ΔP (differential pressure) versus Δω (permanent pressure drop)

Deltafluid
MEASURING UP TO YOUR EXPECTATIONS

differential pressure transmitter

$$Q = K\sqrt{\Delta P}$$

Q   flow
K   constant taking in consideration the fluid and piping parameters
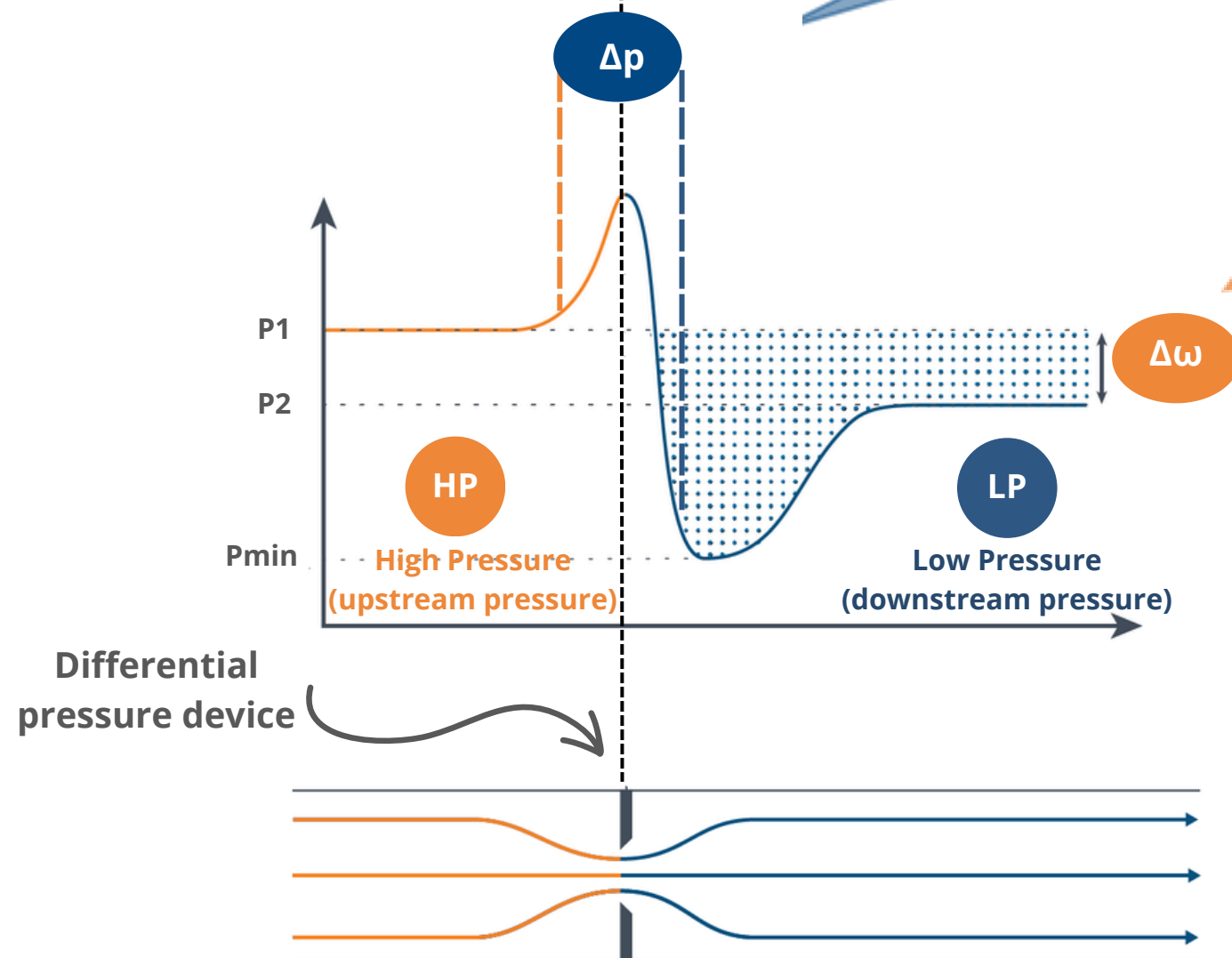ΔP differential pressure
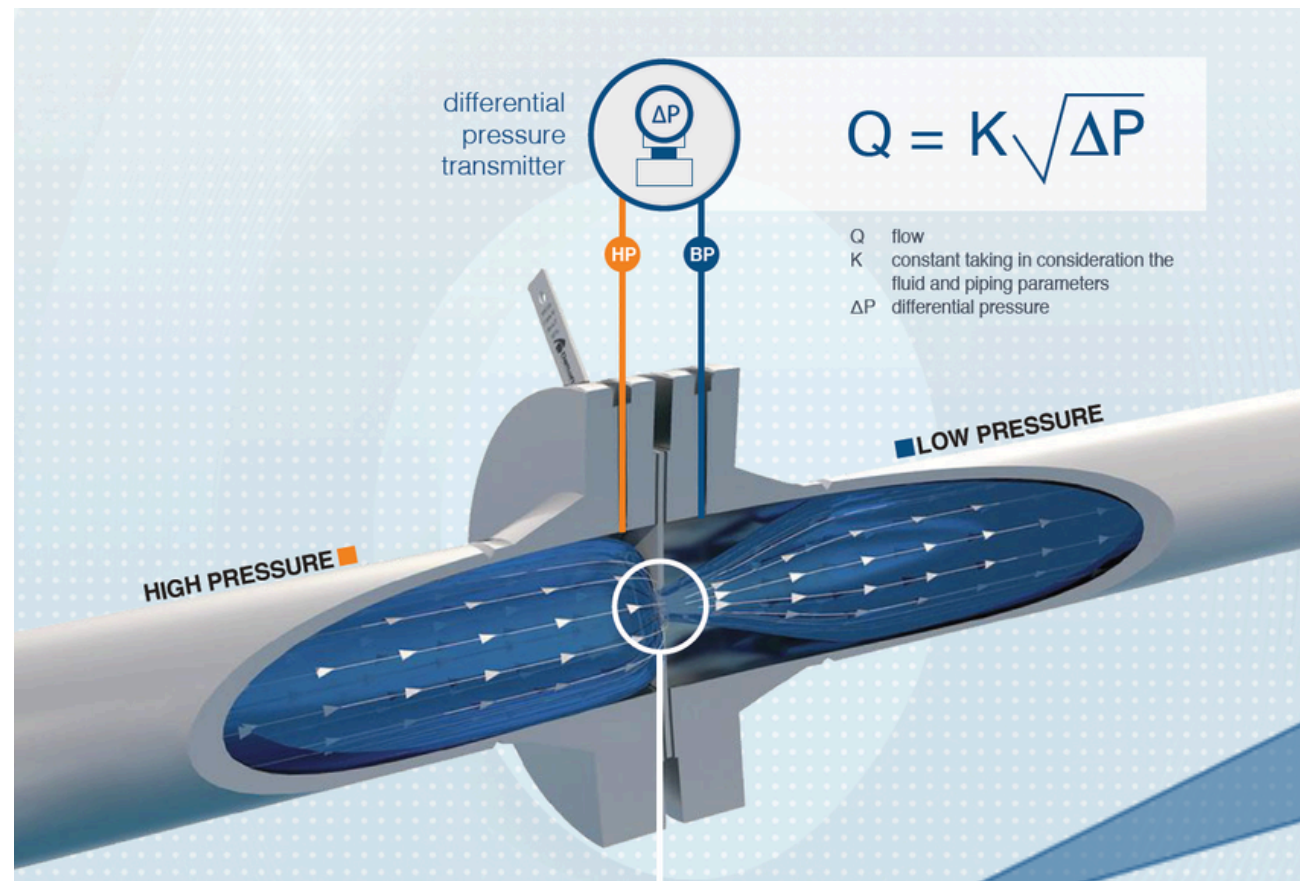
Δp — differential pressure measured between the upstream pressure tap (HP) and the downstream pressure tap (LP) of the flow element

➡ *is used for the flow calculation*

ΔP = HP - LP

$$Q = K\sqrt{\Delta P}$$

Q, flow rate
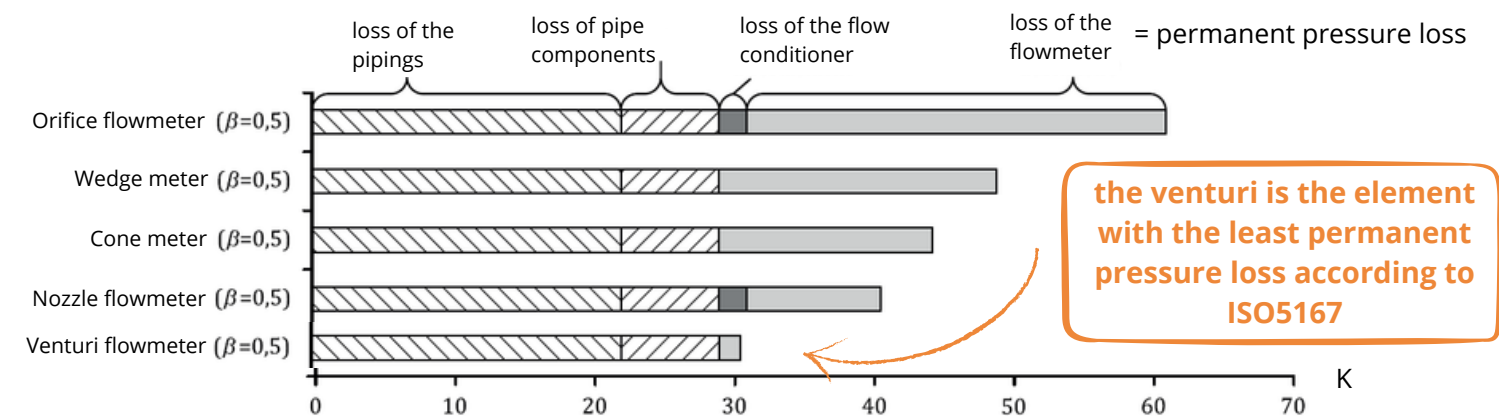K, constant taking into account the fluid and piping parameters

Δω — permanent pressure loss
also called resulting pressure drop   or unrecoverable pressure loss
caused by insertion of the device into a cylindrical pipe

➡ *is used for the design of a restriction orifice*

P1, pressure upstream of the device (measured at 1D upstream of the device) *
P2, pressure downstream (measured at 6D downstream) *
D, internal diameter of the piping

Δω = P1 - P2

* values of 1D upstream and 6D downsteam according to the ISO5167-1 standard

P1

P2

Pmin

HP
High Pressure (upstream pressure)

LP
Low Pressure (downstream pressure)

Differential pressure device

loss of the pipings | loss of pipe components | loss of the flow conditioner | loss of the flowmeter | = permanent pressure loss

Orifice flowmeter (β=0,5)
Wedge meter (β=0,5)
Cone meter (β=0,5)
Nozzle flowmeter (β=0,5)
Venturi flowmeter (β=0,5)

the venturi is the element with the least permanent pressure loss according to ISO5167

0   10   20   30   40   50   60   70   K

extract from ISO5167-1 - K, total pressure loss coefficient for pipe installation

Diagram: comparison of K coefficients for different differential pressure measurement systems for β = 0.5