

**2. Cv CALCULATION**

[①,②: IEC/ANSI/ISA-S75.01, ③-⑥ : FCI62-1]

| Fluid  | Pressure condition                  | Calculation formula   | Unit   |
|--------|-------------------------------------|---|--|
| Liquid | $\Delta P < F_L^2(P_1 - P_{VC})$    | ①<br>$C_v = \frac{1.167 Q \sqrt{G}}{\sqrt{\Delta P}}$ $P_{VC} = (0.96 - 0.28 \sqrt{\frac{P_v}{P_c}}) P_v$ | $P_1$ : Inlet pressure      kgf/cm <sup>2</sup> A<br>$P_2$ : Outlet pressure      kgf/cm <sup>2</sup> A<br>$\Delta P$ : Differential pressure      kgf/cm <sup>2</sup>               |
|        | $\Delta P \geq F_L^2(P_1 - P_{VC})$ | ②<br>$C_v = 1.167 \frac{Q}{F_L} \sqrt{\frac{G}{P_1 - P_{VC}}}$  | $G$ : Specific gravity<br>$Q$ : Flow rate of liquid      m <sup>3</sup> /h<br>: Flow rate of gas      m <sup>3</sup> /h<br>(at 15°C, 1.013 mbar)<br>= Nm <sup>3</sup> /h × (288/273) |
| Steam  | $\Delta P < 0.5 F_L^2 P_1$          | ③<br>$C_v = \frac{W(1 + 0.00126 T_{SH})}{13.5 \sqrt{\Delta P (P_1 + P_2)}}$                               | $W$ : Flow rate of steam   |
|        | $\Delta P \geq 0.5 F_L^2 P_1$       | ④<br>$C_v = \frac{W(1 + 0.00126 T_{SH})}{11.7 P_1 F_L}$   | $T$ : Fluid temperature at valve Inlet (=273+°C)      °K<br>$T_{sh}$ : Degree of superheat      °C   |
| Gas    | $\Delta P < 0.5 F_L^2 P_1$          | ⑤<br>$C_v = \frac{Q \sqrt{G T}}{289 \sqrt{\Delta P (P_1 + P_2)}}$   | $F_L$ : Pressure recovery factor<br>$P_{VC}$ : Vena contract pressure  |
|        | $\Delta P \geq 0.5 F_L^2 P_1$       | ⑥<br>$C_v = \frac{Q \sqrt{G T}}{250 P_1 F_L}$   | $P_v$ : Saturated vapor pressure of liquid at upstream temperature      kgf/cm <sup>2</sup> A<br>$P_c$ : Critical pressure of liquid      kgf/cm <sup>2</sup> A                      |