Pressure Loss in Pipelines

Sample document with complete example values. It shows the report the purchased export produces for YOUR input - it is not itself a report for any part.

Project: Sample project Part/Position: no real part Prepared by: Sample, not released

Velocity assessment: within guideline

Medium

Medium	Wasser 20 °C
Density ρ	998.2 kg/m³
Kinematic viscosity ν	1.004 mm²/s

Pipe and Geometry

Material	Stahl nahtlos neu
Nominal diameter	DN50
Inside diameter d	50 mm
Pipe length L	20 m
Roughness k	0.045 mm
Relative roughness k/d	0.0009

Flow

Volumetric flow rate V	14.137 m³/h
Velocity v_bar	2 m/s
Reynolds number Re	99,602
Flow regime	turbulent
Pipe friction factor λ	0.0218
λ method	Colebrook-White (iterated)
λ comparison, Colebrook	0.0218
λ comparison, Haaland	0.0216
λ comparison, Swamee-Jain	0.022
Dynamic pressure p_dyn	1,996 Pa

Fittings and local losses

ζ value	Count	n·ζ
0.5	1	0.5
0.3	4	1.2
0.2	2	0.4
1	1	1

Fittings and local losses

Sum Σζ	3.1
Equivalent length L_eq	7.1 m

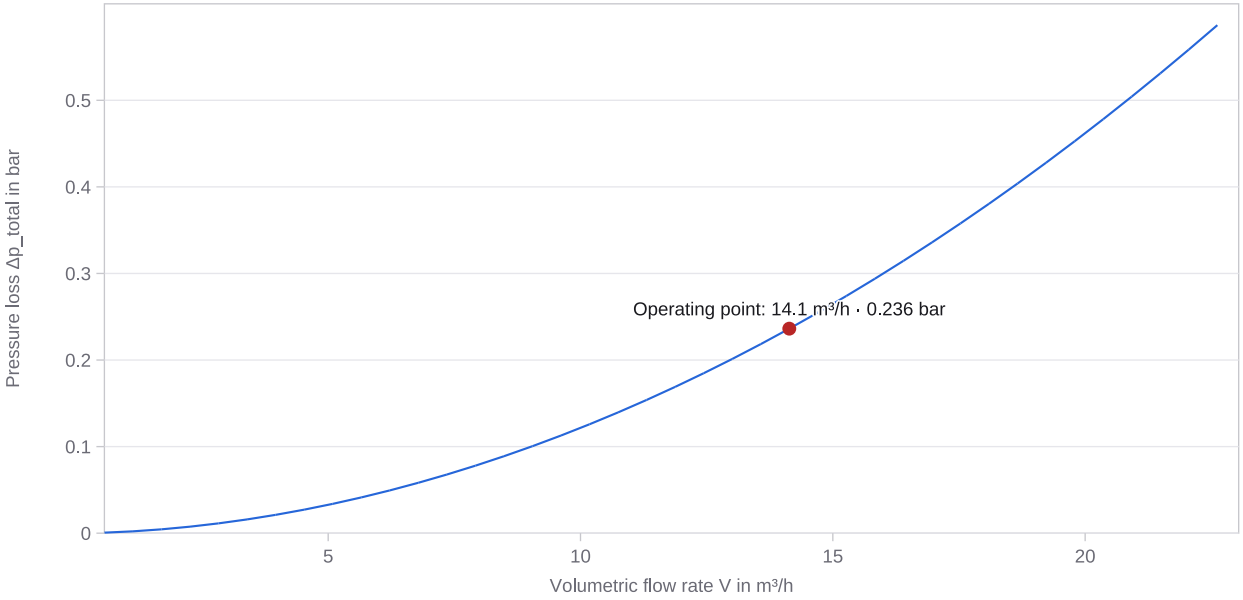
Result: Pressure Loss Components

Component	Pa	bar	m head
Pipe friction	17,435	0.1743	1.78
Fittings and local losses	6,189	0.0619	0.632
Elevation	0	0	0
Total	23,623	0.2362	2.412

Flow Velocity Assessment

Criterion	Value	Limit	Status
Velocity v_bar (application recommendation)	2 m/s	1 … 2 m/s	● OK

System curve Δp over volumetric flow rate



Notes and Calculation Basis

Friction loss per Darcy-Weisbach Δp = λ·(L/d)·(ρ/2)·v_bar², local losses via the ζ method Δp = Σζ·(ρ/2)·v_bar², elevation component ρ·g·Δz. The pipe friction factor λ follows laminar exactly from 64/Re, turbulent from Colebrook-White (iterated); Haaland and Swamee-Jain serve as a comparison.

Roughness values, ζ values and recommended velocities are reference values with real-world scatter (manufacturing, ageing, scaling); manufacturer data takes precedence. Model: steady, incompressible, fully developed flow in a full circular pipe - not a complete engineering verification.

About this sample

All values on these pages come from a freely chosen example calculation and belong to no real part. The purchased export contains the same sections with your input, your header data (project, part, prepared by) and as searchable text. Pricing and scope: maschinenbaurechner.de/en/pricing