

Chapter ILHR 16

ELECTRICAL CODE VOLUME 2

PURPOSE AND SCOPE

- ILHR 16.001 Purpose (p. 2)
 ILHR 16.002 Scope (p. 2)

APPLICATION, ENFORCEMENT AND PETITION FOR VARIANCE

- ILHR 16.01 Application of rules (p. 3)
 ILHR 16.02 Enforcement (p. 3)
 ILHR 16.03 Petition for variance (p. 4)

GENERAL REQUIREMENTS

- ILHR 16.04 Construction and operation (p. 4)
 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. 5)

CHANGES, ADDITIONS OR OMISSIONS TO NEC-1984

- ILHR 16.08 Changes, additions or omissions to NEC-1984 (p. 5)

ARTICLE 90 — INTRODUCTION

- ILHR 16.09 [NEC 90] Purpose, scope and enforcement (p. 5)

ARTICLE 100 — DEFINITIONS

- ILHR 16.10 [NEC 100] Definitions (p. 6)

ARTICLE 110 — GENERAL

- ILHR 16.11 [NEC 110-3] Installation and use (p. 6)

ARTICLE 210 — BRANCH CIRCUITS

- ILHR 16.12 [NEC 210-8] Ground-fault protection for personnel (p. 6)
 ILHR 16.13 [NEC 210-52] Receptacle outlets required (p. 6)

ARTICLE 220 — BRANCH CIRCUIT AND FEEDER CALCULATIONS

- ILHR 16.14 [NEC 220-3] Branch circuits required (p. 7)

ARTICLE 225 — OUTSIDE BRANCH CIRCUITS AND FEEDERS

- ILHR 16.15 [NEC 225] Outside branch circuits and feeders (p. 7)

ARTICLE 230 — SERVICES

- ILHR 16.16 [NEC 230] Services (p. 7)

ARTICLE 250 — GROUNDING

- ILHR 16.17 [NEC 250-71] Bonding to other systems (p. 10)

ARTICLE 280 — SURGE ARRESTERS

- ILHR 16.18 [NEC 280-4] Surge arrester selection (p. 10)

ARTICLE 300 — WIRING METHODS

- ILHR 16.19 [NEC 300] Electrical requirements for septic systems (p. 10)

ARTICLE 310 — CONDUCTORS FOR GENERAL WIRING

- ILHR 16.20 [NEC 310-15] Ampacity (p. 11)

ARTICLE 331 — ELECTRICAL NONMETALLIC TUBING

- ILHR 16.201 [NEC 331-3] Uses permitted (p. 12)

ARTICLE 336 — NON-METALLIC — SHEATHED CABLE

- ILHR 16.21 [NEC 336-3] Uses permitted or not permitted (p. 12)

ARTICLE 348 — ELECTRICAL METALLIC TUBING

- ILHR 16.22 [NEC 348-1] Use (p. 12)

ARTICLE 370 — OUTLET, DEVICE, PULL AND JUNCTION BOXES, CONDUIT BODIES AND FITTINGS

- ILHR 16.221 [NEC 370-7] Conductors entering boxes, conduit bodies, or fittings (p. 12)

ARTICLE 373 — CABINETS AND CUTOUT BOXES

- ILHR 16.222 [NEC 373-5] Conductors entering cabinets or cutout boxes (p. 12)

ARTICLE 400 — FLEXIBLE CORDS AND CABLES

- ILHR 16.23 [NEC 400-8] Uses not permitted (p. 13)

ARTICLE 410 — LIGHTING FIXTURES

- ILHR 16.231 [NEC 410-65] Recessed incandescent fixtures (p. 13)

ARTICLE 445 — GENERATORS

- ILHR 16.24 [NEC 445] Supplemental generators (p. 13)

ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS

- ILHR 16.25 [NEC 450] Transformers and transformer vaults (p. 13)

ARTICLE 514 — GASOLINE DISPENSING AND SERVICE STATIONS

- ILHR 16.251 [NEC 514-8] Underground wiring (p. 14)

ARTICLE 518 — PLACES OF ASSEMBLY

- ILHR 16.26 [NEC 518-3] Wiring methods (p. 14)

ARTICLE 547 — AGRICULTURAL BUILDINGS

- ILHR 16.27 [NEC 547-7] Grounding (p. 14)

ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS AND MOVING WALKS

- ILHR 16.29 [NEC 620-1 through 620-101] Elevators (p. 15)

ILHR 16

ARTICLE 680 — SWIMMING POOLS, FOUNTAINS AND SIMILAR INSTALLATIONS

ILHR 16.30 [NEC 680-8] Overhead conductor clearances (p. 15)

ILHR 16.301 [NEC 680-41] Indoor installations (p. 15)

ARTICLE 700 — EMERGENCY SYSTEMS

ILHR 16.31 [NEC 700] Emergency systems (p. 16)

ILHR 16.32 Standby emergency power (p. 17)

ARTICLE 701 — LEGALLY REQUIRED STANDBY SYSTEMS

ILHR 16.321 [NEC 701-7] Transfer equipment (p. 19)

ILHR 16.322 Legally required standby systems (p. 19)

ARTICLE 710 — OVER 600 VOLTS, NOMINAL GENERAL

ILHR 16.33 [NEC 710-24] Metal-enclosed power switch gear and industrial control assemblies (p. 19)

ARTICLE 760 — FIRE PROTECTIVE SIGNALING SYSTEMS

ILHR 16.34 Required fire alarm systems (p. 19)

ARTICLE 800 — COMMUNICATION CIRCUITS

ILHR 16.35 [NEC 800-21] Underground circuits entering buildings (p. 20)

ILHR 16.36 Electric fences (p. 20)

Not rec'd ? →

PURPOSE AND SCOPE

ILHR 16.001 Purpose. (1) **PRACTICAL SAFEGUARDING.** Pursuant to ss. 101.02 (1), 101.63 (1), (2), 101.73 (1), (2) and 101.865, Stats., the purpose of this chapter 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 this chapter. This occurs because initial wiring did not provide for increases in use of the electricity. An initial adequate installation and reasonable provisions for system changes will provide for future increases in the use of electricity.

(2) **CODE INTENTION.** This chapter is not intended as a design specification or an instruction manual.

Note: Volume 1 of the Electrical Code is found in ch. PSC 114.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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; and

(d) Installations of optical fiber cable.

(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, metering or load management; 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.

1. This chapter covers all premises' wiring or wiring other than utility owned metering or load management equipment, on the load side of the service point of buildings, structures, or any other premises not owned or leased by the utility.

2. This chapter covers installations in buildings used by the utility for purposes other than listed in this sub., 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; and

(e) Installations under the exclusive control of electric utilities or municipal electric departments for the purpose of street or area lighting, where such installations comply with the requirements of ch. PSC 114, Electrical Code, Vol. 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

APPLICATION, ENFORCEMENT AND PETITION FOR VARIANCE

ILHR 16.01 Application of rules. (1) **TYPES OF INSTALLATIONS.** The provisions of this chapter 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 this chapter where 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.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.02 Enforcement. (1) **DEPARTMENT ENFORCEMENT.** The department shall have the responsibility for interpreting this chapter, approving equipment and materials and granting special permission as specified in this chapter.

(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

ILHR 16

service commission has the responsibility for issuance and administration of Vol. 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.03 Petition for variance. (1) **PROCEDURE.** The department shall consider and may grant a variance to an administrative rule upon receipt of a fee and a completed petition for variance form from the owner, provided an equivalent degree of safety or health is established in the petition for variance which meets the intent of the rule requested to be modified. The department may impose specific conditions in a petition for variance 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.

(2) **PETITION PROCESSING TIME.** Except for priority petitions, the department shall review and make a determination on a petition for variance within 30 business days of receipt of all calculations, documents and fees required to complete the review. The department shall process priority petitions within 10 business days.

Note: Copies of the petition for variance form (SB-8) are available from the Division of Safety and Buildings, P.O. Box 7969, Madison, Wisconsin 53707.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84; renum. to be (1) and cr. (2), Register, May, 1985, No. 353, eff. 6-1-85.

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 hazards to life and property. All electrical installations shall conform to the NEC-1984, incorporated by reference in this code, and the requirements specified in this code.

(2) **INSTALLATIONS OVER 600 VOLTS.** Installations over 600 volts shall, in addition to the requirements of this chapter, comply with ch. PSC 114, Electrical Code, Volume 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.05 Inspection and maintenance. All electrical installations and equipment shall be cleaned and inspected at intervals as experience has shown to be necessary. Any equipment or electrical installation 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 shall be made by qualified persons only.

Note: See ch. PSC 114, Electrical Code, Volume 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.06 Use of approved materials and construction methods. (1) **MATERIALS.** Materials which do not comply with the requirements of this chapter shall not be used unless approved by the department. The department shall 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 chapter.

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

(3) **NEW PRODUCTS, CONSTRUCTIONS OR MATERIALS.** The NEC-1984 may require new products, constructions or materials which may not be available at the time this chapter is adopted. In such event, the depart-

Next page is numbered 5

ment may permit the use of the products, constructions or materials which comply with the NEC-1981.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ADOPTION OF STANDARDS

ILHR 16.07 Adoption of standards by reference. (1) **CONSENT TO INCORPORATE.** (a) Pursuant to s. 227.025, Stats., the Attorney General and the Revisor of Statutes have consented to the incorporation by reference of the National Electrical Code-1984 (NEC-1984), subject to those changes, additions, or omissions specified in s. ILHR 16.08.

(b) The National Electrical Code - 1984 (NEC-1984), subject to the changes, additions or omissions specified in ss. ILHR 16.08 to ILHR 16.36 is hereby incorporated by reference into ch. ILHR 16.

(2) **INTERIM AMENDMENTS.** Interim amendments of the NEC-1984 will have no effect in the state, until such time as this chapter is correspondingly revised to reflect these changes.

(3) **AVAILABILITY OF STANDARDS.** Copies of the National Electrical Code-1984 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 GOODS.** 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, 1984, No. 346, eff. 11-1-84.

CHANGES, ADDITIONS OR OMISSIONS TO NEC-1984

ILHR 16.08 Changes, additions or omissions to NEC-1984. Changes, additions or omissions to the NEC-1984 are specified in ss. ILHR 16.09 to 16.36, and are rules of the department and not requirements of the NEC-1984.

Note: The referenced NEC-1984 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, 1984, No. 346, eff. 11-1-84.

ARTICLE 90 - INTRODUCTION

ILHR 16.09 [NEC 90] Purpose, scope and enforcement. The following subsections of the NEC-1984 do not apply in Wisconsin.

(1) [NEC 90-1.] Purpose.

(2) [NEC 90-2.] Scope.

(3) [NEC 90-4.] Enforcement.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 100 - DEFINITIONS

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

(1) "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. ILHR 51.04 for fire-resistive standards.

(2) "Department" means the department of industry, labor and human relations.

(3) "Special permission" means the written consent of the administrator of the division of safety and buildings, department of industry, labor and human relations, or his designee.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 110 - GENERAL

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

Except as otherwise permitted in this chapter and NEC-1984, 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, 1984, No. 346, eff. 11-1-84.

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) (2):

Exception 3. Receptacles specified in s. ILHR 16.19 (4).

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.13 [NEC 210-52] Receptacle outlets required. (1) [NEC 210-52 (a)] **GENERAL PROVISIONS.** These are department rules in addition to the requirements in NEC 210-52 (a):

(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.

(b) Fixed railings and planters shall 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 accessible at grade level installed outdoors at each dwelling unit.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 220 - BRANCH CIRCUIT AND FEEDER
CALCULATIONS

ILHR 16.14 [NEC 220-3] Branch circuits required. This requirement is a department rule in addition to the requirements of NEC 220-3:

(e) Where an air conditioner sleeve is provided in a building wall, a receptacle outlet shall be located within 4 feet of the sleeve. 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 NEC 210-52 (a).

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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:

Clearance of conductors of over 600 volts shall comply with the ch. PSC 114, Electrical Code, 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 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 ch. PSC 114, Electrical Code, Volume 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 (1).

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.

(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. ILHR 57, a separate service drop or lateral shall be permitted for each two attached units.

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

Clearances of service drop conductors shall comply with the ch. PSC 114, Electrical Code, Volume 1.

(b) This is a department rule in addition to the requirements of NEC 230-24:

The clearances required above roofs shall apply to mansards or similar building projections.

(3) [NEC 230-42] SIZE AND RATING. (a) Substitute the following wording for NEC 230-42 (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. Where the total rating of all service entrance conductors is 150 amperes or larger, each dwelling unit shall have a minimum of 50 amperes, 3-wire service or feeder.

(b) This is a department rule in addition to the exceptions listed in NEC 230-42 (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 NEC 220 does not exceed 80 amperes.

2. Specific written approval is granted by the municipal inspection department having jurisdiction.

(4) [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.

Note: See NEC 230-70 (a) for location of service disconnecting means.

(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.

(5) [NEC 230-45] SEPARATE ENCLOSURES. Substitute the following wording for NEC 230-45:

Where two to six service disconnecting means, in separate enclosures and grouped at one location, supply separate loads from one service drop or lateral, one set of service-entrance conductors shall be permitted to supply each or several such equipment enclosures.

(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. (a) Substitute the following wording for NEC 230-71 (a):

(a) General. The service disconnecting means for each service permitted by NEC 230-2, or for each set of service-entrance conductors permitted by NEC 230-40, Exception No. 1, shall consist of not more than six switches or six circuit breakers mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard. There shall be no more than six disconnects per service grouped in any one location.

(b) These exceptions are department rules in addition to the requirements in NEC 230-71 (a):

1. *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.

2. *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 of 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. Where the combined rating of all service disconnecting means is 150 amperes or larger, the service or feeder equipment rating for each dwelling unit 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:

a. The load computed in accordance with NEC 220 does not exceed 80 amperes.

ILHR 16

b. Specific written approval is granted by the municipal inspection department having jurisdiction.

(9) [NEC 230-83] **TRANSFER EQUIPMENT.** Substitute the following wording for NEC 230-83 Exception No. 1 and No. 2:

Exception No. 1: Where suitable automatic equipment is utilized, two or more sources shall be permitted to be connected in parallel through transfer equipment.

Exception No. 2: Where parallel operation is used and suitable automatic control equipment is provided.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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):

Bonding to other systems shall not be done on or within a meter socket.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 duty cycle 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 and the maximum continuous operating voltage (MCOV) rating of the arrester shall be greater than the maximum continuous phase-to-ground voltage available at the point of application.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 effluent pump circuit wiring shall comply with the approved wiring methods as specified in NEC 300 and the following requirements:

(a) Effluent pumps shall be supplied by a separate branch circuit supplying no other loads;

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

(c) All aboveground cables and flexible cords shall be enclosed to protect against physical damage; and

(d) The neutral conductor shall not be common to both alarm and pump circuits.

Note: This prohibits use of a multi-wire branch circuit to supply both the alarm and pump.

(2) CONDUCTOR CONNECTIONS. A wiring enclosure for alarm and pump circuit connections shall be provided outside of and within 3 feet of the pump chamber.

(a) Circuit terminations, connections and splices shall be prohibited within the pump chamber except by approved direct burial splicing methods.

(b) Openings into the pump chamber for circuit wiring shall be sealed or plugged to prevent passage of gas.

(3) DISCONNECTING MEANS. Disconnecting means shall be installed outside of and within 3 feet of the pump chamber to disconnect the alarm and pump circuit wiring.

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

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 310 - CONDUCTORS FOR GENERAL WIRING

ILHR 16.20 [NEC 310-15] Ampacity. (1) These are department requirements in addition to the requirements of Note 3 to NEC Tables 310-16 through 310-19:

(a) The reduced conductor size as permitted in Note 3 is also applicable for feeder conductors of multi-family dwellings where the feeder conductor for each dwelling unit carries the total current supplied by a single service disconnecting means.

(b) Where Note 3 is utilized all conductors, including the neutral, shall be of the same size. When installed in a raceway, the raceway trade size shall be a minimum of one inch in diameter.

Exception: Multi-conductor service-entrance cable assemblies.

(2) This exception is a department rule in addition to the exceptions specified in Note 8 to NEC Tables 310-16 through 310-19:

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

(3) Substitute the following wording for NEC 310-15 (a):

Applications covered by tables. Ampacities for conductors rated 0-2000 volts shall be as specified in Tables 310-16 through 310-19 and their accompanying notes. The ampacity for Types V, AVA, AVB, and AVL conductors rated 2001-5000 volts shall be the same as for those conductor types rated 0-2000 volts. The ampacities for solid dielectric insulated conductors rated 2001 to 35000 volts shall be as specified in Tables 310-69 through 310-84 and their accompanying notes.

(4) The following NEC tables and figures do not apply in Wisconsin:

(a) NEC Tables 310-20 through 310-30.

ILHR 16

(b) NEC Figure 310-1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 331 - ELECTRICAL NONMETALLIC TUBING

ILHR 16.201 [NEC 331-3] Uses permitted. This is a department informational note to be used under NEC 331-3:

Note: For the purpose of this section, floors will be considered stories as specified in chs. ILHR 50 to 64.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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. ILHR 50 to 64.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 direct contact with earth, in concrete slabs or floors poured on earth, or in exterior concrete walls below grade.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 370 - OUTLET, DEVICE, PULL AND JUNCTION BOXES, CONDUIT BODIES AND FITTINGS

ILHR 16.221 [NEC 370-7] Conductors entering boxes, conduit bodies, or fittings. This is a department exception in addition to the requirements of NEC 370-7:

No cable shall be required to be secured to the box or cabinet where it is enclosed within a raceway for mechanical protection providing the cable is secured within 12 inches of where it leaves the raceway. The raceway shall be at least 12 inches in length and sealed to prevent entrance of foreign materials.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 373 - CABINETS AND CUTOUT BOXES

ILHR 16.222 [NEC 373-5] Conductors entering cabinets or cutout boxes. This is a department exception in addition to the requirements of NEC 373-5 (c):

No cable shall be required to be secured to the box or cabinet where it is enclosed within a raceway for mechanical protection providing the cable is secured within 12 inches of where it leaves the raceway. The raceway shall be at least 12 inches in length and sealed to prevent entrance of foreign materials.

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History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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:

Flexible cords and cables shall not be used above false ceilings.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 410 - LIGHTING FIXTURES

ILHR 16.231 [NEC 410-65] Recessed incandescent fixtures. This is a department exception in addition to the exceptions of NEC 410-65 (c):

Exception No. 3. Recessed incandescent fixtures identified for use and installation only in removeable suspended ceilings. Suspended ceilings in this exception are defined as suspended grids with elements such as acoustical tiles or lay-in panels that are not fastened in place and are not part of the building structure.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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, 1984, No. 346, eff. 11-1-84.

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:

Hinged 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 450-41] 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, 1984, No. 346, eff. 11-1-84.

ARTICLE 514 - GASOLINE DISPENSING AND SERVICE STATIONS

ILHR 16.251 [NEC 514-8]. Underground wiring. NEC 514-8 Exception No. 2 does not apply in Wisconsin.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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. ILHR 55.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 547 - AGRICULTURAL BUILDINGS

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

(1) GROUNDING AND BONDING. (a) Grounding and bonding shall comply with NEC 250.

Exception: The grounded circuit conductor (neutral) shall be permitted to be isolated from the equipment grounding conductor and grounding electrode in buildings containing livestock provided all of the following conditions are complied with:

1. An equipment grounding conductor is run with the circuit conductors supplying the building containing livestock. That portion of the equipment grounding conductor run underground shall be insulated or covered copper;

2. The equipment grounding conductor is used for grounding noncurrent-carrying equipment, interior metal piping systems and buildings or structural frames, and is bonded at the building containing livestock to a grounding electrode described in NEC 250 Part H; and

3. The equipment grounding conductor is bonded to the grounded circuit conductor (neutral) at its supply end.

(b) Noncurrent carrying metal parts of equipment, raceways and other enclosures where required to be grounded, shall be grounded by an equipment grounding conductor installed in accordance with NEC 250-57 (b).

(c) Piping, rails, feeders, stanchions and all other fixed metal fittings or structures in the animal containment areas shall be bonded to the building grounding electrode system.

(2) WIRE MESH. (a) Wire mesh shall be installed in the concrete floor of all animal containment areas and shall be provided with an exposed means for bonding to the building grounding electrode system.

(b) The person installing the equipment grounding conductor and electrode required by NEC 250 or sub. (1) (a) shall bond the electrical system ground to the exposed wire mesh bonding means required in sub. (2) (a).

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 ch. Ind 4, Elevator Code.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 NEC 680-8 shall be permitted under utility-owned-operated-maintained supply lines or service drops where such installations provide the clearances specified in ch. PSC 114, Electrical Code, Volume 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.301 [NEC 680-41] Indoor installations. (1) [NEC 680-41] INDOOR INSTALLATIONS. Substitute the following wording for NEC 680-41, introductory paragraph:

A spa, hot tub or hydromassage bathtub installed indoors shall conform to the requirements of this part and shall be connected by wiring methods of chapter 3.

(2) [NEC 680-41 (a)] RECEPTACLES. (a) Substitute the following wording for NEC 680-41 (a) (1), introductory paragraph:

Receptacles on the property shall be located at least 5 feet from the inside walls of the spa, hot tub or hydromassage bathtub.

(b) Substitute the following wording for NEC 680-41 (a) (3):

Receptacles that provide power for a spa, hot tub or hydromassage bathtub shall be ground-fault circuit-interrupter protected.

(3) [NEC 680-41 (c)] WALL SWITCHES. Substitute the following wording for NEC 680-41 (c), introductory paragraph:

Switches shall be located at least 5 feet, measured horizontally, from the inside walls of the spa, hot tub or hydromassage bathtub.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 700 - EMERGENCY SYSTEMS

ILHR 16.31 [NEC 700] Emergency systems. (1) [NEC 700-6] **TRANSFER EQUIPMENT.** Substitute the following wording for the second paragraph of NEC 700-6:

Means shall be permitted to isolate the transfer switch equipment. Where by-pass switches are used in conjunction with isolation switches, interlocks shall be provided to prevent any combination of switches from being closed which would result in parallel operation.

(2) [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 517, parts D and E. Means shall be provided for automatically transferring from one fuel to another where dual fuel supplies are used.

Note: S. ILHR 52.01 requires an on-premise fuel supply for high-rise buildings.

(3) [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. When standby emergency power is required by s. 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 sub. (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 ch. Ind 19, Illumination Code.

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

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

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 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 or confined with a capacity or area equal to or greater than those listed in column B of ILHR Table 16.32.

TABLE 16.32

OCCUPANCIES REQUIRING STANDBY
EMERGENCY POWER

<i>Column A</i> OCCUPANCY	<i>Column B</i> 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 and fellowship halls, dance halls, banquet halls, dining rooms, restaurants, taverns, night clubs, school multi-purpose rooms and simi- lar 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 per- son 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 per- son 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

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

(b) The square foot figures noted in Column B are based on net area which includes internal room and corridor areas. The area occupied by

toilets, stairwells, elevator shafts, janitor's closets, boiler and equipment rooms, and similar areas, are not included in calculating capacity. Areas within rooms occupied by furniture, machinery or display counters shall 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, are included.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ARTICLE 701 - LEGALLY REQUIRED STANDBY SYSTEMS

ILHR 16.321 [NEC 701-7] Transfer equipment. Substitute the following wording for the second paragraph of NEC 701-7:

Means shall be permitted to isolate the transfer switch equipment. Where by-pass switches are used in conjunction with isolation switches, interlocks shall be provided to prevent any combination of switches from being closed which would result in parallel operation.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.322 Legally required standby systems. Substitute the following wording for NEC 701-11 (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 517, parts D and E. Means shall be provided for automatically transferring from one fuel to another where dual fuel supplies are used.

Note: Section ILHR 52.01 requires an on-premise fuel supply for high-rise buildings.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 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 properly guarded.

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

Exception 2. Interlocks shall not be required where all high voltage energized parts are fully insulated.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 chs. ILHR 50 to 64, shall comply with NEC 760 except as modified by s. ILHR 16.34.

(2) WIRING OF REQUIRED FIRE ALARMS. (a) 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 are not required to be installed in metal raceway, providing trouble on the accessory circuits does not affect the required fire alarm system.

(b) *Exception.* 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.

(3) SEPARATE RACEWAY. Raceways for required fire alarm system wiring shall contain no other circuits.

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

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

(5) SMOKE DETECTION. Sections ILHR 56.03 and 57.16 require smoke detectors to be interconnected with required fire alarm systems.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

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 ch. PSC 114, Electrical Code, Volume 1.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.

ILHR 16.36 Electric fences. These are department rules in addition to NEC-1984:

(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). Copies are available from U.L. Laboratories, Inc., 333 Pfingsten Road, Northbrook, Illinois 60062.

(b) Electric fence controllers shall be installed and 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 250 except that where stray voltages in dairy barns or milking parlors create physical problems to the animals, the use of a single made electrode shall be permitted.

History: Cr. Register, October, 1984, No. 346, eff. 11-1-84.