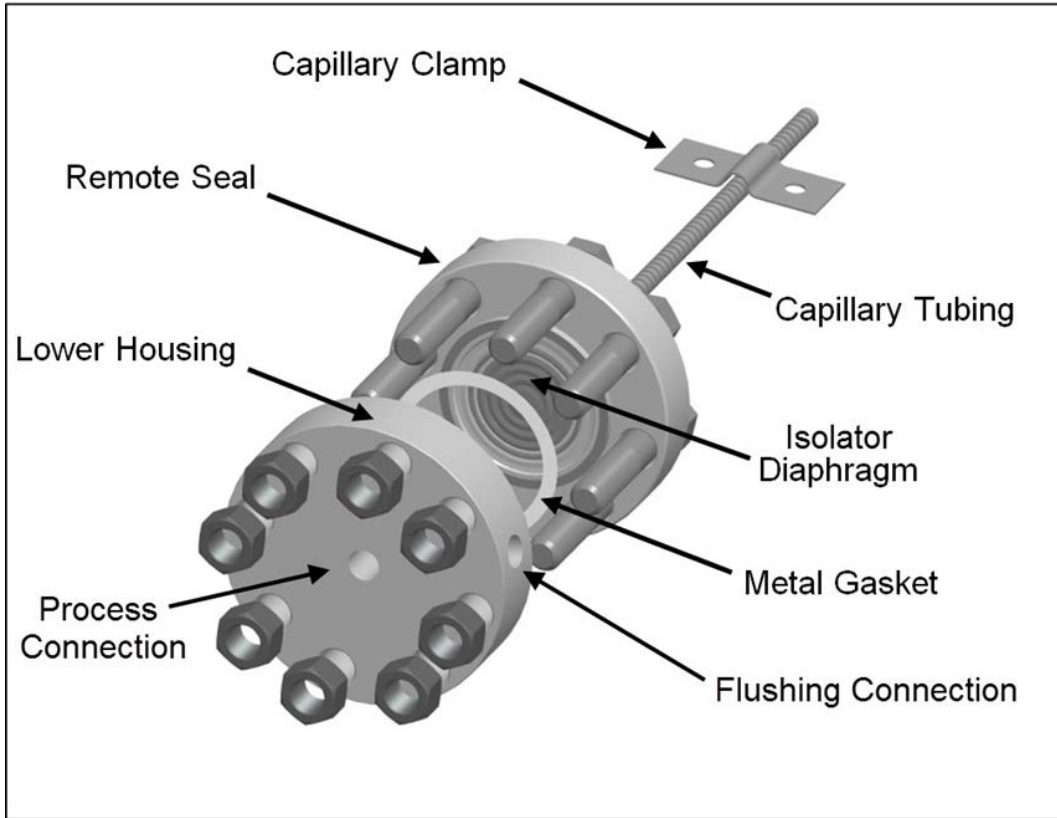
Rosemount offers the 3159 Remote Diaphragm Seal on Rosemount 3150 Series Pressure

Transmitters to encompass both boiling water and pressurized water reactor applications. Rosemount Nuclear provides pressure transmitters in combination with the 3159 Remote Diaphragm Seal in order to accurately measure process pressure, differential pressure or level while isolating the transmitter from the process medium.

Operation

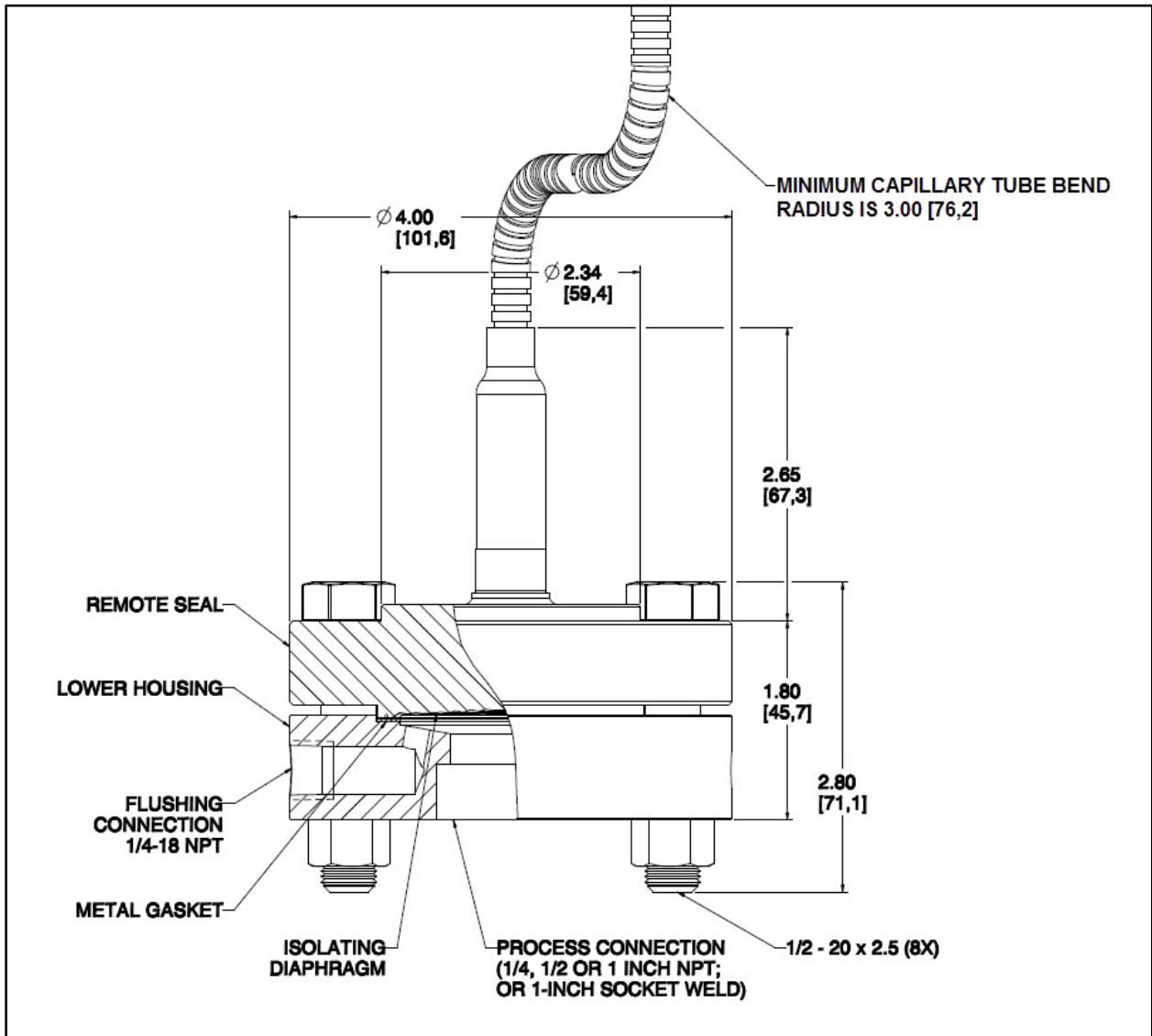
Process pressure sensed by the remote seal isolator diaphragm is transmitted through a filled capillary system to the transmitter's isolating diaphragm. The transmitted pressure displaces the sensing diaphragm in the center of the transmitter's sensor, creating a differential capacitance between the sensing diaphragm and the capacitor plates. The differential capacitance is converted to a 2-wire, 4-20 mA signal.

Figure 1 – 3159 Remote Diaphragm Seal / Lower Housing Assembly



Dimensional Drawings

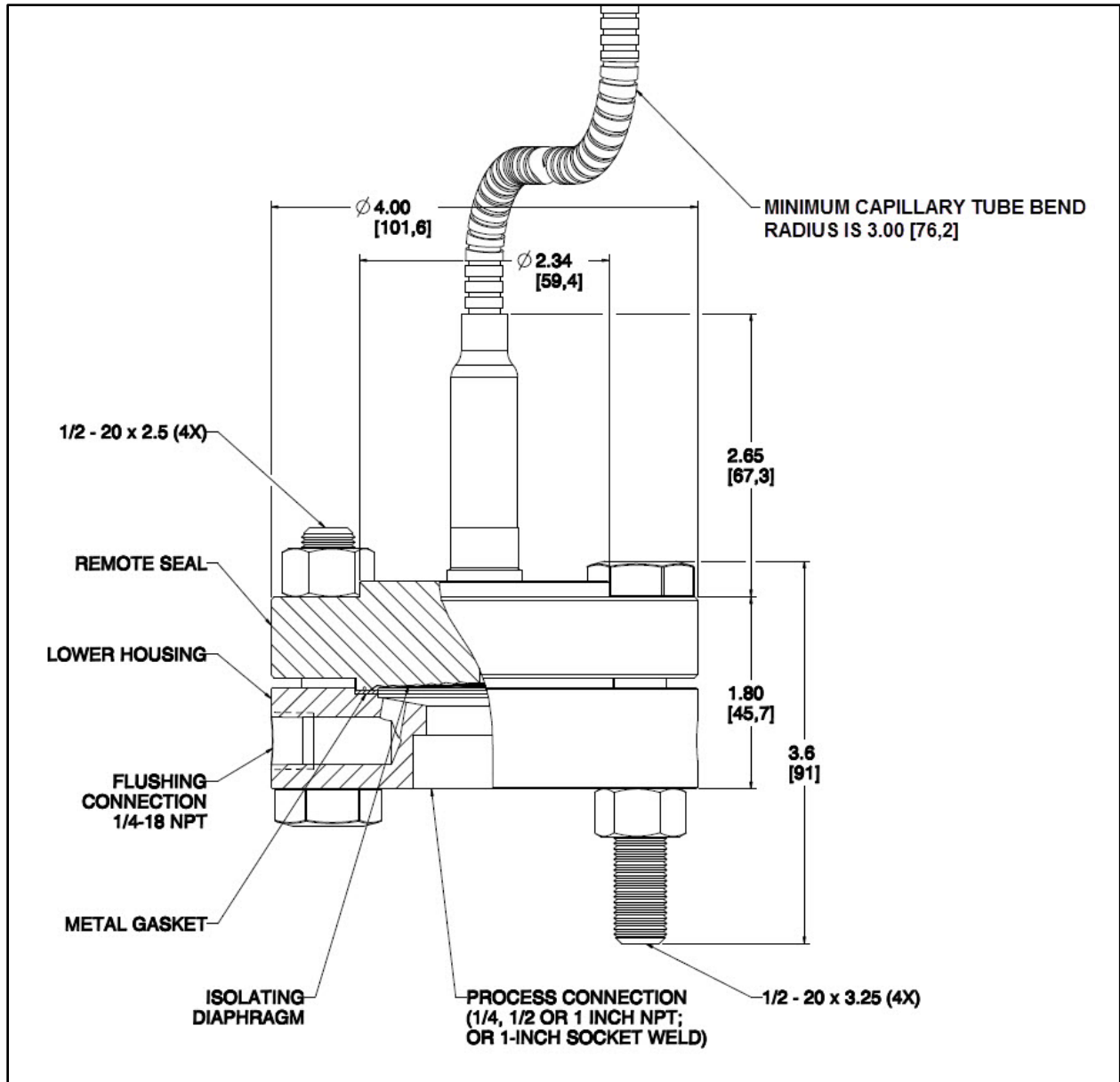
Figure 2a – 3159 Remote Diaphragm Assembly Dimensions ⁽¹⁾



Notes:

(1) All dimensions are nominal in inches [millimeters].

Figure 2b – 3159 Remote Diaphragm Assembly with S0201 Special Option Dimensions ⁽¹⁾



Notes:

(1) All dimensions are nominal in inches [millimeters].

SPECIFICATIONS

Nuclear Specifications ⁽¹⁾

The accuracy of the remote seal system in a design basis event (DBE) is expressed as the algebraic sum of the transmitter accuracy plus the remote seal accuracy. If the transmitter and remote seal assemblies are subjected to different accident conditions, the pertinent transmitter specifications should be combined with the pertinent remote seal specifications.

TRANSMITTER

Refer to the applicable product data sheets for transmitter specifications.

Base Model	Product Data Sheet
3152N	00813-0100-4852
3153N	00813-0100-4853
3154N	00813-0100-4854
3155N	00813-0100-4855

REMOTE SEAL AND CAPILLARY

Remote seal assemblies are qualified according to IEEE Std 323TM-1974/1983/2003 and IEEE Std 344TM-1975/1987/2004 as documented in Rosemount reports D2013009 (mild & harsh) and D2017004 (severe accident).

Seismic – Triaxial Random Multi-Frequency

When exposed to a disturbance defined by the Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE) required response spectra with a ZPA of 5.95g and 8.5g respectively (see Figures 3 and 4), accuracies are as shown in the following tables:

Mild Environment ⁽²⁾

TID (normal + accident) up to 6.5 Mrads (65 kGy).

Fill Fluid	During OBE 5.95g ZPA	During SSE 8.5g ZPA	After
Distilled Water	±13.00 inH ₂ O		Within Applicable Transmitter Accuracy
704	±2.00 inH ₂ O		
PMX-200	±1.25 inH ₂ O		

Harsh Environment

TID (normal + accident) up to 112 Mrads (1.12 MGy).

Fill Fluid	During OBE 5.95g ZPA	During SSE 8.5g ZPA	After
Distilled Water	±13.00 inH ₂ O		Within Applicable Transmitter Accuracy
704	±2.00 inH ₂ O		

Notes:

- (1) Specifications are applicable for capillary lengths from 5 to 60 feet (1.52 to 18.29 meters). Consult factory for lengths longer than 60 feet (18.29 meters).
- (2) PMX-200 fill fluid is qualified for mild environment only.
- (3) A3 option is required for Severe Accident applications (3155N); specifications are applicable for two-sided configurations, capillary lengths up to 60 ft (18.29 m), and 704 fill fluid. Consult factory with questions.

Severe Accident Environment ⁽³⁾

TID (normal + accident) up to 607 Mrad (6.07 MGy).

Fill Fluid	During OBE 5.95g ZPA	During SSE 8.5g ZPA	After
704	±8.00 inH ₂ O	±20.00 inH ₂ O	Within Applicable Transmitter Accuracy

Radiation

When exposed to the radiation profiles described below, accuracies are as shown in the following tables:

Mild Environment ⁽²⁾

Test Type	Dose Rate	TID
Normal	0.1 Mrad (1 kGy) / hr	1 Mrad (10 kGy)
Accident	0.4 Mrad (4 kGy) / hr	5.5 Mrad (55 kGy)
Total	-	6.5 Mrad (65 kGy)

Fill Fluid	Remote Seal Accuracy	
	Normal	Accident
Distilled Water	Within Applicable Transmitter Accuracy	
704		
PMX-200		

Harsh Environment

Test Type	Dose Rate	TID
Normal	0.1 Mrad (1 kGy) / hr	2 Mrad (20 kGy)
Accident	2 Mrad (20 kGy) / hr	4 Mrad (40 kGy)
	1.5 Mrad (15 kGy) / hr	6 Mrad (60 kGy)
	1 Mrad (10 kGy) / hr	100 Mrad (1.0 MGy)
Total	-	112 Mrad (1.12 MGy)

Fill Fluid	Remote Seal Accuracy	
	Normal	Accident
Distilled Water	Within Applicable Transmitter Accuracy	
704	Within Applicable Transmitter Accuracy	±0.35 inH ₂ O per 5 ft of capillary

Severe Accident Environment ⁽³⁾

Test Type	Dose Rate	TID
Normal	0.05 Mrad (0.5 kGy) / hr	7 Mrad (70 kGy)
Accident	1.0 Mrad (10 kGy) / hr	600 Mrad (6.0 MGy)
Total	-	607 Mrad (6.07 MGy)

Fill Fluid	Remote Seal Accuracy	
	Normal	Accident
704	Within Applicable Transmitter Accuracy	

Steam Pressure/Temperature and Post DBE Operation ^{(1) (2)}

Remote seal accuracy during and after exposure to steam in the environments shown in Figures 5-8 can be derived from the following tables:

Mild Environment ⁽⁴⁾

After radiation exposure up to 6.5 Mrads (65 kGy) (normal + accident), typical remote seal accuracies are as shown in the following table:

Fill Fluid	Remote Seal Configuration	Remote Seal Accuracy per 100°F (55.6°C) ⁽²⁾	
		Initial Transient ⁽³⁾	After Transient
Distilled Water ⁽¹⁾	One-sided (S1)	±(3.4 inH ₂ O for first 5 ft +2.38 inH ₂ O for each additional 5 ft of capillary)	±(2.0 inH ₂ O for first 5 ft + 1.4 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(1.3 inH ₂ O for first 5 ft + 0.5 inH ₂ O for each additional 5 ft of capillary)	±(1.3 inH ₂ O for first 5 ft + 0.5 inH ₂ O for each additional 5 ft of capillary)
704	One-sided (S1)	±(18.5 inH ₂ O for first 5 ft + 9.1 inH ₂ O for each additional 5 ft of capillary)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)	±(1.4 inH ₂ O for first 5 ft + 0.7 inH ₂ O for each additional 5 ft of capillary)
PMX-200 ⁽⁴⁾	One-sided (S1)	±(27.6 inH ₂ O for first 5 ft + 13.8 inH ₂ O for each additional 5 ft of capillary)	±(6.0 inH ₂ O for first 5 ft + 3.0 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(6.0 inH ₂ O for first 5 ft + 3.0 inH ₂ O for each additional 5 ft of capillary)	±(1.5 inH ₂ O for first 5 ft + 1.0 inH ₂ O for each additional 5 ft of capillary)

Harsh Environment

After radiation exposure up to 112 Mrads (1.12 MGy) (normal + accident), typical remote seal accuracies are as shown in the following table:

Fill Fluid	Remote Seal Configuration	Remote Seal Accuracy per 100°F (55.6°C) ⁽²⁾	
		Initial Transient ⁽³⁾	After Transient
Distilled Water ⁽¹⁾	One-sided (S1)	±(3.4 inH ₂ O for first 5 ft +2.38 inH ₂ O for each additional 5 ft of capillary)	±(2.0 inH ₂ O for first 5 ft + 1.4 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(1.3 inH ₂ O for first 5 ft + 0.5 inH ₂ O for each additional 5 ft of capillary)	±(1.3 inH ₂ O for first 5 ft + 0.5 inH ₂ O for each additional 5 ft of capillary)
704	One-sided (S1)	±(18.5 inH ₂ O for first 5 ft + 9.1 inH ₂ O for each additional 5 ft of capillary)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)	±(1.4 inH ₂ O for first 5 ft + 0.7 inH ₂ O for each additional 5 ft of capillary)

Severe Accident Environment ⁽⁵⁾

After radiation exposure as indicated, typical remote seal accuracies are as shown in the following table:

Fill Fluid	Remote Seal Configuration	TID (Normal + Accident)	Remote Seal Accuracy per 100°F (55.6°C) ⁽²⁾	
			Initial Transient ⁽³⁾	After Transient and During Post-Accident Monitoring
704	Two-sided (S2)	Up to 112 Mrad (1.12 MGy)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)	±(1.4 inH ₂ O for first 5 ft + 0.7 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	Up to 607 Mrad (6.07 MGy)	±(16 inH ₂ O for first 5 ft + 10 inH ₂ O for each additional 5 ft of capillary)	±(15 inH ₂ O for first 5 ft + 6 inH ₂ O for each additional 5 ft of capillary)

Notes:

- (1) For distilled water at temperatures above 180°F (82.2°C), static pressure must be sufficient to prevent fill fluid from dropping below the vapor pressure limit.
- (2) Specification may be linearly interpolated down to 50°F (27.8°C) temperature interval.
- (3) Initial temperature ramp (or shock) as indicated in Figures 5-8.
- (4) PMX-200 fill fluid is qualified for mild environment only.
- (5) A3 option is required for Severe Accident applications (3155N); which are restricted to two-sided configurations, capillary lengths up to 60 ft (18.29 m), and 704 fill fluid.

Product Data Sheet

00813-0100-4859 Rev AE

August 2020

Rosemount 3159

Nuclear Cleaning

Process-wetted surfaces cleaned to <1ppm chloride content.

Hydrostatic Testing

Differential pressure transmitters hydrostatically tested to 150% of maximum working pressure; gauge and absolute pressure transmitters hydrostatically tested at the overpressure limit. Test pressures are limited by the selected bolting option.

All pressure range code 1 transmitters tested to 2000 psi (13.79 MPa).

Traceability

Per 10CFR50 Appendix B, NQA-1, and ISO 9001; chemical and physical certification of pressure retaining parts and process-wetted materials.

Qualified Life

Remote seal qualified life (all fill fluids) is equivalent to transmitter qualified life (see the applicable transmitter product data sheet for details).

Figure 3 – Seismic Required Response Spectra (RRS) for Mild and Harsh Environments

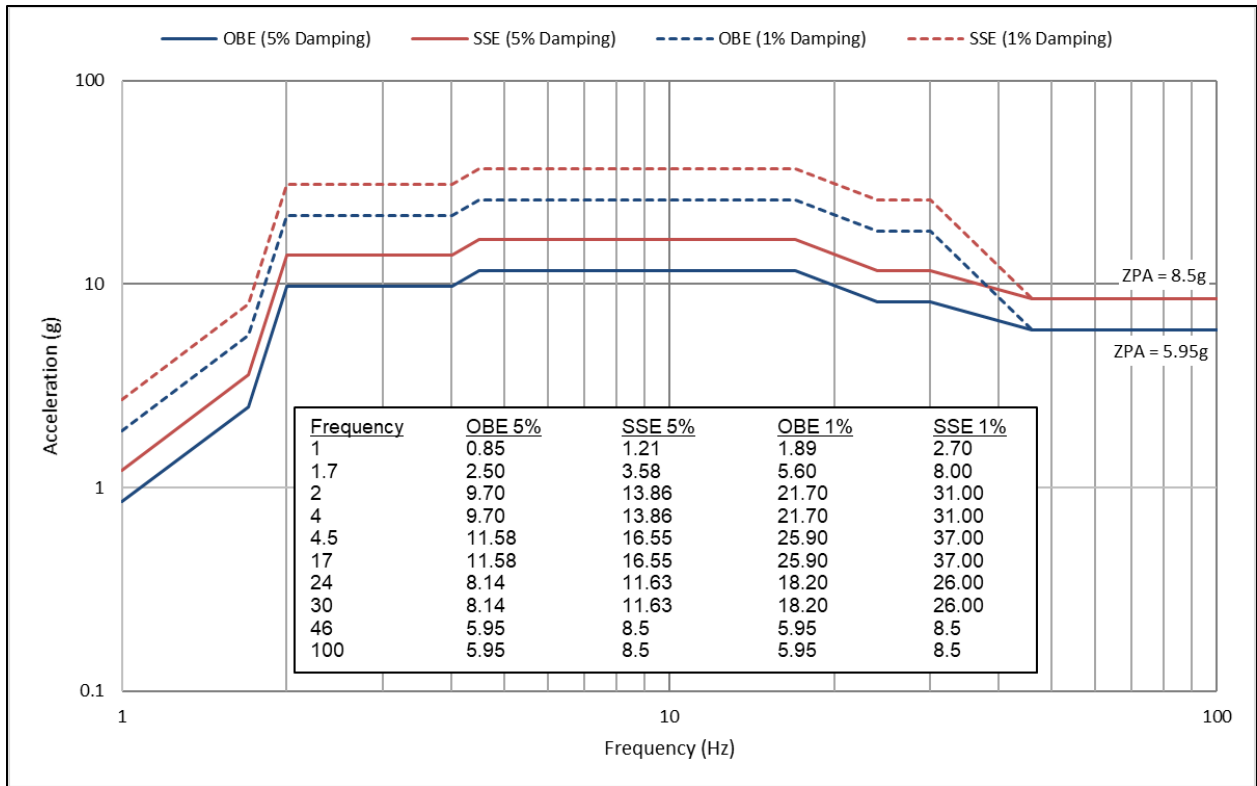


Figure 4 – Seismic Required Response Spectra (RRS) for Severe Accident Environment

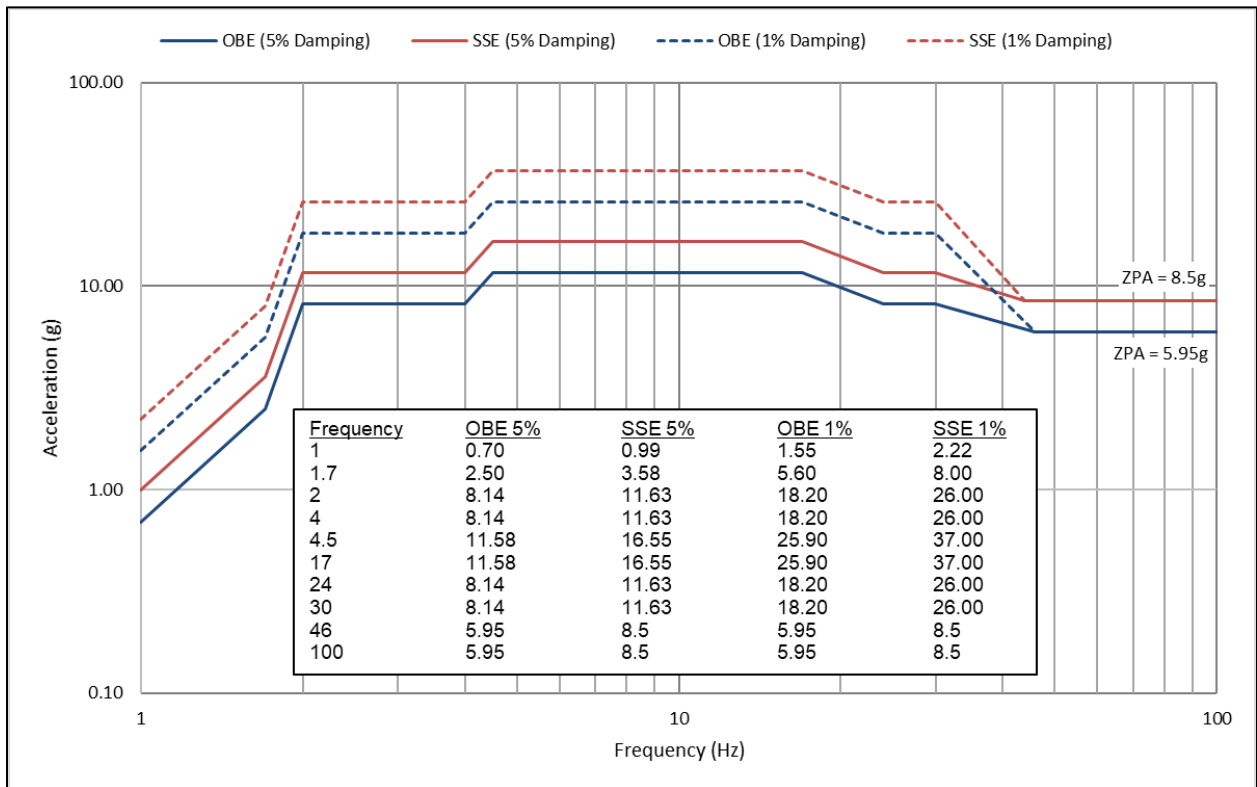


Figure 5 – Mild Steam Pressure/Temperature Profile

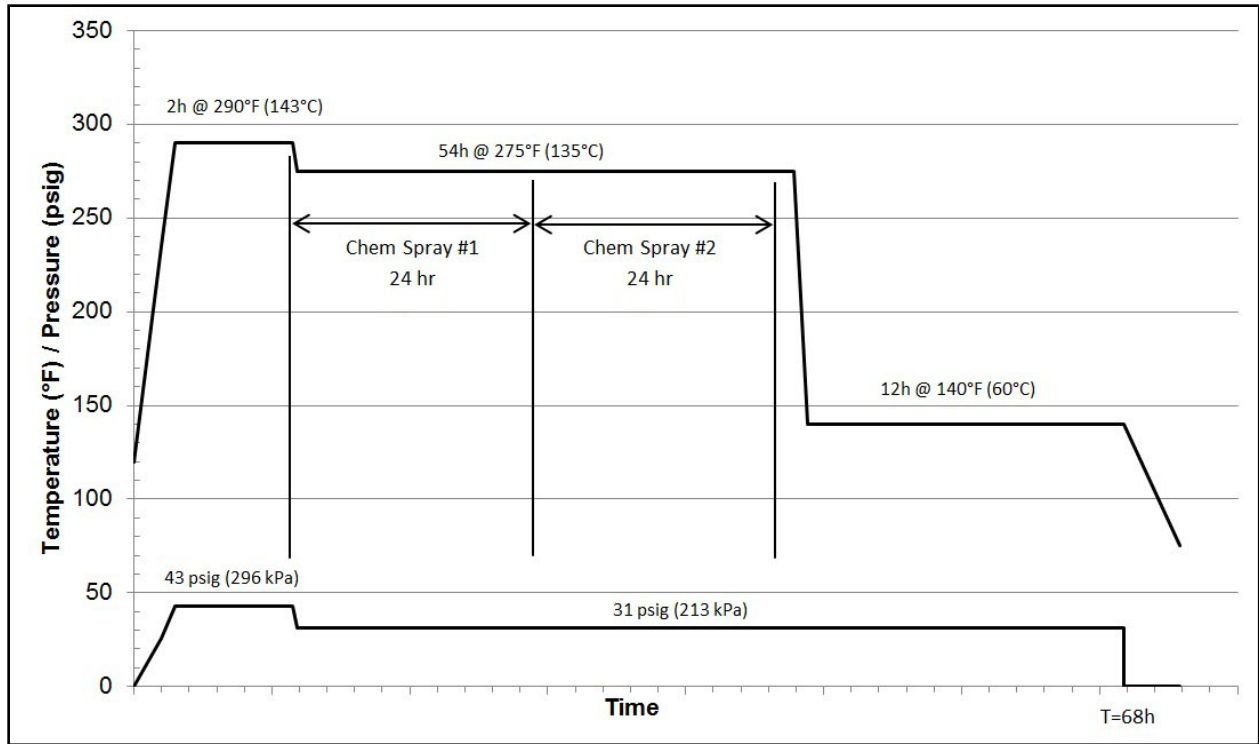


Figure 6 – Harsh Steam Pressure/Temperature Profile

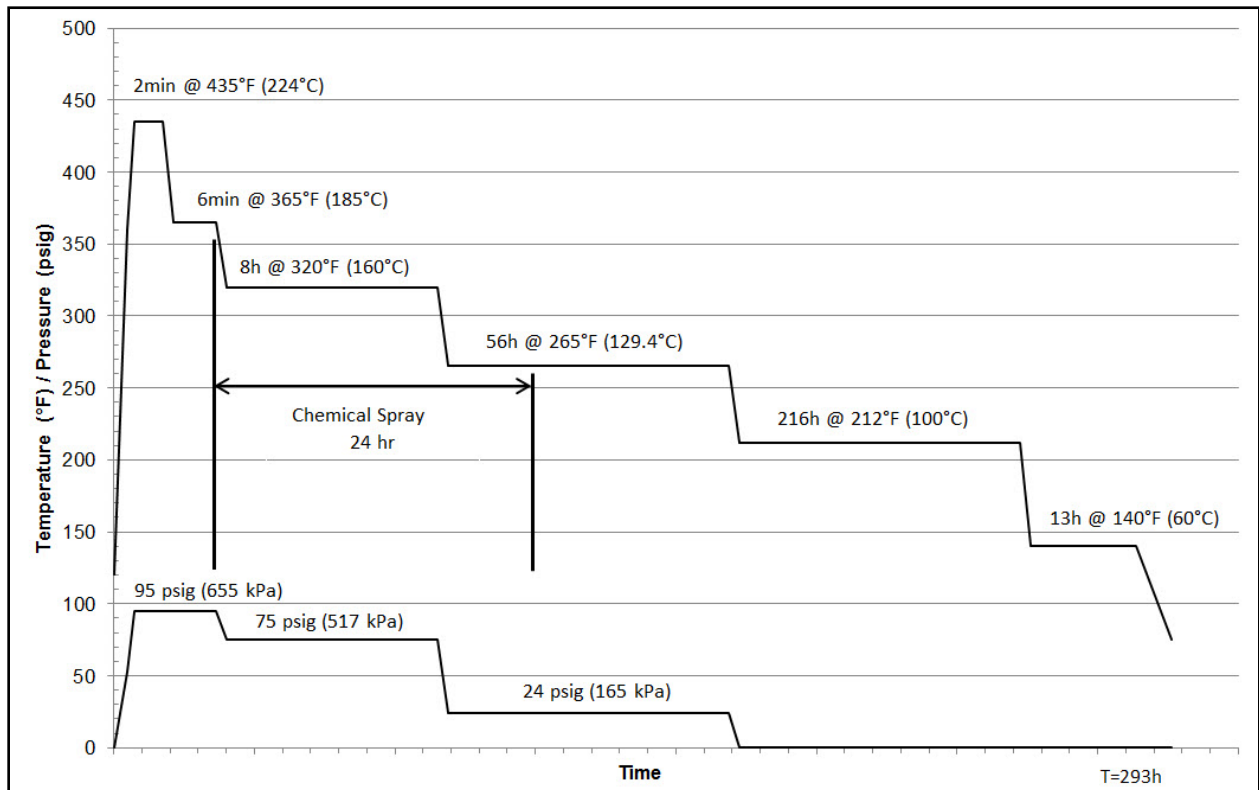


Figure 7 – Steam Pressure/Temperature and Post Accident Monitoring in Submergence Environment Profile

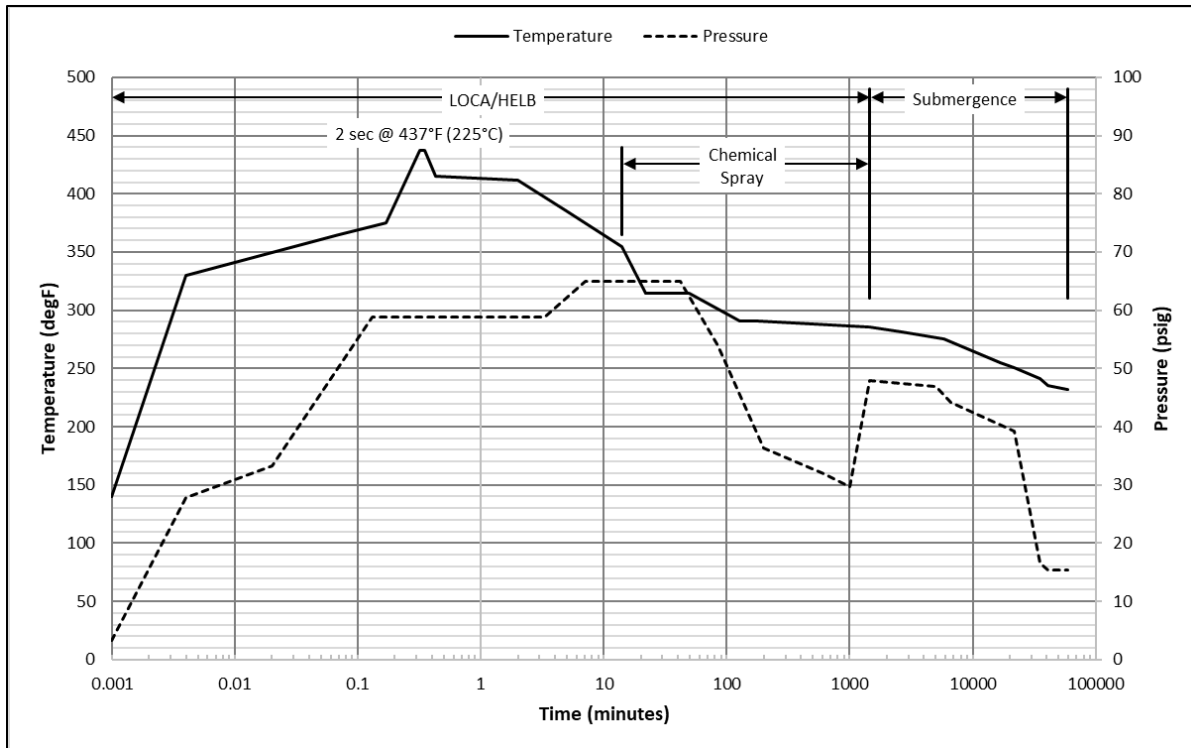
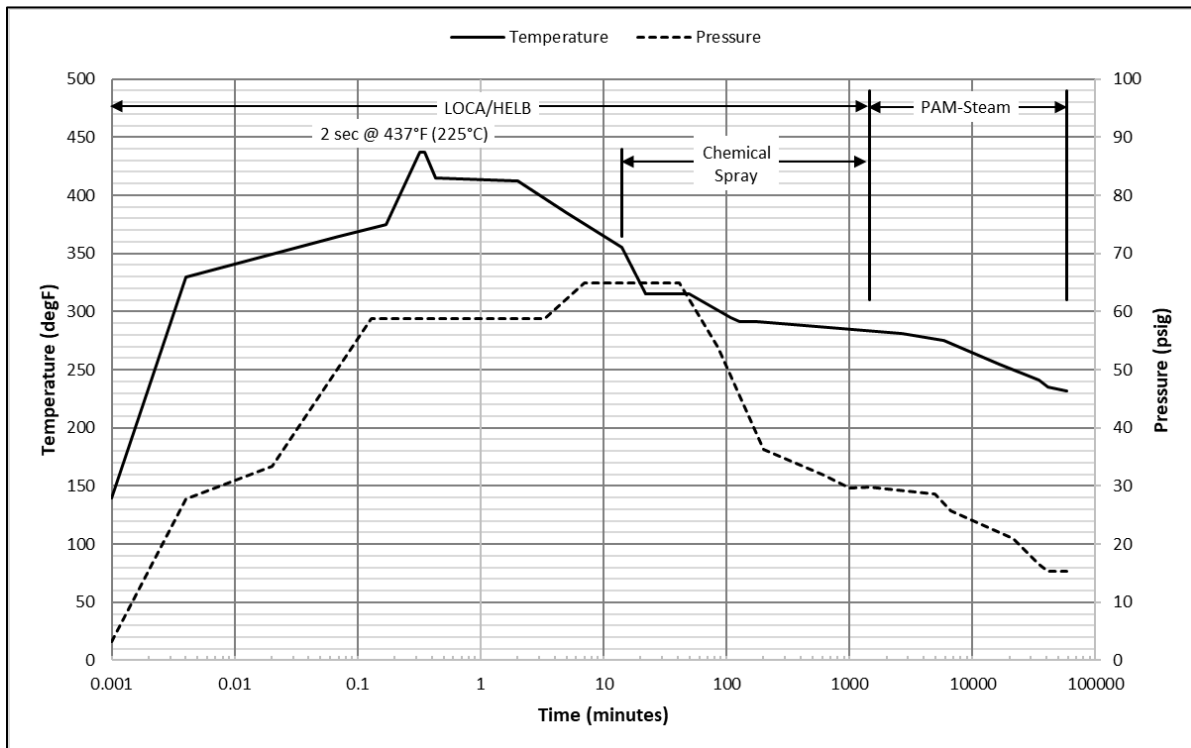


Figure 8 – Steam Pressure/Temperature Post-Accident Monitoring in Steam Environment



Notes:

- (1) LOCA from $t = 0$ hours to $t = 24.23$ hours.
- (2) Chemical Spray from $t = 14$ minutes to $t = 24.23$ hours.
- (3) PAM (Submergence or Steam) from $t > 24.23$ hours to $t = 41$ days.

Performance Specifications

Based on zero-based calibrations under reference conditions. The accuracy of the remote seal system is expressed as the algebraic sum of the transmitter accuracy plus the remote seal accuracy. If the transmitter and remote seal assemblies are subjected to different conditions, the pertinent transmitter specifications should be combined with the pertinent remote seal specifications.

TRANSMITTER

Refer to the applicable product data sheets for transmitter specifications.

Base Model	Product Data Sheet
3152N	00813-0100-4852
3153N	00813-0100-4853
3154N	00813-0100-4854
3155N	00813-0100-4855

REMOTE SEAL AND CAPILLARY

Temperature Effect (1) (2) (3)

Fill Fluid	Remote Seal Configuration	Temperature Effect per 100°F (55.6°C)
Distilled Water	One-sided (S1)	±(2.0 inH ₂ O for first 5 ft + 1.4 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(1.3 inH ₂ O for first 5 ft + 0.5 inH ₂ O for each additional 5 ft of capillary)
704	One-sided (S1)	±(5.3 inH ₂ O for first 5 ft + 2.6 inH ₂ O for each additional 5 ft of capillary)
	Two-sided (S2)	±(1.4 inH ₂ O for first 5 ft + 0.7 inH ₂ O for each additional 5 ft of capillary)
PMX-200	One-Sided (S1)	±(6.0 inH ₂ O for first 5 ft + 3.0 inH ₂ O for each additional 5 ft of capillary)
	Two-Sided (S2)	±(1.5 inH ₂ O for first 5 ft + 1.0 inH ₂ O for each additional 5 ft of capillary)

Mounting Position Effect

Mounting position effects depend on the elevation of the remote seal(s) with respect to the pressure transmitter. See Rosemount 3159 Reference Manual (00809-0100-4859) for additional details.

Notes:

- (1) Temperature effect specification may be linearly interpolated down to 50°F (27.8°C) temperature interval.
- (2) Temperature effect specification is applicable for capillary lengths from 5 to 60 feet (1.52 to 18.29 meters). Consult factory for lengths longer than 60 feet (18.29 meters).
- (3) Temperature effect specification is applicable throughout the normal operating temperature range and during exposure to normal radiation.
- (4) Response time is based on total capillary length (high side capillary length + low side capillary length).
- (5) The response time at another temperature can be estimated from the ratio of kinematic viscosities: $TR_2 = TR_1(v_2 / v_1)$ where TR is time response and v is kinematic viscosity (see page 13).

Response Time (4) (5)

Time constant (63.2%) at 100°F (37.8°C)

Distilled Water

Range Code	Maximum Response Time
1	0.27 sec per 5 ft of capillary
2	0.09 sec per 5 ft of capillary
3	0.06 sec per 5 ft of capillary
4-6	0.02 sec per 5 ft of capillary

704

For TID (normal + accident) up to 112 Mrad (1.12 MGy), typical seal and capillary response time is as shown in the following table:

Range Code	Maximum Response Time
1	2.5 sec per 5 ft of capillary
2	0.80 sec per 5 ft of capillary
3	0.53 sec per 5 ft of capillary
4-6	0.11 sec per 5 ft of capillary

For TID (normal + accident) up to 6.07 MGy (607 Mrad), typical seal and capillary response time is as shown in the following table:

Range Code	Remote Seal Configuration	Capillary Length	Maximum Response Time
2	Two-sided (S2)	Up to 20 ft	0.80 sec per 5 ft of capillary
		25-60 ft	2.75 sec per 5 ft of capillary
3	Two-sided (S2)	Up to 20 ft	0.53 sec per 5 ft of capillary
		25-60 ft	1.82 sec per 5 ft of capillary

PMX-200

Range Code	Maximum Response Time
1	2.9 sec per 5 ft of capillary
2	0.90 sec per 5 ft of capillary
3	0.63 sec per 5 ft of capillary
4-6	0.13 sec per 5 ft of capillary

Functional Specifications

Service

Liquid, gas, vapor

Transmitter Output

4-20 mA

Temperature Limits of Seal and Capillary

Normal Operating Limits ^{(1) (2)}

Fill Fluid	Temperature Limits
Distilled Water	40°F to 180°F (4.4°C to 82.2°C)
704	40°F to 270°F (4.4°C to 132.2°C)
PMX-200	

Qualified Storage Limits

Fill Fluid	Temperature Limits
Distilled Water	40°F to 180°F (4.4°C to 82.2°C)
704	-40°F to 180°F (-40°C to 82.2°C)
PMX-200	

Humidity Limits

0 to 100% relative humidity

Maximum Working Pressure

Larger of transmitter Static Line Pressure Limit or Upper Range Limit (URL). Note bolting option B1 is limited to 2500 psig (17.24 MPa). For Maximum Working Pressures above 2500 psig (17.24 MPa), bolting option B2 must be selected.

Transmitter Pressure Ranges

Adjustable within the range shown ⁽³⁾. Upper Range Limit (URL) is the highest pressure shown.

Range Code	Pressure Range
1	0-5 to 0-25 inH2O (0-1.25 kPa to 0-6.23 kPa)
2	0-25 to 0-250 inH2O (0-6.23 kPa to 0-62.3 kPa)
3	0-100 to 0-1000 inH2O (0-24.9 kPa to 0-249 kPa)
4	0-30 to 0-300 psi (0-206.8 kPa to 0-2068 kPa)
5	0-200 to 0-2000 psi (0-1379 kPa to 0-13.79 MPa)
6 ⁽⁴⁾	0-400 to 0-4000 psi (0-2758 kPa to 0-27.58 MPa)

Static Line Pressure Limits (Differential Only) ⁽⁵⁾

Range Code	Static Line Pressure Limit
1	0.5 psia to 2000 psig (3.45 kPa to 13.79 MPa)
2-5 ⁽⁶⁾	0.5 psia to 3626 psig (3.45 kPa to 25.00 MPa)

Overpressure Limits ⁽⁵⁾

Range Code	Overpressure Limit
1	2000 psig (13.79 MPa)
2-5 ⁽⁶⁾	3626 psig (25.00 MPa)
6 ⁽⁶⁾	5000 psig (34.48 MPa)

Burst Pressure

Minimum burst pressure is 5000 psig (34.48 MPa).

Notes:

- (1) Upper temperature limit is for capillary systems mounted away from the transmitter. Refer to the applicable product data sheets for transmitter temperature limits.
- (2) For distilled water at temperatures above 180°F (82.2°C), static pressure must be sufficient to prevent fill fluid from dropping below the vapor pressure limit.
- (3) Rosemount 3155N calibration values must be set at the factory during manufacturing. The all-welded design does not allow for major zero elevation or suppression adjustments to the transmitter calibration after manufacturing.
- (4) Range 6 offered for gauge and absolute pressure transmitter models only.
- (5) Refer to applicable transmitter product data sheet for performance specifications.
- (6) Maximum Working Pressure of bolting option B1 is limited to 2500 psig (17.24 MPa).

Physical Specifications

Materials of Construction

Numbers in parentheses indicate the location of the part in Figure 9.

Remote Seal Components:

Remote Seal Body (6)
316L SST

Isolator Diaphragm (6)
316L SST

Lower Housing (7)
316L SST

Nuts / Bolts (4 / 5)
316 SST

Metal Gasket (3)
Alloy 400

Capillary Components:

Capillary Tube (1)
316L SST or Alloy C-276

Capillary Fill Tube (1)
316L SST or Alloy C-276

Protective Armored Sleeve (1)
304 SST

Capillary Weld Fitting (1)
316L SST or Alloy C-276

Support Tube (2)
316L SST

Transmitter Interface:

Transmitter Process Flange (8)
316L SST

Accessories:

Capillary Clamps (Optional)
304 SST

Process Connections

1/4, 1/2, or 1-inch NPT; or 1-inch socket weld

Flushing Connection(s)

1/4-18 NPT

Weight

Remote Seal: 7.7 lbs (3.50 kg)
Capillary: 1 oz/ft (93.5 g/m) of capillary

Capillary Fill Fluid ^{(1) (2)}

Fill Fluid	SG ⁽¹⁾	ν (cs) ^{(1) (2)}	α (cc/cc/°C)	Capillary ID (in.)
Distilled Water	1.00	0.903	0.000207	0.028
704	1.07	39	0.000954	0.040
PMX-200	0.93	10	0.001080	0.028

SG = Specific Gravity
 ν = Kinematic Viscosity
 α = Coefficient of thermal expansion

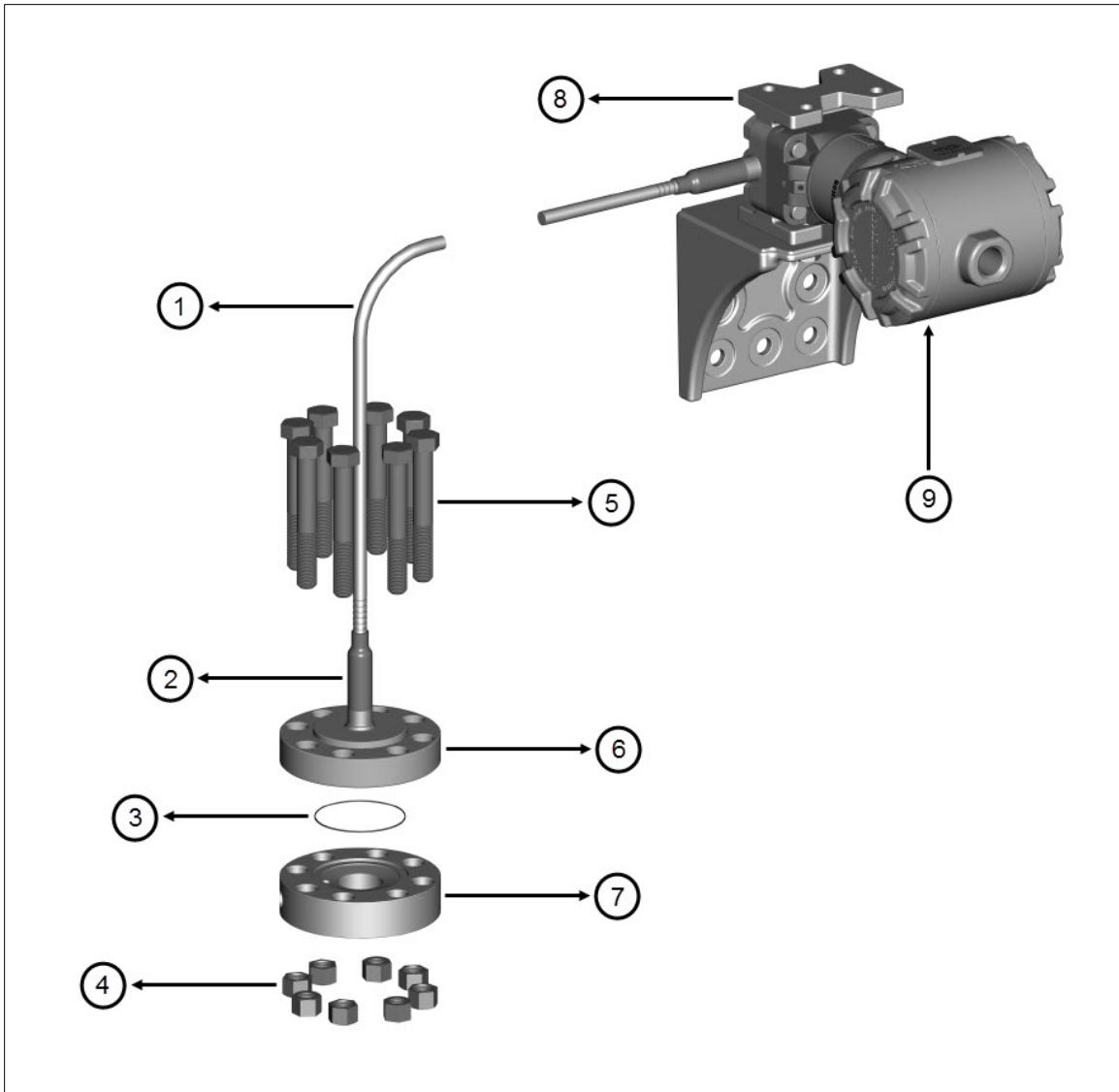
Notes:

- (1) Reference temperature is 25°C (77°F).
- (2) The following equation can be used to calculate the kinematic viscosity as a function of temperature. The equation and coefficients are provided for reference only. Coefficients D, E, and F were experimentally determined by Rosemount Inc. "T" is the ambient temperature in degrees C.

$$\nu(T) = 10^{(D - \frac{E}{F+T})}$$

Fill Fluid	Viscosity Coefficients		
	D	E	F
Distilled Water	-1.41	-186.05	112.12
704	-0.4052	-184.7599	69.294
PMX-200	-0.01	-145.91	122.99

Figure 9 – Parts Drawing and Table, Exploded View



Item No.	Description
1	Capillary System (Includes Capillary Tube, Capillary Fill Tube, Protective Armored Sleeve, and Capillary Weld Fitting)
2	Support Tube
3	Metal Gasket
4	Remote Seal Nuts
5	Remote Seal Bolts
6	Remote Seal and Isolator Diaphragm
7	Lower Housing
8	Transmitter Process Flange
9	315X Pressure Transmitter (Typical, Specified Separately)

ORDERING INFORMATION

Model	Type
3159	Rosemount 3159 Remote Diaphragm Seal
Code	Seal Mounting Location ⁽¹⁾
H	Single Seal Mounted on High Pressure Side of Transmitter
L	Single Seal Mounted on Low Pressure Side of Transmitter
B	Same Seal on Both High and Low Pressure Sides of Transmitter
Code	Capillary Length ^{(2) (3) (4) (5)}
005	5 ft (1.52 m)
010	10 ft (3.05 m)
015	15 ft (4.57 m)
020	20 ft (6.10 m)
025	25 ft (7.62 m)
030	30 ft (9.14 m)
035	35 ft (10.67 m)
040	40 ft (12.19 m)
045	45 ft (13.72 m)
050	50 ft (15.24 m)
055	55 ft (16.76 m)
060	60 ft (18.29 m)
Code	Process Connection ⁽⁶⁾
P1	1/4-in NPT Process Connection, One Flushing Connection
P2	1/2-in NPT Process Connection, One Flushing Connection
P3	1-in NPT Process Connection, One Flushing Connection
P4	1-in Socket Weld Connection, One Flushing Connection
P5	1/4-in NPT Process Connection, Two Flushing Connections
P6	1/2-in NPT Process Connection, Two Flushing Connections
P7	1-in NPT Process Connection, Two Flushing Connections
P8	1-in Socket Weld Connection, Two Flushing Connections
Code	Remote Seal Bolting ⁽⁷⁾
B1	Low Pressure (Standard Bolts/Nuts)
B2	High Pressure (Grade 8 Bolts/Nuts)
Code	Fill Fluid
F1	Distilled Water ^{(8) (9) (10)}
F2	704 Silicone Oil ^{(4) (5)}
F3	PMX-200 Silicone Oil ⁽⁴⁾

Continued on Next Page

Code	Flange Configuration
K00	Required Option Code for Absolute, Gauge, and Two-sided Differential Pressure Measurement
KAC	"A" and "C" Must be Specified for One-sided Differential Pressure Measurement (see Figure 10)

View from Top of Flange

Option Value	Description
1	1/4-18 NPT
2	Welded 3/8-in Swagelok
3	Welded Vent/Drain Valve
4	Welded 1/4-in Swagelok

Figure 10

Code	Standard Options
A3	Alloy C-276 Capillary Assembly ⁽⁵⁾
V4	Threaded Drain / Vent Valve(s) (1/4-18 NPT) – Unassembled (provided separately in package) ⁽⁶⁾ ⁽¹¹⁾
W2	Additional Customer Tagging Information – Wire-on Tag Attached to Capillary
S0201	Remote Diaphragm Seal and Lower Housing are Factory-assembled using Four 2.5-in and Four 3.25-in Remote Seal Bolts; Four Additional Remote Seal Nuts are Provided Separately (see Figure 11) ⁽¹²⁾

Figure 11

Typical Model Number: 3159 H 015 P1 B1 F1 K00

Notes:

- (1) Only two-sided configurations are qualified for Severe Accident applications.
- (2) Maximum capillary length for transmitter range code 1 is 25 ft (7.62 m).
- (3) For capillary lengths greater than 60 ft (18.29 m), consult factory.
- (4) For silicone oils (Codes F2 and F3), it is recommended to keep capillary lengths as short as possible in order to minimize ambient temperature and response time effects.
- (5) A3 option is required for Severe Accident applications and is available only with 3155N. The qualification of 3155N with A3 option includes two-sided configurations, capillaries up to 60 ft (18.29 m), and 704 fill fluid (Code F2). Consult factory with questions.
- (6) Customer assumes responsibility for qualification and installation of the process interface.
- (7) Maximum working pressure for B1 option is 2500 psig (17.24 MPa).
- (8) For distilled water (Code F1) at temperatures above 180°F (82.2°C) static pressure must be sufficient to prevent fill fluid from dropping below the vapor pressure limit.
- (9) Distilled water (Code F1) is not available with absolute pressure type transmitters.
- (10) Distilled water (Code F1) filled remote seal(s) must ship in a temperature-controlled environment at 40°F (4.4°C) or above which may result in additional shipping costs.
- (11) Quantity is one for each 1/4-18 NPT flushing connection or transmitter flange process connection. Refer to Rosemount 3150 Series Reference Manual 00809-0100-4835 for installation instructions.
- (12) Option B2 is required.

REVISIONS

Changes from May 2019 (Rev AD) to August 2020 (Rev AE)

Page (Old)	Page (New)	Changes
Cover, Throughout	Cover, Throughout	Change document revision from May 2019 to August 2020 (Rev AD to Rev AE).
16	16	Correct Figure 10.

NOTE

The above Revision Status list summarizes the changes made. Please refer to both data sheets for complete comparison details.

NOTE

Revision of the Product Data Sheet has no impact to form, fit, or function and does not impact transmitter qualification. Updates were made to provide clarity and improve customer experience/usage.

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