ECAT SK DEMO

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Wien equation to calculate the temperature of plasma :

1) Tk = 2900 / λ
   Wherein :
   Tk = temperature in Kelvin
   λ = wavelength of the radiation
   2900 = Wein constant

1)Tk = 2900/0,3575 = 8111 K

Boltzmann equation to calculate the energy generated by the plasma in the ECAT

2) W = σ x ε x T**4 x S
   Wherein :
   σ = 5,67 x 10**-12
   ε = Emissivity of the core of the plasma = 1
   (but we calculate it at 0,9 assuming the black body is not perfect)

   T**4 = 8111**4 = 4,3 x 10**15
   S = 1,0 cm2 (Dimension of the plasma core:1,1 cm long by 0,3 cm diameter)

   2) W=5,67 x 0,9 x 4,3 x 10**15 x 10**-12 x 1,0 = 21942 W

Energy consume by the system

E1; Energy consume by the control panel = 380 W/h (recovered for heating)

E2 : Energy consume by the ECAT SK;

V = 0,250 (See oscilloscope; 50mV x 5 sides)
R = 78 ohms (as per reading on ohm meter)
A = 0,25 / 78 = 0,0032 amp
W = 0,25 x 0,0032 = 0,0008 W

COP considering E1 + E2 = 21942 / 380 = 57
E2 = 21942 / 0,0008 = SSM

Calorimetric comparison

The ECAT SK is making hot air to warm up a room of a factory that has a surface of 3000 sqft (300 m2) and is 14 ft (4m) high.

To = 0 Celsius
Ti = 16 Celsius

To obtain this result with normal heaters, about 20 to 22 kw are necessary.

Math detail :

Fan : 5500Nmc/h = 6700Kg

ΔT = 16 Celsius

Cp air = 0,17

Power = 6700 x 0,17 x 16 = 18 224 Kcal/h = 20,5 kW

We also made a test with an air flow of 330 Nm/h obtaining a ΔT of 312 Celsius. The resulting power is coherent.

About the control panel radiator :

ΔT = 6 Celsius

Q = 250 Nm/h

W = 300 W

Therefore, the consume energy of the cooling system is almost totally recovered (COP = 0,9)