

# NORTH DAKOTA STATE ELECTRICAL BOARD

## LAWS, RULES AND WIRING STANDARDS OF NORTH DAKOTA

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## CHAPTER 43-09

### ELECTRICIANS

**43-09-01. Definitions.** In this chapter, unless the context or subject matter otherwise requires:

1. "Apprentice electrician" means an individual who is learning the trade under the personal supervision of a state-licensed electrician.
2. "Board" means the state electrical board.
3. "Class B electrician" means an individual who has the necessary qualifications, training, and technical knowledge to wire, install, and repair electrical apparatus and equipment in accordance with the standard rules and regulations governing such work, who has eighteen months' experience in farmstead or residential wiring, and passed an examination before the state electrical board based upon the national electrical code as it applies to farmstead or residential wiring.
4. "Journeyman electrician" means an individual who has the necessary qualifications, training, and technical knowledge to wire, install, and repair electrical apparatus and equipment and power limited systems in accordance with the standard rules and regulations governing such work.
5. "Licensee" means an individual who holds a valid license issued by the board.
6. "Master electrician" means an individual who has the necessary qualifications, training, experience, and technical knowledge to plan, lay out, and supervise the installation and repair of electrical wiring apparatus, and equipment for electric light, heat, power, and power limited systems, in accordance with the standard rules and regulations governing such work.
7. "Nonelectrical system" means a system as defined by the articles contained in chapter 8 and other articles which contains class II or class III circuits and systems as defined by the national electrical code, as adopted by the board. Although the board may expand this definition, the board may not narrow this definition. The term does not include a circuit or system that is installed:

- a. Within an area of special occupancies, as defined under articles 500 through 517 of the national electrical code.
  - b. For heat, light, or power.
  - c. For the control of heat, light, or power, unless the circuit or system employs digital communication.
8. "Power limited electrician" means an individual who has the necessary qualifications, training, experience, and technical knowledge to plan, layout, and supervise the installation and repair of a power limited system.
9. "Power limited system" means a system as defined by the articles contained in chapter 8 and other articles which contains class II or class III circuits and systems as defined by the national electrical code, as adopted by the board. Although the board may expand this definition, the term does not include a nonelectrical system.

**43-09-02. State electrical board - Members - Terms of office - Vacancies.** The state electrical board must consist of five members appointed by the governor for a term of five years with their terms of office so arranged that one term and only one term expires on June thirtieth of each year. One member of the board shall represent the public and may not be directly associated with the electrical industry. The board must include a master electrician who is a contractor, a journeyman electrician, a consumer member of a rural electric cooperative, and a person associated with an investor-owned utility. A member of the board shall qualify by taking the oath of office required of civil officers and shall hold his office until his successor is appointed and qualified. The governor shall fill any vacancy by appointment for the unexpired term of office.

**43-09-03. Qualifications of members of board.** Repealed by S.L. 1949, ch. 287, § 11.

**43-09-04. Officers of board - Compensation of members.** The members of the board shall select from their members a president, a treasurer, and a secretary. Each appointive member of the board is entitled to receive such amount as may be set by the board, and in addition thereto, each member shall receive the necessary and actual expenses incurred by the member in the discharge of the member's duties. The mileage and travel expense allowed may not exceed the amount provided for in section 54-06-09.

**43-09-05. Powers and duties of state electrical board - Biennial report.** The board shall adopt a seal and may adopt reasonable rules to carry out this chapter. The board may submit a biennial report to the governor and the secretary of state in accordance with section 54-06-04. The board shall appoint qualified inspectors. Upon receipt of notice of completion of any electrical wiring or power limited system installation involving a value of five hundred dollars or more, the inspector shall inspect the electrical or power limited system installation and approve or condemn that installation. The inspector shall make a report of the inspection on forms prescribed by the board.

**43-09-06. Meetings of board.** The board shall hold a meeting in the month of January of each year in the city of Bismarck and may hold such other meetings as are necessary to conduct examinations and perform the other duties coming before it. Special meetings must be held at the time and place determined by the president, and upon ten days written notice given by him to each member of the board.

**43-09-07. Expenses of board - How paid.** All reasonable and necessary expenses incurred in conducting the business of the board must be allowed and paid by the board.

**43-09-08. Treasurer to hold moneys of board - Use - Disbursement.**  
Repealed by S.L. 1971, ch. 510, § 15.

**43-09-09. License required - Examination - Board to issue license.**

1. A person may not undertake or plan to undertake with another person to plan, lay out, supervise, install, make additions, make alterations, or make repairs, in the installation of wiring, apparatus, or equipment for electric light, heat, or power or for a power limited system unless licensed by the board.
2. The board shall examine an applicant for licensure and if, upon a technical and practical examination, the applicant is found to possess the required knowledge and skill and to be versed in the laws of electricity, the applicant shall be issued a license in the class for which the applicant was examined. The license must be signed by the president and the secretary of the board and attested by the seal of the board.
3. Each licensee or permit holder shall report that individual's licensing or renewals to the electrical inspector, if there is one, in the city in which that individual operates.

**43-09-09.1. Conviction not bar to licensure - Exceptions.** Conviction of an offense does not disqualify a person from licensure under this chapter unless the board determines that the offense has a direct bearing upon a person's ability to serve the public as an electrician or that, following conviction of any offense, the person is not sufficiently rehabilitated under section 12.1-33-02.1.

**43-09-09.2. Advertising prohibited - Exceptions - Liability - Penalty.**

1. Except as provided in this section, if a license is required under section 43-09-09, a person may not advertise to contract for electrical services without being licensed as or being associated with a class B electrician, master electrician, or power limited electrician, unless that person intends to contract the electrical services with a licensed electrical contractor.
2. If a person associates with an electrician under subsection 1 and that association ends, that person is jointly and severally liable for any contracts entered under that association.
3.
  - a. A person violating this section is guilty of a class B misdemeanor for a first conviction, but no fine in excess of one hundred dollars and no term of imprisonment may be imposed.
  - b. A person violating this section is guilty of a class A misdemeanor for a second or subsequent conviction, but the penalties are as follows:
    - (1) For a second conviction, no fine in excess of one thousand dollars and no term of imprisonment may be imposed.
    - (2) For a third or subsequent conviction, a fine not to exceed one thousand dollars, or imprisonment not to exceed thirty days, or both, may be imposed.

**43-09-10. Types of licenses.** The classes of electricians who may be licensed under section 43-09-09 are:

1. Master electrician.
2. Journeyman electrician.



3. Class B electrician.
4. Power limited electrician.

**43-09-11. Qualifications.** An applicant for an electrician's license must have the following experience and training:

1. For licensure as a master electrician, an applicant must have completed one year's experience as a licensed journeyman electrician.
2. For licensure as a journeyman electrician, an applicant must have:
  - a. Completed eight thousand hours experience in installing and repairing electrical wiring, apparatus, and equipment, which experience may not be obtained in less than three years.
  - b. Effective for an applicant who registered with the board as an apprentice after January 31, 2008, completed at least one of the following:
    - (1) Successfully completed apprenticeship training approved by the board and completed eight thousand hours' experience in installing and repairing electrical wiring, apparatus, and equipment.
    - (2) Successfully completed an appropriate course of study, which may not be less than two years or the equivalent of two years, at a board-approved institution of higher education and completed eight thousand hours' experience in installing and repairing electrical wiring, apparatus, and equipment. The board may determine equivalent hours of education that may be applied as a credit against the eight thousand hours' experience requirement under this paragraph.
3. For licensure as a class B electrician, eighteen months' experience in farmstead or residential wiring.
4. For licensure as a power limited electrician:
  - a. Hold a valid board-recognized tradesman certification; or

- b. Possess the necessary work experience and training, as approved by the board.

**43-09-12. Examination - Requirements.** Each applicant for an electrician's license shall pay the examination fee and shall take an oath and submit written evidence that the applicant has had the required experience.

**43-09-13. License fees.** Examination and annual license fees required to be paid for an electrician's license must be set by the board.

**43-09-13.1. Apprentice electrician registration.** An apprentice electrician shall register with the state electrical board within the first six months of employment and shall pay an annual registration fee in an amount set by the board. An apprentice electrician may work on installations only under the personal supervision of a licensed electrician as provided in section 43-09-18.

**43-09-13.2. Inspectors - License required - Exception.** An individual employed by the state electrical board or a political subdivision to inspect electrical or power limited system installations must be licensed as a journeyman electrician or master electrician.

**43-09-14. Master electrician and class B electrician - Undertaking – Fund.** Repealed by S.L. 2018, ch. 292, §3.

**43-09-15. Renewal of license - Denial, suspension, or revocation of licenses.**

1. An electrician's license may be issued for a term of only one year, but may be renewed without examination upon the payment of the proper fee. If the licensee fails to renew the license for a period of three consecutive years or more, the licensee is required to appear for re-examination. The state electrical board may deny, suspend, revoke, or refuse to renew any license issued or applied for under this chapter for any of the following reasons:
  - a. Failure or refusal to maintain or adhere to the minimum standards set forth in the electrical code referred to in section 43-09-21.
  - b. Any cause for which the issuance of the license could have been refused had that information then existed and been known to the board.

- c. Commitment of any act of gross negligence, incompetency, or misconduct in the practice of the profession regulated under this chapter.
  - d. Material misstatement, misrepresentation, or fraud in obtaining the license.
  - e. After due notice, failed or refused to correct, within the specified time, any installation not in compliance with this chapter.
  - f. Failure or refusal to make deposit or acquire public liability insurance as required by section 43-09-20.
  - g. Failure to pay or enter a written contract for repayment, under a payment schedule acceptable to the board, any financial obligation to the board.
  - h. Failure to furnish certification of completion of continuing education as required under section 43-09-15.1.
2. If an individual's license is denied, suspended, or revoked by the board, or that individual is refused a license by the board, that individual may appeal to the appropriate court.

**43-09-15.1. Education.** An applicant for renewal of an electrician's license pursuant to section 43-09-15 must have successfully completed at least eight hours each biennium, of education relating to the standards set forth in section 43-09-21 or as otherwise prescribed by the board. The board may not require more than sixteen hours of continuing education in each biennium. The board shall conduct education sessions each year at not fewer than six locations throughout the state. Attendance at such sessions, or attendance at other education sessions certified by the board as approved, fulfills the educational requirements of this section. The board may charge a fee for attendance at the education sessions at an amount to be determined by the board, but not to exceed ten dollars per attendee for each session. The board may expend funds to educate and encourage potential electricians into the trade.

**43-09-16. When license not required.** The following persons are not required to be licensed by and are not subject to regulation by the board under this chapter:

- 1. Employees of public utilities engaged in the manufacture and distribution of electrical energy while engaged in work directly

pertaining to the manufacture and distribution of electrical energy. This exemption terminates at the first point of service attachment, except for the installing or testing of electric meters and measuring devices and the maintenance of electric meters and measuring devices.

2. Employees, independent contractors, or subcontractors of a company that is a telecommunication carrier as defined under section 57-34-01 or that is a satellite or cable systems provider, while acting in the scope of employment or the terms of the contract.
3. Employees, independent contractors, or subcontractors of dealers in household appliances, such as room air conditioners, clothes dryers, dishwashers, freezers, garbage disposals, refrigerators, stoves, washing machines, water heaters, and similar appliances while installing and connecting such appliances to an existing electrical receptacle.
4. A representative of a manufacturing firm that is installing or modifying controls of wiring solely on industrial machinery that is for use by the firm itself, and performed by or under the direction of a registered professional engineer who issues a state-accepted evaluation, which is to be maintained with the equipment.
5. An individual who is installing a nonelectrical system.
6. An individual who is installing a power limited system that is installed within a residential dwelling or is installed with a factory connector or cord powered by an existing electrical receptacle.

**43-09-17. Journeyman electrician's permit.** The board, upon the recommendation of one master electrician and two journeyman electricians, may issue a permit for a journeyman electrician to engage in the journeyman electrician's trade until the next meeting of the board for the examination of applicants. Such permit is not renewable.

**43-09-18. Apprentice.** An individual may serve as an apprentice under a licensed master electrician or power limited electrician, but a master electrician or power limited electrician may not allow an apprentice to work on any installation without personal supervision of a licensed electrician.

**43-09-19. Report of work done by licensee.** Every person licensed under the provisions of this chapter and doing electrical work shall report the same to the secretary of the board upon blanks furnished by the board for that purpose.

**43-09-20. Installations made with master electrician, class B electrician, or power limited electrician - Requirement for liability insurance.**

1. A contract, agreement, or undertaking with another for the installation of electrical wiring or power limited wiring or the installation of electrical or power limited system parts of other apparatus may not be entered by anyone other than a master electrician or power limited electrician. A class B electrician may not enter a contract, undertaking, or agreement for the installation of electrical wiring, except for:
  - a. Farmstead electrical wiring; or
  - b. Residential electrical wiring in one or two family dwellings located in a city with a population of two thousand five hundred or fewer.
2. If a licensee is acting as a contractor, that licensee shall submit to the board evidence of the existence of public liability insurance with a licensed insurance carrier, with policy limits of at least five hundred thousand dollars.

**43-09-21. Standards for wiring, apparatus, and equipment.** All electrical and power limited wiring, apparatus, or equipment must comply with the rules of the board made under authority of the laws of this state and in conformity with the approved methods of construction for safety to life and property. The regulations in the national electrical code and the national electrical safety code as approved by the American national standards institute are prima facie evidence of these approved methods. Although a city may make more stringent requirements by ordinance, application of the ordinance must be limited to individuals licensed by the board under this chapter. An electrical or power limited system installation may not be connected for use until proof has been furnished to the person supplying electrical energy that there is compliance with the applicable regulations. The manufacturer of a new manufactured building or modular unit shall make any changes required for the proof within fourteen days from the notice that the building or unit does not comply with the applicable regulations. This section

does not apply to the movement of a new manufactured building or modular unit into or within this state before the process of being connected for use.

**43-09-22. Inspection of installation - Condemnation.**

1. The board has jurisdiction over and shall provide inspection for all electrical installations. The board has jurisdiction over and shall provide inspection for all power limited system installations. If there is a disagreement between an electrician and an inspector over interpretation or over a correction for violation issued by any inspector, the executive director of the board shall review the identified disagreement and render a final decision, which either party may appeal to the board.
2. The executive director of the board, as authorized by the board may condemn installations hazardous to life and property or may order specific corrections to be made. The executive director may order disconnection of service after notice to the owner of the property. The order is subject to the owner's right of appeal to the board. A condemned installation may not be reconnected for service until proof has been furnished that the installation has been brought up to the required standards.
3. The board may charge a master electrician, class B electrician, or power limited electrician responsible for the installation a fee for inspections.
4. A city may make provisions for inspection of all electrical and power limited systems installed within the corporate limits of the city. A city shall register the name of the inspector with the board within ten days of appointment. A city may not require inspection of an installation that is outside the jurisdiction of the board.

**43-09-23. Criminal penalty - Civil proceedings.** A person that violates any of the provisions of this chapter is guilty of a class B misdemeanor. In addition to criminal proceedings, the board may commence administrative or civil court proceedings as follows:

1. The board may issue a cease and desist order against a person allegedly making or offering to make installations in violation of section 43-09-09 or 43-09-09.2 based upon information provided to the board by its inspectors or other persons, by investigation reports, affidavits, complaints of witnesses, or oral testimony given to the board at a regular or special board meeting. Violation of the

cease and desist order may be considered by the court in issuing a temporary or permanent restraining order and in ordering the payment of costs and attorney's fees in proceedings authorized under this section.

2. The board may apply to the district court in the county in which the violations have occurred for a temporary or permanent injunction under chapter 32-06, enjoining persons from performing, advertising, or contracting for making electrical installations without a valid license issued by the board in violation of section 43-09-09 or 43-09-09.2. The court may not require a written undertaking, security, or bond as a basis for issuing any temporary or permanent restraining order under this section unless the court specifically orders and states the basis for requiring the security. Upon a determination that a violation of section 43-09-09 or 43-09-09.2 has occurred, the court may assess against the defendants the actual costs incurred and reasonable attorneys' fees necessary for the investigation and court proceedings against the unlicensed person.
3. After an administrative hearing has been conducted by the board under chapter 28-32, an appeal from an order of the board or from the assessment of costs and attorney's fees may be taken to the district court under chapter 28-32.

**43-09-24. Special emergency.** Repealed by omission from this code.

**43-09-25. License to nonresidents - Reciprocity.** To the extent that other states which provide for the licensing of electricians provide for similar action, the state electrical board may grant licenses of the same grade or class to electricians licensed by other states, upon payment by the applicant of the required fee, after being furnished with proof that the qualifications of the applicant are equal to the qualifications of holders of similar licenses in North Dakota.

**43-09-26. Exemption for coal mines.** The jurisdiction of the board and other requirements of this chapter do not apply to installations, wiring, apparatus, or equipment that are part of a coal mine permitted by the public service commission and are subject to the jurisdiction of the federal mine safety and health administration.

**ARTICLE 24.1-01**  
**GENERAL ADMINISTRATION**

Chapter  
24.1-01-01                      Organization of Board

**CHAPTER 24.1-01-01**  
**ORGANIZATION OF BOARD**

Section  
24.1-01-01-01 .....History and Functions  
24.1-01-01-02.....Board Membership  
24.1-01-01-03.....Executive Director  
24.1-01-01-04.....Director of Inspections  
24.1-01-01-05.....Inspection Districts  
24.1-01-01-06.....Inquiries

**24.1-01-01-01. History and functions.**

In 1917 legislation was approved which created a state board of electricians. In 1949 the name of the board was changed to the state electrical board. The board is charged with the responsibility to examine applicants and issue licenses to those having the necessary qualifications and knowledge in the laws of electricity and electrical codes. The board has jurisdiction over all electrical installations. The executive director may condemn installations hazardous to life and property and order electric service to be discontinued.

**24.1-01-01-02. Board membership.**

The board consists of five members appointed by the governor for terms of five years. Terms are arranged so that one term expires each year. To provide equal representation on the board, one member is selected from the master electricians, one from the journeymen electricians, another from the investor owned utilities, the fourth shall be a consumer member of a rural electric cooperative, and the fifth member represents the public and cannot be directly associated with the electrical industry.

**24.1-01-01-03. Executive director.**

The executive director has full responsibility for directing and supervising the operation of the department under the direction of the board.



#### **24.1-01-01-04. Director of inspections.**

The director of inspections supervises electrical inspectors to carry out an effective inspection program. The director is responsible for reviewing plans and specifications that are submitted on various projects.

#### **24.1-01-01-05. Inspection districts.**

The state is divided into districts. Each electrical inspector is assigned to a district. A map showing the districts is available on the board's website at [www.ndseb.com](http://www.ndseb.com) and by this reference is herein incorporated.

#### **24.1-01-01-06. Inquiries.**

All inquiries and communication relating to licensing, electrical wiring, and inspections must be directed to:

North Dakota State Electrical Board  
P. O. Box 7335  
Bismarck, ND 58507-7335  
Phone (701) 328-9522  
Fax (701) 328-9524  
E-mail: [electric@nd.gov](mailto:electric@nd.gov)

Inquiries or proposals for amendments to the rules and wiring standards must be directed to the executive director.



provisions of North Dakota Century Code chapter 43-09 and all the requirements of the board.

#### **24.1-02-01-02. General statement of policy and interpretative rules.**

1. Purpose and scope. The purpose of these standards is the practical safeguarding of persons and of buildings and building contents from electrical hazards arising from the use or control of electricity for light, heat, power, and control thereof, fire detection systems, and power limited systems. It covers the electrical and power limited installations and associated equipment necessary for its safe operation.
2. These standards, based on the National Electrical Code, are the result of years of experience and research to meet the demand for uniform standards to govern electrical and power limited systems wiring in North Dakota, and provide basic rules for intelligent and uniform installation and inspection.
3. All requirements contained herein must be given careful consideration to ensure greatest permanence, convenience, and safety. These standards do not constitute a design specification for any particular installation, or an instruction manual for untrained individuals. Skill and experience are necessary factors for a safe and adequate wiring installation. Whenever these requirements differ or are in conflict with the requirements of the NFPA 70 2017 edition National Electrical Code and NFPA 101 2015 edition Life Safety Code® through December 31, 2020, and NFPA 70 2020, edition National Electrical Code and NFPA 101 2018 edition Life Safety Code® thereafter, and applicable articles in locally adopted codes or North Dakota State Building Code pertaining to fire detection, fire alarms, fire communications, and smoke detectors, the more restrictive requirements are the minimum.
4. Severability. If any section, sentence or clause, or provision of this chapter or the applicability thereof to any person or circumstances is held invalid, the remainder of this chapter and the application of such provision to other persons or circumstances are not affected thereby.

#### **24.1-02-01-03. Administrative powers and duties.**

1. The executive director, under the direction of the board, shall administer laws, rules, and wiring standards of this state, the electrical requirements of the NFPA 70 2017 edition National Electrical Code and applicable NFPA 72, 101, 110 2015 edition Life Safety Code® through December 31, 2020, and NFPA 70 2020 edition National Electrical Code and NFPA 72, 101, 110 2018 edition Life Safety Code® thereafter, and applicable articles in locally adopted codes or North Dakota State Building Code pertaining to fire detection, fire alarms, fire communications, and smoke detectors. Whenever any action is taken by the executive director to enforce the provisions of any sections contained in these electrical regulations, the NFPA 70 2017 edition National Electrical Code and NFPA 101 2015 edition Life Safety Code® through December 31, 2020, and NFPA 70 2020 edition National Electrical Code and NFPA 101 2018 edition Life Safety Code® thereafter, such acts must be done in the name of and on behalf of the state.
2. The electrical regulations of these standards, the NFPA 70 2017 edition National Electrical Code and NFPA 101 2015 edition Life Safety Code® through December 31, 2020, and NFPA 70 2020 edition National Electrical Code and NFPA 101 2018 edition Life Safety Code® thereafter, may be modified or waived by special permission in particular cases when such modification or waiver is specifically permitted or in particular cases when an advancement in the technology of electricity makes such modification or waiver advisable in the best interest of the people of North Dakota. Such "special permission", in all cases, must be obtained from the executive director in writing before the commencement of the work.
3. Whenever the board is authorized or mandated by law to inspect an electrical installation, the inspector may enter upon land for the purpose of conducting the inspection. Except in emergency circumstances, the inspector shall request permission from the property owner or agent before entering a dwelling, other building, or other place so enclosed as manifestly to exclude intruders. If the landowner refuses to give permission, the board may request the district court of the district containing the property for an order authorizing the inspector to enter the property to conduct the inspection. Emergency circumstances include situations presenting imminent danger to health, safety, or property.

**ARTICLE 24.1-03  
LICENSURE OF ELECTRICIANS**

Chapter  
24.1-03-01                      Licensing Requirements

**CHAPTER 24.1-03-01  
LICENSING REQUIREMENTS**

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24.1-03-01-09	.....Supervision and Responsibilities

**24.1-03-01-01. Application, examination, and annual license fees.**

1. Upon receiving an application packet for an electrician's license from an applicant, the board shall process and review the applicant's employment verification of electrical construction experience as outlined under this section. Upon final approval of the application by the board, the applicant shall be sent an invitation to take the examination. The invitation shall outline the available testing dates. Upon receiving the invitation, the applicant shall contact the board and inform the board as to the date chosen to take the examination. Examination fees shall be paid separately to the examination testing center provider, if required.
2. An applicant shall have the necessary qualifications, training, and technical knowledge to wire, install, and repair electrical apparatus and equipment in accordance with the standard rules and regulations of the National Electrical Code.
3. The board issues an identification card to currently licensed and registered electricians. This identification card, along with a government-issued picture identification card, shall be in the possession of the electrician when doing electrical work. If the identification card is misplaced or destroyed, a replacement charge to cover board costs shall be imposed.

4. The application fees are as follows:
  - a. Master license \$50.00
  - b. Journeyman license \$25.00
  - c. Class B license \$40.00
  - d. Apprentice registration \$10.00
  - e. Power limited license \$50.00
  - f. Power limited apprentice registration \$10.00
  
5. Effective November 1, 2020, annual renewals must be submitted electronically through the board's website.

The license and registration or annual renewal fees are as follows:

a.	Master license	\$50.00	Expires April 30 <sup>th</sup>
b.	Journeyman license	\$25.00	Expires March 31 <sup>st</sup>
c.	Class B license	\$40.00	Expires April 30 <sup>th</sup>
d.	Apprentice registration	\$10.00	Expires January 31 <sup>st</sup>
e.	Power limited license	\$50.00	Expires April 30 <sup>th</sup>
f.	Power limited apprentice registration	\$10.00	Expires January 31 <sup>st</sup>

Expired licenses and registrations shall require a reinstatement fee equal to the annual fee.

#### **24.1-03-01-02. Master electrician.**

A master electrician shall have at least two thousand hours of experience working as a licensed journeyman electrician under the supervision of a contracting master electrician or master of record. There are three categories of master electricians, which are as follows:

1. A contracting master is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards and has shown proof of liability insurance.
2. A master of record is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards for the partnership,

company, corporation, limited liability company, or association and has shown proof of liability insurance that the master of record is covered by the organization. The master of record is not allowed to work on other property other than property owned or leased by the organization.

3. A noncontracting master is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards and has the same responsibility as a journeyman electrician. Electrical work shall be done under the supervision of a contracting master or master of record.

#### **24.1-03-01-03. Journeyman electrician.**

A journeyman electrician shall have completed eight thousand hours experience, which experience may not be obtained in less than three years, registered as an apprentice electrician (of which up to three thousand hours may apply under the qualifications of a class B electrician) under the supervision of a contracting master or master of record licensed electrician in an area where electrical construction work is done in a jurisdiction with similar licensing and inspection rules to the state of North Dakota, and successfully completed apprentice electrician training. Two thousand hours credit may be granted for a graduate of a two-year or more electrical school accepted by the board. Practical experience consists of a minimum of four thousand hours and a maximum of eight thousand hours credit may be granted for wiring and installing electrical wiring, apparatus, and equipment. Practical electrical experience gained through a contracting master electrician also consists of an apprentice completing a board-approved training program. Credit allowed in other areas may include any combination of the following:

1. A maximum of one thousand hours credit for repairing electrical wiring, apparatus, and equipment and light, heat and power.
2. A maximum of one thousand hours credit for wiring fire alarm technology circuits or systems;
3. A maximum of two thousand hours credit for wiring process control circuits or power limited systems; and
4. A maximum of two thousand hours credit of electrical construction experience gained in the armed forces of the United States which the board has determined is equivalent to work performed under the supervision of a North Dakota licensed electrical contractor.

#### **24.1-03-01-04. Class B electrician.**

A class B electrician shall have completed three thousand hours experience in farmstead or residential wiring, in one-family or two-family dwellings, under the supervision of a master or class B electrician. Commercial wiring experience will not be credited for experience toward a class B license. One thousand hours credit will be granted for a graduate of a two-year electrical school approved by the board.

#### **24.1-03-01-05. Power limited electrician.**

A power limited electrician shall have completed six thousand hours experience, which experience may not be obtained in less than two and one-half years, registered as a power limited apprentice electrician under the supervision of a contracting master, master of record, contracting power limited, or a power limited electrician of record. Experience must be obtained where power limited electrical construction work is done in a jurisdiction with similar licensing and inspection rules to the state of North Dakota. The board also may approve licenses based on power limited education or a board-approved tradesman certification. Classification types of a power limited electrician must be defined by the board. There are three categories of power limited electricians, which are as follows:

1. A contracting power limited electrician is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards and has shown proof of liability insurance.
2. A power limited electrician of record is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards for the partnership, company, corporation, limited liability company, or association and has shown proof of liability insurance that the power limited electrician of record is covered by the organization. The power limited electrician of record is not allowed to work on other property other than property owned or leased by the organization.
3. A noncontracting power limited electrician is an individual responsible to adhere to all laws and rules of the North Dakota wiring standards. Power limited electrical work must be done under the supervision of a contracting master, master of record or a contracting power limited electrician or a power limited electrician of record.



#### **24.1-03-01-06. Provisional military spouse licensure.**

See North Dakota Century Code section 43-51-11.1

#### **24.1-03-01-07. Apprentice electrician.**

There are two categories of apprentice electrician training:

1. Apprentice electricians who have successfully completed at least two years of electrical school approved by the board.
2. Apprentice electricians who have successfully completed five hundred seventy-six hours of training classes recognized by the board. An applicant who has prior experience outside of the state of North Dakota may take a placement examination to verify the practical experience obtained in order to apply credit toward the verification of hours. If the applicant fails the placement examination, the applicant is ineligible to retake the examination. An appeal may be submitted in writing to the board within thirty days.

An apprentice electrician who has not successfully completed training as stated in subsection 1 or 2 is required to be registered with the board, but is not eligible to take the journeyman or class B license examination. If the individual receives a license from another state based on the verification that the majority of practical experience was obtained in the state of North Dakota the individual is not eligible for examination for licensure or a reciprocal license.

#### **24.1-03-01-08. Power limited apprentice electrician.**

A power limited apprentice electrician shall meet the following requirements to be eligible for examination:

1. A power limited apprentice must be registered with the board under the same classification as the power limited electrician under whom the apprentice will be working and have completed six thousand hours of work experience under the direct supervision of a power limited electrician; or
2. A power limited apprentice must possess a valid board recognized tradesman certification. An applicant who has prior experience outside of the state of North Dakota may take a placement examination to verify the practical experience obtained in order to

apply credit toward the verification of hours. If the applicant fails the placement examination, the applicant is ineligible to retake the examination. An appeal may be submitted in writing to the board within thirty days.

A power limited apprentice electrician who has not complied as stated in subsection 1 or 2 is not eligible to take the power limited electrician license examination. If the individual receives a license from another state based on the verification that the majority of practical experience was obtained in the state of North Dakota, the individual is not eligible for examination for licensure or a reciprocal license.

#### **24.1-03-01-09. Supervision and responsibilities.**

1. A licensed electrician shall supervise not more than three apprentices. An individual over sixteen years of age may work as an apprentice under a licensed master, class B or power limited electrician, but the master, class B or power limited electrician may not allow an apprentice to work on any installation without direct constant supervision by a North Dakota licensed electrician working with the apprentice at the worksite.
2. When an apprentice is found to be doing electrical or power limited work not under the direct supervision of a licensed electrician, an investigative fee may be charged to cover the costs incurred by the board. Costs are to be calculated at a rate of fifty dollars per hour and mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile of travel.
3. Contractors shall maintain records of all individuals who are or will be performing electrical or power limited work for that contractor and shall permit the electrical board to examine and copy all such records as required by this section. It is the responsibility of the master, class B, or power limited electrician to ensure all individuals who are or will be performing electrical or power limited work for that contractor either be licensed electricians or registered apprentices with the board. Credit may not be given for hours spent working under a power limited electrician to any applicant for a master, journeyman, or class B electrician license.
4. Any master, class B, or power limited electrician who fails or refuses to comply with this section or who fails or refuses to comply or demonstrate compliance with this section at the request of the

board or its representative shall subject that individual's license to nonrenewal, suspension, or revocation by the board.

5. A master, class B, or power limited electrician may exercise that person's privileges as a licensed master, class B, or power limited electrician for no more than one shop or business, and shall comply with provisions as required for contracting with the secretary of state's office as stated in North Dakota Century Code chapter 43-07. A master, class B, or power limited electrician must be actively engaged in the supervision of every project certified under that electrician's license. A master, class B, or power limited electrician shall notify the board office immediately upon changing their status for the business they represent.
6. Maintenance personnel regularly employed by the owner or property manager may maintain or make minor repairs to existing electrical wiring devices and appliances, but are precluded from extending or changing the characteristics of existing circuits, feeders, or other electrical apparatus.



4. The board shall be notified in writing no later than fifteen days prior to the date, time, and location of the class. A representative of the board shall be entitled to attend without charge and have the authority to audit or review education classes.
5. The board may withdraw approval of any educational classes not in compliance with this section.
6. The provider of the class shall forward an attendance list to the board on a form supplied by the board within fifteen days following the class. A certificate of completion shall also be provided to each attendee. Each certificate of completion and attendance list shall include the name of the provider, the name of the instructor, the class identification number, the date and location of the class, and the number of code and noncode hours of instruction for education units. For all classes, include the attendee's name, license or registration number, and last four digits of the electrician's social security number. It is the responsibility of the attendee to have a copy of this certificate of completion. The certificates shall be sent to the board only if requested by the board. The provider shall be responsible to keep accurate attendance by periodically checking attendees during the class. For providers that conduct continuing education classes in North Dakota, the attendance record shall be submitted to the board as required.
7. Continuing education credits can be deposited with the board for a period up to two license renewal periods. Continuing education credits will not be given for attending the same continuing education class more than once in a code cycle (example: same sponsor, same title, and same class approval number).

#### **24.1-04-01-03. Instructor qualifications.**

Instructors shall submit their qualifications to the board before the class. Classes may not be approved unless the instructor has one or more of the following qualifications:

1. A master electrician with at least one year's experience in electrical inspection.
2. A journeyman or master electrician who is certified as an instructor through a vocational education department.

3. An individual with a valid teaching accreditation from a trade or technical school, college, or university teaching an electrical curriculum.
4. A registered or licensed electrical engineer with at least four years' experience in design of premise electrical wiring systems.
5. A representative from the national fire prevention association, testing laboratories, international association of electrical inspectors, and other product manufacturer representatives with five years' practical experience in the subject taught.
6. Instructor of an apprenticeship training program.

**24.1-04-01-04. Education advisory committee.**

1. The board shall form an education advisory committee to review educational classes and programs required by the board.
2. The committee shall develop minimum requirements in the area of study for the electrical education of individuals registered and licensed by the board.
3. The committee shall review the approved classes and programs every five years or as necessary and submit a report to the board for final approval.
4. The executive director shall preside over the committee meetings.
5. The committee shall meet as deemed necessary, but no less than once per year.
6. Committee members may be reimbursed expenses of mileage and travel as per North Dakota Century Code sections 44-08-04 and 54-06-09.
7. The education advisory committee members may consist of individuals selected from the following categories:
  - a. The executive director of the board.
  - b. The training administrator of the board.

- c. A representative from a North Dakota college-approved electrical degree program.
- d. A representative from a North Dakota college-approved off-campus electrical correspondence or online program.
- e. A North Dakota registered professional electrical engineer.
- f. A North Dakota master electrician who is certified as an instructor through a vocational education department.
- g. A North Dakota journeyman electrician who is certified as an instructor through a vocational education department.
- h. A North Dakota power limited electrician who is certified as an instructor through a vocational education department.
- i. An individual having experience with an apprenticeship training program.





- c. A copy must be retained by the master, class B, or power limited electrician.
  - d. A copy must be left in or on the panel or given to the owner.
- 3. Certificates with job cost of twenty thousand dollars or less are valid twelve months from the original filing date. A new wiring certificate must be filed on all unfinished work.
- 4. E-certs are available upon request and submission of an application from any master, class B or power limited electrician holding a proper current license from the board. Electrical (paper) wiring certificates are available until August 31, 2020, or the effective date of the 2020 Laws, Rules & Wiring Standards. The master, class B, or power limited electrician is responsible for all certificates issued to and by that person. A charge of twenty-five dollars to cover board costs must be assessed on each lost electrical paper wiring certificate issued to any master, class B, or power limited electrician, unless returned to the board.
- 5. Whenever an electrical installation made by or under the supervision of a master, class B, or power limited electrician is commenced or in use without submitting an electrical wiring certificate, as directed in subsection 2, the certificate may be considered late and the normal inspection fee, as required under this section, is increased in the amount of fifty dollars. In addition when time and travel are expended by employees of the board to obtain a late certificate, an investigative fee may be charged to cover the costs incurred. Costs are to be calculated at a rate of fifty dollars per hour and mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile of travel.
- 6. Property owners who are self-wiring or doing their own electrical work shall comply with the following before any electrical work commences:
  - a. Notify the board office of intent to self-wire.
  - b. Must own and occupy the residential property or farmstead where the electrical work will be done.
  - c. Review plans or drawings depicting wiring to be done with the local electrical inspector.

- d. Inspection fees will be calculated as stated in this section with a minimum of fifty dollars.
- e. Certification and inspection are required as stated in this section.

**24.1-05-01-02. Fees.**

- 1. The electrical and power limited systems inspection fee shall be based on the total amount of the contract or total cost to the owner, including extras. This includes power limited systems in National Electrical Code chapter 5 special occupancies, articles 500 through 517.

The following items need not be included in the cost:

- a. Appliances, including dishwashers, heat pumps, air-conditioners, disposals, and similar equipment.
  - b. Heating, ventilating, and air-conditioning (HVAC) units.
  - c. Electric motors, PLC, generators; and
  - d. Industrial machines.
- 2. The contractor is responsible to collect the proper inspection fee on each installation. When the owner furnishes the material and the contractor furnishes the labor, the owner shall provide the contractor with the total amount expended for materials used in connection with the installation, and the contractor shall then calculate and collect the necessary inspection fee from the owner. Whenever materials are donated or removed from an existing installation and placed at another location or labor is donated to an installation, the contractor shall estimate the cost of these materials and labor and include the amount in the job cost for the purpose of calculating the proper inspection fee. The contractor shall maintain all job-related records for a minimum of four years and shall permit the board to examine and copy all such records as requested.
  - 3. It shall be grounds for discipline of a master, class B, or power limited electrician's license if it is discovered that they charged or collected from the customer an electrical inspection fee greater than the fee actually in effect.

4. Effective October 1, 2020, inspection fees shall be as follows:

Job Cost:	Inspection Fee:
Up to \$500.00	\$50.00 (minimum fee)
\$500.00 to \$20,000.00	\$50.00 for the first \$500.00 plus 1.25% on balance up to \$20,000.00
Over \$20,000.00	\$293.75 for the first \$20,000.00 plus 1/10 of 1% on balance over \$20,000.00

Effective July 1, 2024, inspection fees shall be as follows:

Job Cost:	Inspection Fee:
Up to \$500.00	\$50.00 (minimum fee)
\$500.00 to \$20,000.00	\$50.00 for the first \$500.00 plus 2% on balance up to \$20,000.00
Over \$20,000.00	\$440.00 for the first \$20,000.00 plus 1/10 of 1% on balance over \$20,000.00

5. Companies having supervision of elevators, dumbwaiters, electrically driven irrigation machine or out-of-state structures or skids installed in North Dakota shall submit reports to the board. The report shall be completed, signed by owner or manager, and forwarded to the board with the inspection fee. The inspection fee shall be as follows:
- Elevators and dumbwaiters having horsepower rating up to 5 horsepower - \$25.00
  - Elevators and dumbwaiters having horsepower rating 5 horsepower through 15 horsepower - \$40.00
  - Elevators and dumbwaiters having horsepower rating over 15 horsepower - \$60.00
  - Electrically driven irrigation machines - \$50.00

- e. Out-of-state structures or skids – Based on inspection fee schedule.
- 6. Whenever a correction order is written and corrections are not completed within the allotted time, there shall be an administration charge of fifty dollars, which shall be paid to the board by the master, class B, or power limited electrician.
- 7. All reinspections shall be paid for by the contractors at a minimum charge of one hundred dollars. In addition, an investigative fee may be charged to cover the costs incurred to be calculated at a rate of fifty dollars per hour and mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile of travel.
- 8. For inspections not covered in this section or special services, the fee shall be fifty dollars per hour, including travel time, plus mileage rates currently allowed by North Dakota Century Code section 54-06-09 per mile traveled.

#### **24.1-05-01-03. Carnivals, circuses, fairs and similar events.**

- 1. All carnivals, circuses, fairs, and similar events shall comply with article 525, 2017 edition, National Electrical Code through December 31, 2020, and article 525, 2020 edition, National Electrical Code thereafter.
- 2. All installations shall be approved by the electrical inspector before usage.
- 3. Each carnival, circus, fair, or similar event operating or intending to operate in North Dakota shall notify the North Dakota State Electrical Board, P.O. Box 7335, Bismarck, North Dakota 58507-7335, each year of its itinerary and make application for the initial inspection thirty days before the first engagement in the state. Failure to notify the board may result in expenses incurred for excess time and travel to inspect these installations.
- 4. The fee shall be paid to the inspector at the first engagement or inspection as follows:
  - a. \$15.00 each ride or concession;
  - b. \$15.00 reinspection fee on each unit, if required; and

- c. \$50.00 each transformer or generator truck.
- 5. Each ride or concession wired properly will be issued a certification of compliance, serving for an entire season, subject to subsequent inspections.
- 6. Minor code violations will be issued a correction order with instructions to correct each violation before the next engagement. A reinspection will be required.
- 7. The electrical inspector is empowered to write a correction order for immediate compliance should the inspector find a condition dangerous to life and property.

**ARTICLE 24.1-06**  
**ELECTRICAL WIRING STANDARDS**

Chapter	
24.1-06-01	General Requirements
24.1-06-02	Wiring and Protection
24.1-06-03	Wiring Methods and Materials
24.1-06-04	Appliances
24.1-06-05	Special Occupancies
24.1-06-06	Special Equipment

**CHAPTER 24.1-06-01**  
**GENERAL REQUIREMENTS**

Section	
24.1-06-01-10.....	Requirements for Electrical Installations
24.1-06-01-20 .....	Water Damaged Electrical Equipment
24.1-06-01-30.....	Markings of Means of Egress, Illumination of Means of Egress, and Emergency Lighting
24.1-06-01-40.....	Smoke Alarms, Heat Alarms, Fire Alarm Systems, and Carbon Monoxide Alarm Requirements for Evacuation and Life Safety

**24.1-06-01-10. Requirements for electrical installations.**

Electrical installations shall be planned to provide adequate capacity for the load.

1. Wiring systems shall have conductors of sufficient capacity to furnish each outlet without excessive line loss or voltage drop. The voltage drop shall not exceed five percent at the farthest outlet of power, heating and lighting loads, or combinations of such loads. (See appendix for example.)
2. All wiring materials and equipment shall be listed by nationally recognized testing laboratories to safeguard life and property. It is the duty of the electrical installer to secure permission from the executive director to use materials, devices, and methods of installation not specifically covered by these standards. Equipment not approved under a testing laboratory category shall be evaluated by a registered professional engineer and recorded on evaluation forms accepted by the board.

Exception: Manufacturing firms that install industrial machinery for use by the firm itself and employ professional engineers may evaluate the industrial machinery according to NFPA 79 or UL 508 Standards. This evaluation shall be maintained with the equipment at all times and a copy submitted to the board.

3. When wiring public school buildings, approval shall be received from the department of public instruction and the board.
4. Overhead conductors shall not cross over water wells or known sites where water wells may be drilled. A minimum distance of twenty feet [6.10 meters] in all directions shall be maintained for overhead conductors.
5. In the wiring of nursing homes and hospitals, reference shall be made to the state department of health for special requirements pertaining to operating rooms, delivery rooms, and emergency lighting.
6. Aluminum conductors in sizes smaller than no. 6 shall not be used. Aluminum conductors installed and all corresponding materials shall be approved by testing laboratories.
7. All new construction shall follow the energy-efficient related requirements for design and construction of buildings in accordance with the locally adopted codes or the State Building Code.

#### **24.1-06-01-20. Water damaged electrical equipment.**

Water damaged electrical equipment wiring and equipment exposed to water damage must comply with the following:

1. All breaker panel boards, breakers, fuses, disconnect switches, controllers, receptacles, switches, light fixtures, and electric heaters that have been submerged or exposed to water damage must be replaced or all electrical equipment, switchgear, motor control centers, boilers and boiler controls, electric motors, transformers, and other similar equipment, such as appliances, water heaters, dishwashers, ovens, and ranges that have been submerged must be reconditioned by the original manufacturer or by its approved representative or replaced.

2. Electrical wiring may require replacement depending on the type of wire or cable and what application it was listed for.
3. Splices and terminations must be checked to ensure compliance with article 110.14, 2017 edition, National Electrical Code through December 31, 2020, and article 110.14, 2020 edition, National Electrical Code thereafter.
4. Energized electrical panels that have been submerged must be de-energized to prevent loss of life and property.

Other recommendations can be found in "Guidelines for Handling Water Damaged Electrical Equipment" published by the national electrical manufacturers association (NEMA).

#### **24.1-06-01-30. Markings of means of egress, illumination of means of egress, and emergency lighting.**

The purpose of this section is to provide marking of means of egress, illumination of means of egress, and emergency lighting of means of egress. Installations must comply with the requirements of NFPA 101<sup>®</sup> (7.10.6 and 7.10.7), Life Safety Code<sup>®</sup>, 2015 edition through December 31, 2020, and NFPA 101<sup>®</sup> (7.10.6 and 7.10.7), Life Safety Code<sup>®</sup>, 2018 edition thereafter or more stringent locally adopted codes. A condensed guide is included in the appendix for convenience, for complete and official information refer to the applicable standard.

#### **24.1-06-01-40. Smoke alarms, heat alarms, fire alarm systems and carbon monoxide alarm requirements for evacuation and life safety.**

Alarm systems stated in this section shall be installed in accordance with the locally adopted codes or the State Building Code and state fire code under the supervision of a master or class B electrician. In new construction, all alarm systems shall receive their primary power from the building wiring and when primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

1. Dwelling units, congregate residences, and hotel or lodging house guest rooms that are used for sleeping purposes shall be provided with smoke alarms. Alarms shall be installed in accordance with the approved manufacturer's instructions.



- a. When more than one smoke alarm is required to be installed within an individual dwelling unit the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit. Smoke alarms shall be installed in the following locations:
- (1) In each sleeping room.
  - (2) Outside each separate sleeping area in the immediate vicinity of the sleeping rooms.
  - (3) On each additional story of the dwelling, including basements and habitable attics but not including crawl spaces and uninhabitable attics. In dwellings or dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.
  - (4) In dwelling units where the ceiling height of a room open to the hallway serving the bedrooms exceeds that of the hallway by twenty-four inches [60.96 centimeters] or more, smoke alarms shall be installed in the hallway and in the adjacent room.
- b. Heat alarms. For new construction, an approved heat alarm shall be installed in the attached single tenant garage of a residence and interconnected with the smoke alarms within the residence.
- c. Household fire alarm systems installed in accordance with NFPA 72 that include smoke alarms, or a combination of smoke detectors and audible notification device installed as required by this section for smoke alarms, shall be permitted. The household fire alarm system shall provide the same level of smoke detection and alarm as required by this section for smoke alarms. Where a household fire warning system is installed using a combination of smoke detector and audible notification device, it shall become a permanent fixture of the occupancy and owned by the homeowner. The system shall be monitored by an approved supervising station and be maintained in accordance with NFPA 72 upper level.

2. Apartment houses, hotels, and congregate residences shall be provided with a manual and automatic fire alarm system in accordance with the requirements of locally adopted codes or the State Building Code and state fire codes.
3. An approved carbon monoxide alarm shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages.

A table in the appendix is offered as a condensed guide for convenience. For further information consult the locally adopted codes or the State Building Code and state fire codes.

## CHAPTER 24.1-06-02 WIRING AND PROTECTION

### Section

24.1-06-02-10.....	(NEC 210) Branch Circuits
24.1-06-02-30.....	(NEC 230) Services
24.1-06-02-40.....	(NEC 240) Overcurrent Protection
24.1-06-02-50.....	(NEC 250) Grounding and Bonding

### **24.1-06-02-10. (NEC 210) Branch circuits.**

Branch circuits shall comply with article 210, 2017 edition, National Electrical Code through December 31, 2020, and article 210, 2020 edition, National Electrical Code thereafter.

1. The total connected load shall be divided as evenly as practicable, between the two ungrounded conductors of a three-wire system and three conductors of a four-wire wye system.
2. In a dwelling unit, a separate circuit with disconnect shall be provided for the purpose of operating or controlling electrical equipment for primary source heating units. Wiring requirements for fixed electrical space heating equipment is provided under article 424, 2017 edition, National Electrical Code through December 31, 2020, and article 424, 2020 edition, National Electrical Code thereafter.
3. A minimum of six 20-amp small appliance branch circuits shall be installed for counter receptacles in kitchens that are used to serve public gatherings at schools, churches, lodges, and similar buildings. Any island counter in these locations shall have at least one receptacle.
4. In dwelling occupancies. A minimum of three 20-amp small appliance branch circuits shall be installed to supply receptacle outlets in kitchen, pantry, dining room, and breakfast room. These circuits shall not supply other outlets and shall have conductors not smaller than no. 12. Two of these circuits shall supply receptacle outlets on or near work counter area and so arranged that adjacent receptacles are not on the same circuit.

5. In dwelling occupancies, one 20-amp bathroom circuit for receptacles shall not feed more than two bathrooms.
6. Fifteen and twenty ampere receptacles supplying sewer pumps and sump pumps shall not need arc fault circuit protection, but shall be ground-fault protected or a single receptacle on a dedicated circuit.
7. Fifteen and twenty ampere receptacles supplying power for garage door openers located in attached or detached garages associated with dwelling units shall be ground-fault protected or a single receptacle installed.
8. Portable cleaning equipment receptacle outlets shall be installed in corridors and located so that no point in the corridor along the floor line, measured horizontally, is more than twenty-five feet [7.62 meters] from an outlet.
9. Exception: 2017 edition, National Electrical Code through December 31, 2020, and 2020 edition, National Electrical Code thereafter, article 210.11(C)(4): Requirements shall not include buildings two hundred fifty square feet or smaller.
10. Exception: 2017 edition, National Electrical Code through December 31, 2020, and 2020 edition, National Electrical Code thereafter, article 210.12(A): AFCI protection is not required for the following:
  - a. Refrigeration appliances if a single receptacle on a dedicated circuit is installed;
  - b. Furnaces used for main heating source.

#### **24.1-06-02-30. (NEC 230) Services.**

Electrical services shall comply with article 230, 2017 edition, National Electrical Code through December 31, 2020, and article 230, 2020 edition, National Electrical Code thereafter.

1. Perpendicular mast used for support of a service may not be less than two-inch [5.08-centimeter] galvanized rigid steel conduit or intermediate metal conduit, fitted with storm collar flashing.

2. Outside switch location. The equipment may not be mounted lower than two feet [.6096 meter] above grade level unless listed for such purpose. If installed outside, the service or services must be installed on the structure or within ten feet of the structure.
3. All services in single-family dwellings must be located in a single accessible location.

Exception: Special permission shall be granted by the electrical inspector for a second service location to be added where there is no available space for the service equipment. The second service location must be installed in accordance with article 230.2, 2017 edition, National Electrical Code, through December 31, 2020, and article 230.2, 2020 edition, National Electrical Code thereafter.

4. Rating of service switch. Any new or old single-family dwelling where the main house panel or service is altered or repaired, the dwelling is moved, or where the dwelling is rewired, a minimum one hundred ampere service-rated panel must be installed. Replacement of service mast or meter enclosure is an alteration of the service.
  - a. A one hundred ampere main house panel must be installed using ungrounded conductors sized for the proper ampacity. The panel must contain provisions for a minimum of twenty full-sized branch circuit spaces.
  - b. A greater than one hundred ampere but less than two hundred ampere main house panel must be installed using ungrounded conductors sized for the proper ampacity. The panel or panels must contain provisions for a minimum of thirty full-sized branch circuit spaces.
  - c. A two hundred ampere or larger main house panel must be installed using ungrounded conductors sized for the proper ampacity. The panel or panels must contain provisions for a minimum of forty full-sized branch circuit spaces.
  - d. Service and feeder calculation for electric heating loads must be sized to one hundred twenty-five percent of the full load rating.
5. For the purpose of separating services within one building, each portion of a building separated by one or more fire walls must be

considered a separate building as defined by locally adopted codes or the State Building Code and state fire codes.

6. 230.67 surge protections for dwelling unit services is not required.

#### **24.1-06-02-40. (NEC 240) Overcurrent protection.**

Overcurrent protection must comply with article 240, 2017 edition, National Electrical Code through December 31, 2020, and article 240, 2020 edition, National Electrical Code thereafter.

1. Exterior overcurrent devices must be located at a height of no less than two feet [.6096 meters] above grade level to the bottom of the enclosure.

Exception: If raising the switch would exceed the height requirements of NEC 240.24(A).

2. Switchboards and panel boards may not be located in bathrooms, clothes closets, stairways, or crawl spaces.

#### **24.1-06-02-50. (NEC 250) Grounding and bonding.**

Grounding and bonding must conform to article 250, 2017 edition, National Electrical Code through December 31, 2020, and article 250, 2020 edition, National Electrical Code thereafter.

1. At motor connections, a bonding jumper sized in accordance with table 250.122, 2017 edition, National Electrical Code through December 31, 2020, and table 250.122, 2020 edition, National Electrical Code thereafter, must be provided around all flexible conduit. The bonding jumper is not required if a separate grounding conductor is included.
2. Grounding of metal outdoor lighting standards.
  - a. Definition of lighting standard is a pole exceeding twelve feet [3.66 meters] in height measured from the bottom of the base or from the intended grade level of poles.
  - b. The metal lighting standard must be connected to a one-half inch [12.70 millimeter] by ten-foot [3.05 meter] copperweld ground rod, or twenty feet [6.10 meters] of one or more bare or zinc galvanized or other electrically conductive coated

steel reinforcing bars or rods (rebar) of not less than one-half inch [1.27 centimeters] in diameter, by the means of a bonding jumper. The ten-foot [3.05 meter] ground rod must be driven in the center of the metal standard base and project slightly above the base. Both ground rod and equipment grounding conductor must be connected to the metal standards. The bonding jumper must be in accordance with 2017 edition, National Electrical Code through December 31, 2020, and 2020 edition, National Electrical Code thereafter, and in no case smaller than no. 8 copper or no. 6 aluminum.

3. The grounding electrode conductor must be connected to the grounded service conductor in the enclosure for the service disconnect.

## CHAPTER 24.1-06-03 WIRING METHODS AND MATERIALS

### Section

24.1-06-03-01.....(NEC 300) Wiring Methods

24.1-06-03-14.....(NEC 314) Boxes and Fittings

### **24.1-06-03-01. (NEC 300) Wiring methods.**

1. Agricultural buildings. This section covers all buildings housing livestock, poultry, and other areas of similar or like nature. All electrical panel boards, wiring devices, and equipment shall be installed in accordance with the provisions of article 547, 2017 edition, National Electrical Code through December 31, 2020, and article 547, 2020 edition, National Electrical Code thereafter.

A site-isolating device shall be permitted to be installed at the distribution point where two or more agricultural building structures are supplied from the distribution point.

2. Electric metallic tubing shall not be used in concrete below grade, in concrete slab or masonry in direct contact with earth. A vapor barrier, if used, will have no effect on the requirements of the section. Electric metallic tubing shall not be embedded in earth or fill.
3. Aluminum conduit shall not be installed in contact with earth or embedded in concrete.
4. The installation of rigid nonmetallic conduit shall comply with the provision of article 352, 2017 edition, National Electrical Code through December 31, 2020, and article 352, 2020 edition, National Electrical Code thereafter. Expansion fittings for rigid nonmetallic conduit shall be provided to compensate for thermal expansion and contraction in accordance with section 352.44, 2017 edition, National Electrical Code through December 31, 2020, and section 352.44, 2020 edition, National Electrical Code thereafter. When installed outdoors and above grade, one hundred forty degrees Fahrenheit [60 degrees Celsius] shall be considered the minimum change in degrees.
5. Fertilizer rooms, meatpacking plants, salt processing plants, and similar locations are judged to be occupancies where severe corrosive conditions are likely to be present. It is recommended



that nonmetallic conduit with nonmetallic boxes and fittings be used as the wiring method for such occupancies. Ferrous and nonferrous metal raceways shall be used providing the raceway, boxes, and fittings are properly protected against corrosion.

6. In any room of an existing building where the sheetrock or wall covering has been removed from all walls, the electrical wiring requirements shall comply with the provisions of 2017 edition, National Electrical Code through December 31, 2020, and 2020 edition, National Electrical Code thereafter.
7. Metal raceways or metal clad cable (type MC) rated for the environment shall be installed in the following occupancies:
  - a. Hospitals;
  - b. Nursing homes;
  - c. Related patient care areas;
  - d. Places of assembly; and
  - e. Dormitories designed to house more than sixteen people.

Metal raceways or metal clad cable (type MC) shall be used in fixed wiring methods including fire alarms along with metal boxes or nonmetallic raceways encased in not less than two inches of concrete.

Exception 1: As provided in article 640, 2017 edition, National Electrical Code, sound reproduction and similar equipment; in article 800, 2017 edition, National Electrical Code, communication circuits; and in article 725, 2017 edition, National Electrical Code, for class 2 and class 3 remote control and signaling circuits through December 31, 2020, and article 640, 2020 edition, National Electrical Code, sound reproduction and similar equipment; in article 800, 2020 edition, National Electrical Code, communication circuits; and in article 725, 2020 edition, National Electrical Code, for class 2 and class 3 remote control and signaling circuits thereafter.

Exception 2: Listed two-hour fire-rated cables as permitted in article 695.6, article 700.9D, and article 760, 2017 edition, National Electrical Code through December 31, 2020, and article 695.6,

article 700.9D, and article 760, 2020 edition, National Electrical Code thereafter.

Adjacent areas separated by an approved fire barrier may be wired in any approved wiring method in chapter 3 of the 2017 edition, National Electrical Code through December 31, 2020, and chapter 3 of the 2020 edition, National Electrical Code thereafter. For the purpose of this section, a fire barrier is defined as a continuous assembly, vertical or horizontal, in accordance with locally adopted codes or the State Building Code.

**24.1-06-03-14. (NEC 314) Boxes and fittings.**

1. Not more than one extension ring may be used on outlet boxes unless special permission has been obtained from the electrical inspector having jurisdiction.
2. Boxes or conduit bodies shall be installed at each opening, splice, or connection, except as provided in article 604, 2017 edition, National Electrical Code through December 31, 2020, and article 604, 2020 edition, National Electrical Code thereafter.

**CHAPTER 24.1-06-04  
EQUIPMENT FOR GENERAL USE**

Section

24.1-06-04-22      (NEC 422) Appliances

**24.1-06-04-22. (NEC 422) Appliances.**

Exception: 2017 edition, National Electrical Code, article 422.16 through December 31, 2020, and 2020 edition, National Electrical Code, article 422.16 thereafter: The use of not more than six feet of flexible appliance cord shall be permitted on permanently installed one hundred twenty volt twenty amp or less fuel-fired furnaces in residential dwellings. The receptacle for this appliance shall be GFCI protected, or a single receptacle, with a lockable in-use cover, and the cord shall meet all requirements of NEC 422.16.

## **CHAPTER 24.1-06-05 SPECIAL OCCUPANCIES**

### Section

24.1-06-05-01.....	(NEC 500) Hazardous Locations
24.1-06-05-50.....	(NEC 550) Mobile Home Parks

### **24.1-06-05-01. (NEC 500) Hazardous locations.**

1. Classification of hazardous locations is required to be completed by owner, representative, or engineer that has the qualifications and shall provide documentation as required by the provisions of article 500.4, 2017 edition, National Electrical Code through December 31, 2020, and article 500.4, 2020 edition, National Electrical Code thereafter, including the reference standards as listed in article 500.4, 2017 edition, National Electrical Code through December 31, 2020, and article 500.4, 2020 edition, National Electrical Code thereafter.
2. For classifications of oilfield installations refer to API RP 500, Classification of Locations for Electrical Installations at Petroleum Facilities, third edition, December 2012.
3. Surge arrestors shall be provided for all services in grain elevators.
4. Hot bearing or other similar detection systems shall be installed in accordance with articles 500-516, 2017 edition, National Electrical Code through December 31, 2020, and articles 500-516, 2020 edition, National Electrical Code thereafter.

### **24.1-06-05-50. (NEC 550) Mobile home parks.**

Service equipment may be installed on manufactured homes as required in article 550.32(b) if the following requirements are met:

1. The mobile home is located on property owned by the homeowner and not in mobile home park.
2. The mobile home is secured to a permanent foundation that complies with locally adopted codes or the State Building Code.

**CHAPTER 24.1-06-06**  
**SPECIAL EQUIPMENT**

Section

24.1-06-06-25. . . . . (NEC 625) Electric Vehicle Charging System

**24.1-06-06-25. (NEC 625) Electric vehicle charging system.**

625.41 Overcurrent protection. Overcurrent protection for feeders and branch circuits supplying vehicle charging equipment must be sized for continuous duty and must have a rating of not less than one hundred twenty-five percent of the maximum load of the equipment. For these installations, "maximum load of equipment" means the setting the electrician adjusted the device to. The adjustment may not be readily accessible or cannot easily be adjusted by the consumer. The electrician shall label the device if set to a value less than the maximum nameplate rating. The contractor shall assure the size of the service feeding these devices is adequate.

## APPENDIX

### Short Cut At 75° C Voltage Drop Formulas 167° F

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$$\text{Voltage drop} = \frac{K \times L \times I}{CMA}$$

$$CMA = \frac{K \times L \times I}{\% \text{ drop} \times \text{voltage}}$$

$$\text{Length} = \frac{CMA \times \text{Voltage drop}}{K \times I}$$

$$\text{Area of circle} = \pi r^2$$

L = length in feet, one way

I = load in amps

E = volts

CMA = circular-mil area

K-factor = 25.8 multiplying factor for copper, 42.4 multiplying factor for aluminum at 75°C.

For three-phase circuits, use formula, then multiply the results by .86

Percent drop permissible voltage drop times voltage of circuit as follows:

5% of 120	120 x .05 = 6 volts
5% of 208	208 x .05 = 10.4 volts
5% of 240	240 x .05 = 12 volts

Examples with copper wire:

240 volts, 1,000 foot distance, 10 ampere load, 5% volt drop maximum

$$CMA = \frac{25.8 \times 1000 \times 10}{.05 \times 240}$$

= 21,500 CMA minimum = #6 cu minimum

Same values as above but use #8 copper wire instead

$$\text{Voltage drop} = \frac{25.8 \times 1000 \times 10}{16510}$$

$$= 15.6 \text{ volts}/240 = 6.5\% \text{ volt drop}$$

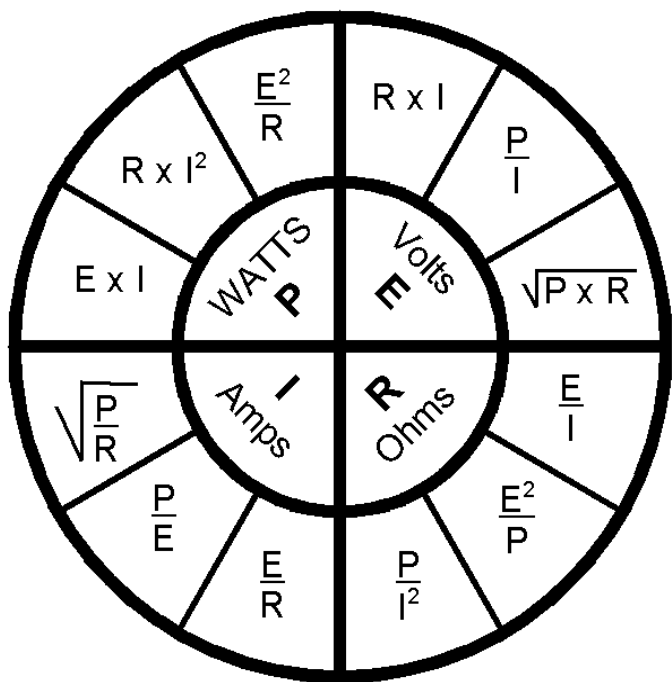
120 volts, 8 ampere load, 100 foot distance, 3% volt drop maximum

$$\text{CMA} = \frac{25.8 \times 100 \times 8}{.03 \times 120}$$

$$= 5733 \text{ CMA minimum} = \#12 \text{ cu minimum}$$

Refer to Chapter 9 Table 8 of NEC for conductor properties

# OHM'S LAW





## Means of Egress Condensed Guide

1. Marking of means of egress. All required exits and access to exits shall be marked by readily visible signs. For externally illuminated signs, letters shall be not less than six inches [150 millimeters] high. Internally illuminated signs shall be listed per ANSI/UL 924 which assures proper letter size. Chevron-shaped arrows are required to indicate direction to exits. Every sign shall be suitably illuminated. For externally illuminated signs see subsection 7.10.6, Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and subsection 7.10.6, Life Safety Code®, NFPA 101, 2018 edition thereafter and for internally illuminated signs see subsection 7.10.7.
2. Illumination of means of egress. Illumination of means of egress shall provide continuous, dependable, illumination of not less than one foot-candle at floor level for all areas such as corridors, stairways, and exit doorway, providing a lighted path of travel to the outside of the building and public way during all times that the means of egress is available for use. For new stairs, the required minimum illumination level is ten foot-candle during conditions of stair use. Illumination shall be from a source of reasonable assured reliability and may be supplied from normal lighting circuits or special circuits with switching controlled by authorized personnel. Illumination required for exit marking shall also serve for illumination of means of egress and shall be so arranged that failure of a single unit, such as burning out of a single bulb will not leave any area in darkness.
3. Emergency lighting. Emergency lighting systems shall be so arranged to provide the required illumination automatically in event of any interruption or failure of the normal power supply. An acceptable alternate source of power may be an electric generator or approved battery. In occupancies where emergency lighting is required, the circuits supplying exit marking and illumination of means of egress shall be supplied by the emergency system. Other areas of the facilities only requiring exit marking and illumination of means of egress may be supplied by the normal source.
4. Classification of occupancy based on chapter 6, Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and chapter 6, Life Safety Code®, NFPA 101, 2018 edition thereafter.

Note: Check with local building official to determine occupancy and occupant load.

Assembly. Assembly occupancies include all buildings or portions of buildings used for gathering together fifty or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, or awaiting transportation. Assembly occupancies also include special amusement buildings regardless of occupant load.

Assembly occupancies might include the following:

Armories	Libraries
Assembly halls	Mortuary chapels
Auditoriums	Motion picture theaters
Bowling lanes	Museums
Clubrooms	Passenger stations and terminals of air, surface, underground, and marine public transportation facilities
Colleges and university	Places of religious worship
Classrooms, fifty persons and over	Poolrooms
Conference rooms	Recreation piers
Courtrooms	Restaurants
Dance halls	Skating rinks
Drinking establishments	Theaters
Exhibition halls	Gymnasiums

Occupancy of any room or space for assembly purposes by fewer than fifty persons in a building or other occupancy and incidental to such other occupancy shall be classified as part of the other occupancy and shall be subject to the provisions applicable thereto.

Educational. Educational occupancies include all buildings or portions of buildings used for educational purposes through the twelfth grade by six or more persons for four or more hours per day or more than twelve hours per week.

Educational occupancies include the following:

Academies	Schools
Kindergartens	

Other occupancies associated with educational institutions shall be in accordance with the appropriate part of Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and Life Safety Code®, NFPA 101, 2018 edition thereafter.

In cases when instruction is incidental to some other occupancy, the section of Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and Life Safety Code®, NFPA 101, 2018 edition thereafter, governing such other occupancy applies. For example:

- College and university classrooms under fifty persons - business occupancy
- College and university classrooms fifty persons and over – assembly
- Instructional building - business occupancy
- Laboratories, instructional - business occupancy
- Laboratories, noninstructional - industrial

Day care. Day care occupancies include all buildings or portions of buildings in which four or more clients receive care, maintenance, and supervision, by other than their relatives or legal guardians, for less than twenty-four hours per day.

Day care occupancies include the following:

- Child day care occupancies
- Adult day care occupancies, except where part of a health care occupancy
- Nursery schools
- Day care homes
- Kindergarten classes that are incidental to a child day care occupancy

In areas when public schools offer only half-day kindergarten programs, many child day care occupancies offer state-approved kindergarten classes for children who require full day care. As these classes are normally incidental to the day care occupancy, the requirements of the day care occupancy should be followed.

Health care. Health care occupancies are those used for purposes such as medical or other treatment or care of persons suffering from physical or mental illness, disease, or infirmity and for the care of infants, convalescents, or infirm aged persons. Health care occupancies provide sleeping facilities for four or more occupants and are occupied by persons who are mostly incapable of self-preservation because of age, physical or mental disability, or because of security measures not under the occupants' control.

Health care occupancies include the following:

- Hospitals
- Nursing homes
- Limited care facilities

**Ambulatory health care.** Ambulatory health care occupancies are those used to provide services or treatment simultaneously to four or more patients on an outpatient basis. The patients are considered incapable of self-preservation due to the treatment rendered, the use of anesthesia, or the injury for which they are receiving emergency or urgent care.

**Detention and correctional.** Detention and correctional occupancies are used to house individuals under varied degrees of restraint or security and are occupied by persons who are mostly incapable of self-preservation because of security measures not under the occupants' control.

Detention and correctional occupancies include the following:

- Adult and juvenile substance abuse centers
- Adult and juvenile work camps
- Adult community residential centers
- Adult correctional institutions
- Adult local detention facilities
- Juvenile community residential centers
- Juvenile detention facilities
- Juvenile training schools

**Residential.** Residential occupancies are those occupancies in which sleeping accommodations are provided for normal residential purposes and include all buildings designed to provide sleeping accommodations.

**Exception.** Those classified under health care or detention and correctional occupancies.

Residential occupancies are treated separately in Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and Life Safety Code®, NFPA 101, 2018 edition thereafter, in the following groups:

- One-family and two-family dwelling unit
- Lodging or rooming house
- Hotels and Dormitories
- Apartment building
- Residential board and care occupancy

Mercantile occupancy. An occupancy used for the display and sale of merchandise.

Mercantile occupancies include the following:

Auction rooms	Restaurants with fewer than fifty persons
Department stores	Shopping centers
Drugstores	Supermarkets

Office, storage, and service facilities incidental to the sale of merchandise and located in the same building should be considered part of the mercantile occupancy.

Business. Business occupancies are those used for the transaction of business other than those covered under mercantile.

Business occupancies include the following:

Air traffic control towers (ATCTs)	Doctors' offices
City halls	Townhalls
College and university instructional buildings, classrooms under fifty persons, and instructional laboratories	General offices
Courthouses	Outpatient clinics, ambulatory
	Dentists' offices

Doctors' and dentists' offices are included unless of such character as to be classified as ambulatory health care occupancies.

Industrial. Industrial occupancies include factories making products of all kinds and properties devoted to operations such as processing, assembling, mixing, packaging, finishing or decorating, and repairing.

Industrial occupancies include the following:

Dry cleaning plants	Power plants
Factories of all kinds	Pumping stations
Food processing plants	Refineries
Gas plants	Sawmills
Hangars (for servicing or maintenance)	Telephone exchanges
Laundries	

In evaluating the appropriate classification of laboratories, the authority having jurisdiction should determine each case individually based on the extent and nature of the associated hazards. Some laboratories may be classified as occupancies other than industrial, for example, a physical therapy laboratory or a computer laboratory.

**Storage.** Storage occupancies include all buildings or structures utilized primarily for the storage or sheltering of goods, merchandise, products, vehicles, or animals.

Storage occupancies include the following:

Barns	Hangars (for storage only)
Bulk oil storage	Parking structures
Cold storage	Warehouses
Freight terminals	Truck and marine terminals
Grain elevators	

Storage occupancies are characterized by the presence of relatively small numbers of persons in proportion to the area. Any new use that increases the number of occupants to a figure comparable with other classes of occupancy changes the classification of the building to that of the new use.

**Multiple occupancies.** A building or structure in which two or more classes of occupancy exists shall be classified as a multiple occupancy. Multiple occupancies shall be protected either as mixed occupancies or as separated occupancies, in accordance with subsection 6.1.14.3 or 6.1.14.4, respectively, of Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and Life Safety Code®, NFPA 101, 2018 edition thereafter. Where exit access from an occupancy traverses another occupancy, the multiple occupancy shall be protected as a mixed occupancy. In implementing the mixed occupancies form of protection, the building shall comply with the most restrictive requirements of the occupancies involved, unless separate safeguards are approved.

#### 5. Occupant load factor table.

<b>Use</b>	<b>Square Feet per Person</b>
Assembly use – less concentrated use	15 net*
Areas of concentrated use without fixed seating	7 net*
Waiting space	3 net*
Bleachers, pews, and similar bench-type seating	Note 1
Fixed seating	Note 2
Kitchens	100 gross**

Libraries	
In stack areas	100 gross**
In reading rooms	50 net*
Swimming pools	
Water surface	50 gross**
Pool decks	30 gross**
Exercise rooms with equipment	50 gross
Exercise rooms without equipment	15 gross
Lighting and access catwalks, galleries, and gridirons	100 net
Casinos and similar gaming areas	11 gross
Skating rinks	50 gross
Stages	15 net*
Educational use	
Classroom area	20 net*
Shops, laboratories, and similar vocational areas	50 net*
Day care use	
Maximum number of persons intended to occupy that floor, but not less than	35 net*
Health care use	
Sleeping departments	120 gross**
Inpatient departments	240 gross**
Ambulatory health care	150 gross**
Detention and correctional use	
Maximum number of persons intended to occupy that floor, but not less than	120 gross**
Residential use	
Hotels, motels, dormitories, apartment buildings: <ul style="list-style-type: none"> <li>        Maximum probable population, but not less than</li> </ul>	200 gross**
Residential board and care use	Note 3
Mercantile use (including malls)	
Street level and below (sales)	30 gross**
Sales area on two or more street floors	40 gross
Upper floor (sales)	60 gross**
Storage, receiving, or shipping (not open to the general public)	300 gross**
Assembly areas	See "Assembly"
Business use (other than below)	150 gross**
Concentrated business use	50 gross**
Air traffic control tower observation levels	40 gross**
Collaboration rooms/spaces $\leq 450 \text{ ft}^2$ (41.8 $\text{m}^2$ ) in area	30 gross

Collaboration rooms/spaces > 450 ft <sup>2</sup> (41.8 m <sup>2</sup> ) in area	15 gross
Other purposes	Note 4
Industrial use	
General and high hazard industrial	100 gross**
Special purpose industrial	N/A
Storage use	
In storage occupancies	N/A
In mercantile occupancies	300 gross**
In other than storage and mercantile occupancies	500 gross**

\* Net floor area is the actual occupied area, not including accessory unoccupied areas or thickness of walls.

\*\* Gross floor area is the floor area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features.

Notes to occupant load table.

Note 1. Bleachers, pews, and similar bench-type seating: one person per eighteen linear inches.

Note 2. Fixed seating. The occupant load of an area having fixed seats shall be determined by the number of fixed seats installed. Required aisle space serving the fixed seats shall not be used to increase the occupant load.

Note 3. Refer to chapters 32 and 33 of Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and chapters 32 and 33 of Life Safety Code®, NFPA 101, 2018 edition thereafter.

Note 4. Occupant load factors associated with the use.

## 6. Building classification table.

x - indicates required

o - indicates not required

Occupancy	Marking of Means Egress	Illumination of Means Egress	Emergency Lighting
Assembly	x	x	x
Educational	x	x	x



Day care	x	x	x
Interior stairs and corridors	x	x	x
Assembly use spaces	x	x	x
Flexible and open plan buildings	x	x	x
Interior or limited access portions of buildings	x	x	x
Shops and laboratories	x	x	x
Family day care homes (more than three but fewer than seven persons)	o	x	o
Group day care homes (seven to twelve persons)	o	x	o
Health care occupancies (Note 1) (for complete details see article 517 of NEC and NFPA standard 99)	x	x	x
Detention and correctional	x	x	x
Residential			
Hotels and dormitories	x	x	x Note 2
Apartment buildings			
Twelve or less apartments	x	x	o Note 3
More than twelve apartments or greater than three stories in height	x	x	x Note 3
Residential board and care			
More than sixteen residents	x	x	x Note 2
Mercantile			
Class A – Over thirty thousand square feet [2787.09 square meters] or greater than three stories	x	x	x
Class B – Three thousand square feet to thirty thousand square feet [278.71 square meters to 2787.09 square meters] or three thousand square feet [278.71 square meters] or less and two or three stories	x	x	x
Class C – Under three thousand square feet [278.71 square meters] and one story	x Note 5	x	o
Malls	x	x	x
Business	x	x	o
Three or more stories in height	x	x	x
Fifty or more persons above or below level of exit discharge	x	x	x
Three hundred or more persons	x	x	x
All limited access and underground	x	x	x

Industrial	x	x Note 6	x Note 6 & 7
Storage	x	x Note 8	x Note 8 & 9

Special structures (refer to chapter 11, Life Safety Code®, NFPA 101, 2015 edition through December 31, 2020, and chapter 11, Life Safety Code®, NFPA 101, 2018 edition thereafter).

Mixed occupancies (Note 5).

#### NOTES:

Note 1. Exception: Power supply for exit and emergency lighting shall conform to NFPA 110.

Note 2. Exception: Where each guest room, guest suite or resident sleeping room has an exit direct to the outside of the building at street or ground level emergency lighting is not required.

Note 3. Exception: Buildings with only one exit need not be provided with exit signs.

Note 4. Exception: Where the same means of egress serve multiple use or combined occupancies, exit lighting, exit signs, and emergency lighting shall be provided for the occupancy with the most stringent lighting requirements. The occupant load of each type of occupancy shall be added to arrive at the total occupant load.

Note 5. Exception: Where an exit is immediately apparent from all portions of the sales area, the exit marking is not required.

Note 6. Exception: Special purpose industrial occupancies without routine human habitation.

Note 7. Exception: Structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination on all portions of the means of egress during these hours.

Note 8. Exception: Storage occupancies do not require emergency lighting when not normally occupied.

Note 9. Exception: In structures occupied only during daylight hours, with skylights or windows arranged to provide the required level of illumination of all portions of the means of egress during these hours, emergency lighting is not required.

## **Fire Alarm System Condensed Guide**

All signaling devices for all occupancies shall meet Americans with Disabilities Act (ADA) requirements (check ADA requirements).

Smoke alarms in hotels, motels, and apartments are not to be tied to the central alarm system (alarm in room or apartment only).

Central alarm trouble indicator shall be located where it will be heard.

Systems with two or more zones shall have an annunciator panel located at an entrance approved by the local fire department.

Cities shall have additional or more stringent requirements.

Be aware the table is the minimum and the owner or designer shall ask for more.