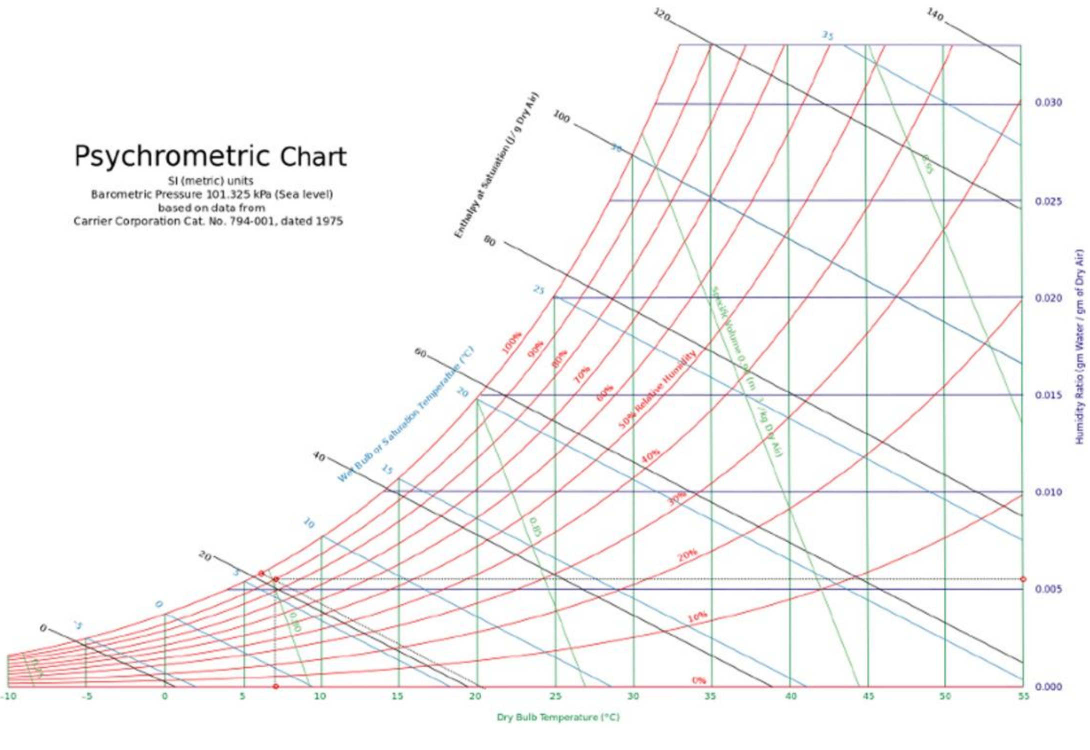
# Practice No1

The time now is 20:00, from the data given in the website [https://www.meteo- o ggi.it/italia/regione-emilia-romagna/tempo-piacenza/](https://www.meteo-oggi.it/italia/regione-emilia-romagna/tempo-piacenza/)

umidità: 90%, i.e., the relative humidity
$
=90%;

pressione atmosferica: 1019 hPa, i.e., the total air pressure P =101.9 kPa;

temperatura effttiva: 7
°C
, i.e., the temperature in Kelvin temperature scale T =230 K




Utilize the psychrometric chart, we can see,

the humidity ratio, i.e., the absolute humidity
w
= 0.0055

the web-bulb temperature
Twb = 6 °C

w=0.622PvPa=0.622PvP–Pv=0.0055, introduce P=101.9 kPa into this equation, and solve it,

Pv = 0.893 kPa

autem, $ = mvmg=90% (1)

for any ideal gas, m=PVRsp.T , during the class we were told that for water vapor, Rsp.=0.4615

introduce the pressure of water vapor
Pv=0.893 kPa, and define the volume of aula A is V, here we have:

mv=0.893V0.4615×230 =8.41×10–3V

subordinate this value to (1), calculate the maximum water vapor mg,

mg=mv90%=9.34 ×10–3V

# Practice No 2

Internal gains,

Calculate the sensibile cooling load from internal gains,

qig, s=136+2.2Acf+22Noc=136+2.2×200+22×2=620 W

Calculate the latent cooling load from internal gains,

qig, l=20+0.22Acf+12Noc=20+0.22×200+12×2=88 W

Infiltration,

for a house with a good construction quality, unit leakage area
Aul=1.4cm2/m2

and the exposed surface
Aes=Awall+Aroof=200+144=344 m2

thus,
AL=Aes×Aul=344×1.4=481.6 cm2

Define the cooling temperature $T_{cooling}$=24 ºC, and
heating temperature $T_{heating}$=20 ºC

in Brindisi,
[Equazione]

O T cooling=31.1 °C –24 °C=7.1 °C=7.1 K

O T heating=20 °C –(–4. 1 °C)=24.1 °C=24.1 K

DR = 7.1 °C=7.1 K

Given that IDF heating=0.073Ls×cm2,

IDF cooling=0.033Ls×cm2 ,

Calculate infiltration airflow rate,

Qi, heating=AL×IDF heating=481.6×0.073=35.157Ls

Qi, cooling=AL×IDF cooling=481.6×0.033=15.893Ls

The required minimum whole-building ventilation rate is

Qv=0.05Acf+3.5(Nbr+1) = 0.05×200+3.5×(1+1)=17Ls

Thus ,

Qi–v,heating =Qi, heating+Qv=35.157+17=52.157Ls

Qi–v, cooling=Qi, cooling+Qv=15.893+17=32.893Ls

Given that
Csensible=1.23 , Clatent=3010, OwCooling=0.0039

q.inf–ventilationcoolingsensible=CsensibleQi–v, cooling OT Cooling=1.23 ×32.893×7.1=287.25 W

q.inf–ventilationcoolinglatent = ClatentQi–v, cooling Ow Cooling=3010 ×32.893 × 0.0039=386.13 W

q.inf–ventilationheatinggsensible=CsensibleQi–v, heating OT heating=1.23 ×52.157×24.1=1546.09 W