<< SELECTION OF A COOLING FAN >>

The following points should be considered when selecting a cooling fan:

1. Determine the amount of heat generated inside the equipment.
2. From the equipment maker' s data, find the maximum permissible equipment temperature.
3. Calculate the air volume necessary from the equation.
4. Select the fan from the performance curves shown in the specification sheets.

The volume of airflow required to cool the equipment can be determined if the internal heat dissipation and the total allowable temperature rise are known.

The basic heat transfer equation is: $Q = Cp \times W \times \Delta T$

Where:

Q = Amount of heat transferred
Cp = Specific heat of air
ΔT = Temperature rise within the cabinet
W = Mass flow = CFM x D
(Where: D= Air Density and CFM is cubic feet / min)

By substitution, we obtain:

$$\text{Air Flow in CFM} = \frac{Q}{Cp \times D \times \Delta T}$$

Then we get the following equations:

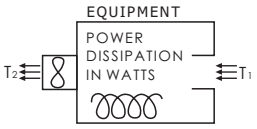
$$\text{Air Flow in CFM} = \frac{3.16 \times P}{Tf} \quad \frac{1.76 \times P}{Tc}$$

$$\text{Air Flow in m3/min} = \frac{0.09 \times P}{Tf} \quad \frac{0.05 \times P}{Tc}$$

P : Internal power dissipation in watts
Tf: Allowable temperature rise in °F
Tc: Allowable temperature rise in °C

T : T2-T1
T1: Incoming airflow temperature,
T2: Outgoing airflow temperature.

1 m^3 / min = 35.315 CFM (Cubic Feet / min)



COOLING OF HEAT GENERATING EQUIPMENT

Ex 1: If internal power dissipation is 1500W and T is 50 °F

$$\text{Air Flow in CFM} = \frac{3.16 \times 1500}{50} = 94.8 \text{ CFM (or } 2.68 \text{ m}^3 \text{ / min)}$$

Ex 2: If internal power dissipation is 1000W and T is 20 °C

$$\text{Air Flow in m3/min} = \frac{0.05 \times 1000}{20} = 2.5 \text{ m}^3 \text{ / min (or } 88.3 \text{ CFM)}$$