(B) Flanged Connections. Individual conductors or multiconductor cables with entirely nonmetallic sheaths shall be permitted to enter enclosures through openings associated with flanges from cable trays where the cable tray is attached to the flange and the flange is mounted directly to the equipment. The openings shall be made such that the conductors are protected from abrasion and the opening shall be sealed or covered to prevent debris from entering the enclosure through the opening.

Informational Note: One method of preventing debris from entering the enclosure is to seal the outer end of the raceway or the opening with duct seal.

392.56 Cable Splices and Type MV Cable Joints. Cable splices and Type MV cable joints made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices and Type MV cable joints shall be permitted to project above the side rails where not subject to physical damage.

392.60 Grounding and Bonding.

(A) Metal Cable Trays. Metal cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with this section. Metal cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250. Metal cable trays containing only non-power conductors shall be electrically continuous through approved connections or the use of a bonding jumper.

Informational Note: Examples of non-power conductors include nonconductive optical fiber cables and Class 2 and Class 3 remote-control, signaling, and power-limited circuits.

Section 392.60(A), together with 250.96, requires all cable tray systems that support electrical conductors (whether mechanically continuous or with isolated segments) to be electrically continuous and effectively bonded and grounded. This requirement applies whether the cable tray is used as an equipment grounding conductor (EGC) or is used for service conductors and connected to the grounded system conductor (or the grounding electrode conductor for ungrounded systems). Where a metal cable tray contains only non-power conductors, such as fire alarm, communications, community antenna television (CATV), or broadband conductors, the tray must be maintained electrically continuous.

(B) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided all the following requirements are met:

(1) The cable tray sections and fittings are identified as an equipment grounding conductor.
(2) The minimum cross-sectional area of cable trays conform to the requirements in Table 392.60(B).
(3) All cable tray sections and fittings are legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction, and the total cross-sectional area of both side rails for ladder or trough cable trays.
(4) Cable tray sections, fittings, and connected raceways are bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

Designers of cable tray systems, for use in establishments that qualify, can specify cables without EGCs and use the cable tray system as the required EGC, provided the cable tray system meets the requirements of 392.60(A) and (B). Exhibit 392.2 illustrates an example of the grounding and bonding of multiconductor cables in cable trays with conduit runs to power equipment. Bonding jumpers connecting discontinuous sections of cable tray used as an EGC are on the load side of the overcurrent device. The equipment bonding jumper must be sized in accordance with 250.102(D).

(C) Transitions. Where metal cable tray systems are mechanically discontinuous, as permitted in 392.18(A), a bonding jumper sized in accordance with 250.102 shall connect the two sections of the cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

The bonding of the entire cable tray system is important, especially for discontinuous cable tray segments. According to 250.96(A), properly sized and installed bonding conductors must be installed across any mechanical discontinuities in the

TABLE 392.60(B) *Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor*

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal*			
	Steel Cable Trays		Aluminum Cable Trays	
	mm^2	$in.^2$	mm^2	$in.^2$
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50†	258	0.40
1000	—	—	387	0.60
1200	—	—	645	1.00
1600	—	—	967.5	1.50
2000	—	—	1290	2.00†

*Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.

†Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.