



NATIONAL PETROCHEMICAL COMPANY
STANDARDS

CONSTRUCTION STANDARD
FOR
ELECTRICAL INSTALLATION IN BUILDINGS

NPCS-CS-EL-03

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TABLE 1

TABLE 2

TABLE 3

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1 SCOPE

This standard covers the minimum requirements for design and installation of the electrical and telecommunication facilities for common buildings.

2 STANDARDS AND CODES

The design and installation of electrical facilities for buildings shall be in accordance with the below listed codes standards:

- API The American Petroleum Institute.
- IEC International Electrotechnical Commission.
- IES *Illumination Engineering Society.
- NEC National Electric Code.

3 BATTERY LIMIT

Battery limits for electrical installation are the incoming feeder of the distribution panel to be installed in each building.

4 ELECTRICAL SYSTEMS

4.1 ELECTRICAL FACILITIES

The facilities are limited to the electrical services associated with the building and will include the following systems:

- All lightings (normal, emergency and safety lights)
- Sockets (convenience and power)
- Heating, ventilation and air conditioning
- Fire **alarm** system
- Telephone system

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4.2 ELECTRICAL FEEDERS

A 380/220 V, three-phase, four-wires feeder for power distribution of each building will be supplied up to the incoming terminals of the relevant switchboard/panels.

Down-stream of this switchboard, a separate panel individually dedicated to each service, i.e. power distribution, air conditioning and lighting should be realized according to the building requirements. The 380/220 V system is solidly earthed.

4.3 DISTRIBUTION CHARACTERISTICS

Outgoing feeders from main switchboards/panels to lighting, convenience sockets and power sockets shall be separated.

Voltages to be used are:

- Three-phase users : 380 V, 3-Phase, 50 Hz with earthing conductor for power sockets or motors.
- Single-phase users : 220 V, 1-Phase, 50 Hz with earthing conductor.
11.0 V, 1-Phase, 50 Hz with earthing conductor.
24. V, 1-Phase, 50 Hz with earthing conductor.

Lighting distribution, both normal and emergency where provided, will start from three-phase 380 V system (4-wires and grounding conductor) while the users will be single-phase and load distribution shall be as symmetrical as possible. (outgoings should be single phase in ordinary buildings).

The emergency lighting, where provided, will be at least 20% of the total lighting fixtures.

In normal conditions, both normal and emergency lighting will be on and each lighting branch circuit will be loaded by using 16 A circuit breakers.

The purpose of the emergency fixture is to allow people within the building to move or operate when the normal lighting is off due to normal voltage lack.

For this reason, the emergency fixtures shall be located in the rooms where it is necessary to operate also in emergency (see Table-1) and near the doors, on the stairs, in the corridors, in the surgery, in the switchboards rooms, in the machine rooms, etc.

The emergency fixtures shall be of the same type as the normal lighting ones.



In addition to the above, the safety fixtures shall be provided in the buildings (see Table-1) where person will be normally occupied for safety evacuation such as stairs, corridors, exits. The safety lightings will be incandescent or fluorescent type equipped with battery and charging unit. The batteries shall be capable of maintaining the illumination levels for at least 60 minutes. The safety lightings will be normally on, and be connected with emergency circuit; however they can be connected with normal circuit if emergency circuit is not supplied. If not otherwise indicated, lighting and power sockets shall be fed from normal circuit or relevant main switchboards.

Each power socket circuit in 16 A branch circuit breaker shall not feed more than:

- 4 sockets

- 1 sockets if sizes for wall/roof air-conditioners

L.4

VOLTAGE DROP

The maximum voltage drops as percentage of nominal voltage for the various parts of the electrical system shall be as follows:

- Motor feeders cables in normal condition : 5%
- Motor feeders in starting condition 15%
- Lighting branch circuits 3%
- Feeder cables to distributions switchgears : 2%

L.5

SWITCHBOARDS, GENERAL

In addition to main power and lighting switchboards/panels which can also be combined in one, if necessary secondary lighting and power switchboards shall be provided. Secondary switchboards will be either wall mounted or flush mounted type.

All switchboards will be provided with an earthing bus-bar to which all earthing conductors will be connected. Switchboards will be realized with Steel plate and hinged doors. According to distribution necessity switchboards could be divided in sections for different use. The instruments and equipment installed on switchboards shall be grouped in order to be easily operated and read. Connections between equipment on doors and the switchboard shall be realized with very flexible conductors. Circuit load shall not exceed 75% of circuits and equipment capacity.