

Light bulb specifications:

- 55W
- 0.540A
- 110V – 220V

When using inverters to convert to AC we need to consider the efficiency of that inverter.

Inverter efficiency rated to **85%**:

- Coefficient: **0.85**

$$\text{WH} = 55\text{W} \times 4 = 220\text{W}$$

$$\text{Watts per hour} = ((0.540 \times 110) \times 4) / \text{coefficient} = 220\text{W} / 0.85 = \mathbf{258\text{ WH}}$$

55W

Calculated amps of the battery required:

- $\text{Ah} = \text{WH} / 12\text{V} = 258 / 12 = \mathbf{21.5\text{ Ah}}$
-

Lead Acid Battery charging rated from 10 to 30 % of battery capacity.

- Let's take max = 30%

30% of 21.5 Ah = **6.45 Amps charger** (It is better to use a nominal 5A charger)

Charging time calculated:

$$T = 21.5\text{Ah} / 6.45\text{A} = \mathbf{3.3\text{ H}} \text{ (With 5A charger= } \mathbf{4.3\text{H}})$$

All the calculations above are taken for 1 H.

Just double the values for extending time by another hour.

Let's take 2H of working time in consideration:

- Battery capacity calculated: 43Ah
- Charger required (30%): 12.9A (10A would be nominal)
- Charging time: $T = 43\text{Ah} / 12.9\text{A} = \mathbf{3.3\text{ H}}$ (With 10A charger=**4.3**)