(5) Resistively Grounded DC Systems. A switchboard, switchgear, or panelboard containing a resistive connection between current-carrying conductors and the grounding system to stabilize voltage to ground shall be legibly and permanently field marked as follows:

CAUTION: DC SYSTEM OPERATING — _____
VOLTS BETWEEN CONDUCTORS AND MAY
OPERATE — _____ VOLTS TO GROUND FOR
INDEFINITE PERIODS UNDER FAULT CONDITIONS

(G) Minimum Wire-Bending Space. The minimum wire-bending space at terminals and minimum gutter space provided in switchboards, switchgear, and panelboards shall be as required in 312.6.

408.4 Descriptions Required.

(A) Circuit Directory or Circuit Description. Every circuit and circuit modification shall be provided with a legible and permanent description that complies with all of the following conditions as applicable:

(1) Located at each switch or circuit breaker in a switchboard or switchgear
(2) Included in a circuit directory that is located on the face of, inside of, or in an approved location adjacent to the panel door in the case of a panelboard
(3) Clear, evident, and specific to the purpose or use of each circuit including spare positions with an unused overcurrent device
(4) Described with a degree of detail and clarity that is unlikely to result in confusion between circuits
(5) Not dependent on transient conditions of occupancy
(6) Clear in explaining abbreviations and symbols when used

The circuit directory is an important feature for the safe operation of an electrical system. It must provide clear identification of circuit breakers and switches that service personnel or other responders may need to operate in an emergency. This requirement is specific to switchboards, switchgear, and panelboards; however, the identification requirements of 110.22 apply to all disconnecting means.

Circuits used for the same purpose must be identified by their location. For example, small-appliance branch circuits can supply outlets in the kitchen, dining room, and kitchen countertops. Identifying these circuits as small-appliance branch circuits is not acceptable; instead, they should be identified as "kitchen wall receptacles," "dining room floor receptacle," or "kitchen countertop receptacles left of sink." Circuit directories containing multiple entries with only "lights" or "outlets" do not provide the sufficient detail required by this section.

Spare devices are required to be marked to indicate that they are spares. Markings are required to indicate permanent features and not temporary conditions of occupancy. For example, for a circuit breaker supplying an office, a label with an employee's name is not useful if the employee no longer occupies that office.

(B) Source of Supply. All switchboards, switchgear, and panelboards supplied by a feeder(s) in other than one- or two-family dwellings shall be permanently marked in accordance with the following:

(1) With the identification and physical location of where the power originates
(2) With a label that is permanently affixed and of sufficient durability to withstand the environment involved
(3) Using a method that is not handwritten

Tracing a feeder circuit back to its originating switchboard, switchgear, panelboard, or other source can be a time-consuming and inaccurate process. Accurate identification of circuits promotes more efficient lockout/tagout processes, which provide a safer work environment for employees. Identification of the feeder circuit when the new feeder is being added is also more economical than the time-consuming process of tracing a circuit.

408.5 Clearance for Conductor Entering Bus Enclosures. Where conduits or other raceways enter a switchboard, switchgear, floor-standing panelboard, or similar enclosure at the bottom, approved space shall be provided to permit installation of conductors in the enclosure. The wiring space shall not be less than shown in Table 408.5 where the conduit or raceways enter or leave the enclosure below the busbars, their supports, or other obstructions. The conduit or raceways, including their end fittings, shall not rise more than 75 mm (3 in.) above the bottom of the enclosure.

TABLE 408.5 *Clearance for Conductors Entering Bus Enclosures*

	Minimum Spacing Between Bottom of Enclosure and Busbars, Their Supports, or Other Obstructions	
Conductor	**mm**	**in.**
Insulated busbars, their supports, or other obstructions	200	8
Noninsulated busbars	250	10

408.6 Short-Circuit Current Rating. Switchboards, switchgear, and panelboards shall have a short-circuit current rating not less than the available fault current. In other than one- and two-family dwelling units, the available fault current and the date the calculation was performed shall be field marked on the enclosure at the point of supply. The marking shall comply with 110.21(B)(3).

The available fault current must be calculated so that the short-circuit current ratings (SCCRs) of certain equipment can be determined to be adequate. Having an available fault current that is greater than the SCCR of installed equipment could lead to equipment failure during a fault. While this value is already