

# Roofing and electrical conduit

The electrical code provides some guidelines regarding conduit placement

by Mark S. Graham

During roof system removal operations or when mechanically attaching rigid board insulation or membranes, roofing professionals sometimes find electrical conduit embedded within roof systems or placed directly below roof decks. In many instances, the presence of electrical conduit is unforeseen, problematic and potentially dangerous.

However, the electrical code provides some guidance regarding electrical cables, raceways and boxes placed in or under roof decks.

## Electrical code

NFPA 70: National Electrical Code® (NEC) serves as the electrical code for most jurisdictions in the U.S.

In NEC's 2011 edition, Chapter 3-Wiring Methods and Materials provides placement and methods for wiring. Section 300.4-Protection Against

Physical Damage includes the following statement specific to wiring installed in or under roof decks: **"(E) Cables, Raceways, or Boxes Installed in or Under Roof Decking.** A cable, raceway, or box, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so there is not less than 38 mm (1½ in.) measured from the lowest surface of the roof decking to the top of the cable, raceway, or box. A cable raceway, or box shall not be installed in concealed locations in metal-corrugated, sheet decking-type roof.

"Informational Note: Roof decking material is often repaired or replaced after the

initial raceway or cabling and roofing installation and may be penetrated by the screws or other mechanical devices designed to provide 'hold down' strength of the waterproofing membrane or roof insulating material.

*"Exception: Rigid metal conduit and intermediate metal conduit shall not be required to comply with 300.4(E)."*

Generally, wiring placed in metallic conduit is considered "protected" by the electrical profession and appropriate for use in most concealed spaces and areas subject to physical abuse. However, roofing

industry experience has shown fasteners used for mechanically attaching rigid board insulation or membranes can readily penetrate metallic conduit embedded within or directly underneath roof assemblies. By way of comparison, the wall thickness of ½-inch-

thick metallic conduit is comparable to the metal thickness of a 20-gauge steel roof deck. Self-cutting or self-drilling roof fasteners can readily penetrate metals of these thicknesses.

Also, cutting and roof system removal operations can damage and penetrate metallic conduit. Another section of the NEC, Section 690.31-Methods Permitted, addresses wiring methods for solar photovoltaic systems: **"(1) Beneath Roofs.** Wiring methods shall not be installed within 25 cm (10 in.) of roof decking or sheathing except where directly below the roof surface covered by PV modules and associated equipment. Circuits

shall be run perpendicular to the roof penetration point to supports a minimum of 25 cm. (10 in.) below roof decking.

"Informational Note: the 25 cm (10 in.) requirement is to prevent accidental damage from saws used by fire fighters for roof ventilation during structural fire."

This statement indicates NEC acknowledges the potential for accidentally cutting metallic conduit; however, it does not adequately restrict metallic conduit placement or prevent such accidental cutting during reroofing.

## NRCA's recommendations

Electrical conduit embedded within roof systems or placed directly below roof decks can be problematic for roofing professionals. Although the electrical code provides some guidance regarding metallic conduit placement within or directly underneath roof systems, experience has shown these requirements are not adequate to address roofing industry concerns.

NRCA does not recommend metallic conduit or wiring be embedded within roof assemblies or placed directly below roof decks. If metallic conduit or wiring needs to be placed near the roof assembly, NRCA recommends it be positioned and supported at least 1½ inches from the bottom side of the roof deck or substrate to which the roof system is applied. Also, hangers or other supports used to attach and support metallic conduit and wiring should be attached to framing or roof deck supports, not the roof deck or roof substrate. ☼●\*

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