

## INSTALLATION AND MAINTENANCE INSTRUCTIONS

### RP45 - PRESSURE REDUCING VALVES

#### GENERAL

- These instructions must be carefully read before any work involving products supplied by VALSTEAM ADCA ENGINEERING S.A. is undertaken.
- The installation procedure is a critical stage in the valve life time and care should be taken to avoid damage to the valve or equipment.
- Reducing valves are designed to give accurate control of down-stream pressures. They give their maximum performance only when the equipment associated with them is correctly sized and installed in accordance with our recommendations.

#### **Warning!**

- At start up, the presence of small particles in the fluid (dirt, scale, weld splatters, etc) may cause an imperfect closure of the seat. If this occurs, proceed to an accurate cleaning.
- Do not touch the equipment without appropriate protection during working operation because it may conduct heat if the used fluid is at high temperature.
- Before starting maintenance be sure that the equipment is not pressurized or hot.
- The equipments must be used within the working temperature and pressure limits laid down for them, otherwise they may fail (refer to nameplate and/or IS- Information Sheet).
- Do not remove the nameplate attached to the equipment. Serial number and other useful information stamped on it.
- This valve is not suitable for oxygen service.

#### INSTALLATION



- Before to installation remove plastic covers placed on flanges or connection ends. The equipment has an arrow or Inlet/Outlet designations. Be sure that it will be installed on the appropriate direction.
- Take care with jointing material to ensure that none may be permitted to block or enter the valve.
- Reducing valves are recommended to be fitted with the centre line of the valve in a vertical position to ensure that the best results are obtained.
- An ADCA pipeline strainer should be installed upstream of the valve to protect from dirt which could damage the valve or cause mal-functioning.
- The reducing valve pipework should be properly supported and free from strain and it should not be subjected to undue surges of pressure.

For steam installations we strongly recommend that the reducing valve is positioned where condensation is unable to collect or that, alternatively, separators and steam traps are fitted so that the pipework drains correctly. The startup condition should be considered.

- A balance pipe must be connected downstream at least 1 meter from valve. See IS.RP45.01.
- RP45 is designed primarily for steam, compressed air and non-inflammable gases. It has limited use for neutral liquids since the plug close in the same direction of the fluid flow, which can produce vibrations and water hammer when used at less than 20% of capacity. To avoid this, valve can be installed with the fluid direction against the plug under certain conditions. Please consult the factory.

At service conditions where the temperature is more than 100°C it is necessary to protect the diaphragm against overheating by using a seal pot.

Never size the valve according to the pipe diameter in which it has to be fitted but according to the required actual flow .Pipe sizing must also respect the maximum recommended flow velocities according to the medium.

- **Service conditions less than 100°C:** with gases the valve is ready to work. In case of liquids the actuator must be filled completely with liquid, so, the vent screw (12) should be open till the water flow without bubbles.

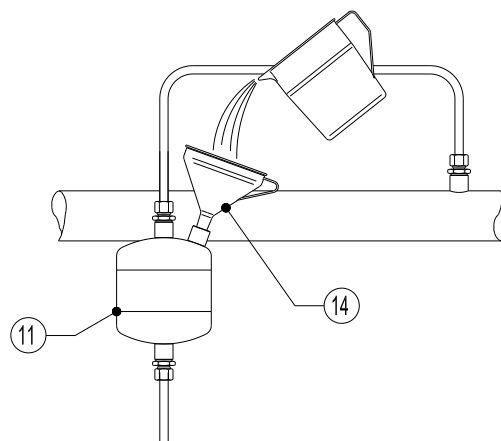
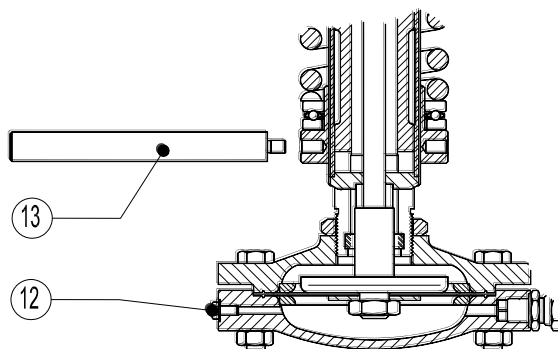
The valve can be installed with the diaphragm pointing upwards or downwards.

- **Service conditions more than 100°C:** Fill the seal pot (11) using a funnel (14) until the water emerges from the actuator vent (12) without bubbles. Close the actuator vent screw (12) and proceed filling the pot until the water reaches the top and close it with the plug. The valve is now ready to work.

The valve must be installed with the diaphragm pointing downwards.

Downstream pressure should be adjusted with the key (13). Compressing the spring, spring force increase and downstream pressure increase. Relaxing the spring, spring force decrease and downstream pressure decrease.

The valve closes when the downstream pressure rises.



#### Installation area requirements:

- The installation area should have easy access and provide enough space for maintenance and removing operations.
- The installation area should have the necessary firing system to prevent damage of the equipment due to over temperature/pressure cause by fire.

#### START UP



ATTENTION

- Current regional safety regulations should be take in to account and followed.
- Protective insulation and warning notice may be required.
- Until the start up of an existing or a new plant, the following must be checked:
  - All works are completed.
  - The valve is correctly installed.
  - All the necessary safety devices have been installed.
- **At start up, the presence of small particles in the fluid (dirt, scale, weld splatters, joint particles, remains of Teflon tape, etc) may cause an imperfect closure of the seat. If this occurs, proceed to an accurate cleaning.**
- **Protection varnishes from pipes and flanges, fats, leftover paint, graphite, etc, should also be carefully clean, because they can be dissolved in the fluids (like steam) blocking the regulation elements after the first service stop.**
- During operation high flow noises can be heard.

## Procedure:

1. All stop valves should be close.
2. Regulation spring must be relaxed. If not, release tension by turning the adjustment screw counter-clockwise.
3. Open downstream stop valve.
4. Open slowly the upstream stop valve, in order to avoid water hammer damaging, until the input pressure reaches its limit.
5. Adjust the regulation spring by turning the adjustment screw clockwise, while observing the output pressure gauge, until the reduced pressure is reached. (There must be some medium consumption on the outlet side during this process).
6. When the system is stable a readjustment of the regulation spring may be needed.
7. The valve is ready.

## Periodical checking:

24 hours after the start up, it is recommended to check pipe connections for leaks and retighten the connections if necessary.

## MAINTENANCE

- We recommend that the pressure reducing valves are serviced as necessary. Pressure reducing valves should be checked periodically (at least yearly), to verify that they are operating correctly and to clean the internal parts and screen (if any).
- When reassembling make sure that all gasket faces are clean and always use a new gasket. Tighten cover bolts uniformly in a diagonal sequence.
- Valves in store for long periods should have their adjusting spring relaxed.
- For further information refer to the relevant RP brochure or consult our Sales Office.

## Replacement of actuator diaphragm:

In reference to the fig.1 proceed as follow:

1. Isolate the valve and make sure the system is depressurized.
2. Drain the actuator and condensate vessel through the actuator vent screw (9), if applicable.
3. Relax the valve regulation spring, turning the key anti-clockwise.
4. Remove the actuator from the valve by unscrewing the nut (8) and turning the actuator anti-clockwise.
5. Remove the screws and nuts (7).
6. Remove the bottom cover (1).
7. Untighten the nut (6), remove the washer (5) and replace the diaphragm (4).
8. Refit all the items in reverse order (tighten the actuator bolts evenly).
9. Fill the condensate vessel again as the above instructions, if applicable

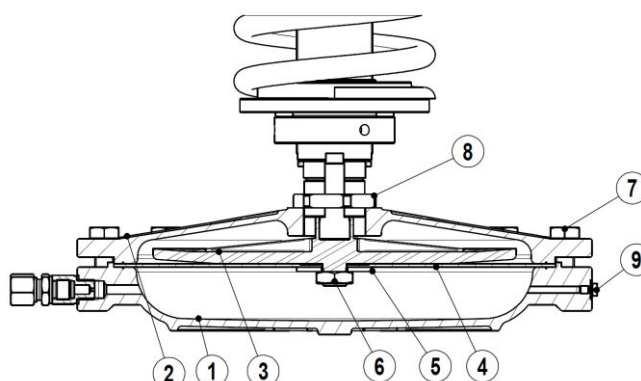


Fig. 1 – Actuator

## Replacement of spring:

In reference to the fig.2 proceed as follow:

1. Relax the spring (9) by unscrewing the bearing support (10). Do so by inserting a small lever and rotating.
2. Remove the actuator on top of the valve, also by unscrewing it (do not use a tool for this, use your hands)
3. Nut (11) will be loose at this point, remove it.
4. Following, continue to unscrewing the bearing support (10) in order to remove it along with the bearing and the spring support.
5. Replace the spring.
6. Screw the spring support, the bearing and the bearing support (10) back on to their original position.
7. Finally screw the nut (11).
8. Install the actuator on the valve and screw it tightly, against the nut. Tighten well.

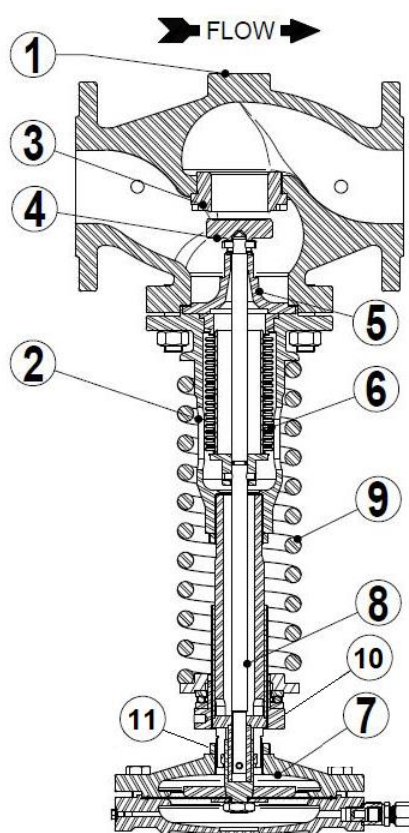


Fig. 2 – RP45 valve

| CE MARKING ( PED - European Directive ) |                |                          |
|-----------------------------------------|----------------|--------------------------|
| PN 16                                   | PN 40          | Category                 |
| DN15 to DN50                            | DN15 to DN32   | SEP - art. 3, paragraph3 |
| DN65 to DN150                           | DN40 to DN100  | 1 (CE Marked)            |
| /                                       | DN125 to DN150 | 2 (CE Marked)            |

| LIMITING CONDITIONS              |                |          |          |                  |          |          |                    |          |          |
|----------------------------------|----------------|----------|----------|------------------|----------|----------|--------------------|----------|----------|
|                                  | RP45G<br>RP45S | RP45S    | RP45I    | RP45GT<br>RP45ST | RP45ST   | RP45IT   | RP45GN*<br>RP45SN* | RP45SN * | RP45IN * |
| Body design conditions           | PN16           | PN40     | PN40     | PN16             | PN40     | PN40     | PN16               | PN40     | PN40     |
| Max.upstream pressure            | 13 bar         | 25 bar   | 25 bar   | 13 bar           | 25 bar   | 25 bar   | 13 bar             | 25 bar   | 25 bar   |
| Max.downstream DN15/100          | 13 bar         | 18 bar   | 18 bar   | 13 bar           | 18 bar   | 13 bar   | 13 bar             | 18 bar   | 18 bar   |
| Max.downstream DN125/150         | 12 bar         | 16,5 bar | 16,5 bar | 12 bar           | 16,5 bar | 16,5 bar | 12 bar             | 16,5 bar | 16,5 bar |
| Min.downstream pressure          | 0,15 bar       | 0,15 bar | 0,15 bar | 0,15 bar         | 0,15 bar | 0,15 bar | 0,15 bar           | 0,15 bar | 0,15 bar |
| Max.operating temperature        | 200°C          | 250°C    | 250°C    | 200 °C           | 200 °C   | 200 °C   | 80 °C              | 80 °C    | 80 °C    |
| Max.reducing ratio               | 25:1           | 25:1     | 25:1     | 25:1             | 25:1     | 25:1     | 10:1               | 10:1     | 10:1     |
| Rangeability                     | 10:1           | 10:1     | 10:1     | 10:1             | 10:1     | 10:1     | 10:1               | 10:1     | 10:1     |
| Max.cold hydraulic test          | 24 bar         | 25 bar   | 25 bar   | 24 bar           | 25 bar   | 25 bar   | 24 bar             | 25 bar   | 25 bar   |
| Max.hyd. factory valve body test | 24 bar         | 60 bar   | 60 bar   | 24 bar           | 60 bar   | 60 bar   | 24 bar             | 60 bar   | 60 bar   |

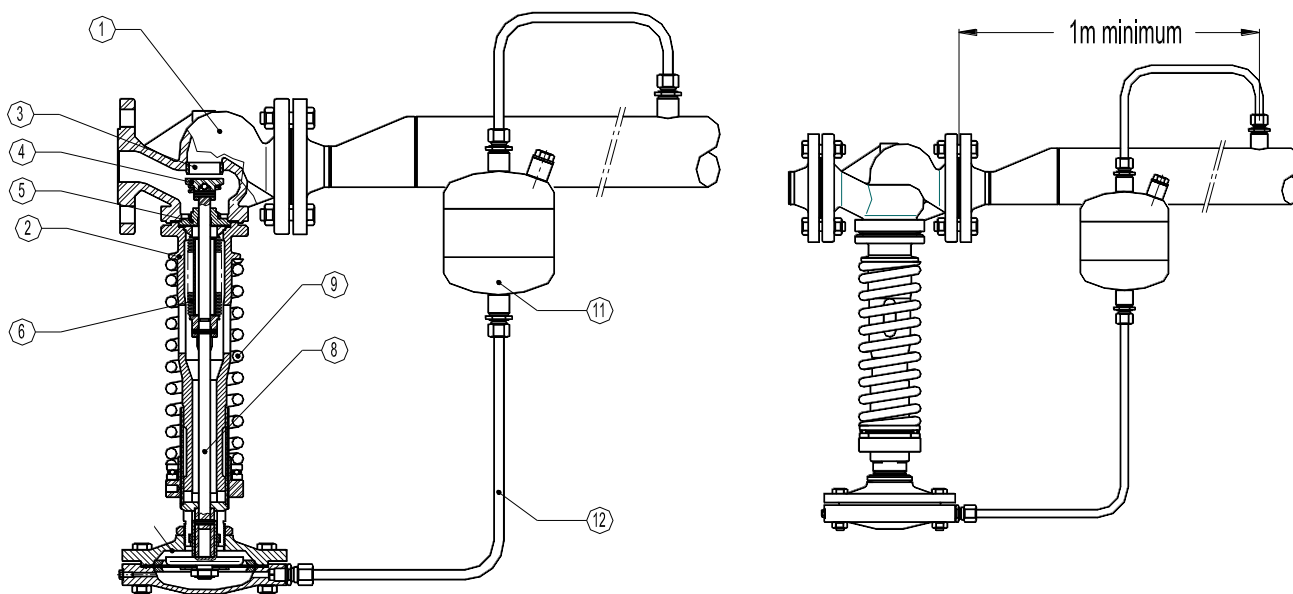
\*Suffix N : - a maximum turndown ratio 10:1 should be observed. Other soft materials on request.

**USEFUL NOTES ON VALVE AND PIPE SIZING** - If the flow is unknown it is possible to estimate it based on pipe size or equipment heat requirement - please consult.

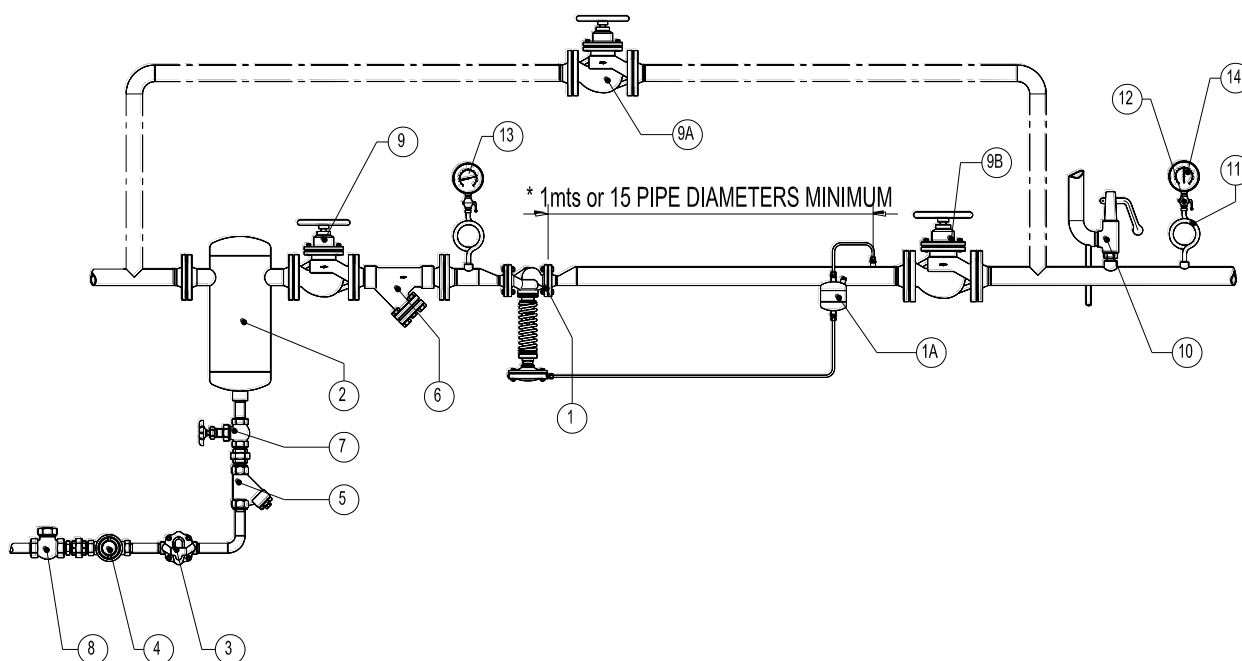
#### PARTS LIST FOR RP45 PRESSURE REDUCING VALVES:

| CODE         | DESIGNATION                               | VALVE SIZE<br>DN | POS.NR.    | QTY. |
|--------------|-------------------------------------------|------------------|------------|------|
| VR.9451.015  | Stainless steel bellows                   | DN15-DN25        | 6          | 1    |
| VR.9451.032  | Stainless steel bellows                   | DN32-DN40        | 6          | 1    |
| VR.9451.050  | Stainless steel bellows                   | DN50-DN65        | 6          | 1    |
| VR.9451.080  | Stainless steel bellows                   | DN80             | 6          | 1    |
| VR.9451.100  | Stainless steel bellows                   | DN100            | 6          | 1    |
| VR.9451.125  | Stainless steel bellows                   | DN125            | 6          | 1    |
| VR.9451.150  | Stainless steel bellows                   | DN150            | 6          | 1    |
| VR.9455.060  | Regulating spring nr 60                   | DN15-DN40        | 9          | 1    |
| VR.9455.061  | Regulating spring nr 61                   | DN50-DN65        | 9          | 1    |
| VR.9455.062  | Regulating spring nr 62                   | DN80             | 9          | 1    |
| VR.9455.063  | Regulating spring nr 63                   | DN100            | 9          | 1    |
| VR.9455.064  | Regulating spring nr 64                   | DN50-DN65        | 9          | 1    |
| VR.9455.065  | Regulating spring nr 65                   | DN80             | 9          | 1    |
| VR.9455.066  | Regulating spring nr 66                   | DN15-DN40        | 9          | 1    |
| VR.9455.067  | Regulating spring nr 67                   | DN50-DN65        | 9          | 1    |
| VR.9455.068  | Regulating spring nr 68                   | DN80             | 9          | 1    |
| VR.9455.069  | Regulating spring nr 69                   | DN100            | 9          | 1    |
| VR.9455.070  | Regulating spring nr 70                   | DN125-150        | 9          | 1    |
| VR.94502.015 | Piston body, valve disc, bellows, spindle | DN15-DN25        | 2, 4, 6, 8 | 1    |
| VR.94502.032 | Piston body, valve disc, bellows, spindle | DN32-DN40        | 2, 4, 6, 8 | 1    |
| VR.94502.050 | Piston body, valve disc, bellows, spindle | DN50-DN65        | 2, 4, 6, 8 | 1    |
| VR.94502.080 | Piston body, valve disc, bellows, spindle | DN80             | 2, 4, 6, 8 | 1    |
| VR.94502.100 | Piston body, valve disc, bellows, spindle | DN100            | 2, 4, 6, 8 | 1    |
| VR.94502.125 | Piston body, valve disc, bellows, spindle | DN125            | 2, 4, 6, 8 | 1    |
| VR.94502.150 | Piston body, valve disc, bellows, spindle | DN150            | 2, 4, 6, 8 | 1    |

| CODE        | DESIGNATION | ACTUATOR                    | POS.NR. | QTY. |
|-------------|-------------|-----------------------------|---------|------|
| VR.9459.001 | Diaphragm   | A1 / A11 / A10S / A12S / B1 | --      | 1    |
| VR.9459.002 | Diaphragm   | A2 / A21 / B1 / B21         | --      | 1    |
| VR.9459.003 | Diaphragm   | A3 / B3                     | --      | 1    |
| VR.9459.004 | Diaphragm   | A4 / B4                     | --      | 1    |
| VR.9459.005 | Diaphragm   | C11S                        | --      | 1    |



### TYPICAL INSTALLATION



| MATERIALS RP45 |                           |                    |
|----------------|---------------------------|--------------------|
| POS.           | DESIGNATION               | MODEL              |
| 1              | Pressure reducing valve   | RP45               |
| 1A             | Water seal pot            | Steel              |
| 2              | Humidity separator        | S25                |
| 3              | Steam trap                | FLT series         |
| 4              | Sight glass               | SW12               |
| 5              | Strainer                  | IS16               |
| 6              | Strainer                  | IS16F              |
| 7              | Stop valve                | Globe type         |
| 8              | Check valve               | Globe type         |
| 9              | Stop valve                | Globe or gate type |
| 9A*            | By-pass valve             | Globe type         |
| 9B             | Stop valve                | Globe or gate type |
| 10             | Safety valve              | ----               |
| 11             | Coil                      | ----               |
| 12             | Gauge cock                | ----               |
| 13             | Upstream pressure gauge   | ----               |
| 14             | Downstream pressure gauge | ----               |

#### Remarks:

\* By-pass is optional. In case the by-pass is not allowed than stop valve 9B should be placed after pressure gauge 14 allowing the isolation of safety valve.

PN, classes and materials according to the operating pressures.

The balance pipe connection is recommended to enter downstream pipe at a minimum of 1 meter from the valve.

Information sheet are available (IS - RP45) and typical assembling drawing.

Special assembling designs may be produced on request.

#### PRODUCTS RETURNING



ATTENTION

- Information regarding any hazards and precautions to be considered because of contaminating fluids and residues or mechanical damage that may represent a health, safety or environmental risk, must be provided in writing by the distributors and costumers when returning products to Valsteam ADCA engineering.
- Health and safety data sheets regarding substances identified as hazardous or potentially hazardous must be provided with the information mention above.



ATTENTION

- **LOSS OF WARRANTY:** Total or partial disregard of above instructions involves loss of any right to warranty.