

Exception: Listed tools, listed appliances, and listed equipment covered in 250.114, list items 2 through 4, shall not be required to be connected to an equipment grounding conductor if protected by a system of double insulation or its equivalent. Double-insulated equipment shall be distinctively marked.

- (1) In hazardous (classified) locations
- (2) If operated at over 150 volts to ground

Exception No. 1 to (2): Motors, if guarded, shall not be required to be connected to an equipment grounding conductor.

Exception No. 2 to (2): Metal frames of electrically heated appliances, exempted by special permission, shall not be required to be connected to an equipment grounding conductor, in which case the frames shall be permanently and effectively insulated from ground.

- (3) In residential occupancies:
 - a. Refrigerators, freezers, icemakers, and air conditioners
 - b. Clothes-washing, clothes-drying, and dish-washing machines; ranges; kitchen waste disposers; information technology equipment; sump pumps; and electrical aquarium equipment
 - c. Hand-held motor-operated tools, stationary and fixed motor-operated tools, and light industrial motor-operated tools
 - d. Motor-operated appliances of the following types: hedge clippers, lawn mowers, snow blowers, and wet scrubbers
 - e. Portable handlamps
- (4) In other than residential occupancies:
 - a. Refrigerators, freezers, icemakers, and air conditioners
 - b. Clothes-washing, clothes-drying, and dish-washing machines; information technology equipment; sump pumps; and electrical aquarium equipment
 - c. Hand-held motor-operated tools, stationary and fixed motor-operated tools, and light industrial motor-operated tools
 - d. Motor-operated appliances of the following types: hedge clippers, lawn mowers, snow blowers, and wet scrubbers
 - e. Portable handlamps
 - f. Cord-and-plug-connected appliances used in damp or wet locations or by persons standing on the ground, standing on metal floors, or working inside of metal tanks or boilers
 - g. Tools likely to be used in wet or conductive locations

Exception: Tools and portable handlamps and portable luminaires likely to be used in wet or conductive locations shall not be required to be connected to an equipment grounding conductor if supplied through an isolating transformer with an ungrounded secondary of not over 50 volts.

250.116 Nonelectrical Equipment. The metal parts of the following nonelectrical equipment described in this section shall be connected to the equipment grounding conductor:

- (1) Frames and tracks of electrically operated cranes and hoists
- (2) Frames of nonelectrically driven elevator cars to which electrical conductors are attached
- (3) Hand-operated metal shifting ropes or cables of electric elevators

Informational Note: If extensive metal in or on buildings or structures may become energized and is subject to personal contact, adequate bonding and grounding will provide additional safety.

Δ 250.118 Types of Equipment Grounding Conductors.

As a general rule, the NEC requires only one EGC, and it can be any of the types specified in this section. However, some specific requirements, such as 517.13(B), require an additional wire-type EGC regardless of the wiring method. If a wire-type EGC is installed in a metal raceway and is not isolated per 250.96(B), the raceway is in parallel with the wire, and the combination of the metal raceway and the wire is the EGC for enclosed circuit(s).

See also

250.122 for sizing of wire-type EGCs

Δ (A) **Permitted.** Each equipment grounding conductor run with or enclosing the circuit conductors shall be one or more or a combination of the following:

- (1) A copper, aluminum, or copper-clad aluminum conductor. This conductor shall be solid or stranded; insulated, covered, or bare; and in the form of a wire or a busbar of any shape.
- (2) Rigid metal conduit.
- (3) Intermediate metal conduit.
- (4) Electrical metallic tubing.
- (5) Listed flexible metal conduit meeting all the following conditions:
 - a. The conduit is terminated in listed fittings.
 - b. The circuit conductors contained in the conduit are protected by overcurrent devices rated at 20 amperes or less.
 - c. The size of the conduit does not exceed metric designator 35 (trade size 1¼).
 - d. The combined length of flexible metal conduit, flexible metallic tubing, and liquidtight flexible metal conduit in the same effective ground-fault current path does not exceed 1.8 m (6 ft).
 - e. If flexibility is necessary to minimize the transmission of vibration from equipment or to provide flexibility for equipment that requires movement after installation, a wire-type equipment grounding conductor or a bonding jumper in accordance with 250.102(E)(2) shall be installed.
 - f. If flexible metal conduit is constructed of stainless steel, a wire-type equipment grounding conductor or bonding jumper in accordance with 250.102(E)(2) shall be installed.