

outlets installed together in common housing shall be permitted in accordance with 800.133(A)(3), Exception No. 2.

382.56 Splices and Taps. Extensions shall consist of a continuous unbroken length of the assembly, without splices, and without exposed conductors between fittings, connectors, or devices. Taps shall be permitted where approved fittings completely covering the tap connections are used. Aerial cable and its tap connectors shall be provided with an approved means for polarization. Receptacle-type tap connectors shall be of the locking type.

Part III. Construction Specifications (Concealable Nonmetallic Extensions Only)

382.100 Construction. Concealable nonmetallic extensions shall be of a multilayer flat conductor design consisting of a center ungrounded conductor enclosed by a sectioned grounded conductor and an overall sectioned equipment grounding conductor.

382.104 Flat Conductors. Concealable nonmetallic extensions shall be constructed, using flat copper conductors equivalent to 14 AWG or 12 AWG conductor sizes, and constructed per 382.104(A), (B), and (C).

A multilayer flat conductor is a complete assembly of branch-circuit conductors, thinner than a business card and yet flexible enough to bend to any angle required for a customized installation. Exhibit 382.1 is one example of a concealable nonmetallic extension circuit conductor assembly of flat conductors meeting the requirements of Article 382.

A concealable extension is a five-layer design for circuit integrity and protection. Flat-sectioned equipment grounding conductor (EGC) layers fully encase the ungrounded conductor and grounded conductor layers of the cable. By design, any penetration in the flat wire cable assembly will penetrate the EGC layer first, then the grounded conductor layer, then the ungrounded conductor layer. A penetration will result in a short circuit between the three conductors described that will

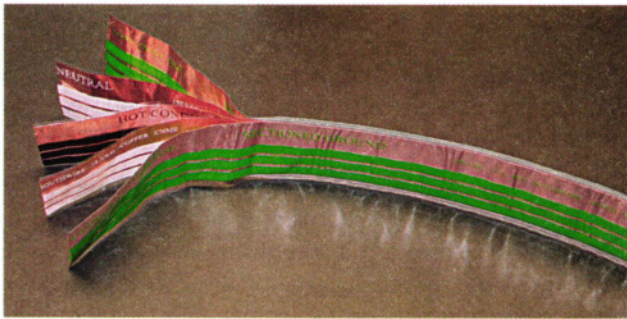


EXHIBIT 382.1 One example of a flat conductor cable assembly used as a concealable nonmetallic extension. (Courtesy of FlatWire Technologies, a division of Southwire®)

immediately trip the overcurrent protective device (OCPD), causing automatic disconnection of the circuit.

(A) Ungrounded Conductor (Center Layer). The ungrounded conductor shall consist of one or more ungrounded flat conductor(s) enclosed in accordance with 382.104(B) and (C) and identified in accordance with 310.6(C).

(B) Grounded Conductor (Inner Sectioned Layers). The grounded conductor shall consist of two sectioned inner flat conductors that enclose the center ungrounded conductor(s). The sectioned grounded conductor shall be enclosed by the sectioned equipment grounding conductor and identified in accordance with 200.6.

(C) Equipment Grounding Conductor (Outer Sectioned Layers). The equipment grounding conductor shall consist of two overall sectioned conductors that enclose the grounded conductor and ungrounded conductor(s) and shall comply with 250.4(A)(5). The equipment grounding conductor layers shall be identified by any one of the following methods:

- (1) As permitted in 250.119
- (2) A clear covering
- (3) One or more continuous green stripes or hash marks
- (4) The term "Equipment Grounding Conductor" printed at regular intervals throughout the cable

382.112 Insulation. The ungrounded and grounded flat conductor layers shall be individually insulated and comply with 310.14(A)(3). The equipment grounding conductor shall be covered or insulated.

382.120 Marking.

(A) Cable. Concealable nonmetallic extensions shall be clearly and durably marked on both sides at intervals of not more than 610 mm (24 in.) with the information required by 310.8(A) and with the following additional information:

- (1) Material of conductors
- (2) Maximum temperature rating
- (3) Ampacity

(B) Conductor Identification. Conductors shall be clearly and durably identified on both sides throughout their length as specified in 382.104.

ARTICLE 384

Strut-Type Channel Raceway

Part I. General

384.1 Scope. This article covers the use, installation, and construction specifications of strut-type channel raceway.

- **384.6 Listing Requirements.** Strut-type channel raceways and accessories shall be listed and identified for such use.

Part II. Installation

384.10 Uses Permitted. The use of strut-type channel raceways shall be permitted in the following:

- (1) Where exposed.
- (2) In dry locations.
- (3) In locations subject to corrosive vapors where protected by finishes approved for the condition.
- (4) As power poles.
- (5) In hazardous (classified) locations as permitted in Chapter 5.
- (6) As extensions of unbroken lengths through walls, partitions, and floors where closure strips are removable from either side and the portion within the wall, partition, or floor remains covered.
- (7) Ferrous channel raceways and fittings protected from corrosion solely by enamel shall be permitted only indoors.

The installation shown in Exhibit 384.1 is typical of how a strut-type channel raceway can be used.

384.12 Uses Not Permitted. Strut-type channel raceways shall not be used as follows:

- (1) Where concealed.
- (2) Ferrous channel raceways and fittings protected from corrosion solely by enamel shall not be permitted where subject to severe corrosive influences.

384.21 Size of Conductors. No conductor larger than that for which the raceway is listed shall be installed in strut-type channel raceways.

384.22 Number of Conductors. The number of conductors or cables permitted in strut-type channel raceways shall not exceed the percentage fill using Table 384.22 and applicable cross-sectional area of specific types and sizes of wire given in the tables in Chapter 9.

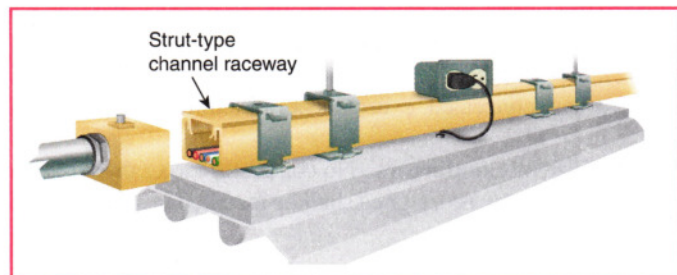


EXHIBIT 384.1 An example of a strut-type channel raceway using accessories to support and supply power to luminaires.

TABLE 384.22 Channel Size and Inside Cross-Sectional Area

Size Channel	Area		40% Area*		25% Area†	
	in. ²	mm ²	in. ²	mm ²	in. ²	mm ²
1⅝ × 1⅝	0.887	572	0.355	229	0.222	143
1⅝ × 1	1.151	743	0.460	297	0.288	186
1⅝ × 1⅜	1.677	1076	0.671	433	0.419	270
1⅝ × 1⅞	2.028	1308	0.811	523	0.507	327
1⅝ × 2⅞	3.169	2045	1.267	817	0.792	511
1⅝ × 3¼	4.308	2780	1.723	1112	1.077	695
1½ × ¾	0.849	548	0.340	219	0.212	137
1½ × 1½	1.828	1179	0.731	472	0.457	295
1½ × 1⅞	2.301	1485	0.920	594	0.575	371
1½ × 3	3.854	2487	1.542	995	0.964	622

*Raceways with external joiners shall use a 40 percent wire fill calculation to determine the number of conductors permitted.

†Raceways with internal joiners shall use a 25 percent wire fill calculation to determine the number of conductors permitted.

The adjustment factors of 310.15(C)(1) shall not apply to conductors installed in strut-type channel raceways where all of the following conditions are met:

- (1) The cross-sectional area of the raceway exceeds 2500 mm² (4 in.²).
- (2) The current-carrying conductors do not exceed 30 in number.
- (3) The sum of the cross-sectional areas of all contained conductors does not exceed 20 percent of the interior cross-sectional area of the strut-type channel raceways.

384.30 Securing and Supporting.

(A) Surface Mount. A surface mount strut-type channel raceway shall be secured to the mounting surface with retention straps external to the channel at intervals not exceeding 3 m (10 ft) and within 900 mm (3 ft) of each outlet box, cabinet, junction box, or other channel raceway termination.

(B) Suspension Mount. Strut-type channel raceways shall be permitted to be suspension mounted in air with identified methods at intervals not to exceed 3 m (10 ft) and within 900 mm (3 ft) of channel raceway terminations and ends.

384.56 Splices and Taps. Splices and taps shall be permitted in raceways that are accessible after installation by having a removable cover. The conductors, including splices and taps, shall not fill the raceway to more than 75 percent of its area at that point. All splices and taps shall be made by approved methods.

384.60 Grounding. Strut-type channel raceway enclosures providing a transition to or from other wiring methods shall have a means for connecting an equipment grounding conductor. Strut-type channel raceways shall be permitted as an equipment grounding conductor in accordance with 250.118(A)(13). Where a snap-fit metal cover for strut-type channel raceways is used to