What size ground wire is needed for a household electrical distribution box



Overview

Equipment grounding conductor (EGC) sizes for copper and aluminum wiring, from NEC Table 250.122. Find the minimum ground wire size for any breaker size from 15A to 800A.

Key Takeaways

Ground wires in household distribution boxes must be sized according to NEC Table 250. 122, typically using copper conductors from 14 AWG to 3/0 AWG depending on the overcurrent protection device, and must be properly bonded to metal boxes and equipment.

Ground Wire Sizing

The National Electrical Code (NEC) Article 250 governs grounding and bonding in residential electrical systems. Equipment grounding conductors (EGCs) provide a low-impedance path for fault currents, ensuring that circuit breakers trip quickly during faults. The minimum size of the ground wire is determined by the rating of the overcurrent protection device (OCPD) protecting the circuit, as specified in NEC Table 250.

122: 15-20 amp circuits: 14 AWG copper30 amp circuits: 10 AWG copper60 amp circuits: 6 AWG copper100 amp circuits: 8 AWG copper200 amp circuits: 4 AWG copper Aluminum conductors are typically one size larger than copper due to lower conductivity. For circuits exceeding 1200 amps, the EGC must be at least 12. 5% of the area of the largest ungrounded conductor.

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Material Selection

Copper is preferred for household grounding, especially for buried or exposed runs, due to its superior conductivity and resistance to corrosion. Aluminum is generally avoided for grounding in residential applications, particularly underground, because it corrodes over time and can compromise safety. Installation PracticesEGCs must run with all circuit conductors in the same raceway, cable, or conduit to maintain the lowest possible impedance.

Metal electrical boxes must be bonded to the system ground using a green grounding screw or a metal ground clip. Pre-assembled green ground wires with a screw on one end and a u-clip on the other can simplify connections to fixtures. Ground wires inside the box should be bonded together using crimp connectors rather than twist-on connectors to avoid crowding and ensure reliable connections.

Grounding electrode conductors (GECs) connect the system to the earth via rods or plates, providing a path for fault currents to dissipate safely. Typical residential installations use 6-foot copper rods or equivalent buried horizontal copper conductors.

Safety and Compliance

The total resistance of the grounding system should be 25 ohms or less to ensure effective fault current dissipation. Properly sized and installed ground wires prevent equipment damage, reduce shock hazards, and ensure compliance with inspections. Always verify connections and conductor sizes against the latest NEC code or consult a licensed electrician for final design decisions.

By following these specifications, household electrical distribution boxes will have a safe, code-compliant grounding system that protects both people and equipment.

Article Content

Ground Wire Size Chart NEC 2026: Complete Grounding Guide

Your ground wire size depends on the circuit breaker or fuse rating protecting the circuit. For common residential circuits: 15-amp circuits need 14 AWG copper ground wire, 20-amp circuits

Ground Wire Size Chart — NEC Table 250.122

Equipment grounding conductor (EGC) sizes for copper and aluminum wiring, from NEC Table 250.122. Find the minimum ground wire size for any breaker size from 15A to 800A.

NEC Ground Wire Size Chart: What Size Ground Wire Do You Need

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Learn how to properly size ground wires according to NEC requirements. This comprehensive guide covers equipment grounding conductors, grounding electrode conductors, and

How to Size Ground Wire for 100A, 125A, and 200A Services

A practical guide to correctly sizing the grounding electrode conductor (GEC) for common residential services like 100A, 125A, and 200A using NEC Table 250.66.

Ground Wire Size Chart (NEC 2023): How to Choose the Correct

Ensuring electrical safety in your home begins with proper grounding. This guide, based on the NEC 2023, provides clear instructions on how to select the correct ground wire size for

NEC Ground Wire Size Chart Explained

NEC ground wire size chart is a crucial resource for electrical engineering and maintenance professionals, providing clear guidelines on selecting the appropriate grounding

Ground Wire Size Chart

There are two distinct types of ground wire size charts as governed by the National Electric Code. The first one is the Equipment Grounding Conductor (EGC) chart, based on NEC

Grounding Wire Size Calculator

Calculate equipment grounding conductors (EGC) based on circuit breaker size, grounding electrode conductors (GEC) for service entrances, and ground fault protection requirements.

How to Size a Ground Wire for Your Electrical System

Master the correct sizing rules for electrical grounding conductors (EGC and GEC) based on circuit type and service size.

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NEC Ground Wire Size Chart – Electrical Grounding Guide

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NEC Ground Wire Size Chart ensures electrical grounding safety. Learn conductor sizing, bonding, and fault current protection for residential and commercial systems.

Ground Wire Size Chart NEC 2026: Complete Grounding Guide

Master NEC ground wire sizing with complete Table 250.122, copper/aluminum conductor comparisons, and practical examples for safe electrical installations in 2026.

Residential Electrical Service Grounding Requirements

The earth ground ensures the safety of an electrical system—the key components are the grounding rod, grounding wire, and grounding clamp.

Distribution Box and Selection Guide: Internal Structure, Components ...

Learn how to choose a distribution box and understand its internal structure, including MCBs, busbars, neutral bars, earth bars, RCDs, RCBOs, SPDs, enclosure ratings, and wiring layout.

Ground Screw Sizes For Electrical Boxes: What You Need To Know

Learn about ground screw sizes for electrical boxes, including standard dimensions, compatibility with different box types, and how to ensure a secure connection for your electrical devices.

Ground Wire Size Chart (A Complete Guide)

If the wire run is longer than standard distances (usually over 100 feet), voltage drop becomes a concern, and you may need a larger wire size. For precise results, especially in complex

Ground Wire Size Calculator

The Ground Wire (Conductor) Size Calculator will determine the appropriate size of ground conductor needed for grounding pathways & equipment based on the ampere rating of the

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