Orifice Plate Sizing — Report

DOCUMENT

Plant / project	**Example Plant**
Equipment tag / system	**FE-1001**
Calculation / document no.	**CALC-FE-001**
Revision	**0**
Prepared by	**Your name**
Checked by	**—**
Date	**28-Oct-2026**
Calculation basis	Size the bore for a flow and differential · Flange taps · Fluid: Water / steam (liquid) at 30.0 °C · Pipe: NPS 6 Sch 40 · ISO 5167-2: Reader-Harris/Gallagher C, ISO expansibility factor
Status	**✓ Inputs OK**

KEY INPUTS

Input	Unit	Value used
Flowing temperature	°C	30.0
Upstream pressure (at the upstream tap)	bar g	5.000
Mass flow (full scale for sizing)	kg/h	100,000.0
Differential at full-scale flow	mbar	250.00

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Calculation summary | PlantCalcKit v1.0

RESULTS

Result	Unit	Value
Orifice bore at 20 °C	mm	88.32
Diameter ratio β = d/D	—	0.5733
Pipe inside diameter at 20 °C	mm	154.08
Discharge coefficient C	—	0.60681
Expansibility factor ε	—	1.00000
Velocity of approach factor E = 1/√(1−β⁴)	—	1.05881
Mass flow	kg/h	100,000.0
Actual volume flow at the upstream conditions	m³/h	100.49
Differential pressure	mbar	250.00
Pipe Reynolds number ReD	—	284,336
Permanent pressure loss	mbar	164.39
Density at the upstream tap	kg/m³	995.140
Viscosity	mPa·s	0.8072
Straight length upstream (no straightening vanes)	D	9
Straight length downstream	D	3

FLOW AGAINST DIFFERENTIAL

Flow, %	kg/h	mbar	% of Δp	ReD	C	ε
120 %	120,000.0	360.39	144.2	341,203	0.6065	1.0000
110 %	110,000.0	302.67	121.1	312,770	0.6066	1.0000
100 %	100,000.0	250.00	100.0	284,336	0.6068	1.0000
90 %	90,000.0	202.37	80.9	255,902	0.6070	1.0000
80 %	80,000.0	159.77	63.9	227,469	0.6072	1.0000
70 %	70,000.0	122.21	48.9	199,035	0.6075	1.0000
60 %	60,000.0	89.68	35.9	170,602	0.6079	1.0000
50 %	50,000.0	62.19	24.9	142,168	0.6083	1.0000
40 %	40,000.0	39.72	15.9	113,734	0.6090	1.0000
30 %	30,000.0	22.27	8.9	85,301	0.6099	1.0000
20 %	20,000.0	9.85	3.9	56,867	0.6114	1.0000
10 %	10,000.0	2.43	1.0	28,434	0.6151	1.0000

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FINDINGS AND RECOMMENDATIONS

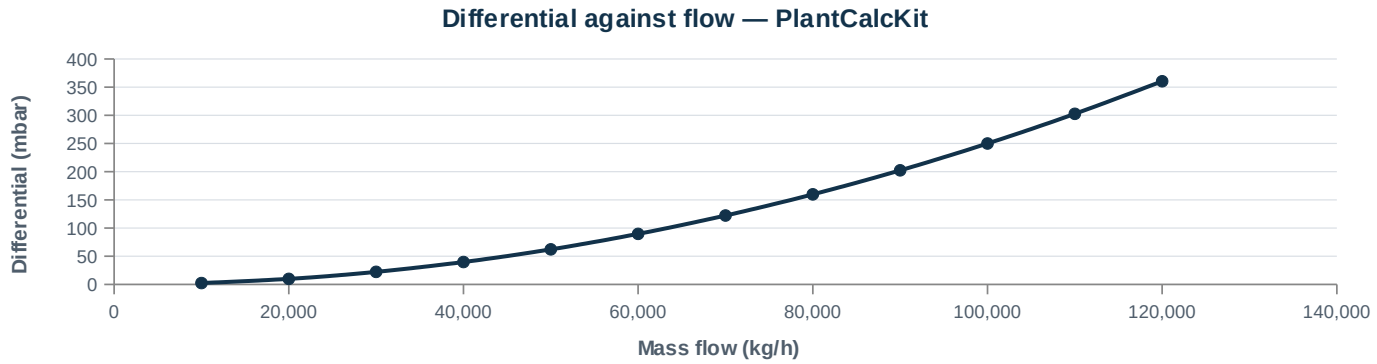
ℹ️ **Note**

Round the bore to the nearest 0.01 mm and order the plate with this bore at 20 °C. Check the plate thickness (ISO 5167-2: e ≤ 0.02 D for the bore edge) and bevel the downstream edge if the plate is thicker.

ℹ️ **Note**

Straight lengths are Perry Table 10-5 (about a 1 % metering error). ISO 5167-2 Table 3 gives the lengths for zero additional uncertainty; they are longer.

CHART



Observations — orifice

[Write your observations here]

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