

# Occupational Safety and Health Administration

 [osha.gov/laws-regs/standardinterpretations/1999-12-21](https://www.osha.gov/laws-regs/standardinterpretations/1999-12-21)

## Standard Number:

1910.304(f)(5)(v)

1910.304(a)(3)

OSHA requirements are set by statute, standards and regulations. Our interpretation letters explain these requirements and how they apply to particular circumstances, but they cannot create additional employer obligations. This letter constitutes OSHA's interpretation of the requirements discussed. Note that our enforcement guidance may be affected by changes to OSHA rules. Also, from time to time we update our guidance in response to new information. To keep apprised of such developments, you can consult OSHA's website at <https://www.osha.gov>.

December 21, 1999

MEMORANDUM FOR: CINDY COE, ACTING REGIONAL ADMINISTRATOR  
ATLANTA REGIONAL OFFICE

ATTENTION: BENJAMIN ROSS, ASSISTANT REGIONAL ADMINISTRATOR  
FOR TECHNICAL SUPPORT

LUIS R. SANTIAGO, AREA DIRECTOR  
SAVANNAH AREA OFFICE

FROM: RICHARD E. FAIRFAX, DIRECTOR  
DIRECTORATE OF COMPLIANCE PROGRAMS

SUBJECT: INTERPRETATION OF ELECTRICAL STANDARDS

Thank you for your December 2, 1999 memorandum requesting an interpretation on the electrical grounding requirements for a nursing home. Your scenario, questions, and our reply follow.

**Scenario:** A nursing home was cited under the **Electrical Standards**, 29 CFR §1910.304(f)(5)(v) requirements for the failure to provide a ground for equipment (i.e., refrigerators; microwaves ovens; water fountains) connected by cord and plug. The building was built circa 1958, had a two wire electrical system, and, according to the employer, had not been altered or remodeled. The receptacle boxes had receptacles that would accept a three-wire attachment plug and the employer used the receptacles to power grounding-type

equipment. The employer is not disputing the merits of the electrical grounding citation. However, he wishes to install ground fault circuit interrupters (GFCI) to abate the electrical shock hazard in lieu of expensive system grounding rewiring.

**Question #1:** Is it acceptable to install GFCI protection instead of rewiring the facility with an electrical grounding conductor system?

**Reply:** The answer to your question, with respect to the cord- and plug-connected equipment that requires grounding, is "No." <sup>(1)</sup> The described existing condition at the nursing home was properly cited as the grounding type receptacles, which replaced the previous nongrounding-type receptacles, were only permitted to be installed if a grounding means existed in the receptacle enclosure. The equipment grounding conductor grounds the noncurrent-carrying, metal parts of tools or equipment and carries off the leakage current thus limiting the voltage on the tool or equipment frame by providing a low resistance path to ground. When the leakage current increases beyond the setting of the over-current device protecting the circuit (usually 15 or 20 amperes), the device trips and interrupts the current.

The ground-fault circuit interrupter, on the other hand, is a fast-acting device which senses small current leakage to ground and, in a fraction of a second, shuts off the electricity and interrupts its faulty flow to ground. The rapid response of the GFCI is fast enough to prevent electrocution and this protection is independent of the condition of the grounding conductor.

A GFCI can prevent an electrocution; however, it cannot by itself prevent an initial electric shock to an employee before it interrupts the circuit. This initial shock could lead to injuries of an indirect or secondary nature in which involuntary muscular reaction could cause bruises, bone fractures, and even death resulting from collisions or falls. Therefore, GFCIs are in addition to, and not in lieu of, equipment grounding conductor requirements.

In *A.L. Baumgartner Construction, Inc.*, 16 BNA OSHC 1995 (No. 92-1022, 1994), the Review Commission affirmed a decision by an Administrative Law Judge regarding GFCI protection and a damaged power cord. The Commission held that the violation was "serious" since the employees were also exposed to a fall hazard and a slight shock may cause them to fall and sustain serious injuries. Even though the GFCI is designed to protect against electrocution, the Commission ruled other hazards exist due to the involuntary muscular contractions which may cause a startled employee reaction to the shock.

OSHA is not allowing the use of a GFCI alone to protect employees using cord and plug connected equipment when such equipment is required to be grounded. Paragraph 1910.304(f)(5)(v)(a) through (c), describes the types of cord and plug connected equipment, such as refrigerators and microwave ovens, that is required to be grounded with an equipment grounding conductor.

**Question #2:** The company contacted a member of the National Electrical Code (NEC) Committee and they were told, that according to the 1999 code, it was acceptable to use a GFCI instead of a grounding wire. Is this interpretation correct and would it be considered compliant to meet this NEC provision in lieu of §1910.304(f)(5)(v)?

**Reply:** The company interpretation is incorrect. The equipment grounding requirements for cord and plug connected equipment, contained in Section 250-114 of the 1999 NEC, does not provide an exception that permits the use of a GFCI in lieu of equipment grounding. The GFCI provisions, contained in Section 210-7(d), pertain to the requirements for receptacle replacement and not to the grounding of equipment. <sup>(2)</sup>

The use of a GFCI-type receptacle or GFCI-type circuit breaker in lieu of an equipment grounding conductor run to the receptacle outlet is permitted by the 1999 NEC, Section 210-7, on branch circuits. However, all of the listed conditions must be met to meet this code exception. Section 210-7(d)(3) contains additional marking and wiring requirements that must be met when GFCI-type receptacle(s) or circuit breaker(s) are used when a grounding means is not available. Strict compliance with these NEC requirements would constitute a de minimis violation of OSHA electrical standard §1910.304(a)(3) as the GFCI-type receptacles would provide additional personnel protection and would not be used in lieu of equipment grounding.

For example, if a GFCI-type receptacle is used, it must be visibly marked "No Equipment Ground," and equipment required to be grounded **may not** be used in the ungrounded, GFCI-type receptacle. However, many appliances (i.e., lamps; toasters; televisions; double insulated appliances) and tools (i.e., double insulated tools; tools supplied with a low voltage isolating transformer) are not required to be grounded and they **may** be used in an ungrounded, GFCI-type receptacle. The GFCI feature of these GFCI-type receptacles provides additional electrocution protection in the event of misuse (i.e., a floor buffing machine is powered by a 3-prong plug from a properly marked and wired ungrounded, GFCI-type receptacle).

We hope you find this information helpful. If you have any further questions, please feel free to contact the Office of General Industry Compliance Assistance at (202) 693-1850.

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**FOOTNOTE (1)** The §1910.304(f)(5)(v) grounding provisions were contained in the former §1910.309(a) which incorporated by reference Section 250-45(a) through (d) of the 1971 National Electrical Code. Therefore, all general industry employers have been required to be in compliance with these "retroactive" grounding requirements since March 15, 1972.

Additionally, OSHA considered the issue, during the **Electrical Standards** rulemaking process (**Federal Register**, 46(11), Friday, January 16, 1981, p. 4043), of whether to change the existing §1910.309(a) application paragraph. It was decided that these application

"retroactive" provisions were reasonably necessary for employee safety and had not been shown to be an unwarranted or extreme cost burden on employers. ([Back to text](#))

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**FOOTNOTE (2)**Also, the provisions of Article 517 of the 1999 NEC apply to electrical construction and installation criteria and are nevertheless intended to apply in a very specific manner. Part B of this Section applies to the patient care areas of the health care facility and section 517-13 covers the grounding of receptacles and fixed electrical equipment. It should be clearly understood that Section 517-13(a) requires (with three exceptions) grounding by means of an insulated copper conductor installed with the branch-circuit conductors. ([Back to text](#))

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