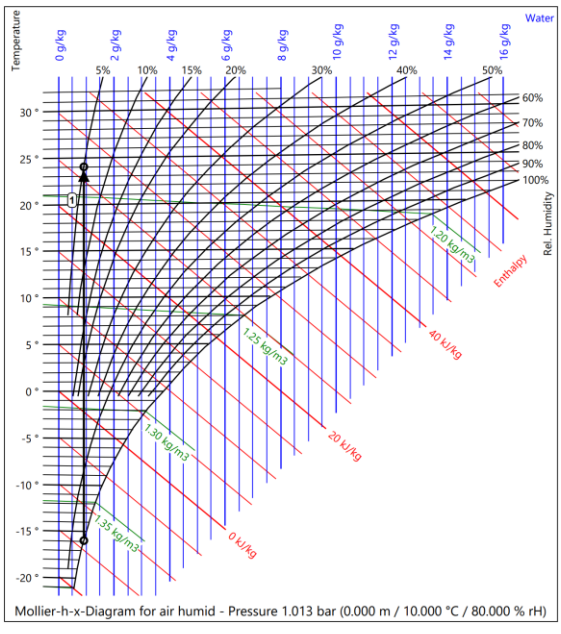
HVAC
Standard definitions

As early as 1967 at the technical university in Winterthur, it was pointed out in vain, that in processes with gases only the dry mass flow in kg/h remains constant and that the humid volume flow in m3/h, of course without reference to the system height above sea level and without reference to the temperature and relative humidity. This was the ideal basis for large deviations in offers for finned heat exchangers, although it was suggested in vain, ***that a temperature of 20°C and a relative humidity of 40% should be set as the base values***. In vain we have pointed this out to relevant associations such as the SWKI in Switzerland, the VDI in Germany and hundreds of planning engineers without any success. It is now 2022, 55 years later, and we are totally disillusioned to find, that nothing has changed in this respect.

Let's take as an example an air volume flow of 10'000 m3/h at 20°C/40% above sea level, where the air is to be heated from -16°C/100% to 24°C/5.007%. This corresponds to a dry mass flow of air of 11'927.808 kg/h and a capacity of 133.591 kW, which any halfway sober so-called air conditioning engineer with more than 2 brain cells should be able to calculate.

Using our AHH software, the air volume flow of 10'000 m3/h was first set at the inlet and then at the outlet, which led to an unacceptable ***deviation of 15.555%*** in terms of performance. Assuming that the system is located in Zermatt at an altitude of 1'600 meters above sea level, the capacity is only 109.541 kW and thus a ***unacceptable deviation of 40.121%***, which is also unacceptable for negotiators.

Pressure on sea level	bar	1.013	
Heating capacity	kW	153.490	
		Air in	Air out
Temperature	°C	-16.000	24.000
Rel. humidity	%	100.000	5.007
Abs. humidity	g/kg	0.916	0.916
Density humid	kg/m³	1.372	1.187
Enthalpy humid	kJ/kg	-13.832	26.488
Volume flow humid	m³/h	10000.000	11555.454
Mass flow dry	kg/h	13704.483	13704.483
Heating capacity	kW	132.829	
		Air in	Air out
Temperature	°C	-16.000	24.000
Rel. humidity	%	100.000	5.007
Abs. humidity	g/kg	0.916	0.916
Density humid	kg/m³	1.372	1.187
Enthalpy humid	kJ/kg	-13.832	26.488
Volume flow humid	m³/h	8653.922	10000.000
Mass flow dry	kg/h	11859.753	11859.753



Quod erat demonstrandum!