Power Transmission and Distribution Lab Manual

# Lab No. 12

***House Load Calculation and Cable Sizing***

## Objective

To determine and understand the load calculation for home.

## Theory

This is a simplified method for doing a **very rough** calculation. Remember, electricians and designers use rules that are much more complicated, so don't get ahead of yourself. Let's look at a simple formula.

**HOUSE LOAD = BASIC LOAD + LARGE APPLIANCES + SPECIAL LOADS**

## Basic Load

* + Include lighting, outlets, and smaller appliances including oil or gas furnaces, central vacuums, pool pumps, waste disposals, etc.

## Large Appliances

* + Include electric stove, electric dryer and electric water heater

## Special Loads

* + Include saunas, fixed electric heaters (most commonly baseboard heaters), electric furnaces, central air conditioners, etc.

The cable selection procedures set out in this LAB SESSION will give the basic guidelines to be followed to determine the minimum size of cable required to satisfy a particular installation condition. The following three main factors influence the selection of a particular cable to satisfy the circuit requirements.

***Current-carrying capacity*** dependent upon the method of installation and the presence of external influences, such as thermal insulation, which restrict the operating temperature of the cable.

***Voltage drop*** dependent upon the impedance of the cable, the magnitude of the load current and the load power factor.

Determine the current requirements of the circuit. This current is known as Design current.

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(For 1 Phase)

(For 3 Phase)

If motor power is given in Horse Power (hp) then use the conversion 1hp=746 Watts.

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## Load of Different Appliances

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| --- | --- |
| **HOME APPLIANCES** | **WATT** |
| Lamps (Bulb) | 40 |
| Lamps (Bulb) | 60 |
| Lamps (Bulb) | 100 |
| Energy Saver (CFL) | 14 |
| Energy Saver (CFL) | 22 |
| Tube Lights | 40 |
| Tube Lights (Electronic Choke) | 60 |
| Electric iron | 600- 1000 |
| Immersion heater | 1500 |
| Water heater/Geyser | 1000-2000 |
| Toaster | 750 |
| Refrigerator (165 liters ) | 200 |
| Air -conditioner (Window)( 1.5 ton) | 1500-2000 |
| Air -conditioner (Split)( 1.5 ton) | 1200-1800 |
| Desert cooler ( medium) | 200 |
| Room cooler | 60-200 |
| Table fan/ceiling fan | 60-100 |
| Exhaust fan | 150 |
| Washing machine | 700 |
| DVD Player | 40 |
| Television | 200 |
| Mixer-cum-grinder | 200 |
| Computer | 200 |
| Pump motor (Half HP) | 370 |
| Pump motor (1 HP) | 740 |
| Pump motor(1.5 HP) | 1110 |

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## Lab Task:

* + Make connection of the single phase watt hour meter with the service main and distribute the single-phase incoming service main and neutral wire to different distribution boards and electrical points (for appliances) in different rooms of the house.
  + Calculate total load.
  + Determine size of cables required for them.
  + Measure the total energy.

### Teacher remarks:

***Obtained Marks: /*** *10*