



Physical constants for air and water

Correct physical constants

Correct physical constants for air and water play an important role in the calculation of processes with humid air, i.e. in air heating, in air cooling and thus of course also in the Mollier-Diagram and in the Psychrometric-Chart. We use internationally confirmed values for this purpose, for example to be found at www.wikipedia.org.

Universal gas constant	J/kMolK	8,314.463
Heat of evaporation of water at 0.010°C	J/kg	2,500,500,000
Molecular weight of water	kg/kMol	18.015
Molecular weight of air	kg/kMol	28.949

For the molecular weight of air, one can also find information such as **28.965 kg/kMol**, i.e. a value that is higher by a factor of **1.0005527**. Perhaps such writers have taken into account a bit of **microplastics in the air** and consequently forgot to raise the molecular weight of **dirty water** as well.

This leads us to a customer's question

Why is it stated in the software DEH, the economic efficiency of air conditioning units with energy recovery, that an energy expenditure of **69,458 MWh is required for 100 tons of humidification**, regardless of whether you humidify with water or steam.

Heat of evaporation of water at 0.010°C	J/kg	2,500,500,000
Evaporation quantity	t	100,000
Evaporation quantity	kg	100,000,000
Energy (2,500,500 x 100,000 / 3,600)	Wh	69,458,333.333
Energy	kWh	69,458.333
Energy	MWh	69.458

We explain this with an example

According to the Mollier-HX-Diagram, the aim is to increase a dry air volume of 100,000 kg/h from -10°C/80% to 25°C/40% (**process 1**), which corresponds to a **capacity of 1,446.5 kW**.

You can do this in two fundamentally different ways.

Variant 1 (Processes 2 and 3)

Air heater from -10°C/80% to 41.2°C/2.6%
Capacity 1,435.1 kW

Adiabatic humidification with water 15°C
From 41.2°C/2.6% to 25°C/40%
Capacity 11.4 kW

Total capacity 1,446.5 kW

Variant 2 (Processes 4 and 5)

Air heater from -10°C/80% to 24.1°C/6.9%
Capacity 954.4 kW

Humidification with saturated steam 110°C
From 24.1°C/6.9% to 25°C/40%
Capacity 492.1 kW

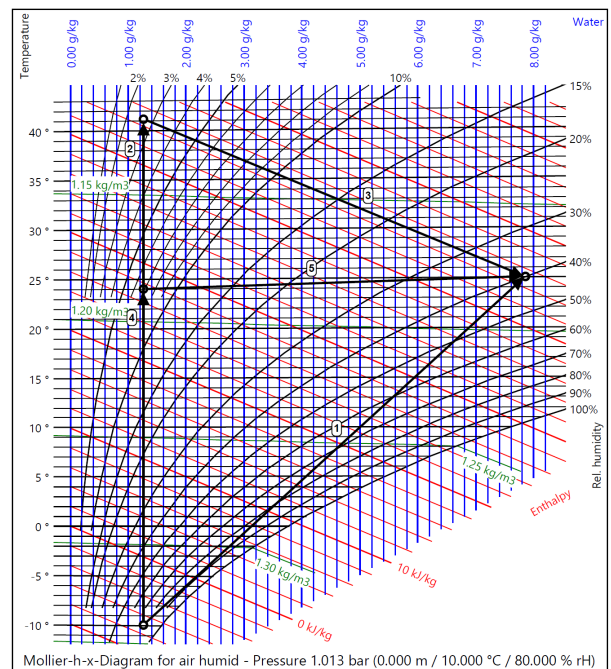
Total capacity 1,446.5 kW

Our software applications for air conditioning technology

At the beginning of 2025, a total of **8,128 licenses** are on the market, of which:

- 6,597 licenses AHH, see picture on the right
- 1,162 licenses for finned heat exchangers
- 369 licenses for other heat exchangers

Our only competitor is www.unilab.eu in Padua in northern Italy, which can be found regularly at trade fairs with its inadequate software. **We can do without it, because word of quality gets around.**



AHH (Air Humid Handling) = All in one!

