CONTROL VALVE SIZING

The valve sizing is based on the calculation of the Kv coefficient. The Kv represents the quantity of water, expressed in cubic meters (m^3) at 15 ºC that flows through the valve with a pressure drop of 1 bar, in a one-hour period. The formulas below indicated allow the Kv calculation in accordance with the type of fluid and its operating condition.
After the Kv calculation, the corresponding Kvs is available from the valve data sheet. If real operating data have been used for the calculation, as a rule, the calculated Kv should be around 70% to 80% of the selected valve Kvs in order to guaranty the proper regulation of maximum flow rate at the given operating conditions preventing that sometimes some *precautionary additions* will result in undesirable valve oversizing. At the same time, it is necessary to check whether the minimum flow rate can be even regulated or not, considering the chosen valve rangeability.
For critical applications (critical flow velocities, for example), noise prediction, etc, please fill the data sheet available in the next pages and submit it to our technical department for proper selection using our software.

CALCULATION OF KV VALUE

PRESSURE DROP	MEDIUM		
	LIQUIDS	SATURATED STEAM	GASES
a) $P2 > \frac{P1}{2}$ $Dp < \frac{P1}{2}$	$Kv = Q1\sqrt{\frac{d1}{Dp \times 1000}}$	$Kv = \frac{Q2}{22{,}4\sqrt{Dp \times P2}}$	$Kv = \frac{Q3}{514}\sqrt{\frac{d2 \times T}{Dp \times P2}}$
b) $P2 < \frac{P1}{2}$ $Dp > \frac{P1}{2}$		$Kv = \frac{Q2}{11{,}2 \times P1}$	$Kv = \frac{Q3}{257 \times P1}\sqrt{d2 \times T}$

Remarks: *For superheated steam and other fluids please consult.*
a) *Subcritical pressure drop: downstream absolute pressure more than 50% of the absolute upstream pressure in the valve.*
b) *Supercritical pressure drop: downstream absolute pressure is equal or less than 50% of the upstream absolute pressure in the valve.*

Kv	Flow coefficient	m^3/h
P1	Upstream absolute pressure	bar
P2	Downstream absolute pressure	bar
Dp	Pressure drop (P1 – P2)	bar
Q1	Flow rate	m^3/h
Q2	Flow rate	kg/h
Q3	Flow rate	Nm3/h (0 ºC – 1013 mbar)
d1	Specific weight of liquid	kg/m^3
d2	Specific weight of gas	kg/m^3
T	Absolute temperature (T = 273 + t ºC)	K
t	Fluid temperature	ºC

RECOMMENDED FLOW VELOCITIES AT THE INLET OF VALVES

LIQUIDS	GASES	SATURATED STEAM	SUPERHEATED STEAM
2,5 m/s	20 m/s	25 m/s	50 m/s