

## Chapter ILHR 16

### ELECTRICAL, 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Note: Chapter ILHR 16 as it existed on October 31, 1984 was repealed and a new chapter ILHR 16 was created effective November 1, 1984; Chapter ILHR 16 as it existed on February 29, 1988 was repealed and a new chapter ILHR 16 was created effective March 1, 1988; Chapter ILHR 16 as it existed on October 31, 1990, was repealed and a new chapter ILHR 16 was created effective November 1, 1990.

**Subchapter I — Administration and Enforcement**

**ILHR 16.01 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 increases 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: 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.02 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, carnivals, parking and other lots, mines, trenches and tunnels, and industrial substations.

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

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

(d) Installations of optical fiber cable.

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

(a) Installations of electric conductors and equipment in ships, watercraft other than floating buildings, railway rolling stock, aircraft, or automotive vehicles other than mobile homes and recreational vehicles.

(b) Installations of electric conductors and equipment for generation, transformation or distribution of power used exclusively by railways 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; or for the generation, control, transformation, transmission and distribution of electric energy

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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; except as provided in subds. 1. and 2.

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, October, 1990, No. 418, eff. 11-1-90; am. (1) (b) and (c), Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.03 Application of rules. (1) TYPES OF INSTALLATIONS.** The provisions of this chapter 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.04 Authority. (1) DEPARTMENT AUTHORITY.** The department shall have the authority and responsibility for interpreting this chapter and the National Electrical Code, and granting special permission as specified in this chapter.

(2) **MUNICIPAL AUTHORITY.** Municipalities may exercise jurisdiction over inspection of electrical construction covered by the scope of this chapter. For public buildings and places of employment, s. ILHR 17.13 (2) specifies the conditions required for municipalities to exercise this jurisdiction.

Note 1: Section ILHR 20.02 (1) (a) prohibits any municipality from adopting an ordinance establishing restrictions on the electrical construction of one- and two-family dwellings covered by the Uniform Dwelling Code.

Note 2: Subsection (2) provides municipalities with the authority to enforce this chapter and the National Electrical Code. See sub. (1) for the authority for interpreting the rules of this chapter and the National Electrical Code.

(3) **PERSONS AUTHORIZED TO PERFORM INSPECTIONS.** All inspections performed for a municipality, independent inspection agency or the department for the purpose of ad-

ministering and enforcing this chapter shall be performed by a certified inspector.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.05 Petition for variance. (1) PROCEDURE.** The department shall consider and may grant a variance to a provision contained in this chapter upon receipt of a fee and a completed petition for variance form from the owner and, where applicable, a completed position statement from the chief of the local fire department, 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 variance is granted constitutes a violation of this chapter.

(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.

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. ILHR 2 for fee requirements relating to petitions.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.06 Penalties.** Penalties for violations of this chapter shall be assessed in accordance with s. 101.02 (12) and (13), Stats.

Note 1: Section 101.02 (13) (a), Stats., indicates penalties will be assessed against any employer, employe, owner or other person who fails or refuses to perform any duty lawfully enjoined, within the time prescribed by the department, for which no penalty has been specifically provided, or who fails, neglects or refuses to comply with any lawful order made by the department, or any judgment or decree made by any court in connection with ss. 101.01 to 101.25, Stats. For each violation, failure or refusal, the employe, owner or other person must forfeit and pay into the state treasury a sum not less than \$10 nor more than \$100 for each violation.

Note 2: Section 101.02 (12), Stats., indicates that every day during which any person, persons, corporation or any officer, agent or employe thereof, fails to observe and comply with an order of the department will constitute a separate and distinct violation of such order.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.07 Appeals. (1) APPEAL OF LOCAL ORDER.** Any person affected by a local order which may be in conflict with a provision of this chapter may petition the department for a hearing on the grounds that the local order is unreasonable and in conflict with the provision of this chapter. All appeals shall be acted on and a decision in writing shall be issued by the department within 30 business days of receiving an appeal.

Note: Section 101.01 (1) (f), Stats., defines "local order" as any ordinance, order, rule or determination of any common council, board of aldermen, board of trustees or the village board, of any village or city, or the board of health of any municipality, or an order or direction of any official of such municipality, upon any matter over which the department has jurisdiction.

(2) **PETITION OF ADMINISTRATIVE RULE.** Pursuant to s. 227.12, Stats., any municipality, corporation or any 5 or more persons having an interest in an administrative rule may petition the department requesting the adoption, amendment or repeal of the rule.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

## Subchapter II — General Requirements

**ILHR 16.08 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 National Electrical Code, incorporated by reference in this chapter, and the requirements specified in this chapter.

Note: The federal and state Fair Housing Acts, the federal Americans with Disabilities Act and the Wisconsin Commercial Building Code (Chs. ILHR 50 to 64) contain requirements relating to making buildings accessible to and usable by people with disabilities. Some of those requirements apply to the installation of various electrical devices. For example, in the federal fair housing accessibility guidelines, devices such as light switches, electrical outlets, thermostats and other environmental controls would meet the requirements if operable parts of the controls are located no higher than 48 inches, and no lower than 15 inches, above the floor. If the reach is over an obstruction between 20 and 25 inches in depth, the maximum height is reduced to 44 inches for forward approach; or 46 inches for side approach, provided the obstruction is no more than 24 inches in depth. Complete copies of the federal Fair Housing Accessibility Guidelines or the federal Americans with Disabilities Act Accessibility Guidelines can be obtained from the Superintendent of Documents, New Orders, P.O. Box 371954, Pittsburgh, PA 15250-7954.

(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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.09 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.10 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.11 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) Factory Mutual Research Corporation;
- (f) American Gas Association, for equipment tested under applicable ANSI or UL standards; and
- (g) 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.

(3) **NEW PRODUCTS, CONSTRUCTIONS OR MATERIALS.** The incorporated National Electrical Code 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 a previous edition of the National Electrical Code.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.12 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, NEC-1993, subject to those changes, additions, or omissions specified in subch. III.

(b) The National Electrical Code, NEC-1993, 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 National Electrical Code 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 can be obtained from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269, telephone 1-800-344-3555.

Note 2: Copies of the National Electrical Code 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 1, 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, October, 1990, No. 418, eff. 11-1-90; am. (1), Register, March, 1994, No. 459, eff. 4-1-94.

## Subchapter III —

### Changes, Additions or Omissions to NEC

**ILHR 16.15 Changes, additions or omissions to NEC.** Changes, additions or omissions to the National Electrical Code (NEC) are specified in this subchapter and are rules of the department and not requirements of the NEC.

Note: The referenced NEC article or section number, located in brackets, will follow the ILHR designation and title and precede the text of the rule. Example: ILHR 16.18 [NEC 110-3]

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

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ARTICLE 90 -  
INTRODUCTION

**ILHR 16.16 Purpose, scope and enforcement. [NEC 90]**  
The following sections of the NEC do not apply in Wisconsin.

- (1) PURPOSE. [NEC 90-1]
- (2) SCOPE. [NEC 90-2]
- (3) ENFORCEMENT. [NEC 90-4]

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

ARTICLE 100 -  
DEFINITIONS

**ILHR 16.17 Definitions. [NEC 100]** 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 NEC.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

ARTICLE 110 -  
REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

**ILHR 16.18 Installation and use. [NEC 110-3]** Substitute the following wording for NEC 110-3 (b):

Except as otherwise permitted in this chapter and the NEC, 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, provided the instructions, markings, listings or labels do not conflict with this chapter.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

ARTICLE 210 -  
BRANCH CIRCUITS

**ILHR 16.185 Multiwire branch circuits. [NEC 210-4]** This is a department informational note to be used under NEC 210-4 (d):

Note: For 277/480 volt systems, the recommended wire colors are brown, orange and yellow. For 120/208 volt systems, the recommended wire colors are black, red and blue.

History: Cr. Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.19 Receptacles and cord connectors. [NEC 210-7]** 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-Register, March, 1994, No. 459

interrupter protected receptacles may be used without connecting a grounding conductor to the grounding contact.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.20 Ground-fault circuit-interrupter protection for personnel. [NEC 210-8] (2) OUTDOOR RECEPTACLES. [NEC 210-8 (a) (3)]** This is a department exception in addition to the requirements of NEC 210-8 (a) (3):

Exception. Receptacles specified in s. ILHR 16.28 (4) are not required to have ground-fault circuit-interrupter protection.

(3) RECEPTACLES IN CRAWL SPACES AND BASEMENTS. [NEC 210-8 (a) (4)] Substitute the following wording for NEC 210-8 (a) (4) introductory paragraph:

(a) All 125-volt, single-phase, 15- and 20-ampere receptacles installed in crawl spaces at or below grade level shall have ground-fault circuit-interrupter protection for personnel.

(b) At least one 125-volt, single-phase, 15- or 20-ampere receptacle installed in a basement shall have ground-fault circuit-interrupter protection for personnel and it shall be so identified.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. (1), Register, March, 1994, No. 459, eff. 4-1-94.

## ILHR 16.21 Branch-circuit requirements - summary. [NEC 210-24]

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.22 Dwelling unit receptacle outlets. [NEC 210-52] (2) OUTDOOR OUTLETS. [NEC 210-52 (e)]** This is a department rule in addition to the requirements of NEC 210-52 (e):

For a multi-family dwelling, at least one receptacle outlet accessible at grade level shall be installed outdoors for each dwelling unit which is at grade level and which has individual exit doors to grade.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. (1), Register, March, 1994, No. 459, eff. 4-1-94.

ARTICLE 220 -  
BRANCH-CIRCUIT AND FEEDER CALCULATIONS

**ILHR 16.23 Branch circuits required. [NEC 220-4]** 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, October, 1990, No. 418, eff. 11-1-90.

ARTICLE 225 -  
OUTSIDE BRANCH CIRCUITS AND FEEDERS

**ILHR 16.24 Outside branch circuits and feeders. [NEC 225] (1) CLEARANCE FROM GROUND. [NEC 225-18] (a)** This

is a department rule in addition to the requirements of NEC 225-18:

Conductors of not over 600 volts nominal shall have a clearance of at least 24.5 feet over track rails of railroads.

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

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

(2) CLEARANCES FROM BUILDINGS FOR CONDUCTORS NOT OVER 600 VOLTS. [NEC 225-19] (b) Substitute the following wording for NEC 225-19 (a) Exception No. 4:

Exception No. 4. The requirement for maintaining the vertical clearance 3 feet from the edge of the roof shall not apply to the final conductor span to the building.

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

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

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; am (1) (a), r. (2) (a), r. and recr. (2) (b), Register, March, 1994, No. 459, eff. 4-1-94.

#### ARTICLE 230 - SERVICES

**ILHR 16.25 Services. [NEC 230] (1) NUMBER OF SERVICES.** [NEC 230-2] (a) Section NEC 230-2, second paragraph, does not apply in Wisconsin.

Note 1: See definition of building in s. ILHR 16.17 (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) CLEARANCES. [NEC 230-24] 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) SIZE AND RATING. [NEC 230-42] (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 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) LENGTH OF SERVICE CONDUCTORS ENTERING A BUILDING. [NEC 230] 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 to the service disconnect or the first service disconnect of a group of disconnects as permitted by NEC 230-71. The raceways or conductors shall be considered to have entered the building at the point where they pass through the outer surface of the building exterior wall, except as permitted by NEC 230-6.

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

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

(5) GENERAL. [NEC 230-70] 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) MAXIMUM NUMBER OF DISCONNECTS. [NEC 230-71] 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.* Additional disconnecting means installed on individual dwelling units as permitted for different uses, such as for different rate schedules, permitted by NEC 230-2 Exception No. 6, shall be allowed to remain should subsequent changes in use occur.

(c) *Exception No. 3.* Not more than 6 circuit breakers shall be permitted to be installed in existing dual or split bus service panelboards installed prior to February 1, 1968.

(7) RATING OF DISCONNECT. [NEC 230-79] 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

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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.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. (8), Register, March, 1994, No. 459, eff. 4-1-94.

#### ARTICLE 250 - GROUNDING

**ILHR 16.26 Service equipment. [NEC 250-71]** 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.27 Grounding electrode system. [NEC 250-81]** These are department rules in addition to the requirements of NEC 250-81 (a):

(1) **BONDING TO SERVICE-ENTRANCE CONDUCTOR.** For services supplying one- or two-family dwelling units, the supplemental electrode shall be bonded to the grounded service-entrance conductor within a service equipment enclosure. Where the service equipment is at different locations, this bond shall be made at a location common to both services or at each service equipment location.

(2) **TWO SUPPLEMENTAL ELECTRODES.** For one- and two-family dwellings, where the supplemental electrode required by NEC 250-81 (a) consists of made electrodes specified in NEC 250-83, not less than 2 supplemental made electrodes shall be installed.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

#### ARTICLE 300 - WIRING METHODS

**ILHR 16.28 Electrical requirements for septic systems. [NEC 300]** 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;

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(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 and holding tank 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, October, 1990, No. 418, eff. 11-1-90; am. (2) (intro.), Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.29 Protection against physical damage. [NEC 300-4]** Section NEC 300-4 (d) does not apply in Wisconsin.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

#### ARTICLE 310 - CONDUCTORS FOR GENERAL WIRING

**ILHR 16.30 Ampacity. [NEC 310-15] (1) DWELLING SERVICES.** [NEC Tables 310-16 through 310-19] These are department rules in addition to the requirements of Note 3 to NEC Tables 310-16 through 310-19:

(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.

(2) **AMPACITY ADJUSTMENT FACTORS.** [NEC Tables 310-16 through 310-19] This is a department exception in addition to the exceptions specified in Note 8 (a) to NEC Tables 310-16 through 310-19:

Exception No. 6. The derating factors shown above do not apply to branch circuits supplying an individual dwelling unit.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. (1) (a), am. (2), Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.31 Uses permitted. [NEC 331-3]**

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 336 -  
NONMETALLIC-SHEATHED CABLE**

**ILHR 16.32 Uses not permitted. [NEC 336-4] (1) FLOORS AS STORIES. [NEC 336-4 (a) (1)]** 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.

**(2) COMMERCIAL GARAGES. [NEC 336-4 (a) (3)]** Substitute the following wording for NEC 336-4 (a) (3):

In those rooms or areas of commercial garages having hazardous (classified) locations as provided in NEC 511-3.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.325 Exposed work - general. [NEC 336-10]** Substitute the following wording for NEC 336-10 (intro.):

In exposed work, except as provided in NEC 336-12 and 336-13, the cable shall be installed as specified in (a) and (b) below.

History: Cr. Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 348 -  
ELECTRICAL METALLIC TUBING**

**ILHR 16.33 Use. [NEC 348-1]** 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, 1990, No. 418, eff. 11-1-90.

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

**ILHR 16.34 Conductors entering boxes, conduit bodies, or fittings. [NEC 370-7]** 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, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.35 In wall or ceiling. [NEC 370-10]** This is a department rule in addition to the requirements of NEC 370-10:

A wall with wood studs covered by plaster or gypsum board is considered to be a wall of noncombustible material for the purposes of NEC 370-10.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 373 -  
CABINETS AND CUTOUT BOXES**

**ILHR 16.36 Conductors entering cabinets or cutout boxes. [NEC 373-5]** 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, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 400 -  
FLEXIBLE CORDS AND CABLES**

**ILHR 16.37 Uses not permitted. [NEC 400-8]** This is a department rule in addition to the requirements of NEC 400-8:

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

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. and rec. Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.38 Stationary motors. [NEC 430-142]**

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 450 -  
TRANSFORMERS AND TRANSFORMER VAULTS**

**ILHR 16.39 Transformers and transformer vaults. [NEC 450] (1) HIGH VOLTAGE SWITCH INTERLOCKS. [NEC 450]** 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 16.49.

**(3) LOCATION. [NEC 450-41]** 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, 1990, No. 418, eff. 11-1-90; r. (2), Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 514 -  
GASOLINE DISPENSING AND SERVICE STATIONS**

**ILHR 16.40 Underground wiring. [NEC 514-8]** NEC 514-8 Exception No. 2 does not apply in Wisconsin.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 518 -  
PLACES OF ASSEMBLY**

**ILHR 16.41 Wiring Methods. [NEC 518-4] (1) WIRING METHODS. [NEC 518-4]** Substitute the following wording for NEC 518-4 Exception No. 1:

Exception No. 1. Nonmetallic-sheathed cable, Type AC cable, electrical nonmetallic tubing, and rigid nonmetallic conduit shall be permitted to be installed in those buildings that are classified as Type 7 or 8 construction in accordance with s. ILHR 51.03.

**(2) OCCUPANCY CLASSIFICATION. [NEC 518-4]** This is a department rule in addition to the requirements of NEC 518-4:

The wiring methods required by this section shall apply to the entire area within each assembly hall occupancy

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classification as specified in ch. ILHR 55 and to places of assembly in connection with ch. ILHR 56 occupancies.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 547 -  
AGRICULTURAL BUILDINGS**

**ILHR 16.42 Grounding, bonding and equipotential plane. [NEC 547-8] (1) GROUNDING AND BONDING.** [NEC 547-8 (a)] (a) This is a department informational note to be used under NEC 547-8 (a) Exception No. 1c:

Note: A pole-top disconnect is recognized as the service disconnecting means required by this section.

(b) NEC 547-8 (a) Exception No. 2 does not apply in Wisconsin.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; r. (2) and (3), Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 600 -  
ELECTRIC SIGNS AND OUTLINE LIGHTING**

**ILHR 16.43 Electric signs and outline lighting. [NEC 600] (1) LISTING REQUIRED.** [NEC 600-4] This is a department exception in addition to the requirements of NEC 600-4:

Exception: Listing shall not be required for permanently-connected, skeleton-type neon signs for interior use.

(2) **INSTALLATION OF CONDUCTORS.** [NEC 600-31] Substitute the following wording for NEC 600-31 (a) and Exception:

Conductors shall be installed as concealed conductors on insulators, in rigid metal conduit, in intermediate metal conduit, in rigid nonmetallic conduit, in flexible metal conduit, in liquidtight flexible metal conduit, in liquidtight flexible nonmetallic conduit, in electrical metallic tubing, or as Type MC cable.

(3) **FIXED OUTLINE LIGHTING AND SKELETON-TYPE SIGNS FOR INTERIOR USE.** [NEC 600-36] (a) Substitute the following wording for NEC 600-36 (c) and Exception:

1. Secondary conductors shall be insulated for the voltage of the circuit and shall be installed in a wiring method recognized by sub. (1).

2. Exception: Secondary conductors, such as gas tube sign cable, shall not be required to be enclosed where all of the following conditions are met:

a. The conductor length shall not exceed 18 inches.

b. The conductors shall be located in the open and are visible.

c. The conductors shall be located not less than 8½ feet above the finished floor level.

d. Conductors shall be separated from all objects other than the insulators on which they are mounted by a spacing of not less than 1-½ inches.

3. Exception: Gas tube sign cable not exceeding 4 feet in length between gas tubing and adjacent metal enclosures shall be permitted to be enclosed in continuous glass or other insulating sleeves.

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(b) This is a department rule in addition to the requirements of NEC 600-36:

Secondary conductor splices and terminations shall be insulated with a suitable sleeving device having an insulation rating equivalent to the voltage of the circuit.

(4) **PORTABLE GAS TUBE SIGNS FOR SHOW WINDOWS AND INTERIOR USE.** [NEC 600-37] This is a department rule in addition to the requirements of NEC 600-37:

Secondary conductor splices and terminations shall be insulated with a suitable sleeving device having an insulation rating equivalent to the voltage of the circuit.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90; renum. (1) to (3) to be (2) to (4), cr. (1) and (3) (a) 3., Register, March, 1994, No. 459, eff. 4-1-94.

**ARTICLE 680 -  
SWIMMING POOLS, FOUNTAINS, AND  
SIMILAR INSTALLATIONS**

**ILHR 16.44 Overhead conductor clearances. [NEC 680-8]** 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, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 700 -  
EMERGENCY SYSTEMS**

**ILHR 16.45 Emergency systems. [NEC 700] (1) TRANSFER EQUIPMENT.** [NEC 700-6] Substitute the following wording for the second paragraph of NEC 700-6:

Means shall be permitted to isolate the transfer switch equipment. Where bypass 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) **WIRING, EMERGENCY SYSTEM.** [NEC 700-9] (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 listed raceways or Type MC cable.

2. Required fire alarm system wiring shall comply with s. ILHR 16.50.

(3) **GENERAL REQUIREMENTS.** [NEC 700-12] Section NEC 700-12 (b) (3) does not apply in Wisconsin.

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



(4) EMERGENCY ILLUMINATION. [NEC 700-16] (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 16.46, 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 16.46, 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.

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

(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 listed raceways or with the wiring method used for the exit light circuit.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ILHR 16.46 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 16.46.

Note: See s. ILHR 16.46 (4) for requirements relating to ch. Ind 19, Part G.

**TABLE 16.46  
OCCUPANCIES REQUIRING STANDBY EMERGENCY POWER**

Column A Occupancy	Column B Calculated Capacity or Area
1. Apartment buildings .....	50 bedrooms, including efficiency units
2. Arenas .....	800 square feet (Use seated space only)
3. Art galleries .....	20,000 square feet
4. Assembly halls such as church dining rooms 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

(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 16.46 are based on net area which includes internal room

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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 employees work, shall be included.

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 701 -  
LEGALLY REQUIRED STANDBY SYSTEMS**

**ILHR 16.47 Transfer equipment. [NEC 701-7]** Substitute the following wording for the second paragraph of NEC 701-7:

Means shall be permitted to isolate the transfer switch equipment. Where bypass 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, 1990, No. 418, eff. 11-1-90.

**ILHR 16.48 Legally required standby systems. [NEC 701-11]** Section NEC 701-11 (b) (3) does not apply in Wisconsin.

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

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 710 -  
OVER 600 VOLTS, NOMINAL GENERAL**

**ILHR 16.49 Metal-enclosed power switchgear and industrial control assemblies. [NEC 710-24]** Substitute the following wording for NEC 710-24 (f) (1):

(1) **DOORS AND INTERLOCKS.** Doors which provide non-qualified 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.

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

History: Cr. Register, October, 1990, No. 418, eff. 11-1-90.

**ARTICLE 760 -  
FIRE PROTECTIVE SIGNALING SYSTEMS**

**ILHR 16.50 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) 1. Except as provided in subd. 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 listed raceways or Type MC cable.

2. Accessory devices are not required to be installed in listed raceways or Type MC cable 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.

(b) Where a raceway is installed for required fire alarm system wiring, it shall contain no circuits that are not part of the fire alarm system.

(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 16.46 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, October, 1990, No. 418, eff. 11-1-90; am. (2) (b), Register, March, 1994, No. 459, eff. 4-1-94.

**ILHR 16.51 Electric fences.** These are department rules in addition to the requirements of the NEC:

(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.

(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 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, 1990, No. 418, eff. 11-1-90.