**FRIDAY, 2 AUGUST 2013**

**Electrical thumb rule**

**Cable current Capacity:**

* **For Copper  Wire Current Capacity (Up to 25 Sq.mm) = 5-**6X Size of Wire in Sq.mm
* Ex. For 4 Sq.mm=6×4=24 Amp,
* **For Aluminum wire Current Capacity =**4X Size of Cable in Sq.mm ,upto 10sqmm
* Ex. For 1.5 Sq.mm=4×1.5=6 Amp.

**Nomenclature for cable Rating**

Uo=Phase-Ground Voltage, U=Phase-Phase Voltage, Um=Highest Permissible Voltage  
**Current Capacity of Equipments:**

* **1 Phase Motor draws Current=**6**-**7Amp per HP.
* **3 Phase Motor draws Current=**1.7Amp per KW.
* **Full Load Current of 3 Phase Motor=**HPx1.3 from 10 HP onward
* **Full Load Current of 1 Phase Motor=**5 to6 times of HP
* **No Load Current of 3 Phase Motor =**25-30% of FLC
* **KW Rating of Motor=**HPx0.75
* **Full Load Current of equipment =**1.39xKVA (for 3 Phase 415Volt)
* **Full Load Current of equipment =**1.74xKw (for 3 Phase 415Volt)

**Earthing Resistance:**

* **Earthing Resistance for Single Pit=**5Ω ,
* Earthing Grid=0.5Ω
* **As per NEC 1985 Earthing Resistance** should be <5Ω.
* **Voltage between Neutral and Earth** <=2 Volts
* **Resistance between Neutral and Earth** <=1Ω
* **Creepage Distance=**18 to 22mm/KV (Moderate Polluted Air) or
* **Creepage Distance=**25 to 33mm/KV (Highly Polluted Air)

**Insulation Resistance:**

* **IR Value for Rotating Machine=** (KV+1) MΩ.
* **IR Value for Motor (IS 732) =** ((20xVoltage (L-L)) / (1000+ (2xKW)).
* **IR Value for Equipment (<1KV) =** Minimum 1 MΩ.
* **IR Value for Equipment (>1KV) =** KV 1 MΩ per 1KV.
* **IR Value for Panel =** 2 x KV rating of the panel.
* **Min Insulation Resistance Value (Domestic) =**50 MΩ / No of Points. (All Electrical Points with Electrical fitting & Plugs). Should be less than 0.5 MΩ
* **Min Insulation Resistance Value (Commercial) =**100 MΩ / No of Points. (All Electrical Points without fitting & Plugs).Should be less than 0.5 MΩ.
* **Test Voltage (A.C) for Meggering =**(2X Name Plate Voltage) +1000
* **Test Voltage (D.C) for Meggering = (**2X Name Plate Voltage).
* Submersible Pump Take 0.4 KWH of extra Energy at 1 meter drop of Water.

**Lighting Arrestor:**

* **Arrestor have Two Rating=**
* (1) MCOV=Max. Continuous Line to Ground Operating Voltage.
* (2) Duty Cycle Voltage. (Duty Cycle Voltage>MCOV).

**Transformer:**

* **Current Rating of Transformer**=KVAx1.35
* **Short Circuit Current of Generator/transformer**

**=**Current Rating / % Impedance

* **No Load Current of Transformer=**<2% of Transformer Rated current
* **Capacitor Current (Ic)=**KVAR / 1.732xVolt (Phase-Phase)
* Typically the local utility provides transformers rated up to **500kVA**For maximum connected load of **99kW,**
* Typically the local utility provides transformers rated up to **1250kVA**For maximum connected load of **150kW.**
* The diversity they would apply to apartments is around **60%**
* Maximum HT (11kV) connected load will be around **4.5MVA per circuit**.
* 4No. earth pits per transformer (2No. for body and 2No. for neutral earthing),
* Clearances, approx.1000mm around Transformer allow for transformer movement for replacement.

**Diesel Generator:**

* **Diesel Generator Set Produces=**3.87 Units (KWH) in 1 Litter of Diesel.
* **Requirement Area of Diesel Generator =** for 25KW to 48KW=56 Sq.meter, 100KW=65 Sq.meter.
* DG less than or equal to **1000kVA must be in a canopy.**
* DG greater **1000kVA** can either be in a canopy or skid mounted in an acoustically treated room
* DG noise levels to be less than **75dBA @ 1meter.**
* DG fuel storage tanks should be a maximum of **990 Litter per unit** Storage tanks above this level will trigger more stringent explosion protection provision.

**Current Transformer:**  
**Nomenclature of CT:**

* **Ratio:** input / output current ratio
* **Burden (VA):** total burden including pilot wires. (2.5, 5, 10, 15 and 30VA.)
* **Class:** Accuracy required for operation (Metering: 0.2, 0.5, 1 or 3, Protection: 5, 10, 15, 20, 30)**.**
* **Accuracy Limit Factor:**
* Nomenclature of CT: Ratio, VA Burden, Accuracy Class, Accuracy Limit Factor.**Example:** **1600/5, 15VA 5P10**(Ratio: 1600/5, Burden: 15VA, Accuracy Class: 5P, ALF: 10)
* **As per IEEE Metering CT:** 0.3B0.1 rated Metering CT is accu­rate to 0.3 percent if the connected secondary burden if imped­ance does not exceed 0.1 ohms.
* **As per IEEE Relaying (Protection) CT:** 2.5C100 Relaying CT is accurate within 2.5 percent if the secondary burden is less than 1.0 ohm (100 volts/100A).