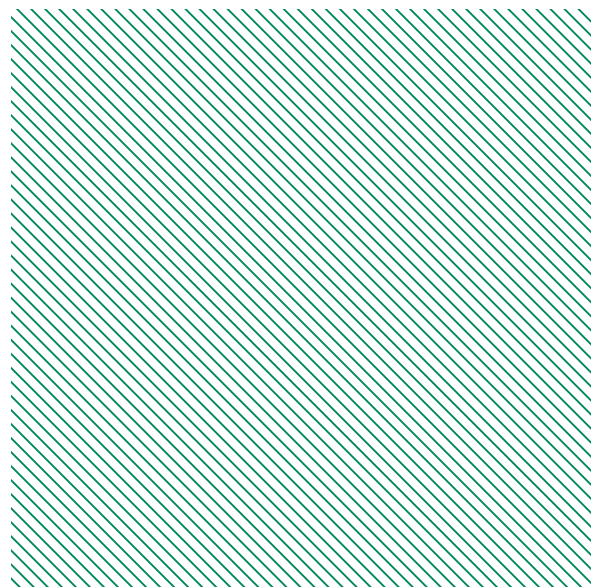
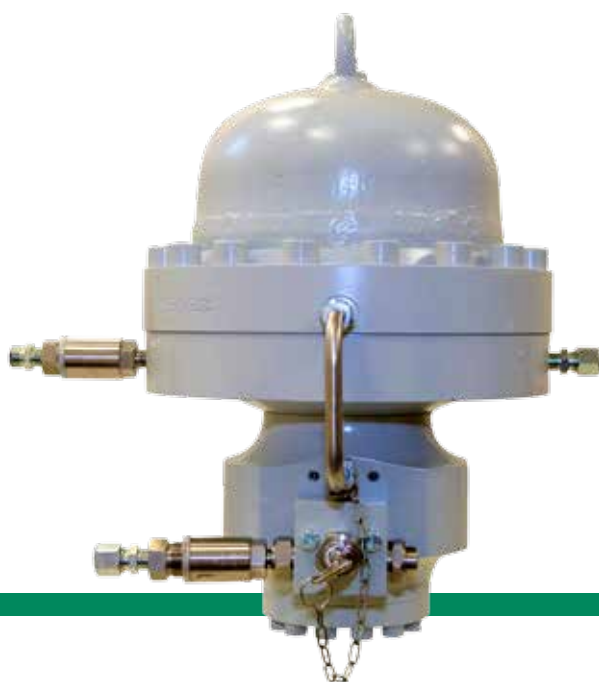




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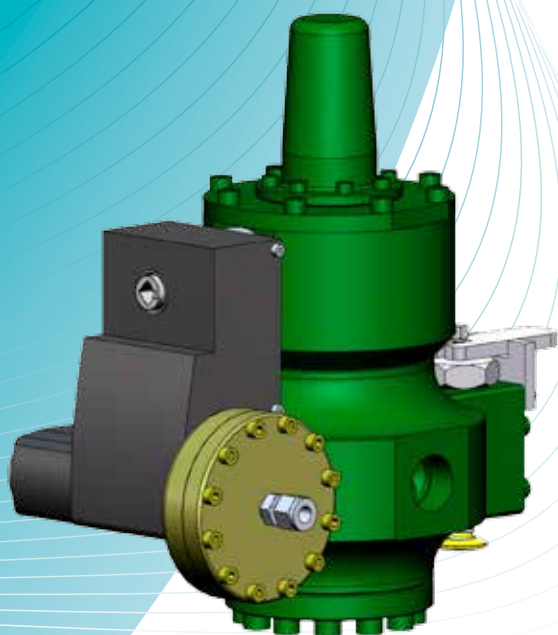
TA-992

High pressure Regulator & Safety Shutoff Valve

TA992SH



TA992SSV



Products range

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TA-992 FAMILY

TA992 family of high pressure devices is composed of:

- TA992SH High pressure regulator
- TA992SSV High pressure Safety Shut-off Valve

TA992 devices are designed to operate with inlet pressure up to 325 bar.

TA992SH pressure regulators are of the direct action type equipped with a pressure loaded static head as counter-balancing force to the diaphragm. The valve is fully balanced for higher accuracy and rangeability.

TA992SSV is a safety shut-off valve spring operated, equipped with a pressure sensing device that may be used for over-pressure and/or under-pressure detection in the system to be protected.

TA992 devices are used in all applications where high pressure compressed gas (up to 325 bar) is reduced to a lower pressure. Applications range from CNG stations, to Virtual Pipeline, to medium pressure supply to ovens and furnaces, etc.

TA992 design is of a Top Entry type, this allows for ease of maintenance since main valve body may be left in the line while all internals can be removed from above. Reducing maintenance time and associated costs.



FEATURES



TA992SH main characteristics are the following:

- Very high inlet pressure up to 325 bar.
- High Accuracy up to AC 5%.
- Fully balanced valve.
- Wide range of regulated outlet pressure from 1 to 80 bar.
- Built in relief valves to protect the regulator chamber.
- Built in Static Head pressure filling and venting valves

TA992SSV main characteristics are the following:

- Very High operational pressure up to 325 bar.
- High Accuracy up to AG 1%.
- Fully balanced valve.
- Wide range of set pressure from 1 to 95 bar.
- Over-pressure and /or under-pressure operation.
- Remote control accessory.
- Push push button for pressure equalization.

TECHNICAL SPECIFICATIONS TA992SH / TA992SSV

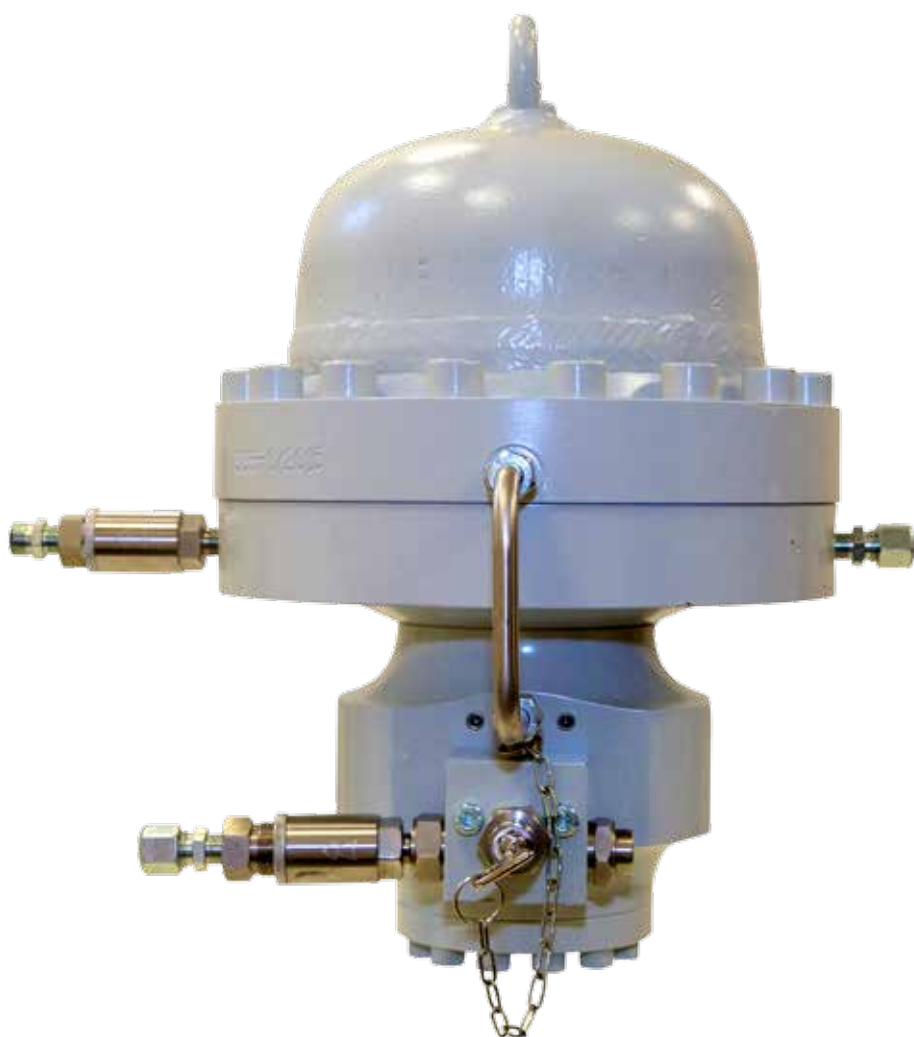
Maximum Inlet Pressure pumax		325 bar	
Regulated Pressure Range Wh		1 ÷ 80 bar	
Size		1" NPT Screwed / CG=130	
Type of connection		Threaded NPT - Available on request Flanged UNI (PN) or ANSI	
Accuracy class AC		Up to 5%	
Closing pressure class SG		Up to 10%	
TA-992SSV Safety Shutoff Valve	Set Range	Overpressure Wdo	Underpressure Wdu
		1 - 95 bar	0.15 - 29 bar
	Accuracy AG	Up to 1%	
	Closing time ta	Less than 1s	
Operational temperature range		-40 °C to +100 °C	
Operation and strength according to		EN 334, EN 14382, PED 2014/68/EU	
EX protection		Since the device is not fitted with potential ignition sources of its own, it is not subject to ATEX 95 regulations (all used electronic accessories meet ATEX requirements).	

TA992SH MATERIALS & WEIGHT

Body and covers	ASTM A 350 LF2
Stem	ASTM A 182 F6
Gaskets	NBR LT / FKM LT
Diaphragm	NBR LT NYLON REINFORCED
Seat	NBR LT
Bolts, Nuts	8.8/L7,Gr.4
Weight	65.5 kg

TA992SSV MATERIALS & WEIGHT

Body and covers	ASTM A 350 LF2
Stem	ASTM A 182 F6
Gaskets	NBR / FKM
Seat	NBR
Bolts, Nuts	8.8/L7,Gr.4
Weight	31.5 kg



TA992SH PRINCIPLE OF OPERATION

High pressure gas flows through the valve and is reduced to the required downstream controlled pressure.

The valve is fully balanced and the stem that connects the valve to the diaphragm is guided on low friction bearings.

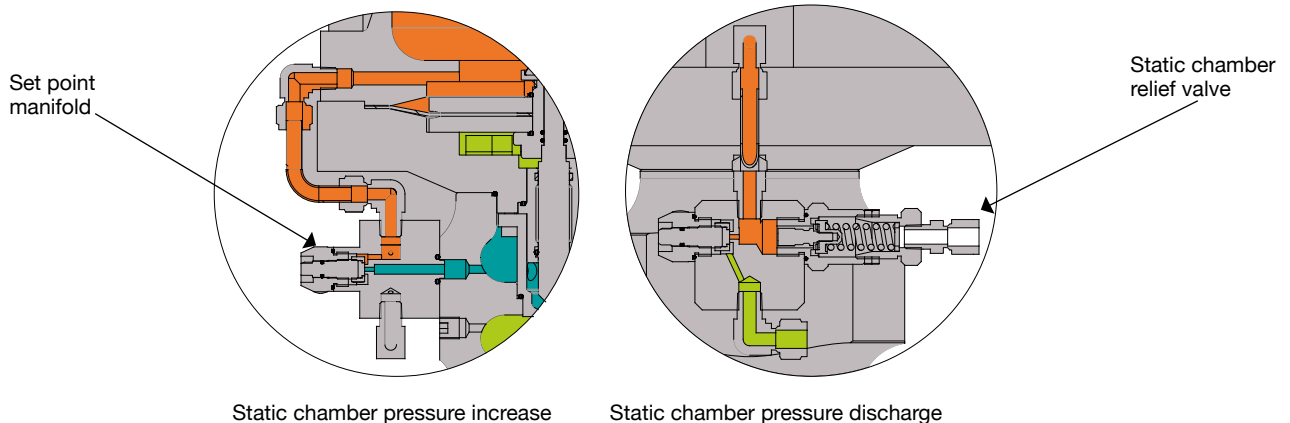
In order to set the desired downstream controlled pressure, the static chamber is filled with gas taken from upstream by means of the set point manifold. The pressure loading in the static chamber acts on the upper side of the diaphragm.

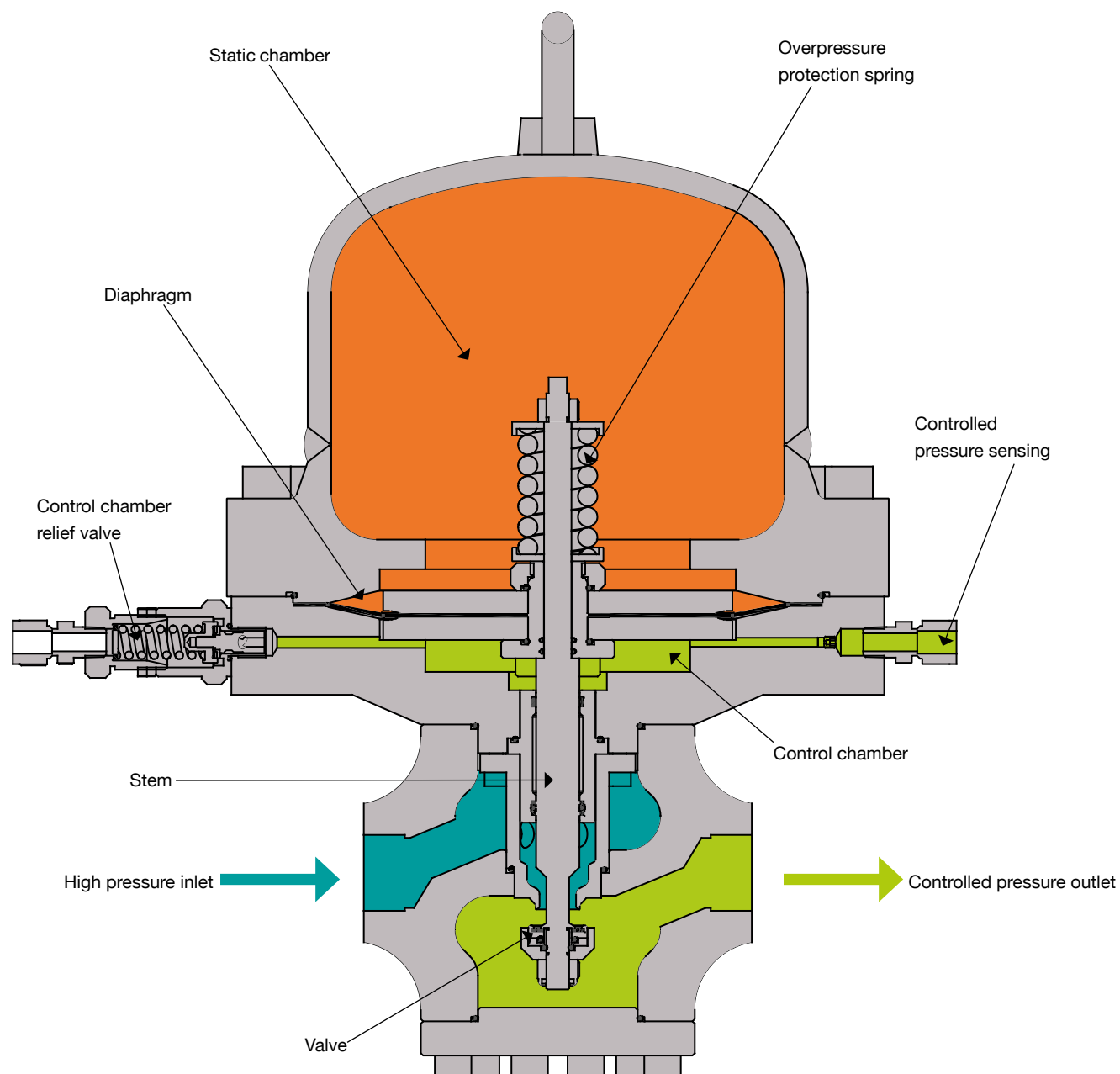
When the regulator is in operation, the downstream pressure is taken into the control chamber through the controlled pressure sensing line. The equilibrium between downstream pressure, static chamber pressure and weight of the moving parts determines the opening position of the regulator valve.

When the flow rate is reduced, downstream pressure will increase and consequently the force below the diaphragm will increase. This will overcome the fixed force generated by the static chamber pressure on the upper side of the diaphragm.

The valve will therefore move to a position closer to the orifice until the desired flow rate is achieved maintaining the required downstream pressure. When flow rate increases, the system will operate vice versa and the valve will move open.

If upstream pressure increases, downstream pressure will tend to increase as well and the same reaction described above will take the seat to close. Vice versa when upstream pressure decreases, the seat will compensate by increasing its opening.





TA992SSV PRINCIPLE OF OPERATION

The TA992SSV utilises the same body as the TA992SH regulator, but uses a different seat design and a high pressure version of the well-established TA958 Pressure Sensing Device.

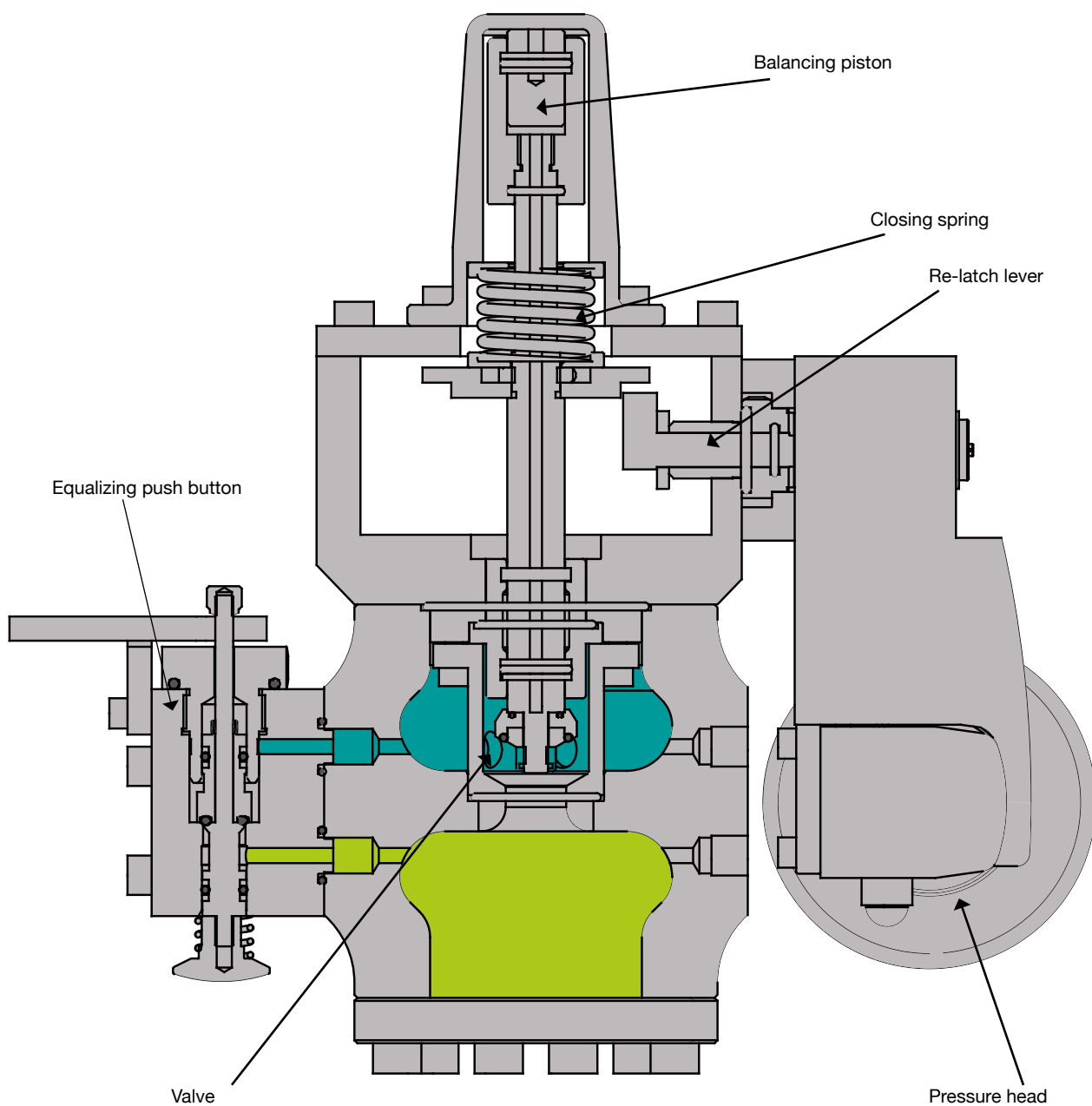
The unit is equipped with a pressure equalizing device across the seat.

The valve of the SSV is a fully balanced design by using a piston located in the upper part of the stem. The valve is shown armed in fully open position.

When an over pressure situation is detected by the pressure head, that is connected to the downstream pipework, the re-latch lever is released by the TA958

device and the valve closes under the force of the closing spring.

When the cause for operation of the valve has been identified and corrected, then the TA992SSV can be re-latched by first operating the push button lever pushing downwards in order to establish almost a zero delta P across the valve seat. Following this use the wrench (provided) on the re-latching lever. This is to be rotated clockwise until the valve is fully armed in open position.

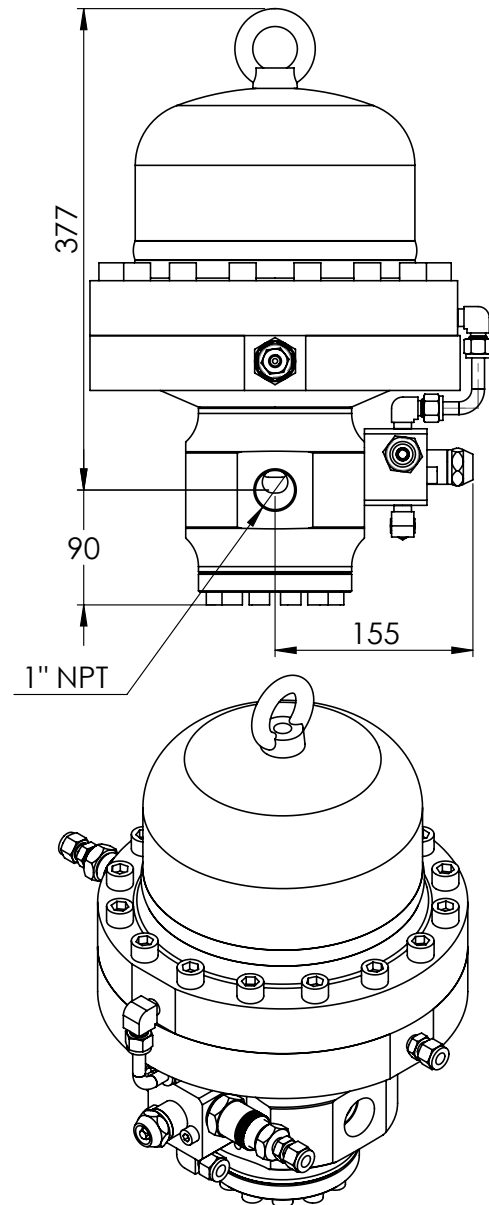
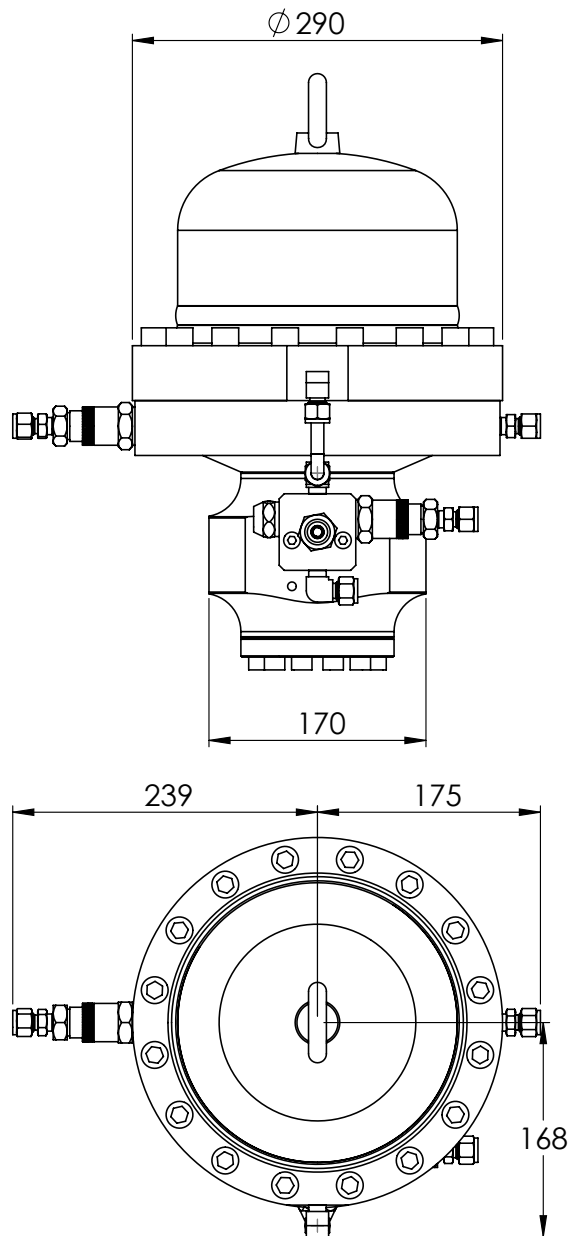


Pressure legend

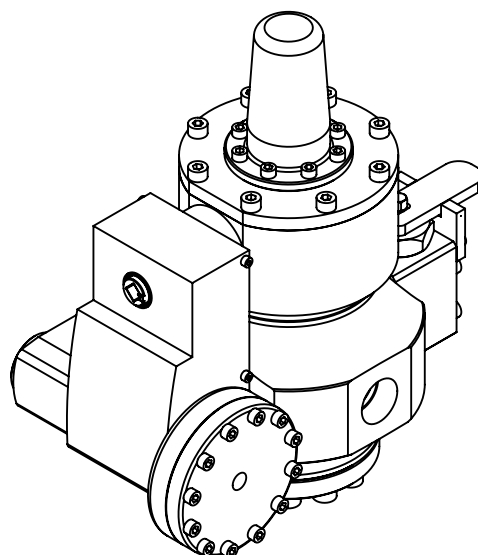
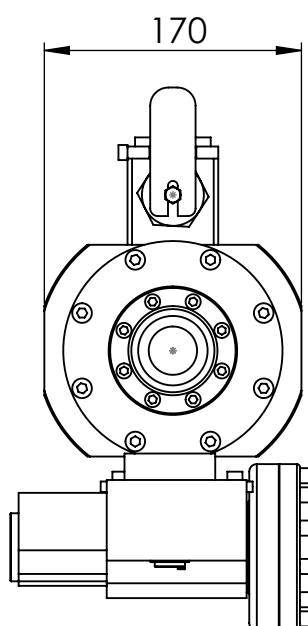
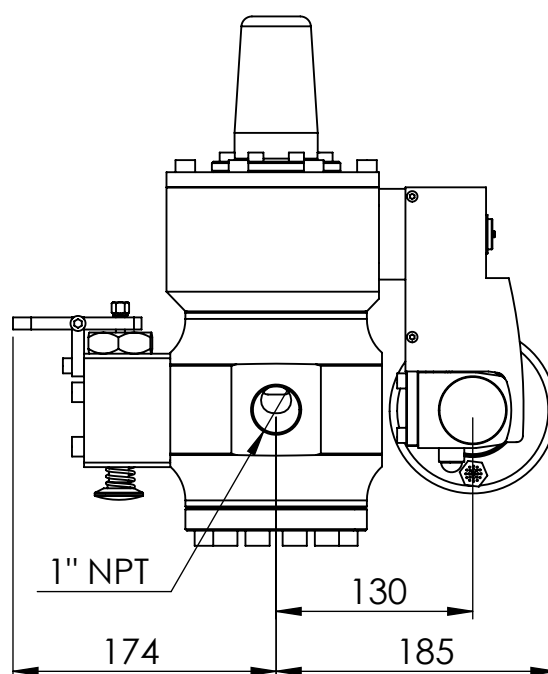
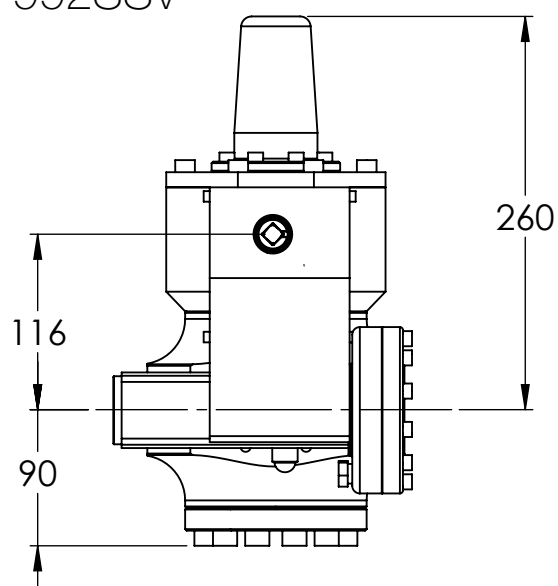
■ High pressure inlet
 ■ Controlled pressure
 □ Atmospheric

DIMENSIONS

TA-992SH

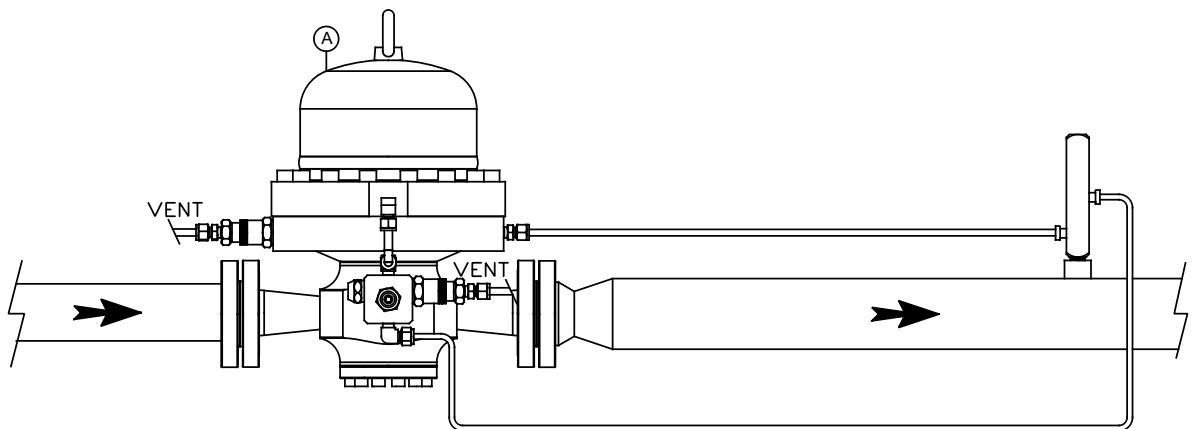


TA-992SSV

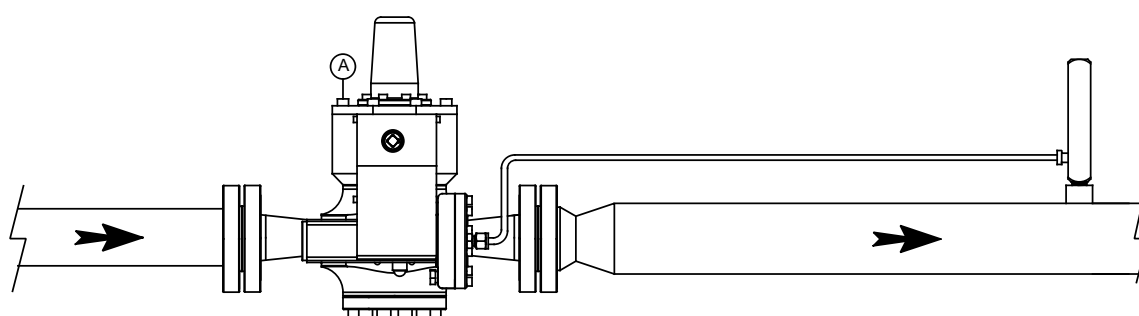


INSTALLATION SCHEMATICS

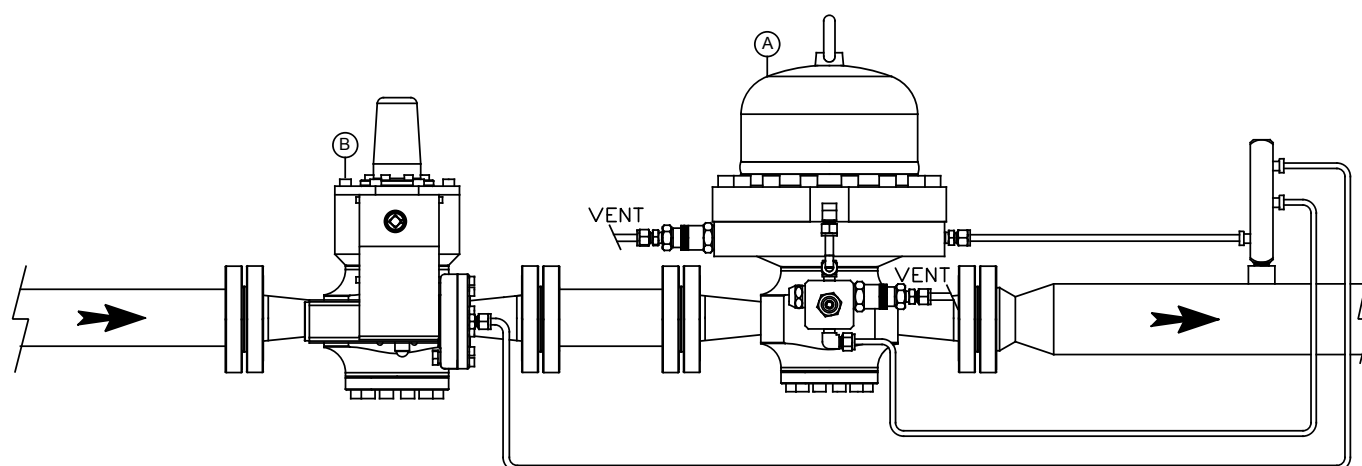
TA-992SH



A - TA992SH REGULATOR



A - TA992 SSV SAFETY SHUTOFF VALVE



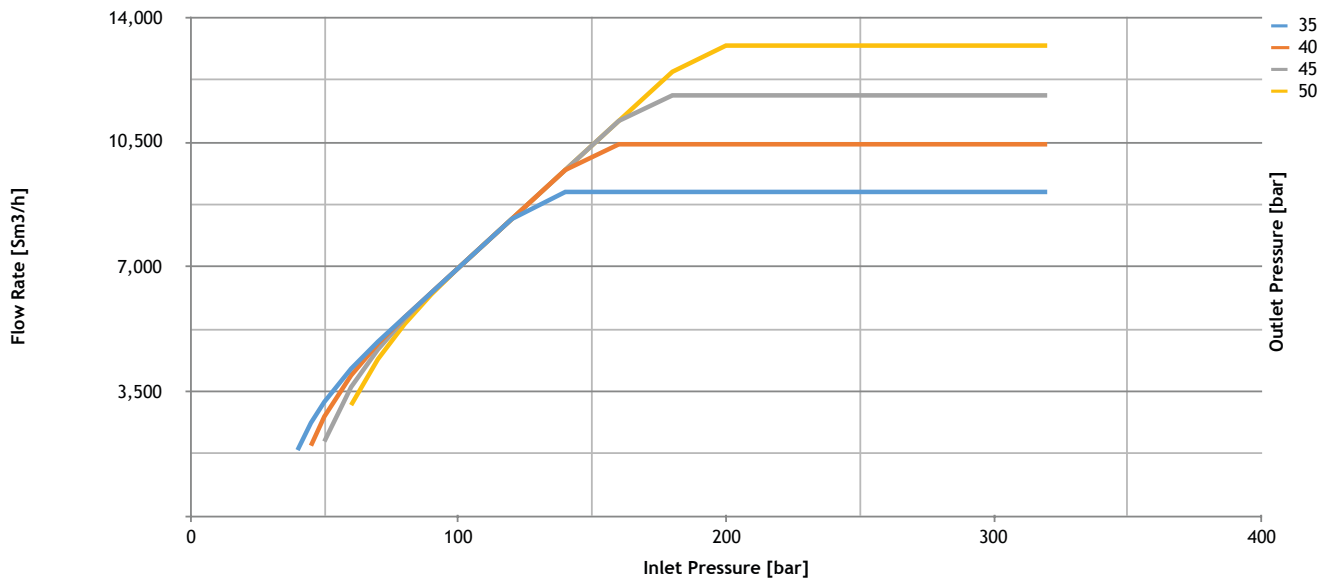
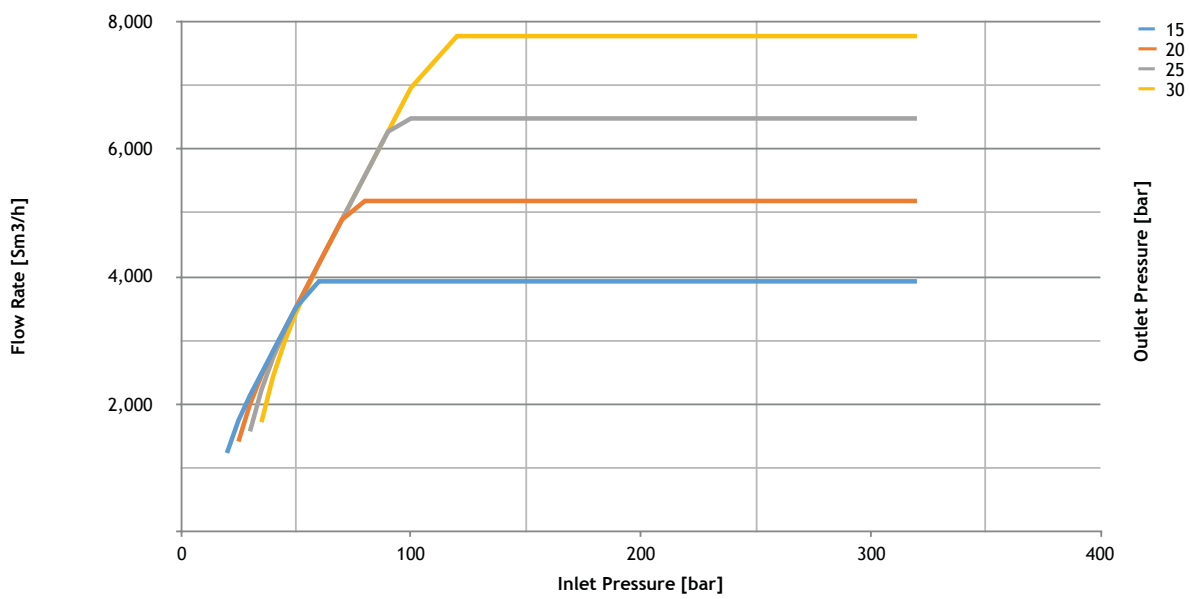
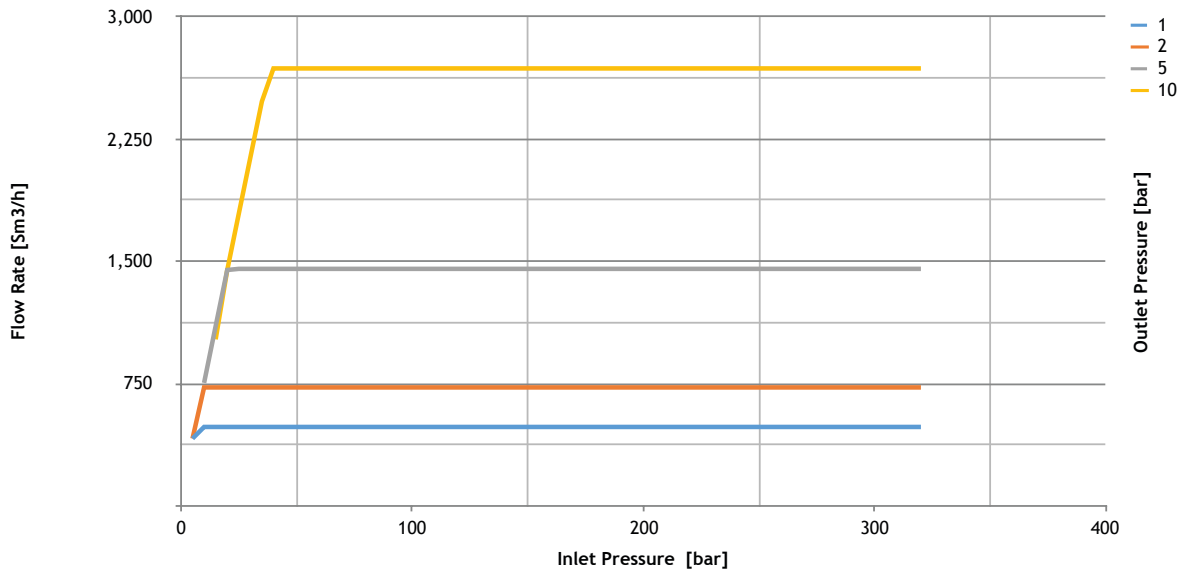
A - TA992SH REGULATOR
B - TA992 SSV SAFETY SHUTOFF VALVE

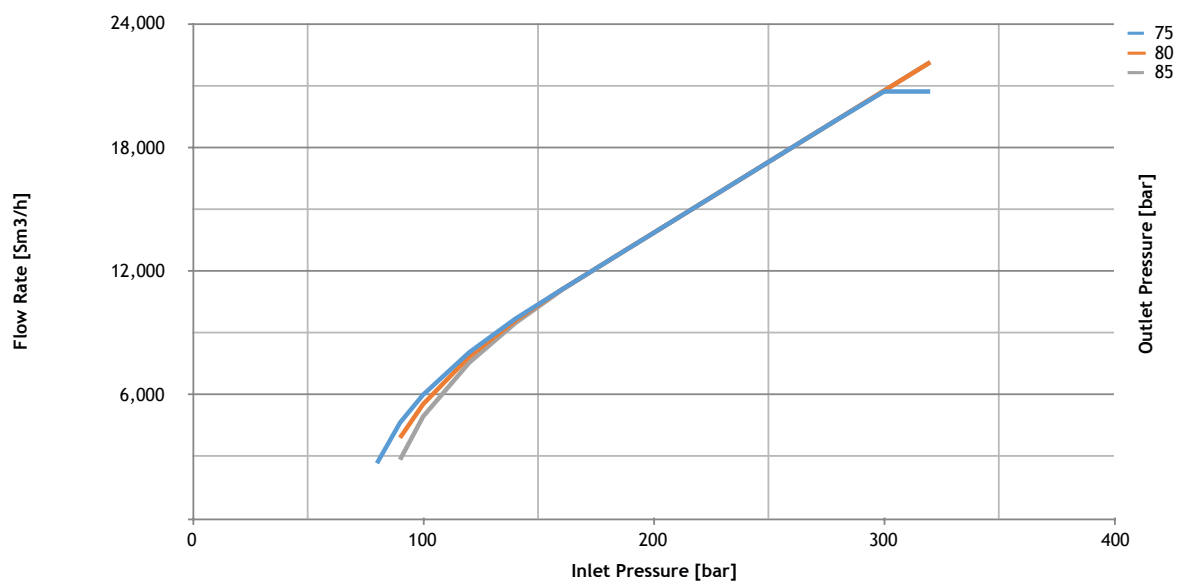
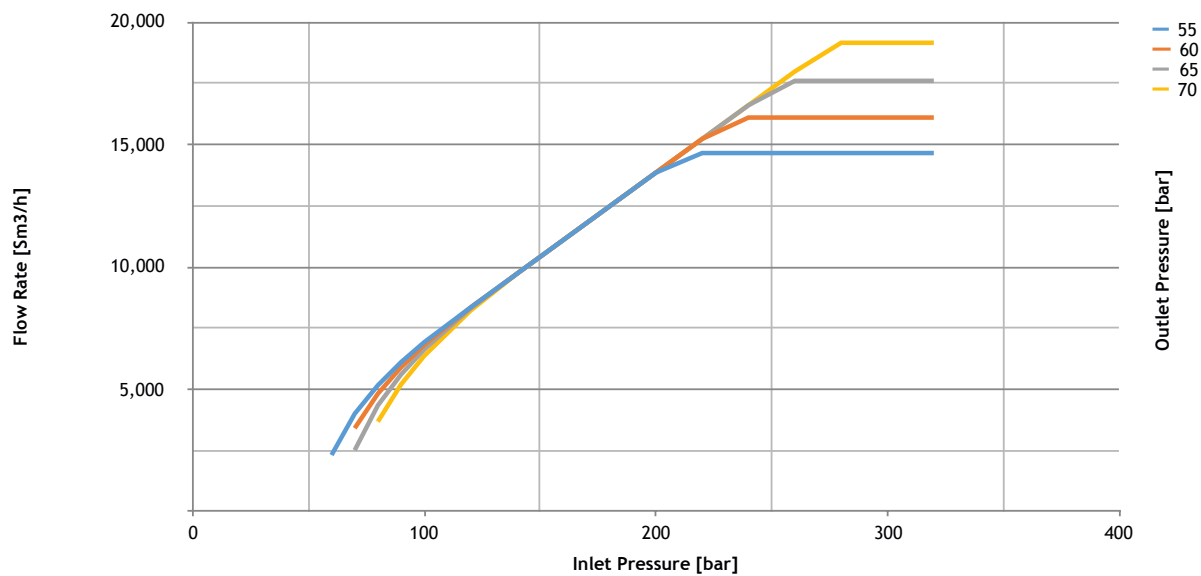
TA-992 FLOW TABLE

TAKE ALWAYS A 20% SAFETY MARGIN ON REQUIRED FLOWRATE	1"									
	Cg									
	130									
	Di									
	20									
	Flow Rate									
	Sm³/h									
Outlet Pressure [bar]	1.0	2.0	5.0	10.0	15.0	20.0	25.0	30.0	35.0	
Inlet Pressure [bar]										
5.0	413	413								
10.0	485	727	755							
15.0	485	727	1,103	1,022						
20.0	485	727	1,447	1,445	1,233					
25.0	485	727	1,454	1,792	1,743	1,412				
30.0	485	727	1,454	2,136	2,135	1,997	1,571			
35.0	485	727	1,454	2,481	2,481	2,446	2,222	1,716		
40.0	485	727	1,454	2,683	2,825	2,825	2,722	2,427	1,849	
45.0	485	727	1,454	2,683	3,170	3,170	3,143	2,972	2,615	
50.0	485	727	1,454	2,683	3,514	3,514	3,514	3,432	3,203	
60.0	485	727	1,454	2,683	3,924	4,204	4,204	4,203	4,135	
70.0	485	727	1,454	2,683	3,924	4,893	4,893	4,893	4,892	
80.0	485	727	1,454	2,683	3,924	5,185	5,582	5,582	5,582	
90.0	485	727	1,454	2,683	3,924	5,185	6,271	6,271	6,271	
100.0	485	727	1,454	2,683	3,924	5,185	6,479	6,960	6,960	
120.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	8,338	
140.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
160.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
180.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
200.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
220.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
240.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
260.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
280.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
300.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	
320.0	485	727	1,454	2,683	3,924	5,185	6,479	7,770	9,099	

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TA992SH FLOW RATE





SIZING

Sizing of gas pressure regulator involves establishing if the regulator C_g is higher than the required C_g and if the outlet velocity of gas at regulator outlet flange is within the required limits.

The following units shall be used in the below formulas:

- Q = Flow Rate [Sm^3/h] (Reference conditions $T=15^\circ\text{C}$, $P=1$ barg)
- P_u = Upstream Pressure [bar g]
- P_d = Downstream (Controlled) Pressure [bar g]
- P_b = Atmospheric Pressure [bar]
- d = Gas Density Relative to Air
- t_u = Upstream Temperature [$^\circ\text{C}$]
- DN = Regulator Outlet Nominal Diameter [mm]
- v = Gas Velocity at Outlet Flange [m/s]

According to the ratio of inlet to outlet pressure there are two cases using different formulas.

a) Sub Critical Flow Conditions

$$(P_u - P_d) \leq 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{Q}{13.57} \sqrt{\frac{d(t_u + 273)}{(P_d + P_b)(P_u - P_d)}}$$

b) Critical Flow Conditions

$$(P_u - P_d) > 0.5 (P_u + P_b)$$

Required C_g is calculated with the following formula.

$$C_g = \frac{2Q}{13.57 (P_u + P_b)} \sqrt{d(t_u + 273)}$$

In case of gases different from $d=0.61$ Natural Gas a correction factor F shall be used in the value of the Flow Rate Q used in the above formulas.

The Flow Rate to be used shall be $Q'=Q/F$.

F is taken from the following table.

Gas conversion table

Gas	Relative Density [d]	Coefficient [F]
Air	1	0.78
City Gas	0.44	1.17
Butane	2.01	0.55
Propane	1.53	0.63
Nitrogen	0.97	0.79
Carbon Dioxide	1.52	0.63
Hydrogen	0.07	3

Velocity of gas at regulator outlet flange shall be calculated using the following formula:

$$v = \frac{345.92 \times Q \times (1 - 0.002 \times P_d)}{(DN^2 \times (P_d + P_b))}$$

Allowable velocity

Downstream Pressure P_d [bar g]	Maximum Allowable Velocity v [m/s]
1	250
3	230
5	200
10 and higher	150

Interpolation may be used for intermediate values.

EMEA - ASEA



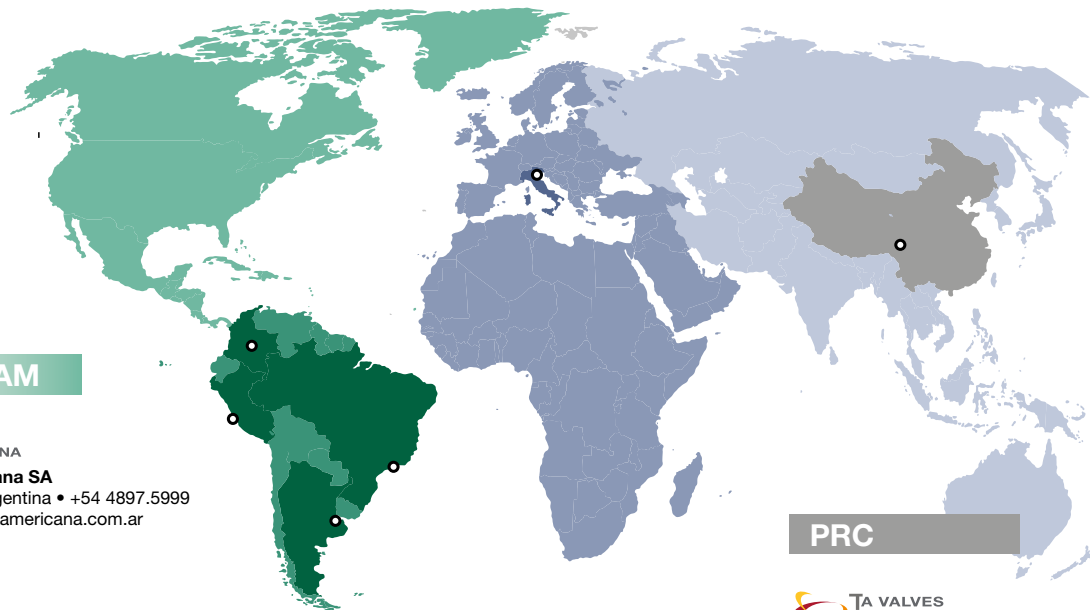
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