



**DRAFT ENERGY CONSERVATION BUILDING
CODE
(ELECTRIC SYSTEMS)**

8. Electrical Power

8.1 General

Electric equipment and systems shall comply with the mandatory requirements of § 8.2.

8.2 Mandatory Requirements

8.2.1 Transformers

8.2.1.1 Maximum Allowable Power Transformer Losses

Power transformers of the proper ratings and design must be selected to satisfy the minimum acceptable efficiency at their full load rating. In addition, the transformer must be selected such that it minimizes the total of its initial cost in addition to the present value of the cost of its total lost energy while serving its estimated loads during its respective life span. Transformers used in buildings shall be constructed with high quality grain oriented low loss silicon steel and virgin electrolytic grade copper and the manufacturer's certificate to this effect shall be obtained.

Table 8.2.1.1 Maximum Allowable Losses of 11,22 kV Transformers

Transformer Capacity, kVa	Maximum Allowable Losses at Full Load in % of Rating	
	11 kV Transformer	22 kV Transformer
100	2.5	2.7
160	2.3	2.2
250	2.1	1.8
400	1.5	1.5
630	1.4	1.5
800	1.4	1.5
1000	1.2	1.2

Reference conditions: 100% of nameplate load at temperature of 75° C

8.2.1.2 Measurement and Reporting of Transformer Losses

All measurement of losses shall be carried out by using calibrated digital meters of class 0.5 or better accuracy and certified by the manufacturer. All transformers of capacity of 500 kVA and above would be equipped with additional metering class current transformers (CTs) and potential transformers (PTs) additional to requirements of Utilities so that periodic loss monitoring study may be carried out.

8.2.2 Energy Efficient Motors

Motors shall comply with the following:

- (a) All permanently wired polyphase motors of 0.375 kW or more serving the building and expected to operate more than 1,500 hours per year and all permanently wired polyphase motors of 50kW or more serving the building and expected to operate more than 500 hours per year shall have a minimum acceptable nominal full load motor efficiency not less than shown in Table 8.2.2 or the BIS for energy efficient motors.
- (b) Motors of horsepower differing from those listed in the table shall have efficiency greater than that of the next listed kW motor.

- (c) Motor horsepower ratings shall not exceed 200% of the calculated maximum load being served.
- (d) Motor nameplates shall list the nominal full-load motor efficiencies and the full-load power factor.
- (e) Motor users should insist on proper rewinding practices for any rewind motors. If the proper rewinding practices cannot be assured, the damaged motor should be replaced with a new, efficient one rather than suffer the significant efficiency penalty associated with typical rewind practices.
- (f) Certificates shall be obtained and kept on record indicating the motor efficiency. Whenever a motor is rewound, appropriate measures shall be taken so that the core characteristics of the motor is not lost due to thermal and mechanical stress during removal of damaged parts. After rewinding, a new efficiency test shall be performed and a similar record shall be maintained.

Table 8.2.2 Minimum Acceptable Motor Efficiencies

Motor Size (kW)	Efficiency (%)	
	2 Pole	4 Pole
1.1 (1.5 hp)	82.2	83.8
1.5 (2 hp)	84.1	85.0
2.2 (3 hp)	85.6	86.4
3.0 (4 hp)	86.7	87.4
4.0 (5.5 hp)	87.6	88.3
5.5 (7.5 hp)	88.5	89.2
7.5 (10 hp)	89.5	90.1
11.0 (15 hp)	90.6	91.0
15.0 (20 hp)	91.3	91.8
18.5 (25 hp)	91.8	92.2
22.0 (30 hp)	92.2	92.6
30.0 (40 hp)	92.9	93.2
37.0 (50 hp)	93.3	93.6
45.0 (60 hp)	93.7	93.9
55.0 (75 hp)	94.0	94.2
75.0 (100 hp)	94.6	94.7