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2017 NEC CHANGES & CT LAW

Student Handout

4 Continuing Education Hours for

Connecticut Unlimited Electrical Licensees

Approved by the CT Occupational and Professional Licensing Division

JADE0819CT-U

INDEX

CONNECTICUT GENERAL STATUTES

CONNECTICUT GENERAL STATUTES

Sec. 20-332b. Hiring ratios re apprentices, journeymen and contractors.
Electrical, plumbing, heating, piping and cooling, sprinkler fitter and sheet metal work. Regulations. The Commissioner of Consumer Protection shall amend existing regulations of Connecticut state agencies adopted pursuant to section 20-332 to specify the following allowable hiring ratios regarding apprentices, journeymen and contractors for the following trades:

TRADE
Electrical, Plumbing, Heating, Piping and Cooling,
Sprinkler Fitter and Sheet Metal Work

Apprentices	Licensees (Journeymen or Contractors)
1	1
2	2
3	3
4	6
5	9
6	12
7	15
8	18
9	21
10	24

Ratio continues at 3 Journeypersons
To 1 Apprentice

Sec. 20-332-15a. Employment of apprentices

(a) Nothing in Chapter 393 of the General Statutes shall be construed to prohibit the employment of apprentices.

(b) An apprentice may perform the work for which he is being trained only in the presence and under the direct supervision of a licensed contractor or journeyman in his trade, and shall comply with all the regulations pertaining thereto.

(c) No apprentice shall at any time engage in any of the work for which a license is required without direct supervision. Direct supervision shall mean under the guidance of a licensed contractor or journeyman and within the sight and/or hearing of said licensed person.

(d) Any person who encourages or permits an apprentice or helper to so engage in the work or occupation for which a license is required without direct supervision shall also be subject to appropriate disciplinary action. The contractor who obtains the permit for the work for which a license is required shall be deemed to have encouraged or permitted the apprentice or helper to work without direct supervision for the purpose of disciplinary action by the appropriate board.

(e) Ratios

Nothing in Chapter 393 of the General Statutes shall be construed to prohibit the employment of apprentices by a licensed contractor in the electrical, plumbing, heating, piping and cooling, sprinkler fitter or sheet metal work trades according to the following schedule:

TRADE

Electrical, Plumbing, Heating, Piping and Cooling, Sprinkler Fitter and Sheet Metal Work

Apprentices	Licensees (Journeymen or Contractors)
1	1
2	2
3	3
4	6
5	9
6	12
7	15
8	18
9	21
10	24

Ratio continues at 3 Journeypersons To 1 Apprentice

(f) How to register as an apprentice.

(1) No apprentice shall perform the work of any occupation covered by Chapter 393 of the General Statutes unless he has first obtained a card of registration from the Connecticut Department of Labor.

(2) Prior to employing an apprentice, the contractor shall communicate immediately with the Connecticut Department of Labor to request registration of said apprentice.
(3) When registration is requested for an area of the trade which is not available through the Connecticut Department of Labor, said contractor shall make his request to the appropriate board prior to the employment of the apprentice.
(Effective November 20, 1992; Amended June 10, 2011; Amended December 8, 2017)

Sec. 20-332-16. Prohibited acts. Records. Lettering on commercial vehicles

(a) Any licensee who installs, performs or directs the performance of work in violation of any applicable state statute, state code, or state regulation, any municipal code or ordinance, any of these regulations, or who violates generally accepted basic trade practices shall be subject to disciplinary action by the appropriate board.

(b) Licensed contractors alone shall be permitted to acquire building permits to perform work covered by chapter 393 of the General Statutes and the regulations promulgated thereunder. In order to apply for a building permit to perform work covered by chapter 393 of the General Statutes and the regulations adopted thereunder a contractor shall be directly employed by the business on a regular and full time basis. In applying for the building permit to perform work covered by chapter 393 of the General Statutes and the regulations promulgated thereunder the contractor is attesting to the fact that he is responsible for and will directly supervise the work being performed under said permit. Except as provided for in Section 20-338b of the General Statutes, the licensed contractor must sign each building permit application personally and may not delegate the signing of the permit to any employee, subcontractor or other agent. Any licensed contractor who violates these regulations shall be subject to disciplinary action by the appropriate board.

(c) No licensee shall engage in or offer to engage in business under any name other than that stated on his application for a license unless he has notified the board ten days prior to using the new name.

(d) Any holder of a journeyman's license who performs work without being in the direct and regular employ of a properly licensed contractor shall be subject to disciplinary action by the appropriate board.

(e) All licensed contractors shall keep a record of all employees they employ and exhibit such records to the Commissioner or her agents upon request.

(f) No one shall perform any work beyond the limitations stated on his license regardless of the type of license his employer holds. Further, no one holding a limited or unlimited journeyman's license can perform any work beyond the limitations of the license held by the contractor for whom he is employed.

(g) The lettering of the state license numbers required to be displayed on all commercial vehicles used in the contractor's business shall be at least one inch high and legible.

(h) Any holder of a contractor's license who installs, performs or directs the performance of work for which a building permit is required shall cause said performance of work to be performed by a person licensed or registered under the provisions of Section 20-334 of the General Statutes. The contractor who obtains the building permit shall be deemed to have caused or directed the performance of all work performed under the building permit.

(i) No person shall use solder containing more than 0.2 per cent lead in making joints and fitting in any public or private plumbing, heating or cooling system, or fire protection system as defined in Sections 20-330 (3), 20-330- (5) and 20-330 (9) of the general statutes.

(Effective October I, 1993)

Sec. 20-335. License fee.

Continuing professional education requirements. Expiration and renewal. Any person who has successfully completed an examination for such person's initial license under this chapter shall pay to the Department of Consumer Protection a fee of one hundred fifty dollars for a contractor's license or a fee of one hundred twenty dollars for any other such license. Any such initial license fee shall be waived for persons who present a recommendation for review issued pursuant to section 31-22u. All such licenses shall expire annually. No person shall carry on or engage in the work or occupations subject to this chapter after the expiration of such person's license until such person has filed an application bearing the date of such person's registration card with the appropriate board. Such application shall be in writing, addressed to the secretary of the board from which such renewal is sought and signed by the person applying for such renewal. A licensee applying for renewal shall, at such times as the commissioner shall by regulation prescribe, furnish evidence satisfactory to the board that the licensee has completed any continuing professional education required under sections 20-330 to 20-341, inclusive, or any regulations adopted thereunder. The board may renew such license if the application for such renewal is received by the board no later than one month after the date of expiration of such license, upon payment to the department of a renewal fee of one hundred fifty dollars in the case of a contractor and of one hundred twenty dollars for any other such license. For any completed renewal application submitted pursuant to this section that requires a hearing or other action by the applicable examining board, such hearing or other action by the applicable examining board shall occur not later than thirty days after the date of submission for such completed renewal application. The department shall issue a receipt stating the fact of such payment, which receipt shall be a license to engage in such work or occupation. A licensee who has failed to renew such licensee's license for a period of over two years from the date of expiration of such license shall have it reinstated only upon complying with the requirements of section 20-333. All license fees and renewal fees paid to the department pursuant to this section shall be deposited in the General Fund.

Sec. 20-338a. Work required to be performed by licensed persons.
Any contractor who applies for a building permit from a local building official for any work required to be performed by a person licensed under the provisions of this chapter, shall cause such work to be performed by a person licensed under the provisions of this chapter.

Sec. 20-338b. Building permit applications. Who may sign.
Any licensed contractor who seeks to obtain a permit from a building official may sign the building permit application personally or delegate the signing of the building permit application to an employee, subcontractor or other agent of the licensed contractor, provided, the licensed contractor's employee, subcontractor or other agent submits to the building official a dated letter on the licensed contractor's letterhead, signed by the licensed contractor, stating that the bearer of the letter is authorized to sign the building permit application as the agent of the licensed contractor. The letter shall not be a copy or a facsimile, but shall be an original letter bearing the original signature of the licensed contractor. The letter shall also include: (1) The name of the municipality where the work is to be performed; (2) the job name or a description of the job; (3) the starting date of the job; (4) the name of the licensed contractor; (5) the name of the licensed contractor's agent; and (6) the license numbers of all contractors to be involved in the work.

Sec. 20-338c. Work not to commence until permit obtained.
No person licensed pursuant to sections 20-330 to 20-341, inclusive, shall commence work within the scope of sections 20-330 to 20-341, inclusive, unless each applicable permit with respect to the specific work being performed by such licensee has been obtained as required pursuant to local ordinances and the general statutes.

Sec. 20-340. Exemptions from licensing requirements.

The provisions of this chapter shall not apply to: (1) Persons employed by any federal, state or municipal agency; (2) employees of any public service company regulated by the Public Utilities Regulatory Authority or of any corporate affiliate of any such company when the work performed by such affiliate is on behalf of a public service company, but in either case only if the work performed is in connection with the rendition of public utility service, including the installation or maintenance of wire for community antenna television service, or is in connection with the installation or maintenance of wire or telephone sets for single-line telephone service located inside the premises of a consumer; (3) employees of any municipal corporation specially chartered by this state; (4) employees of any contractor while such contractor is performing electrical-line or emergency work for any public service company; (5) persons engaged in the installation, maintenance, repair and service of electrical or other appliances of a size customarily used for domestic use where such installation commences at an outlet receptacle or connection previously installed by persons licensed to do the same and maintenance, repair and service is confined to the appliance itself and its internal operation; (6) employees of industrial firms whose main duties concern the maintenance of the electrical work, plumbing and piping work, solar thermal work, heating, piping, cooling work, sheet metal work, elevator installation, repair and maintenance work, automotive glass work or flat glass work of such firm on its own premises or on premises leased by it for its own use; (7) employees of industrial firms when such employees' main duties concern the fabrication of glass products or electrical, plumbing and piping, fire protection sprinkler systems, solar, heating, piping, cooling, chemical piping, sheet metal or elevator installation, repair and maintenance equipment used in the production of goods sold by industrial firms, except for products, electrical, plumbing and piping systems and repair and maintenance equipment used directly in the production of a product for human consumption; (8) persons performing work necessary to the manufacture or repair of any apparatus, appliances, fixtures, equipment or devices produced by it for sale or lease; (9) employees of stage and theatrical companies performing the operation, installation and maintenance of electrical equipment if such installation commences at an outlet receptacle or connection previously installed by persons licensed to make such installation; (10) employees of carnivals, circuses or similar transient amusement shows who install electrical work, provided such installation shall be subject to the approval of the State Fire Marshal prior to use as otherwise provided by law and shall comply with applicable municipal ordinances and regulations; (11) persons engaged in the installation, maintenance, repair and service of glass or electrical, plumbing, fire protection sprinkler systems, solar, heating, piping, cooling and sheet metal equipment in and about single-family residences owned and occupied or to be occupied by such persons; provided any such installation, maintenance and repair shall be subject to inspection and approval by the building official of the municipality in which such residence is located and shall conform to the requirements of the State Building Code; (12) persons who install, maintain or repair glass in a motor vehicle owned or leased by such persons; (13) persons or entities holding themselves out to be retail sellers of glass products, but not such persons or entities that also engage in

automotive glass work or flat glass work; (14) persons who install preglazed or preassembled windows or doors in residential or commercial buildings; (15) persons registered under chapter 400 who install safety-backed mirror products or repair or replace flat glass in sizes not greater than thirty square feet in residential buildings; (16) sheet metal work performed in residential buildings consisting of six units or less by new home construction contractors registered pursuant to chapter 399a, by home improvement contractors registered pursuant to chapter 400 or by persons licensed pursuant to this chapter, when such work is limited to exhaust systems installed for hoods and fans in kitchens and baths, clothes dryer exhaust systems, radon vent systems, fireplaces, fireplace flues, masonry chimneys or prefabricated metal chimneys rated by Underwriters Laboratories or installation of stand-alone appliances including wood, pellet or other stand-alone stoves that are installed in residential buildings by such contractors or persons; (17) employees of or any contractor employed by and under the direction of a properly licensed solar contractor, performing work limited to the hoisting, placement and anchoring of solar collectors, photovoltaic panels, towers or turbines; (18) persons performing swimming pool maintenance and repair work authorized pursuant to section 20-417aa; and (19) any employee of the Connecticut Airport Authority covered by a state collective bargaining agreement.

Sec. 20-341. Penalties for violations.

(a) Any person who wilfully engages in or practices the work or occupation for which a license is required by this chapter or chapter 399b without having first obtained an apprentice permit or a certificate and license for such work, as applicable, or who wilfully employs or supplies for employment a person who does not have a certificate and license for such work, or who wilfully and falsely pretends to qualify to engage in or practice such work or occupation, including, but not limited to, offering to perform such work in any print, electronic, television or radio advertising or listing when such person does not hold a license for such work as required by this chapter, or who wilfully engages in or practices any of the work or occupations for which a license is required by this chapter after the expiration of such person's license, shall be guilty of a class B misdemeanor, except that no criminal charges shall be instituted against such person pursuant to this subsection unless the work activity in question is reviewed by the Commissioner of Consumer Protection, or the commissioner's authorized agent, and the commissioner or such agent specifically determines, in writing, that such work activity requires a license and is not the subject of a bona fide dispute between persons engaged in any trade or craft, whether licensed or unlicensed. Notwithstanding the provisions of subsection (d) or (e) of section 53a-29 and subsection (d) of section 54-56e, if the court determines that such person cannot fully repay any victims of such person within the period of probation established in subsection (d) or (e) of section 53a-29 or subsection (d) of section 54-56e, the court may impose probation for a period of not more than five years. The penalty provided in this subsection shall be in addition to any other penalties and remedies available under this chapter or chapter 416.

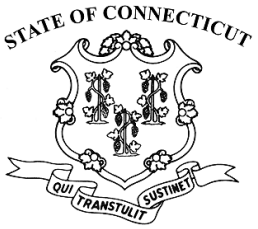
(b) The appropriate examining board or the Commissioner of Consumer Protection may, after notice and hearing, impose a civil penalty for each violation on any person who (1) engages in or practices the work or occupation for which a license or apprentice registration certificate is required by this chapter, chapter 394, chapter 399b or chapter 482 without having first obtained such a license or certificate, or (2) wilfully employs or supplies for employment a person who does not have such a license or certificate or who wilfully and falsely pretends to qualify to engage in or practice such work or occupation, or (3) engages in or practices any of the work or occupations for which a license or certificate is required by this chapter, chapter 394, chapter 399b or chapter 482 after the expiration of the license or certificate, or (4) violates any of the provisions of this chapter, chapter 394, chapter 399b or chapter 482 or the regulations adopted pursuant thereto. Such penalty shall be in an amount not more than one thousand dollars for a first violation of this subsection, not more than one thousand five hundred dollars for a second violation of this subsection and not more than three thousand dollars for each violation of this subsection occurring less than three years after a second or subsequent violation of this subsection, except that any individual employed as an apprentice but improperly registered shall not be penalized for a first offense.

(c) If an examining board or the Commissioner of Consumer Protection imposes a civil penalty under the provisions of subsection (b) of this section as a result of a violation initially reported by, a municipal building official in accordance with subsection (c) of section 29-261, the commissioner shall, not less than sixty days after collecting such civil penalty, remit one-half of the amount collected to such municipality.

(d) A violation of any of the provisions of this chapter shall be deemed an unfair or deceptive trade practice under subsection (a) of section 42-110b.

(e) This section shall not apply to any person who (1) holds a license issued under this chapter, chapter 394, chapter 399b or chapter 482 and performs work that is incidentally, directly and immediately appropriate to the performance of such person's trade where such work commences at an outlet, receptacle or connection previously installed by a person holding the proper license, or (2) engages in work that does not require a license under this chapter, chapter 394, chapter 399b or chapter 482.

RATIO OF APPRENTICES TO LICENSED TRADESPERSON



Substitute Senate Bill No. 353

Public Act No. 17-76

AN ACT ESTABLISHING AN APPRENTICE, JOURNEYMEN AND CONTRACTOR WORKING GROUP.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. (NEW) (*Effective from passage*) (a) There is established a working group to discuss hiring ratios for apprentices, journeymen and contractors and study the hiring ratio relief process. The working group shall meet at least three times annually and shall study and make recommendations related to apprentices, journeymen and contractors.

(b) The working group shall consist of ten members, and shall be evenly divided between members of the following union and nonunion industry trade groups: The International Brotherhood of Electrical Workers, the Independent Electrical Contractors of New England, the Associated Builders and Contractors of Connecticut, Sheet Metal Local 40, Sprinkler Fitters Local 669, the Connecticut Chapter of American Fire Sprinkler Association, the United Association of Plumbers and Pipefitters Local 777, the Plumbing Heating and Cooling Contractors of Connecticut, the Connecticut Heating and Cooling Contractors and the Connecticut State Building and Construction Trades Council. Each union industry trade group member shall be either the business manager of such group or such

business manager's designee from such group. Each nonunion industry trade group member shall be either the president of such group or such president's designee from such group.

(c) Such members shall be selected as follows:

(1) Two union members appointed by the speaker of the House of Representatives;

(2) Two union members appointed by the president pro tempore of the Senate;

(3) One nonunion member appointed by the majority leader of the House of Representatives;

(4) One union member appointed by the majority leader of the Senate;

(5) Two nonunion members appointed by the minority leader of the House of Representatives; and

(6) Two nonunion members appointed by the minority leader of the Senate.

(d) All appointing authorities shall consult with the chairpersons and ranking members of the joint standing committee of the General Assembly having cognizance of matters relating to the Department of Consumer Protection prior to making any appointments pursuant to this section.

(e) All appointments to the working group shall be made not later than thirty days after the effective date of this section. Any vacancy shall be filled by the appointing authority.

(f) The members of the working group shall select the chairpersons of the working group from among the members of the group. One

chairperson shall be a union member and one chairperson shall be a nonunion member. Such chairpersons shall schedule the first meeting of the working group.

(g) The administrative staff of the joint standing committee of the General Assembly having cognizance of matters relating to the Department of Consumer Protection shall serve as administrative staff of the working group.

(h) Not later than December 1, 2017, and annually thereafter, the working group shall submit a report on its recommendations to the joint standing committee of the General Assembly having cognizance of matters relating to the Department of Consumer Protection, in accordance with the provisions of section 11-4a of the general statutes.

Sec. 2. Section 20-332b of the general statutes is repealed and the following is substituted in lieu thereof (*Effective from passage*):

The Commissioner of Consumer Protection shall amend existing regulations of Connecticut state agencies adopted pursuant to section 20-332 to specify the following allowable hiring ratios regarding apprentices, journeymen and contractors for the following trades:

TRADE

Electrical, Plumbing, Heating, Piping and Cooling,
Sprinkler Fitter and Sheet Metal Work

Apprentices	Licensees (Journeymen or Contractors)
1	1
2	2
3	**[**5**]** <u>3</u>
4	**[**8**]** <u>6</u>

5	**[**11**]**	9
6	**[**14**]**	12
7	**[**17**]**	15
8	**[**20**]**	18
9	**[**23**]**	21
10	**[**26**]**	24

Ratio continues at 3 Journeypersons
To 1 Apprentice

Approved June 27, 2017

CONNECTICUT DEPARTMENT OF LABOR APPLICATION FOR APPRENTICESHIP RATIO RELIEF

******Ratio Relief applicants must advertise open journey person position(s) for 30 days on CThires.com prior to subcommittee review of application beginning January 1, 2018****

Ratio Relief is intended to help when qualified Journey workers cannot be found

GENERAL INFORMATION

1. Name of Firm/Sponsor _____ Date of Application _____
   dba Name, if any _____
   Mailing Address _____ Zip Code _____
   Physical Location _____ Zip Code _____
   City _____ County/State _____
   Trade _____ License Category _____
   Email _____ Phone # _____ Fax # _____

2. Type of Firm (Check only one) □ Corporation □ Partnership □ Proprietorship □ Joint Venture □ LLC
3. How many years has the
   Firm been in business? _____ Under the same name? _____ Program Approval Date _____
4. Number of previous requests for ratio relief within the past five years _____
5. Please answer the following questions & attach the proper documentation:
   □ yes □ no A. Is the Firm actively seeking Journey workers? □ yes □ no B. Is the Firm actively seeking Apprentices?
   □ yes □ no C. Registered and posted job listing with CT Hires? www.cthires.com Job # _____
   Please attach a copy of the CT Hires job listing. ***THIS IS A REQUIREMENT***
   □ yes □ no D. Advertising for licensed position(s)? Please attach all copies.

6. Within the past five years has the firm, any affiliate, (including any contractor of record), any predecessor company or entity, owner of 5.0% or more of the firm's shares, director, officer, partner, or proprietor been subject of: (check any that apply and explain under sponsor remarks. It is imperative that a full explanation of the circumstances relating to a "yes" statement be submitted to ensure an objective evaluation by the Department. Attach additional pages if necessary).

   □ yes □ no A. A judgment or conviction of any business related conduct constituting a crime under state or federal law?
   □ yes □ no B. A currently pending indictment for any business-related conduct constituting a crime under state or federal law?
   □ yes □ no C. A grant of immunity for any business-related conduct constituting a crime under state or federal law or regulation?
   □ yes □ no D. Any final determination of a violation of any federal labor law or regulation?
   □ yes □ no E. Any OSHA violation that was categorized as willful, repeat, failure to abate, or was based on retaliating against an employee for filing a safety or health complaint.
   □ yes □ no F. Any final determination of a violation of any state labor law or regulation?
   Public work violation? □ yes □ no Was this violation willful? □ yes □ no
   □ yes □ no G. A consent order with the Connecticut Department of Environmental Protection, or a federal or state enforcement determination involving a construction-related violation of federal or state environmental laws?
   □ yes □ no H. A debarment from federal contracts for violation of the Davis-Bacon Act, 49 Stat. 101(1931), 40 USC 278a-2?
   □ yes □ no I. A debarment from state contracts for violation of Connecticut's prevailing wage law pursuant to Conn. Gen. Stat. Section 31-53a?
   □ yes □ no J. A debarment or suspension for violation of any other state prevailing wage law?
   □ yes □ no K. Rejection of any bid or proposed subcontract or general contract for lack of responsibility pursuant to state law?
   □ yes □ no L. Any final determination of a violation of any state occupational licensing statute or regulation?
   □ yes □ no M. A consent order entered into with the Connecticut Department of Consumer Protection or any other state or federal government agency?
   □ yes □ no N. Any pending enforcement proceeding by a federal, state or municipal agency regarding an alleged violation of the law?
   □ yes □ no O. Are all current apprentices attending related instruction (if required)?

AT-8 (Rev. 9/17)

SPONSOR _____ TRADE _____

CURRENT NUMBER OF JOURNEYPERSONS EMPLOYED _____

CURRENT NUMBER OF PRE-APPRENTICES REGISTERED _____

CURRENT NUMBER OF APPRENTICES REGISTERED _____

CURRENT NUMBER OF APPRENTICES (STATUS)

YEAR 1 _____ YEAR 2 _____ YEAR 3 _____ YEAR 4 _____ YEAR 5 _____ YEAR 6 _____

NUMBER OF APPRENTICES RATIO RELIEF IS REQUESTED FOR? _____ TRADE _____

Is this request for a CT Technical High School graduate? □ yes □ no School Attended? _____
Is this request for a pre-apprentice student? □ yes □ no
Is this request for a U.S. Military Veteran? □ yes □ no

CUMULATIVE APPRENTICESHIP RECORD (based on previous five years)
Registered _____ *Completed _____

* Completed is defined as those individuals who have been awarded a certificate of completion per the Regulations of Connecticut State Agencies, Sec. 31-51d-2(h).

PRE-APPRENTICE STARTING (WAGE) RATE $ _____

APPRENTICE STARTING (WAGE) RATE $ _____ or _____%

JOURNEYPERSON COMPLETION (WAGE) RATE $ _____

TOTAL NUMBER OF JOURNEYPERSONS TERMINATED IN THE PAST FIVE YEARS? _____

TOTAL NUMBEROF JOURNEYPERSONS WHO VOLUNTARILY QUIT IN THE PAST FIVE YEARS? _____

TOTAL NUMBER OF APPRENTICES TERMINATED IN THE PAST FIVE YEARS? _____ PRE-APPRENTICES _____

TOTAL NUMBER OF APPRENTICES WHO VOLUNTARILY QUIT IN THE PAST FIVE YEARS? _____ PRE-APPRENTICES _____

TERMINATION DATA (based on previous five years)

TERMINATION CODES	NUMBER OF APPRENTICES TERMINATED
1. Discharged/Released	_____
2. Left to accept related employment	_____
3. Left to accept other employment	_____
4. Unsatisfactory Performance	_____
5. Lack of work	_____
6. Entered military service	_____
7. Illness/death	_____
8. Voluntarily quit	_____
9. Probationary period – discharge/voluntary quit	_____
Total	_____

SPONSOR REMARKS (Reason(s) for request, attach additional sheet if necessary):

CERTIFICATION: The undersigned acknowledges that this questionnaire is submitted for the express purpose of inducing the Connecticut Labor Department to authorize the hiring of apprentices in a certain ratio to journeypersons under its state apprenticeship program pursuant to Section 31-51d-5(l) of the Regulations of Connecticut State Agencies. Applicant acknowledges that the Department may, in its discretion, determine the truth and accuracy of all statements made herein. Applicant further acknowledges that intentional submission of false or misleading information in this application may constitute reasonable cause for institution of a formal de-registration proceeding against applicant's apprenticeship program pursuant to Section 31-51d-7 of the Regulations of Connecticut State Agencies. Applicant states and certifies under penalty of law (Conn. Gen. Stat. Section 53a-175 Class A Misdemeanor) that the information submitted in this questionnaire and any attached pages is true, to the best of his or her knowledge.

_____	_____	_____
Signature of Officer	Date	Signature of Contractor of Record
_____	_____	_____
Printed or Typed Name of Officer	Title	Printed or Typed Name of Contractor of Record

Please return to:

Connecticut Department of Labor
Office of Apprenticeship Training
200 Folly Brook Boulevard
Wethersfield, CT 06109

For Office Use Only

Date Received at OAT: _____ Reviewed & Verified by: _____

Date Received CO: _____ Initials: _____

CT DOL OAT Recommendation

□ Approved □ Denied □ Partial Approval for: _____

If Denied, explain _____

Signature: _____ Program Manager

□ **Approved** □ **Partial Approval for: _____** □ **Denied**

Signature: _____ Commissioner

The Connecticut Department of Labor

2017 CONNECTICUT STATE BUILDING CODE

The following 2018 State Building Codes are applicable to all license holders relative to each particular project. Always refer to the State Building Official's website for all amendments to the codes. The State Building Official's website is: https://portal.ct.gov/DAS/Office-of-State-Building-Inspector/Building-and-Fire-CodeAdoption-Process/Documents

- 2015 International Building Code
- 2009 ICC/ANSI A117.1 Accessible and Usable Buildings and Facilities
- 2015 International Existing Building Code
- 2015 International Plumbing Code
- 2015 International Mechanical Code
- 2015 International Energy Conservation Code
- 2017 NFPA 70, National Electrical Code, of the National Fire Protection Association Inc
- 2015 International Residential Code of the International Code Council, Inc.
- 2018 Amendments to the Connecticut State Building Code

SAFETY: ToolBoxTopics.com

Company Name _____ Job Name _____ Date_____

SAFE OPERATING RULES AND PRACTICES

Safe operating rules and practices are to be established during the planning meeting at the start of the job as dictated by the hazards inherent in the nature of the work, federal and state Safety and Health Regulations, company policies, and owner and other regulatory agency requirements. Other safety rules may have to be added as the work progresses due to changed conditions, new methods, new equipment, and as an outgrowth of accident experience.

General safe operating rules and practices apply to all employees, regardless of the nature of their duties. These rules are to be explained to each new hire during indoctrination and must be reemphasized at toolbox meetings and in day-to-day contacts. These are minimum requirements, and are to be rigidly enforced. Examples of general rules follow:

Wear personal protective equipment as required.

Wear suitable shoes and work clothes in good repair

Lift correctly. Get help on the heavy loads.

Do not smoke in prohibited areas.

Avoid off-balanced positions when pulling, pushing, or prying, especially at heights

Report all injuries promptly, even though minor in nature,

Keep alert around moving equipment

Always inspect ladders prior to use and use ladders correctly.

Always follow the approved lock and tag procedures.

Operate equipment and vehicles only if authorized

Correct unsafe conditions as noted, or if you can't correct them, call them to the attention of your foreman immediately.

Keep tools and materials away from the edge of scaffolds or floor openings where they can be knocked off on employees working below.

Be considerate of the welfare of fellow employees. Do not distract their attention or engage in horseplay.

Replace all guards removed for servicing or other reasons,

Pressure cylinders should be used and stored in an upright position and secured against accidental tipping.

Keep all stairways, ladders, ramps, scaffold platforms, walkways and work areas free from loose materials and trash.

Riding on loads, hooks and hoists is prohibited.

Always wear eye protection when grinding, drilling, burning, or performing any operation which may produce flying particles or objects.

Safety Recommendations:_____

Job Specific Topics:_____

M.S.D.S Reviewed:_____

Attended By:

_____

_____

Company Name _____ Job Name _____ Date_____

ELECTRICAL

All electrical work, installation and wire capacities shall be in accordance with provisions of the National Electrical Code.

Job sites will have a Ground Fault Circuit Interrupter system, or an Assured Equipment Grounding Conductor Program. This is required for all 120 volt, single phase 15 and 20 ampere receptacle outlets which are not a part of the permanent wiring of the building or structure in use by employees.

The company shall not permit an employee to work in such proximity to any part of an electric power circuit that he/she may come in contact with it in the course of his/her work unless the employee is protected against electric shock by de-energizing the circuit and grounding it or by guarding it by effective insulation or other means. In work areas where the exact location of underground electric power lines is unknown, workmen using jackhammers, bars, or other hand tools which may come in contact with a line shall be provided with insulated protective gloves.

Before work is begun, the cognizant supervisor shall ascertain by inquiry, direct observation, or instruments whether any part of an electric power circuit, exposed or concealed, is located so that the performance of the work may bring any person, tool, or machine into physical or electrical contact with it. The company shall post and maintain proper warning signs where such a circuit exists. Employees shall be advised of the location of such lines, the hazards involved, and the protective measures to be taken.

Suitable barriers or other means shall be provided to ensure that workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed.

Sufficient space shall be provided and maintained in the area of electrical equipment to permit ready and safe operation and maintenance of such equipment. When parts are exposed, the minimum clearance for the workspace shall be not less than 6-1/4 feet high nor less than a radius of 3 feet wide. There shall be a clearance sufficient to permit at least a 90 degree opening of all doors or hinged panels. All working clearances shall be maintained in accordance with the National Electrical Code.

Equipment or circuits that are de-energized shall be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized. Controls that are to be deactivated during the course of work or energized or de-energized equipment or circuits shall be tagged. Tags shall be placed to identify plainly the equipment or circuits being worked on. Unexpected energizing of any electrical line can cause death, shock, serious injury, etc. In addition to the tag, the circuit at the switch box should be padlocked in the "OFF" position. A lockout hoop should be provided and used.

Safety Recommendations:_____

Job Specific Topics:_____

M.S.D.S Reviewed:_____

Attended By:

_____

_____

_____

_____

_____

Company Name _____ Job Name _____ Date_____

LOCKOUT/TAGOUT PROCEDURES

Lockout/Tagout Procedures

Before any maintenance, construction, demolition, tie-in, inspection or servicing of equipment (electrical, mechanical, steam or other) that requires entrance into or close contact with machinery, equipment, power sources or line breaking, the power shall be disconnected and locked out.

Electrical

Electrical sources will have the main power switch locked out, and if possible, the fuses removed. Locks with dissimilar keys will be provided to each person working on the affected job. Only the person attaching the lock shall remove it. Multiple locking devices shall be provided. Tags will be attached to each lock indicating the name of the person attaching the lock, the location where he/she is working and the person's foreman or supervisor. Hot work will be avoided, if possible.

Moving Equipment

The main power source, or sources, shall be locked out; drive gear disengaged and locked out; and appropriate tags applied.

Piping

Piping shall be blanked or valves shall be closed, chained and locked. Where possible, at least two valves before and after the affected section should be chained, locked and tagged. Piping shall be de- pressurized, drained and purged, if necessary.

Other Energy Sources

Other power sources shall be rendered inoperative as directed by a qualified supervisor or manager

Locks And Tags

Locks and tags will be attached and removed only by the individual employee directly involved in the operation. The last person removing his/her lock shall ensure that there are no persons exposed should the power be turned on.

Safety Recommendations:_____

Job Specific Topics:_____

M.S.D.S Reviewed:_____

Attended By:

_____

_____

_____

_____

_____

Company Name _____ Job Name _____ Date_____

AERIAL LIFTS

Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to work at above ground elevations:

1 Extensible boom platforms

2 Articulating boom platforms

3 Vertical towers

4 Aerial ladders

5 A combination of any of the above

Aerial equipment may be powered or manually operated and are deemed aerial lifts whether or not they are capable of rotating about a substantially vertical axis. Specific requirements:

1 Ladder trucks and tower trucks - Ladders shall be locked in lowered and stowed position prior to highway travel.

2 Extensible and articulating boom platforms

a. Lift controls shall be tested each day prior to use to determine that such controls are in safe working condition.

b. Only authorized persons shall operate an aerial lift.

c. Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

d. Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders or other devices for a work position.

e. A body belt shall be worn and a lanyard attached to the boom or basket when working from an aerial lift.

f. Boom and basket load limits specified by the manufacturer shall not be exceeded.

g. The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline, provided they can be safely installed.

h. An aerial lift truck shall not be moved when the boom is elevated in a working position with men in the basket, except for equipment which is specifically designed for this type of operation in accordance with the provisions of 1926.556(a)(1) and (2).

i. Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for overriding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

j. Climbers shall not be worn while performing work from an aerial lift

k. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

l. Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position except as provided in paragraph h. above.

Safety Recommendations:_____

Job Specific Topics:_____

M.S.D.S Reviewed:_____

Attended By:

_____

_____

_____

_____

_____

2017 NEC CODE CHANGES

The Connecticut General Statues and Regulations and 2017 NEC Changes Chapters 4-5 for Unlimited Licensees

Instructor Introduction

Morning Class Schedule: 4 hours

- General Statues and Regulations, Ratio of Apprentices
- Connecticut State Building Code
- Safety
- 2017 NEC Changes
- Calculations
- Final Q&A

1

- This course is worth 4 hours of continuing education for Unlimited Licensees. (E1, E2, E9)
- You will be emailed a copy of your certificate within 2 business days.

Questions? Concerns?
Call the office at 1-800-443-5233

2

Section 332b - Hiring ratios for apprentices, journeymen and contractors

Lower ratios of licensees to apprentices compared to previous law

Apprentices	Licensees (now)
3	3
4	6
6	12
8	18
10	24

(Ratio continues at 3 licensees to 1 apprentice)

3

Section 30-332-15a - Employment of Apprentices

Apprentices:

May perform work *only* in the presence and under the direct supervision of a licensed contractor or journeyman

Direct Supervision:

Is defined as under the guidance of and within sight and/or hearing of the licensed person

Violation:

May result in disciplinary action, including loss of license by contractor who obtains the permit for the work

4

Section 332-15a (f) - How to register an apprentice

- An apprentice may not perform any work covered by Chapter 393 of the General statutes prior to registration
- The contractor must contact the department of labor to request registration of the apprentice.
- An Electrician apprentice can be registered as an E-2 and then must receive 8000 total hours of training in multiple types of electrical work. Four years (minimum) of on-the-Job training is required.

5

Section 20-332-16 - Prohibited Acts, Records, Lettering

Prohibited acts subject to disciplinary action include:
Working beyond the limitations of one's license or operating under a name other than the one on his license without first informing the licensure board.

Records:
Licensed contractors must keep records of all employees, to be shown to the Commissioner (or his/her agent) upon request.

Lettering:
State license numbers must be displayed on all commercial vehicles in letters at least one inch high and legible.

6

Section 20-335 - License Fee, Continuing Ed. Requirements, Expiration & Renewal

Initial License Application Fee: Journeyman $90.00, Contractor $150.00

Annual License Renewal Fee: Journeyman $120.00, Contractor $150.00

Continuing Education Requirements:

The required annual continuing education for all license categories is **4 hours.**

Expired licenses:

Licenses can be renewed up to one month after date of expiration with no penalty. Failure to renew license within two years after expiration requires re-application and payment of associated fees.

7

Section 20-338a - Work required to be performed by licensed persons

All work for which a building permit is required must be performed by a licensed contractor or journeyman. (Or a properly supervised and trained apprentice)

8

Section 20-338b - Building permit applications; Who may sign

- The contractor may sign the permit application personally.
- He or she may delegate this to an employee, subcontractor or other agent provided.
- A *dated* letter on *the contractor's letterhead* must be provided to the building official authorizing the agent to sign the permit application. The letter must include:
  - Name of municipality where work is to be performed
  - Job name or description
  - Starting date for the job
  - Name of both the contractor and the agent
  - The license numbers of all involved

9

Section 20-338c - Work not to commence until permit is obtained

No licensed contractor may begin work for which a license is required, prior to obtaining all necessary permits from the local AHJ.

- Different permits may be required by general statute (state law) and by local ordinance.
- The state mandates building permit requirements.
- Local government may require additional permits, for example:
  - Occupancy Permits for work being done in the public right of way.
  - Alarm permits, sign permits, zoning permits etc.
- Each municipality may have its own unique regulations

10

Section 20-340 - Exemptions from Licensing Requirements

- Persons employed by any federal, state or municipal agency
- Employees of any public service company or corporate affiliate
- Industrial maintenance firms
- Work performed on Single Family Residences occupied by the owner
- Employees of licensed solar contractors
- Stage and theatrical companies, carnivals, circuses, etc.

11

Section 20-341 - Penalties for Violations

Offenses covered by this section include:

- Work performed without a license
- Advertising to do work for which one is not licensed
- Employing a person who does not hold the appropriate license (or apprentice permit)
- Working under an expired license or apprentice permit;

Penalties may include:

  - Criminal charges. (class B misdemeanor)
  - Civil penalties of up to $3000.00 per violation.

12

Public Act No. 17-76 & Ratio Relief Form

Public Act No. 17-76 – repeals and replaces Sec 20-332b

Two important changes to laws:

- Apprenticeship ratio relief form
- Lower ratios of licensees to apprentices compared to previous law – *examples below*

Apprentices	Licensees (before)	Licensees (now)
3	5	3
4	8	6
6	14	12
8	20	18
10	26	24

(Ratio continues at 3 licensees to 1 apprentice)

13

Connecticut State Building Codes

The 2018 Connecticut State Building Code is based on the following model codes:

- The 2015 ICC codes and references:
- The ICC A117.1-2009 (accessibility) standard
- National Electrical Code (2017 NFPA 70)
- The 2018 State codes applies to projects with permit applications
- Amendments to the model codes can be found from this link: https://portal.ct.gov/-/media/DAS/Office-of-State-Building-Inspector/2018-CT-State-Building-Code---Effective-10-01-18.pdf?la=en

14

Safe Operating Rules and Procedures

Wear Personal Protective Equipment as needed for hazards identified.

Lift correctly. Lift with your legs not your back. Lift only objects that can be done safely.

Smoke in only designated areas.

Report all injuries. This is important, because the injury might prove to be serious later!

Inspect all ladders and scaffolding before use.

Always follow your companies LOTO program.

Correct and report all unsafe conditions.

Identify all hazards and mitigate as necessary.

15

Electrical

All electrical work shall comply with the current National Electrical Code adopted at the time of installation.

Job sites shall be provided with GFCI protection for personnel. This protection shall comply with OSHA, NEC and NFPA 70E current standards. In lieu, of GFCI protection an assured equipment grounding conductor program is permissible.

It is the responsibility of the company owner to guarantee no contact with energized conductors or parts. All employees will be notified where energized parts are located. Barriers shall be provided to notify personnel of the minimum approach distance as specified by OSHA, the NEC and NFPA 70E.

The tags for LOTO shall be visible and legible.

16

Lockout/Tagout Procedures

Before any maintenance, construction, demolition, tie-in, inspection or servicing of equipment (electrical, mechanical steam or other) that requires entrance into or close contact with machinery, equipment, power sources or line breaking, the power shall be disconnected and locked out.

Lock out at the source, not control devices.

All energy sources shall be rendered inoperative, pneumatics, hydraulics, moving equipment, etc.

Locks and Tags will be removed only by the person directly responsible for the safe operation of the equipment.

17

Aerial Lifts

Aerial lifts include the following: Extensible and articulating boom platforms, vertical towers, aerial ladders, or any combination thereof!

Lift controls shall be tested everyday prior to use.

You must be authorized to operate an aerial lift.

Do not attach your fall protection to adjacent structures. A body belt must be worn and the lanyard attached to the lift.

Brakes shall be locked when outriggers are used on a solid flat surface, wheel chocks, shall be in place

Do not move the truck when the boom is extended. Controls for the boom shall be both upper and lower.

The insulation value of the bucket shall have integrity.

18

2017 NEC Changes Chapter 4

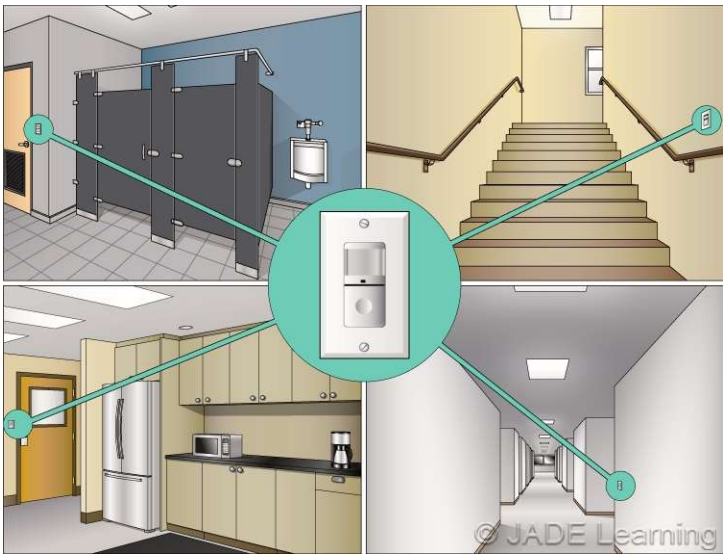
19

400.10 & 400.12 - Flexible Cords and Cables – Uses Permitted and Uses Not Permitted

A flexible cord is permitted to be located above a suspended or dropped ceiling if it is contained within an enclosure for use in Other Spaces Used for Environmental Air.

20

404.2(C) Switches Controlling Lighting Loads.

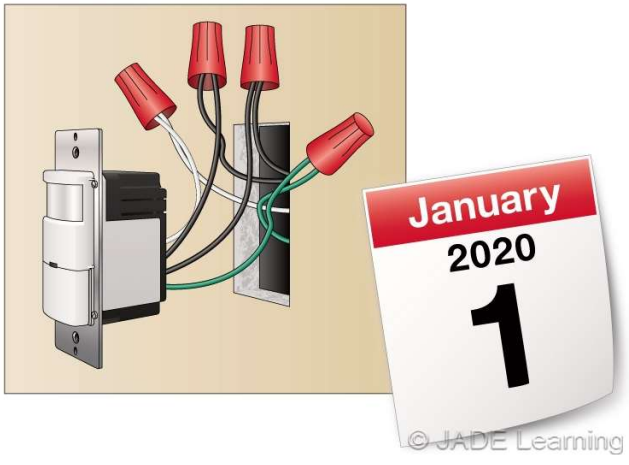


The grounded conductor must be installed at switch locations in bathrooms, hallways, stairways and rooms suitable for human occupancy.

21

404.22 - Electronic Lighting Control Switches

After January 1, 2020 an equipment grounding conductor cannot be used to power the electronic light switch.



22

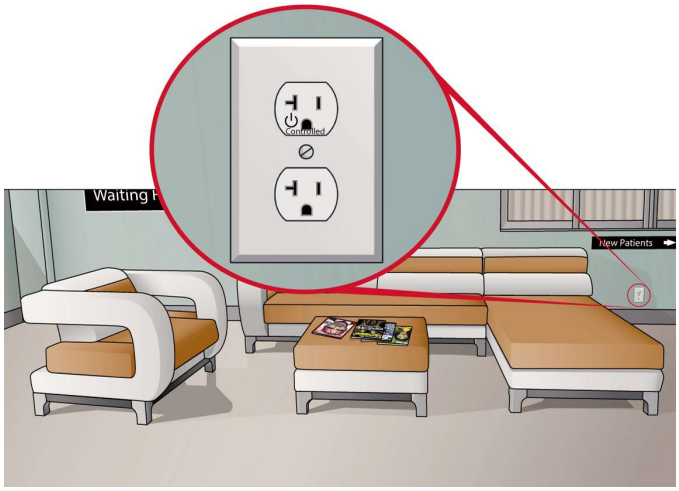
406.2 - Definitions - Outlet Box Hood

An outlet box hood is a housing shield intended to fit over a faceplate for flush-mounted wiring devices, or an integral component of an outlet box or of a faceplate for flush-mounted wiring devices.

23

406.3(E) - Receptacle Rating and Type - Controlled Receptacle Marking

Receptacles that are controlled by an energy management system must be marked with the power symbol and the word "controlled."



24

406.3(F) - Receptacle Rating and Type - Receptacle with USB Charger

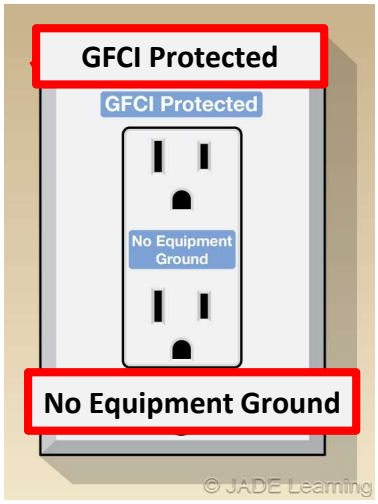
Receptacles with built in USB chargers must be listed.

25

406.4(D)(2) - General Installation Requirements - Replacements Non-Grounding-Type Receptacles

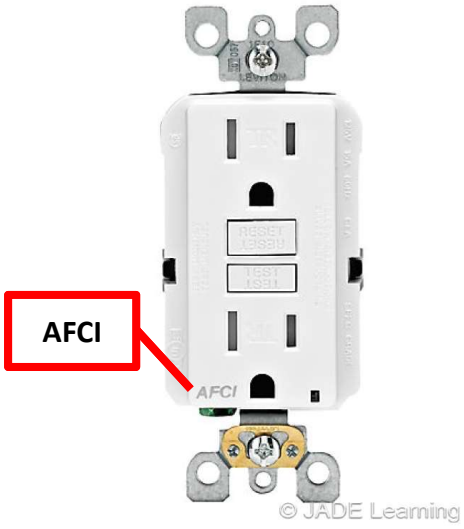
Not all non-grounding type receptacles can be replaced with a GFCI receptacle.

Some manufacturers require an equipment ground for their equipment or appliance.



26

406.4(D)(4) General Installation Requirements - Replacements - AFCI Protection



Replacing a non-grounding type receptacle with another non-grounding type receptacle in an area that requires AFCI protection is not permitted.

JADE Top 20

27

406.4(D)(5) - General Installation Requirements – Replacements - Tamper-Resistant Receptacles

A non-grounding receptacle is permitted to replace a non-grounding receptacle without providing tamper-resistant protection.

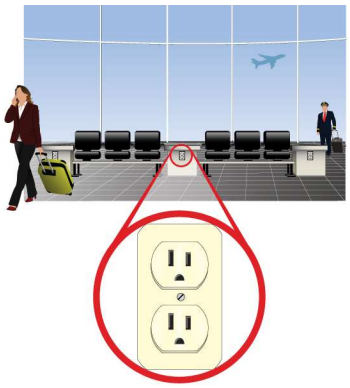
28

Connecticut 2017 NEC Changes for Unlimited Licensees

406.5(E), (F), (G), (H) - Receptacle Mounting - Receptacles in Countertops, Work Surfaces, Orientation, in Seating Areas

Receptacles listed for installation in countertops may be installed in work surfaces. Receptacles that are listed for installation in work surfaces only cannot be installed in countertops.

Listed for Countertop Applicatons



Listed for Work Surface Applicatons Only

29

Connecticut 2017 NEC Changes for Unlimited Licensees

406.6(D) - Receptacle Faceplates - Receptacle Faceplate with Integral Night Light and/or USB Charger.

Receptacle cover plates that incorporate a night light and/or a USB connector must be listed.

30

406.9(B)(1) - Wet Locations - Receptacles of 15 and 20 Amperes in a Wet Location

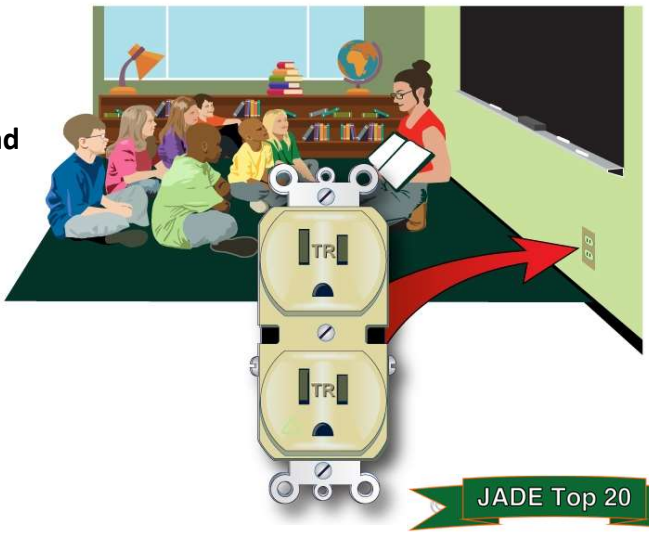
Receptacles in wet locations do not require an extra duty hood where the enclosure is identified for outdoor use without an outlet hood.

31

406.12 - Tamper-Resistant Receptacles

Also required in:

- **Preschools and elementary schools**
- **Business offices, corridors and waiting rooms in medical facilities**
- **Places of awaiting transportation**
- **Gymnasiums**
- **Skating rinks**
- **Auditoriums**
- **Dormitories.**

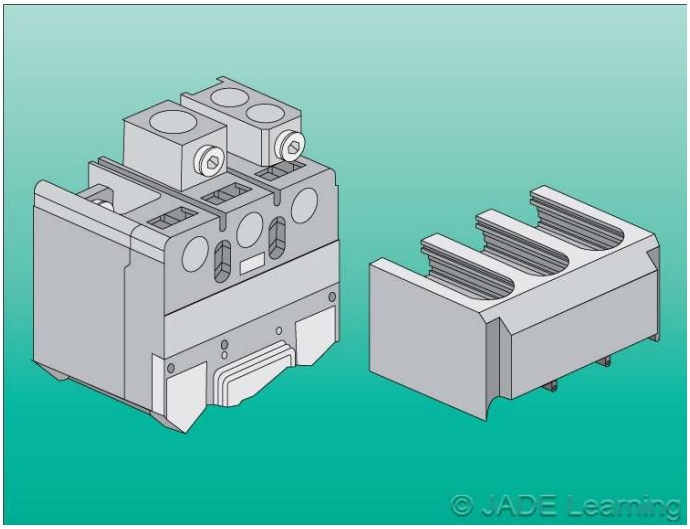


JADE Top 20

32

408.3(A)(2) - Service Panelboards, Switchboards, and Switchgear

Barriers are required, which will prevent accidental contact with busbars while servicing load terminations.



33

408.4(B) - Field Identification Required – Source of Supply

The label must be:

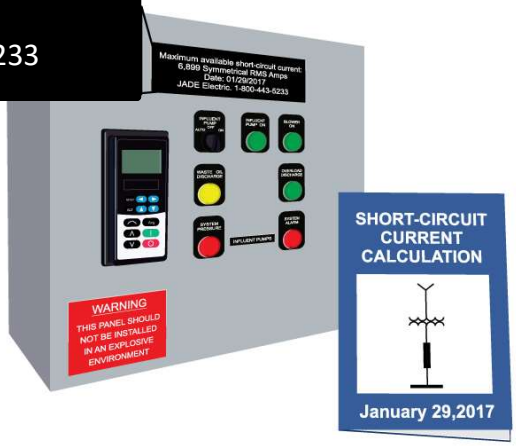
- **Permanent**
- **Durable**
- **Not handwritten.**

34

409.22 - Industrial Control Panels: Short-Circuit Current Rating

Maximum Available short-circuit current:
6,899 Symmetrical RMS Amps
Date: 01/29/2017
JADE Electric: 1-800-443-5233

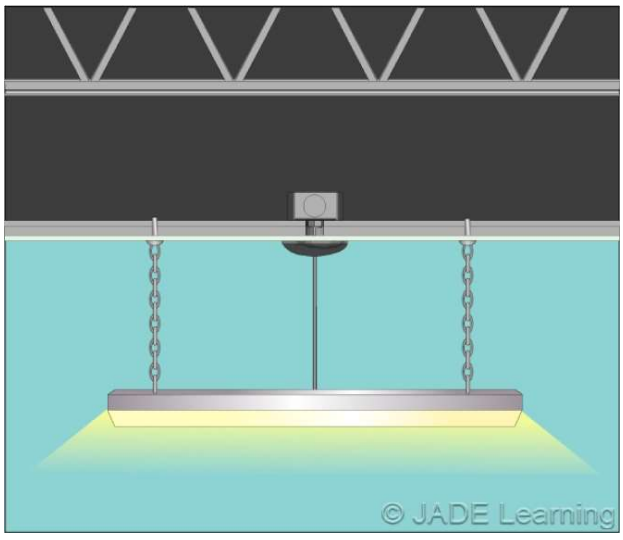
A record of the available short-circuit current and the date of the calculation must be kept.



35

410.62(C) Cord-Connected Electric-Discharge and LED Luminaires.

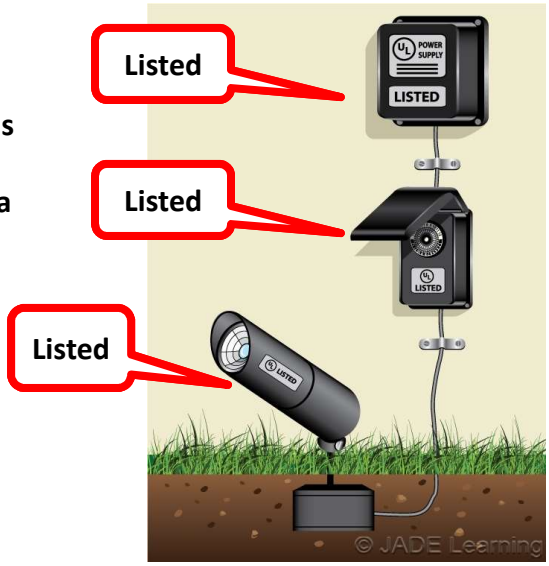
A luminaire can be cord-and-plug connected using a grounding-type attachment plug. The luminaire must be located directly below the lighting outlet, and the cord must be visible for its entire length.



36

Article 411 - Low-Voltage Lighting

Low voltage lighting systems using insulated conductors do not need to be listed as a complete system as long as each component is listed.



37

422.5 Appliances - GFCI Protection for Personnel

Single- or 3-phase appliances rated 250 volts or less, and 60 amperes or less, must have GFCI protection for personnel.

38

Connecticut 2017 NEC Changes for Unlimited Licensees

422.6 – Appliances: Listing Required

All appliances operating at 50 volts or more shall be listed.

39

Connecticut 2017 NEC Changes for Unlimited Licensees

422.16(B)(2) - Built-in Dishwashers & Trash Compactors

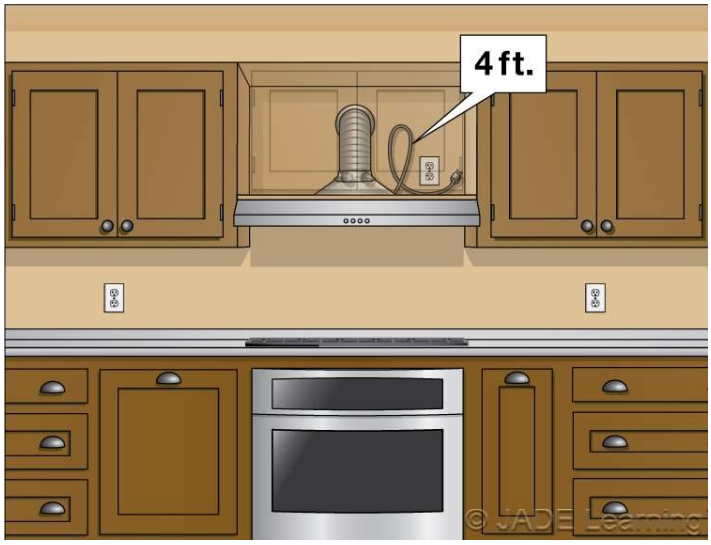
A receptacle for the dishwasher is no longer permitted to be installed behind the dishwasher. The receptacle must be accessible.

40

Connecticut 2017 NEC Changes for Unlimited Licensees

422.16(B)(4) - Flexible Cords: Range Hoods

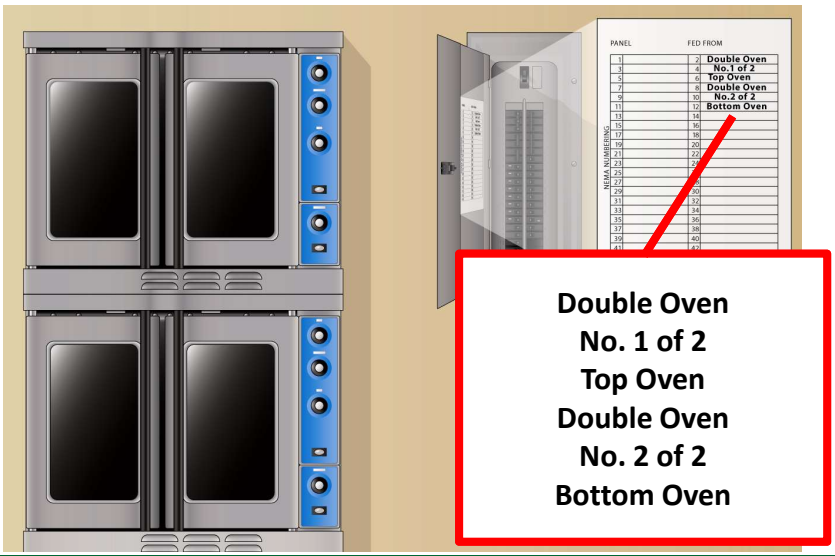
The maximum length of the cord for a range hood has been increased to 4 feet.



41

Connecticut 2017 NEC Changes for Unlimited Licensees

422.30 – Appliances: Disconnecting Means - General



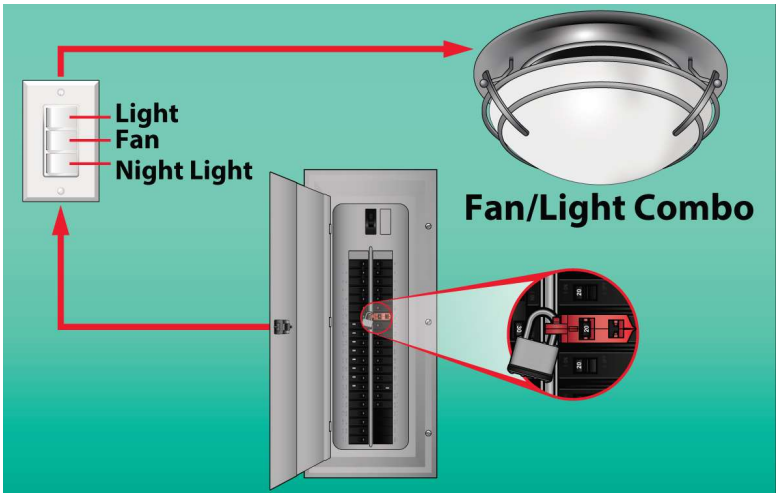
The disconnecting means for an appliance supplied by more than one branch circuit must be grouped and identified as the multiple disconnecting means for the appliance.

42

Connecticut 2017 NEC Changes for Unlimited Licensees

422.31(A) - Disconnection of Permanently Connected Appliances: Rated at Not over 300 Volt-Amperes or 1/8 Horsepower

The disconnecting means for appliances that are rated not more than 300 volt-amperes or 1/8 HP must be within sight of the appliance or have a lockout device on the circuit breaker.

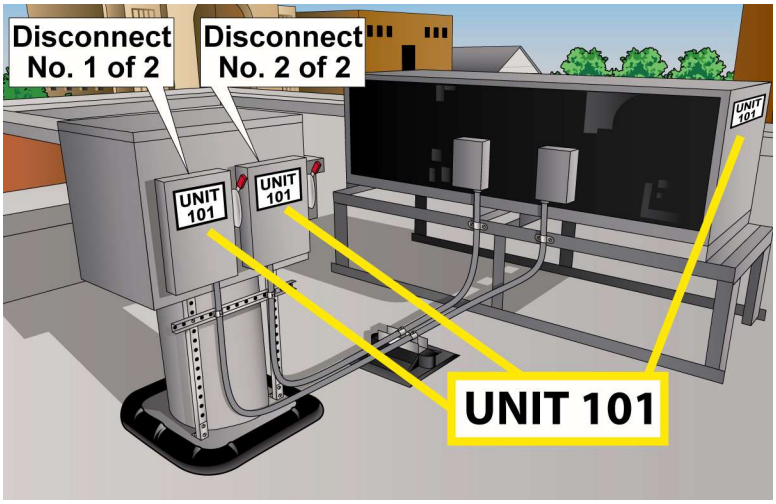


43

Connecticut 2017 NEC Changes for Unlimited Licensees

424.19 - Control and Protection of Fixed Electric Space-Heating Equipment: Disconnecting Means

Multiple disconnects for heating equipment must be grouped and identified as being a part of multiple disconnecting means.

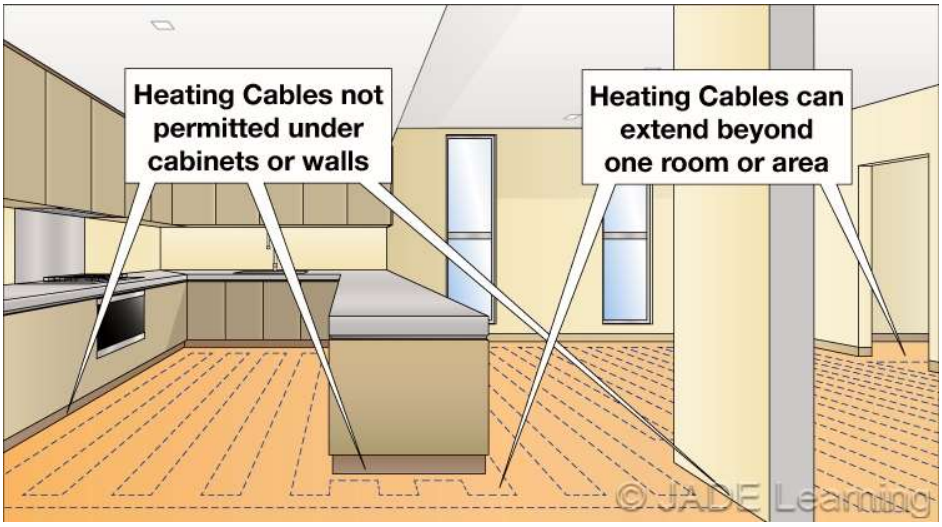


44

Connecticut 2017 NEC Changes for Unlimited Licensees

424.38 - Electric Space-Heating Cables - Area Restrictions

Heating cables are now permitted to extend beyond one room or area.

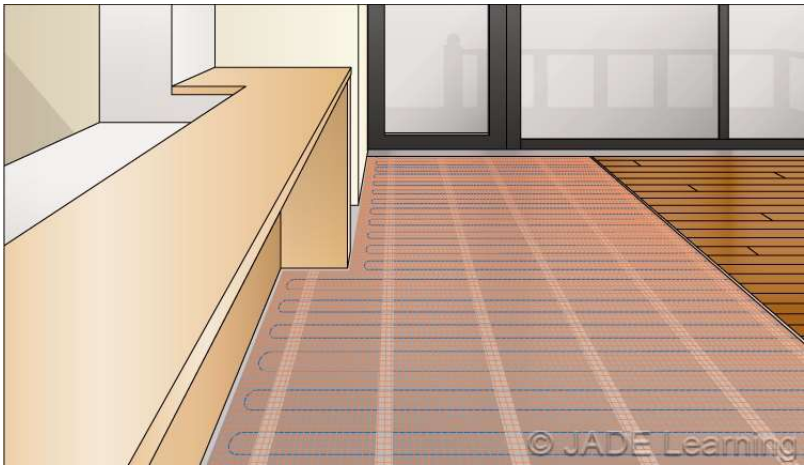


45

Connecticut 2017 NEC Changes for Unlimited Licensees

424.45 - Electric Space-Heating Cables: Installation of Cables Under Floor Coverings

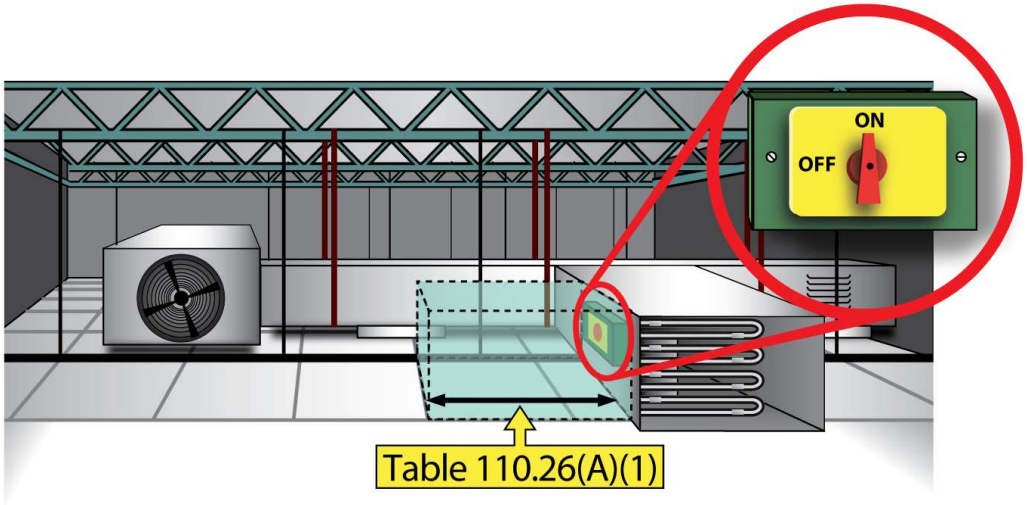
Electric space-heating cables can be installed below ceramic tile, hardwood, vinyl floor coverings or even carpet if installed according to the manufacturer's instructions and identified as suitable for use under the floor covering.



46

424.66 - Duct Heaters - Installation

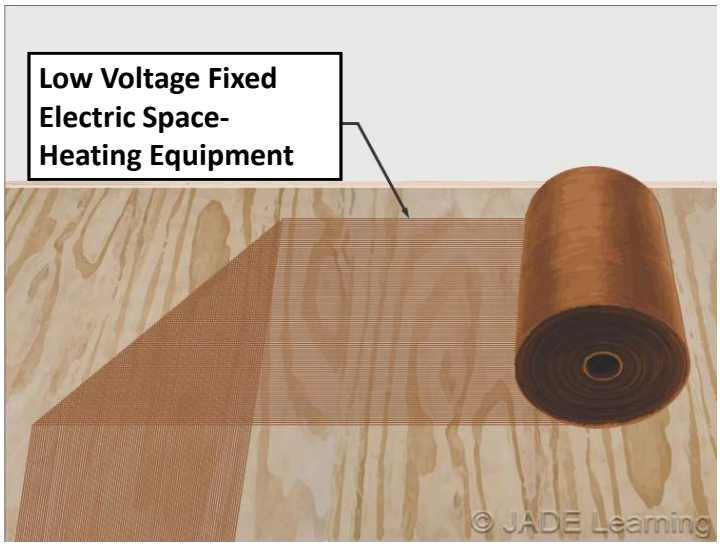
Duct heaters require working space in areas with limited access.



47

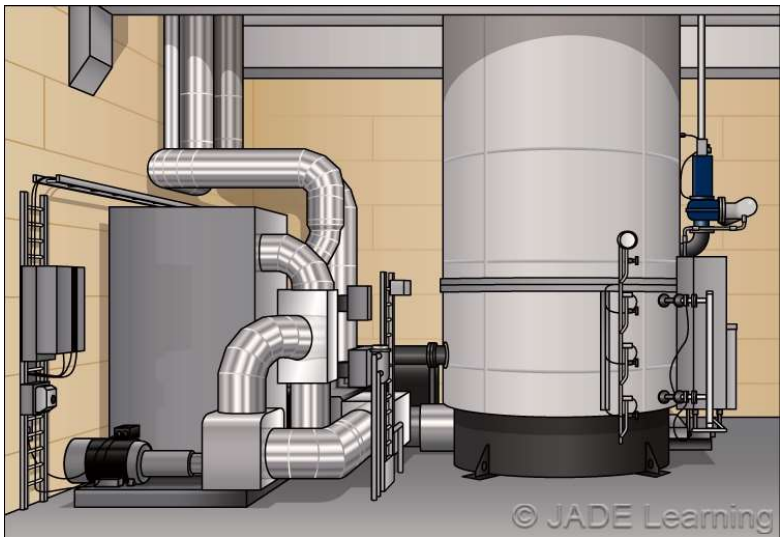
424 - Part X: Low-Voltage Fixed Electric Space-Heating Equipment.

Low-voltage fixed electric space-heating equipment must be listed as a complete system and installed in accordance with the manufacturer's installation instructions.



48

Article 425 Fixed Resistance and Electrode Industrial Process Heating Equipment



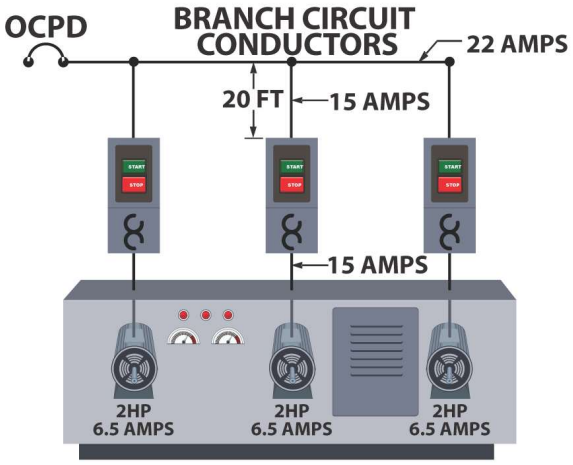
Article 425 covers fixed industrial process heating equipment that uses resistance or electrode heating technology.

49

430.53(D)(4) Several Motors or Loads on One Branch Circuit. Single Motor Taps.

20 amps.

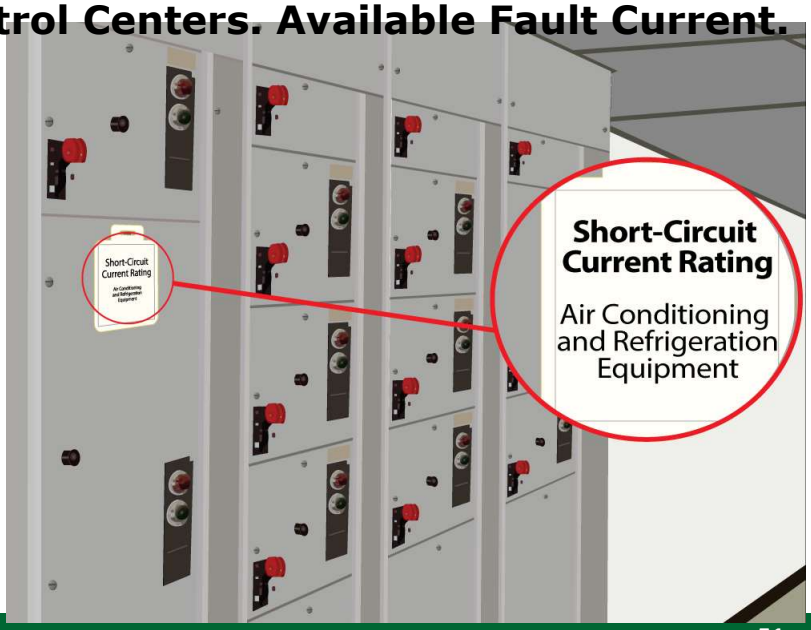
The tap conductors must be at least 1/3 the ampacity of the branch circuit conductors or the same size as the conductors from the manual motor starter to the motor, whichever is larger.



50

430.99 Motor Control Centers. Available Fault Current.

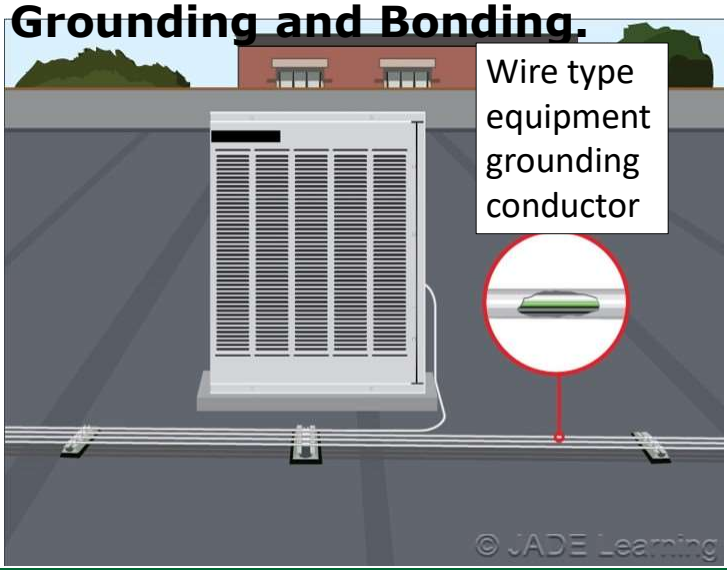
The available short-circuit current must be made available to those authorized to inspect the installation.



51

440.9 Air-Conditioning and Refrigerating Equipment. Grounding and Bonding.

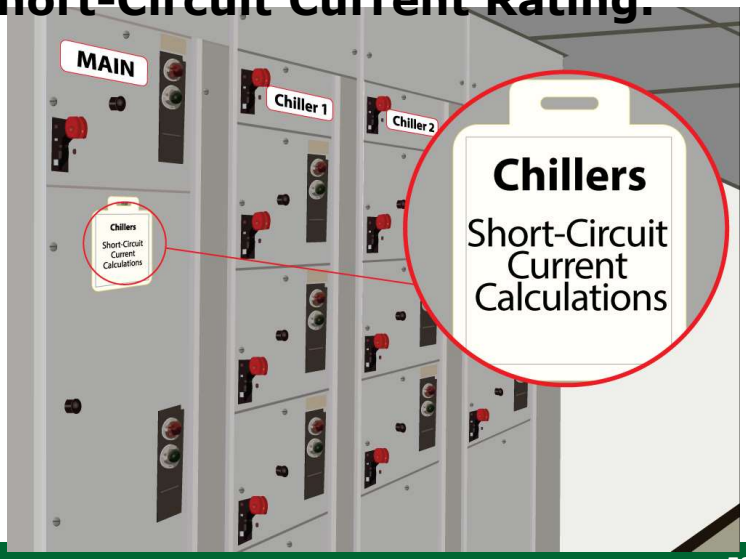
A wire type equipment grounding conductor must be installed in metallic raceways that are installed outdoors on a roof and that use non-threaded fittings.



52

440.10 Air-Conditioning and Refrigerating Equipment. Short-Circuit Current Rating.

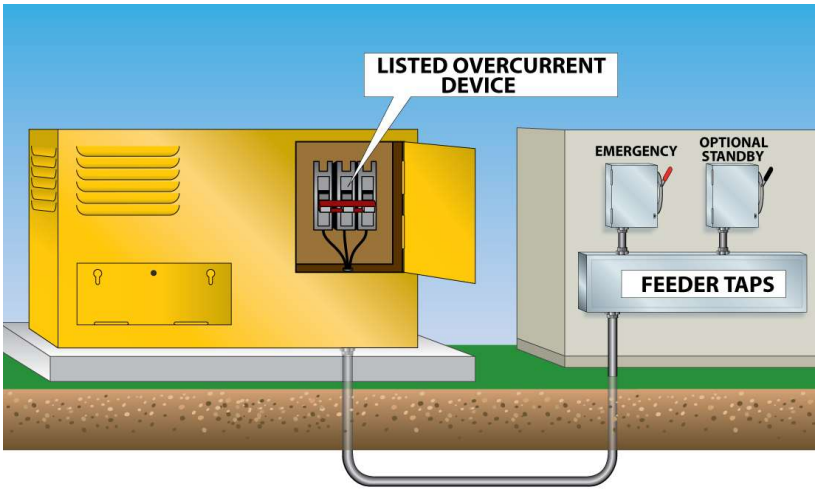
The available short-circuit current and the date the calculation was performed shall be documented and made available to those authorized to inspect the installation.



53

445.13(B) – Generators - Ampacity of Conductors: Overcurrent Protection Provided

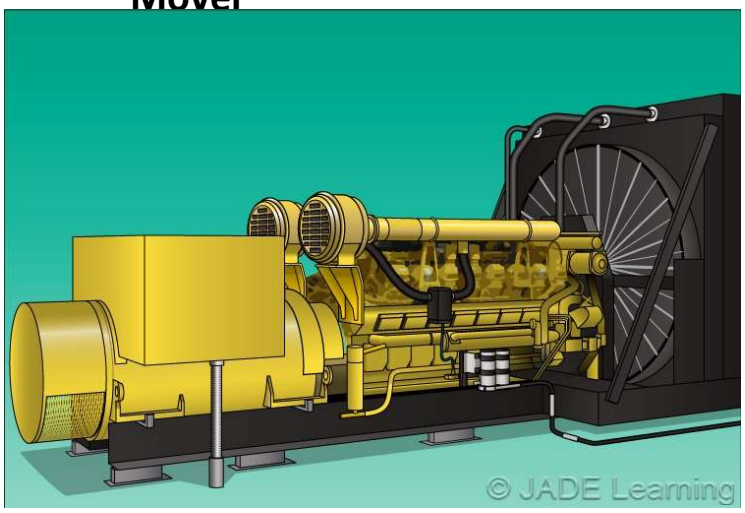
If a stationary generator rated 15 kW or more is equipped with a listed overcurrent device, taps to the generator feeder can be made on the load side of a listed overcurrent device.



54

445.18(A), (B) – Generators: Disconnecting Means, Shutdown of Prime Mover

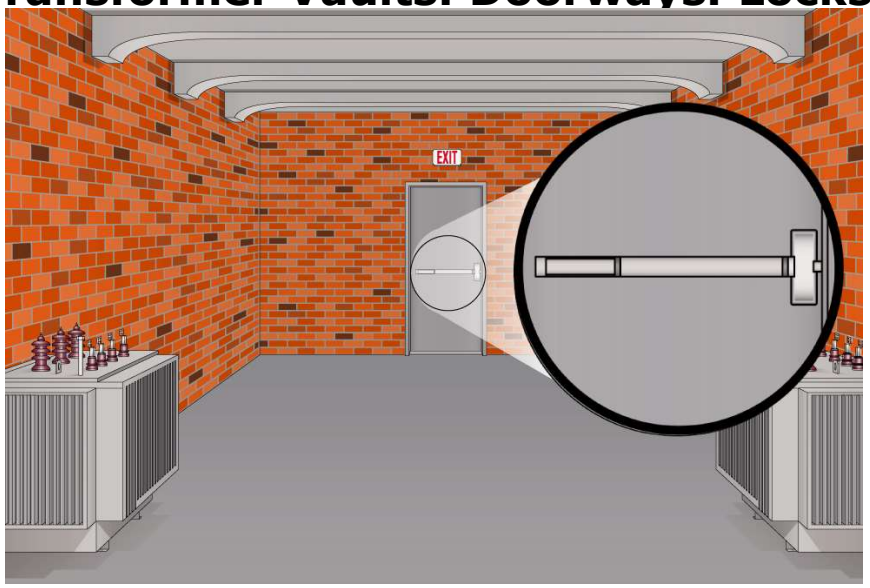
A disconnecting means must be provided for the generator and the prime mover. The disconnecting means must disable start circuits so the generator cannot restart without a manual reset.



55

450.43(C) Transformer Vaults. Doorways. Locks.

Personnel doors are required to open in the direction of egress and be equipped with listed panic hardware.



56

480.3 - Storage Batteries - Equipment

Storage batteries must be listed.

57

2017 NEC Changes Chapter 5

58

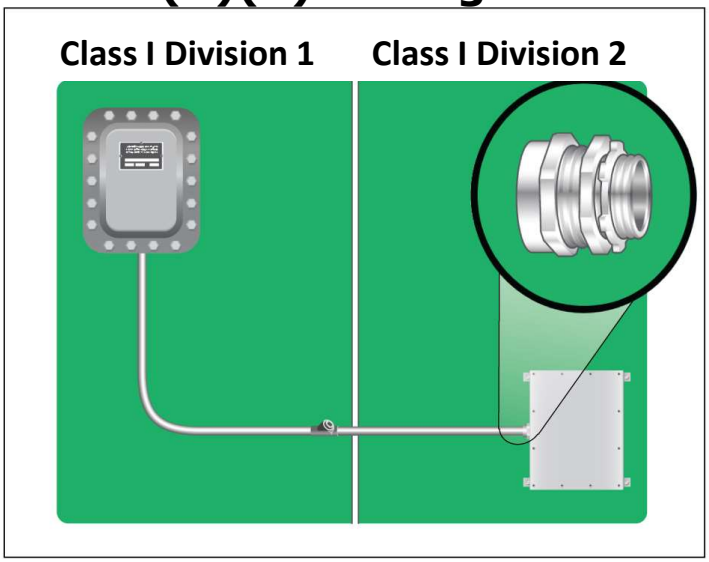
500.2 Special Occupancies. Definitions - Relocated.

Article 500 Definitions	Article 100 Definitions
	As Applied to Hazardous (Classified) Locations
Combustible Dust	Combustible Dust
Combustible Gas Detection System	Combustible Gas Detection System
Control Drawing	Control Drawing
Dust - Ignition Proof	Dust - Ignition Proof
Dusttight	Dusttight
Hermetically Sealed	Hermetically Sealed
Nonincendive Circuit	Nonincendive Circuit
Nonincendive Field Wiring Apparatus	Nonincendive Field Wiring Apparatus
Oil Immersion	Oil Immersion
Purged and Pressurized	Purged and Pressurized
Unclassified Locations	Unclassified Locations

A number of definitions were moved from Article 500 to Article 100.

59

501.10(B)(1) Wiring Methods. Class I, Division 2.



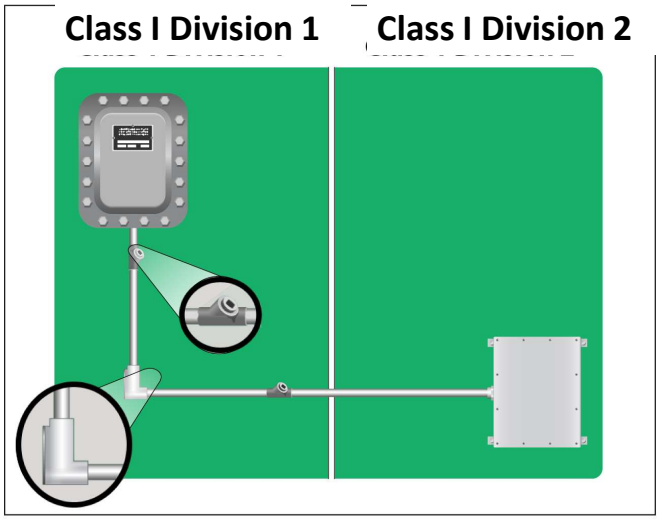
Threadless fittings for rigid metal conduit and intermediate metal conduit can be used in Class I, Division 2 locations.

60

Connecticut 2017 NEC Changes for Unlimited Licensees

501.15(A)(1) Sealing and Drainage. Conduit Seals, Class I, Division 1. Entering Enclosures.

Conduit bodies cannot be used between the explosionproof enclosure and the conduit seal.

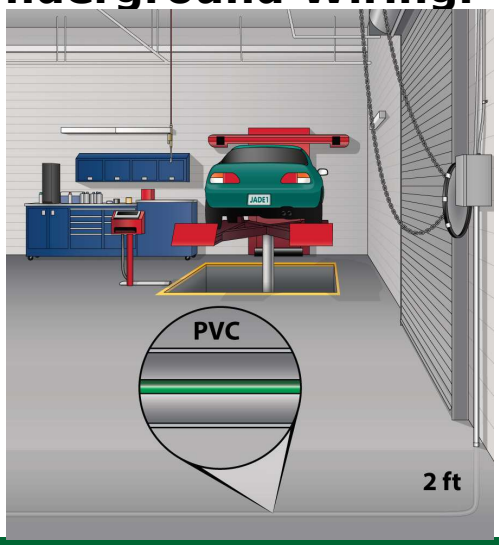


61

Connecticut 2017 NEC Changes for Unlimited Licensees

511.8 Commercial Garages, Repair and Storage. Underground Wiring.

Where PVC is used, a wire-type equipment grounding conductor is required.

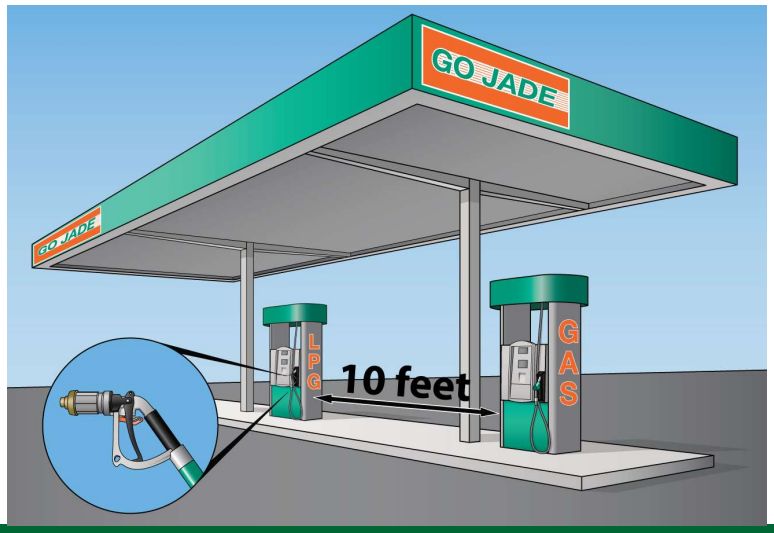


62

514.3(B)(2) Motor Fuel Dispensing Facilities. Classified Locations.

- Compressed Natural Gas
- Liquefied Natural Gas
- Liquefied Petroleum Gas

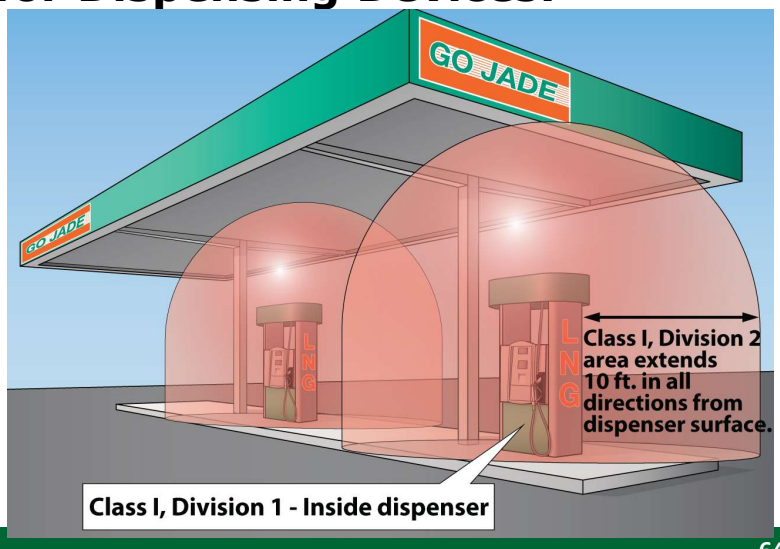
The minimum required distance between LPG dispensers and Class I liquid dispensers is now 10 feet.



63

Table 514.3(B)(2) Electrical Equipment Classified Areas for Dispensing Devices.

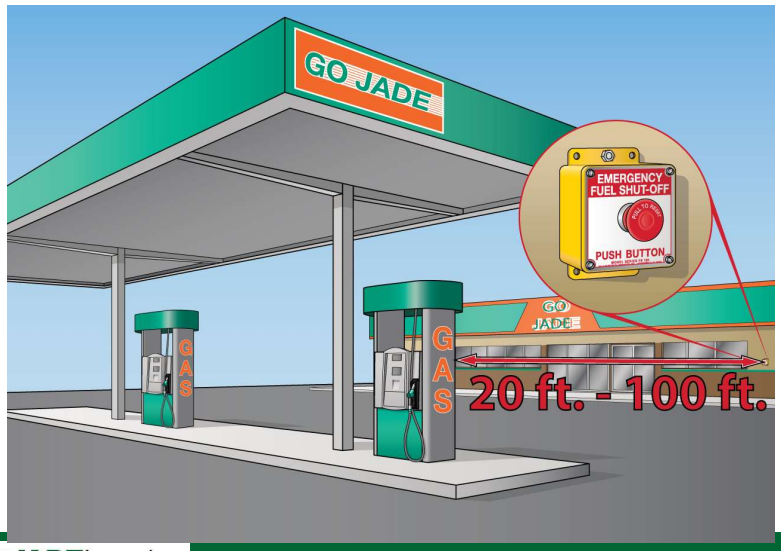
- Class I, Division 1: The area inside a LNG dispenser.
- Class I, Division 2: The area extending 10 feet in all directions from the LNG dispenser.



64

Connecticut 2017 NEC Changes for Unlimited Licensees

514.11 Motor Fuel Dispensing Facilities. Circuit Disconnects.



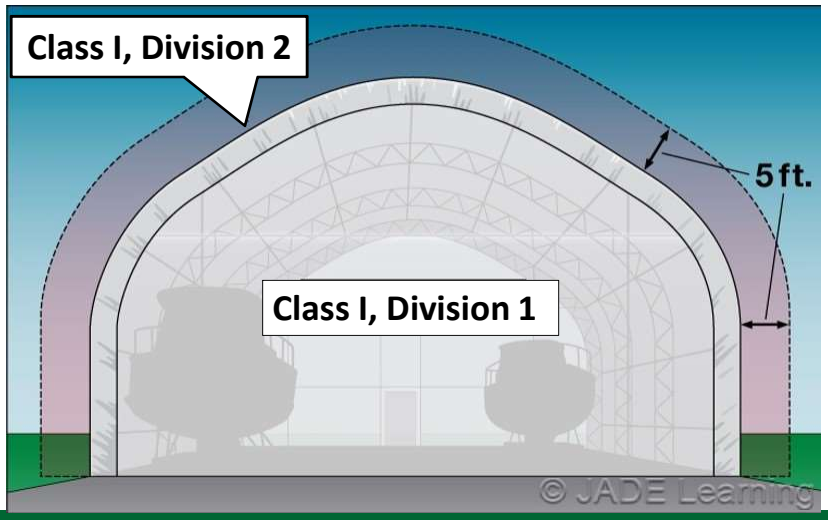
- Emergency disconnects not less 20 feet and not more than 100 feet away.
- All circuits must be disconnected.

65

Connecticut 2017 NEC Changes for Unlimited Licensees

516 Spray Application, Dipping, Coating, and Printing Processes Using Flammable or Combustible Materials.

- Class I, Division 1 : The area inside a membrane enclosure.
- Class I, Division 2 : The area extending 5 feet outside the membrane area.



66

Connecticut 2017 NEC Changes for Unlimited Licensees

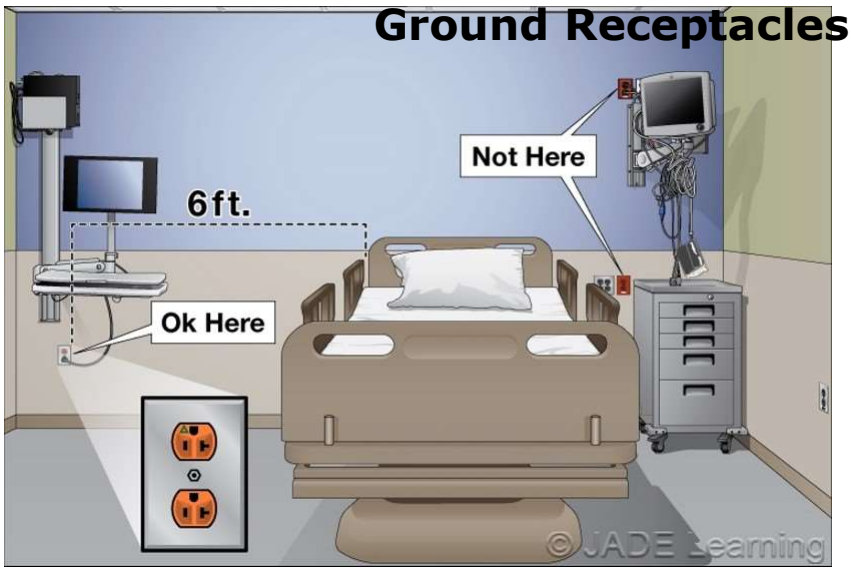
517.2 Health Care Facilities. Definitions.

There is a new definition of a medical and dental office.

67

Connecticut 2017 NEC Changes for Unlimited Licensees

517.16 Health Care Facilities. Use of Isolated Ground Receptacles.

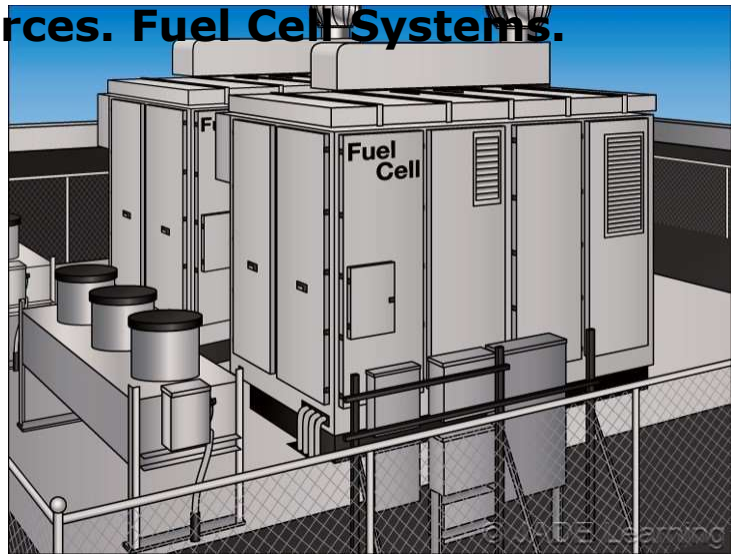


An isolated ground receptacle cannot be installed in the patient care vicinity.

68

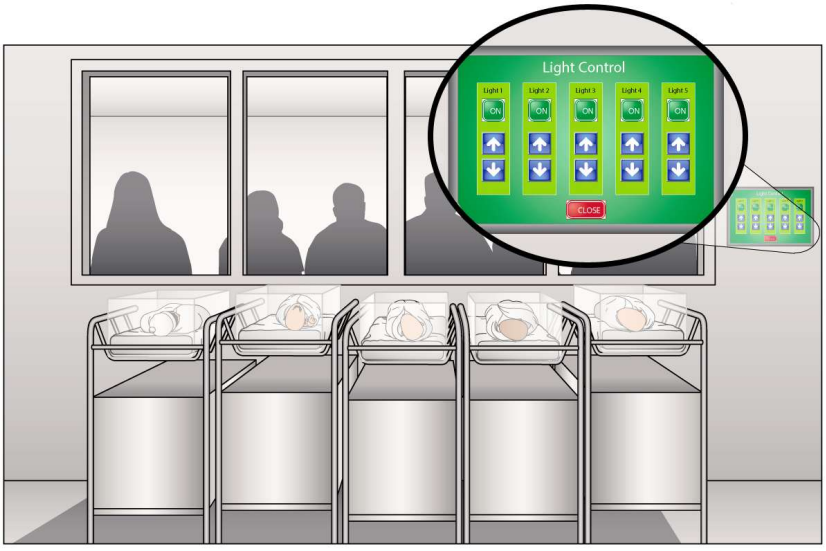
517.30(B)(2) Health Care Facilities. Types of Power Sources. Fuel Cell Systems.

Fuel cells can be used as an emergency source of power for essential electrical systems in hospitals and other health care facilities.



69

517.34(B) Health Care Facilities. Critical Branch.

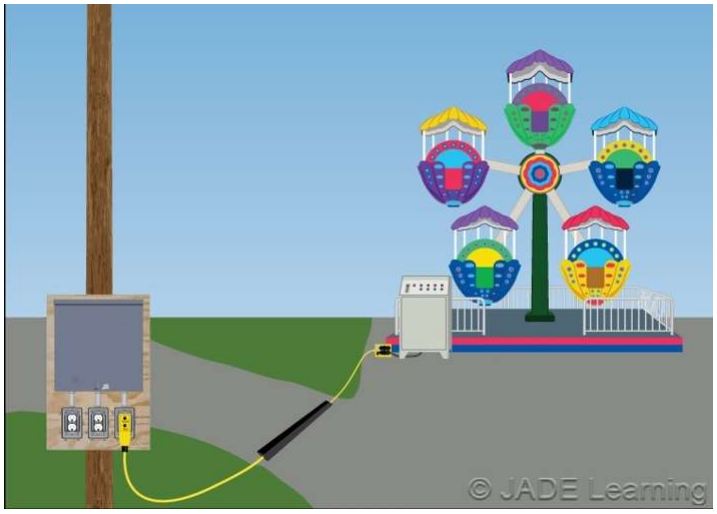


Task lighting on the critical branch of the essential electrical system, such as in an infant nursery, can be controlled by switches or other devices like keypads.

70

525.23(D) Carnivals, Circuses, Fairs. GFCI Protection. Receptacles Supplied by Portable Cords.

GFCI receptacles that are supplied by flexible cord must be listed for portable use.



71

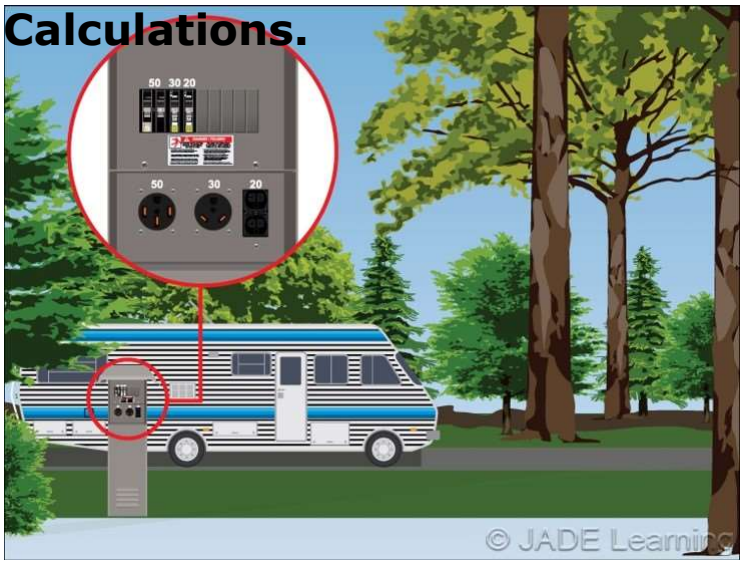
551.71 Recreational Vehicle Parks. Type Receptacles Provided.

- Every RV site with electric power requires at least 1 GFCI protected 20-ampere 125-volt receptacle.
- 70% of RV sites require a single 30-ampere 125-volt receptacle.
- 40% of new RV sites require a single 50-ampere 125/250-volt receptacle.

72

551.73(A) RV Parks. Calculated Load. Basis of Calculations.

When calculating the load for an entire RV Park, the load per type of receptacle is multiplied by the number of receptacles before the demand factors are applied.



JADE Top 20

555.1 Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities. Scope.

Article 555 now covers docking facilities at:

- one-family dwellings
- two-family dwellings
- multifamily dwellings
- residential condominiums

Connecticut 2017 NEC Changes for Unlimited Licensees

555.3 Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities. Ground-Fault Protection.

Overcurrent protective devices that supply marinas, boatyards, and commercial and noncommercial docking facilities must now have ground-fault protection not exceeding 30 mA.

75

Connecticut 2017 NEC Changes for Unlimited Licensees

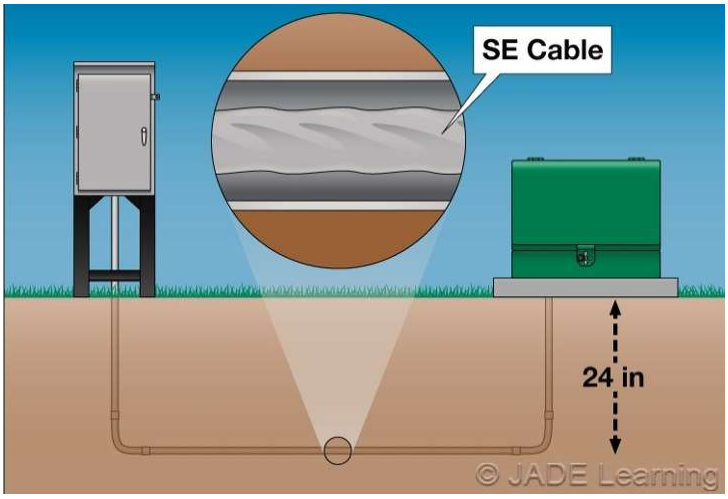
555.24 Marinas, Boatyards, and Commercial and Noncommercial Docking Facilities. Signage.

Signs around a marina or docking facility must warn swimmers that there is a potential shock hazard from electrical currents in the water.

76

590.4(B),(C),(G) Temporary Installations. General. Feeders, Branch Circuits, Splices.

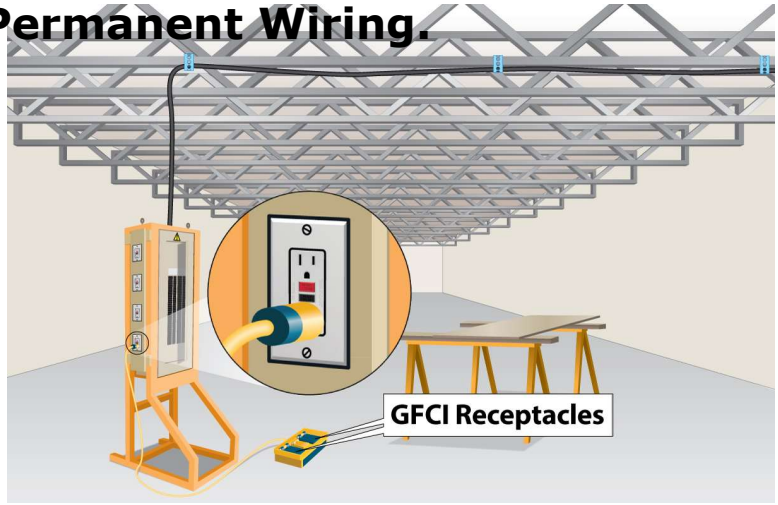
In temporary installations SE cable can be installed in a raceway underground.



77

590.6(A)(1) GFCI Protection for Personnel. Receptacle Outlets. Receptacle Outlets Not Part of Permanent Wiring.

Listed portable cord sets can be used to provide GFCI protection in temporary installations.



78

Calculate branch circuit size and overcurrent protection fixed electric heat

Calculate branch circuit size and overcurrent protection fixed electric heat

When sizing branch-circuit conductors for fixed electric space-heating equipment, you must consider these to be a continuous load. The branch-circuit conductors and overcurrent devices for fixed electric space-heating equipment must have an ampacity not less than 125% of the total heating load.

What size conductor and overcurrent device with 75°C terminals is required for a 10kW, 240V fixed electric space heater that has a 3A blower motor?

Step 1. Determine the total load.

I = VA ÷ E

I = 10,000VA ÷ 240V = 41.67A

I = 41.67A + 3A = 44.67A, round up to 45A

80

Calculate branch circuit size and overcurrent protection fixed electric heat

Step 2. Size the conductors at 125% of the load [110.14(C), 210.19(A)(1)].

Conductor = 45A × 1.25 = 56A

A 6 AWG conductor is rated 65A at 75°C

Step 3. Size the overcurrent device at 125% of the load [210.20(A), 240.4(B) and 240.6(A)].

Overcurrent device = 45A × 1.25 = 56A

Choose the next standard size up, which is 60A [240.4(B)]

6 Conductor from the 75 degree column with 60A overcurrent protection

81

Calculate branch circuit size, overcurrent protection, and GFCI protection for electric de-icing and snow melting equipment

Connecticut 2017 NEC Changes for Unlimited Licensees

Calculate branch circuit size, overcurrent protection, and GFCI protection for electric de-icing and snow melting equipment

426.4 Continuous Load. Fixed outdoor electric deicing and snow-melting equipment shall be considered a continuous load.

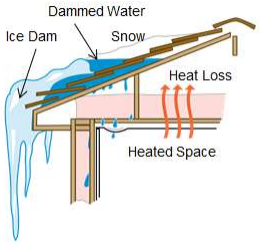
Our snow melting cable is 120V and 100 foot long. The wattage is 8watts/ft.

Step 1. Determine the total load.

I = VA ÷ E

I = 800 Watts ÷ 120V = 6.66A

I = 6.66 Amps, round up to 7A



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Connecticut 2017 NEC Changes for Unlimited Licensees

Calculate branch circuit size, overcurrent protection, and GFCI protection for electric de-icing and snow melting equipment

Step 2. Size the conductors at 125% of the load [110.14(C), 210.19(A)(1)].

Conductor = 7A × 1.25 = 8.75A

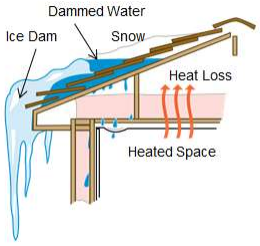
A 14 AWG conductor is rated 15A at 60°C

Step 3. Size the overcurrent device at 125% of the load [210.20(A), 240.4(B) and 240.6(A)]

Overcurrent device = 7A × 1.25 = 8.75A

Choose the next standard size up, which is 15A [240.4(B)]

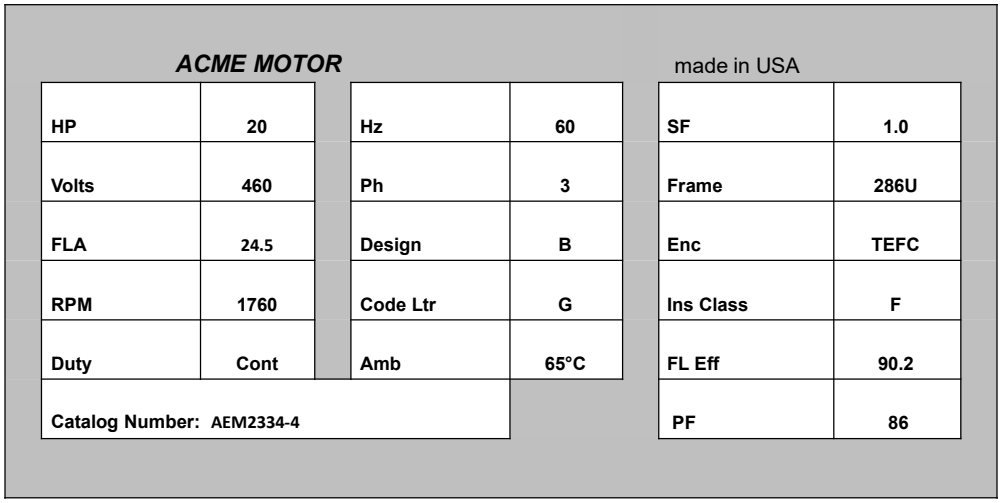
14 Conductor from the 60 degree column with 15A overcurrent protection



83

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases



ACME MOTOR made in USA

HP	20	Hz	60	SF	1.0
Volts	460	Ph	3	Frame	286U
FLA	24.5	Design	B	Enc	TEFC
RPM	1760	Code Ltr	G	Ins Class	F
Duty	Cont	Amb	65°C	FL Eff	90.2
Catalog Number: AEM2334-4				PF	86

84

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- 430.6 (A) (1)

  (1) Table Values. Other than for motors built for low speeds (less than 1200 RPM) or high torques, and for multispeed motors, the values given in Table 430.247, Table 430.248, Table 430.249, and Table 430.250 shall be used to determine the ampacity of conductors or ampere ratings of switches, branch-circuit short-circuit and ground-fault protection, instead of the actual current rating marked on the motor nameplate.

85

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.250 states that a 20HP, 3 phase 460 volt motor will draw _____ amps full load current.
- How many amps did the nameplate say? _____
- Section 430.22 tells us we now have to _____ .
- We must now go to Table 310.15(B)16 and find a conductor with insulation of THWN that can carry our motor load, the size is _____.

The 60 degree column must be used because of the rating of our terminals.

86

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.52 will provide information about the proper size of time delay fuses we need. We had a full load current of 27 amps according to Table 430.250. We must increase this number by what percent _____.
- The calculated number is _____ amps.
- Now we must look at 240.6 and locate the appropriate overcurrent device in accordance with 430.52 (C) (1) Exc. #1. The size of the fuses are _____ ?

87

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Let's begin with 430.32 (A) (1)
  - A separate overload device that is responsive to motor current. This device shall be selected to trip or shall be rated at no more than the following percent of the motor nameplate full load current rating:
- Our motor had a FLA on the nameplate of 24.5 amps. The service factor of our motor was 1.0, based on this, our overloads will be _____% of 24.5.
- Which will result in a heater size of _____.

88

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

The last calculation was a 3 phase motor, let's try a single phase motor. Our overcurrent protection will be a molded case circuit breaker.

89

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- 430.6 (A) (1)

  (1) Table Values. Other than for motors built for low speeds (less than 1200 RPM) or high torques, and for multispeed motors, the values given in Table 430.247, Table 430.248, Table 430.249, and Table 430.250 shall be used to determine the ampacity of conductors or ampere ratings of switches, branch-circuit short-circuit and ground-fault protection, instead of the actual current rating marked on the motor nameplate.

90

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.248 states that a 5HP, single phase 230 volt motor will draw _____ amps full load current.
- How many amps did the nameplate say? _____
- Section 430.22 tells us we now have to _____ .
- We must now go to Table 310.15(B)16 and find a conductor with insulation of THWN that can carry our motor load, the size is _____.

All terminals are rated at 75 degrees Celsius.

91

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.52 will provide information about the proper size of molded case breaker we need. We had a full load current of 28 amps according to Table 430.248. We must increase this number by what percent _____.
- The calculated number is _____ amps.
- Now we must look at 240.6 and locate the appropriate overcurrent device in accordance with 430.52 (C) (1) Exc. #1. The size of the molded case circuit breaker will be _____

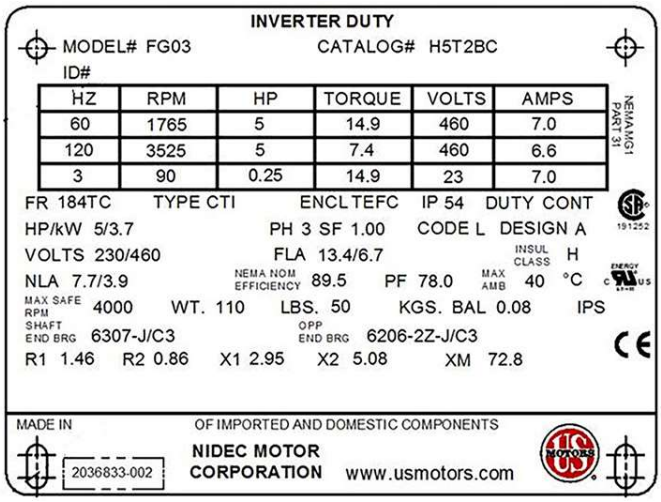
92

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Let's begin with 430.32 (A) (1)
  - A separate overload device that is responsive to motor current. This device shall be selected to trip or shall be rated at no more than the following percent of the motor nameplate full load current rating:
- Our motor had a FLA on the nameplate of 20.6 amps. The service factor of our motor was 1.15, based on this, our overloads will be _____% of 20.6.
- Which will result in a heater size of _____.

93

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases



This motor will be controlled by a VFD

94

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- 430.6 (A) (1)

  (1) Table Values. Other than for motors built for low speeds (less than 1200 RPM) or high torques, and for multispeed motors, the values given in Table 430.247, Table 430.248, Table 430.249, and Table 430.250 shall be used to determine the ampacity of conductors or ampere ratings of switches, branch-circuit short-circuit and ground-fault protection, instead of the actual current rating marked on the motor nameplate.

95

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.250 states that a 5HP, 3 phase 460 volt motor will draw _____ amps full load current.
- How many amps did the nameplate say? _____
- Section 430.22 tells us we now have to _____ .
- We must now go to Table 310.15(B)16 and find a conductor with insulation of THWN that can carry our motor load, the size is _____.

96

Calculate branch circuit size, overcurrent protection, motor overload device size, and thermal protection for at least 3 different types of motors, voltages, and phases

- Table 430.52 will provide information about the proper size of molded case breaker we need. We had a full load current of 7.6 amps according to Table 430.250. We must increase this number by what percent _____.
- The calculated number is _____ amps.
- Now we must look at 240.6 and locate the appropriate overcurrent device in accordance with 430.52 (C) (1) Exc. #1. The size of the breaker is _____ ?

97

Calculate branch circuit size and overcurrent protection for air conditioning and refrigerating equipment

Calculate branch circuit size and overcurrent protection for air conditioning and refrigerating equipment

The branch circuit conductor size can be sized as a minimum circuit conductor size by using the MCA [minimum circuit ampacity].This name plate says the ampacity must equal or exceed 27 amps. Look in Table 310-16 in the 60 degree column as required in 110-14 for conductors smaller than a 1 AWG conductor regardless of the insulation on that conductor. The minimum branch circuit conductor size for this name plate is 10 AWG copper branch circuit conductor size.

99

Calculate branch circuit size and overcurrent protection for air conditioning and refrigerating equipment

Overcurrent Protection

The maximum overcurrent protection is determined by the manufacturer and is usually marked “maximum fuse or HACR type breaker”

If the maximum fuse or HACR type breaker size in amps [maximum overcurrent protection] is not found on the nameplate, it may be determined as follows; RLA OR BCSC whichever is greater x 175%]

OR if that overcurrent device size won't carry the load without tripping then you may calculate as a maximum [RLA x 225%] but only if required for the equipment to work reliably without the overcurrent device tripping.

This breaker or fuse is used only for short circuit protection

100

Calculate transformer size, primary/secondary feeder size, and overcurrent protection for primary/secondary for a load as determined by you

Calculate transformer size, primary/secondary feeder size, and overcurrent protection for primary/secondary

Our load will be a lighting load in a commercial building. The voltage at each light is 120 V. The ampacity of this continuous load is 85 Amps.

Sizing the Transformer: 85 times 1.25 = 106.25 Amps We need a transformer that can deliver this amount of amps continuously.

Calculating KVA we must take 106.25 times 208 times 1.732 which equals 38,277.2 KVA divided by 1000

Since transformers are sized in KVA the next higher size would be chosen
Standard sizes for three-phase transformers:
3, 6, 9, 15, 30, 45, 75, 112.5, 150, 225, 300, 500, 750 and 1,000 (KVA)

101

Calculate transformer size, primary/secondary feeder size, and overcurrent protection for primary/secondary

Since we now know the size of the transformer we can calculate our required conductor sizes.

Step 1. Determine Transformer Current Ratings: Determine the primary and secondary current rating of the transformers:

	Primary Current	Secondary Current
45 kVA	45,000 VA/(480 x 1.732) = 54A	45,000 VA/(208 x 1.732) = 125A

Step 2. Primary Protection [450.3]: The primary winding of transformers shall be protected against overcurrent in accordance with the percentages listed in Table 450.3 and all applicable notes. Where 125 percent of the primary current does not correspond to a standard rating of a fuse or nonadjustable circuit breaker as listed in 240.6(A), the next higher rating can be used [Note 1].

45 kVA	54A x 1.25 = 68A, next size up 70A

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Calculate transformer size, primary/secondary feeder size, and overcurrent protection for primary/secondary

Step 3. Size Primary Conductor: Feeder conductors supplying continuous loads shall be sized no less than 125 percent of the continuous loads based on the conductor ampacities as listed in Table 310.15(B)(16), before any ampacity adjustment in accordance with the terminal temperature rating [110.14(C) and 215.2(A)(1)].

45 kVA 54A x 1.25 = 68A, 4 AWG rated 85A at 75°C, Table 310.15(B)(16)

Step 4. Size Secondary Conductor All based on 45 KVA we would take 45000 divided by 208 times 1.732 = 125 Amps Continuous load 125 times 1.25 = 156.25 Table 310.15(B)(16) states that at 75 degrees C a 1 gauge conductor may be used.

Step 5. Size Secondary Overcurrent Protection When the secondary current is 9 amps or more the overcurrent protection for the secondary will be a maximum of 125% of 125 amps which is the secondary current = 125 times 1.25 = 156.25. We are allowed to round up according to 240.6 which results in a circuit breaker size of 175 Amp.

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Questions?

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