

WAC 296-24-980 Safeguards for personnel protection. (1) Use of protective equipment.

(a) Personal protective equipment.

(i) You must provide employees working in areas where there are potential electrical hazards with electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed, and you must ensure that they use such protective equipment.

Note: Personal protective equipment requirements are contained in chapter 296-24 WAC Part L, and WAC 296-800-160.

(ii) You must maintain protective equipment in a safe, reliable condition and you must periodically inspect or test it, as required by chapter 296-24 WAC Part L, and WAC 296-800-160.

(iii) If the insulating capability of protective equipment may be subject to damage during use, you must protect the insulating material. (For example, an outer covering of leather is sometimes used for the protection of rubber insulating material.)

(iv) Employees must wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

(v) Employees must wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electric arcs or flashes or from flying objects resulting from electrical explosion.

(b) General protective equipment and tools.

(i) When working near exposed energized conductors or circuit parts, each employee must use insulated tools or handling equipment if the tools or handling equipment might make contact with such conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, you must protect the insulating material.

(A) You must use fuse handling equipment, insulated for the circuit voltage, to remove or install fuses when the fuse terminals are energized.

(B) Ropes and handlines used near exposed energized parts must be nonconductive.

(ii) You must use protective shields, protective barriers, or insulating materials to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts which might be accidentally contacted or where dangerous electric heating or arcing might occur. When normally enclosed live parts are exposed for maintenance or repair, they must be guarded to protect unqualified persons from contact with the live parts.

(2) **Alerting techniques.** You must use the following alerting techniques to warn and protect employees from hazards which could cause injury due to electric shock, burns, or failure of electric equipment parts:

(a) **Safety signs and tags.** You must use safety signs, safety symbols, or accident prevention tags where necessary to warn employees about electrical hazards which may endanger them.

(b) **Barricades.** You must use barricades in conjunction with safety signs where it is necessary to prevent or limit employee access to work areas exposing employees to uninsulated energized conductors or circuit parts. Conductive barricades may not be used where they might cause an electrical contact hazard.

(c) **Attendants.** If signs and barricades do not provide sufficient warning and protection from electrical hazards, you must station an attendant to warn and protect employees.

(3) **Design requirements.** Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following requirements:

(a) **Manufacture and marking.**

(i) Blankets, gloves, and sleeves must be produced by a seamless process.

(ii) Each item must be clearly marked as follows:

(A) Class 0 equipment must be marked Class 0.

(B) Class 1 equipment must be marked Class 1.

(C) Class 2 equipment must be marked Class 2.

(D) Class 3 equipment must be marked Class 3.

(E) Class 4 equipment must be marked Class 4.

(F) Nonozone-resistant equipment other than matting must be marked Type I.

(G) Ozone-resistant equipment other than matting must be marked Type II.

(H) Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided.

(iii) Markings must be nonconducting and must be applied in such a manner as not to impair the insulating qualities of the equipment.

(iv) Markings on gloves must be confined to the cuff portion of the glove.

(b) **Electrical requirements.**

(i) Equipment must be capable of withstanding the a-c proof-test voltage specified in Table A-2 or the d-c proof-test voltage specified in Table A-3.

(A) The proof-test must reliably indicate that the equipment can withstand the voltage involved.

(B) The test voltage must be applied continuously for three minutes for equipment other than matting and must be applied continuously for one minute for matting.

(C) Gloves must also be capable of withstanding the a-c proof-test voltage specified in Table A-2 after a sixteen-hour water soak. (See the note following (c)(ii)(B) of this subsection.)

(ii) When the a-c proof-test is used on gloves, the 60 hertz proof-test current may not exceed the values specified in Table A-2 at any time during the test period.

(A) If the a-c proof-test is made at a frequency other than 60 hertz, the permissible proof-test current must be computed from the direct ratio of the frequencies.

(B) For the test, gloves (right side out) must be filled with tap water and immersed in water to a depth that is in accordance with Table A-4. Water must be added to or removed from the glove, as necessary, so that the water level is the same inside and outside the glove.

(C) After the sixteen-hour water soak specified in (b)(i)(C) of this subsection, the 60-hertz proof-test current may exceed the values given in Table A-2 by not more than 2 milliamperes.

(iii) Equipment that has been subjected to a minimum breakdown voltage test may not be used for electrical protection. (See the note following (c)(ii)(B) of this subsection.)

(iv) Material used for Type II insulating equipment must be capable of withstanding an ozone test, with no visible effects. The ozone test must reliably indicate that the material will resist ozone exposure in actual use. Any visible signs of ozone deterioration of the

material, such as checking, cracking, breaks, or pitting, is evidence of failure to meet the requirements for ozone-resistant material. (See the note following (c)(ii)(B) of this subsection.)

(c) **Workmanship and finish.**

(i) Equipment must be free of harmful physical irregularities that can be detected by the tests or inspections required under this section.

(ii) Surface irregularities that may be present on all rubber goods because of imperfections on forms or molds or because of inherent difficulties in the manufacturing process and that may appear as indentations, protuberances, or imbedded foreign material are acceptable under the following conditions:

(A) The indentation or protuberance blends into a smooth slope when the material is stretched.

(B) Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

Note: Rubber insulating equipment meeting the following national consensus standards is deemed to be in compliance with subsection (1) of this section:

American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.

ASTM D 178-93, Specification for Rubber Insulating Matting.

ASTM D 1048-93, Specification for Rubber Insulating Blankets.

ASTM D 1049-93, Specification for Rubber Insulating Covers.

ASTM D 1050-90, Specification for Rubber Insulating Line Hose.

ASTM D 1051-87, Specification for Rubber Insulating Sleeves.

These standards contain specifications for conducting the various tests required in subsection (1) of this section. For example, the a-c and d-c proof-tests, the breakdown test, the water soak procedure, and the ozone test mentioned in this paragraph are described in detail in the ASTM standards.

(4) **In-service care and use.**

(a) You must maintain electrical protective equipment in a safe, reliable condition.

(b) The following specific requirements apply to insulating blankets, covers, line hose, gloves, and sleeves made of rubber:

(i) Maximum use voltages must conform to those listed in Table A-5.

(ii) You must inspect insulating equipment for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. You must give insulating gloves an air test, along with the inspection.

(iii) Insulating equipment with any of the following defects must not be used:

(A) A hole, tear, puncture, or cut;

(B) Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks);

(C) An embedded foreign object;

(D) Any of the following texture changes: Swelling, softening, hardening, or becoming sticky or inelastic.

(E) Any other defect that damages the insulating properties.

(iv) You must remove insulating equipment found to have other defects that might affect its insulating properties from service and returned for testing under (b)(viii) and (ix) of this subsection.

(v) You must clean insulating equipment as needed to remove foreign substances.

(vi) You must store insulating equipment in such a location and in such a manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.

(vii) You must wear protector gloves over insulating gloves.

(viii) You must subject electrical protective equipment to periodic electrical tests. Test voltages and the maximum intervals between tests must be in accordance with Table A-5 and Table A-6.

(ix) The test method used under (b) (viii) and (xi) of this subsection must reliably indicate whether the insulating equipment can withstand the voltages involved.

Note: Standard electrical test methods considered as meeting this requirement are given in the following national consensus standards:
 American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.
 ASTM D 1048-93, Specification for Rubber Insulating Blankets.
 ASTM D 1049-93, Specification for Rubber Insulating Covers.
 ASTM D 1050-90, Specification for Rubber Insulating Line Hose.
 ASTM D 1051-87, Specification for Rubber Insulating Sleeves.
 ASTM F 478-92, Specification for In-Service Care of Insulating Line Hose and Covers.
 ASTM F 479-88a, Specification for In-Service Care of Insulating Blankets.
 ASTM F 496-93b, Specification for In-Service Care of Insulating Gloves and Sleeves.

(x) Employees must not use insulating equipment failing to pass inspections or electrical tests by employees, except as follows:

(A) Rubber insulating line hose could be used in shorter lengths with the defective portion cut off.

(B) Rubber insulating blankets could be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.

(C) Rubber insulating blankets could be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area must not be smaller than twenty-two inches by twenty-two inches (560 mm by 560 mm) for Class 1, 2, 3, and 4 blankets.

(xi) You must retest repaired insulating equipment before it may be used by employees.

(xii) You must certify that equipment has been tested in accordance with the requirements of (b) (viii), (ix), and (xi) of this subsection. The certification must identify the equipment that passed the test and the date it was tested.

Note: Marking of equipment and entering the results of the tests and the dates of testing onto logs are two acceptable means of meeting this requirement.

Table A-2. -A-C
 Proof-Test
 Requirements
 Maximum proof-
 test current, mA
 (gloves only)
 Class of
 equipment

Proof-test voltage rms V	267-mm (10.5- in) glove	356-mm (14-in) glove	406-mm (16-in) glove	457-mm (18-in) glove	
0	5,000	8	12	14	16
1	10,000		14	16	18
2	20,000		16	18	20
3	30,000		18	20	22
4	40,000			22	24

Table A-3. -D-C
 Proof-Test
 Requirements

Class of equipment	Proof-test voltage
0	20,000
1	40,000
2	50,000
3	60,000
4	70,000

Note: The d-c voltages listed in this table are not appropriate for proof-testing rubber insulating line hose or covers. For this equipment, d-c proof-tests must use a voltage high enough to indicate that the equipment can be safely used at the voltages listed in Table A-4. See ASTM D 1050-90 and ASTM D 1049-88 for further information on proof-tests for rubber insulating line hose and covers.

Table A-4. -Glove Tests-Water Level^{1,2}

Class of glove	mm.	A-C proof-test in.	mm.	D-C proof-test in.
0	38	1.5	38	1.5
1	38	1.5	51	2.0
2	64	2.5	76	3.0
3	89	3.5	102	4.0
4	127	5.0	153	6.0

- ¹ The water level is given as the clearance from the cuff of the glove to the water line, with a tolerance of 13 mm. (0.5 in.).
² If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25 mm. (1 in.).

Table A-5. -Rubber Insulating Equipment Voltage Requirements

Class of equipment	Maximum use voltage ¹ a-c-rms	Retest voltage ² a-c-rms	Retest voltage ² d-c-rms
0	1,000	5,000	20,000
1	7,500	10,000	40,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000

- Note: You must only use rubber gloves on voltages of 5000 volts phase-to-phase or less.
¹The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design/voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design/voltage:
 1. If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential, or
 2. If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.
² You must apply the proof-test voltage continuously for at least one minute, but no more than three minutes.

Table A-6. -Rubber Insulating Equipment Test Intervals

Type of equipment	When to test
Rubber insulating line hose	Upon indication that insulating value is suspect.
Rubber insulating covers	Upon indication that insulating value is suspect.
Rubber insulating blankets	Before first issue and every 12 months thereafter. ¹
Rubber insulating gloves	Before first issue and every 6 months thereafter. ¹
Rubber insulating sleeves	Before first issue and every 12 months thereafter. ¹

- ¹ If the insulating equipment has been electrically tested but not issued for service, it may not be placed into service unless it has been electrically tested within the previous 12 months.

(5) Where switches or fuses of more than 150 volts to ground are not guarded during ordinary operations, you must provide suitable insulating floors, mats or platforms on which the operator must stand while handling the switches.

[Statutory Authority: RCW 49.17.010, 49.17.040, 49.17.050, and 49.17.060. WSR 15-24-100, § 296-24-980, filed 12/1/15, effective 1/5/16; WSR 04-18-080, § 296-24-980, filed 8/31/04, effective 11/1/04. Statutory Authority: RCW 49.17.010, [49.17].040, and [49.17].050. WSR 01-11-038, § 296-24-980, filed 5/9/01, effective 9/1/01. Statutory Authority: Chapter 49.17 RCW. WSR 91-24-017 (Order 91-07), § 296-24-980, filed 11/22/91, effective 12/24/91.]