

Chapter E 480

STORAGE BATTERIES

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E 480.01 Scope. The provisions of this chapter shall apply to all stationary installations of storage batteries using acid or alkali as the electrolyte and consisting of a number of cells connected in series with a nominal voltage in excess of 16 volts.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.02 Definition of nominal battery voltage. The nominal battery voltage shall be calculated on the basis of 2.0 volts per cell for the lead-acid type, and 1.2 volts per cell for the alkali type.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.03 Wiring and apparatus supplied from batteries. Wiring, appliances, and apparatus supplied from storage batteries shall be subject to the requirements of this code applying to wiring, appliances, and apparatus operating at the same voltage, except as otherwise provided for communication systems in Wis. Adm. Code chapter E 800.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.04 Insulation of batteries of not over 250 volts. The provisions of this rule shall apply to storage batteries having the cells so connected as to operate at a nominal battery voltage not exceeding 250 volts.

(1) **LEAD-ACID BATTERIES.** Cells in lead-lined wood tanks, where the number of cells in series does not exceed 25, shall be supported individually on glass or glazed porcelain insulators. Where the number of the cells in series exceeds 25, the cells shall be supported individually on oil insulators.

(2) **ALKALI-TYPE BATTERIES.** Cells of the alkali type in jars made of conducting material shall be installed in trays of nonconducting material, with not over 20 cells in a series circuit in any one such tray, or the cells may be supported singly or in groups on porcelain or other suitable insulators.

(3) **UNSEALED JARS.** Cells in unsealed jars made of nonconductive material shall be assembled in trays of glass or supported on glass or glazed porcelain insulators; or, where installed on a rack, shall be supported singly or in groups on glass or other suitable insulators.

(4) **SEALED RUBBER JARS.** Cells in sealed rubber or composition containers shall require no additional insulating support where the total

nominal voltage of all cells in series does not exceed 150 volts. Where the total voltage exceeds 150 volts, batteries shall be sectionalized into groups of 150 volts or less and each group shall have the individual cells installed in trays or on racks. Where trays or racks are required for this type of cell, such trays or racks shall be supported on glass or glazed porcelain insulators or oil-type insulators.

(5) **SEALED GLASS OR PLASTIC JARS.** Cells in sealed glass jars or in sealed jars of approved heat-resistant plastic, with or without wood trays, require no additional insulation.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.05 Insulation of batteries of over 250 volts. The provisions of E 480.04 shall apply to storage batteries having the cells so connected as to operate at a nominal voltage exceeding 250 volts and, in addition, the provisions of this chapter shall also apply to such batteries. Cells shall be installed in groups having a total nominal voltage of not over 250 volts, in trays or on racks supported on oil insulators.

(1) **EXCEPTION NO. 1.** Where each individual cell, or sub-group in the tray or rack, is supported on oil insulators, no additional insulation for the group need be provided.

(2) **EXCEPTION NO. 2.** Cells of not over 10 ampere-hour capacity in sealed glass jars may be grouped in trays, the total nominal voltage of all cells in such group not to exceed 250 volts, and each such tray to be supported on glass or glazed porcelain insulators, the trays being mounted on racks supported on oil insulators with a total nominal voltage of not over 500 volts for all cells in series on each such insulated rack.

Note: Maximum protection is secured by sectionalizing high-voltage batteries into cell groups insulated from each other.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.06 Racks and trays. Racks and trays shall conform to the following:

(1) **RACKS.** Racks, as required in this chapter, refer to frames designed to support cells or trays. They shall be substantial, and made of:

(a) Wood, so treated as to be resistant to deteriorating action by the electrolyte; or

(b) Metal, so treated as to be resistant to deteriorating action by the electrolyte, and provided with nonconducting members directly supporting the cells or with suitable insulating material on conducting members; or

(c) Other similar suitable construction.

(2) **TRAYS.** Trays refer to frames such as crates or shallow boxes usually of wood or other nonconducting material, so constructed or treated as to be resistant to deteriorating action by the electrolyte.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.

E 480.07 Battery rooms. Battery rooms shall conform to the following:

(1) **USE.** Separate battery rooms or enclosures shall be required only for batteries in unsealed jars and tanks where the aggregate capacity at the 8-hour discharge rate exceeds 5 kilowatt hours.

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(2) **VENTILATION.** Provision shall be made for sufficient diffusion and ventilation of the gases from the battery to prevent the accumulation of an explosive mixture in the battery room.

(3) **WIRING METHOD.** In storage battery rooms, bare conductors, open wiring, type MI cable, type ALS cable, or conductors in rigid conduit or electrical metallic tubing shall be used as the wiring method. Rigid metal conduit, or electrical metallic tubing, where used, shall be of corrosion-resistant material or shall be suitably protected from corrosion.

(4) **VARNISHED-CAMBRIC CONDUCTORS.** Varnished-cambric-covered conductors, type V, shall not be used.

(5) **BARE CONDUCTORS.** Bare conductors shall not be taped.

(6) **TERMINALS.** Where metal raceway or other metallic covering is used in the battery room, at least 12 inches of the conductor at the end connected to a cell terminal shall be free from the raceway or metallic covering and shall be bushed by a substantial glazed insulating bushing. The end of the raceway shall be sealed tightly to resist the entrance of electrolyte by spray or by creepage. Sealing compound, rubber insulating tape or other suitable material shall be used for this purpose.

History: Cr. Register, January, 1968, No. 145, eff. 2-1-68.