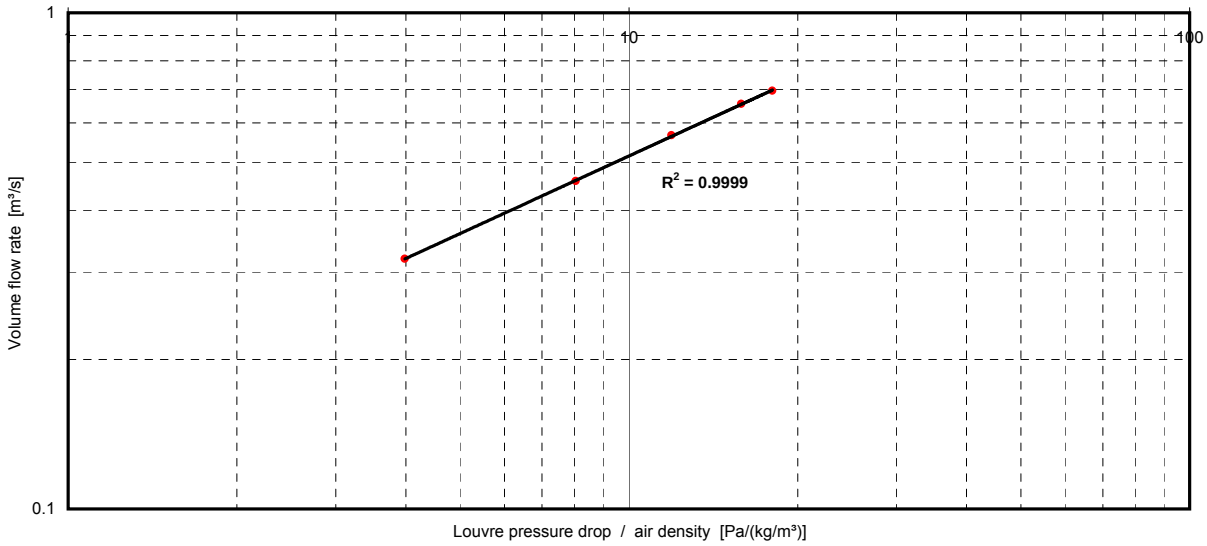
SINTEF

EN 13030 aerodynamic test of ventilation louvres.
(Flow measurement method ISO 5167-2)

Louvre description	NorSap transformator rist	
Louvre core area	0.38064 [m²]	
Is the louvre symmetrical?	yes	
Entry or discharge test	discharge	
Manometer for ISO orifice	DPM instr. # 2302, kalibrert	
Manometer for louvre	DPM instr. # 5784, kalibrert	
Flow area behind louvre	1 [m²]	
Duct internal diameter (D)	300 [mm]	
ISO orifice tappings type	Corner [-]	
Dry bulb air temperature	21.1 [°C]	Humidity ratio 0.00418598 [kg/kg]
Relative humidity	26.5 [%]	Air density 1.17170608 [kg/m³]
Barometric pressure	992.2 [mbar]	Dyn. viscosity 1.7738E-05 [Pa·m]

Measured by: TER
Date: 7.okt.2009

ISO orifice diameter (d)	ISO-orifice Δp_s	Calibration-corrected pressure (Δp_s)	Louvre static pressure drop (Δp_s)	Calibration-corrected pressure (Δp_s)	Corrected local static pressure loss (Δp_s)	True volume flowrate (q_v)	Louvre face velocity	Discharge coefficient	Variance from mean C_D	Entry loss coefficient	Variance from mean C_E
[mm]	[Pa]	[Pa]	[Pa]	[Pa]	[Pa]	[m³/h]	[m/s]	(C_D)	[%]	(C_E)	[%]
160	367	367	5.0	5.0	4.67020951	0.31908007	0.83827257	0.285	-1.6 %	0.297	-1.8 %
160	760	760	10.1	10.1	9.42060096	0.45797638	1.2031746	0.287	-0.7 %	0.300	-0.8 %
160	1167	1167	15.0	15.0	13.9606898	0.56643907	1.48812282	0.292	0.8 %	0.305	0.8 %
160	1565	1565	20.0	20.0	18.6106104	0.65492661	1.72059323	0.292	0.9 %	0.305	1.0 %
160	1771	1771	22.7	22.7	21.1301053	0.69617091	1.82894839	0.291	0.7 %	0.305	0.7 %



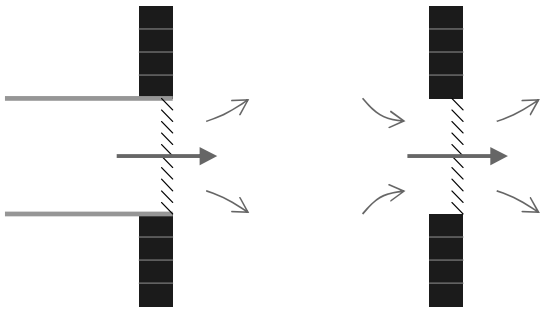
Summary

Discharge coefficient C_D = **0.289**
EN 13030 Class = **3**

Equations:

$$\frac{q_v}{A} = v = C_D\sqrt{\frac{2\cdot\Delta p_t}{\rho}} \quad \Leftrightarrow \quad \Delta p_t = \frac{1}{C_D^2}\cdot\left(\frac{1}{2}\rho\cdot v^2\right)$$

Examples:

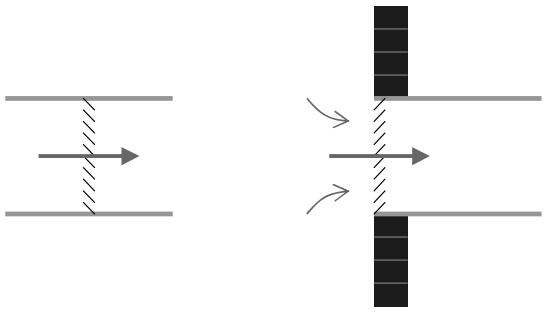


Entry loss coefficient C_E = **0.302**
EN 13030 Class = **2**

Equations:

$$\frac{q_v}{A} = v = C_E\sqrt{\frac{2\cdot\Delta p_t}{\rho}} \quad \Leftrightarrow \quad \Delta p_t = \frac{1}{C_E^2}\cdot\left(\frac{1}{2}\rho\cdot v^2\right)$$

Examples:



Nomenclature:

q_v = Volume flow rate [m³/s]
A = Core area of louvre [m²]
v = Nominal velocity at face of louvre [m/s]
Δp_t = Total pressure drop through lovre [Pa]
ρ = Air density ≈ 1.2 [kg/m³]