

(H) Free from Contact with Conductive Surfaces. Cables shall be kept free from contact with metal or other electrically conductive surfaces.

(I) Joists. In dry board applications, cable shall be installed parallel to the joist, leaving a clear space centered under the joist of 65 mm (2½ in.) (width) between centers of adjacent runs of cable. A surface layer of gypsum board shall be mounted so that the nails or other fasteners do not pierce the heating cable.

(J) Crossing Joists. Cables shall cross joists only at the ends of the room unless the cable is required to cross joists elsewhere in order to satisfy the manufacturer's instructions regarding clearance from ceiling penetrations and luminaires.

424.42 Finished Ceilings. Finished ceilings shall not be covered with decorative panels or beams constructed of materials that have thermal insulating properties, such as wood, fiber, or plastic. Finished ceilings shall be permitted to be covered with paint, wallpaper, or other approved surface finishes.

424.43 Installation of Nonheating Leads of Cables.

(A) Free Nonheating Leads. Free nonheating leads of cables shall be installed in accordance with Chapter 3 wiring methods, or other listed means, from the junction box to a location within the ceiling.

(B) Leads in Junction Box. Not less than 150 mm (6 in.) of free nonheating lead shall be within the junction box. The marking of the leads shall be visible in the junction box.

(C) Excess Leads. Excess leads of heating cables shall not be cut but shall be secured to the underside of the ceiling and embedded in plaster or other approved material, leaving only a length sufficient to reach the junction box with not less than 150 mm (6 in.) of free lead within the box.

424.44 Installation of Cables in Concrete or Poured Masonry Floors.

(A) Adjacent Runs. Adjacent runs of heating cable shall be installed in accordance with the manufacturer's instructions.

(B) Secured in Place. Cables shall be secured in place by non-metallic frames or spreaders or other approved means while the concrete or other finish is applied.

(C) Leads Protected. Leads shall be protected where they leave the floor by rigid metal conduit, intermediate metal conduit, rigid polyvinyl chloride conduit, electrical metallic tubing, or by other approved means.

(D) Bushings or Approved Fittings. Bushings or approved fittings shall be used where the leads emerge within the floor slab.

(E) Ground-Fault Circuit-Interrupter Protection. In addition to the requirements in 210.8, ground-fault circuit-interrupter protection for personnel shall be provided for cables installed in

electrically heated floors of bathrooms, kitchens, and in hydro-massage bathtub locations.

GFCI protection is required where cables are installed in concrete or poured masonry floors, thereby reducing shock hazards to persons walking barefoot in those areas. This requirement applies regardless of the type of floor covering over the concrete or poured masonry. Electric radiant heating cables are not permitted in spa, hot tub, or pool locations in accordance with 680.27(C)(3).

424.45 Installation of Cables Under Floor Coverings.

(A) Identification. Heating cables for installation under floor covering shall be identified as suitable for installation under floor covering.

(B) Expansion Joints. Heating cables shall not be installed where they bridge expansion joints unless provided with expansion and contraction fittings applicable to the manufacture of the cable.

(C) Connection to Conductors. Heating cables shall be connected to branch-circuit and supply wiring by wiring methods described in the installation instructions.

(D) Anchoring. Heating cables shall be positioned and secured in place under the floor covering, in accordance with the manufacturer's instructions.

(E) Ground-Fault Circuit-Interrupter Protection. In addition to the requirements in 210.8, ground-fault circuit-interrupter protection for personnel shall be provided.

(F) Grounding Braid or Sheath. Grounding means, such as copper braid, metal sheath, or other approved means, shall be provided as part of the heated length.

424.46 Inspection. Cable installations shall be made with due care to prevent damage to the cable assembly and shall be inspected and approved before cables are covered or concealed.

424.47 Label Provided by Manufacturer. The manufacturers of electric space-heating cables shall provide marking labels that indicate that the space-heating installation incorporates electric space-heating cables and instructions that the labels shall be affixed to the panelboards to identify which branch circuits supply the circuits to those space-heating installations. If the electric space-heating cable installations are visible and distinguishable after installation, the labels shall not be required to be provided and affixed to the panelboards.

424.48 Installation of Cables in Walls. Unless prohibited by 424.38(B), heating cables and cable sets shall be permitted to be installed in, on, or behind walls provided all of the following are met:

- (1) Heating cables and cable sets shall be identified as suitable for installation in, on, or behind walls.