

# **BNBC (Bangladesh National Building Code) rules and regulations for 11KV/0.4KV Electrical Indoor Substation you should FOLLOW !!**

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## **General (REF. BNBC 2006, VOL 3, SEC 1.3.23.1):**

- a. According to the rule of the distribution companies of Bangladesh, 11KV/0.4KV Electrical substations shall be required for a building if the load requirement of the building exceeds 50KW.
- b. To determine the rating of the substation required, a load factor of at least 80% shall be applied to the estimated load of the building. Future expansion requirements should definitely be taken into consideration.

## **Location of Substation (REF. BNBC 2006, VOL 3, SEC 1.3.23.2):**

- a. In a multi-storied building, the substation shall preferably be installed on the lowest floor level (Ground Floor), but direct access from the street for installation or removal of the equipment shall be provided.
- b. The floor level of the substation or switch room shall be above the highest flood level of the locality.
- c. The location of a substation will depend on (i) the feed point of the 11 KV Supply Authority line and (ii) the location of the LT vertical riser cables.
- d. In case of a building complex, or a group of buildings belonging to the same organization, the substation should preferably be located in a separate building and should be adjacent to the generator room, if any.
- e. Location of the substation in the basement floor and on the floors above the ground floor level (GFL) preferably is avoided. If Sub- Station it to be installed on the basement floor or the floors above ground floor level (GFL) special safety measures are to be taken by the user or owner. Measures are as follows:
  - (i) No objection certificate stating the Sub-Station safe by the Fire Service and Civil Defense Department.
  - (ii) Certification of the building consultant stating safe, proper ventilation, Easy entrance, and exit and safe load-bearing capacity of the floors above the ground floor level (GFL).

## Height, Area & Floor Level (REF. BNBC 2006, VOL 3, SEC 1.3.23.3):

- The minimum height of a substation room should be 3.0m to 3.6m depending upon the size of the transformer.
- The minimum area required for substation and transformer room for different capacities is given in Table 8.1.24.
- For transformers having large oil content (more than 2000 liters), soak pits are to be provided.
- The floor level of the substation should be high.

Table 8.1.24 Area Required for Transformer and Recommended Minimum Area for Substation of Different Capacities

Capacity of Transformer (kVA)	Transformer Area (m <sup>2</sup> )	Total Substation Area (with HT, LT Panels & Transformer Room but without Generators) (m <sup>2</sup> )
1x150	12	45
1x250	13	48
2x250	26	100
1x400	13	48
2x400	30	100
3x400	40	135
2x630	26	100
3x630	40	190
2x1000	40	180
3x1000	45	220

## 11KV/0.4KV Distribution Transformer for the Substation of a Building (REF. BNBC 2006, VOL 3, SEC 1.3.23.4):

a. An 11KV / 0.4KV indoor distribution Transformer is a major part of an indoor substation. These Substations may be installed inside the building itself or may be housed in a separate building adjacent to the building. For small to moderate power rating up to 2MW two types of indoor transformers have been widely used in recent years.

These are:

- Oil Type Natural Cooled transformer and
- Cast Resin Dry Type Natural Cooled transformers.

In most cases, Oil Type Natural Cooled transformer may be used for substations if adequate space is available to accommodate the transformer.

Cast Resin Dry Type Natural Cooled transformers should be used  
(i) in places where stringent protection against the spread of fire is needed and  
(ii) in places where space saving is of utmost importance.

### **Ventilation of a Substation (REF. BNBC 2006, VOL 3, SEC 1.3.23.6):**

In an Electrical Substation significant amount of forced ventilation is very much needed apart from natural ventilation. Exhaust Fans (minimum 18" dia) must be provided in sufficient numbers on all sides of the substation above the lintel level. Grill fitted Windows having window panes must be provided on all sides for natural ventilation. The windows must have sun sheds to ensure that no rainwater can come inside the substation. If due to space constraint or due to any other difficulties, a sufficient number of windows and ventilating fans cannot be installed, high velocity forced ventilation using ducts must be provided.

#### **Special Recommendation:**

The 11KV/0.4KV substation shall not be placed in a basement.

The substation shall preferably be placed on the ground floor. Placing a substation on any other floor other than the ground floor shall be avoided.

The substation room and the areas adjacent to cable routes must have adequate fire alarm and fire extinguishing/ fire system appropriate for extinguishing the fire due to the electrical system, cable burning and oil burning.