Annexure-V

BATTERY RATING CALCULATION

The formula employed rating calculation is as stipulated below :-

FORMULA EMPLOYED :

$$\text{Capacity of Battery (AH)} = \frac{\text{DC Current X Duration in Hrs}}{\text{\%age capacity utilization}}$$

$$\text{Where , DC Current} = \frac{\text{UPS(KVA) x 1000 x Load Power Factor (=1)}}{\text{Inverter efficiency x End Voltage}}$$

Hence , VAH = AH x Nominal Voltage

For e.g. : for 3 KVA UPS , 1 hour Backup :

$$\text{DC Current} = \frac{3 \times 1000 \times 1}{0.93 \times 10.5 \times 18} = 17.0 \text{ A}$$

$$\text{Battery "AH "} = \frac{17.0 \times 1.0}{0.62} = 27.4 \text{ AH}$$

Hence , 18 nos of 12V/28AH batteries will suffice .
TOTAL VAH = 18 x 12 x 28 = 6048 VAH

The following assumptions have been made in the above calculations :-

1. DC Voltage – 216 for 3 KVA
2. End cell voltage / battery of 10.5 V
3. Load Power Factor = 1.0
4. Inverter efficiency = 93%

% Capacity utilization is :

Duration	**% Capacity utilization**
½ hr (30 mins)	52%
1hrs	62%
2hrs	74%
3hrs	83%
4hr	85%