

CONTROL VALVE SIZING CALCULATOR (GAS AND VAPOUR)

Project: Fuel gas to burner FV 1201

Calc no: CALC CV 002 Rev: 0

Yellow cells: enter data. Grey cells: calculated automatically. Free template from instrumentationblog.in

Gas and valve data

Molecular weight (kg/kmol)	18	Specific heat ratio γ	1.3
Compressibility Z	0.98	Pressure drop ratio factor xT	0.72
Rated Cv of selected valve	46	Selected valve	Globe, 2", equal %
Fy (calculated)	0.929	Choked $x = Fy \times xT$	0.669

Sizing cases (pressures in bar a)

Case	Mass flow W (kg/h)	Inlet P1	Outlet P2	T1 (°C)	ρ_1 (kg/m³)	$x = \Delta P \div P_1$	Sizing x	Y	Required Kv	Required Cv	Cv ratio / regime
Minimum	400	10.00	8.50	40	7.05	0.150	0.150	0.925	4.9	5.6	0.12 OK
Normal	1000	10.00	8.00	40	7.05	0.200	0.200	0.900	10.8	12.5	0.27 OK
Maximum	1500	9.50	7.00	40	6.70	0.263	0.263	0.869	15.5	17.9	0.39 OK
Cv ratio at maximum flow (target ≤ 0.85)										OK	
Cv ratio at minimum flow (target ≥ 0.1)										OK	

$K_v = W \div (27.3 \times Y \times \sqrt{(x \times P_1 \times \rho_1)})$ with W in kg/h, P1 in bar a and ρ_1 in kg/m³. $Y = 1 - x \div (3 \times Fy \times xT)$. Flow is choked when $x \geq Fy \times xT$; then x is limited to that value. Check noise separately for high pressure drops.

Prepared by	Checked by
Name:	Name:
Signature:	Signature:
Date:	Date: