# V222

**Two-way Pressure Balanced Plug Valve, Flanged PN 16 (232 psi)**

F-20-02

**30 Mar 2004**

**V222** is a flanged plug valve, designed for control of large flows in heating and air conditioning installations. The plug is balanced whereby only a low actuating force is required.

For other types of applications, please contact your nearest TAC sales office.

The V222 valve can be used with the following types of fluids:

- hot water, or deaerated cooling water.
- deaerated water with glycol-type antifreeze agent (max.50%)
- with cooling medias at temperatures below 0 °C a stem heater must be fitted, to protect from stem seizure due to freezing.

## TECHNICAL DATA

Design .................... two-way pressure balanced plug valve
Pressure class ............................................ PN 16 (232 psi)
Flow characteristics .................................................... EQ%
Stroke ................DN 65 –DN 100 ...............30 mm (1.18 in.)
DN 125 – DN 150 ............50 mm (1.97 in.)
Rangeability Kv/Kv min ...................................................... 50
Leakage .................................................... <0.05% of Kv/Cv
ΔPm ............................................. 800 kPa (116 psi), water
Max. temperature of medium: ...................... 150 °C (302 °F)
Min. temperature of medium: .........................–10 °C (14 °F)
Connection ........................... Flange according ISO 7005-2
Materials:
Body ....................................................... Cast iron GG25
Stem ....................................... stainless steel SS 1.4021
Plug ........................................ stainless steel SS 1.4021
Seat ........................................ stainless steel SS 1.4021
Packing box .......................... Spring-loaded PTFE-V-ring

**Key to Technical specification**

- The rangeability is the ratio of $K_V$ to $K_{Vmin}$ ($C_V$ to $C_{Vmin}$).
- $K_V$ ($C_V$) is the valve flow at the max. lift and a pressure drop of 100 kPa across the valve.
- $K_{Vmin}$ ($C_{Vmin}$) is the minimum controllable flow at a pressure drop of 100 kPa, within the flow range where the characteristic meets the requirements on characteristic slope according to IEC534-1.
- $\Delta p_m$ is max. pressure drop across a fully open valve.

| Size DN | Size In. | Kv m³/h | Cv | Part number | Pressure Equipment Directive PED 97/23/EC | CE-marked |
|---|---|---|---|---|---|---|
| 65 | 2½ | 63 | 76 | 721-2254-000 | Cat. III | CE |
| 80 | 3 | 100 | 117 | 721-2258-000 | Cat. III | CE |
| 100 | 4 | 160 | 187 | 721-2262-000 | Cat. III | CE |
| 125 | 5 | 250 | 292 | 721-2266-000 | Cat. III | CE |
| 150 | 6 | 400 | 467 | 721-2270-000 | Cat. III | CE |

## FUNCTION AND FLOW CHARACTERISTIC

The design of the **V222** plug is pressure balanced to ensure high close off pressure with lower actuator force.

The valve closes with the stem down.

The flow characteristic of the **V222** is equal percentage (EQ%, also called logarithmic), giving an equal-percentage change in flow.

The latter is necessary to give good control in systems with large load variations

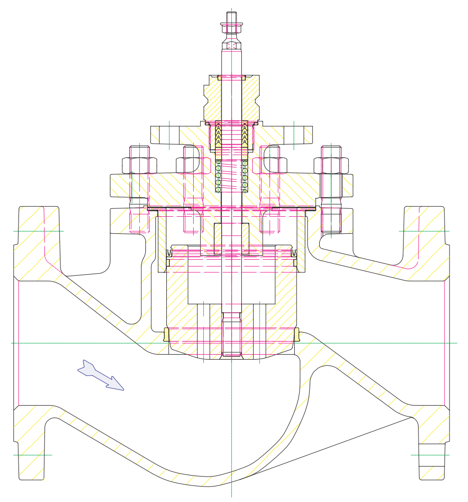

Figure 1

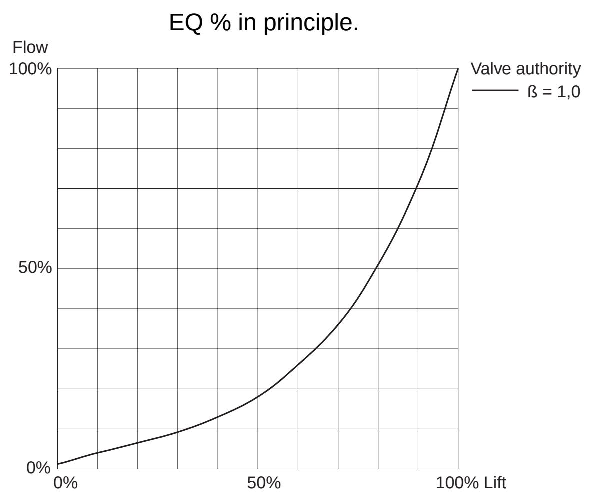


Figure 2

## ACTUATOR

| Size | | M800 ΔPc | | M22 ΔPc | | M50 ΔPc | |
|---|---|---|---|---|---|---|---|
| DN | in. | kPa | PSI | kPa | PSI | kPa | PSI |
| 65 | 2½ | 1500 | 218 | – | – | – | – |
| 80 | 3 | 1500 | 218 | – | – | – | – |
| 100 | 4 | 1100 | 160 | – | – | – | – |
| 125 | 5 | – | – | 1600 | 232 | 1600 | 232 |
| 150 | 6 | – | – | 1400 | 203 | 1600 | 232 |

$\Delta P_c$ = Max. close-off pressure drop across the valve.

## INSTALLATION

The valve should be mounted with flow direction in accordance with the valve marking.

It is recommended to install the valve in the return pipe, in order to avoid exposing the actuator to high temperatures.

The valve must not be mounted with the actuator under the valve.

To ensure that suspended solids will not become jammed between the valve plug and seat, a filter should be installed upstream of the valve and the pipe system should be flushed before the valve is installed.

**A.** Typical installation without local circulating pump.

To provide good function the pressure drop across the valve should be no less than half of the available pressure (Δp). This corresponds to a valve authority of 50%.

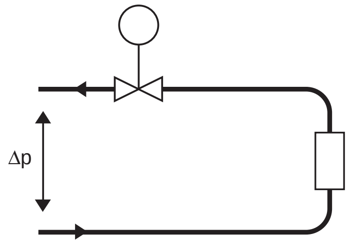


Figure 3

**B.** Typical installation with local circulating pump.

The $K_V/C_V$ value of the valve to be selected so that the entire available pressure drop (Δp) falls across the control valve.

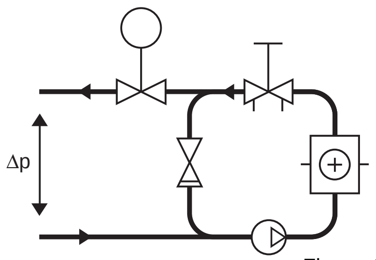


Figure 4

## PRESSURE DROP DIAGRAM

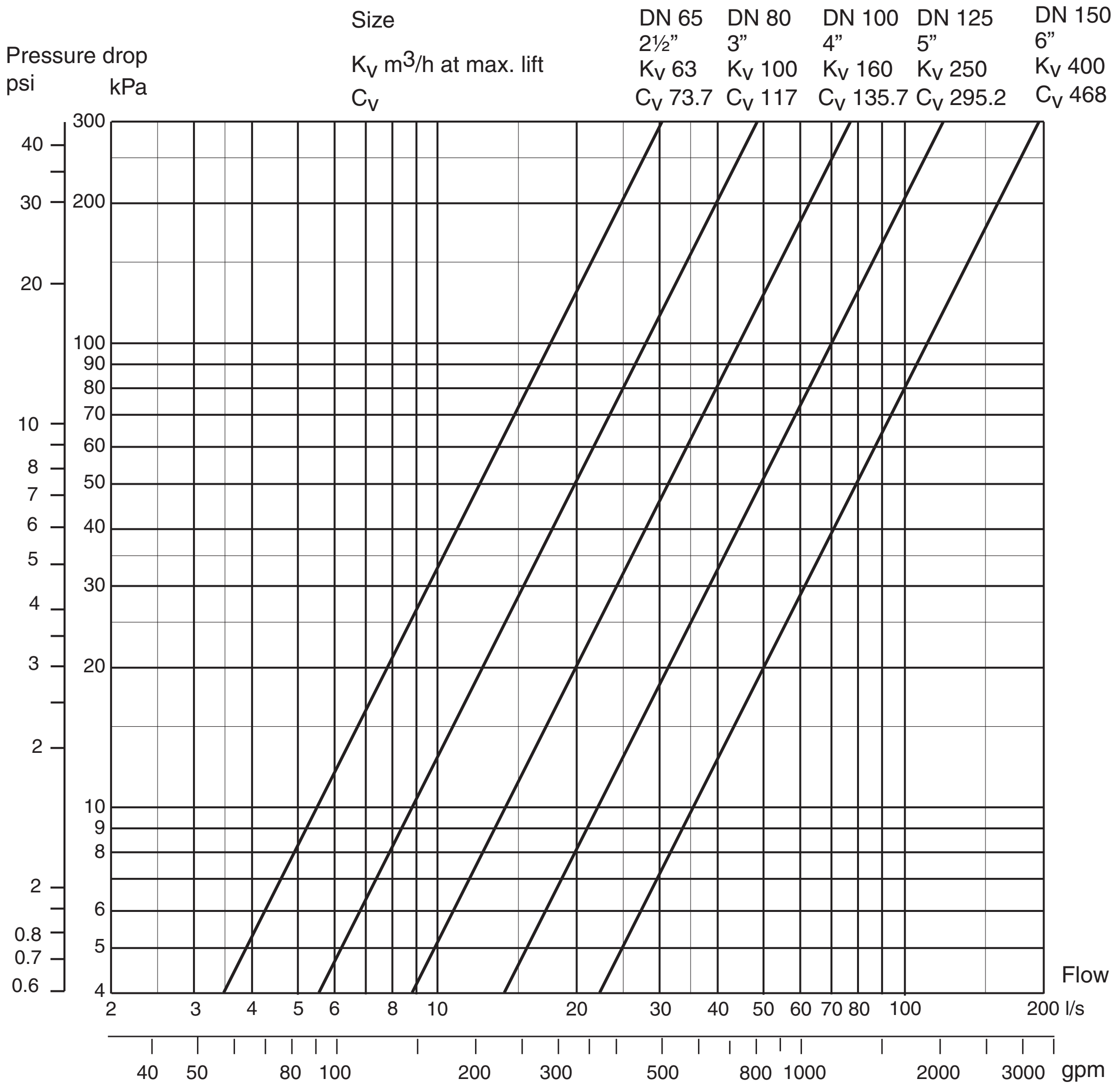


Figure 5

## CAVITATION

Cavitation takes place in a valve when the velocity of the flow between the plug and seat increases to the extent that gas bubbles are created in the water.

When, after the plug and seat, the velocity decreases, the gas bubbles collapse (implode), generating considerable noise and causing considerable wear on the valve.

By means of the cavitation diagram shown in figure 6 it can be checked if risk of cavitation exists with the working conditions in the pertinent installation. Proceed as follows:

Using the static pressure before the valve (e.g. 1000 kPa), plot a horizontal line to the line for the temperature of the liquid (e.g. 120 °C).

From the intersection point, plot a vertical line downwards and read off the max. permissible pressure drop across the valve.

If the computed pressure drop exceeds the value read from the diagram there is risk of cavitation.

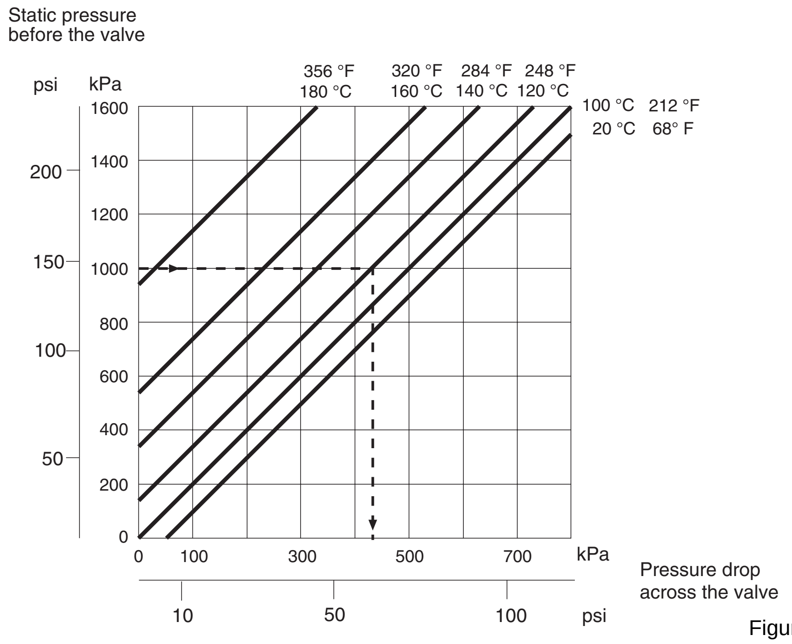


Figure 6

## MEASUREMENTS AND WEIGHTS

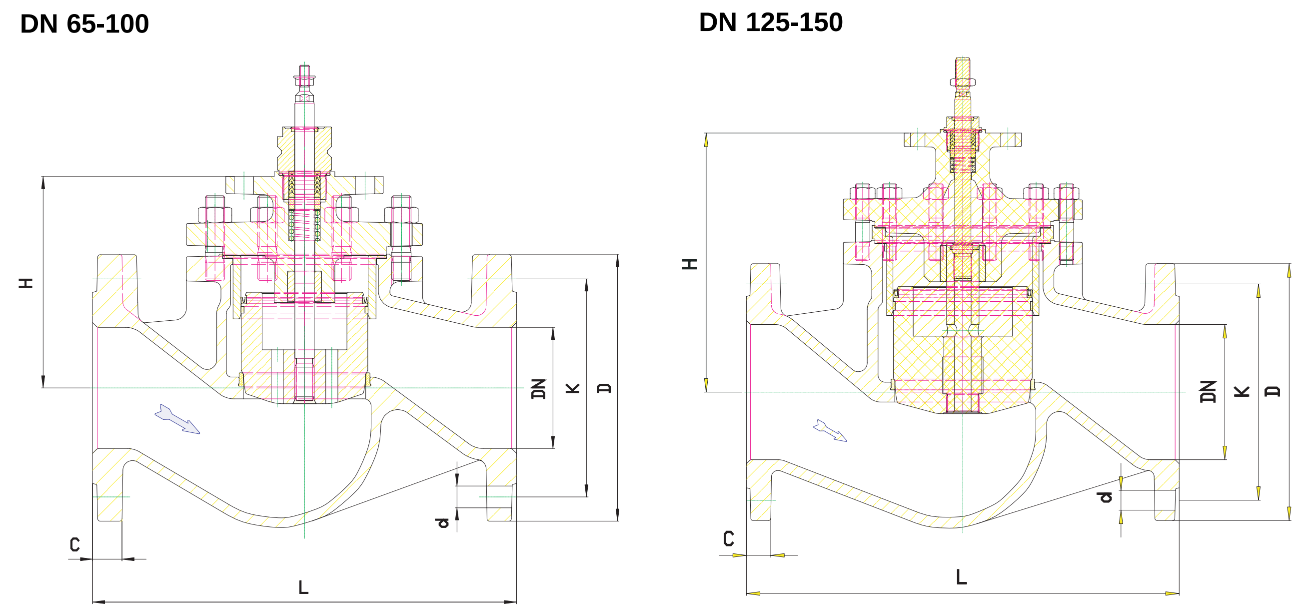


Figure 7

| Part No 721- | Size. DN | in. | Stroke mm | in. | Dimensions L mm | in. | H mm | in. | d mm | in. | D mm | in. | K mm | in. | C mm | in. | Weight kg | lb. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2254 | 65 | 2½ | 30 | 1.18 | 290 | 11.4 | 137 | 5.4 | 4x18 | 4x0.7 | 185 | 7.3 | 145 | 5.7 | 20 | 0.8 | 16.8 | 37.0 |
| 2258 | 80 | 3 | 30 | 1.18 | 310 | 12.2 | 152 | 6.0 | 8x18 | 8x0.7 | 200 | 7.9 | 160 | 6.3 | 22 | 0.9 | 22.9 | 50.5 |
| 2262 | 100 | 4 | 30 | 1.18 | 350 | 13.8 | 171 | 6.7 | 8x18 | 8x0.7 | 220 | 8.7 | 180 | 7.1 | 24 | 0.9 | 36.9 | 81.4 |
| 2266 | 125 | 5 | 50 | 1.97 | 400 | 15.7 | 228 | 9.0 | 8x18 | 8x0.7 | 250 | 9.8 | 210 | 8.3 | 26 | 1.0 | 63 | 139 |
| 2270 | 150 | 6 | 50 | 1.97 | 480 | 18.9 | 288 | 11.3 | 8x22 | 8x0.9 | 285 | 11.2 | 240 | 9.4 | 26 | 1.0 | 93 | 205 |