UNIFORM STATUTORY DECLARATION FORM FOR THE REGISTRATION OF FITTING DESIGNS

New Brunswick | Nova Scotia | Prince Edward Island | Newfoundland and Labrador
Nunavut | Yukon | Northwest Territories

Manufacturers Name: Swagelok Company

Manufacturers Address: 29500 Solon Road, Solon, Ohio 44139 USA

Plant Locations: Headquarters: 29500 Solon Road, Solon, Ohio 44139 USA (See Attachment A)

Category of Fittings to be registered. Circle one Category only

- A Pipe fittings, including couplings, tees, elbows, Ys, plugs, unions, pipe caps, or reducers
- B Flanges: all flanges
- C Valves: all line valves
- D Expansion joints, flexible connections, and hose assemblies: all types
- E Strainers, filters, separators, and steam traps
- F Measuring devices, including pressure gauges, level gauges, sight glasses, levels, or pressure transmitters
- G Certified capacity-rated pressure relief devices acceptable as primary over pressure protection on boilers, pressure vessels, piping and fusible plugs
- H Pressure retaining components that do not fall into one of the above categories
- N Nuclear components: Class 1 ☐ Class 2 ☐ Class 3 ☐, (Meeting CNSC or ASME requirements)

Title of the Standard of Construction

ASME B31.1 for unlisted components
ASME B31.3 for unlisted components

Show Manufacturers Name, Trademark, or Logo as it will appear on the product

Swagelok

Type of Construction

Forged ☐ Welded ☐ Wrought ☒
Cast ☐ Other ☐
Describe other:

List of supporting documentation and identification of the actual items to be registered:

ISO 9001:2015 Certificate, Attachment A, Attachment B, Catalog Information and other Support Documents.

Declaration:

I James Nordholt (see note 3) employed by Swagelok Company and being the person having full authority and responsibility for the quality of the end product do solemnly declare that the information contained in this form is true to the best of my knowledge represents the product for which registration is sought. The dimensions, materials of construction, pressure temperature ratings, and identification markings are in accordance with the herein named standards. I further declare that the manufacture of these fittings is regulated by a Quality Control Program which extends to each plant where fabrication occurs in whole or in part and has been verified by BSI as being suitable for that purpose and I make this solemn declaration conscientiously believing it to be true, and knowing that it is of the same force and effect as if made under oath.

Signature of Declarer: _____

Declared before me at SOLON, OH

This 15 day of FEBRUARY AD 2024

Commissioner of Oaths

Or Notary Public: (sign) _____

(Affix Official seal to the right)

JEFFREY C. TRUMBULL
Notary Public
This space for the Official Seal
Recorded in Lake County
Certificate # 2020-RE-813693
My Commission Expires
April 15, 2025

This space for Regulatory Authority use.
This registration must be revalidated after ten (10) years from the Date of acceptance.

CRN: 0C25329.5

FID#: 1214

Notes:

1. All Fittings shall be registered in the name of the Manufacturer.
2. Each Category shall be supported with two Statutory Declaration forms and one copy of supporting documentation.
3. The Declaration shall be made by the person having full authority and responsibility for the quality of the end product.
4. Quality Control programs shall be resubmitted for validation.

Scope: Pressure Regulators (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA Series). 15 plant locations.

11/2016 (DGallant)

BOILER & PRESSURE VESSEL ACT & REGULATIONS
NOVA SCOTIA
Date Aug. 23/24
C.R.N. 0C25329.58
Dwg. as described
Signed _____
1 of 1 Part

Sect 1.0 - Fittings Rev.2

1.0 SCOPE

The Swagelok Process Pressure Regulators (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA Series) comply with the requirements of ASME B31.1-2020 “Power Piping” as an unlisted component per Section 104.7.2 and ASME B31.3-2022 “Process Piping” as an unlisted component per Section 304.7.2.

Compliance is supported by:

- Material properties and allowable stress values from ASME B31.3 Table 1A, ASME B31.3 Table 1B and industry standards.
- Design calculations consistent with the design criteria of ASME B31.3 Section 304.7.2 for minimum wall thickness and ANSI B1.1 Appendix B for thread strength.
- Burst testing to meet the Minimum Required Burst Pressure including Adjustment Factors per ASME B31.1 and ASME B31.3 under laboratory test conditions.

2.0 PRODUCT DESCRIPTION AND RATINGS

The process regulator line of products is highly configurable, as such this design file will review sections of the regulator by feature. Descriptions used in the document relate to the catalogue series and size, where the first 4 characters describe the “Series” of the regulator, and the next 2 digits describe the nominal connection “size” in 16th of an inch. The terms “series” and “size” will be used subsequently in the document.

Product Series & Size	Material	Maximum Rated Pressure					
		At ambient temperature			At maximum temperature		
		Inlet	Outlet	Dome	Inlet	Outlet	Dome
SGRS08	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGRS12	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGRS16	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGRS24	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGBS08	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGBS12	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGBS16	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGBS24	316	6000psi @100°F	6000psi @100°F	N/A	1450psi @356°F	1450psi @356°F	N/A
SGRD08	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGRD12	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGRD16	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGRD24	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGRA08	316	6000psi @100°F	6000psi @100°F	250psi @100°F	1450psi @356°F	1450psi @356°F	188psi @356°F
SGRA12	316	6000psi @100°F	6000psi @100°F	250psi @100°F	1450psi @356°F	1450psi @356°F	188psi @356°F
SHRS08	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHRS12	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHRS16	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHRS24	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHRD08	316	250psi @100°F	250psi @100°F	250psi @100°F	188psi @356°F	188psi @356°F	188psi @356°F
SHRD12	316	250psi @100°F	250psi @100°F	250psi @100°F	188psi @356°F	188psi @356°F	188psi @356°F
SHRD16	316	250psi @100°F	250psi @100°F	250psi @100°F	188psi @356°F	188psi @356°F	188psi @356°F
SHRD24	316	250psi @100°F	250psi @100°F	250psi @100°F	188psi @356°F	188psi @356°F	188psi @356°F
SGBD08	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGBD12	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGBD16	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGBD24	316	6000psi @100°F	6000psi @100°F	6000psi @100°F	1450psi @356°F	1450psi @356°F	1450psi @356°F
SGBA08	316	6000psi @100°F	6000psi @100°F	250psi @100°F	1450psi @356°F	1450psi @356°F	188psi @356°F
SGBA12	316	6000psi @100°F	6000psi @100°F	250psi @100°F	1450psi @356°F	1450psi @356°F	188psi @356°F
SHBS08	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHBS12	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHBS16	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A
SHBS24	316	250psi @100°F	250psi @100°F	N/A	188psi @356°F	188psi @356°F	N/A

Series “SGRS”
General service, pressure reducing, spring loaded. These units can be offered with a diaphragm or piston sensing mechanism dependant on the downstream pressure.

Series “SGRD” (sizes up to and including 24)
General service, pressure reducing, dome loaded. These units are loaded externally with pressure via the dome port.

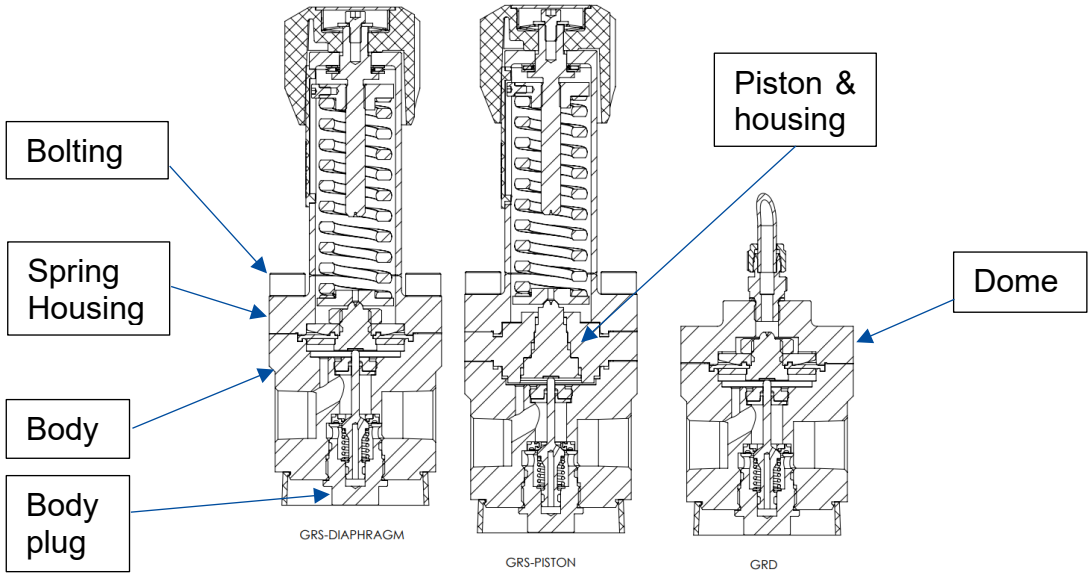

Figure 1 SGRS & SGRD General, Pressure Reducing,

Series “SHRS”
High sensitivity, pressure reducing, spring loaded. These units are offered with a diaphragm sensing mechanism.

Series “SHRD”
High sensitivity, pressure reducing, dome loaded. These units are loaded externally with pressure via the dome port.

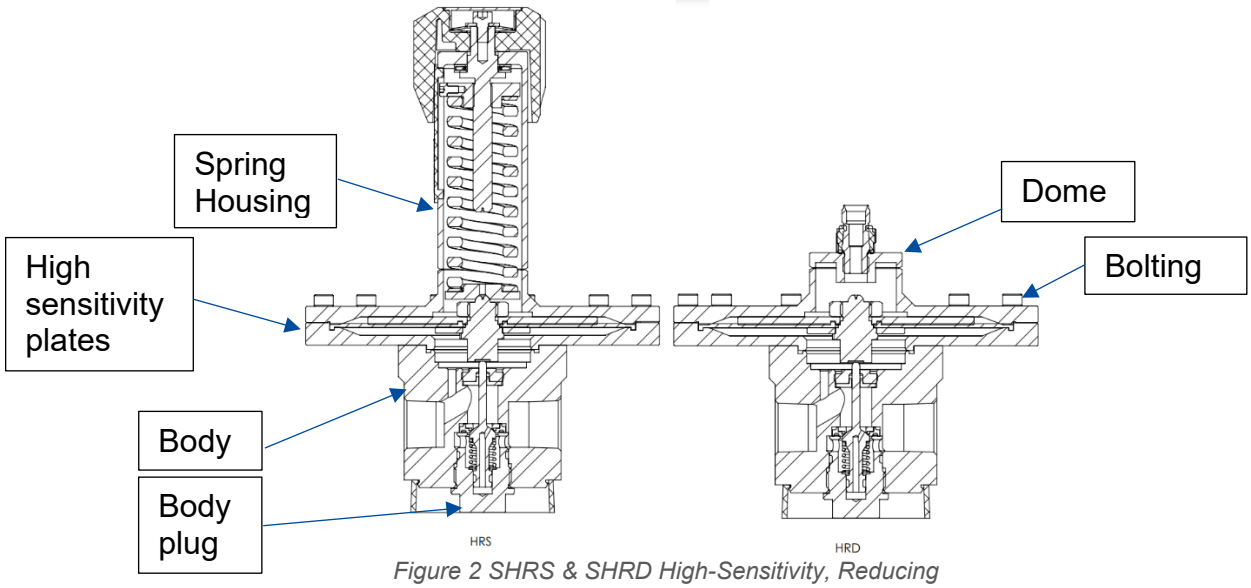

Figure 2 SHRS & SHRD High-Sensitivity, Reducing

Series “SGBS”
General service, back pressure, spring loaded. These units can be offered with a diaphragm or piston sensing mechanism dependant on the upstream pressure.

Series “SGBD”
General service, back pressure, dome loaded. These units are loaded externally with pressure via the dome port.

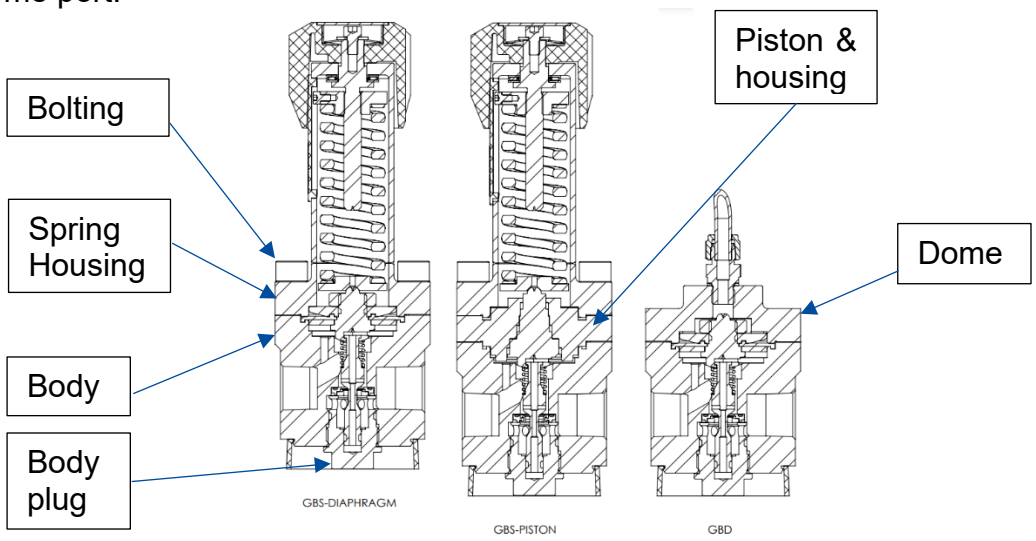

Figure 3 SGBS & SGBD, General, Back pressure

Series “SHBS”
High sensitivity, back pressure, spring loaded. These units are offered with a diaphragm sensing mechanism.

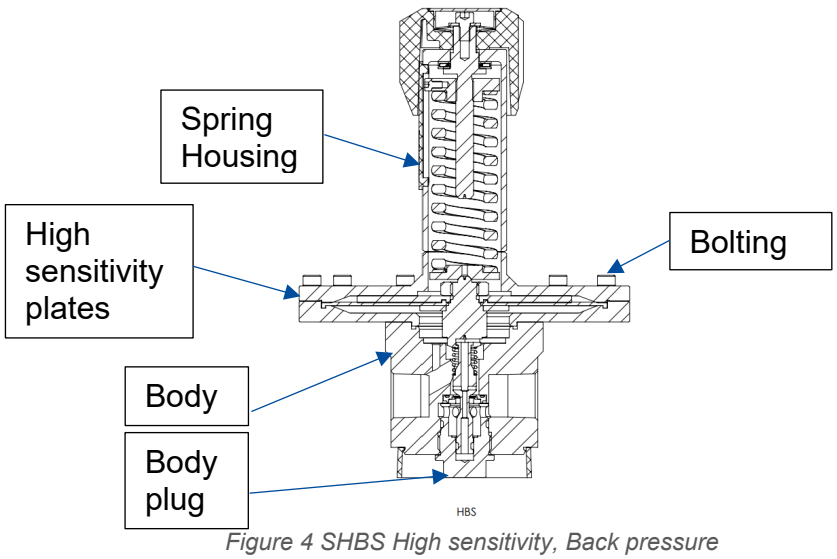

Figure 4 SHBS High sensitivity, Back pressure

Series “SGRA”
General service, pressure reducing, ratio loaded. These units are loaded externally with pressure via the dome port.

Series “SGBA”
General service, pressure reducing, ratio loaded. These units are loaded externally with pressure via the dome port.

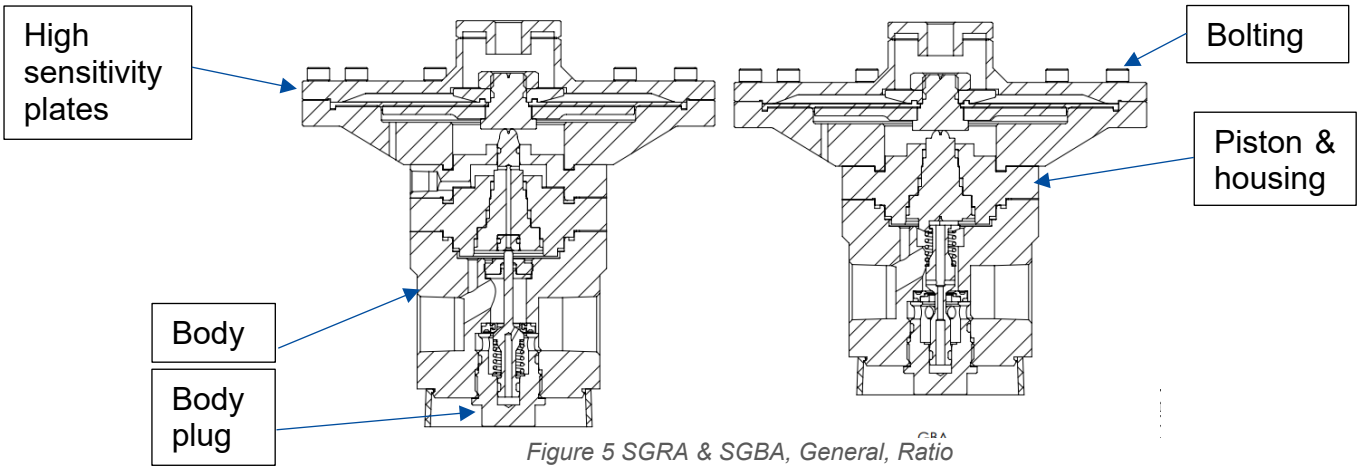

Figure 5 SGRA & SGBA, General, Ratio

3.0 MATERIALS

The materials of construction for pressure-containing components of the Swagelok Process Pressure Regulators (SGRS, SGRD, SGBS, SGBD, SHRS, SHBS, SHRD, SGRA, and SGBA Series) are listed in the table below. These are the only materials used for the pressure-retaining components. The table below gives the maximum allowable stress values. The source of these values is provided in the table.

Component	Material Type & Form	Material Standard & grade	ASME B31.1 or ASME B31.3 code listing	Allowable Stress Source	Tensile Strength	
					Max Allowable Stress at 0 to 100°F	Max Allowable Stress at rated temperature
Body Spring Housing	Stainless Steel 316L Annealed Bar	ASTM A479 316	listed	ASME B31.1 Table A-3 (1)	20000 psi	14872 psi
Bolt	Stainless Steel 304 carbide solution treated, and strain hardened	ASTM A193-B8-C2	listed	ASME B31.1 Table A-10 & ASME SEC II PART D Table 3 (2)	25000 psi	25000 psi

Table 1 Materials

(1) MDMT -425°F as listed in ASME B31.3 Table A1
(2) MDMT -325°F as listed in ASME B31.3 Table A2

4.0 BURST TESTING

The modularity of the Process Regulator design lends itself to a test matrix approach, ensuring that that each critical component has been tested without the need for many expensive tests. The table below shows the 6 main components of the product (as labelled in section 2), and how each planned test covers the various sizes of product.

The tests in this table account for the pressure containing components used in the smallest and largest sizes of each regulator series (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA Series).

For example, burst test ordering number SGRS16 demonstrates that all size 16 bodies can withstand 413bar, and that both the size 16 & 24 spring housings & bolting can withstand 413bar as they share the same spring housings and bolts.

Burst test		**Product covered**					
Ordering Number	**Working Pressure (WP) Rating** psig (bar)	**Body & Body plug**	**Piston & Piston plate**	**Spring housing**	**Dome**	**High sensitivity plates**	**Bolting**
SGRD08	6000 (413)	All size 08 & 12			General service size 08 & 12		General service size 08 & 12
SGRD24	6000 (413)	All size 24			General service size 16 & 24		General service size 16 & 24
SGRS08	6000 (413)	All size 08 & 12	General service size 08 & 12	General service size 08 & 12			General service size 08 & 12
SGRS16	6000 (413)	All size 16	General service size 16 & 24	General service size 16 & 24			General service size 16 & 24
SHRS08	250 (17.2)			High Sensitivity size 08, 12, 16 & 24		High Sensitivity size 08 & 12	High Sensitivity size 08 & 12
SHRD16	250 (17.2)				High Sensitivity size 08, 12, 16 & 24	High Sensitivity size 16 & 24	High Sensitivity size 16 & 24

4.1. TEST RESULTS

A number of burst tests were conducted to validate the above’s calculations compliance to ASME B31.1 & B31.3 and documented in CTR-10821

Ordering Number	Working Pressure (WP) Rating psig (bar)	4 x WP psig (bar)	Material Factor	Target Pressure Including Adjustment Factors psig (bar)	Pass/ Fail
SGRD08	6000 (413)	24000 (1655)	1.108	26592 (1833)	Pass
SGRD24	6000 (413)	24000 (1655)	1.108	26592 (1833)	Pass
SGRS08	6000 (413)	24000 (1655)	1.118	26832 (1850)	Pass
SGRS16	6000 (413)	24000 (1655)	1.147	27528 (1898)	Pass
SHRS08	250 (17.2)	1000 (68.9)	1.118	1118 (77)	Pass
SHRD16	250 (17.2)	1000 (68.9)	1.147	1147 (79)	Pass

4.2. UNLISTED COMPONENT QUALIFICATION

The Swagelok Process Pressure Regulators (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA Series) are qualified in accordance with ASME B31.1 2022 “Power Piping” as an unlisted component per Section 104.7.2 and ASME B31.3 2022 “Process Piping” as an unlisted component per Section 304.7.2. Burst testing was conducted per ASME BPVC Code Section I, A-22 (Ref. 2.10) and ASME Code Section VIII, Division 1, UG-101. For results, see Product Test Report CTR-10821.

4.3. PRESSURE RATINGS AT RATED TEMPERATURE

Using the allowable stress values from section 3 above, a pressure rating for the valves was calculated at the temperature. In the table below, these calculated values are compared to the valve’s actual pressure ratings at the temperature rating published in the product catalogue. In all cases, the valves are de-rated at temperature more than what the allowable stress values from the code require.

				At Maximum Rated Temperature	
Product Series	Material	Maximum working Pressure rating @ -49 to 100°F	Maximum Rated Temperature	Calculated Maximum Pressure based on Allowable Stress	Actual Maximum Working Pressure at Temperature Rating
SG	316 SS	6000psi	356°F	4680psi	1450psi
SH	316 SS	250psi	356°F	194psi	188psi

5.0 END CONNECTIONS

The NPT pipe fittings are covered by registration number OA12577.5C. The BSP end connections conform to ISO/EN 10226. The ASME flanges are covered by registration number 0A0395.3C.

Swagelok Process Regulators are supplied with a variety of end connections, including female NPT and ASME Flange connections. The geometries of these end connections are identical to the geometry qualified under separate Swagelok Fitting (Category A) CRN’s.

The ratings of the end connections are accounted for in the product rating so if the end connection pressure rating is less than the regulator pressure rating, the product would be rated to the lesser value.

The following table indicates the Swagelok Fitting CRN numbers that correspond to end connections that may be used with Swagelok Process Regulators:

End Connection	CRN
316 SS Swagelok Tube Fitting	0A21025.5C
316 SS Flange Adapters	0A17712.2C

6.0 MARKING

The Swagelok Process Series Pressure Regulators (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA) are marked on the exterior of the body with the following information: manufacturer’s name (Swagelok), order number, and part number including material designator as noted in MSS SP-25.

7.0 CONCLUSIONS

The summary provided above supports compliance of the Swagelok Process Pressure Regulators (SGRS, SGRD, SHRS, SHRD, SGBS, SGBD, SHBS, SGRA, and SGBA Series) with the requirements of ASME B31.1-2020 “Power Piping” as an unlisted component per Section 104.7.2 and ASME B31.3-2022 “Process Piping” as an unlisted component per Section 304.7.2.

Product Engineer: G.H. Stephenson
Date: September 16, 2024