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**See instructions on the inside cover page to submit your exams and pay for your course**
2017 Oregon Rule & Law

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

4. An inspecting jurisdiction shall inspect within ________ hours of a written request for inspection unless the time for inspection is extended to a set date by mutual agreement.
   A. 18
   B. 24
   C. 36
   D. 48
5. 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

6. True or False? After a correction has been issued, no extensions shall be issued until the corrections have been satisfied.
   A. True  
   B. False

7. Who hears the appeals of decisions made by a deputy inspector?
   A. Chief electrical inspector  
   B. Oregon electrical board  
   C. The BCD  
   D. No listed answer

8. True or False? After the chief electrical inspector for Oregon has made a decision on an appeal, no other appeals may be filed.
   A. True  
   B. False

To Access and find electrical Board actions, Oregon statute, administrative rule, electrical code, code interpretations, and enforcement case studies go to http://www.oregon.gov/BCD/pages/index.aspx. On the lower left side of the page, select boards and follow the prompts to 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

(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.

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

10. A code appeal process can be initiated to either the local jurisdiction's appeals board or the state ________.
   A. BCD
   B. Electrical Board
   C. Electrical committee
   D. Specialty code chief

11. How long does a person initiating the code appeal process have to respond when the chief electrical inspector asks for more information?
   A. 14 days
   B. 7 calendar days
   C. 30 calendar days
   D. 14 business days

12. How much money does it cost to file a state building code appeal?
   A. 20 dollars
   B. 50 dollars
   C. 12 dollars
   D. No fee required
13. What Oregon Administrative Rule would you reference to determine if you needed an electrical permit?
A. 918-282-0170  
B. 918-305-0430  
C. 918-305-0440  
D. 918-309-0000

14. What permit is required to install cord and plug connected Class 2 irrigation control systems?
A. Class B  
B. Class A  
C. No permit required  
D. Phased permit

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.

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 ground work shall be counted toward the number of electrical inspections allowed by the full permit once plan review is complete and the permit is issued.

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**EXAM QUESTIONS**

15. Oregon has created a standardized _______ electrical permit application format.
   A. County by county  
   B. City  
   C. Statewide  
   D. County

16. Oregon has created a _______ statewide method for calculating permit fees.
   A. Divisional  
   B. Proprietary  
   C. Area  
   D. Uniform

17. Fees can only be charged for the categories established in OAR chapter 918, division _______.
   A. 309  
   B. 512  
   C. 420  
   D. 318

18. True or False? Local Oregon jurisdictions may set different electrical fees.
   A. True  
   B. False

19. All fees established for the various categories adopted in the Oregon rules _______ inserted in the permit application form for local jurisdictions.
   A. Can be  
   B. May optionally be  
   C. Must not be  
   D. Shall be

20. A surcharge required by ORS _______ and 455.220 shall be added to the fees established.
   A. 455.110  
   B. 455.320  
   C. 455.210  
   D. 455.420

21. How many hours does a general journeyman need in industrial work to qualify for the Oregon State general journeyman exam?
   A. 1000 hours  
   B. 500 hours  
   C. 250 hours  
   D. No such requirement.

22. The state of Oregon will accept a non-graded pass score as proof of training hours for what area of study listed below?
   A. Electrical measuring devices  
   B. Tunnel rack work  
   C. Conduit preparation  
   D. Shop

23. During the plan review process, an electrical contractor may request a complete or partial _______ before the entire plans and specifications are submitted.
   A. Permit extension  
   B. Waived fee  
   C. Revision  
   D. Permit

24. If a contractor begins work without plan review approving their plans, the permittee proceeds at his or her _______.
   A. Accord  
   B. Submitted design direction  
   C. Own Risk  
   D. Maximum bond issuance allotment
OESC 90.4 Enforcement.

This Code is intended to be suitable for mandatory application by governmental bodies that exercise legal jurisdiction over electrical installations, including signaling and communications systems, and for use by insurance inspectors. The authority having jurisdiction for enforcement of the Code has the responsibility for making interpretations of the rules, for deciding on the approval of equipment and materials, and for granting the special permission contemplated in a number of the rules.

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.

This Code may require new products, constructions, or materials that may not yet be available at the time the Code is adopted. In such 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 2017 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.

OESC 100 Definitions.

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.

OESC 110.10 Circuit Impedance; Short-Circuit Current Ratings, and Other Characteristics. The overcurrent protective devices, the total impedance, the equipment short-circuit current ratings, and other characteristics of the circuit to be protected shall be selected and coordinated to permit the circuit protective devices used to clear a fault to do so without extensive damage to the electrical equipment of the circuit. This fault shall be assumed to be either between two or more of the circuit conductors or between any circuit conductor and the equipment grounding conductor(s) permitted in 250.118. Listed equipment applied in accordance with their listing shall be considered to meet the requirements of this section.

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.

OESC 110.14 (D) Installation. Where a tightening torque is indicated as a numeric value on equipment or in installation instructions provided by the manufacturer, a calibrated torque tool shall be used to achieve the indicated torque value, unless the equipment manufacturer has provided installation instructions for an alternative method of achieving the required torque.

The permit holder is not required to demonstrate compliance with this section.

OESC 110.24 (A) Field Marking. Service equipment at other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault-current calculation was performed and be of sufficient durability to withstand the environment involved. The calculation shall be documented and made available to those authorized to design, install, inspect, maintain, or operate the system.
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.

(B) Modifications.

(Exception: Not adopted by the State of Oregon).

Exception: The field marking requirements in 110.24(A) and 110.24(B) shall not be required in industrial installations where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

OESC 110.26 (C)(3) Personnel Doors. Where equipment rated 800 A 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 in the direction of egress and be equipped with listed panic hardware.

Note: Additional construction requirements are located in the Oregon Structural Specialty Code (OSSC) Section 1008.1.10. This section governs panic hardware listing and installation requirements. Section 1008.1.10.1 is not part of this code but is provided here for the reader’s convenience.

### EXAM QUESTIONS

25. What fault-current values can be used to satisfy the labeling requirements of 110.10?
   A. The calculated current between any 2 phases
   B. FLA of the service
   C. Instantaneous short circuit condition of the Main
   D. Serving utility

26. What direction is an egress door equipped with listed panic hardware required to open towards?
   A. The direction of the control room
   B. The direction of the equipment
   C. The direction of egress
   D. All listed answers

27. How do requests for special permission need to be made to the authority having jurisdiction?
   A. In writing
   B. Certified mail
   C. Orally
   D. All listed answers

28. What best defines 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?
   A. Initiation devices
   B. Fire suppression system
   C. Fire protection system
   D. Annunciating devices

29. True or False? As of the adoption of the 2017 Oregon Electrical Specialty Code, a permit holder is required to demonstrate compliance with all tightening torque requirements upon request.
   A. True
   B. False

30. What does “listed” or “labeled” mean under ORS 479.530?
   A. Certified electrical product
   B. Catalog number
   C. Tested product
   D. Stamped and legible
31. What is service equipment at other than dwelling units required to be marked in the field with?
   A. The power factor
   B. The maximum available current
   C. The maximum available voltage
   D. The maximum available fault current

OSSC Section 1008.1.10.1 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 at least one-half of the door leaf width; and
4. The maximum unlatching force shall not exceed 15 pounds (67 N).

OSSC Section 1008.1.10.2 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.

OESC 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, panelboards, or motor control centers installed indoors. Control by automatic means only shall not be permitted. 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.

OESC 210.8 Ground-Fault Circuit-Interrupter Protection for Personnel. Ground-fault circuit-interrupter protection for personnel shall be provided as required in 210.8(A), (B) as amended, (C) and (E). 210.8(D) is not adopted by the State of Oregon.

The ground-fault circuit-interrupter shall be installed in a readily accessible location.

Informational note no. 3: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems.
(A) Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in 210.8(A)(1) through (10) shall have ground-fault circuit-interrupter protection for personnel.
(2) Garages, and also accessory buildings that have a floor located at or below grade level not intended as habitable rooms and limited to storage areas, work areas, and areas of similar use.
(5) Unfinished portions or areas of the basement not intended as habitable rooms.

Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection if the receptacle is labeled as “not GFCI protected.”
(6) Kitchens – where the receptacles are installed to serve the countertop surfaces
(7) Sinks – where receptacles are installed within 1.8m (6 ft) from the top inside edge of the bowl of the sink.
(10) Laundry areas

Exception to (2),(5),(6),(7),(10): 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:
   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 appliance is cord-and-plug connected.
   d. The receptacle is labeled as “not GFCI protected.”

The receptacle(s) shall not be considered as meeting the requirements of 210.52(G).

(B) Other than 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.

(D) Kitchen Dishwasher Branch Circuit. (Not adopted by the State of Oregon) GFCI protection shall be provided for outlets that supply dishwashers installed in dwelling unit locations.

(E) 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.

Exception to 210.8(A), (B), and (E): Receptacle ground-fault protection shall not be required for a single receptacle for sewage or sump pumps if the receptacle is labeled as “not GFCI protected.”

OESC 210.12 (A) Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets or devices installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, alcoves, laundry areas, or similar rooms or areas shall be protected by any of the means described in 210.12(A)(1) through (6):

Exception No. 1: Where an individual branch circuit to a fire alarm system installed in accordance with 760.41(B) or 760.121(B) is installed in RMC, IMC, EMT, or steel-sheathed cable, Type AC or Type MC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.

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.

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**Exam Questions**

32. What is the minimum required illumination for all working spaces about service equipment?
   A. 20 foot candles average
   B. 15-foot candles average
   C. 10-foot candles average
   D. 30 foot candles average

33. True or False? GFCI protection is required for all branch circuits that power dishwashers in Oregon.
   A. True
   B. False

34. What listed response is a required location for AFCI protection in Oregon?
   A. Hallways
   B. Bedrooms
   C. Laundry areas
   D. Dining rooms.

35. If balanced doors are used and panic hardware is required, the panic hardware is required to be of what type?
   A. Sensor driven
   B. The push-pull type
   C. Automatic initiated
   D. The push-pad type
36. Where are ground-fault circuit-interrupters required to be installed?
   A. Accessible location
   B. Readily accessible location
   C. Protected location
   D. 24” above finish grade

37. How many areas are listed where GFCI protection is required?
   A. 7
   B. 5
   C. 10
   D. 8

38. What UL number is panic hardware installed on an egress door in Oregon required to be listed in accordance with?
   A. 305
   B. 350
   C. 315
   D. 395

39. 15- and 20-ampere branch circuits supplying outlets in alcoves shall be protected by any of the means as described in what section(s)?
   A. 220.12(A)(1) through (4)
   B. 210.12(A)(1) through (6)
   C. 215.12(B)(1) through (8)
   D. 210.2(A)(1) through (6)

40. What is the maximum allowable unlatching force permitted for an egress door?
   A. 10 pounds
   B. 5 pounds
   C. 15 pounds
   D. 20 pounds

41. What section should be referenced for the power supplies that power fire alarm systems?
   A. 760.41(C) and 760.121(D)
   B. 740.41(B) and 770.121(B)
   C. 730.41(B) and 750.121(B)
   D. 760.41(B) and 760.121(B)

(B) Dormitory Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets and devices installed in dormitory unit bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms shall be protected by any of the means described in 210.12(A)(1) through (6).

(D) Branch Circuit Extensions or Modifications – Dwelling Units and Dormitory Units. In any of the areas specified in 210.12(A) or (B), where branch-circuit wiring is modified, replaced, or extended, the branch circuit shall comply with the following:
   (1) Extensions or modifications of existing circuits shall not require the installation of AFCI protection.
   (2) Replacement or upgrading of a service or panelboard shall not require that existing circuits be protected by AFCI devices.
   (3) Where an existing branch circuit is replaced, the installation of AFCI protection shall be required.

OESC 210.52
(C)(1) Wall Countertop Spaces and Work Surface.
   Exception: Receptacle outlets shall not be required on a wall directly behind a range, counter-mounted cooking unit, or sink in the installation described in Figure 210.52(C)(1). Despite Figure 210.52(C)(1), no receptacle shall be required behind a range, counter-mounted cooking unit, or sink mounted in a corner.
   (C)(2) Island Countertop Spaces. At least one receptacle outlet shall be installed at each island countertop with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater.
   (C)(3) Peninsular Countertop Spaces. At least one receptacle outlet shall be installed at each peninsular countertop long dimension space with a long dimension of 1.05 m (42 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connecting edge.
   (C)(4) Separate Spaces. Countertop spaces separated by range tops, refrigerators, or sinks shall be considered as
separate countertop spaces in applying the requirements of 210.52(C)(1). If a range, counter-mounted cooking unit, or sink is installed in a peninsular countertop and the depth of the countertop behind the range, counter-mounted cooking unit, or sink is.

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

Exception to (3): Decks or porches located at grade level with an area of less than 20 sq. ft. are not required to have an additional receptacle installed.

(I) Alcoves. In dwelling units, alcoves shall have at least one receptacle installed. These outlets shall be in addition to the required hallway outlets.

As used in this subsection an Alcove is 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.


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 75 feet.

OESC 225.30 Number of Supplies. A building or other structure that is served by a branch circuit or feeder on the load side of a service disconnecting means shall be supplied by only one feeder or branch circuit unless permitted in 225.30(A) through (E) (F). For the purpose of this section, a multiwire branch circuit shall be considered a single circuit. Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder or branch circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E) (F).

(F) One- or Two-Family Dwelling Unit(s). For a one- or two-family dwelling unit(s) with multiple feeders, it shall be permissible to install not more than six disconnects grouped at one location where the feeders enter the building, provided the feeder conductors originate at the same switchboard, panelboard, or overcurrent protection device location.

OESC 225.36 Type of Disconnecting Means. The disconnecting means specified in 225.31 shall be comprised of a circuit breaker, molded case switch, general use switch, snap switch, or other approved means. Where applied in accordance with 250.32(B), Exception No. 1, the disconnecting means shall be suitable for use as service equipment. 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.

### EXAM QUESTIONS

<table>
<thead>
<tr>
<th>42. What type of breaker is required to be installed when an existing branch circuit is replaced?</th>
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<tbody>
<tr>
<td>A. Inverse time circuit breaker</td>
</tr>
<tr>
<td>B. No requirement to change the existing breaker(s)</td>
</tr>
<tr>
<td>C. GFCI</td>
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<tr>
<td>D. AFCI</td>
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<tr>
<th>43. How do you determine the dimensions of a peninsular countertop?</th>
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<tbody>
<tr>
<td>A. You measure from the un-connected perpendicular wall connecting edge</td>
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<tr>
<td>B. You measure from the connected perpendicular wall edge</td>
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<tr>
<td>C. You measure from the connecting edge</td>
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<tr>
<td>D. You measure from the connected wall connecting edge to the closest pass through</td>
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</tbody>
</table>
44. What is the maximum number of disconnects permitted to be installed in one location for a two-family dwelling unit with multiple feeders?
   A. 6
   B. 1
   C. 2
   D. 5

45. A service upgrade in a dormitory unit requires what type of breaker(s) to be installed?
   A. GFCI
   B. AFCI
   C. No requirement to change the existing breaker(s)
   D. Inverse time circuit breaker

46. How many receptacles are required to be installed around a deck that is 18 sq. ft. located on grade level?
   A. 3
   B. 1
   C. 2
   D. 0

47. How many receptacles are required to be installed on an island countertop with a long dimension of 30 inches?
   A. 1
   B. 2
   C. 3
   D. No requirement

48. What is required to use a certified in-line fuse holder for a single light pole installation?
   A. Be installed by a qualified person
   B. Get special permission
   C. Be installed in an accessible location
   D. All listed answers

49. What are countertop spaces separated by range tops, refrigerators, or sinks considered?
   A. Dinning spaces
   B. Extension of the existing counter
   C. Separate countertop spaces
   D. Islands

50. When replacing existing HVAC equipment, a receptacle outlet is not required if one is already located on the same level and within how many feet?
   A. 25 feet
   B. 65 feet
   C. 50 feet
   D. 75 feet

51. What is a multiwire branch circuit considered according to OESC 225.30?
   A. A prohibited circuit
   B. A single circuit
   C. A non-grounded wireway
   D. An equipment grounding conductor

52. Where does Oregon NOT require a receptacle to be installed in a kitchen?
   A. Behind a range
   B. Sink mounted in a corner.
   C. Counter-mounted cooking unit
   D. All listed answers

53. The extensions or modifications of existing circuits in a dormitory require what type of breaker to be installed?
   A. GFCI
   B. AFCI
   C. No requirement to change the existing breaker(s)
   D. Inverse time circuit breaker

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**OESC 230.40 Number of Service-Entrance Conductor Sets.**

Exception No. 3: A one-family dwelling unit and its accessory structures shall be permitted to have one set of service-entrance conductors run to each from a single service drop, set of overhead service conductors, set of under-ground service conductors, or service lateral. When there are continuous metallic paths bonded to the grounding system in the buildings involved, a disconnect, a grounded conductor and an equipment grounding conductor shall be installed to meet the provisions of Article 225, 230, and 250.
OESC 230.43 Wiring Methods for 1000 Volts, Nominal, or Less.
Exception: Items (13) and (15) are limited to traffic control devices and highway lighting poles.

OESC 230.70 (A)(1) Readily Accessible Location.
Exception: In existing installations where only the service panel or meter base is changed and the existing service conductors meet the ampacity requirements, or the existing conduit is of sufficient size to install new conductors, the panel may remain at the present location providing all requirements of Section 110.26 and 240.24 are met. This exception does not require a main disconnect located nearest the point of entry.

OESC 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 persons 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.

Informational Note: See definitions of Service Conductors, Overhead; Service Conductors, Underground; Service Drop; and Service Lateral in Article 100.

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 Section 230.95 shall not be performed prior to the above installation requirements. Warning signs shall be installed.

(B) 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 Section 230.95 shall not be performed prior to the above installation requirements. Warning signs shall be installed.

OESC 250.32 (B)(1) Grounded Systems Supplied by a Feeder or Branch Circuit.
Exception No. 1: For existing and new installations made in compliance with previous editions the 2005 edition of this Code that permitted such connection, the grounded conductor run with the supply to the building or structure shall be permitted to serve as the ground-fault return path if all of the following requirements continue to be met:

OESC 250.52 (A) Electrodes Permitted for Grounding.
(3) Concrete-Encased Electrode. A concrete-encased electrode shall consist of at least 6.0 m (20 ft) of either (1) or (2):

(1) One or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (1/2 in.) in diameter, installed in one continuous 6.0 m (20 ft) length, or if in multiple
54. What is the minimum size conductor that can be used as a concrete-encased electrode?
A. 2 AWG  
B. 4 AWG  
C. 6 AWG  
D. 1/0

55. True or False? The on-site ground fault test required by Section 230.95 is required to be performed prior to the installation requirements of OESC 250.24(B).
A. True  
B. False

56. What is the minimum allowable thickness of concrete required to cover a concrete encased electrode?
A. 6 inches  
B. 4 inches  
C. 2 inches  
D. There are no special requirements

57. What is the minimum required diameter for rebar to be used as a concrete-encased electrode?
A. 1/2 inch  
B. 1/4 inch  
C. 3/8 inch  
D. 5/8 inch

58. According to OESC 230.43, what are Items (13) and (15) are limited to?
A. Transformers  
B. Instrumentation and process control  
C. Traffic control devices and highway lighting poles  
D. Panelboards

59. When is the ground-fault protection system performance test required to be done?
A. When first installed on site  
B. At the service inspection  
C. After the service has been energized  
D. During the fire marshal inspection

60. If 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 what side of the utility ground fault sensing device?
A. The downstream feeders  
B. Line side  
C. The upstream feeders  
D. Load side
61. What is the minimum required continuous length for rebar to be used as a concrete-encased electrode?
   A. 16 feet
   B. 10 feet
   C. 20 feet
   D. 25 feet

62. A single-family dwelling unit and its accessory structures are permitted to have one set of service-entrance conductors run to each from a single service drop, and when there are continuous metallic paths bonded to the grounding system in the buildings involved, what is required to be installed to meet the provisions of Article 225, 230, and 250?
   A. A disconnect
   B. A grounded conductor
   C. An equipment grounding conductor
   D. All listed answers

63. What does a conductor used as a concrete-encased electrode need to be made from?
   A. Nickle clad
   B. Aluminum
   C. Copper
   D. All listed answers

64. What does the exception to OESC 230.70 (A)(1) not require to be located nearest the point of entry?
   A. An equipment grounding conductor
   B. A main disconnect
   C. A grounded conductor
   D. All listed answers

OESC 250.94 Bonding for Communication Systems. Communications system bonding terminations shall be connected in accordance with (A) or (B).

(A) The Intersystem Bonding Termination Devices. An intersystem bonding termination (IBT) or exposed and supported length of #6 bare copper conductor 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 additional buildings or structures. If an IBT is used it shall comply with the following:

1. Be accessible for connection and inspection.
2. Consist of a set of terminals with the capacity for connection of not less than three intersystem bonding conductors.
3. Not interfere with opening the enclosure for a service, building or structure disconnecting means, or metering equipment.
4. At the service equipment, be securely mounted and electrically connected to an enclosure for the service equipment, to the meter enclosure, or to an exposed nonflexible metallic service raceway, or be mounted at one of these enclosures and be connected to the enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
5. At the disconnecting means for a building or structure, be securely mounted and electrically connected to the metallic enclosure for the building or structure disconnecting means, or be mounted at the disconnecting means and be connected to the metallic enclosure or to the grounding electrode conductor with a minimum 6 AWG copper conductor.
6. The terminals shall be listed as grounding and bonding equipment.
OESC 250.118 Types of Equipment Grounding Conductors. The equipment grounding conductor run with or enclosing the circuit conductors shall be one or more or a combination of the following:

(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 Section 250.122.

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

OESC 334.12 Uses Not Permitted.

(A) Types NM, NMC, and NMS. Types NM, NMC, and NMS cables shall not be permitted as follows:

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

Exception to (2): Types NM, NMC, and NMS 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.

OESC 334.15 Exposed Work (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, type 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, type RTRC marked with the suffix –XW, or other approved means extending at least 150 mm (6 in.) above the floor.

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 8 feet above the floor. Exposed nonmetallic sheathed cable less than 8 feet above the floor that enters the top or bottom of a panel board shall be protected from physical damage by conduit, raceway, ½-inch plywood or ½-inch drywall.

(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.

OESC 336.10 Uses Permitted. Type TC cable shall be permitted to be used as follows:

(9) For generators and HVAC systems, type TC-ER cable containing both power and control conductors that is identified for pulling through structural members shall be permitted. Type TC-ER cable used as interior wiring shall be installed per the requirements of Part II of Article 334.

Exception: Where used to connect a generator and associated equipment having terminals rated 75°C (140°F) or higher, the cable shall not be limited in ampacity by 334.80 or 340.80.
### Exam Questions

**65.** Type NM cable can 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 what listed section?

- A. 334.15
- B. 310.15(B)
- C. 336.15
- D. 342.15(A)

**66.** How many connection points are required for intersystem bonding conductors?

- A. 2
- B. 3
- C. 1
- D. 5

**67.** What does Oregon require to be installed in a metallic conduit installed on a roof top?

- A. Pull string
- B. Strain relief
- C. An equipment grounding
- D. All listed answers

**68.** What size conductor is required to be installed for intersystem bonding termination devices?

- A. 2 AWG
- B. 6 AWG
- C. 4 AWG
- D. 1/0

**69.** What does the OESC require to be done with spare or unused raceways?

- A. Pull strings installed
- B. Be Labeled on both ends
- C. Be sealed or plugged
- D. All listed answers

**70.** Where are communications system bonding terminations required to be installed if using a busbar?

- A. At each server rack for testing and maintenance
- B. In the communications room
- C. In the main electrical service room next to the service concrete encased electrode
- D. In an accessible location

**71.** What distance above finished floor can surface mount NM cable be run without physical protection?

- A. 10 feet
- B. 6 foot 7 inches
- C. 8 feet
- D. 5 feet

**72.** What is a permissible use for type TC-ER cable in Oregon?

- A. For single family interior wiring
- B. For generators and HVAC systems
- C. For multi-family interior wiring
- D. All listed answers

**73.** What suffix does an RTRC raceway need to be marked with when used to sleeve non-metallic cable passing through a floor?

- A. XW
- B. WX
- C. WY
- D. YX

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**OESC 394.12**

*Uses Not Permitted. Concealed knob-and-tube wiring shall not be used in the following:*

(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 Section 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 25 and a smoke density not to exceed 450 when tested in accordance with ASTM E84-91A 2009 Edition. 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 of NFPA 70-2017. 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 Section 240.53.

OESC 400.10 (A) Uses. Flexible cords and flexible cables shall be used only for the following:

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

OESC 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 cable 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): Cord sets and power-supply cords shall be permitted if part of a listed assembly, other than a luminaire, and the cord length does not exceed 1.8m (6 ft).

OESC 406.4 (D) Replacements.

(4) Arc-Fault Circuit Interrupter Protection. (Not adopted by the State of Oregon) Where a receptacle outlet is located in any areas specified in 210.12(A) or (B), a replacement receptacle at this outlet shall be one of the following:

(1) A listed outlet branch-circuit type arc-fault circuit interrupter receptacle

(2) A receptacle protected by a listed outlet branch-circuit type arc-fault circuit-interrupter type receptacle

(3) A receptacle protected by a listed combination type arc-fault circuit-interrupter type circuit breaker

OESC 406.12

Tamper-Resistant Receptacles. All 15- and 20-ampere, 125- and 250-volt nonlocking-type receptacles in the areas specified in 406.12(1) through (4) and (7) shall be listed tamper-resistant receptacles. (406.12(5) and (6) not adopted by the State of Oregon)

(1) Dwelling units in all areas specified in 210.52 and 550.13

(2) Guest rooms and guest suites of hotels and motels
(3) Child care facilities
(4) Preschools and elementary education facilities
(5) Business offices, corridors, waiting rooms and the like in clinics, medical and dental offices and outpatient facilities
(6) Subset of assembly occupancies described in 518.2 to include places of waiting transportation, gymnasiums, skating rinks, and auditoriums
(7) Dormitories

OESC 422.34 Unit Switch(es) as Disconnecting Means. A unit switch(es) with a marked-off position that is a part of an appliance and disconnects all ungrounded conductors shall be permitted as the disconnecting means required by this article where other means for disconnection are provided in occupancies specified in 422.34 (A) through (D). Unit switches on ranges, ovens and dishwashers shall not be considered the disconnect required by this section.

EXAM QUESTIONS

74. What is the maximum length cord permitted where flexible power-supply cords that are part of a listed assembly, other than a luminaire, can be installed above suspended or dropped ceilings?
   A. 5 feet
   B. 6 feet
   C. 3 feet
   D. 10 feet

75. Where does Oregon NOT require a tamper-resistant receptacle to be installed?
   A. Dwelling units
   B. Child care facilities
   C. Dormitories
   D. Dental offices

76. All knob-and-tube circuits are required to have overcurrent protection in compliance with what column of Table 310-16 of the NFPA 70-2017?
   A. 75° C
   B. 90° C
   C. 60° C
   D. There are no special requirements

77. True or False? For the 2017 code cycle, Oregon requires all replacement receptacles to be an arc-fault circuit interrupter receptacle if specified in 210.12(A) or (B).
   A. True
   B. False

78. Who must approve flexible cords and flexible cables used at airports that are part of listed assemblies for fixtures and controllers?
   A. Federal Aviation Administration
   B. Authority Having Jurisdiction
   C. Oregon BCD
   D. All listed answers

79. What appliance(s) cannot use a factory installed unit switch to disconnect all ungrounded conductors as described in OESC 422.34?
   A. Ovens
   B. Dishwashers
   C. Ranges
   D. All listed answers

80. If using knob-and-tube wiring in the hollow spaces of walls, ceilings, and attics, what type of insulation is NOT permitted to envelop the conductors?
   A. Loose insulation
   B. Rolled insulation
   C. Foamed-in-place insulating material
   D. All listed answers
OESC 500.8 Equipment. (A) Suitability. “Suitability of identified equipment” as used in Article 500.8 (A) means that equipment meets the requirements of ORS 479.760.

ORS 479.760

(1) An electrical product may not be certified unless the product meets electrical product safety standards established in rule by concurrence of the Electrical and Elevator Board and the Director of the Department of Consumer and Business Services.

(2) Any person may apply to have the Department of Consumer and Business Services certify an electrical product. The department shall certify an electrical product if the product is shown to meet electrical product safety standards by one of the following methods:

(a) An equipment safety program approved by the board;

(b) Equipment minimum safety standards established by concurrence of the board and the director;

(c) An evaluation by an approved field evaluation firm;

(d) A listing from a nationally recognized testing laboratory;

(e) An evaluation of a first model of a product by the board; or

(f) Any other method approved by the board.

(3) To have an electrical product certified, a person may submit a specimen, sample or prototype to the department within a reasonable time before the date on which certification will be required, together with a fee set by the department sufficient to defray the cost of shipment and evaluation. The department shall evaluate the electrical product to determine whether the product meets electrical product safety standards. Not later than six months after receipt of a specimen, prototype or sample the department shall complete the required evaluation and give a decision certifying or rejecting the product. The department may appoint a special deputy or enter into an appropriate contract with a testing laboratory approved by the board under this section for the evaluation required under this subsection.

(4) The director with the approval of the board may establish standards and procedures for the approval of testing laboratories to test electrical products in the certification process under this section. [1959 c.406 §§16 (2) and (3),22,23; 1981 c.815 §26; 1999 c.794 §1; 2001 c.573 §17; 2003 c.299 §5]

OESC 517.10 Applicability.

(A) Applicability. Part II shall apply to patient care space of all health care facilities.

(B) Not Covered. Part II shall not apply to the following:

(1) Business offices, corridors, waiting rooms, and the like in clinics, medical and dental offices, and outpatient facilities.

(2) Areas of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these areas are used exclusively as patient sleeping rooms.

(3) Health care facilities located in Type B Occupancies as defined by the Oregon Structural Specialty Code (OSSC) used exclusively for any of the following purposes:

   a. Intramuscular Injections (Immunizations)
   b. Psychiatry and Psychotherapy
   c. Massage Therapy
   d. Physical Therapy
81. Within what distance does a GFCI protected receptacle need to be installed from a single receptacle supplying a dedicated load and marked “not GFCI protected” in an agricultural building?
   A. 5 feet
   B. 2 feet
   C. 18 inches
   D. 3 feet

82. What code defines health care facilities located in Type B Occupancies?
   A. Oregon Electrical Specialty Code
   B. Oregon Structural Specialty Code
   C. Oregon Elevator Specialty Code
   D. Oregon Mechanical Specialty Code

83. What ORS defines a professional engineer who designs electrical systems?
   A. ORS 672.020(2)
   B. ORS 762.002(2)
   C. ORS 672.002(2)
   D. ORS 692.002(2)

84. What entity does NOT need to certify that a product meets the electrical product safety standards established by the Oregon state rules?
   A. Department of Business Services and product regulation
   B. Director of the Department of Consumer and Business Services
   C. Oregon Electrical Board
   D. Oregon Elevator Board

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OESC 547.5

(G) Receptacles. All 125-volt, single phase, 15- and 20-ampere general-purpose receptacles installed in the locations listed in (1) through (4) shall have ground-fault circuit-interrupter protection:

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.

OESC 547.10

Equipotential Planes and Bonding of Equipotential Planes. The installation and bonding of equipotential planes shall comply with 547.10(A) and (B). For the purposes of this section, the term livestock shall not include poultry.

(A) Where Required. Equipotential planes shall be installed where required in (A)(1) and (A)(2).

(1) Indoors. Equipotential planes shall be installed in confinement areas with concrete floors where metallic equipment is located that may become energized and is accessible to livestock.

(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.
OESC 620.1 Scope. This article covers the installation of electrical equipment and wiring used in connection with elevators, dumbwaiters, escalators, moving walks, platform lifts, and stairway chairlifts.

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

OESC 620.2 Definitions.

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

OESC 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 section 110.26(A).

OESC 620.11

Insulation of Conductors. The insulation of conductors shall comply with 620.11(A) through (D).

(A) Hoistway Door Interlock Wiring. The conductors to the hoistway door interlocks from the hoistway riser shall be shall be one of the following:

(1) Flame retardant and suitable for temperature of not less than 200°C (392°F). Conductors shall be Type SF or equivalent.

(2) Physically protected using an approved method, such that the conductor assembly is flame retardant and suitable for a temperature of not less than 200°C (392°F).

Exception: Where not required by the Oregon Elevator Specialty Code (ASME A17.1).

OESC 620.37

Wiring in Hoistways, Machine Rooms, Control Rooms, Machinery Spaces, and Control Spaces.

(A) Uses Permitted. Only such electrical wiring, raceways, and cables used directly in connection with the elevator or dumbwaiter, including wiring for signals, for communication with the car, for lighting, heating, air conditioning, and ventilating the elevator car, for fire detecting systems, for pit sump pumps, and for heating, lighting, and ventilating the hoistway, shall be permitted inside the hoistway, machine rooms, control rooms, machinery spaces, and control spaces.

Conduits and raceways necessary for the connection of such devices shall only enter hoistways and machine rooms to the extent necessary to connect the devices(s) attached thereto.

OESC 620.51

Disconnecting Means.

(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. When 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.

(C) Location. The disconnecting means shall be located where it is readily accessible to qualified persons.

Where machine rooms are provided, the disconnecting means required by 620.51 shall be located within 610 mm (24 inches) of the open side of the machine room access door. Where more than one disconnect is required for a multi-car group, the disconnects shall be adjacent to each other with the first disconnect located within 610 mm (24 inches) of the open side of the machine room access door. Measurement shall be taken from the edge of the disconnect nearest the machine room door.

(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.

(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. OESC 620.86

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

**EXAM QUESTIONS**

85. What section is required to be referenced to determine the required electrical equipment working space in elevator machine rooms?
   A. 110.26(A)
   B. 110.26
   C. 110.16(A)
   D. 110.26(B)

86. Where does Oregon require you to size the equipment grounding conductor if using flexible metal conduit between the disconnecting means specified in Section 620.51 and the elevator controller?
   A. 250.104(D)
   B. 250.66
   C. 250.104
   D. 250.122

87. True or False? A conduit rack system is allowed to pass through an elevator equipment room to feed other systems and subpanels that do not power or supply systems for the elevator equipment.
   A. True
   B. False

88. What article should be referenced when installing an elevator?
   A. Article 620
   B. Article 720
   C. Article 640
   D. Article 670
89. What code allows an exception to the installation requirements of hoistway door interlock wiring?
   A. Oregon Electrical Specialty Code
   B. Oregon Elevator Specialty Code
   C. Oregon Structural Specialty Code
   D. Oregon Mechanical Specialty Code

90. If an elevator car disconnect is automatically opened due to a sprinkler system initiation in the elevator car machinery spaces, how does Oregon require the disconnect to be reset?
   A. Manually
   B. Automatically
   C. With use of an on delay timer
   D. A keyed switch at the elevator car location

91. Within how many feet of a motor controller does a stairway chairlift disconnect need to be located?
   A. 5 feet
   B. 2 feet
   C. 3 feet
   D. 6 feet

92. An elevator car system equipped with an automatically controlled disconnect to open before a sprinkler system is initiated must be located within how many feet of the machine room access door?
   A. 3 feet
   B. 6 feet
   C. 2 feet
   D. 5 feet

93. What best defines a circuit dedicated solely for the purpose intended without other devices, systems or equipment connected to the circuit?
   A. Identified branch circuit
   B. Dedicated branch circuit
   C. Separate branch circuit
   D. Individual branch circuit

OESC 645.2
Critical Operations Data System. An information technology equipment system that has been designated by the building owner as requiring continuous operation.

OESC 645.10
Disconnecting Means. An approved means shall be provided to disconnect power to all electronic equipment in the information technology equipment room or in designated zones within the room. There shall also be a similar approved means to disconnect the power to all dedicated HVAC systems serving the room or designated zones and shall cause all required fire/smoke dampers to close. The disconnecting means shall be grouped and identified and shall be readily accessible at the principal exit doors, or shall comply with either 645.10(A) or (B).

OESC 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 emergency responders in accordance with 690.12(A) through (D). Where an addition to an existing system on or in a building is installed, a rapid shutdown function shall be provided for the existing system(s) on or in the building.

OESC 690.31
Methods Permitted
(G)(1) Embedded in Building Surfaces. Circuit conductors shall not be embedded in built-up, laminate, or membrane roofing materials in roof areas not covered by PV modules and associated equipment.
(G)(5) Beneath Roofs. Wiring methods shall not be installed within 45 cm (18 in.) of the roof decking or sheathing except where directly below the roof surface covered by PV modules and associated equipment. Circuits shall be run perpendicular to the roof penetration point to supports a minimum of 45 cm (18 in.) below the roof decking. Informational Note: The 45 cm (18 in.) requirement is to prevent accidental damage from saws used by fire fighters for roof ventilation during a structure fire.

OESC 690.47
Grounding Electrode System.
Where a grounding electrode conductor is required by 690.47(A), (B), (C), or (D), it shall not be smaller than 6AWG copper or 4 AWG aluminum.

OESC 700
Emergency Systems
Building Officials and inspectors administering and enforcing the state building code under ORS 455.148 and 455.150, shall ensure compliance with Sections 700.28, 701.27, or 708.54 by verifying receipt of a certificate signed by the Engineer of Record or the Signing Supervisor stating that the proposed installation complies with the selective coordination requirements of this code.

OESC 700.32
Selective Coordination. Emergency system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.
For the purposes of this section, supply side overcurrent protection means those protective devices 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. Overcurrent devices shall be selectively coordinated for .01 seconds and greater.
Exception No. 1: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.
Exception No. 2: The requirements for selective coordination shall meet the coordination requirements in effect at the time of the original installation when the installation is being altered, maintained or repaired. The ground fault sensing function of overcurrent protective devices will only be required to selectively coordinate with the ground fault sensing functions of other protective devices.

OESC 701.27
Selective Coordination. Legally required standby system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.
For the purposes of this section, supply side overcurrent protection means those protective devices 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. Overcurrent devices shall be selectively coordinated for .01 seconds and greater.
Exception No. 1: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Exception No. 2: The requirements for selective coordination shall meet the coordination requirements in effect at the time of the original installation when the installation is being maintained, altered or repaired. The ground fault sensing function of overcurrent protective devices will only be required to selectively coordinate with the ground fault sensing functions of other protective devices.

OESC 702.4
Capacity and Rating.
(2) Automatic Transfer Equipment. Where automatic transfer equipment is used, an optional standby system shall comply with (2)(a) or (2)(b).
(a) Full Load. The standby source shall be capable of supplying the full load that is transferred by the automatic transfer equipment.
(b) Load Management. Where a system is employed that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the load management system.
Exception: In one- and two-family dwellings manual management of the connected load shall be permitted.

OESC 708.1
Scope. The provisions of this article apply to the installation, operation, monitoring, control, and maintenance of the portions of the premises wiring system intended to supply, distribute, and control electricity to designated critical operations areas (DCOA) in the event of disruption to elements of the normal system.
Critical operations areas and critical operations power systems are designated by the owner of the facility. A building official has no authority to designate or require designation of an area as requiring a critical operations power system. Critical operations power systems can include but are not limited to power systems, HVAC, fire alarm, security, communications, and signaling for designated critical operations areas.

OESC 708.54
Selective Coordination. Critical operations power system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.
For the purposes of this section, supply side overcurrent protection means those protective devices 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. Overcurrent devices shall be selectively coordinated for .01 seconds and greater.
Exception No. 1: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.
Exception No. 2: The requirements for selective coordination shall meet the coordination requirements in effect at the time of the original installation when the installation is being maintained, altered or repaired. The ground fault sensing function of overcurrent protective devices will only be required to selectively coordinate with the ground fault sensing functions of other protective devices.
OESC 725.24
Mechanical Execution of Work. Class 1, Class 2, and Class 3 circuits 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 will not be 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. This installation shall also comply with 300.4 and 300.11.

OESC 760.24
Mechanical Execution of Work.
(A) General. Fire alarm circuits shall be installed in a neat 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 will not be damaged by normal building use. Such cables shall be supported by straps, staples, cable ties, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also comply with 300.4 and 300.11.

OESC 760.41
NPFLA Circuit Power Source Requirements
(B) Branch Circuit. The branch circuit supplying the fire alarm equipment(s) shall supply no other loads. The location of the branch-circuit overcurrent protective devise shall be permanently identified at the fire alarm control unit. The circuit disconnecting means shall have red identification, and shall be identified as “FIRE ALARM CIRCUIT.” The red identification shall not damage the overcurrent protective devices or obscure the manufacturer’s markings. This branch circuit shall not be supplied through ground-fault circuit interrupters or arc-fault circuit-interrupters.

**EXAM QUESTIONS**

94. What is the minimum time overcurrent devices are to be selectively coordinated?
   A. .01 seconds
   B. 0.1 seconds
   C. 1 second
   D. 5 seconds

95. How many disconnects would you expect to see in a readily accessible location at the principal exit door(s) from an information technology equipment room?
   A. 3
   B. 1
   C. 2
   D. 5

96. What are the legally required standby system(s) overcurrent devices required to be selectively coordinated with?
   A. A legally required standby system shall not connect to overcurrent protective devices
   B. All load side overcurrent protective devices
   C. All in line overcurrent protective devices
   D. All supply side overcurrent protective devices

97. How far below roof decking are PV system conductors required to be installed?
   A. 24 inches
   B. 6 inches
   C. 18 inches
   D. 12 inches
98. What system does an NPFLA circuit power
   A. Server Rack
   B. Fire Alarm
   C. Communication
   D. Wireless internet

99. Who designates critical operations areas?
   A. AHJ
   B. Building official
   C. Owner of the facility
   D. Oregon crisis management officials

100. What does Oregon define as an information technology equipment system that has been designated by the building owner as requiring continuous operation?
    A. Critical Data System Operations
    B. Critical Operations Data System
    C. Emergency Management Operations System
    D. Continuity Data System Operations