

E 2, 101, 103, 110 to 112,
114, 116, 121, 123, 128, 129

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PSC 114

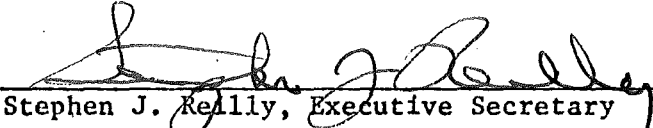
STATE OF WISCONSIN)
) SS
DEPARTMENT OF INDUSTRY,)
LABOR AND HUMAN RELATIONS)

TO ALL TO WHOM THESE PRESENTS SHALL COME, GREETINGS:

I, Stephen J. Reilly, Executive Secretary of the Department of Industry, Labor and Human Relations, and custodian of the official records of said Department, do hereby certify that the attached rules to Wisconsin Administrative Code, Wisconsin State Electrical Code-- Volumes No. 1 and 2, were adopted by the Department of Industry, Labor and Human Relations on February 21, 1972.

I further certify that said copy has been compared by me with the original on file in this Department and that the same is a true copy thereof and of the whole of such original.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the official seal of the Department at the Capitol, in the City of Madison, this 21 day of February, A.D., 1972.


Stephen J. Reilly, Executive Secretary

Mail Cert Code 1971 in file 2/22/72

Consent of Dept. of Ind. & Lab. attached to PSC filings

ORDER OF

DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS

Pursuant to authority vested in the Department of Industry, Labor and Human Relations by Section 101.01 to 101.29, Wis. Stats., the Department of Industry, Labor and Human Relations hereby amends Wisconsin Administrative Code, Wisconsin State Electrical Code--Volume No. 1, and repeals and recreates Wisconsin Administrative Code, Wisconsin State Electrical Code--Volume No. 2.

The rules attached hereto shall become effective on the first day of the month following publication in the Wisconsin Administrative Code as provided in Section 227.

ORDER OF THE
PUBLIC SERVICE COMMISSION
AMENDING RULES

Sections E 2.01; E 2.02 (4) (b); E 101.02 (36), (45), (60) note, (90), (92), (110) (intro. par.), and (127); E 103.01 (3); E 103.03; E 103.04 (4); E 103.05; E 103.06 (2) (b), (e), and (5); E 110.01 (1) and (2); E 111.02 (3); E 111.03 (13); E 112.04 (1); E 114.07; E 116.05 (1); E 116.07; E 121.05 (2); E 121.06 (1); E 123.03 TABLE 1 (left-hand column); E 123.05 (3) (d) 2. a. TABLE 4 Note (a) and (12); E 128.06 (4); E 128.08 (1) (a); E 128.09 (1) (c) 1. c.; and E 129.11 of the WISCONSIN ADMINISTRATIVE CODE (all in Volume 1 of the Electrical Code), and Chapter PSC 114 of the WISCONSIN ADMINISTRATIVE CODE, are amended to read as follows:

E 2.01 Scope of code. The Wisconsin State Electrical Code shall apply as minimum fire and safety requirements for the construction, installation and maintenance of all electrical power and communication circuits and equipment including signal, radio, and lightning rod equipment; and includes rules to be observed in the operation of electrical power and communication equipment and lines. In volume 1 of the Wisconsin State Electrical Code, references to

NEC-71 refer to those portions of the National Electrical Code-1971 (also ANSI C1-1971--American National Standards Institute C1-1971) incorporated by reference into the Wisconsin Administrative Code according to sections F 90.01 and E 90.02, volume 2 of the Wisconsin State Electrical Code.

E 2.02 (4) (b) Nothing in this code shall be construed to deprive a municipality of jurisdiction over utilities, places of employment, or public buildings except that no local requirement shall be contrary to the requirements in these chapters. (See sections 101.16 and 196.58, Wis. Stats.)

E 101.02 (36) Conduit--Rigid metal: A tubular raceway with threaded ends, for electric wires and cables; if of ferrous metal, having a corrosion resistant coating on all surfaces except threads, and if of corrosion resistant material, properly identified, and in either case with a uniformly smooth interior coating of enamel or like material. Conduit may be made of mild steel tubing of circular cross-section having walls which in the various electrical trade sizes comply with the measurements set forth in NEC-1971 Chapter 9, Table 4. For other materials, dimensions are to be the same.

(45) Current--Limiting overcurrent protective device: (See NEC-1971 section 240-27.)

(60) Duty--Varying: A requirement of service that demands operation at loads, and for intervals of time, both of which may be subject to wide variation.

Note: See table in NEC-1971 section 430-21 for illustrations of various types of duty.

(90) Hazardous locations: See NEC-1971 Article 500.

(92) Identified: As used in NEC-1971 Article 200, the conductor or terminal to which it refers is to be recognized as grounded.

(110) Low-energy power circuit: A circuit which is not a remote-control or signal circuit but which has the power supply limited in accordance with the requirements of class 2 remote-control circuits. (See NEC-1971 Article 725.)

(127) Qualified person: One familiar with the construction and operation of the apparatus and the hazards involved for over 600 volts.

E 103.01 (3) Additional rules covering grounding requirements for interior wiring, radio, communication systems and signal circuits will be found in NEC-1971 Articles 250 except as changed in volume 2 (See section E 250.92), 810, 800 except as changed in volume 2 (See sections E 800.02 and E 800.21), 720 and 725, respectively.

E 103.03 Grounding conductor enclosures. The grounding of lighting and utilization wiring systems as well as metal envelopes containing supply conductors must comply with NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92) even though in locations used exclusively by supply facilities.

E 103.04 (4) Non-current carrying parts of fixed equipment may be grounded by metallicly connecting them to the grounded metal raceway or cable armor, or otherwise as provided in NEC-1971 section 250-57.

E 103.05 Grounding of portable equipment. The grounding of portable equipment is required by NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92) and such portable equipment must be grounded even though in locations used exclusively by supply facilities.

E 103.06 (2) (b) For alternating current circuits. A grounding conductor for an alternating-current system shall have a current-carrying capacity not less than one-fifth that of the conductor to which it is attached but in no case shall the conductivity or tensile strength be less than that of No. 8 copper. See NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92) for conductor size for grounding utilization equipment in interior wiring.

(e) Interior utilization wiring, raceways, etc. For conductor sizes for grounding utilization wiring, raceways, equipment, and portable and pendent equipment see NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92).

(5) Common grounding conductor for circuits, metal raceways and equipment (See NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92)).

E 110.01 Electrical equipment in stations, substations, factories and elsewhere.

(1) The following chapters (E 110-E 119) apply to all electrical equipment and conductors of over 600 volts. If such equipment and conductors are not installed in supply stations or other quarters accessible only to qualified persons, they shall, in addition to complying with Wis. Adm. Code chapters E 110-E 119, comply also with the rules of volume 2.

(2) Equipment and wiring of less than 600 volts shall comply with the rules of volume 2, except that if such equipment or

wiring is installed in supply stations or other quarters accessible only to qualified persons, it may be installed in conformity with chapters E 110-E 119, in which case only wiring used to distribute a power supply for lighting, service outlets and other utilization equipment need comply with the rules of volume 2.

E 111.02 (3) Fixtures, pendants and plug receptacles. (See also NEC-1971 Article 410). Arrangements of permanent fixtures and plug receptacles shall be such that portable cords need not be brought into dangerous proximity to live or moving apparatus. All lamps shall be arranged to be controlled, replaced, or trimmed from safely accessible places. Pendent conductors shall not be installed where they can be readily moved so as to bring them in contact with live parts of electrical supply equipment.

E 111.03 (13) Transformer vaults on customer's premises. Transformer vaults on customer's premises shall comply with NEC-1971 Sections 450-41 to 450-48, inclusive, except as changed in volume 2 (see sections E 450.41 and E 450.42).

E 112.04 Protective grounding. (1) Grounding method. All grounding which is intended to be a permanent and effective protection measure, such as lightning arrester, circuit, equipment, or wire raceway grounding, shall be made in accordance with the methods specified in Wis. Adm. Code chapter E 103 and NEC-1971 Article 250 except as changed in volume 2 (see section E 250.92).

E 114.07 Wiring in battery rooms. Wiring shall be in accordance with the requirements of NEC-1971 Article 480 (storage batteries).

E 116.05 Guarding in hazardous locations.

(1) Rigid steel conduit. Conductors in locations where flammable gas normally exists shall be in metal conduit. All fittings and outlets of such conduit shall be electrically and mechanically continuous with the conduit or metal sheath, and the conduit shall be sealed to prevent entrance of gases. (See NEC-1971 Article 500.)

E 116.07 Wiring for illumination. Wiring installed for the illumination of the station should be installed and protected as required for similar utilization equipment and conductors in volume 2 of the code.

E 121.05 (2) Noncurrent-carrying parts. Ungrounded metal-sheathed service cable, service conduits, metal fixtures, and similar noncurrent-carrying parts, if located in urban districts and where liable to become charged to more than 300 volts, shall be isolated or guarded so as not to be exposed to accidental contact by unauthorized persons. As an alternative to isolation or guarding, grounding of certain noncurrent-carrying parts as permitted by sections E 121.06 (2) and E 128.01 (1) (d) may be used.

E 121.06 Grounding of circuits and equipment. (1) Methods. The methods to be used for effective grounding for lightning arresters of supply lines, for circuits, for equipment and for wire raceways are given in Wis. Adm. Code chapter E 103. The methods to be used for grounding of lightning arresters on communication lines are specified in NEC-1971 section 800-31.

E 123.03 TABLE 1 (left-hand column)

Location of Wires and Cables

- Over track rails of railroads (e).....
 - Over streets, alleys or roads (g).....
 - Along streets or alleys in urban districts (g).....
 - Along roads in rural districts (g).....
 - Over areas used for agricultural purposes.....
 - Over fenced or otherwise guarded rights of way in
which only authorized persons are permitted (i)...
 - Over normal high water of lakes, streams or ponds
See (y).....
 - Over commercial areas such as parking lots and
drive-in establishments not subject to truck
traffic.....
 - Over driveways to residence garages.....
 - Over commercial and industrial areas, parking lots
and other areas subject to truck traffic.....
 - Over agricultural areas subject to truck traffic....
 - Over footwalks and spaces accessible to pedestrians
only.....
 - Over spaces or ways not covered above:
 - In rural districts (p).....
 - In urban districts (p).....
-

E 123.05 (3) (d) 2. a. TABLE 4 Note: Con-
ductors shall have a clearance of not less
than 8 feet from the highest point of roofs
over which they pass, except that where the
voltage between conductors does not exceed
300 and the roof has a slope of not less
than 4 inches in 12 inches the clearance may
be not less than 3 feet. Service-drop con-
ductors of 300 volts or less which do not
pass over other than a maximum of 4 feet
of the overhang portion of the roof for the
purpose of terminating at a (through-the-
roof) service raceway or approved support
may be maintained at a minimum of 18 inches
from any portion of the roof over which
they pass.

E 123.05 (12) Near swimming pools. A horizontal clearance of at least ten feet shall be maintained between service drops or other open overhead wiring, and swimming pools, diving structures, observation stands, towers or platform. (See NEC-1971 Section 680-8.)

E 128.06 (4) Service drops. Service drops shall comply with NEC-1971 Sections 230-21 through 230-27 except as changed in volume 2 (see section E 230.24) and except as otherwise provided in volume No. 1.

E 128.08 (1) (a) At stations for public use they shall be protected by one of the methods specified in NEC-1971 Article 800 except as changed in volume 2 (see sections E 800.02 and E 800.21).

E 128.09 (1) (c) 1. c. The precautions in Wis. Adm. Code chapter E 144 and NEC-1971 Article 800 except as changed in volume 2 (see sections E 800.02 and E 800.21) have been taken.

E 129.11 Underground services. Underground services shall comply with NEC-1971 Sections 230-30 through 230-33 except as changed in volume 2 (see section E 230.31) and except as otherwise provided in volume No. 1.

Chapter PSC 114

WISCONSIN STATE ELECTRICAL CODE

- PSC 114.01 Wisconsin state electrical code
PSC 114.02 Availability of state electrical code

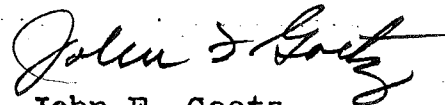
PSC 114.01 Wisconsin state electrical code. The Wisconsin state electrical code is issued and administered by the public service commission and the department of industry, labor and human relations as part of the Wisconsin Administrative Code. The rules carry the prefix E.

PSC 114.02 Availability of state electrical code. The Wisconsin state electrical code published in two volumes may be purchased from the same source as other Wisconsin Administrative Code material.

The amended rules contained herein shall take effect on March 1, 1972, as provided in section 227.026

(1) Wis. Stats.

PUBLIC SERVICE COMMISSION



John F. Goetz
Secretary

Dated: February 2, 1972

WISCONSIN ADMINISTRATIVE CODE

ELECTRICAL, VOLUME 2

DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS

Division of Industrial Safety and Buildings
P. O. Box 2209, Madison, Wisconsin 53701

PUBLIC SERVICE COMMISSION

433 Hill Farms State Office Building, Madison, Wisconsin 53702

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and
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CHAPTER E 1

PURPOSE AND SCOPE

E 1.01 Purpose. (1) The purpose of this code is the practical safeguarding of persons and of buildings and their contents from hazards arising from the use of electricity for light, heat, power, radio, signaling and for other purposes.

(2) This code contains provisions considered necessary for safety. Compliance therewith and proper maintenance will result in an installation essentially free from hazard, but not necessarily efficient, convenient, or adequate for good service or future expansion of electrical use.

NOTE: Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with the code. This occurs because initial wiring did not provide for increases in use of electricity. For this reason it is recommended that the initial installation be adequate and that reasonable provisions for system changes be made as may be required for future increase in the use of electricity.

(3) This code is not intended as a design specification nor an instruction manual for untrained persons.

E 1.02 Scope. (1) COVERED. It covers the electric and communication conductors and equipment installed in places of employment, within or on public and private buildings and other premises, including yards, carnivals and parking lots, mines, trenches and tunnels, industrial substations, mobile home parks and recreational vehicle parks; also the conductors that connect the installations to a supply of electricity and other outside conductors adjacent to the premises; also mobile homes and recreational vehicles.

(2) NOT COVERED. It does not cover: (a) Installations in ships, watercraft, railway rolling stock, aircraft or automotive vehicles (except 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 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, etc., or outdoors by established rights on private property.

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

CHAPTER E 10

GENERAL REQUIREMENTS

E 10.10 Character of construction, maintenance and operation. All electrical power and communication equipment and lines shall be of such construction, and so installed, operated and maintained as to minimize the life and fire hazard.

E 10.11 Use of approved materials and construction methods. (1) MATERIALS. No materials, employed in construction covered by this code, shall be used which have not been approved by the Department of Industry, Labor and Human Relations or the Public Service Commission.

(a) Exception: Materials which comply with the requirements of this code are hereby approved.

NOTE: It is the policy of the administrative authority to approve materials, devices, and systems which are listed as standard by the Underwriters' Laboratories if they do not conflict with the requirements of this or other state codes or the laws of the state.

(2) METHODS OF INSTALLATION. No methods of installing electrical materials or devices in construction covered by this code shall be used which are not approved by the Department of Industry, Labor and Human Relations or the Public Service Commission.

(a) Exception: Methods of installation which comply with the requirements of this code are hereby approved.

E 10.12 Construction, inspection and repairs. (1) All construction and equipment shall be cleaned when necessary and inspected at such intervals as experience has shown to be necessary. Any equipment or construction known to be defective so as to endanger life or property shall be promptly repaired, permanently disconnected, or isolated until repairs can be made. Construction, repairs, additions and changes to electrical equipment and conductors shall be made by qualified persons only. (See also Wis. Adm. Code volume 1, Electrical, sections E 121.02 and E 121.04.)

E 10.13 Application of rules. (1) WAIVING RULES. The rules are intended to apply to all installations except as modified or waived by the proper administrative authority. They are intended to be so modified or waived in particular cases wherever any rules are shown for any reason to be impracticable or if equivalent or safer construction is secured in other ways.

(2) APPLICATION. The intent of the rules will be realized (a) by applying the rules in full to all new installations, reconstructions, alterations and extensions, except where any rule is shown to be impracticable for special reasons or where the advantage of uniformity with existing construction is greater than the advantage of construction in compliance with the rules, providing the existing construction is reasonably safe; (b) by bringing existing installations into conformity with these rules as far as may be directed by the Department of Industry, Labor and Human Relations or the Public Service Commission and within the time determined by them.

(3) TEMPORARY INSTALLATIONS. See NEC-1971, Article 305.

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

(5) EMERGENCY. In case of emergency or pending decision of the administrator, the person responsible for the installation may decide as to modification or waiver of any order, subject to review by proper authority.

CHAPTER E 90

ADOPTION OF NATIONAL ELECTRICAL CODE, 1971
AND WISCONSIN AMENDMENTS THERETO

E 90.01 Adoption of code for electrical and communication equipment and wiring. The National Electrical Code-1971 (NEC-1971), also American National Standards Institute C1-1971 (ANSI C1-1971), Article 90, chapters 1 through 9, inclusive, and index, subject to omissions shown in section E 90.03, and changes and additions shown in section E 90.04, is hereby incorporated by reference into the Wisconsin Administrative Code, Electrical, Volume 2. Interim amendments of the NEC-1971 will have no effect in the state of Wisconsin until such time as this section is correspondingly revised to reflect these changes.

E 90.02 Consent to incorporate NEC-1971 by reference. Pursuant to section 227.025, Wis. Stats., the Attorney General and the Revisor of Statutes have consented to the incorporation by reference of the standards, except for sections E 90.03 and E 90.04, contained in the NEC-1971, which can be obtained from the National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts 02110. Copies of the aforementioned standard code are on file in the offices of the Department of Industry, Labor and Human Relations, the Public Service Commission, the Secretary of State and the Revisor of Statutes.

E 90.03 Omissions from NEC-1971. (1) The following sections of the NEC-1971 are not incorporated as part of the Wisconsin State Electrical Code, volume 2:

Section 90-1
90-2
90-6
90-7
230-2 Exception No. 7

(2) The NFPA, ANSI or American National Standard references listed in the following sections or tables of the National Electrical Code, ANSI C1-1971, are not incorporated as part of the Wisconsin State Electrical Code, but are considered standards acceptable to the administrative authority.

| | |
|--------------------------------|----------------|
| Section 230-90 Exception No. 5 | Section 540-18 |
| Table 310-2 (a) | 540-22 |
| Section 422-14 | 550-3 (f) |
| 424-66 | 550-23 (a) |
| 430-12 (a) | 551-13 (c) |
| 430-31 (b) | 551-42 |
| 450-8 | 551-52 |
| 450-42 | 555-3 |
| 450-43 (a) | 645-2 (c) (1) |
| 500-2 (c) | 670-4 (b) |
| 503-14 | |
| 517-2 | |

E 90.04 Changes or additions to NEC-1971. Following are the changes or additions to the NEC-1971. (The following changes or additions have been prefixed by the letter E to denote that such changes or additions are rules of this state and not those of NEC-1971. Following the E designation is the referenced NEC section or subsection. Example: E 110.02 (NEC 110-2). The word "Change" following the section number and heading means that the corresponding wording of the NEC-1971 has been changed and that the new wording is substituted at the appropriate location. The word "Addition" following the section number and heading means that a new requirement is incorporated in the NEC-1971 and that the new requirement is inserted at the appropriate location.)

ARTICLE 100--DEFINITIONS

Administrative Authority (Addition): The department of Industry, Labor and Human Relations and/or the Public Service Commission.

Special Permission (Change): The written consent of the Department of Industry, Labor and Human Relations or the Public Service Commission.

ARTICLE 110--GENERAL

E 110.02 (NEC 110-2.) Approval. (Addition)

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

E 110.08 (NEC 110-8.) Wiring Methods. (Addition)

(a) In spaces where livestock is housed, milk houses, pump houses, root cellars, silos and poultry houses, the wiring method shall be rigid nonmetallic conduit, or types NMC, UF or other nonabsorbent nonmetallic sheathed cable. In addition, insulated boxes, lamp holders, ducts and bushings should be used. If some metal boxes must be used they shall be mounted out of contact with masonry with a minimum clearance of 3/4 inch between the metal box and the masonry.

E 110.22 (NEC 110-22.) Identification. (Change)

Each disconnecting means required by this code for motors and appliances, and each service, feeder or branch circuit at the point where it originates, shall be legibly marked to indicate its purpose. The marking shall be of sufficient durability to withstand the environment involved.

E 110.23 (NEC-110-23.) Readily Accessible. (Addition)

Disconnect switches and circuit breakers shall be readily accessible and have the center of the operating means in its highest position not more than 6-1/2 feet above the floor or operating level, and it is recommended that it be at least 3 feet above this level. Fuses shall be readily accessible with the location of their midpoint governed by the same dimensions as for switches and circuit breakers.

The operating means of disconnect switches and circuit breakers may function through rods or cables when the switches or breakers are located outside the above range. This requirement does not cover installations specifically exempted elsewhere in this code.

(a) Exception No. 1: This section does not apply to equipment exceeding 600 volts.

ARTICLE 210--BRANCH CIRCUITS

E 210.05 (NEC 210-5.) Color Code. (Change)

(b) Any conductor intended solely for grounding purposes shall be identified by a continuous green color or a continuous green color with a yellow stripe unless it be bare. Except for public highway traffic control, communications, metering, railway and railroad signal installations, branch circuit conductors and equipment lead wires, to which branch circuit conductors attach, having a continuous green color or a continuous green color with a yellow stripe, shall not be used for other than grounding purposes.

ARTICLE 220--BRANCH CIRCUIT AND FEEDER CALCULATIONS

E 220.03 (NEC 220-3.) Branch Circuits Required. (Addition)

(d) Fixed Appliances. Fixed appliances exceeding 1/8 hp or 300 watts rating shall not be connected to general purpose branch circuits. Where an air conditioner sleeve is provided in a building wall, an outlet within 4 feet of the sleeve location shall be provided. If a circuit is not run to the outlet, a raceway shall be provided. When the air conditioner is installed in the sleeve it shall be supplied by a separate circuit. A receptacle outlet installed for an air conditioner shall not be counted as one of the receptacles required by section NEC 210-22 (b).

(e) A single branch circuit shall not supply outlets in more than one apartment of a multi-family building, except rooming houses, hotels and motels.

E 220.04 (NEC 220-4.) Calculation of Feeder Loads. (Addition)

(p) Air Conditioners. Where provisions are made for installing one or more air-conditioning units, a feeder load of 1,000 watts or the nameplate rating of the appliance, whichever is larger, shall be included for each unit.

ARTICLE 230--SERVICES

E 230.02 (NEC 230-2.) Number of Services to a Building or Other Premises Served. (Change)

Exception No. 4: Capacity Requirements. Additional services may be installed by special permission, or in accordance with the following table:

| Service Rating | Number of Services Permitted |
|-----------------------|------------------------------|
| 0- 400 amperes----- | 1 |
| 401- 800 amperes----- | 2 |
| 801-1200 amperes----- | 3 |

Note 1: Where 2 services are permitted, one must be of at least 400 ampere rating. Where 3 services are permitted, 2 must be of at least 400 ampere rating.

Note 2: For services above 1200 ampere rating and 3 in number, the pattern established by the above table and Note 1 is to be continued.

Exception No. 5: Buildings of Large Area. Two or more sets of service conductors may be installed for the same class of service for the same consumer if located more than 150 feet apart (measured in a straight line), provided that all electrical wiring supplied by each service has no common raceway or connection with any other service.

E 230.24 (NEC 230-24.) Clearance of Service Drops. (Addition)

(b) 27 feet--over track rails of railroads.

(d) Clearance from storage tanks. A horizontal clearance of at least 15 feet shall be maintained between aboveground flammable liquids storage tanks and open conductors operating at more than 300 volts to ground. When the voltage is 300 or below, a horizontal clearance of not less than 8 feet shall be maintained.

NOTE: This requirement does not apply to LPG tanks with capacity of 1,000 gallons or less.

(e) Clearance from wells. A horizontal clearance of at least 3/4 the required vertical clearance of the conductor shall be maintained between open conductors and wells.

E 230.24 (NEC 230-24.) Clearance of Service Drops. (Change)

NOTE: For clearance of conductors of over 600 volts, see Wis. Adm. Code, Electrical, volume 1, section E 123.03.

E 230.31 (NEC 230-31.) Size of Underground Service Conductors. (Addition)

(a) The underground service lateral shall not extend into a building in a raceway longer than 3 feet.

E 230.41 (NEC 230-41.) Size of Service Entrance Conductors, Overhead System and Underground System. (Change)

Exception No. 1: For single-family residences requiring more than three 2-wire branch circuits or having an area of more than 500 square feet (external dimensions), the service shall be a minimum of 100 amperes, 3-wire or 4-wire. For multioccupancy residential buildings requiring more than three 2-wire branch circuits, the service shall be a minimum of 150 amperes, 3-wire or 4-wire, and each unit requiring more than two 2-wire branch circuits shall have a 3-wire service or feeder. Services or feeders to each unit of multioccupancy residential buildings shall be a minimum of 50 amperes.

E 230.51 (NEC 230-51.) Connections at Service Head. (Addition)

(h) Service head and service drop attachments and communication cables or conductors attached to or carried along the surface of a building shall be so located that no part of the drop loops or service drop conductors within 3 feet of the service head and service drop attachments shall be less than 12 inches from communication cables or conductors.

E 230.70 (NEC 230-70.) General. (Change)

(a) Disconnection from Service Conductors. Means shall be provided for disconnecting all conductors in the building or other structure from the service conductors. The disconnecting means for each set of service conductors shall consist of:

1. A single main disconnecting means for single occupancy buildings or other structures, or
2. A single main disconnecting means for each metered service in each occupancy of a multioccupancy building having service conductors run to each occupancy, or
3. A single main disconnecting means for each metered service up to and including 6, or
4. Not more than 6 switches or 6 circuit breakers where the combined rating of the service disconnecting means exceeds 400 amperes, or
5. Not more than 6 switches or 6 circuit breakers for each farm service entrance, whether on a pole or in separate buildings, except for the residence which shall have a single main disconnecting means.
6. Not more than 6 switches or 6 circuit breakers for additions to existing services installed prior to February 1, 1968.

Note 1: Main disconnects for fire pumps, water pumps, emergency lighting or fire alarm systems shall not be counted as disconnecting means so far as the limit of the number of disconnecting means is concerned.

Note 2: A water pump may be connected in such a way that opening of other than its own circuit protection will not interrupt service to the pump.

(b) Location. The disconnecting means shall be located at a readily accessible point nearest to the entrance of the conductors, either inside or outside the building or other structure.

In a multiple-occupancy building, each occupant shall have access to his disconnecting means. A multiple-occupancy building having individual occupancy above the second floor shall have service equipment grouped in a common accessible place. Multiple-occupancy buildings that do not have individual occupancy above the second

floor may have service conductors run to each occupancy in accordance with section NEC 230-2 Exception No. 3 (b).

(g) Switch and Circuit Breaker. Where more than one switch is permitted in section E 230.70 (a), they shall be in a common enclosure or in a group of separate enclosures.

E 230.71 (NEC 230-71.) Rating of Service Equipment. (Change)

Exception No. 1: For single-family residences requiring more than three 2-wire branch circuits or having an area of more than 500 square feet (external dimensions), the service equipment shall have a rating of not less than 100 amperes, 3-wire or 4-wire. For multioccupancy residential buildings requiring more than three 2-wire branch circuits, the service equipment shall have a rating of not less than 150 amperes, 3-wire or 4-wire. Service or feeder equipment for each unit of multi-occupancy residential buildings shall have a rating of not less than 50 amperes.

E 230.71 (NEC 230-71.) Rating of Service Equipment. (Addition)

Exception No. 3: For installations consisting of a single branch circuit, a circuit breaker of 15 or 20 ampere rating may be used.

ARTICLE 240--OVERCURRENT PROTECTION

E 240.16 (NEC 240-16.) Location in Premises. (Change)

(a) Readily accessible, except as provided in sections NEC 230-91 and NEC 230-92 for service equipment, NEC 364-11 for busways, E 600.06 and NEC 600-6 for signs, and NEC 610-42 for cranes and hoists.

ARTICLE 250--GROUNDING

E 250.92 (NEC 250-92.) Installation. (Addition)

Except where fished in hollow spaces of finished buildings, No. 6 or larger grounding conductors shall be fastened at intervals not exceeding 4-1/2 feet and within 12 inches of every cabinet, box, or fitting.

ARTICLE 334--METAL-CLAD CABLE

E 334.04 (NEC 334-4.) Construction. (Addition)

(a) One or more grounding conductors shall be incorporated under the metallic covering. The total cross section of the grounding conductor shall be approximately equal to one-half the cross section of one phase conductor.

E 334.12 (NEC 334-12.) Exposed Work. (Addition)

(d) Running boards shall not be less than 2 inches wide.

ARTICLE 336--NONMETALLIC-SHEATHED CABLE

E 336.13 (NEC 336-13.) Running Boards. (Addition.)

Running boards shall not be less than 2 inches wide.

ARTICLE 338--SERVICE-ENTRANCE CONDUCTOR

E 338.02 (NEC 338-2.) Use as Service-Entrance Conductors. (Addition)

(a) Type USE service-entrance cable used as service conductors in direct earth burial shall be buried not less than 24 inches below the surface, when supplementary protection from physical injury, such as a covering board, concrete pad, raceway, etc., is not provided.

E 338.03 (NEC 338-3.) Use as Branch Circuits or Feeders. (Addition)

(d) Type USE service-entrance cable used as branch circuit or feeder conductors in direct earth burial shall be buried not less than 18 inches below the surface, when supplementary protection from physical injury, such as a covering board, concrete pad, raceway, etc., is not provided.

ARTICLE 354--UNDERFLOOR RACEWAYS

E 354.15 (NEC 354-15.) Connections to Cabinets and Wall Outlets. (Change)

Connections between raceways and distribution centers and wall outlets shall be made by means of approved raceways or by means of fittings approved for the purpose.

ARTICLE 370--OUTLET, SWITCH AND JUNCTION BOXES, AND FITTINGS

E 370.18 (NEC 370-18.) Pull and Junction Boxes. (Addition)

(a)(4) The depth opposite the side of the cover shall conform to the specifications of NEC Table 373-6 (a) column No. 1.

ARTICLE 400--FLEXIBLE CORDS AND CABLES

E 400.04 (NEC 400-4.) Prohibited Uses. (Addition)

(6) Above false ceilings.

ARTICLE 450--TRANSFORMERS AND VAULTS

E 450.08 (NEC 450-8.) Ventilation. (Addition)

Vaults containing oil-filled equipment shall be vented to the outside.

E 450.26 (NEC 450-26.) Oil-Insulated Transformers Installed on Roofs. (Addition)

Oil-insulated transformers installed on the roof of a building shall comply with the following conditions:

(a) The structure of the building shall be of sufficient strength to carry the weight of the transformers, their enclosures, the equipment used in connection therewith, plus the superimposed live load. There shall be a path from the edge of the roof to the transformer location of sufficient strength to support the transformer.

NOTE: See Wis. Adm. Code chapters Ind 50-59--Building and Heating, Ventilating and Air Conditioning--chapter Ind 53 for structural requirements.

(b) Where the roof construction has a 2-hour fire-resistive rating or greater, the transformers shall be installed in a fenced enclosure, vault or other enclosure where the live parts are guarded against accidental contact. Where a fence is used, it shall be of a type that cannot be readily climbed and shall not be less than 6 feet in height excluding any barbed wire. A locked gate shall be provided. Where the transformers are installed in other than a vault, a curb or basin shall be provided. The curb shall be high enough to contain the oil from the largest of the transformers, but in no case less than 6 inches high. A drain shall be provided to carry any oil away from the building.

(c) Where the roof construction has less than a 2-hour fire-resistive rating, the transformers shall be enclosed in a vault complying with NEC Article 450, Part C--Provisions for Transformer Vaults.

NOTE: See Wis. Adm. Code chapters Ind 50-59--Building and Heating, Ventilating and Air Conditioning--chapter Ind 51 for fire-resistive standards.

E 450.41 (NEC 450-41.) Location. (Change)

Vaults containing oil-insulated transformers shall be located where they can be ventilated to the outside air without using flues or ducts.

Exception: Where special permission is granted by the administrative authority.

E 450.42 (NEC 450-42.) Walls, Roof and Floor. (Change)

The walls and roofs of vaults shall be constructed of reinforced concrete, brick, load-bearing tile, concrete block, or other fire-resistive construction which has adequate structural strength for the conditions, and a minimum fire-resistive rating of 3 hours. The floors of vaults in contact with the earth shall be of concrete not less than 4 inches thick, but when the vault is constructed with a vacant space or other stories below it, the floor shall have adequate structural strength for the dead and/or superimposed live loads imposed thereon and a minimum fire-resistive rating of 3 hours.

NOTE: See Wis. Adm. Code chapters Ind 50-59--Building and Heating, Ventilating and Air Conditioning--chapter Ind 51 for fire-resistive standards and chapter Ind 53 for structural requirements.

ARTICLE 511--COMMERCIAL GARAGES

E 511.02 (NEC 511-2.) Hazardous Areas. (Change)

(d) Adjacent areas at the same or higher elevation and in which hazardous vapors are not likely to be released, such as offices, salesrooms, stockrooms, switchboard rooms and other similar locations, shall not be classed as hazardous.

ARTICLE 515--BULK STORAGE PLANTS

E 515.02 (NEC 515-2.) Hazardous Areas. (Addition)

(d)(5) Open conductors shall not pass over aboveground flammable liquids storage tanks. Such conductors operating at more than 300 volts to ground shall be kept at least 15 feet horizontally from such tanks. When the voltage is 300 or below, a horizontal clearance of not less than 8 feet shall be maintained.

ARTICLE 600--ELECTRIC SIGNS AND OUTLINE LIGHTING

E 600.02 (NEC 600-2.) Disconnect Required. (Addition)

The switch or breaker required by this section may control one or more signs or outline lighting installations.

E 600.03 (NEC 600-3.) Sign Enclosures as Raceways. (Addition)

A sign enclosure shall not be used as a pull box or raceway for conductors supplying other signs or equipment.

E 600.06 (NEC 600-6.) Load of Branch Circuit. (Addition)

Branch circuit overcurrent devices, if on or within the body of the sign, shall be mounted in a separate accessible compartment.

ARTICLE 620--ELEVATORS, DUMBWAITERS, ESCALATORS, AND MOVING WALKS

See Wis. Adm. Code chapter Ind 4--Elevator Code.

ARTICLE 670--METALWORKING MACHINE TOOLS

E 670.01 (NEC 670-1.) Scope and Standard for Metalworking Machine Tools. (Change)

(a) The provisions of this article apply to the size and overcurrent protection of supply conductors to metalworking machine tools and to the nameplate data required on each such tool.

(b) Electrical equipment, apparatus and wiring furnished as part of metalworking machine tools, shall comply with a standard acceptable to the administrative authority.

NOTE: The administrative authority considers NFPA "Standard on Metalworking Machine Tools" (No. 79)--1971 to be an acceptable standard.

ARTICLE 700--EMERGENCY SYSTEMS

E 700.05 (NEC 700-5.) Capacity and Systems. (Change)

(a) Emergency systems shall have adequate capacity and rating for the emergency operation of all equipment connected to the system.

(b) Current supply shall be such that in the event of failure of the normal building supply to or within the building or group of buildings concerned, emergency lighting, or emergency power, or both emergency lighting and power, will be immediately available. The supply system for emergency purposes may comprise one or more of the types of system covered in sections E 700.07, NEC 700-7 through NEC 700-10 and E 700.22, NEC 700-22, except as limited by section E 700.06. The "one service, in accordance with Article 230," referred to in sections E 700.07, NEC 700-7 and NEC 700-8, may consist of the normal building service, a building feeder or branch circuit.

(c) Consideration must be given to the type of service to be rendered, whether of short time duration, as for exit lights of a theater, or of long duration, as for supplying emergency power and lighting due to a long period of current failure from trouble either inside or outside the building, as in the case of a hospital.

E 700.06 (NEC 700-6.) Standby Emergency Power. (Change)

(a) Standby emergency power of a type recognized by sections E 700.07, NEC 700-7, NEC 700-8, or E 700.22, NEC 700-22 shall be provided as a source of supply for required exit lights, emergency lighting or power in occupancies where people are housed, assembled, confined or congregated with a capacity or area equal to or greater than either Column B or C of Table E 700.06.

(b) The capacity of assembly hall type occupancies shall be based upon the entire area within each assembly hall occupancy separation as provided in the Wisconsin State Building Code, chapter Ind 55. This area may include one or more rooms or floors.

TABLE E 700.06

OCCUPANCIES REQUIRING STANDBY EMERGENCY POWER

| Column A | Column B | Column C |
|--|-----------------------------|---|
| Occupancy | No. Persons Accommodated | Calculated Capacity or Area |
| 1. Apartment buildings | 200 | 200 bedrooms |
| 2. Apartment buildings (housing for elderly or homes for the aged) | 30 | 30 bedrooms |
| 3. Arenas | 200 | 800 square feet. (Use seated space only.) |
| 4. Art galleries | 200 | 20,000 square feet |

| Column A | Column B | Column C |
|--|-----------------------------|---|
| Occupancy | No. Persons Accommodated | Calculated Capacity or Area |
| 5. Assembly halls such as church dining rooms and fellowship halls, dance halls, banquet halls, dining rooms, restaurants, taverns, night clubs, school multipurpose rooms and similar occupancies | 200 | 2,000 square feet |
| 6. Assembly halls with stage | 200 | 1,400 square feet |
| 7. Asylums | 30 | 30 inmate beds |
| 8. Auditoriums | 200 | 1,400 square feet |
| 9. Banks | 400 | 30,000 square feet |
| 10. Bowling alleys | 200 | 200 persons based on 5 persons per alley plus number of spectator seats and 10 square feet per person for bar and dining areas. |
| 11. Children's homes | 30 | 30 beds |
| 12. Convents | 200 | 200 beds |
| 13. Dormitories including those used in detention schools | 200 | 200 beds |
| 14. Exhibition buildings | 200 | 20,000 square feet |
| 15. Factories | 400 | 30,000 square feet |
| 16. Field houses | 200 | 800 square feet. (Use seated space only.) |
| 17. Gymnasiums | 200 | 200 persons based on 6 square feet per person for seated space and 15 square feet per person for unseated space. |
| 18. Hospitals | 30 | 30 patient beds |
| 19. Hotels | 200 | 200 rooms |
| 20. Jails | 30 | 30 inmate beds |
| 21. Lecture halls | 200 | 1,400 square feet |

| Column A | Column B | Column C |
|----------------------------------|-----------------------------|--|
| Occupancy | No. Persons Accommodated | Calculated Capacity or Area |
| 22. Libraries | 200 | 200 persons based on 20 square feet per person for reading rooms and 100 square feet per person for the balance. |
| 23. Lodge halls | 200 | 200 persons based on 6 square feet per person for seated space and 15 square feet per person for unseated space. |
| 24. Motels | 200 | 100 rooms |
| 25. Museums | 200 | 20,000 square feet |
| 26. Nursing homes | 30 | 30 patient beds |
| 27. Office buildings | 400 | 30,000 square feet |
| 28. Rooming houses | 200 | 200 rooms |
| 29. Skating rinks | 200 | 3,000 square feet |
| 30. Stores | 200 | 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) | 30 | 450 square feet |
| 32. Theaters and theater lobbies | 200 | 1,400 square feet. (Theater and lobby must be combined in determining total area.) |
| 33. Warehouses | 400 | 120,000 square feet |

NOTE: The square foot figures noted in Column C are based on net area which would include internal room and corridor areas. The area occupied by toilets, stairwells, elevator shafts, janitor's closets, boiler and equipment rooms, and similar areas need not be included in calculating capacity. Areas within rooms occupied by furniture, machinery or display counters must be included. The area occupied by a bar or serving counter, such as is found in a tavern, restaurant or drugstore, and the area behind them where employes work need not be included.

E 700.07 (NEC 700-7.) Storage Battery. (Addition)

An automatic battery charging means shall be provided.

E 700.14 (NEC 700-14.) Emergency Illumination. (Change)

Emergency illumination shall include all required exit lights and emergency lighting required by the Illumination Code--chapter Ind 19, Part G. When standby emergency power is required by section E 700.06, the required exit lights and emergency lighting shall be supplied from the standby source.

(a) Exception: Required exit lights in occupancies not requiring standby emergency power under E 700.06 may be supplied from a separate switch or circuit breaker in a branch circuit or feeder panelboard, or the load side of the service disconnect, under the following conditions:

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

2. The exit-light wiring shall comply with sections E 700.17 and NEC 700-17 from the point where it leaves the separate switch or breaker, branch circuit or feeder panelboard.

E 700.17 (NEC 700-17.) Independent Wiring. (Addition)

Emergency circuit wiring shall be in approved raceways.

E 700.22 (NEC 700-22.) Unit Equipments. (Change)

(d) A relaying device arranged to energize the lamps automatically upon failure of the normal supply to the area served by the unit equipment.

E 700.23 (NEC 700-23.) Fire Alarm Wiring. (Addition)

(a) The energy for operation of fire alarm systems shall be taken from sources suited to the design of the system. Batteries shall not be used.

(b) A 3-wire 120-240 volt or 120-208 volt (3-phase, 4-wire) service shall be provided for required electrical fire alarm systems. The system shall be supervised with the operating current secured from one ungrounded conductor and the neutral or grounded conductor and the current for operating trouble signal or signals secured from the other ungrounded conductor and the neutral or grounded conductor. Alarm indicating device circuits shall be designed for operation on 120 volt AC power. The signal voltage measured across all open alarm initiating device contacts shall be no less than 20 volts.

(c) Electrical wiring in connection with fire alarm systems shall be installed in rigid metal conduit, flexible metal conduit, electrical metallic tubing or surface metal raceway. Fire alarm systems are considered emergency wiring and shall comply with sections E 700.17 and NEC 700-17. Metal-clad cable may be used where it can be fished in hollow spaces of walls or partitions in apartments or rooming houses not over 3 stories in height. Where the wiring is subject to excessive moisture or severe mechanical injury, rigid metal conduit shall be used. The smallest size conductor to be used in any fire alarm system in a building over 3 stories in height shall be No. 14 AWG or No. 16 AWG for buildings not over 3 stories in height. The wires shall be provided with insulation suitable for use on circuits not exceeding 600 volts. Fire alarm systems shall be connected to the line side of the main service switch or to the emergency feeder through 2 single pole breakers or switches

used for no other purpose and arranged so they can be locked in the "on" position, and under the supervision of a qualified person. The breaker and switches shall be identified by a red color. Two pole breakers shall not be used.

NOTE: See Wis. Adm. Code chapters Ind 50-59--Building and Heating, Ventilating and Air Conditioning--section Ind 51.24 for general requirements covering fire alarm systems.

ARTICLE 730--OUTSIDE BRANCH CIRCUITS AND FEEDERS

E 730.04 (NEC 730-4.) Conductor Covering. (Addition)

Approved factory assembled cables, consisting of one or more insulated conductors lashed or twisted with an uninsulated and effectively grounded messenger or neutral, may be used for outdoor overhead branch circuits and feeders. The uninsulated conductor, when used as a neutral, shall not be used as an equipment grounding conductor.

E 730.18 (NEC 730-18.) Clearance from Ground. (Addition)

27 feet--over track rails of railroads.

E 730.18 (NEC 730-18.) Clearance from Ground. (Change)

NOTE: For clearance of conductors of over 600 volts, see Wis. Adm. Code volume 1, Electrical, section E 123.03.

E 730.19 (NEC 730-19.) Clearances from Buildings for Conductors Not in Excess of 600 Volts. (Addition)

(c) Conductors run above the top level of a window are considered out of reach of that window.

E 730.19 (NEC 730-19.) Clearances from Buildings for Conductors Not in Excess of 600 Volts. (Change)

NOTE: For clearance of conductors of over 600 volts, see Wis. Adm. Code volume 1, Electrical, section E 123.03.

ARTICLE 800--COMMUNICATION CIRCUITS

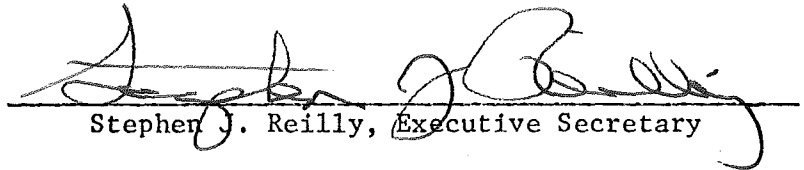
E 800.02 (NEC 800-2.) Protective Devices. (Addition)

Underground circuits buried without separation from power conductors shall be provided with protectors.

E 800.21 (NEC 800-21.) Underground Circuits. (Change)

(a) With Electric Light or Power Conductors. See Wis. Adm. Code volume 1, Electrical, chapter E 129.

DEPARTMENT OF INDUSTRY, LABOR AND HUMAN RELATIONS


Stephen J. Reilly, Executive Secretary

February 21, 1971
Date

INDEX

Volume No. 2

References are to rule numbers unless otherwise noted. This index applies only to Wis. Adm. Code, Electrical, Volume No. 2. See National Electrical Code-1971 for index of NEC-1971.

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