

By: Rubén Darío Uriza Escobar

1.

Aula A: $14 \times 7.4 \times 4$

$T=25^{\circ}\text{C}$

$P=100 \text{ kPa}$

Humidity=85%

Saturation=3.1698kPa

$\Phi = P_v / P_g = P_v = \Phi * P_g = 0.85 * 3.1698 = 2.69 \text{ kPa}$

$P_a = P - P_v = 100 \text{ kPa} - 2.69 = 97.31 \text{ kPa}$

$W = 0.622 P_v / P_a = 0.622 * 2.69 / 97.31 = 0.0171 \text{ Kg vap / Kg dry air}$

$R_{sp} = R_g / M_{gas}$

$R_a = 0.287$

$R_v = 0.461$

$M_a = P_a V_a / R_a T$

$M_a = (97.31 * 14 * 7.4 * 4) / (0.287 (273 + 25)) = 40325.26 / 85.52 = 471.53 \text{ kg}$

$M_v = (2.69 * 14 * 7.4 * 4) / (0.461 (273 + 25)) = 1114.73 / 137.52 = 8.10 \text{ kg}$

$W = 1.017 \text{ kg air vap}$

$T_{wb} = 25^{\circ}\text{C}$

2.

$H = 2.5$

$A = 200 \text{ m}^2$

occupants=2

bedrooms=1

Wall A=144m²

$\Delta T_{cooling} = 31.1 - 24 = 7.1^{\circ}\text{C}$

$\Delta T_{heating} = 20 - 4.1 = 15.9^{\circ}\text{C}$

$\dot{Q}_{igsensible} = 136 + 2.2acf + 22noc = 136 + 2.2 * 200 + 22 * 2 = 620 \text{ W}$

$\dot{Q}_{inlatent} = 20 + 0.22Acf + 12Noc = 20 + 0.22 * 200 + 12 * 2 = 88 \text{ W}$

$A_{ul} = 14 \text{ cm}^2 / \text{m}^2$

$$A_{es}=200+144=344\text{m}^2$$

$$A_l=A_{es}*A_{ul}=344*1.4=481.6\text{cm}^2$$

$$IDF_{heating}=0.063\text{L/scm}^2$$

$$IDF_{cooling}=0.053\text{L/scm}^2$$

$$\dot{Q}_{igheating}=A_l*IDF=481*0.063=30.34\text{L/S}$$

$$\dot{Q}_{igcooling}=A_l*IDF=4.81*0.053=25.52\text{L/S}$$

$$\dot{Q}_v=0.05A_{cf}+3.5(N_{br}+1)=0.05*200+3.5*2=17\text{L/S}$$

$$\dot{Q}_{infventheating}=30.34+17=47.34\text{L/S}$$

$$\dot{Q}_{infventcooling}=25.52+17=42.52\text{L/S}$$