GENERAL INFORMATION

Swagelok manufactures a complete range of pressure regulators and backpressure controllers, both:
- spring loaded
- dome loaded
- electronically controlled

Swagelok RHPS Series regulators are suitable for most **gases and liquids**, including aggressive fluids.

Regulators from ¼" to 4", with threaded or flanged connections are available.

All soft seated regulators have been designed with the following design criteria in mind:
- bubble tight sealing of the seat
- no external leakage

However, a regulator is not a shut-off valve and should not be left pressurised for extended periods. Ideally there should be valves upstream and downstream of the regulator.

STANDARD PRODUCTS

The following materials are used in standard RHPS regulators:
- seals : nitrile (NBR), viton (FPM), epdm, ptfe
- seats : PCTFE, with peek and vespel as options
- bodies : ss 316L
- valve trims : ss 316L

Minor variations are available, such as:
- metal diaphragms
- metallic o-rings
- spring energised ptfe seals
- body materials such as monel, inconel etc.

DELIVERY TIMES

It is Swagelok's policy to maintain stock of the standard products.
This means that, in case of emergency, regulators with threaded connections can be supplied within a few days.
With standard products we mean the regulators up to 2 inch.

SPECIAL APPLICATIONS

Swagelok supplies regulators for many different special applications, e.g.:
- sour gas (H_2S) to NACE
- biopharmaceutical service regulators
- semiconductor high purity regulators

MATERIAL TRACEABILITY

All stainless steel bar stock regulators can be supplied with material certificates to EN10204/3.1, all parts will be batch numbered, and certificates are kept on file. Together with our in-house cross-reference system this provides full traceability.

SURFACEFINISH AND CLEANING

Industrial grade bar stock regulators will have surface finishes to 0,8 - 1,6 µm and be ultrasonically cleaned. Regulators for semiconductor high purity systems have surface finishes to 0,25 µm and are electro polished to semiconductor industry standards.

TESTING

All industrial grade regulators are pressure tested with pure air or optionally with helium to the maximum inlet pressure and next performance tested.
Regulators for high purity systems are leak tested with helium mass spectrometers.

OXYGEN SERVICE

Specification of materials in regulators for oxygen service is the USER's RESPONSIBILITY. Swagelok can perform cleaning for oxygen service based on ASTM-G93LevelC/CGA4.1 at additional cost.

GUIDELINES

LEAKAGE
RHPS Series pressure regulators normally seal bubble tight. In operation damage caused by **particles** often leads to **seat leakage.** Industrial standards do not require pressure regulators to close leak tight. If leak tight shut-off is required shut-off **valves** should be used.
It is also advisable to use good system filters.

SAFETY VALVES
The maximum allowable working pressure of the regulator should never be exceeded.
On the downstream side the maximum allowable pressure is 1½ times the maximum outlet set pressure. It is recommended to install a relief valve.
The relief pressure should be set in such a way that minor outlet pressure variations of the regulator do not cause the relief valve to start relieving.

MOUNTING
The normal way of mounting RHPS Series regulators in the line is horizontally with the spring housing pointing upwards.
Mounting in vertical lines is sometimes possible. However, it can cause inaccuracy and increased wear. Please ask our advice.

OPERATION
Quick opening of valves should be avoided. Pressure regulators should not be subjected to pressure surges. As leak tight shut-off under “no flow” conditions cannot always be guaranteed, a valve should be installed downstream of the regulator.

THREADS
Swagelok RHPS Series regulators use **parallel** threads to ISO R/228/1.*
This is a non-sealing fastening pipe thread.
Designation example: for female 3/4" thread: G 3/4"
Reference specifications: BS 2779, DIN-ISO 228/1, JIS B0202, ISO 228/1

NPT threads to ANSI B 1.20.1

* our catalogue pages refer to this thread as bspp.

SEALING
ISO R228/1 is a parallel thread where a pressure tight seal is **not made** on the thread.
The seal is usually made metal to metal against the female port or with a gasket.
Swagelok recommends the use of a bonded seal.

TEMPERATURE

The maximum and minimum temperature rating of our regulators depend on the choice of o-ring, diaphragm and seatmaterial.

The values mentioned on our datasheets are based on the choice of nitrile o-rings and diaphragm and a pctfe seat.

As a rule of thumb the temperature range lies between –20C and +80°C.
Our ABS plastic knobs can handle the same temperature.

Other materials used in RHPS regulators:
- epdm : –50 to +150°C
- viton : –15 to +200°C
- ffkm : –10 to +250°C
- hnbr : –25 to +150°C
- peek : –50 to +250°C

Note that not all elastomers can be used in the higher pressure ranges.

The minimum temperature is that at which the compound retains sufficient flexibility and elastomeric behaviour. The minimum temperatures given are for operation at **atmospheric pressure**.

If a seal is cooled below its minimum operating temperature prior to applying system pressure (gas or liquid) bypass leakage can occur.

Reducing the temperature of an elastomer causes it to harden and loose flexibility.
This occurs gradually. The compound changes from flexible to brittle as the temperature decreases and becomes progressively more leathery.

Applying pressure to a seal in a hydraulic or gas system results in a decrease of the minimum operation temperature at a rate of 1°C per 50 bar approximately. Hence a system pressure of 1000 bar results in a decrease of the minimum temperature with 20°C.
For example: a change from −10 to +10°C.

If a pressure is applied before the temperature is reduced, the seal can often operate at temperatures well below its recommended minimum operating temperature.

In high-pressure gas systems where “blow-down” conditions cause a reduction in the system temperature, the system should be allowed to “warm up” again to above the compounds minimum operating temperature prior to re-pressurising the system.

(source: James Walker)

DEVELOPMENT

Due to continuous development of our product range, we reserve the right to alter the dimensions and information contained in this leaflet as required. Swagelok may suggest certain materials for certain applications. These suggestions are based on compatibility information provided by material suppliers or on previous experience. However, Swagelok does not guarantee the material to be compatible with a specific media, this will be the sole responsibility of the user.

Safe Product Selection

When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.

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