



# RESIDENTIAL GROUNDING AND BONDING

THESE REQUIREMENTS ARE FOR PERMITS ISSUED ON OR AFTER JANUARY 1, 2014

## BUILDING DIVISION REQUIREMENTS

Any work involving adding sub-panels, upgrade of electrical service, change of water service (if using a less conductive material than is existing), re-piping of a structure, or adding circuits (if no grounding system exists) will require upgrading of the grounding and bonding of the electrical service. A permit is required for each of these upgrades/remodels. Following are the grounding and bonding requirements based on the 2013 California Electrical Code. This brochure is intended to provide general information, contact the Building Safety Division for any questions or additional information.

### Grounding

Grounding shall consist of a continuous grounding electrode conductor run from the panel to a ground rod (grounding electrode) and to the cold water pipe. Grounding of the electrical service at the main water line must be within the first 5' of water piping into the building. The underground water service shall not be used as the grounding electrode without supplemental electrode. [CEC 250.52 (A)(1) and 250.53 (I), 250.68(c)]

For new structures and additions to existing structures, a concrete encased ground electrode shall be installed. This shall consist of 20' of 1/2" bare or zinc-coated rebar or bare copper wire in the portion of the footing in contact with earth. (CEC 250.50)

For existing structures, the grounding electrode shall be nonferrous (copper), listed, and not be less than 1/2" in diameter. The electrode shall be installed such that at least 8' of length is in contact with the soil. The upper end of the electrode shall be flush with or below ground level unless the above-ground end and the grounding electrode conductor attachment is protected against physical damage. [CEC 250.52 (A)(5) and 250.53 (D)]

The required grounding electrode conductor (from electrode to panel) size is listed in the following table:

GROUNDING ELECTRODE CONDUCTOR SIZING (Table 250.66)		
Size of Main Panel	Copper Conductors	Aluminum or Copper-Clad Aluminum
100 Amps	#8 AWG	#6 AWG
125 Amps	#8 AWG	#6 AWG
150 Amps	#6 AWG	#4 AWG
200 Amps	#4 AWG	#2 AWG

### Bonding

Bonding shall consist of a continuous bond jumper installed at the water heater between the hot, cold, and gas lines. The bonding jumper shall be sized based on the following table:

BONDING JUMPER SIZING (Table 250.122)		
Size of Main Panel	Copper Conductors	Aluminum or Copper-Clad Aluminum
100 Amps	#8 AWG	#6 AWG
125 Amps	#6 AWG	#4 AWG
150 Amps	#6 AWG	#4 AWG
200 Amps	#6 AWG	#4 AWG