

Chapter ILHR 16

WISCONSIN STATE ELECTRICAL CODE, VOLUME 2

- PURPOSE AND SCOPE
ILHR 16.001 Purpose (p. 2)
ILHR 16.002 Scope (p. 2)
- APPLICATION, ENFORCEMENT AND PETITION FOR MODIFICATION
ILHR 16.01 Application of rules (p. 3)
ILHR 16.02 Enforcement (p. 3)
ILHR 16.03 Petition for modification (p. 3)
- GENERAL REQUIREMENTS
ILHR 16.04 Construction and operation (p. 3)
ILHR 16.05 Inspection and maintenance (p. 4)
ILHR 16.06 Use of approved materials and construction methods (p. 4)
- ADOPTION OF STANDARDS
ILHR 16.07 Adoption of standards by reference (p. 4)
- CHANGES, ADDITIONS OR OMISSIONS TO NEC-1981
ILHR 16.08 Changes, additions or omissions to NEC-1981 (p. 5)
- ARTICLE 90 — INTRODUCTION
ILHR 16.09 Purpose, scope and enforcement (p. 5)
- ARTICLE 100 — DEFINITIONS
ILHR 16.10 Definitions (p. 5)
- ARTICLE 110 — GENERAL
ILHR 16.11 Installation and use (p. 5)
- ARTICLE 210 — BRANCH CIRCUITS
ILHR 16.12 Ground-fault protection for personnel (p. 6)
ILHR 16.13 Receptacle outlets required (p. 6)
- ARTICLE 220 — BRANCH CIRCUIT AND FEEDER CALCULATIONS
ILHR 16.14 Branch circuits required (p. 6)
- ARTICLE 225 — OUTSIDE BRANCH CIRCUITS AND FEEDERS
ILHR 16.15 Outside branch circuits and feeders (p. 6)
- ARTICLE 230 — SERVICES
ILHR 16.16 Services (p. 7)
- ARTICLE 250 — GROUNDING
ILHR 16.17 Bonding to other systems (p. 9)
- ARTICLE 280 — SURGE ARRESTERS
ILHR 16.18 Surge arrester selection (p. 9)
- ARTICLE 300 — WIRING METHODS
ILHR 16.19 Electrical requirements for septic systems (p. 9)
- ARTICLE 310 — CONDUCTORS FOR GENERAL WIRING
ILHR 16.20 Ampacity (p. 10)
- ARTICLE 336 — NON-METALLIC-SHEATHED CABLE
ILHR 16.21 Uses permitted or not permitted (p. 10)
- ARTICLE 348 — ELECTRICAL METALLIC TUBING
ILHR 16.22 Use (p. 10)
- ARTICLE 400 — FLEXIBLE CORDS AND CABLES
ILHR 16.23 Uses not permitted (p. 10)
- ARTICLE 445 — GENERATORS
ILHR 16.24 Supplemental generators (p. 10)
- ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS
ILHR 16.25 Transformers and transformer vaults (p. 10)
- ARTICLE 518 — PLACES OF ASSEMBLY
ILHR 16.26 Wiring methods (p. 11)
- ARTICLE 547 — AGRICULTURAL BUILDINGS
ILHR 16.27 Grounding (p. 11)
- ARTICLE 600 — ELECTRICAL SIGNS AND OUTLINE LIGHTING
ILHR 16.28 Listing required (p. 12)
- ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS AND MOVING WALKS
ILHR 16.29 Elevators (p. 12)
ILHR 16.30 Overhead conductor clearances (p. 12)
- ARTICLE 700 — EMERGENCY SYSTEMS
ILHR 16.31 Emergency systems (p. 12)
ILHR 16.32 Standby emergency power (p. 13)
- ARTICLE 710 — OVER 600 VOLTS, NOMINAL GENERAL
ILHR 16.33 Metal-enclosed power switch gear and industrial control assemblies (p. 15)
- ARTICLE 760 — FIRE PROTECTIVE SIGNALING SYSTEMS
ILHR 16.34 Required fire alarm systems (p. 15)
- ARTICLE 800 — COMMUNICATION CIRCUITS
ILHR 16.35 Underground circuits entering buildings (p. 16)
ILHR 16.36 Electric fences (p. 16)

ILHR 16

Note: Chapters Ind 16 and the Electrical Code, Volume 2 as they existed on October 31, 1981, were repealed and a new chapter ILHR 16 was created effective November 1, 1981.

ILHR 16.001 Purpose. (1) **PRACTICAL SAFEGUARDING.** Pursuant to ss. 101.02, 101.63 (1), 101.73 (2) and 167.16, Stats., the purpose of this code is the practical safeguarding of persons and property from hazards arising from the installation and use of electricity.

Note: Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with the code. This occurs because initial wiring did not provide for increases in use of the electricity. An initial adequate installation and reasonable provision for system changes will provide for future increases in the use of electricity.

(2) **CODE INTENTION.** This code is not intended as a design specification nor an instruction manual.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.002 Scope. (1) **COVERED.** This code covers:

(a) Installations of electric and communication conductors and equipment in places of employment, within or on public and private buildings or other structures, including mobile homes, recreational vehicles, and floating dwelling units; and other premises such as yards, carnival, parking and other lots, mines, trenches and tunnels, and industrial substations.

(b) Installations of conductors that connect to the supply of electricity.

(c) Installations of other outside conductors on the premises.

(2) **NOT COVERED.** This code does not cover:

(a) Installations in ships, watercraft other than floating dwelling units, railway rolling stock, aircraft, or automotive vehicles other than mobile homes and recreational vehicles.

(b) Installations of railways for generation, transformation or distribution of power used exclusively for signaling and communication purposes.

(c) Installations of communication equipment under exclusive control of communication utilities, located outdoors or in building spaces used exclusively for such installations.

(d) Installations under the exclusive control of electric utilities for the purpose of communication or metering; or for the generation, control, transformation, transmission and distribution of electric energy located in buildings used exclusively by utilities for such purposes or located outdoors on property owned or leased by the utility or on public highways, streets, roads or similar public thoroughfares, or outdoors by established rights on private property.

Note: It is the intent of this section that this code covers all premises' wiring or wiring other than utility owned metering equipment, on the load side of the service point of buildings, structures, or any other premises not owned or leased by the utility. Also, it is the intent that this code cover installations in buildings used by the utility for purposes other than listed in this subsection, such as office buildings, warehouses, garages, machine shops, and recreational buildings which are not in an integral part of a generating plant, substation, or control center.

Register, October, 1981, No. 310

(e) Installations under the exclusive control of electric utilities or municipal electric departments for the purpose of street or area lighting.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

APPLICATION, ENFORCEMENT AND PETITION FOR MODIFICATION

ILHR 16.01 Application of rules. (1) **TYPES OF INSTALLATIONS.** The provisions of this code shall apply to all new installations, reconstructions, alterations and extensions.

(2) **TESTING.** Rooms, which are used exclusively for routine or special electrical test work and are under the supervision of a qualified person, shall comply with the code insofar as is practicable for the character of the testing done.

(3) **EXISTING INSTALLATIONS.** Existing installations may be required to be brought into compliance with these rules by the department and within the time determined by the department.

ILHR 16.02 Enforcement. (1) **DEPARTMENT ENFORCEMENT.** The department shall have the responsibility for interpreting the rules, for deciding upon the approval of equipment and materials, and for granting special permission specified in the rules.

(2) **JOINT ENFORCEMENT.** The Wisconsin State Electrical Code is issued and administered by the department and the public service commission as part of the Wisconsin Administrative Code. The department has the responsibility for issuance and administration of Vol. 2, and the public service commission has the responsibility for issuance and administration of Vol. 1.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.03 Petition for modification. The department shall consider and may grant a variance to an administrative rule upon receipt of a fee and a completed petition for modification form from the owner, provided an equivalent degree of safety is established in the petition for modification which meets the intent of the rule requested to be modified. The department may impose specific conditions in a petition for modification to promote the protection of the health, safety or welfare of the employes or the public. Violation of those conditions under which the petition is granted constitutes a violation of these rules.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

GENERAL REQUIREMENTS

ILHR 16.04 Construction and operation. (1) **GENERAL.** All electrical power and communication equipment and lines shall be constructed, installed, operated and maintained so as to minimize the life and fire hazard. All electrical installations shall conform to the NEC-1981, incorporated by reference in this code, and the requirements specified in this code.

Register, October, 1981, No. 310

ILHR 16

(2) **INSTALLATIONS OVER 600 VOLTS.** Installations over 600 volts shall, in addition to the requirements of this code, comply with the Wis. Adm. Code, Electrical, Volume 1.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.05 Inspection and maintenance. All construction and equipment shall be cleaned and inspected at intervals as experience has shown to be necessary. Any equipment or construction known to be defective so as to endanger life or property shall be promptly repaired, permanently disconnected, or isolated until repairs can be made. Construction, repairs, additions and changes to electrical equipment and conductors should be made by qualified persons only. (See Wis. Adm. Code, Electrical, Volume 1)

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.06 Use of approved materials and construction methods. (1) **MATERIALS.** Materials which do not comply with the requirements of this code shall not be used unless approved by the department. It is the policy of the administrative authority to approve materials, devices and systems which are listed as standard by the Underwriters' Laboratories or other nationally recognized testing laboratories if they do not conflict with the requirements of this or other state codes or the laws of the state.

(2) **METHODS OF INSTALLATION.** Methods of installation, which do not comply with the regulations of this code shall not be used unless approved by the department.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ADOPTION OF STANDARDS

ILHR 16.07 Adoption of standards by reference. (1) **CONSENT TO INCORPORATE.** Pursuant to s. 227.05, Stats., the attorney general and the revisor of statutes have consented to the incorporation by reference of the National Electrical Code-1981 (NEC-1981), subject to those changes, additions, or omissions specified in s. ILHR 16.08.

(2) **INTERIM AMENDMENTS.** Interim amendments of the National Electrical Code will have no effect in the state, until such time as this section is correspondingly revised to reflect these changes.

(3) **AVAILABILITY OF STANDARDS.** Copies of the National Electrical Code-1981 can be obtained from the National Fire Protection Association, Batterymarch Park, Quincy, MA, 02269.

Note: The public service commission has similarly adopted the National Electrical Safety Code (NESC) with certain deletions, changes and additions which are found in Volume 1, Wis. State Electrical Code. Copies of Vol. 1, Wis. State Electrical Code, may be ordered from the Wis. Department of Administration, Document Sales and Distribution, 202 S. Thornton Ave., Madison, WI 53702. Copies of the NESC may be purchased from the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017.

(4) **FILING OF CODES.** Copies of the standards in reference are on file in the offices of the department, the secretary of state and the revisor of statutes.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

Register, October, 1981, No. 310

CHANGES, ADDITIONS OR OMISSIONS TO NEC-1981

ILHR 16.08 Changes, additions or omissions to NEC-1981. Changes, additions or omissions to the NEC are specified in ss. ILHR 16.09 through 16.36, and are rules of the department and not requirements of the NEC 1981.

Note: The referenced NEC section or subsection, located in brackets, will follow the ILHR designation and precede the text of the rule. Example: ILHR 16.11 [NEC 110-3].

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 90 — INTRODUCTION

ILHR 16.09 [NEC 90] Purpose, scope and enforcement. The following subsections of the NEC-1981 do not apply in Wisconsin.

- (1) [NEC 90-1.] Purpose.
- (2) [NEC 90-2.] Scope.
- (3) [NEC 90-4.] Enforcement.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 100 — DEFINITIONS

ILHR 16.10 [NEC 100] Definitions. The following definitions are added and submitted to read:

(1) **ADMINISTRATIVE AUTHORITY.** "Administrative authority" means the department of industry, labor and human relations.

(2) **BUILDING.** A "building" means a structure which stands alone or which is separated from adjoining structures by fire walls having not less than a 3-hour fire-resistive rating with all openings in the wall protected with 3-hour fire-rated door assemblies.

Note: See s. Ind 51.04, Wis. Adm. Code, for fire-resistive standards.

(3) **DEPARTMENT.** "Department" means the department of industry, labor and human relations.

(4) **SPECIAL PERMISSION.** "Special permission" means the written consent of the department of industry, labor and human relations.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 110 — GENERAL

ILHR 16.11 [NEC 100-3] Installation and use. Substitute the following wording for NEC 110-3 (b):

Except as otherwise permitted in this code, all electrical equipment shall be installed or used in the exact manner and for the exact purpose indicated by the manufacturer's instructions, markings, listings or labels.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

Register, October, 1981, No. 310

ARTICLE 210 — BRANCH CIRCUITS

ILHR 16.12 [NEC 210-8] Ground-fault protection for personnel. This is a department rule in addition to NEC 210-8 (a):

Exception 3. Receptacles specified in s. ILHR 16.19 (3).

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.13 [NEC 210-52] Receptacle outlets required. (1) [NEC 210-52 (a)] GENERAL PROVISIONS. This is a department rule in addition to the requirements in NEC 210-52 (a):

Sliding panels in exterior walls, and alcoves less than 4 feet in width and located in room entrances shall not be considered wall space.

(2) [NEC 210-52 (d)] **OUTDOOR OUTLETS.** Substitute the following wording for NEC 210-52 (d):

One-family, 2-family, and multi-family dwelling units having individual exit doors to grade, shall have at least one receptacle outlet installed outdoors at each dwelling unit.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 220 — BRANCH CIRCUIT AND FEEDER CALCULATIONS

ILHR 16.14 [NEC 220-3] Branch circuits required. These requirements are department rules in addition to the requirements of NEC 220-3:

(1) **FIXED APPLIANCES.** Where an air conditioner sleeve is provided in a building wall, an outlet within 4 feet of the sleeve location shall be provided. If a circuit is not run to the outlet, a raceway shall be provided. When the air conditioner is installed in the sleeve, it shall be supplied by a separate circuit. A receptacle outlet installed for an air conditioner shall not be counted as one of the receptacles required by section NEC 210-52 (a).

(2) **BRANCH CIRCUITS.** A branch circuit shall not supply outlets in more than one apartment of a multi-family building, except hotels and motels.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 225 — OUTSIDE BRANCH CIRCUITS AND FEEDERS

ILHR 16.15 [NEC 225] Outside branch circuits and feeders. These requirements are department rules in addition to the requirements of NEC-225:

(1) [NEC 225-18] **CLEARANCE FROM GROUND.** This is a department rule in addition to the requirements of NEC 225-18:

27 feet — over track rails of railroads.

(2) [NEC 225-18] **CLEARANCE FROM GROUND.** Substitute the following wording for the note to NEC 225-18:

Register, October, 1981, No. 310

Clearance of conductors of over 600 volts shall comply with the Wis. Adm. Code, Electrical, Volume 1.

(3) [NEC 225-19] CLEARANCES FROM BUILDINGS FOR CONDUCTORS NOT IN EXCESS OF 600 VOLTS. Substitute the following wording for NEC 225-19 (a):

Exception 1. Fully insulated conductors are permitted to have vertical or diagonal clearances of 8 feet or more.

(4) [NEC 225-19] CLEARANCES FROM BUILDINGS FOR CONDUCTORS NOT IN EXCESS OF 600 VOLTS. Substitute the following wording for the note to NEC 225-19.

Clearance of conductors of over 600 volts shall comply with the Wis. Adm. Code, Electrical, Volume 1.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 230 — SERVICES

ILHR 16.16 [NEC 230] Services. (1) [NEC 230-2] NUMBER OF SERVICES. The second paragraph does not apply in Wisconsin.

Note #1: See definition of building in s. ILHR 16.10 (2).

Note #2: It is recommended that the electric utility or cooperative supplying electric current be contacted prior to service equipment installations for any special requirements.

(2) [NEC 230-2] CAPACITY REQUIREMENTS. (a) Substitute the following wording for NEC 230-2, Exception No. 5:

Two or more service drops or laterals may be installed for the same class of service if located more than 150 feet apart, measured in a straight line, and provided that all electrical wiring supplied by each service has no common raceway or connection with any other service.

(b) This is a department rule in addition to the requirements of NEC 230-2:

Exception 8. For rowhouse construction as defined in ch. Ind 57, Wis. Adm. Code, a separate service drop or lateral shall be permitted for each 2 attached units.

(3) [NEC 230-24] CLEARANCE OF SERVICE DROPS. Substitute the following wording for NEC 230-24:

Clearances of service drop conductors shall comply with the Wis. Adm. Code, Electrical, Volume 1.

(4) [NEC 230-41] SIZE AND RATING. (a) Substitute the following wording for NEC 230-41 (b) (1) and (2):

1. 100-ampere, 3-wire or 4-wire for a one-family dwelling requiring more than three 2-wire branch circuits or having an area of more than 500 square feet (external dimensions).

2. 150-ampere, 3-wire or 4-wire for a 2-family or multi-family dwelling. Each dwelling unit shall have a minimum of a 50-ampere, 3-wire service or feeder.

ILHR 16

(b) This is a department rule in addition to the exceptions listed in NEC 230-41 (b):

A 100-ampere, 3-wire or 4-wire service shall be permitted to be installed in an existing 2-family dwelling only where both of the following conditions are complied with:

1. The load computed in accordance with Article 220 does not exceed 80 amperes.
2. Specific written approval is granted by the municipal inspection department having jurisdiction.

(5) [NEC 230] LENGTH OF SERVICE CONDUCTORS ENTERING A BUILDING. This is a department rule in addition to the requirements of NEC 230:

Service conductors shall not extend into a building in a raceway or cable longer than 8 feet.

(a) *Exception 1.* Service conductors shall be permitted to exceed 8 feet provided that the service enters on an outside wall of a substation or mechanical equipment room.

(b) *Exception 2.* Service entrance busway shall be permitted to exceed 8 feet.

(6) [NEC 230-70] GENERAL. This is a department rule in addition to the requirements of NEC 230-70:

Disconnecting means shall be provided to disconnect the utility wiring from the premises wiring at any point where utility wiring terminates and premises wiring extends overhead or underground to more than one building or structure.

(7) [NEC 230-71] MAXIMUM NUMBER OF DISCONNECTS. These exceptions are department rules in addition to the requirements in NEC 230-71 (a):

(a) *Exception No. 1.* Individual dwelling units shall have a single main disconnecting means for each metered service except services rated 300 amperes or more shall be permitted to have 2 service disconnecting means.

(b) *Exception No. 2.* Not more than 6 switches or 6 circuit breakers shall be permitted for additions to existing services installed prior to February 1, 1968.

(8) [NEC 230-79] RATING OF DISCONNECT. Substitute the following wording for NEC 230-79 (c):

(c) One-family and multi-family dwellings.

1. For one-family dwellings requiring more than three 2-wire branch circuits or having an area or more than 500 square feet (external dimensions), the service equipment shall have a rating of not less than 100 amperes, 3-wire or 4-wire.

2. For 2-family or multi-family dwellings, the service equipment shall have a rating of not less than 150 amperes, 3-wire or 4-wire. Service or feeder equipment for each dwelling unit of multi-occupancy buildings shall have a rating of not less than 50 amperes.

Exception. Service equipment having a rating of not less than 100 amperes, 3-wire or 4-wire, shall be permitted to be installed in an existing 2-family dwelling only where both of the following conditions are complied with:

1. The load computed in accordance with Article 220 does not exceed 80 amperes.
2. Specific written approval is granted by the municipal inspection department having jurisdiction.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 250 — GROUNDING

ILHR 16.17 [NEC 250-71] Bonding to other systems. This requirement is a department rule in addition to the requirements of NEC 250-71 (b):

This bonding shall not be done on or within a meter socket.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 280 — SURGE ARRESTERS

ILHR 16.18 [NEC 280-4] Surge arrester selection. Substitute the following wording for NEC 280-4:

(a) **ON CIRCUITS OF LESS THAN 1000 VOLTS.** The rating of the surge arrester shall be equal to or greater than the nominal phase-to-ground power frequency voltage available at the point of application.

(b) **ON CIRCUITS OF 1 kV AND OVER.** The rating of the surge arrester shall be not less than 125 percent of the nominal phase-to-ground voltage available at the point of application.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 300 — WIRING METHODS

ILHR 16.19 [NEC 300] Electrical requirements for septic systems. This is a department rule in addition to the requirements of NEC 300:

(1) **WIRING METHODS.** All septic pumps shall comply with the approved wiring methods as specified in NEC 300.

(a) Septic pumps shall be supplied by a separate electrical circuit.

(b) Alarm wiring shall not be connected to the pump circuit.

(2) **DISCONNECTING MEANS.** Disconnecting means shall be installed outside of the pump chamber to disconnect the pump and alarm circuit wiring.

(3) **GROUND-FAULT CIRCUIT PROTECTION.** A receptacle located at the pump chamber that has a pump or alarm connected to it will not require a ground-fault circuit protection.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

Register, October, 1981, No. 310

ILHR 16

ARTICLE 310 — CONDUCTORS FOR GENERAL WIRING

ILHR 16.20 [NEC 310-15] Ampacity. This exception is a department rule in addition to the exceptions specified in Note 8 to tables 310-16 through 310-19.

The derating factors shown above shall not apply to branch circuits supplying an individual dwelling unit.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 336 — NON-METALLIC-SHEATHED CABLE

ILHR 16.21 [NEC 336-3] Uses permitted or not permitted. This is a department informational note to be used under NEC 336-3:

Note: For the purpose of this section, floors will be considered stories as specified in chs. Ind 60-64, Wis. Adm. Code.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 348 — ELECTRICAL METALLIC TUBING

ILHR 16.22 [NEC 348-1] Use. This is a department rule in addition to the requirements of NEC 348-1:

Electrical metallic tubing shall not be used in concrete slabs or floors poured on earth, nor in exterior concrete walls below grade.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 400 — FLEXIBLE CORDS AND CABLES

ILHR 16.23 [NEC 400-8] Uses not permitted. This is a department rule in addition to the requirements in NEC 400-8:

Above false ceilings.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 445 — GENERATORS

ILHR 16.24 [NEC 445] Supplemental generators. This is a department rule in addition to the requirements in NEC 445:

Generators used to supplement a normal power source and operated in parallel with a normal power source shall have a positive automatic means of separating from the normal power source in the event that the normal power source becomes de-energized for any reason.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS

ILHR 16.25 [NEC 450] Transformers and transformer vaults.
(1) [NEC 450] HIGH VOLTAGE SWITCH INTERLOCKS. This is a department rule in addition to the requirements in NEC 450:

Register, October, 1981, No. 310

Doors or covers providing access to exposed high voltage parts in pad-mounted or metal-enclosed transformers shall be interlocked with the high voltage switch, as required in s. ILHR 16.33.

(2) [NEC 450-23] HIGH FIRE POINT LIQUID-INSULATED TRANSFORMERS. Transformers insulated with a listed liquid having a fire point not less than 300°C are permitted to be installed indoors without vaults if provided with a liquid confinement area and protected by an automatic fire extinguishing system. Such transformers when installed indoors and rated over 35,000 volts shall be installed in a vault complying with Part C of NEC Article 450 — Transformers and Vaults. Transformers installed outdoors shall comply with NEC 450-27.

(3) [NEC 450-41] LOCATION. Substitute the following wording for NEC 450-41:

Vaults containing oil-insulated transformers shall be located where they can be ventilated to the outside air without using flues or ducts, except where special permission is granted.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 518 — PLACES OF ASSEMBLY

ILHR 16.26 [NEC 518-3] Wiring methods. (1) [NEC 518-3] WIRING METHODS. NEC 518-3, Exception No. 1 does not apply in Wisconsin.

(2) OCCUPANCY CLASSIFICATION. This is a department rule in addition to the NEC 518-3 and the omission in sub. (1):

The wiring methods required by this section shall apply to the entire area within each assembly hall occupancy classification as specified in ch. Ind 55, Wis. Adm. Code.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 547 — AGRICULTURAL BUILDINGS

ILHR 16.27 [NEC 547-7] Grounding. Substitute the following wording for NEC 547-7:

Grounding and bonding shall comply with Article 250.

Note 1: Running the equipment grounding conductor in the same raceway, cable or cord may reduce objectionable stray voltages and currents. Requirements for equipment grounding conductors are contained in NEC 250-67 (b).

Note 2: Metallic parts should be bonded together as necessary to reduce equipment to ground potentials to acceptable levels in milking parlors, stalls, pens or other similar livestock holding areas.

Piping, rails, feeders, stanchions and all other fixed metal fittings or structures within and attached to the livestock area should be bonded together as necessary to obtain the acceptable level.

It is recommended that a wire mesh effectively grounded and bonded to the equipment specified in this section be installed in the floor of milking parlors, stalls, pens or other similar livestock holding areas to maintain the same potential throughout the area.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

Register, October, 1981, No. 310

ILHR 16

ARTICLE 600 — ELECTRIC SIGNS AND OUTLINE LIGHTING

ILHR 16.28 [NEC 600-4] Listing required. Section NEC 600-4 does not apply in Wisconsin.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS AND MOVING WALKS

ILHR 16.29 [NEC 620-1 through 620-101] Elevators. This is a department informational note to be used in addition to the requirements of NEC 620-1 through 620-101:

Note: See Wis. Adm. Code, Elevator, ch. Ind 4.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 680 — SWIMMING POOLS, FOUNTAINS, AND SIMILAR INSTALLATIONS

ILHR 16.30 [NEC 680-8] Overhead conductor clearances. Substitute the following wording for NEC 680-8, Exception No. 1:

Structures listed in (1), (2) and (3) above shall be permitted under utility-owned-operated-maintained supply lines or service drops where such installations provide the clearances specified in the Wis. Adm. Code, Electrical, Volume 1.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 700 — EMERGENCY SYSTEMS

ILHR 16.31 [NEC 700] Emergency systems. (a) [NEC 700-9] WIRING, EMERGENCY SYSTEM. (a) Substitute the following wording for NEC 700-9, introductory paragraph:

Wiring from emergency source or emergency source distribution over-current protection to emergency loads shall be kept entirely independent of all other wiring and equipment and shall not enter the same raceway, box or cabinet with other wiring.

(b) This exception is a department rule in addition to the exceptions listed in NEC 700-9:

Exception 6: Emergency circuit wiring shall be in approved raceways.

(c) Substitute the following wording for NEC 700-12 (b) (3):

Prime movers shall not be solely dependent upon a public utility gas system for their fuel supply or municipal water supply for their cooling systems for occupancies covered by NEC Article 517, parts D and E. Means shall be provided for automatically transferring from one fuel to another where dual fuel supplies are used.

(2) [NEC 700-16] EMERGENCY ILLUMINATION. Substitute the following wording for NEC 700-16:

(a) Emergency illumination shall include all required exit lights and emergency lighting required by the Illumination Code, ch. Ind 19, Part G, Wis. Adm. Code. When standby emergency power is required by s.

Register, October, 1981, No. 310

ILHR 16.32, the required exit lights and emergency lighting shall be supplied from the standby source, except required exit lights in occupancies not requiring standby emergency power under s. ILHR 16.32 shall be permitted to be supplied from a separate switch or circuit breaker in a branch circuit panelboard, under the following conditions:

1. The exit lights are supplied from separate branch circuits not supplying other lights or equipment.
2. The exit-light wiring shall comply with s. ILHR 16.31 (1) from the point where it leaves the branch circuit panelboard.
3. Armored cable shall be permitted to be used where it can be fished in hollow spaces of walls or partitions in existing apartments or rooming houses not over 3 stories in height.

Note: Required intensities of emergency lighting are specified in the Illumination Code, chapter Ind 19, Wis. Adm. Code.

(b) Emergency lighting systems shall be so designed and installed that the failure of any individual lighting element, such as the burning out of a light bulb, cannot leave any space in total darkness.

(c) Smoke detectors are permitted to be connected to exit light circuits providing the detectors are wired with approved raceways.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.32 Standby emergency power. These are department rules in addition to NEC 700:

(1) **WHERE REQUIRED.** Standby emergency power of a type recognized by subsection NEC 700-12 (a), (b) or (f) shall be provided as a source of supply for required exit lights, emergency lighting or power in occupancies where people are housed, assembled, confined or congregated with a capacity or area equal to or greater than column B of Table 16.32.

(2) **CAPACITY OF ASSEMBLY HALLS.** The capacity of assembly hall type occupancies shall be based upon the entire area within each assembly hall occupancy separation as specified in ch. Ind 55, Wis. Adm. Code. This area may include one or more rooms or floors.

TABLE 16.32
OCCUPANCIES REQUIRING STANDBY EMERGENCY POWER

COLUMN A Occupancy	COLUMN B Calculated Capacity or Area
1. Apartment buildings.....	50 bedrooms, including efficiency units
2. Arenas.....	800 square feet (Use seated space only.)
3. Art galleries.....	20,000 square feet
4. Assembly halls such as church dining rooms, fellowship halls, dance halls, banquet halls, dining rooms, restaurants, taverns, night clubs, school multi-purpose rooms and similar occupancies.....	2,000 square feet
5. Assembly halls with stage.....	1,400 square feet
6. Auditoriums.....	1,400 square feet
7. Banks.....	30,000 square feet
8. Bowling alleys.....	200 persons based on 5 persons per alley plus number of spectator seats and 10 square feet per person for bar and dining areas
9. Centers for developmentally disabled.....	20 inmate beds
10. Children's homes.....	20 beds
11. Community-based residential facilities.....	20 beds
12. Convents.....	200 beds
13. Dormitories including those used in detention schools.....	200 beds
14. Exhibition buildings.....	20,000 square feet
15. Factories.....	30,000 square feet
16. Field houses.....	800 square feet (Use seated space only.)
17. Gymnasiums.....	200 persons based on 6 square feet per person for seated space and 15 square feet per person for unseated space
18. Hospitals.....	20 patient beds
19. Hotels.....	200 rooms
20. Jails.....	20 inmate beds
21. Lecture halls.....	1,400 square feet
22. Libraries.....	200 persons based on 20 square feet per person for reading rooms and 100 square feet per person for balance
23. Lodge halls.....	200 persons based on 6 square feet per person for seated space and 15 square feet per person for unseated space
24. Motels.....	100 rooms
25. Museums.....	20,000 square feet
26. Nursing homes.....	20 patient beds
27. Office buildings.....	30,000 square feet
28. Rooming houses.....	200 rooms
29. Skating rinks.....	3,000 square feet
30. Stores.....	200 persons based on 30 square feet per person for first floor and 60 square feet per person for second floor and above
31. Swimming pools (indoor).....	450 square feet
32. Theaters and theater lobbies.....	1,400 square feet (Theater and lobby must be combined in determining total area)
33. Warehouses.....	120,000 square feet

Note: The square foot figures noted in Column B are based on net area which would include internal room and corridor areas. The area occupied by toilets, stairwells, elevator shafts, janitor's closets, boiler and equipment rooms, and similar areas, need not be included in calculating capacity. Areas within rooms occupied by furniture, machinery or display

counters must be included. The area occupied by a bar or serving counter, such as is found in a tavern, restaurant or drugstore, and the area behind them where employes work, need not be included.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 710 — OVER 600 VOLTS, NOMINAL GENERAL

ILHR 16.33 [NEC 710-24] Metal-enclosed power switch gear and industrial control assemblies. Substitute the following wording for NEC 710-24 (f) (1):

Doors which would provide nonqualified persons access to high voltage energized parts shall be locked. In addition, such doors shall be interlocked with the high voltage switch to prevent the door from being opened unless the switch is in its isolating position. If the switch is in the same compartment, any exposed parts which remain energized upon opening the switch shall be a minimum of 6 feet above the floor and shall be properly guarded.

Exception 1. Interlocks shall not be required if a qualified person is on the premises during normal hours of operation.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 760 — FIRE PROTECTIVE SIGNALING SYSTEMS

ILHR 16.34 Required fire alarm systems. These are rules of the department in addition to NEC 760:

(1) **FIRE ALARM SYSTEMS.** Fire alarm systems required by Wis. Adm. Code chs. Ind 50-64, Building and Heating, Ventilating and Air Conditioning, shall comply with Article 760 except as modified by s. ILHR 16.34.

(2) **WIRING OF REQUIRED FIRE ALARMS.** All electrical wiring in connection with required fire alarm systems, including accessory devices such as detectors, shall be installed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, flexible metal conduit or surface metal raceway. Accessory devices such as detectors or devices used to monitor the system shall not be required to be installed in metal raceway, providing trouble on the accessory circuits does not affect the required fire alarm system.

(a) *Exception 1.* Armored cable shall be permitted to be used where it can be fished in hollow spaces of walls or partitions in existing apartment or rooming houses not over 3 stories in height.

(b) *Exception 2.* Any wiring method recognized by Article 760 shall be permitted in buildings used for other purposes prior to occupancy as a day care center, as provided in s. Ind 60.36 (1) (a), Wis. Adm. Code.

(3) Required fire alarm systems are considered emergency wiring and shall comply with s. ILHR 16.31 (1).

(4) Required fire alarm systems shall be supplied from an emergency source recognized by NEC 700-12.

Register, October, 1981, No. 310

ILHR 16

(a) *Exception.* Where s. ILHR 16.32 requires standby emergency power, required fire alarm systems shall be supplied from an approved standby emergency source.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ARTICLE 800 — COMMUNICATION CIRCUITS

ILHR 16.35 [NEC 800-21] Underground circuits entering buildings. Substitute the following wording for NEC 800-21 (a):

(a) **WITH ELECTRIC LIGHT OR POWER CONDUCTORS.** See Wis. Adm. Code, Electrical, Volume 1.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.

ILHR 16.36 Electric fences. These are department rules in addition to NEC-1981:

(1) **ELECTRIC FENCE CONTROLLERS.** (a) Electric fence controllers shall be of a type listed by a nationally recognized testing laboratory.

Note: The department recognizes UL 69 — Electric Fence Controllers as acceptable standards that satisfy the requirements of s. ILHR 16.36 (1).

(b) Electric fence controllers shall be installed or used in the exact manner and for the exact purpose indicated by the manufacturer's instructions, markings, listings or labels.

(2) **GROUNDING.** Electric fence controllers shall be grounded as specified in the NEC, Article 250, except where stray voltages in dairy barns or milking parlors become a problem, the use of a single made electrode shall be permitted.

History: Cr. Register, October, 1981, No. 310, eff. 11-1-81.