

Part 2: Physical Requirements



270) Indoor Substations

270.10) General

270.10.10) Each aisle or work space about substation equipment shall have a suitable means of exit which shall be kept clear of all obstructions. If the plan of the vault and the character and arrangement of equipment are such that an accident would close or make inaccessible a single exit, a second exit shall be provided.

270.10.20) All personnel doors shall swing out and be equipped with full width panic bars that are normally latched but open under simple pressure for quick escape in the event of trouble. A description of the door latch shall be submitted to We Energies for approval. An example of an acceptable door latch is a Von Duprin catalog number 99NL-F

270.10.30) The customer shall furnish and install sufficient lighting fixtures to provide a minimum illumination intensity of 5 foot candles. If the room temperature is to be maintained above 40°F, fluorescent light fixtures may be used. The lighting fixtures shall be so arranged that persons changing lamps or making repairs on the lighting system will not be endangered by live parts or other equipment.

270.10.40) Only metal-enclosed equipment will be allowed in areas accessible to unqualified persons. This equipment must conform to the switchgear requirements listed in section 260. All other equipment must be located in an area where access to which is controlled by a lock.

270.10.50) The customer shall provide We Energies personnel 24-hour per day access to indoor vaults for the purpose of switching and maintenance.

270.20) Secondary Service Transformer Vaults.

270.20.05) Secondary Service Transformer Vaults requirements apply to a room in the customer's facility in which We Energies will build and own an electrical distribution substation. The customer is responsible for the structure and the environment and We Energies is responsible for the electrical distribution equipment.

270.20.10) Indoor vaults shall be located so as to be easily accessible by Company personnel to facilitate moving and operation of utility electrical distribution equipment. The customer must provide floors, doorways, passageways and/or elevators having structural strength and clearances adequate for the transportation, installation and replacement of transformers and associated equipment. These clearances should take into consideration the ultimate transformer size needed for the installation. It is highly desirable that a hatchway or doorway on an outside wall or ceiling of the vault will be provided such that the equipment can be installed directly from the outdoors.

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270.20.20) The size and shape of the vault in which We Energies equipment is to be installed must be sufficient to safely operate the installed equipment, perform maintenance on such equipment, and remove and replace such equipment should that become necessary. The vault size and shape will be specified by the We Energies Application Engineer.

270.20.30) The transformer vault shall be constructed according to the requirements of the Wisconsin State Administrative Code, Volume 1 and 2, “Electrical”, and meet the requirements of all local inspectors and local ordinances.

270.20.40) Vaults shall be located where they can be ventilated to the outside without using flues or ducts wherever such an arrangement is practicable. When special permission is granted by the administrative authority, flues and ducts may be used if the ducts are of a fire resistive construction.

270.20.50) The vault will be secured with a We Energies installed a high security cylinder lock in each door.

270.20.60) Pipe or duct systems foreign to the electrical installation shall not enter or pass through a transformer vault except by special permission. No system will be approved if it contains appurtenances that require maintenance.

270.20.70) Louvers at the outside of the building shall be covered with 8 mesh per inch copper wire screen and constructed to restrict entrance of snow and rain.

270.20.80) The walls and roofs of vaults shall be constructed of masonry materials which have adequate structural strength for the conditions with a minimum fire resistance of 3 hours. The floors of vaults in contact with earth shall be concrete not less than 4 inches thick, but when the vault is constructed with a vacant space or other rooms below it, the floor shall have adequate structural strength for the ultimate load and a minimum fire resistance of 3 hours.

270.20.90) The customer shall provide fireproof doors suitable for the required size of the doorway. All doors shall swing out of the vault. The We Energies Application Engineer will specify required doorway size and location. The fireproof rating of the door shall meet requirements of 270.20.80. A minimum 3.5” concrete sill or curb shall be provided under each vault doorway to contain within the vault the oil from the largest transformer unless the floor of the transformer vault is at least 4” inches below the adjacent area.

270.20.100) The customer shall provide floor drains to carry off any accumulation of water. The floor shall be pitched to the drains. Sump crocks and pumps associated with transformer vault floor drains shall be located outside of the transformer vault so they can be maintained without entry to the transformer vault. The customer shall consult with local sewerage district

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to determine what if any provisions are required to prevent transformer oil entry into the local sewer system in the event of a transformer case leak. The customer is responsible to install any required oil stop provisions.

270.20.110) The customer shall provide ventilation adequate to dispose of transformer full-load losses without creating an excessive ambient temperature (above 40°C).

a) For a vault ventilated by natural circulation, the combined net area of all ventilating openings shall not be less than 3 square inches per kVA of ultimate transformer capacity. Roughly half of the total area of openings required for ventilation shall be in one or more openings near the floor and the remainder in one or more openings in the roof or side walls near the roof. Intake and exhaust vents should be located at opposite ends of the vault to promote good air circulation.

b) For a vault ventilated by forced circulation, the forced air system shall provide a minimum ventilation capacity of 2 CF/M/kVA of ultimate transformer capacity. Fan or blower units shall be located outside of the transformer vault so that they can be maintained without entry to the transformer vault. Forced air systems shall be thermostat controlled with a turn-on temperature of 85° F.

270.20.120) When special permission is granted by the administrative authority to ventilate the transformer vault to the indoors, ventilation openings to the indoors shall be fitted with automatic closing fire dampers that operate in response to a vault fire. These dampers shall possess a standard fire rating of not less than 1-1/2 hours. For transformer vaults that are ventilated to the indoors the customer shall hold We Energies harmless for any damage that results from smoke or fire entry into the building associated with a transformer vault fire..

270.20.130) In addition to the lighting circuit, the customer is required to furnish and install one 20 ampere, 120 volt circuit in the transformer vault. This circuit shall be supplied from an emergency service, if present.

270.20.140) The customer shall provide fire suppression system (automatic sprinkler) if required by local inspectors and local ordinances. The fire suppression system shall be a type that is not damaged or activated by freezing temperatures. Heads and associated piping shall not obstruct replacement of transformers or switchgear.

270.20.150) Secondary services shall be metered per the We Energies “Electric Service and Metering Manual Book 1 and 2.

270.20.160) If the customer installs a We Energies approved service termination enclosure We Energies will extend secondary conductors within customer installed conduits from the

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transformer vault to the termination enclosure. We Energies will extend conductors no greater than 8 feet outside the transformer vault.

270.20.170) If the customer installs a termination enclosure that is not approved by We Energies, the customer must extend secondary conductors from the termination enclosure to the terminals of the We Energies owned transformers in the transformer vault.

270.20.180) The customer shall be responsible for all maintenance to the:

- a) Vault Structure – Walls, floors, ceiling, doors and fire proofing materials.
- b) Ventilation System – Louvers, screening, duct work, fans, motors, motor controllers, thermostats, etc.
- c) Drainage System – Drains, piping, sumps, pumps, etc.
- d) Lighting Systems – Bulbs, fixtures, switches, outlets, conduit and wire.
- e) Fire Suppression System – Sprinkler heads, piping, etc.

270.20.190) The Wisconsin State Administrative Code, Volume 2 “Electrical” and We Energies policy does not allow customers access to secondary metered substations. We Energies will inform the customer of any required maintenance, or at the request of the customer will escort the customer through the substation for the purpose of inspection. Any required maintenance will be performed by the customer or his contractor in the presence of a We Energies inspector.

270.30) Vault Agreement.

Prior to energizing any services from the transformer vault the customer shall sign a vault agreement stipulating to all items in section 270 above.