

Chapter ILHR 16

ELECTRICAL CODE, VOLUME 2

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Note: Chapter ILHR 16 as it existed on October 31, 1984 was repealed and a new chapter ILHR 16 was created effective November 1, 1984. Chapter ILHR 16 as it existed on February 29, 1988 was repealed and a new chapter ILHR 16 was created effective March 1, 1988.

Subchapter I Administration and Enforcement

ILHR 16.001 Purpose. (1) PRACTICAL SAFEGUARDING. Pursuant to ss. 101.02 (1), 101.63 (1), 101.73 (1), 101.82 (1) 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 in-

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creases in use of the electricity. An adequate initial 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 as an instruction manual.

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

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.002 Scope. (1) **COVERED.** This chapter 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 buildings; 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.

(d) Installations of optical fiber cable.

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

(a) Installations in ships, watercraft other than floating buildings, 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 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.

(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.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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.** Installations existing on the effective date of this chapter may be required to be brought into compliance with this chapter by the department and within the time period determined by the department.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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 by the public service commission as part of the Wisconsin administrative code. The department has the responsibility for issuance and administration of Volume 2 as contained in this chapter, and the public service commission has the responsibility for issuance and administration of Volume 1 as contained in ch. PSC 114.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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 from which the variance is requested. 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 this chapter.

Note 1: 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.

Note 2: Section 101.02 (6), Stats., and ch. ILHR 3 outline the procedures for submitting petitions to the department and the department's procedures for hearing petitions.

Note 3: See ch. Ind 69 for fee requirements relating to petitions.

(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 of receipt of the required items.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

Subchapter II 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-1987, incorporated by reference in this chapter, and the requirements specified in this chapter.

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

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.06 Electrical inspection of public buildings and places of employment. Inspection of electrical construction relating to public buildings and places of employment shall comply with the requirements of ch. ILHR 17, Subch. II.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.07 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 by the following organizations, providing they do not conflict with the requirements of this chapter:

- (a) Underwriters Laboratories, Inc.;
- (b) Canadian Standards Association;
- (c) ETL Testing Laboratories, Inc.;
- (d) Applied Research Laboratories;
- (e) American Gas Association, for equipment tested under applicable ANSI or UL standards; and
- (f) Other nationally recognized testing laboratories approved by the department.

Note: In approving other testing laboratories, items that may be evaluated include qualifications of the staff, laboratory facilities, testing and follow-up procedures, and national recognition.

(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.

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(3) **NEW PRODUCTS, CONSTRUCTIONS OR MATERIALS.** The NEC-1987 may require new products, constructions or materials which may not be available at the time this chapter is adopted. In such event, the department may permit the use of the products, constructions or materials which comply with the NEC-1984.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.08 Adoption of standards by reference. (1) **CONSENT TO INCORPORATE.** (a) Pursuant to s. 227.21, Stats., the Attorney General and the Revisor of Statutes have consented to the incorporation by reference of the National Electrical Code-1987 (NEC-1987), subject to those changes, additions, or omissions specified in subch. III.

(b) The National Electrical Code-1987 (NEC-1987), subject to the changes, additions or omissions specified in subch. III is hereby incorporated by reference into this chapter.

(2) **INTERIM AMENDMENTS.** Interim amendments of the NEC-1987 will have no effect in this state until such time as this chapter is correspondingly revised to reflect those changes.

Note 1: Copies of the National Electrical Code-1987 can be obtained from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

Note 2: Copies of the National Electrical Code-1987 are on file in the offices of the department, the Secretary of State and the Revisor of Statutes.

Note 3: The Public Service Commission has similarly adopted the National Electrical Safety Code (NESC) with certain deletions, changes and additions which are found in Volume I, Wis. State Electrical Code, ch. PSC 114. Copies of ch. PSC 114 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.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

Subchapter III

Changes, Additions or Omissions To NEC-1987

ILHR 16.11 Changes, additions or omissions to NEC-1987. Changes, additions or omissions to the NEC-1987 are specified in this subchapter and are rules of the department and not requirements of the NEC-1987.

Note: The referenced NEC-1987 article or section number, located in brackets, will follow the ILHR designation and precede the text of the rule. Example: ILHR 16.14 [NEC 110-3].

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 90 - INTRODUCTION

ILHR 16.12 [NEC 90] Purpose, scope and enforcement. The following sections of the NEC-1987 do not apply in Wisconsin.

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

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 100 - DEFINITIONS

ILHR 16.13 [NEC 100] Definitions. The following are department definitions in addition to the definitions of NEC 100:

(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 department.

Note: Special permission is different from a petition for variance. The use of the special permission procedure is only allowed where specifically stated in this chapter or the National Electrical Code.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 110 - REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

ILHR 16.14 [NEC 110-3] Installation and use. Substitute the following wording for NEC 110-3 (b):

Except as otherwise permitted in this chapter and the NEC-1987, 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 210 - BRANCH CIRCUITS

ILHR 16.15 [NEC 210-7] Receptacles and cord connectors. This is a department rule in addition to the requirements of NEC 210-7:

Where receptacles are added to existing branch circuits not containing a grounding means, ground-fault circuit-interrupter protected receptacles may be used without connecting a grounding conductor to the grounding contact.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.16 [NEC 210-8] Ground-fault protection for personnel. (1) [NEC 210-8 (a) (3)] **OUTDOOR RECEPTACLES.** This is a department exception in addition to the requirements of NEC 210-8 (a) (3):

Exception. Receptacles specified in s. ILHR 16.23 (4) are not required to have ground-fault circuit-interrupter protection.

(2) [NEC 210-8 (a) (5)] **RECEPTACLES IN KITCHENS.** Substitute the following wording for NEC 210-8 (a) (5):

All 125-volt, single-phase, 15- and 20-ampere receptacles installed within 6 feet of the kitchen sink and connected to the small appliance Register, February, 1988, No. 386

branch circuits required by NEC 220-4 (b) (1) shall have ground-fault circuit-interrupter protection for personnel.

Note: The intent of this rule is to permit the exemption of receptacles which are located specifically for appliances such as refrigerators and freezers from ground-fault circuit-interrupter protection for personnel.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.17 [NEC 210-24] Branch-circuit requirements - summary. (1) COMMON AREA OUTLETS. This is a department rule in addition to the requirements of NEC 210-24:

Branch circuits supplying dwelling occupancies shall not supply public or common area outlets or load.

Note: Outlets intended to be used by individual occupants are not considered to be common area outlets.

(2) **CENTRAL ALARM CIRCUITS.** This is a department rule in addition to the requirements of NEC 210-24 Exception:

These branch circuits in multi-family dwellings shall not be supplied from a dwelling unit branch circuit panelboard.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.18 [NEC 210-52] Dwelling unit receptacle outlets. (1) [NEC 210-52 (a)] GENERAL PROVISIONS. These are department rules in addition to the requirements of 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 220 - BRANCH CIRCUIT AND FEEDER CALCULATIONS

ILHR 16.19 [NEC 220-4] Branch circuits required. This is a department rule in addition to the requirements of NEC 220-4:

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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 225 - OUTSIDE BRANCH CIRCUITS AND FEEDERS

ILHR 16.20 [NEC 225] Outside branch circuits and feeders. (1) [NEC 225-18] CLEARANCE FROM GROUND. (a) This is a department rule in addition to the requirements of NEC 225-18:

Open conductors of not over 600 volts nominal shall have a clearance of at least 27 feet over track rails of railroads.

(b) Substitute the following wording for the note to NEC 225-18:

For clearance of conductors of over 600 volts, see ch. PSC 114.

(2) [NEC 225-19] CLEARANCES FROM BUILDINGS FOR CONDUCTORS NOT IN EXCESS OF 600 VOLTS. (a) Substitute the following wording for NEC 225-19 (a) Exception No. 1:

Exception No. 1. Fully insulated conductors are permitted to have vertical or diagonal clearances of 8 feet or more.

(b) Substitute the following wording for the note to NEC 225-19:

See ch. PSC 114 regarding clearance of conductors of over 600 volts and for prohibition of constructing dwellings under or near overhead lines.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 230 - SERVICES

ILHR 16.21 [NEC 230] Services. (1) [NEC 230-2] NUMBER OF SERVICES. (a) Section NEC 230-2, second paragraph, does not apply in Wisconsin.

Note 1: See definition of building in s. ILHR 16.13 (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.

(b) Substitute the following wording for NEC 230-2, Exception No. 5:

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.

(c) This is a department exception in addition to the exceptions of NEC 230-2:

Exception No. 8. For rowhouse construction as defined in ch. ILHR 57, a separate service drop or lateral shall be permitted for each 2 attached units.

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

Clearances of service drop conductors shall comply with ch. PSC 114. 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):

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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 based on 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:

(a) Except as provided in par. (b), raceways containing service conductors or cables, or service-entrance cables not contained within a raceway, shall not extend longer than 8 feet into a building.

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

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

(5) [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.

(6) [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.

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

(a) One-family dwellings. For one-family dwellings requiring more than three 2-wire branch circuits or having an area of more than 500

square feet based on external dimensions, the service equipment shall have a rating of not less than 100 amperes, 3-wire or 4-wire.

(b) Two- or multi-family dwellings. Except as provided in par. (c), 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.

(c) 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 NEC 220 does not exceed 80 amperes.

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

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

(a) Exception No. 1. Where suitable automatic equipment is utilized, 2 or more sources shall be permitted to be connected in parallel through transfer equipment.

(b) Exception No. 2. Where parallel operation is used, suitable automatic control equipment shall be provided.

(9) [NEC 230-201] CLASSIFICATION OF SERVICE CONDUCTORS. Substitute the following wording for NEC 230-201:

(a) Service Point. In all cases the conductors connected to the load side of the service point shall be classified as service conductors and shall terminate in a service disconnecting means in accordance with NEC 230-205.

(b) Transformers. 1. Except as provided in subd. 2, where a transformer steps down the voltage from above 600 volts to 600 volts or less, the secondary conductors of the transformer shall also be classified as service conductors and shall supply service equipment meeting the requirements of NEC Article 230.

Note: Ground-fault protection of equipment may be required. See NEC 230-95.

2. The secondary conductors of transformers utilized only for control power associated with equipment operating in excess of 600 volts shall not be classified as service conductors.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 250 - GROUNDING

ILHR 16.22 [NEC 250-71] Bonding to other systems. This 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, February, 1988, No. 386, eff. 3-1-88.
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ARTICLE 300 - WIRING METHODS

ILHR 16.23 [NEC 300] Electrical requirements for septic systems. These are department rules 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, as follows:

(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.

Note: The disconnecting means is normally located within the wiring enclosure required by sub. (2).

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

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 310 - CONDUCTORS FOR GENERAL WIRING

ILHR 16.24 [NEC 310-15] Ampacity. (1) [NEC TABLES 310-16 THROUGH 310-31] **DWELLING SERVICES.** These are department rules in addition to the requirements of Note 3 to NEC Tables 310-16 through 310-31:

(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) When using Note 3 and the conductors are installed in a raceway, the raceway trade size shall be a minimum of one inch in diameter.

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(2) [NEC TABLES 310-16 THROUGH 310-31] AMPACITY ADJUSTMENT FACTORS. This exception is a department rule in addition to the exceptions specified in Note 8 (a) to NEC Tables 310-16 through 310-31:

Exception No. 5. The derating factors shown above do not apply to branch circuits supplying an individual dwelling unit.

(3) [NEC TABLES 310-25 THROUGH 310-31] OPTIONAL AMPACITY DETERMINATION. This is a department exception in addition to the requirements of NEC 310-15:

Exception. For conductor installation applications not covered by Tables 310-25 through 310-31 and their accompanying notes, or where application of these Tables and notes results in a conductor ampacity lower than specified in Table 310-16, conductor ampacity may be determined by Table 310-16 and its accompanying notes.

(4) [NEC TABLE 310-16] AMPACITIES OF CONDUCTORS. Substitute the following wording for the title of Table 310-16:

Table 310-16. Ampacities of Not More than Three Single Insulated Conductors, Rated 0 through 2000 Volts, in Raceway or Earth (Directly Buried) and Ampacities of Cable Types AC, NM, NMC, UF and SE.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 331 - ELECTRICAL NONMETALLIC TUBING

ILHR 16.25 [NEC 331-3] Uses permitted. This is a department informational note to be used under NEC 331-3 (4):

Note: Areas above suspended ceilings with panels designed to allow access are considered to be readily accessible, and would require the ceiling to have a 15-minute finish rating when electrical nonmetallic tubing is installed.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 336 - NONMETALLIC-SHEATHED CABLE

ILHR 16.26 [NEC 336-4] Uses not permitted. This is a department informational note to be used under NEC 336-4 (a) (1):

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

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 348 - ELECTRICAL METALLIC TUBING

ILHR 16.27 [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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 350 - FLEXIBLE METAL CONDUIT

ILHR 16.28 [NEC 350-3] Minimum size. Substitute the following wording for NEC 350-3 Exception No. 3:

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Exception No. 3. Flexible metal conduit of 3/8-inch nominal trade size shall be permitted in lengths not in excess of 6 feet.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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

ILHR 16.29 [NEC 370-7] Conductors entering boxes, conduit bodies, or fittings. This is a department exception in addition to the requirements of NEC 370-7 (b) and (c):

Exception. Cable shall not 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 373 - CABINETS AND CUTOUT BOXES

ILHR 16.30 [NEC 373-5] Conductors entering cabinets or cutout boxes. This is a department exception in addition to the requirements of NEC 373-5 (c):

Exception. Cable shall not 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 400 - FLEXIBLE CORDS AND CABLES

ILHR 16.31 [NEC 400-8] Uses not permitted. This is a department rule in addition to the requirements of NEC 400-8:

(1) **ABOVE SUSPENDED CEILINGS.** Except as provided in sub. (2), flexible cords and cables shall not be used above suspended ceilings.

(2) **EXCEPTION.** Listed ceiling, fixture and cord combinations, where the cord utilizes a special configuration attachment plug and is visible from the floor or normal standing surface below the unit, shall be permitted.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 410 - LIGHTING FIXTURES, LAMPHOLDERS, LAMPS, RECEPTACLES AND ROSETTES

ILHR 16.32 [NEC 410-8] Fixtures in clothes closets. This is a department rule in addition to the requirements of NEC 410-8 (a):

(1) **CLEARANCE MEASUREMENT.** The clearances between the fixture and the storage area shall be measured horizontally between the fixture and the vertical extension of the edge of a storage shelf or clothes hanging rod, whichever is closer.

(2) **WALL-MOUNTED FLUORESCENT FIXTURE.** A surface-mounted fluorescent fixture shall be permitted to be installed on the wall above the closet door, provided there is a 6-inch clearance between the fixture and storage area and the fixture is mounted above the level of any clothes hanging rod.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 430 - MOTORS, MOTOR CIRCUITS AND CONTROLLERS

ILHR 16.33 [NEC 430-142] Stationary motors. This is a department rule in addition to the requirements of NEC 430-142:

Unless specifically designed by the manufacturer to be fully insulated from ground, the frame of a motor of a water pump shall be grounded by an equipment grounding conductor or grounded in accordance with manufacturer's instructions. The equipment grounding conductor shall also be bonded to the metallic well casing.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 445 - GENERATORS

ILHR 16.34 [NEC 445] Supplemental generators. This is a department rule in addition to the requirements of 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 450 - TRANSFORMERS AND TRANSFORMER VAULTS

ILHR 16.35 [NEC 450] Transformers and transformer vaults. (1) [NEC 450] HIGH VOLTAGE SWITCH INTERLOCKS. This is a department rule in addition to the requirements of NEC 450:

Hinged doors 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 16.46.

(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, February, 1988, No. 386, eff. 3-1-88.
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ARTICLE 514 - GASOLINE DISPENSING AND SERVICE STATIONS

ILHR 16.36 [NEC 514-8] Underground wiring. NEC 514-8 Exception No. 2 does not apply in Wisconsin.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 518 - PLACES OF ASSEMBLY

ILHR 16.37 [NEC 518-4] Wiring methods. (1) [NEC 518-4] WIRING METHODS. NEC 518-4 Exception No. 1 does not apply in Wisconsin.

(2) OCCUPANCY CLASSIFICATION. This is a department rule in addition to the requirements of NEC 518-4 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 and to places of assembly in connection with ch. ILHR 56 occupancies.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 547 - AGRICULTURAL BUILDINGS

ILHR 16.38 [NEC 547-6] Motors. This is a department informational note to be used under NEC 547-6:

Note: See s. ILHR 16.33 for requirements relating to grounding of water pumps.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.39 [NEC 547-8] Grounding, bonding and equipotential plane. Substitute the following wording for NEC 547-8:

(1) GROUNDING AND BONDING. (a) Except as provided in par. (b), grounding and bonding shall comply with NEC Article 250.

Note: See NEC 250-21 for objectionable current over grounding conductors.

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

1. All buildings and premises wiring are under single management.
2. An equipment grounding conductor of the same size as the circuit conductors is run with the supply conductors.
3. Disconnecting means is provided at the distribution point for supply to those buildings.
4. The equipment grounding conductor is connected by an approved means to the grounded circuit conductor at the distribution point.
5. A grounding electrode, as required by NEC Article 250 Part H, is provided and connected to the equipment grounding conductor in each building disconnect required by NEC 230-84.

(2) BONDING. Piping, rails, feeders, stanchions, all other fixed metal fittings or structures and concrete embedded elements in animal contain-

ment areas shall be bonded and connected to the building grounding electrode system.

(3) **SEPARATE EQUIPMENT GROUNDING CONDUCTOR.** In agricultural buildings as described in NEC 547-1 (a) and (b), noncurrent-carrying metal parts of equipment, raceways and other enclosures where required to be grounded, shall be grounded by a copper equipment grounding conductor installed between the equipment and the building disconnecting means. If installed underground, the equipment grounding conductor shall be insulated or covered. The equipment grounding conductor shall be run with the circuit conductors in accordance with NEC 300-3 (b).

(4) **METALLIC WELL CASINGS.** Metallic casings of wells supplying agricultural buildings shall be included as part of the grounding electrode system required by NEC 250-81.

Note: Grounding electrode system resistances lower than required by NEC Article 250 Part II, may reduce potential differences in livestock facilities.

(5) **EQUIPOTENTIAL PLANE.** (a) *Definition.* An equipotential plane means an area where a wire mesh or other conductive elements are embedded in concrete, bonded to all adjacent conductive equipment, structures, or surfaces and connected to the building grounding electrode system to prevent a difference in voltage from developing within the plane.

Note: With a wire mesh or other conductive grid embedded in the concrete floor or platform and bonded to the building grounding electrode system, livestock making contact between the floor or platform and the equipment or metal structure will be less likely to be exposed to a level of voltage that may alter animal behavior or productivity.

(b) *Concrete embedded elements.* Wire mesh or other conductive elements shall be provided in the concrete floor of animal confinement areas to provide an equipotential plane and shall be bonded by an exposed means to the building grounding electrode system. The bonding conductor shall be copper, insulated, covered or bare, not smaller than No. 8. The means of bonding to wire mesh or conductive elements shall be by pressure connectors or clamps of brass, copper, copper alloy or an equally substantial approved means.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 620 - ELEVATORS, DUMBWAITERS, ESCALATORS AND MOVING WALKS

ILHR 16.40 [NEC 620-1] Scope. Substitute the following wording for NEC 620-1 **Note:**

Note: For further information, see ch. Ind 4, Elevator Code.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 680 - SWIMMING POOLS, FOUNTAINS, AND SIMILAR INSTALLATIONS

ILHR 16.41 [NEC 680-8] Overhead conductor clearances. Substitute the following wording for NEC 680-8 **Exception No. 1:**

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.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

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ARTICLE 700 - EMERGENCY SYSTEMS

ILHR 16.42 [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 (b), introductory paragraph:

Wiring from an emergency source or emergency source distribution overcurrent 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 is a department rule in addition to the requirements of NEC 700-9 (b):

1. Except as provided in subd. 2, emergency circuit wiring shall be in approved raceways or Type MC cable with a metallic sheath and equipment grounding conductor.

2. Required fire alarm system wiring shall comply with s. ILHR 16.47 (2) (a).

(3) [NEC 700-12] **GENERAL REQUIREMENTS.** 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: Section ILHR 52.01 requires an on-premise fuel supply for high-rise buildings.

(4) [NEC 700-16] **EMERGENCY ILLUMINATION.** (a) Substitute the following wording for the first paragraph of NEC 700-16:

1. Emergency illumination shall include all required exit lights and emergency lighting required by the Illumination Code, ch. Ind 19, Part G.

2. When standby emergency power is required by s. ILHR 16.43, the required exit lights and emergency lighting shall be supplied from the standby source.

3. When standby emergency power is not required by s. ILHR 16.43, required exit lights shall be supplied by one of the sources of power specified in NEC 700-12, or shall be permitted to be supplied from a separate switch or circuit breaker in a branch circuit panelboard, under the following conditions:

a. The exit lights are supplied from separate branch circuits not supplying other lights or equipment.

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b. The exit-light wiring shall comply with sub. (2) from the point where it leaves the branch circuit panelboard.

4. Existing apartment or rooming house buildings not over 3 stories in height shall be permitted to have exit light wiring installed as Type AC or MC cable providing the cable is fished in hollow spaces of walls or partitions.

Note: Required intensities of emergency lighting are specified in ch. Ind 19, Illumination Code.

(b) This is a department rule in addition to the requirements of NEC 700-16 and par. (a):

When chs. ILHR 50 to 64 do not require smoke detectors to be interconnected with required fire alarm systems, the detectors shall be permitted to be connected to exit light circuits providing the detectors are wired with approved raceways or with the wiring method used for the exit light circuit.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.43 Standby emergency power. These are department rules in addition to the requirements of NEC 700:

(1) WHERE REQUIRED. Standby emergency power of a type recognized by NEC 700-12 (a), (b), (c) 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 Table 16.43.

Note: See s. ILHR 16.42 (4) for requirements relating to ch. Ind 19, Part G.

TABLE 16.43
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 and day care center 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.....	12,000 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

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(2) CAPACITY. (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 of Table 16.43 are based on net area which includes internal room and corridor areas. The area occupied by toilet rooms, 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, shall be included.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 701 - LEGALLY REQUIRED STANDBY SYSTEMS

ILHR 16.44 [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, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.45 [NEC 701-11] 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, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 710 - OVER 600 VOLTS, NOMINAL GENERAL

ILHR 16.46 [NEC 710-24] Metal-enclosed power switchgear and industrial control assemblies. Substitute the following wording for NEC 710-24 (f) (1):

(1) **DOORS AND INTERLOCKS.** Doors which provide nonqualified persons access to high voltage energized parts shall be locked. Except as provided in sub. (2), these 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.

(2) **EXCEPTIONS.** (a) *Exception No. 1.* Interlocks are not required if a qualified person is on the premises during normal hours of operation.

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(b) *Exception No. 2.* Interlocks are not required where all high voltage energized parts are fully insulated.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ARTICLE 760 - FIRE PROTECTIVE SIGNALING SYSTEMS

ILHR 16.47 Required fire alarm systems. These are department rules in addition to the requirements of NEC 760:

(1) **FIRE PROTECTIVE SIGNALING SYSTEMS.** All fire protective signaling systems, including fire alarm systems and smoke or heat detection systems, shall comply with NEC 760 except as modified by this section.

(2) **REQUIRED FIRE ALARM SYSTEMS.** Fire alarm systems required by chs. ILHR 50 to 64 to comply with s. ILHR 51.24 shall comply with the following:

(a) Except as provided in subds. 1 and 2, all electrical wiring, including accessory devices such as detectors, fire door closers, sprinkler valve operators or monitoring devices directly connected to the fire alarm circuit, shall be installed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, flexible metal conduit or surface metal raceway.

1. "Exception No. 1". Accessory devices are not required to be installed in metal raceway where they are not directly connected to the fire alarm circuit and trouble on the accessory circuits, such as an open circuit or short circuit to ground, does not affect the required fire alarm system.

2. "Exception No. 2". Existing apartment or rooming house buildings not over 3 stories in height shall be permitted to have exit light wiring installed as Type AC or MC cable providing the cable is fished in hollow spaces of walls or partitions.

(b) Raceways for required fire alarm system wiring shall contain no other circuits.

(c) 1. Except as provided in subd. 2, required fire alarm systems shall be supplied from an emergency source recognized by NEC 700-12.

2. Where s. ILHR 16.43 requires standby emergency power, required fire alarm systems shall be supplied from an approved standby emergency source.

Note: Sections ILHR 56.03 and 57.16 require smoke detectors to be interconnected with required fire alarm systems.

History: Cr. Register, February, 1988, No. 386, eff. 3-1-88.

ILHR 16.48 Electric fences. These are department rules in addition to the requirements of NEC-1987:

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

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(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, February, 1988, No. 386, eff. 3-1-88.