ANSWER SHEET • 2023 ELECTRICAL RULE & LAW • OREGON

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1.	A	B	C	D	26.	A	B	C	D	51.	A	B	C	D	76.	A	B	C	D
2.	A	B	C	D	27.	A	B	C	D	52.	A	B	C	D	77.	A	B	C	D
3.	A	B	C	D	28.	A	B	C	D	53.	A	B	C	D	78.	A	B	C	D
4.	A	B	C	D	29.	A	B	C	D	54.	A	B	C	D	79.	A	B	C	D
5.	A	B	C	D	30.	A	B	C	D	55.	A	B	C	D	80.	A	B	C	D
6.	A	B	C	D	31.	A	B	C	D	56.	A	B	C	D	81.	A	B	C	D
7.	A	B	C	D	32.	A	B	C	D	57.	A	B	C	D	82.	A	B	C	D
8.	A	B	C	D	33.	A	B	C	D	58.	A	B	C	D	83.	A	B	C	D
9.	A	B	C	D	34.	A	B	C	D	59.	A	B	C	D	84.	A	B	C	D
10.	A	B	C	D	35.	A	B	C	D	60.	A	B	C	D	85.	A	B	C	D
11.	A	B	C	D	36.	A	B	C	D	61.	A	B	C	D	86.	A	B	C	D
12.	A	B	C	D	37.	A	B	C	D	62.	A	B	C	D	87.	A	B	C	D
13.	A	B	C	D	38.	A	B	C	D	63.	A	B	C	D	88.	A	B	C	D
14.	A	B	C	D	39.	A	B	C	D	64.	A	B	C	D	89.	A	B	C	D
15.	A	B	C	D	40.	A	B	C	D	65.	A	B	C	D	90.	A	B	C	D
16.	A	B	C	D	41.	A	B	C	D	66.	A	B	C	D	91.	A	B	C	D
17.	A	B	C	D	42.	A	B	C	D	67.	A	B	C	D	92.	A	B	C	D
18.	A	B	C	D	43.	A	B	C	D	68.	A	B	C	D	93.	A	B	C	D
19.	A	B	C	D	44.	A	B	C	D	69.	A	B	C	D	94.	A	B	C	D
20.	A	B	C	D	45.	A	B	C	D	70.	A	B	C	D	95.	A	B	C	D
21.	A	B	C	D	46.	A	B	C	D	71.	A	B	C	D	96.	A	B	C	D
22.	A	B	C	D	47.	A	B	C	D	72.	A	B	C	D	97.	A	B	C	D
23.	A	B	C	D	48.	A	B	C	D	73.	A	B	C	D	98.	A	B	C	D
24.	A	B	C	D	49.	A	B	C	D	74.	A	B	C	D	99.	A	B	C	D
25.	A	B	C	D	50.	A	B	C	D	75.	A	B	C	D	100.	A	B	C	D

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DISCLAIMER NOTE: This course is APPROVED by the Oregon Building Codes Division for continuing education to renew your electrical license and is not intended to replace or supersede any state or local adopted codes.

2023 OREGON RULE & LAW

918-008-0085
Statewide Code Interpretation Process

(1) A petitioner may request a statewide code interpretation by providing the following information in writing or on division approved forms:

(a) A brief description of the facts and circumstances giving rise to the need for a statewide code interpretation; and

(b) The specialty code section at issue.

(2) Notwithstanding subsections (1)(a) and (b) of this rule, the division may elect to accept a substantially complete request for a statewide code interpretation if circumstances merit.

(3) After receipt and approval of a petitioner's request for interpretation, the division will process the request, reach a conclusion, and distribute the decision.

(4) Each quarter, the division will communicate to the appropriate advisory board its actions concerning statewide code interpretations.

918-008-0095
Alternate Method Ruling Process

(1) A petitioner may request an alternate method ruling by providing the following information in writing or on division approved forms:

(a) Information on the material, design, or method the person wishes to utilize;

(b) The specialty code section at issue; and

(c) A brief description of the technical and scientific facts and circumstances giving rise to the need for an alternate method ruling.

(2) Notwithstanding subsections (1)(a) through (c) of this rule, the division may elect to accept a substantially complete request for an alternate method ruling if circumstances merit.

(3) After receipt of a petitioner's complete request for interpretation, the appropriate advisory board makes a recommendation on the technical and scientific facts of the proposed alternate method ruling, consistent with ORS 455.060.

(4) After considering the recommendation of the appropriate advisory board, the division makes the final decision on the alternate method ruling and distributes the decision consistent with ORS 455.060.

918-305-0430
Requests for Inspection and Notice of Results

(1) All persons who take out an electrical permit shall request an inspection within 24 hours of:

(a) The completion of any electrical installation intended to be covered or concealed or that is intended to be placed into service before the final electrical inspection; and

(b) The completion of all electrical installations for the job site covered by a particular permit.

(2) Except as provided in Section (3) of this rule, an inspecting jurisdiction shall inspect within 48 hours of a written request for inspection unless the time for inspection is extended to a set date by mutual agreement. The 48 hours excludes Saturdays, Sundays and holidays.

(3) The inspecting jurisdiction shall inspect an installation at a remote location within a reasonable time of the request.

(a) For the purpose of this section, a "remote location" is:

(A) An inspection location that is more than 60 miles one way using the most direct route, measured from the closest of the inspector's station, inspection office or the inspecting jurisdiction's primary offices; or

(B) An inspection location that requires more than one hour of normal driving, one way, using the most direct route from the closest point mentioned in paragraph (A) of this subsection.

(b) For the purposes of this section, "within a reasonable time" means a response time that takes into account the time, distance and number of inspection requests, but shall not exceed seven consecutive calendar days including the date the request was received, unless the time for inspection is extended to a set date by mutual agreement. If the seventh calendar day falls on a weekend or holiday, this is extended to include the next business day.

(4) Reasonable procedures designed to provide actual notice of inspection results shall be used by all inspecting jurisdictions to notify the person requesting inspections, of the results of electrical inspection. "Reasonable procedures designed to provide actual notice" shall include posting at the job site and:

(a) Nothing more, when the installation is by an owner;

(b) Nothing more, when the installation is approved;

(c) Notification of any deficiencies on a specific permit by:

(A) FAX transmittal to the electrical contractor;

(B) Personal delivery to the electrical contractor or signing supervisor;

(C) Mailing; or

(D) Telephone followed by written notification.

(d) By written confirmation of inspection approval if a permit holder requests confirmation.

(5) If the inspection mentioned in Sections (1) and (2) of this rule involves a cover inspection, the work cannot be covered unless:

(a) Inspection clearance is given; or

(b) The request for inspection is in writing communicated to the inspecting jurisdiction, with notice that a cover inspection is involved, no extensions are agreed to and the maximum time for making the required inspection under Sections (1) and (2) of this rule are exceeded. For the purposes of this subsection:

(A) Written request includes a letter, telegram or FAX transmittal; and

(B) The burden of proof is on the person requesting the electrical inspection to prove that a written request was communicated.

918-305-0440
Correction of Defects

(1) Defects in electrical installations noted by the electrical inspector shall be corrected and an inspection request made within 20 calendar days of the date of actual notice of deficiency. For the purpose of this rule, actual notice is given when the inspecting jurisdiction does everything required in OAR 918-271-0020.

(2) If corrections cannot reasonably be made within the specified time in section (1) of this rule, or an interpretation or written appeal has been requested, the permit holder shall contact the inspecting jurisdiction and request an extension of time to a specified date or until deficiency is resolved.

(3) Requests for inspection and requests for extension may be communicated in any way. However, if challenged, the burden of proof is on the requester to document the request was in fact communicated. Responses may also be communicated in any way, but if challenged, the burden of proof is on the inspecting jurisdiction.

918-305-0470
Appeals

(1) Appeals of decisions recommended by a deputy inspector in relation to the application of the Oregon Electrical Specialty Code shall be to the chief electrical inspector in accordance with OAR 918, division 251, provided that no notice needs to be given to any local jurisdiction.

(2) The chief electrical inspector's determination may be appealed to the director who may consult with the Electrical and Elevator Board or other consultants on any technical issues deemed necessary by the director.

EXAM QUESTIONS

1. How often does the division issue code interpretations when formally requested?

A. Within 10 business days
B. The second Thursday of every month
C. Quarterly
D. Within 15 business days

2. What ORS does the board use when analyzing technical and scientific facts when making an Alternate Method Ruling?

A. 918-008-0085
B. 455.060
C. 918-008-0045
D. 693.020

3. Oregon requires calling for an electrical inspection within _____ hours of any electrical installation intended to be covered or concealed.

A. 24
B. 48
C. 36
D. No requirement.

4. Any corrections noted by an electrical inspector are required to be corrected and an inspection request made within _____ calendar days of the date of actual notice of deficiency.

A. 10
B. 15
C. 20
D. 30

5. How many miles from an inspection location using the most direct route measured from the inspector's station is considered a remote location?

A. 60 miles
B. 30 miles
C. 50 miles
D. 45 miles

6. All appeals of decisions made by a deputy inspector shall be to the _____.

A. The BCD
B. Oregon electrical board
C. Chief electrical inspector
D. No listed answer

To Access and find electrical Board actions, Oregon statute, administrative rule, electrical code, code interpretations, and enforcement case studies go to http://www.cbs.state.or.us/bcd/. On the right side of the page, select the correct board and information desired.

For electricians and contractors to informally request clarification on a code call or interpretation, call your local Authority Having Jurisdiction. To formally request such information, refer to OAR 918-008-0120 listed below:

918-008-0120
State Building Code Appeal Process

(1) A person aggrieved by the building official's decision on the application of the state building code adopted under ORS 447.020, 455.020, 455.610, 460.085, 460.360, 479.730 or 480.545 may appeal to either the local jurisdiction's appeals board or the state specialty code chief. The appeals process selected may not change once initiated.

(2) A filing fee of $20 is required for appeals to the state specialty code chief.

(3) An appeal must be filed within 30 calendar days of the building official's decision.

(4) An appeal must include the following information and other information requested by the chief:

(a) The person filing the appeal, the jurisdiction where the act occurred, and any parties involved, including contact information;

(b) The specific code or codes involved, with proper citation;

(c) A written description of appeal, which may include diagrams or drawings with distances shown to scale;

(d) A copy of any written interpretation or decision, if issued by the jurisdiction;

(e) An explanation why the ruling should be reversed;

(f) The status and date of stop work order if issued; and

(g) Other information as requested by the chief.

(h) Notwithstanding subsection (a) through (g) of this rule, the division may elect to accept a substantially complete request for an appeal when it appears that doing so furthers the interests of the state.

(5) The building official and person appealing must respond within 7 calendar days to a request from the chief for additional information. The chief has 14 days to render a decision and inform both the jurisdiction and the person appealing a decision of a local jurisdiction. The maximum time for rendering a decision may not exceed 30 calendar days. The Building Codes Division Administrator may suspend these procedural time frames when the complexity of the issue merits additional decision time.

(6) A decision by a local jurisdiction's appeals board or chief may be appealed to the appropriate advisory board within 30 calendar days of the decision. A filing fee of $20 is charged for an appeal of a local jurisdiction's appeals board decision.

918-309-0000
Electrical Permits

(1) Except as provided by OAR 918, division 282, dealing with restricted energy transactions, limited maintenance specialty contractor-HVAC/R, and registered telecommunications service provider, the signature of a signing supervising electrician or limited supervising electrician must be required on each permit to aid inspections by the division and indicate responsibility under ORS 479.710. Any person providing false or incorrect information or false or an incorrect signature to obtain a permit may be subject to compliance action by the board.

(2) The following may purchase electrical permits:

(a) Electrical contractors; and

(b) Registered telecommunications service providers (TSP) as defined in ORS 759.005, including competitive carriers, competitive local exchange carriers (CLEC) and telecommunications utilities. These telecommunications service providers are listed as such by the Public Utilities Commission (PUC).

(3) A permit is required prior to start of electrical work. See OAR 918-309-0080 for temporary permit criteria. Expansion of work under a permit may be added to an existing permit prior to final inspection.

(4) A permit must be posted in a conspicuous place near the main electrical panel location. If there is no main panel installed, the permit must be posted in a conspicuous place on the job site.

(5) An electrical permit, other than a restricted energy electrical permit as provided in OAR 918-309-0400, issued to one person or firm is not transferable and may not permit any other person or firm to perform any electrical work thereunder.

(6) Any permittee holding an unexpired permit may apply for an extension of the time within which work may be completed.

(7) Permits issued by an inspection jurisdiction under the provisions of the Oregon Electrical Specialty Code and these rules expire and become null and void if the work authorized by the permit is:

(a) Not started within 180 days from the date of permit issuance; or

(b) Suspended or abandoned for a period of 180 days after the work is started.

(8) Corrections to electrical installations must be completed regardless of 180-day suspension or abandonment of work. All corrections to electrical installations must be completed within 20 calendar days of notice of deficiency. See OAR 918-271-0030 for requirements.

(9) In addition to other signing supervising electricians, the following are authorized to sign permits:

(a) A person whose qualifications are relied upon for licensing under OAR 918-282-0140 is a "supervisor" under ORS 479.560 and can sign for electrical permits or labels for work under a limited maintenance specialty contractor-HVAC/R license;

(b) A Class "A" or Class "B" limited energy technician can sign permits or labels for 100 volt-ampere or less

electrical installations performed by those licensees;

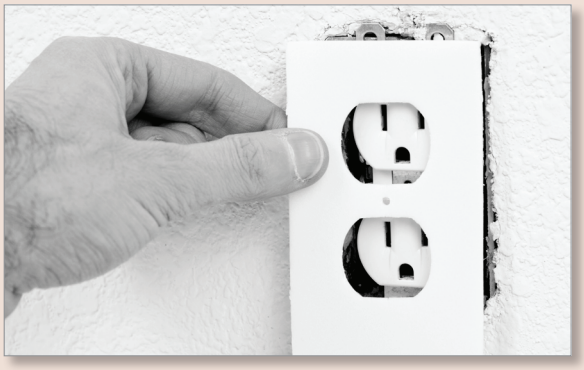
(c) A "supervisor" as used in ORS 479.630 who can sign restricted energy permits includes:

(A) A Class "A" or "B" limited energy technician when the electrical installation is within the scope of the person's license;

(B) Persons whose qualifications are relied upon for the issuance of a restricted energy electrical contractor license under OAR 918-282-0060; and

(C) Any other electrical licensee authorized to sign a permit provided the work is within the scope of the person's license.

(10) No electrical permit is required:



(a) To replace light bulbs, fluorescent tubes, or approved fuses, or to connect approved portable electrical equipment to permanently installed and properly wired receptacles;

(b) For experimental electrical work or testing of electrical products in testing laboratories of electric shops, educational institutions, industrial plants, or recognized testing laboratories;

(c) For those minor electrical installations for which the board has authorized an installation label;

(d) To install components exempted by OAR chapter 918, division 261;

(e) To replace an existing garbage disposal, dish washer, electric water heater or similar appliance of 30 amps or less, single phase; or

(f) To install cord and plug connected Class 2 irrigation control systems.

(11) Unless noted otherwise in these rules, a permittee is entitled to two inspections for each electrical installation or portion thereof for which a permit fee is assessed. The total number of inspections under a permit are aggregated and used to inspect any of the installations under the permit. A permittee is considered to have received an inspection only when the permittee has requested and received an inspection from the municipality. Inspections are counted based on a single visit, in person or through an approved electronic inspection method, to a job site. See examples in Table 2-E.

918-309-0010 Electrical Permit Form and Format

The division has adopted a:

(1) Standardized statewide electrical permit application format; and

(2) Uniform statewide method for calculating permit fees:

(a) Fees can only be charged for the categories and under the procedures and requirements established in OAR chapter 918, division 309.

(b) The fees set out in OAR 918-309-0070 are for state permits. Local jurisdictions may set different fees as authorized by ORS 479.845.

(c) The fees established for the various categories adopted in this rule shall be inserted in the permit application form for local jurisdictions.

(d) The surcharge required by ORS 455.210 and 455.220 shall be added to the fees established.

EXAM QUESTIONS

7. What side of the Oregon Build Codes division website is the link to find electrical Board actions, Oregon statute, administrative rule, electrical code, code interpretations, and enforcement case studies?

A. Left
B. Right
C. Top
D. Bottom

8. How long does a person initiating the code appeal process have to respond when the chief electrical inspector asks for more information?

A. 14 business days
B. 14 days
C. 30 calendar days
D. 7 calendar days

9. How much money does it cost to file a state building code appeal?

A. No fee required
B. 50 dollars
C. 12 dollars
D. 20 dollars

10. What Oregon Administrative Rule would you reference to determine if you needed an electrical permit?

A. 918-305-0440
B. 918-305-0430
C. 918-309-0000
D. 918-282-0170

11. What permit is required to install cord and plug connected Class 2 irrigation control systems?

A. Class A
B. No permit required
C. Class B
D. Phased permit

12. If there is no main panel installed on a jobsite yet, where is the electrical permit required to be posted?

A. In the parts crib
B. In the truck window
C. In the break area
D. In a conspicuous place on the job site

13. What is the maximum amperage garbage disposal you can install without an electrical permit?

A. 20 amp
B. 25 amp
C. 30 amp
D. 15 amp

918-282-0170
General Journeyman License

(1) A general journeyman:

(a) Is authorized to make any electrical installation; and

(b) Shall work under the supervision, direction and control of a general supervising electrician unless doing the type of work that may be supervised, directed or controlled by a person holding a specific limited supervising electrician license, or the type of work requiring no supervision.

(2) A general journeyman working in a manufacturing or industrial plant without a supervising electrician or engineer is limited to maintenance work.

(3) License and Equivalent Requirements.

(a) Applicants for acceptance under equivalent requirements shall show proof of the following work categories and minimum hours of on-the-job training or experience:

(A) Stock room and material handling, 100 hours:
(i) Shop;
(ii) Service.

(B) Residential Wiring, 1,000 hours:
(i) Service and panel;
(ii) Conduit, flex, romex boxes, electric heating systems;
(iii) Wire pulling and taps;
(iv) Wiring devices and fixtures;
(v) Remodel and finish work.

(C) Commercial Installations, 1,000 hours:
(i) Services, switchboards and panels;
(ii) Conduit, flex, metal moldings, floor duct and boxes;
(iii) Wire pulling and taps;
(iv) Wire devices;
(v) Lighting fixtures - high voltages, explosion proof, perimeter lighting.

(D) Industrial Installations, 1,000 hours:
(i) Services, switchboards and panels;
(ii) Conduit, tray and boxes;
(iii) Wire pulling and taps;
(iv) Motor and equipment installations;
(v) Lighting fixtures - High voltage, explosion proof, security lighting.

(E) Intercommunication, Signal and Control Systems, 500 hours;

(F) Underground Construction, 100 hours:
(i) Tunnel rack work;
(ii) Ditch digging and material handling;
(iii) Conduit preparation.

(G) Trouble Shooting and Maintenance, 250 hours;

(H) Finishing and Fixture Hanging, 50 hours;

(I) Total Minimum Subject Hours, 4,000.

(b) Total Hours Required. Total electrical work experience shall be at least 8,000 hours. No more than 300 percent credit shall be allowed for subjects (A) through (H) for any one subject;

(c) Related Training Classes. Applicants shall submit transcripts with passing grades of "C" or better in graded classes and a "pass" in non-graded classes in the following related electrical training classes:

(A) Electrical mathematics;

(B) Safety and accident prevention;

(C) Care and use of hand and power tools;

(D) Blueprint reading and electrical symbols;

(E) Introduction to National Electrical Code;

(F) Electrical fundamentals and basic theory, including AC and DC;

(G) Electrical measuring devices;

(H) Wiring methods;

(I) Low voltage and limited energy circuits;

(J) Residential, industrial and commercial calculations;

(K) Motors, generators and transformers;

(L) Practical circuit sketching;

(M) Lighting circuits;

(N) Fundamentals of electronics;

(O) High voltage distribution and equipment

918-309-0025 Phased Permitting

(1) During the plan review process, an electrical contractor may request a complete or partial permit before the entire plans and specifications are submitted or approved, if adequate information is provided showing compliance with pertinent portions of the code. The permittee proceeds at his or her own risk, without assurance that the permit for the entire installation will be granted, or that corrections will not be required, including those portions permitted. The partial permit shall allow the electrical contractor to proceed with work pertaining to the electrical system of the structure.

(2) Any inspections performed by the local jurisdiction on the site or of the groundwork shall be counted toward the number of electrical inspections allowed by the full permit once plan review is complete and the permit is issued.

EXAM QUESTIONS

14. How many hours does a general Journeyman need in industrial work to qualify for the Oregon State General journeyman exam?

A. 500
B. 1000
C. 250
D. No such requirement.

15. The state of Oregon will accept a non-graded pass score as proof of training hours for what area of study listed below.

A. Shop
B. Tunnel rack work
C. Conduit preparation
D. Electrical measuring devices

16. How many hours does a general journeyman need in trouble shooting and maintenance to qualify for the Oregon State general journeyman exam?

A. 250 hours
B. 50 hours
C. 100 hours
D. 500 hours

The 2023 Oregon Electrical Specialty Code (OESC) is based on the 2023 edition of the National Fire Protection Association (NFPA) 70, National Electrical Code (NEC), approved as an American National Standard on Sept. 1, 2022.

90.4(C) Specific Requirements and Alternative Methods. By special permission, the authority having jurisdiction may waive specific requirements in this Code or permit alternative methods where it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety.

Requests for special permission shall be made in writing to the authority having jurisdiction. Special permission must be granted in writing by the authority having jurisdiction and shall be obtained prior to the start of the electrical installation.

90.4(D) New Products, Constructions, or Materials. This Code may require new products, constructions, or materials that may not yet be available at the time the Code is adopted. In such an event, the authority having jurisdiction may permit the use of the products, constructions, or materials that comply with the most recent previous edition of this Code adopted by the jurisdiction.

Where the NEC requires electrical products to be "listed" or "labeled", the words "listed" or "labeled" shall have the same meaning as "certified electrical product" under ORS 479.530.

The occupancy classification and use designations shall be established in accordance with the Oregon Structural Specialty Code (OSSC), as stated on the construction documents by the registered design professional and approved by the building official.

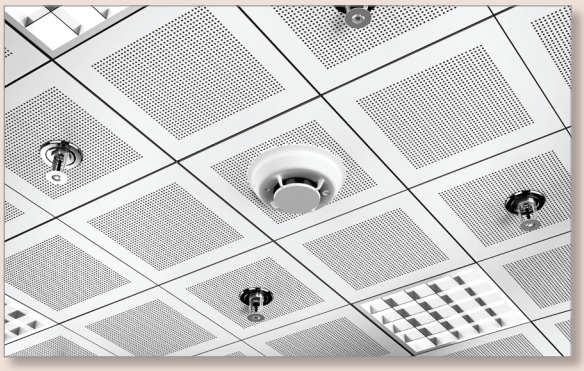
The electrical datum plane as used throughout the OESC shall be the Design Flood Elevation as determined by the flood plain administrator in accordance with the Oregon Structural Specialty Code (OSSC) or Oregon Residential Specialty Code (ORSC) as applicable.

90.5(C) Explanatory Material. Explanatory material, such as references to other standards, references to related sections of this Code, or information related to a Code rule, is included in this Code in the form of informational notes or an informative annex. Unless the standard reference includes a date, the reference is to be considered as the latest edition of the standard effective on Oct. 1, 2023. Such notes are informational only and are not enforceable as requirements of this Code.

Alcoves. An area extending from, and returning to, the common wall of hallways, foyers, entries, and landings with a depth of not less than 600 mm (2 ft) and a length of not less than 900 mm (3 ft).

Critical Operations Data System. An information technology equipment system that has been designated by the building owner as requiring continuous operation.

Dormitory Unit. A space in a building where group sleeping accommodations are provided in one room, or in a series of closely associated rooms, for persons not members of the same family group, under joint occupancy and single management, as in college dormitories, or fraternity houses.



Electrical Datum Plane. A specified vertical distance above the normal high-water level at which electrical equipment can be installed and electrical connections can be made.

Informational Note: See OESC 90.4(D) for additional information.

Fire Protection System. Approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination thereof.

EXAM QUESTIONS

17. What code are the occupancy classification and use designations established in accordance with?

A. Oregon Electrical Specialty Code
B. Oregon Structural Specialty Code
C. Oregon Residential Specialty Code
D. Oregon Energy Specialty Code

18. Who determines the Design Flood Elevation in Oregon?

A. The flood plain administrator
B. The BCD
C. The EPA
D. The Ecological administration

19. What code section describes explanatory material in the 2023 OESC?

A. 90.4(C)
B. 90.5(C)
C. 90.5(D)
D. 90.5(A)

20. What term best describes an area extending from, and returning to, the common wall of hallways, foyers, entries, and landings with a depth of not less than (2 ft) and a length of not less than (3 ft)?

A. Electrical Datum Plane
B. Critical Operations Data System
C. Dormitory Unit
D. Alcoves

21. What best defines an information technology equipment system that has been designated by the building owner as requiring continuous operation?

A. Alcoves
B. Critical Operations Data System
C. Dormitory Unit
D. Electrical Datum Plane

22. What term best describes a specified vertical distance above the normal high-water level at which electrical equipment can be installed and electrical connections can be made?

A. Alcoves
B. Electrical Datum Plane
C. Critical Operations Data System
D. Dormitory Unit

23. What are approved devices, equipment and systems or combinations of systems used to detect a fire, activate an alarm, extinguish or control a fire, control or manage smoke and products of a fire or any combination considered?

A. Critical Operations Data System
B. Alcoves
C. Fire Protection System
D. Dormitory Unit

Separate Branch Circuit. A circuit dedicated solely for the purpose intended without other devices, systems or equipment connected to the circuit.

Structure. That which is built or constructed, other than equipment or a post(s) or pole(s) with an attached meter base.

Servicing. The process of following a manufacturer's set of instructions or applicable industry standards to analyze, adjust, or perform prescribed actions upon equipment with the intention to preserve or restore the operational performance of the equipment.

110.3(A)(8) Cybersecurity for network connected life safety equipment to address its ability to withstand unauthorized updates and malicious attacks while continuing to perform its

intended safety functionality. The permit holder is not required to demonstrate compliance with this list item.

Circuit Impedance; Short-Circuit Current Ratings, and Other Characteristics. 110.10

Exception No. 1: A temporary service may be energized without demonstrating compliance with this section. This exception is applied at the discretion of the supervising electrician.

Exception No. 2: Fault-current values provided by the serving utility may be used to satisfy the labeling requirements.

110.14(D) Terminal Connection Torque. Tightening torque values for terminal connections shall be as indicated on equipment or in installation instructions provided by the manufacturer. An approved means shall be used to achieve the indicated torque value. The permit holder is not required to demonstrate compliance with this section.

110.17 Servicing and Maintenance of Equipment. Servicing and electrical preventive maintenance of used electrical equipment by means of inspection, testing or repair with listed or recognized components shall be permitted.

110.20 Reconditioned Equipment. Reconditioned equipment shall be permitted except where prohibited elsewhere in this Code. Equipment that is restored to operating condition shall be reconditioned with identified replacement parts, verified under applicable standards, that are either provided by the original equipment manufacturer that are designed by an engineer experienced in the design of replacement parts for the type of equipment being reconditioned, or selected by the supervising electrician.

Informational Note No. 1: See ANSI EERS 2018.

Informational Note No. 2: See 110.17 and definition of Servicing.

110.22(A) General.

Informational Note: The location of the circuit source may include panel name, circuit number, or other information necessary to help service personnel to locate the circuit source disconnecting means.

110.24(A) Field Marking.

Exception No. 1: A temporary service may be energized without demonstrating compliance with this section. This exception is applied at the discretion of the supervising electrician.

Exception No. 2: Fault-current values provided by the serving utility may be used to satisfy the labeling requirements.

EXAM QUESTIONS

24. That which is built or constructed, other than equipment or a post(s) or pole(s) with an attached meter base is considered?

A. A structure
B. Alcoves
C. A fire Protection System
D. A separate Branch Circuit

25. Generally, who can allow a temporary service to be energized without demonstrating compliance with this section 110.10 in Oregon?

A. Journeyman electrician
B. General contractor
C. Supervising electrician
D. All listed answers

26. Fault-current values provided by the serving utility may be used to satisfy the _____ requirements.

A. Short circuit
B. Labeling
C. Manufacturers
D. Owners

27. A(an) _____means shall be used to achieve the indicated torque value.

A. Listed
B. Secondary
C. New
D. Approved

28. What listed code section in the OESC has information regarding the servicing and maintenance of equipment?

A. 110.17
B. 110.20
C. 110.14(D)
D. 110.22(A)

29. What kind of information may be included when describing the location of a circuits source?

A. Circuit location
B. Panel name
C. Circuit number
D. All listed answers

30. Generally, who can allow a temporary service to be energized without demonstrating compliance with this section 110.24(A) in Oregon?

A. General contractor
B. Supervising electrician
C. Journeyman electrician
D. All listed answers

110.26(C)(3) Personnel Doors. Where equipment rated 800 amperes or more that contains overcurrent devices, switching devices, or control devices is installed in structures other than one- and two-family dwellings and individual multifamily units and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open at least 90 degrees in the direction of egress and be equipped with listed panic hardware or listed fire exit hardware.

Informational Note: Additional construction requirements are located in Section 1010.1.10 of the OSSC. This section governs panic hardware listing and installation requirements. The following OSSC sections are not part of this code but are provided here for the reader's convenience.

OSSC Section 1010.10.10.1 Installation. Where panic or fire exit hardware is installed, it shall comply with the following:

1. Panic hardware shall be listed in accordance with UL 305.

2. Fire exit hardware shall be listed in accordance with UL 10C and UL 305.

3. The actuating portion of the releasing device shall extend not less than one-half of the door leaf width.

4. The maximum unlatching force shall not exceed 15 pounds (67 N).

OSSC Section 1010.1.10.2 Balanced Doors. If balanced doors are used and panic hardware is required, the panic hardware shall be the push-pad type and the pad shall not extend more than one-half the width of the

door measured from the latch side.

110.26(D) Illumination. Illumination of 10-foot candles average, measured at the floor, shall be provided for all working spaces about service equipment, switchgear switchboards, switchgear, enclosed panelboards, or motor control centers installed indoors. Control by automatic means shall not be permitted to control all illumination within the working spaces. Additional lighting outlets shall not be required where the work space is illuminated by an adjacent light source or as permitted by 210.70(A)(1), Exception No. 1, for switched receptacles.

110.31(A)(4) Locks. Doors shall be equipped with locks, and doors shall be kept locked, with access allowed only to qualified persons. Personnel doors shall open at least 90 degrees in the direction of egress and be equipped with panic hardware or fire exit hardware.

Informational Note: See the OESC Section 110.26(C)(3) amendment.

110.33(A)(3) Personnel Doors. Where there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open at least 90 degrees in the direction of egress and be equipped with panic hardware or fire exit hardware.

Informational Note: See the OESC Section 110.26(C)(3) amendment.

210.8(A) Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the following locations shall have ground-fault circuit- interrupter protection for personnel.

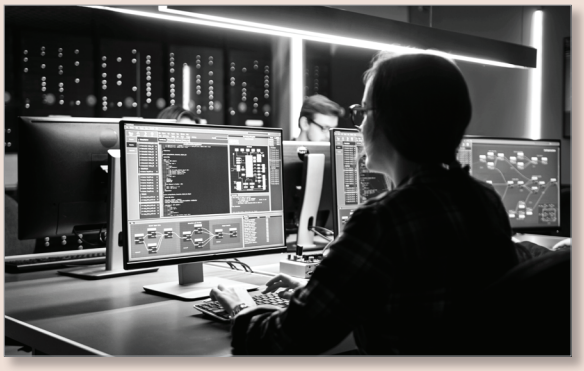
Items (1) through (4) remain unchanged.

(5) Unfinished portions or areas of basements not intended as habitable rooms

(6) Kitchens—where the receptacles are installed to serve the countertop surfaces

Exception No. 2: A receptacle supplying only a permanently installed premises security system shall be permitted to omit ground-fault circuit-interrupter protection if the receptacle is labeled as "not GFCI protected."

Exceptions No. (3) and (4) remain unchanged.



Exception No. 5: For the locations in 210.8(A)(2), (5), (6), (8), and (11), GFCI protection shall not be required for a single receptacle serving an appliance or a duplex receptacle serving two appliances if all of the following conditions are met:

1. The appliance is located within a dedicated space.

2. In normal use the appliance is not easily moved or is fastened in place.

3. The receptacle is labeled as "not GFCI protected."

Receptacle(s) installed under this exception shall not be considered as meeting the requirements of 210.52(C) and (G).

EXAM QUESTIONS

31. Personnel door(s) intended for entrance to and egress from the working space are required to open at least _____in the direction of egress.

A. Toward
B. 120 degrees
C. 90 degrees
D. As near

32. Panic hardware shall be_____ in accordance with UL 305.

A. Approved
B. Utilized
C. Listed
D. Permitted

33. If called for, what type of panic hardware is required to be used with balanced doors?

A. Push-pad type
B. Push-pull type
C. Permitted
D. Listed

34. Where do you take the illumination measurement to ensure compliance 110.26(D)?

A. At the egress door
B. 12 inches from the fixture
C. Midway between the fixture and the floor
D. At the floor

35. How many conditions must be met where a non GFCI protected duplex receptacle can feed two kitchen appliances?

A. 4
B. 2
C. 3
D. 6

210.8(B) Other than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the following locations shall be provided with GFCI protection.

Items (1) through (14) and Exceptions (1) through (6) remain unchanged.

Exception No. 7: GFCI protection shall not be required for a single receptacle installed in indoor locations serving aquariums and similar open aquatic vessels or containers if the receptacle is labeled as "not GFCI protected."

Exception No.8: GFCI protection shall not be required for a single receptacle serving an appliance or a duplex receptacle serving two appliances in laundry areas if all of the following conditions are met:

a. The appliance is located within a dedicated space.

b. In normal use the appliance is not easily moved or is fastened in place.

c. The receptacle is labeled as "not GFCI protected."

210.8(C) Crawl Space Lighting Outlets. GFCI protection shall be provided for lighting outlets not exceeding 120 volts installed in crawl spaces at or below grade level.

210.8(D) Specific Appliances. GFCI protection for specific appliances shall be provided in accordance with 422.5.

210.8(E) Equipment Requiring Servicing.

Exception: Receptacles installed indoors in dwelling units to meet this requirement shall not be required to be GFCI protected, unless otherwise required in 210.8(A) or 210.8(C).

210.8(F) Outdoor Receptacles. All outdoor general-purpose receptacles phase branch circuits rated 150 volts or less to ground, 50 amperes or less, shall be provided with GFCI protection.

Informational Note: This requirement does not apply to specific use supplied by single receptacles that are regulated by other sections in this code such as 551.71.

210.12(B) Dwelling Units. All 120-volt, single phase, 10-, 15- and 20-ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (A)(6):

Items (1) through (13) remain unchanged.

(14) Not adopted by the State of Oregon

(15) Alcoves

Exception No. 1: AFCI protection shall not be required for an individual branch circuit supplying a fire alarm system installed in accordance with 760.41(B) or 760.121(B). The branch circuit shall be installed in a metal raceway, metal auxiliary gutter, steel-armored cable, Type MC or Type AC, meeting the applicable requirements of 250.118, with metal boxes, conduit bodies, and enclosures.

Exception No. 2: AFCI protection shall not be required on branch circuits supplying receptacles located in hallways, kitchens or laundry areas and GFCI protected receptacles installed in dining rooms.

Exception No. 3: AFCI protection shall not be required for optional, dedicated outlets that supply equipment known to cause unwanted tripping of AFCI devices.

Exception No 4: AFCI protection shall not be required for branch circuits that serve an appliance that is not easily moved or that is fastened in place.

EXAM QUESTIONS

36. GFCI protection shall not be required for a single receptacle installed in indoor locations serving _____and similar open aquatic vessels or containers if the receptacle is labeled as "not GFCI protected."

A. Boat slips
B. Aquariums
C. Boat docks
D. Aquatic structures

37. What section does the OESC require GFCI protection for specific appliances to be provided in accordance with?

A. 242.5
B. 450.5
C. 422.5
D. 224.5

38. All outdoor general-purpose receptacles phase branch circuits rated 150 volts or less to ground, _____or less, shall be provided with GFCI protection.

A. 60 amperes
B. 50 amperes
C. 30 amperes
D. 20 amperes

39. What section(s) does an individual branch circuit supplying a fire alarm system need to comply with to not need AFCI protection?

A. 450(A)(1) or 460(B)(4)
B. 220(B)(3)
C. 220 and 225
D. 760.41(B) or 760.121(B)

210.12 Dormitory Units. All 120-volt, single-phase, 10-, 15-, and 20- ampere branch circuits supplying outlets or devices installed in the following locations shall be protected by any of the means described in 210.12(A)(1) through (7) (6).

Items (1) through (4) remain unchanged.

(5) Not adopted by the State of Oregon

(6) Not adopted by the State of Oregon

(7) Study areas

210.12(E) Branch Circuit Wiring Extensions, Modifications or Replacements. If branch circuit wiring for any of the areas specified in 210.12(B), or (C), (D is not adopted), is modified, replaced, or extended, the branch circuit shall be protected by one of with the following:

(1) By any of the means described in 210.12(A)(1) through (A)(6)

(2) A listed outlet branch-circuit type AFCI located at the first receptacle outlet of the existing branch circuit.

Exception No. 1: Extensions or modifications of existing circuits shall not require the installation of AFCI protection.

Exception No. 2: Replacement or upgrading of a service or panelboard shall not require that existing circuits be protected by AFCI devices.

210.52(D) Bathrooms. Unless prohibited in 406.9(C), at least one receptacle outlet shall be installed in bathrooms within 900 mm (3 ft) of the outside edge of each sink. The receptacle outlet shall be located on a wall or partition that is adjacent to the sink or sink countertop, located on the countertop, or installed on the side or face of the sink cabinet. In no case shall the receptacle be located more than 300 mm (12 in.) below the top of the sink or sink countertop. Receptacle outlet assemblies listed for use in countertops shall be permitted to be installed in the countertop.

210.52(E)(3) Balconies, Decks, and Porches.

Exception No. 1 to (3): Decks or porches located at grade level with an area of less than 1.9 m2 (20 ft2) are not required to have an additional receptacle installed.

Exception No. 2 to (3): Decks or porches located above grade level with a depth of 304 mm (1 ft) or less measured from the outside of the wall to the outside of the framing member are not required to have an additional receptacle installed.

210.52(J) Alcoves. In dwelling units, alcoves shall have at least one receptacle installed. These outlets shall be

in addition to the required hallway outlets.

210.63(A) Heating, Air Conditioning, and Refrigeration Equipment.

Exception No. 1: A receptacle outlet shall not be required at one- and two-family dwellings for the service of evaporative coolers.

Exception No. 2: An additional receptacle outlet shall not be required to be installed when replacing existing HVAC equipment if a receptacle outlet is located on the same level and within 23 m (75 ft).

210.70 Lighting Outlets Required. Lighting outlets shall be installed where specified in 210.70(A), (B), and (C).

225.36 Type of Disconnecting Means.

Exception: In single light pole installations that have the connections to the light pole circuit made in a location accessible only to qualified persons, recognized or certified in-line fuse holders shall be allowed, subject to special permission.

230.43 Wiring Methods for 1000 Volts, Nominal, or Less.

Exception: Items (13) and (15) are limited to use on traffic control devices and highway lighting poles.

230.46 Spliced and Tapped Conductors. Service-entrance conductors shall be permitted to be spliced or tapped in accordance with 110.14, 300.5(E), 300.13, and 300.15. Power distribution blocks, pressure connectors, and devices for splices and taps shall be listed.

EXAM QUESTIONS

40. What code section describes the branch circuit protection needed for dormitory units?

A. 210.12
B. 210.12(E)
C. 220.12
D. 760.121(B)

41. What code section describes the branch circuit protection needed when a branch circuit is modified, replaced, or extended?

A. 210.12
B. 210.12(E)
C. 220.12
D. 760.121(B)

42. What minimum height are bathroom receptacles required to be installed above a sink countertop?

A. 16 inches
B. 18 inches
C. 12 inches
D. 24 inches

43. How many outlets are required to be installed in a dwelling unit alcove?

A. 1
B. 0
C. 2
D. 3

44. How many outlets are required to be installed in a one- and two-family dwelling for the service of evaporative coolers?

A. 3
B. 1
C. 2
D. 0

45. What code section lists where lighting outlets are required to be installed?

A. 225.36
B. 210.70
C. 225.41
D. 230.46

46. What are power distribution blocks, pressure connectors, and devices for splices and taps required to be?

A. Approved
B. Listed
C. Identified
D. All listed answers

230.62(C) Barriers.

Exception: This section shall not apply to service equipment with more than one service disconnecting means in an enclosure installed in accordance with OESC 230.71.

230.70(A)(1) Readily Accessible Location.

Exception: In existing installations where the service panel or meter base is being replaced, the panel and service disconnecting means may remain at the existing location if the following conditions exist:

(1) The existing service conductors are of sufficient ampacity to supply the load or the existing conduits large enough to accommodate new conductors that are of sufficient size to supply the load.

(2) All requirements of 110.26 and 240.24 are met except as follows:

1. If the installation was made prior to July 1, 1978, the workspace requirement in 110.26 for installations of 0-volts to 150-volts to ground is reduced to 762 mm (30 in.).
2. If the installation was made prior to July 1, 1993, the provisions of 240.24(E) do not apply.
3. If the installation was made prior to July1,1996, the provisions of 240.24(F) do not apply.

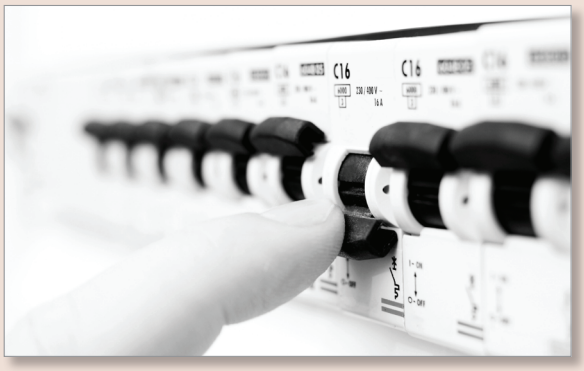
230.71(A) General. The service disconnecting means for each service permitted by 230.2, or for each set of service-entrance conductors permitted by 230.40, Exception No. 1, 3, 4, or 5, shall consist of not more than six switches or sets of circuit breakers, or a combination of not more than six switches and sets of circuit breakers, mounted in a single enclosure, in a group of separate enclosures, or in or on a switchboard or in switchgear. There shall be not more than six sets of disconnects per service grouped in any one location. For the purpose of this section, disconnecting means installed as part of listed equipment and used solely for the following shall not be considered a service disconnecting means: ***Items (1) through (4) remain unchanged.***

230.71(C) Single-Pole Units. Two or three single-pole switches or breakers, capable of individual operation, shall be permitted on multiwire circuits, one pole for each ungrounded conductor, as one multipole disconnect, provided they are equipped with identified handle ties or a master handle to disconnect all conductors of the service with no more than six operations of the hand.

Informational Note: See 408.36, Exception No. 1 and Exception No. 2, for service equipment in certain panelboards, and see 430.95 for service equipment in motor control centers.

230.95(C) Performance Testing. The ground-fault protection system shall be performance tested when first installed on site. This testing shall be conducted by a person(s) having proper training and experience required to perform and evaluate the results of such performance testing, in accordance with instructions that shall be

provided with the equipment. A written record of this testing shall be made, signed by the person(s) performing this test and shall be available to the authority having jurisdiction.



240.6(D) Remotely Accessible Adjustable-Trip Circuit Breakers. A circuit breaker(s) that can be adjusted remotely to modify the adjusting means shall be permitted to have an ampere rating(s) that is equal to the adjusted current setting (long-time pickup setting). Remote access shall be achieved by one of the following methods:

(1) Connected directly through a local nonnetworked interface.

(2) Connected through a networked interface complying with one of the following methods:

1. The circuit breaker and associated software for adjusting the settings are identified as being evaluated for cybersecurity.

2. A cybersecurity assessment of the network is completed. Documentation of the assessment and certification shall be made available to those authorized to inspect, operate, and maintain the system.

3. The permit holder is not required to demonstrate compliance with 240.6(D)(2)(a) and (b).

240.24(E) Not Located in Bathrooms. In dwelling units, dormitory units, and guest rooms or guest suites, overcurrent protective devices, other than supplementary overcurrent protection, shall not be located in bathrooms.

EXAM QUESTIONS

47. How many service disconnects must be installed in a single enclosure for section 230.62(C) not to apply?

A. 3
B. 1
C. 0
D. 2

48. If an installation was made prior to July 1, 1978, what can the workspace requirement in 110.26 for installations of 0-volts to 150-volts to ground be reduced to?

A. 24 inches
B. 30 inches
C. 18 inches
D. 42 inches

49. What code section is listed for service equipment in motor control centers?

A. 230.95
B. 408.36
C. 430.95
D. 240.6(D)

50. When is the ground-fault protection system required to be performance tested?

A. After final inspection
B. After the gear is assembled
C. When first installed on site
D. All listed answers

51. In dwelling units, where does the code list overcurrent protective devices, other than supplementary overcurrent protection, to not be located?

A. Garages
B. Bathrooms
C. Bedrooms
D. Basements

240.67(C) Performance Testing. The arc energy reduction protection system shall be performance tested when first installed on site. The testing shall be conducted by a person(s) having proper training and experience required to perform and evaluate the results of such performance testing, in accordance with instructions that shall be provided with the equipment.

A written record of this testing shall be made, signed by the person(s) performing this test and shall be available to the authority having jurisdiction.

240.87(C) Performance Testing. The arc energy reduction protection system shall be performance tested when first installed on site. The testing shall be conducted by a person(s) having proper training and experience required to perform and evaluate the results of such performance testing, in accordance with instructions that shall be provided with the equipment.

A written record of this testing shall be made, signed by the person(s) performing this test and shall be available to the authority having jurisdiction.

250.24(A)(1) General.

Exception: When the electric utility has installed a ground fault protection system ahead of the customer's service equipment, no bonding or electrical connection from the grounding electrode system shall be made to the grounded service conductor on the load side of the utility ground fault sensing device. The neutral or grounded service conductor, however, shall be grounded on the line side of the first ground fault sensor in a manner otherwise required at the customer's service equipment. The grounding electrode conductor shall be run to an equipment grounding bus or terminal at the service equipment as long as the equipment grounding conductor and the grounded neutral conductor are not connected to each other at this point. The on-site ground fault test required by 230.95 shall not be performed prior to the above installation requirements. Warning signs shall be installed.

250.24(C) Main Bonding Jumper.

Exception No. 3: When the electric utility has installed a ground fault protection system ahead of the customer's service equipment and if the operation of the ground fault system relies on the absence of the main bonding jumper at the service equipment but includes an otherwise satisfactory main bonding jumper as a part of its sensing device, the main bonding jumper shall not be installed at the service equipment which would otherwise bond the grounded service conductor to the equipment ground. The on-site ground fault test required by 230.95 shall not be performed prior to the above installation requirements. Warning signs shall be installed.

250.52(A)(3) Concrete-Encased Electrode. A concrete-encased electrode shall consist of at least 6.0 m (20 ft) of the following: **(Items (1) and (2) remain unchanged.)**

Metal components shall be encased by at least 50 mm (2 in.) of concrete and shall be located horizontally within that portion of a concrete foundation or footing that is in direct contact with the earth or within vertical foundations or structural components or members that are in direct contact with the earth. If multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system. Where an addition to a building or structure is remote from the service and the integrity of the grounding electrode system has been verified,

connection of the remote concrete encased electrode is not required.

250.52(B) Not Permitted for Use as Grounding Electrodes. The following systems and materials shall not be used as grounding electrodes: **(Items (1) and (3) remain unchanged.)**

(4) In existing electrical installations, when a service change or upgrade occurs, an existing metal under groundwater pipe shall not be used unless the metal underground water pipe has been verified as suitable for continued use as a grounding electrode. An existing metal underground water pipe shall be bonded to the new grounding electrode system as required by 250.104(A).

Informational Note: See Chapter 6 of the Oregon Plumbing Specialty Code.

250.53(A)(2) Supplemental Electrode Required.

Exception No. 1: If a single rod, pipe, or plate grounding electrode has a resistance to earth of 25 ohms or less, the supplemental electrode shall not be required.

Exception No. 2: A supplemental electrode shall not be required for a single-phase, 200 amps or less temporary service.

EXAM QUESTIONS

52. When is the arc energy reduction system required to be performance tested?

A. After the gear is assembled
B. When first installed on site
C. After final inspection
D. All listed answers

53. Who is responsible for signing the arc energy reduction protection system test paperwork?

A. The owner
B. The general contractor
C. The electrical contractor
D. Person performing the test

54. What needs to be installed when exception No.3 to 250.24(C) is being performed?

A. A ground ring
B. Warning signs
C. A ground fault test
D. A ground resistance reading

55. How much concrete needs to cover a concrete encased electrode?

A. 8 inches
B. 3 inches
C. 6 inches
D. 2 inches

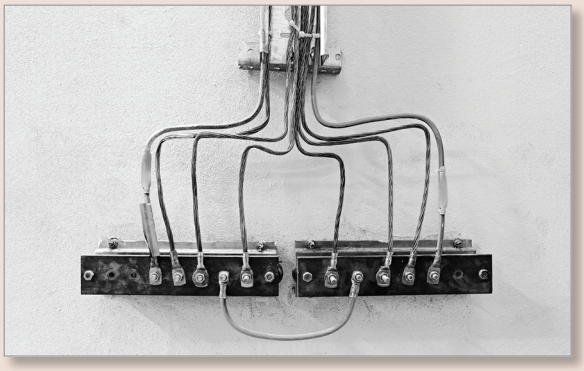
56. At what resistance value to earth does a supplemental grounding electrode need not be installed?

A. 35 Ohms
B. 30 Ohms
C. 25 Ohms
D. 40 Ohms

250.94(A) The Intersystem Bonding Termination Devices. An intersystem bonding termination (IBT) or an exposed and supported length of #6 bare copper conductor for connecting intersystem bonding conductors shall be provided external to enclosures at the service equipment or metering equipment enclosure and at the disconnecting means for any buildings or structures that are supplied by a feeder or branch circuit. If an IBT is used it shall comply with the following:

250.118(A) Permitted.

(14) Surface metal raceways listed for grounding. Where metallic conduit is installed on roof tops, an equipment grounding conductor shall be provided within the raceway and sized per 250.122.



300.5(G) Raceway Seals. Conduits or raceways through which moisture might contact live parts shall be sealed or plugged at either or both ends. Spare or unused raceways shall also be sealed.

300.9 Raceways in Wet Locations Above Grade.

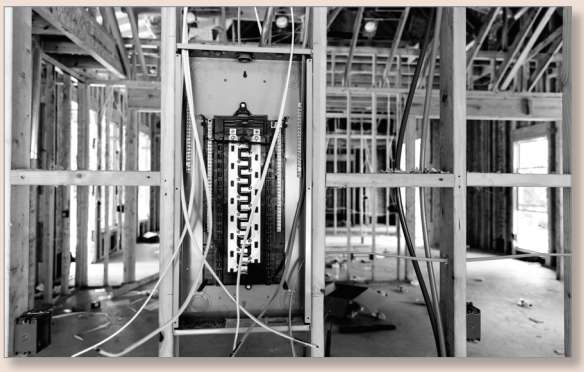
Exception: The interior of raceways up to 2.5m (8 ft) in length installed solely to provide physical protection shall not be considered a wet location.

314.27(C) Boxes at Ceiling-Suspended (Paddle) Fan Outlets. Where spare, separately switched, ungrounded conductors are provided to a ceiling-mounted outlet box, intended for the installation of a ceiling-suspended (paddle) fan in one-family, two-family, or multifamily dwellings, the outlet box or outlet box system shall be listed for the sole support of ceiling-suspended (paddle) fans.

315.40 Support. Type MV cable terminated in equipment or installed in pull boxes or vaults shall be secured and supported by metallic or nonmetallic supports suitable to withstand the weight by cable ties, or other approved means, at intervals not exceeding 1.5 m (5 ft) from terminations or a maximum of 1.8 m (6 ft) between supports.

320.30(A) General. Type AC cable shall be supported and secured by staples; cable ties; straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable. Type AC cable fittings shall be permitted as a means of cable support.

330.30(A) General. Type MC cable shall be supported and secured by staples; cable ties; straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable. Type MC cable fittings shall be permitted as a means of cable support.



334.12(A) Types NM and NMC.

(2) Exposed within a dropped or suspended ceiling cavity in other than one- and two-family and multifamily dwellings.

Exception to (2): Types NM and NMC cables may be installed within a dropped or suspended ceiling cavity in structures other than one- and two-family and multifamily dwellings when installed in accordance with 334.15.

334.15(B) Protection from Physical Damage. Cable shall be protected from physical damage where necessary by rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix –XW, or other approved means. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 80 PVC conduit, RTRC marked with the suffix –XW, or other approved means extending at least 150 mm (6 in.) above the floor. Conduit or tubing shall be provided with a bushing or adapter that provides protection from abrasion at the point the cable enters and exits the raceway.

Type NMC cable installed in the shallow chases or grooves in masonry, concrete, or adobe, shall be protected in accordance with the requirements in 300.4(F) and covered with plaster, adobe, or similar finish.

Exposed nonmetallic sheathed cable shall be protected where it is installed horizontally less than 2.5 m (8 ft) above the floor. Exposed nonmetallic sheathed cable less than 2.5 m (8 ft) above the floor that enters the top or bottom of a panelboard shall be protected from physical damage by conduit, raceway, 1⁄2-inch plywood, 1⁄2-inch drywall, or other approved means.

EXAM QUESTIONS

57. What code section is listed that has information regarding intersystem bonding termination devices?

A. 250.94(A)
B. 250.104(A)
C. 430.95
D. 408.36

58. What code section is used to size an equipment grounding conductor?

A. 250.102
B. 250.122
C. 250.66
D. 250.102(C)

59. The interior of raceways up to _____ in length installed solely to provide physical protection shall not be considered a wet location.

A. 3 ft
B. 4 ft
C. 6 ft
D. 8 ft

60. What is the maximum distance between supports allowed when installing MV cable?

A. 6 ft
B. 5 ft
C. 4 ft
D. 3 ft

61. What can be used to secure type AC cable?

A. Straps
B. Hangars
C. Cable ties
D. All listed answers

62. What code section must be followed when installing type NMC cable in a suspended ceiling cavity in structures other than one- and two-family and multifamily dwellings?

A. 430.95
B. 250.94(A)
C. 334.15
D. 408.36

334.15(C) In Unfinished Basements. Where cable is run at angles with joists in unfinished basements, it shall be permissible to secure cables not smaller than two 6 AWG or three 8 AWG conductors directly to the lower edge of the joists. Smaller cables shall be run either through bored holes in joists or on running boards. Nonmetallic-sheathed cable installed on the wall of an unfinished basement shall be permitted to be installed in a listed conduit or tubing or shall be protected in accordance with 300.4.

334.24 Bending Radius. Bends in Types NM and NMC cable shall be so made that the cable will not be damaged. The radius of the curve of the inner edge of any bend during or after installation shall not be less than five times the diameter of the cable.

334.30 Securing and Supporting. Nonmetallic-sheathed cable shall be supported and secured by staples; cable ties; or straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1⁄2 ft) and within 300 mm (12 in.) of every cable entry into enclosures such as outlet boxes, junction boxes, cabinets, or fittings. Flat cables shall not be stapled on edge.

336.10 Uses Permitted. (9) Type TC-ER-JP cable containing conductors for both power and control circuits shall be permitted for branch circuits and feeders. Type TC-ER-JP cable used as interior wiring shall be installed per the requirements of Part II of Article 334 and where installed as exterior wiring shall be installed per the requirements of Part II of Article 340.

337.30 Securing and Supporting. Type IM cable shall be supported and secured by cable ties; straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable.

338.24 Bending Radius. Bends in Types USE and SE cable shall be so made that the cable will not be damaged. The radius of the curve of the inner edge of any bend, during or after installation, shall not be less than five times the diameter of the cable.

340.24 Bending Radius. Bends in Types USE and SE cable shall be so made that the cable will not be damaged. The radius of the curve of the inner edge of any bend, during or after installation, shall not be less than five times the diameter of the cable.

348.30(A) Securely Fastened. FMC shall be securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 1.4 m (41⁄2 ft).

350.30(A) Securely Fastened. LFMC shall be securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 1.4 m (41⁄2 ft).

356.30 LFNC Securing and Supporting.

(1) Where installed in lengths exceeding 1.8 m (6 ft), the conduit shall be securely fastened at intervals not exceeding 900 mm (3 ft) and within 300 mm (12 in.) on each side of every outlet box, junction box, cabinet, or fitting.

362.10 ENT Uses Permitted.

(2) In any building exceeding three floors above grade concealed within combustible or noncombustible walls, floors, and ceilings where the walls, floors, and ceilings provide a

thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

Exception to (2): Where a fire sprinkler system(s) is installed in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, on all floors, ENT shall be permitted to be used within walls, floors, and ceilings, exposed or concealed, in buildings exceeding three floors above grade.

362.10 (5) Above suspended ceilings where the suspended ceilings provide a thermal barrier of material that has at least a 15- minute finish rating as identified in listings of fire-rated assemblies, except as permitted in 362.10(1)a.

Exception to (5): ENT shall be permitted to be used above suspended ceilings in buildings exceeding three floors above grade where the building is protected throughout by a fire sprinkler system(s) in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems.

362.30(A) Securely Fastened. ENT shall be securely fastened at intervals not exceeding 900 mm (3 ft). In addition, ENT shall be securely fastened in place within 900 mm (3 ft) of each outlet box, device box, junction box, cabinet, or fitting where it terminates.

392.30(B) Cables and Conductors. Cables and conductors shall be secured to and supported by the cable tray system in accordance with (1), (2), and (3) as applicable.

EXAM QUESTIONS

63. If cable is run at angles with joists in unfinished basements, how many 6AWG conductors can you secure directly to the lower edge of the joists?

A. 3
B. 1
C. 0
D. 2

64. How far from a junction box is Nonmetallic-sheathed cable required to be secured?

A. 6 inches
B. 12 inches
C. 36 inches
D. 52 inches

65. What part of Article 340 is Type TC-ER-JP cable required to be installed in accordance with when used as exterior wiring?

A. Part II
B. Part III
C. Part IV
D. Part V

66. What code section should be referenced to determine the bending radius for type SE cable?

A. 250.94(A)
B. 338.24
C. 334.24
D. 334.15

67. What part of a cable is used when measuring its radius?

A. Overall diameter
B. Outer edge
C. Inner edge
D. Termination edge to the raceway entrance

68. How often does the code required FMC to be supported?

A. 12 inches
B. 3 ft
C. 4 ½ ft
D. 18 inches

69. How far from a junction box is LFMC required to be secured?

A. 6 inches
B. 12 inches
C. 36 inches
D. 52 inches

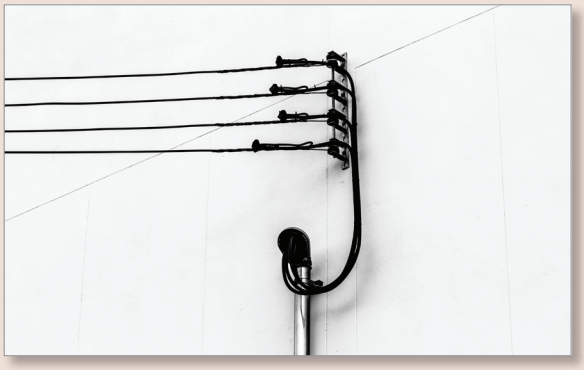
70. How far from a junction box is ENT required to be fastened in place?

A. 6 inches
B. 36 inches
C. 12 inches
D. 52 inches

393.14(A) General Requirements. Support wiring shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable is not damaged by normal building use. Such cables shall be supported by straps, staples, hangers, cable ties, or similar fittings designed and installed so as not to damage the cable.

394.12 Uses Not Permitted.

(5) Hollow spaces of walls, ceilings, and attics where such spaces are insulated by loose, rolled, or foamed-in-place insulating material that envelops the conductors.



Exception: The provisions of 394.12 shall not be construed to prohibit the installation of loose or rolled thermal insulating materials in spaces containing existing knob-and-tube wiring, provided all the following conditions are met:

(1) The visible wiring shall be inspected by a certified electrical inspector or a general supervising electrician employed by a licensed electrical contractor.

(2) All defects found during the inspection shall be repaired prior to the installation of insulation.

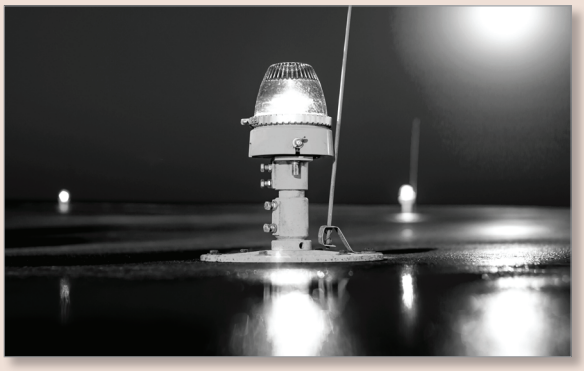
(3) Repairs, alterations or extensions of or to the electrical systems shall be inspected by a certified electrical inspector.

(4) The insulation shall have a flame spread rating not to exceed 25and a smoke density not to exceed 450 when tested in accordance with ASTM E84-91A. Foamed in place insulation shall not be used with knob-and-tube wiring.

(5) Exposed splices or connections shall be protected from insulation by installing flame resistant, non-conducting, open top enclosures which provide three inches, but not more than four inches side clearances, and a vertical clearance of at least four inches above the final level of the insulation.

(6) All knob-and tube circuits shall have overcurrent protection in compliance with the 60-degree C column of Table 310.16. Overcurrent protection shall be either circuit breakers or type S fuses. The type S fuse adapters shall not accept a fuse of an ampacity greater than permitted in 240.53.

400.10(A) Uses. (12) Listed assemblies of fixtures and controllers, approved by the Federal Aviation Administration.



400.12 Uses not permitted.

(5) Where concealed by walls, floors, or ceilings or located above suspended or dropped ceilings.

Exception No. 1 to (5): Flexible cord and flexible cables, and power supply cords shall be permitted if contained within an enclosure for use in other spaces used for environmental air as permitted by 300.22(C)(3).

Exception No. 2 to (5): In other than spaces used for environmental air, cord sets and power-supply cords shall be permitted above accessible suspended or dropped ceilings if part of a listed assembly, other than a luminaire, and the cord length does not exceed 1.8 m (6 ft).

406.9(A) Damp Locations. A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All 15- and 20- ampere, 125-volt nonlocking receptacles shall be a listed weather-resistant type. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

406.9(B)(1) Receptacles of 15 Amperes and 20 Amperes in a Wet Location. Receptacles of 15 amperes and 20 amperes, 125 volts and 250 volts installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. An outlet box hood installed for this purpose shall be listed and shall be identified as extra-duty. Other listed products, enclosures, or assemblies providing weatherproof protection that do not utilize an outlet box hood need not be identified extra duty. Hinged covers of outlet box hoods shall be able to open at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to routine high-pressure spray washing shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

All 15- and 20-ampere, 125 volt nonlocking-type receptacles shall be listed and so identified as the weather-resistant type.

EXAM QUESTIONS

71. How is support wiring required to be installed?

A. A neat and workmanlike manner
B. Parallel to the support structure
C. In a listed raceway
D. All listed answers

72. What table are all knob-and tube circuits required to have their overcurrent protection installed in compliance with?

A. Table 250.122
B. Table 310.15(B)
C. Table 310.16
D. Table 310.15(B)(1)(a)

73. An installation suitable for _____locations shall also be considered suitable for damp locations.

A. Hazardous
B. Dry
C. Wet
D. All

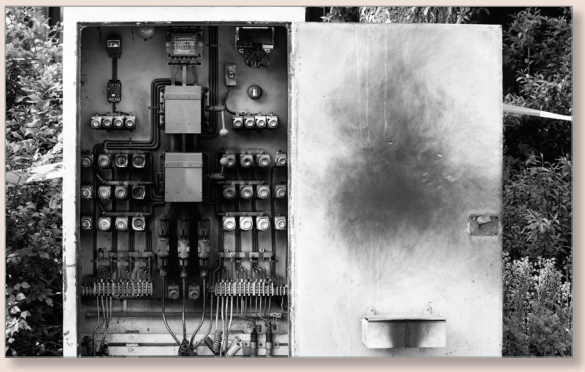
74. How is an outlet box hood installed in a wet location required to be listed and identified?

A. Moisture resistant
B. Tamper proof
C. Light-duty
D. Extra-duty

406.9(C) Bathtub and Shower Space.

Exception No. 2: In bathrooms with less than the required zone, the receptacle(s) required by 210.52(D) shall be permitted to be installed outside of the room as near as practicable to the strike side of the door.

408.2 Reconditioned Equipment. The use of reconditioned equipment within the scope of this article shall be limited as described in 408.2(A) and (B). If equipment has been damaged by fire, products of combustion, corrosive influences, or water, it shall be specifically evaluated by its manufacturer, or a qualified testing laboratory, or the signing supervisor prior to being returned to service.



408.9(B) Panelboards Not Listed for the Specific Enclosure. If the available fault current is greater than 10,000 amperes, the completed work shall be field labeled.

408.36 Overcurrent Protection.

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment with multiple disconnecting means in accordance with 230.71. In panelboards protected by three or more main circuit breakers or sets of fuses, the circuit breakers or sets of fuses shall not supply a second bus structure within the same panelboard assembly.

Exception No. 2: Individual protection shall not be required for a panelboard protected on its supply side by two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard constructed or wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of determining the maximum of 42 overcurrent devices, a 2-pole or a 3-pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 3: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.

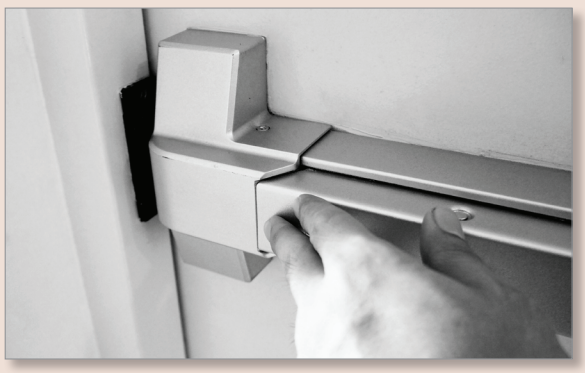
408.38 Enclosure. Panelboards shall be mounted in cabinets, cutout boxes, or identified enclosures and shall be dead-front.

410.2 Reconditioned Equipment. Reconditioned luminaires, lampholders, ballasts, LED drivers, lamps, and retrofit kits shall not be permitted. If a retrofit kit is installed in a luminaire in accordance with the installation instructions, the retrofitted luminaire shall not be considered reconditioned. Service and maintenance of luminaires shall not be considered reconditioning.

422.5(A) General. Appliances identified in 422.5(A)(1) through (A)(7) 150 volts or less to ground and 60 amperes or less, single- or 3-phase, shall be provided with Class A protection for personnel. Multiple Class A protective devices shall be permitted but shall not be required. (Items (1) through (5) remain unchanged.)

(6) Sump pumps and sewage pumps

Exception to (6): Receptacle ground-fault protection shall not be required for a single receptacle if the receptacle is labeled as "not GFCI protected."



445.19(C) Emergency Shutdown in One- and Two-Family Dwelling Units. For other than cord-and-plug-connected portable generators, an emergency shutdown device shall be located outside the dwelling unit at a readily accessible location and shall also meet the requirements of 445.19(A)(1) and (A)(2).

450.43(C) Locks. Doors shall be equipped with locks, and doors shall be kept locked, with access being allowed only to qualified persons. Personnel doors be capable of opening not less than 90 degrees in the direction of egress and be equipped with listed fire exit hardware.

Informational Note: See the OESC Section 110.26(C)(3) amendment.

480.10(E) Egress. Personnel doors intended for entrance to, and egress from, rooms designated as battery rooms shall open at least 90 degrees in the direction of egress and shall be equipped with listed panic or listed fire exit hardware.

Informational Note: See the OESC Section 110.26(C)(3) amendment.

495.49 Reconditioned Switchgear. Reconditioned switchgear, or sections of switchgear, shall be permitted. If equipment has been damaged by fire, products of combustion, or water, it shall be specifically evaluated by its manufacturer, or a qualified testing laboratory, or the signing supervisor prior to being returned to service.

EXAM QUESTIONS

75. Who can sign off for electrical equipment to be returned to service that has been damaged by fire?

A. The signing supervisor prior
B. Qualified testing laboratory
C. The manufacturer
D. All listed answers

76. If the available fault current is greater than _____ amperes, the completed work shall be field labeled.

A. 200
B. 1000
C. 600
D. 10,000

77. A panelboard wired using 408.36 exception No 2 can contain a maximum of _____ overcurrent devices.

A. 30
B. 36
C. 32
D. 42

78. What is NOT permitted to be reconditioned with regards to luminaires?

A. lamps
B. ballasts
C. Lampholders
D. All listed answers

79. For other than cord-and-plug-connected portable generators, an emergency shutdown device shall be located outside the dwelling unit at a _____ location.

A. Readily accessible
B. Accessible
C. Identified
D. Labeled

80. According to Article 450.43(C), what are doors required to be equipped with?

A. Push bars
B. Locks
C. Hydraulic hinges
D. Egress signage

81. Who can sign off for reconditioned switchgear to be returned to service that has been damaged by water?

A. The signing supervisor prior
B. Qualified testing laboratory
C. The manufacturer
D. All listed answers

500.8(A) Suitability. "Suitability of identified equipment" shall be determined in accordance with ORS 479.760.

517.10(B) Not Covered. Part II shall not apply to the following: *(Items (1) and (2) remain unchanged.)*

(3) Areas used exclusively for any of the following purposes:

1. Intramuscular injections (immunizations)
2. Psychiatry and psychotherapy
3. Alternative medicine (i.e. acupuncture, chiropractic therapy, etc.)
4. Optometry
5. Pharmacy services not contiguous to health care facilities
6. Massage therapy
7. Physical therapy
8. Audiology

517.13(A) Wiring Methods.

Exception: Type PVC conduit may be installed underground or embedded in concrete in Dental Clinics located in type B occupancies, provided that a wire type equipment grounding conductor is installed to meet the requirements of 250.118 and a separate insulated equipment grounding conductor is installed to meet the requirements of 517.13(B).

517.17(D) Testing. When equipment ground-fault protection of equipment is first installed, each level shall be performance tested to ensure compliance with 517.17(C). This testing shall be conducted by a person(s) having proper training and experience required to perform and evaluate the results of such performance testing, using a test process in accordance with the instruction provided with the equipment. A written record of this testing shall be made, signed by the person(s) performing this test, and shall be available to the authority having jurisdiction.

547.28 Ground-Fault Circuit-Interrupter Protection. Ground-fault circuit-interupter protection (GFCI) shall be provided as required in 210.8(B) for areas of agricultural buildings not included in the scope of this article. GFCI protection shall not be required for other than 125-volt, 15- and 20-ampere receptacles installed in the following areas:

(1) Areas requiring an equipotential plane

(2) Outdoors

(3) Damp or wet locations

(4) Dirt confinement areas for livestock

GFCI protection shall not be required for a single receptacle supplying a dedicated load and marked "not GFCI protected." A GFCI protected receptacle shall be located within 900 mm (3 ft) of the non-GFCI protected receptacle.

547.44(A) Where Required. Equipotential planes shall be required in the following areas:

(1) Indoors. Equipotential planes shall be installed in areas designated by the owner.

(2) Outdoors. Equipotential planes shall be installed in concrete slabs where metallic equipment is located

that may become energized and is accessible to livestock. The equipotential plane shall encompass the area where the livestock stands while accessing metallic equipment that may become energized.

Exception to (A)(1) and (A)(2): Where the electrical system is designed by a professional engineer, as defined in ORS 672.002(2), and the electrical equipment is isolated and not accessible to livestock, and non-electrical metallic equipment is not likely to become energized an equipotential plane shall not be required.

Informational Note: See the definition of Equipment in Article 100.

EXAM QUESTIONS

82. What ORS is required to be used to determine the suitability of identified equipment?

A. ORS 470.763
B. ORS 479.760
C. ORS 469.760
D. ORS 480.780

83. What type of conduit can be installed underground in dental clinics located in type B occupancies provided all requirements are met?

A. IMC conduit
B. ENT conduit
C. PVC conduit
D. EMT conduit

84. When equipment ground-fault protection of equipment is first installed, each level shall be performance tested to ensure compliance with _____.

A. 547.44(A)
B. 517.17(C)
C. 551.7(C)
D. 551.77(A) through (F)

85. With regards to agricultural buildings, a GFCI protected receptacle shall be located within _____ of a non-GFCI protected receptacle.

A. 6ft
B. 5ft
C. 2 ft
D. 3 ft

86. What ORS defines a professional engineer?

A. ORS 479.760
B. ORS 672.002(2)
C. ORS 469.760
D. ORS 480.780

551.71(B) 30-Ampere. A minimum of 70 percent of all recreational vehicle sites with electrical supply shall each be equipped with a 30-ampere, 125-volt receptacle conforming to Figure 551.46(C)(1). This supply shall be permitted to include additional receptacle configurations conforming to 551.81. The remainder of all recreational vehicle sites with electrical supply shall be equipped with one or more of the receptacle configurations conforming to 551.81.

551.7(C) 50-Ampere. A minimum of 20 percent of existing and 40 percent of all new recreational vehicle sites with electrical supply, shall each be equipped with a 50-ampere, 125/250-volt receptacle conforming to the configuration as identified in Figure 551.46(C)(1). Every recreational vehicle site equipped with a 50-ampere receptacle shall also be equipped with a 30-ampere, 125-volt receptacle conforming to Figure 551.46(C)(1). These electrical supplies shall be permitted to include additional receptacles that have configurations in accordance with 551.81.

551.77 Recreational Vehicle Site Supply Equipment. Recreational vehicle site supply equipment shall comply with 551.77(A) through (F).

555.35(A) Feeder.

Exception No. 1: Transformer secondary conductors of a separately derived system that do not exceed 3 m (10 ft) and are installed in a raceway shall be permitted to be installed without ground-fault protection. This exception shall also apply to the supply terminals of the equipment supplied by the transformer secondary conductors.

Exception No. 2: Modifications to existing systems shall not require GFPE.

555.36(C) Emergency Electrical Disconnect. Each marina power outlet or enclosure that provides shore power to boats shall be provided with a listed emergency shutoff device or electrical disconnect that is clearly marked "Emergency Shutoff" in accordance with 110.22(A). The emergency shutoff device or electrical disconnect shall be within sight of the marina power outlet or other enclosure that provides shore power to boats, readily accessible, externally operable, manually resettable, and listed for use in wet locations. The emergency shutoff device or electrical disconnect shall de-energize the power supply to all circuits supplied by the marina power outlet(s) or enclosure(s) that provide shore power to boats.

590.8(A) Where reused, Overcurrent Protective Devices. Overcurrent protective devices that have been previously used and are installed in a temporary installation shall be installed and with no evidence of impending failure.

620.1 Scope.

Informational Note No. 1: For further information, see the Oregon Elevator Specialty Code as adopted in OAR chapter 918, division 400.

620.5 Working Clearances. Working space shall be provided about controllers, disconnecting means, and other electrical equipment in accordance with 110.26(A). Where conditions of maintenance and supervision ensure that only qualified persons examine, adjust, service, and maintain the equipment, the clearance requirements of 110.26(A) shall not be required where any of the conditions in 620.5(A) through (D) are met. Where machine room doors swing inward, the arc of the door shall not encroach on those clearances required by 110.26(A).

620.6(C) Sump Pumps. A single receptacle supplying a permanently installed sump pump shall not require ground-fault circuit-interrupter protection.

620.37(A) Uses Permitted. Electrical wiring, raceways, and cables used directly in connection with the elevator or dumbwaiter shall be permitted inside the hoistway, machine rooms, control rooms, machinery spaces, and control spaces, including wiring for the following:

(Items (1) through (7) remain unchanged.)

620.51(B) Operation. No provision shall be made to open or close this disconnecting means from any other part of the premises.

If sprinklers are installed in hoistways, machine rooms, control rooms, machinery spaces, or control spaces, the disconnecting means shall be permitted to automatically open the power supply to the affected elevator(s) prior to the application of water. No provision shall be made to automatically close this disconnecting means. Power shall only be restored by manual means. Where provided, this disconnecting means shall be located in the elevator control room or control space. The installation shall comply with the requirements of NFPA 72 as adopted in OAR 918-306-0005. Conduits and raceways necessary for the connection of such devices shall only enter hoistways and machine rooms to the extent necessary to connect the device(s) attached thereto.

620.51(C)(4) On Platform Lifts and Stairway Chairlifts. On platform lifts and stairway chairlifts, the disconnecting means shall be located within sight of the motor controller or lift and within 1.83 m (six feet) of the motor controller. The disconnecting means shall not be located in the runway enclosure.

EXAM QUESTIONS

87. A minimum of _____of all recreational vehicle sites with electrical supply shall each be equipped with a 30-ampere, 125-volt receptacle conforming to Figure 551.46(C)(1).

A. 10 percent
B. 50 percent
C. 30 percent
D. 70 percent

88. What code section(s) are recreational vehicle site supply equipment required to comply with?

A. 547.44(A)
B. 517.17(C)
C. 551.7(C)
D. 551.77(A) through (F)

89. Transformer secondary conductors of a separately derived system that do not exceed _____ and are installed in a raceway shall be permitted to be installed without ground-fault protection.

A. 5 ft
B. 10 ft
C. 20 ft
D. 6 ft

90. How are marina power outlets required to be marked that provide shore power to boats?

A. Receptacle emergency shutoff
B. Power shutoff
C. Shutoff
D. Emergency shutoff

91. Where machine room doors swing _____, the arc of the door shall not encroach on those clearances required by 110.26(A).

A. Outward
B. 90 degrees
C. Inward
D. 45 degrees

92. What type of protection is not required for a single receptacle supplying a permanently installed sump pump?

A. Fused
B. Monitored
C. AFCI
D. GFCI

93. How close to a platform lift is the disconnecting means required to be located from the motor controller?

A. 6 ft
B. 2 ft
C. 5 ft
D. 3 ft

620.51(C)(5) Residential installations. A disconnecting means shall be required to be placed within sight of the controller or lift. Where such devices are supplied with flexible cord and plug type connectors, the supply receptacle shall be switched by the disconnecting means. The disconnecting means does not require overcurrent protection, provided such protection is supplied by the branch circuit overcurrent device. In all other respects the disconnecting means shall comply with the requirements of this section.

620.86 Flexible Metal Conduit. Where flexible metal conduit is utilized between the disconnecting means specified in 620.51 and the elevator controller, an equipment grounding conductor shall be provided within the raceway and sized per 250.122 and Table 250.122.

646.19 Entrance to and Egress from Working Space. For equipment over 1.8 m (6 ft) wide or deep, there shall be one entrance to and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (6 1⁄2 ft) high at each end of the working space. Doors shall open to the full extent of their designed egress opening and be equipped with listed panic hardware or listed fire exit hardware. A single entrance to and egress from the required working space shall be permitted where either of the conditions in 646.19(A) or (B) is met.

682.15(B) Feeder and Branch Circuits on Piers. Feeder and branch-circuit conductors that are installed on piers shall be provided with ground-fault protection not exceeding 100 mA. Coordination with downstream ground-fault protection shall be permitted at the feeder overcurrent protective device.

690.12 Rapid Shutdown of PV Systems on Buildings. PV system circuits installed on or in buildings shall include a rapid shutdown function to reduce shock hazard for firefighters in accordance with 690.12(A) through (D). Where an addition to an existing system(s) on or in a building is installed, a rapid shutdown function shall be provided for the existing system(s) on or in the building. The provisions of 690.12(B)(2) shall not apply to the existing system(s).

690.31(C)(1)(1) Single-Conductor Cable.

(b) Exposed cables sized 8 AWG or smaller shall be supported and secured at intervals not to exceed 600 mm

(24 in.) by cable ties, or straps, hangers, or similar fittings listed and identified for securement and support in outdoor locations. PV wire or cable shall be permitted in all locations where RHW-2 is permitted. (c) Exposed cables sized larger than 8 AWG shall be supported and secured at intervals not to exceed 1400 mm (54 in.) by cable ties, or straps, hangers, or similar fittings listed and identified for securement and support in outdoor locations.

690.47(B) Grounding Electrodes and Grounding Electrode Conductors. Additional grounding electrodes shall be permitted to be installed in accordance with 250.52 and 250.54. Grounding shall be permitted to be connected directly to the PV module frame(s) or support structure. A grounding electrode conductor shall be sized according to 250.66 and shall not be smaller than 6 AWG copper or 4 AWG aluminum. A support structure for a ground-mounted PV array shall be permitted to be considered a grounding electrode if it meets the requirements of 250.52. PV arrays mounted to buildings shall be permitted to use the metal structural frame of the building if the requirements of 250.68(C)(2) are met.

700.32(A) General. Emergency system(s) overcurrent protective devices (OCPDs) shall be selectively coordinated with all supply-side and load-side OCPDs. Selective coordination shall be selected by a licensed professional engineer or other qualified persons engaged primarily in the design, installation, or maintenance of electrical systems. The selection shall be documented and made available to those authorized to design, install, inspect, maintain, and operate the system.

For the purposes of this section, supply side overcurrent protection means those OCPDs on the emergency system supply side and not on the normal power supply side. The protection shall be selectively coordinated using the higher of the normal power supply fault current levels or emergency system fault current levels. OCPDs shall be selectively coordinated for .01 seconds and greater.

EXAM QUESTIONS

94. Where is the disconnect for a lift required to be placed according to 620.51(C)(5)?

A. Within 6 ft
B. Within sight
C. On the controller
D. In a conspicuous location

95. What table is required to be used when sizing an equipment grounding conductor for an elevator controller using flexible metal conduit?

A. Table 250.66
B. Table 250.102
C. Table 250.102(C)
D. Table 250.122

96. How many conditions must be met according to 646.19 where a single entrance to and egress from the required working space is be permitted?

A. 1
B. 2
C. 3
D. 4

97. Feeder and branch-circuit conductors that are installed on piers shall be provided with ground-fault protection not exceeding _____ mA.

A. 50
B. 30
C. 100
D. 200

98. PV wire or cable shall be permitted in all locations where _____is permitted.

A. THHN
B. THW
C. THWN
D. RHW-2

99. What is the smallest copper grounding electrode conductor permitted according to Article 690.47(B)?

A. 4 AWG
B. 6 AWG
C. 8 AWG
D. 1/0

100. An OCPD is required to be selectively coordinated for _____seconds and greater.

A. .01
B. .001
C. .0001
D. .00001