Air Vision,

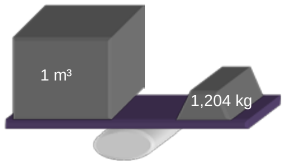
Flow rate

Mass flow and volume flow

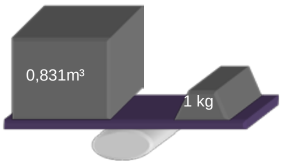
According the routing sheet, the flow to be realized by the fan is given in volume flow (m^3/h) or in mass flow (kg/h).
The fans is a volumetric machine, it operates only with effective m^3/h of air. To make conversions, it is important to remind what the density of the air is. (Please refer to our article “the density”)

Let’s take an easy example with the following values:

Temperature: T= 20°C and the installation at the sea level
density: $\rho = 1{,}204\ kg/m^3$
Flow to be carried out by the fan: $Q = 1000\ m^3/h$
The fan carries then 1204 kg/h according the formula



$Q\ (kg/h) = Q\ (m^3/h) \times \rho\ (kg/m^3)$



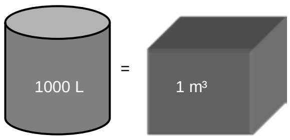
Temperature: T= 20°C and installation at the sea level
Density: $\rho = 1{,}204\ kg/m^3$
Flow to be carried out by the fan: $Q = 1000\ kg/h$
The fan carries then effective 831 m^3/h according the formula.

$Q\ (m^3/h) = Q\ (kg/h) / \rho\ (kg/m^3)$

Liters/h or m³/h?

The density is not interfering in order to convert Liters/h to m^3/h.
Flow to be carried out by the fan: 100.000 liters/h
The fan carries 100 m^3/h

$Q\ (m^3/h) = Q\ (l/h) / 1000$



Nm³ or effective m³/h?

The normal m^3 is considered at the temperature of 0°C and at the atmospheric pressure at the sea level. For the air its density is $\rho 0 = 1{,}293\ kg/m^3$. To select a fan, we should take into account the density of the air crossing the fan.
For example a flow of 1000 Nm^3/h at the temperature of 20°C with $\rho 1 = 1{,}204\ kg/m^3$ will give 1074 effective m^3/h according the formula.

$$Q\ effective\ (m^3/h) = Q\ (Nm^3/h) \times \frac{\rho 0\ (kg/m^3)}{\rho 1\ (kg/m^3}$$

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