

CADDY®

2005 National Electrical Code®

2002 Canadian Electrical Code®

A handbook of
recommended CADDY®
Fasteners for easy
compliance to the
fastening requirements of the
2005 NEC® and 2002 CEC®



ERICO®

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The intent of this publication is to help the electrical industry meet the 2005 National Electrical Code® requirements in North America as they relate to fastening applications. (See page 18 for 2002 Canadian Electrical Code®.) Shown are a variety of solutions.

NOTE: Consult the AHJ (authority having jurisdiction) as local codes may supersede the National Electrical Code. – ERICO®, Inc.

2005 NEC Article 90 Introduction

90.3 Code Arrangement.

Chapter 8 covers communications systems and is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8. [See page 14]

90.4 Enforcement.

...The authority having jurisdiction for enforcement of the Code has the responsibility for making interpretations of the rules, for deciding on the approval of equipment and materials, and for granting the special permission contemplated in a number of the rules.

By special permission, the authority having jurisdiction may waive specific requirements in this Code or permit alternative methods where it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety.

2005 NEC Article 300 Wiring Methods

300.4 Protection Against Physical Damage.

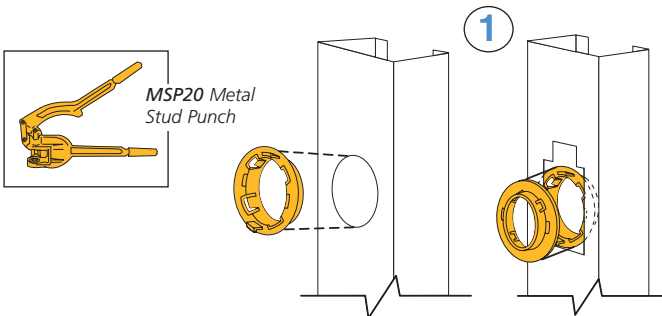
Where subject to physical damage, conductors shall be protected.

(B) Nonmetallic-Sheathed Cables and Electrical Nonmetallic Tubing through Metal Framing Members.

(1) **Nonmetallic-Sheathed Cable.** ... the cable shall be protected by listed bushings or listed grommets covering all metal edges that are securely fastened in the opening prior to installation of the cable. [See Fig. 1]

Reference
CEC 12-516
CEC 12-616

ESG1 Grommet for 360° Protection of Nonmetallic Sheathed Cable and Tubing. ("V" and "U" Shaped Grommets and Retrofit Bushings Disallowed. Grommets/Bushings must be listed.)



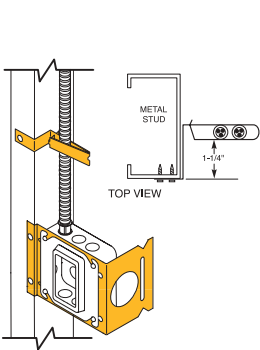
300.4 Protection Against Physical Damage. (continued)

(D) Cables and Raceways Parallel to Framing Members.

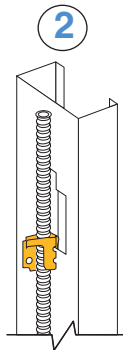
...the cable or raceway shall be installed and supported...not less than 32 mm (1¼ in.) from the nearest edge of the framing member...where nails or screws are likely to penetrate. [See Fig. 2]

Where this distance cannot be maintained, the cable or raceway shall be protected from penetration by nails or screws by a steel plate, sleeve, or equivalent at least 1.6 mm (1/16 in.) thick... [See Fig. 3 & 9 on page 8]

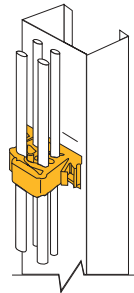
Exception No. 3: A listed and marked steel plate less than 1.6 mm (1/16 in.) thick that provides equal or better protection against nail or screw penetration shall be permitted.



CJ6 Cable Support for MC/AC and Nonmetallic Sheathed Cable

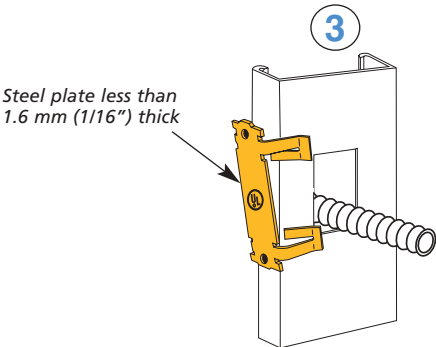


MAC2 Series for MC/AC Cable



CG4 Cable Gripper for Nonmetallic Sheathed Cable or low-voltage wiring to wood and metal stud

Reference
CEC® 12-510
CEC 12-516
CEC 12-618



304B2 Press-on Protection Plates For Wood and Metal Studs

Reference
CEC 12-516
CEC 12-616

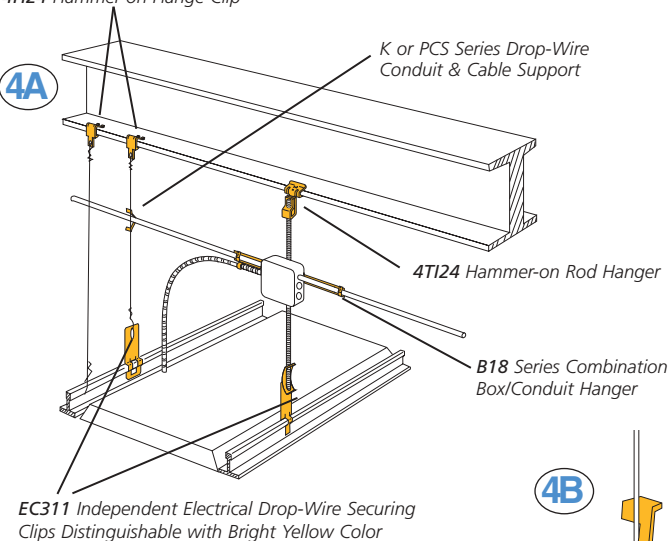
300.11 Securing and Supporting.

(A) **Secured in Place.** Raceways, cable assemblies, boxes, cabinets and fittings shall be securely fastened in place. Support wires that do not provide secure support shall not be permitted as the sole support. Support wires and associated fittings that provide secure support and that are installed in addition to the ceiling grid support wires shall be permitted as the sole support. Where independent support wires are used, they shall be secured at both ends. Cables and raceways shall not be supported by ceiling grids.

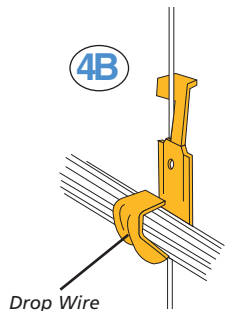
(1) **Fire-Rated Assemblies.** Wiring located within the cavity of a fire-rated floor-ceiling or roof-ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided and shall be permitted to be attached to the assembly. Where independent support wires are used, they shall be distinguishable by color, tagging, or other effective means from those that are part of the fire-rated design. [See Fig. 4A and 4B]

(2) **Non-Fire-Rated Assemblies.** Wiring located within the cavity of a non-fire-rated floor-ceiling or roof-ceiling assembly shall not be secured to, or supported by, the ceiling assembly, including the ceiling support wires. An independent means of secure support shall be provided. [See page 16 for more details relating to 300.11 and fastener solutions.]

4H24 Hammer-on Flange Clip



4B



2005 NEC® Article 310
Conductors for General Wiring

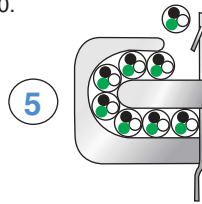
310.15 Ampacities for Conductors Rated 0-2000 Volts
310.15(B)(2) Adjustment Factors

Exception No. 5: Adjustment factors shall not apply to Type AC cable or to Type MC cable without an overall outer jacket under the following conditions:

- (a) Each cable has not more than three current-carrying conductors.
- (b) The conductors are 12 AWG copper.
- (c) Not more than 20 current carrying conductors are bundled, stacked, or supported on “bridle rings”.

A 60 percent adjustment factor shall be applied where the current-carrying conductors in these cables that are stacked or bundled longer than 600 mm (24 in.) without maintaining spacing exceeds 20.

(b) **More Than One Conduit, Tube, or Raceway.** Spacing between conduits, tubing, or raceways shall be maintained.



2005 NEC Article 314
Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes

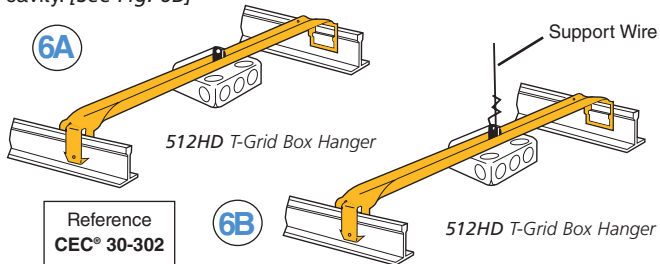
314.23 Supports.

Enclosures within the scope of this article shall be supported in accordance with one or more of the provisions in 314.23(A) through (H).

(D) **Suspended Ceilings.** An enclosure mounted to structural or supporting elements of a suspended ceiling shall be not more than 1650 cm³ (100 in.³) in size and shall be securely fastened in place in accordance with either (D)(1) or (D)(2).

(1) **Framing Members.** An enclosure shall be fastened to the framing members by mechanical means such as bolts, screws, or rivets, or by the use of clips or other securing means identified for use with the type of ceiling framing member(s) and enclosure(s) employed. The framing members shall be adequately supported and securely fastened to each other and to the building structure. [See Fig. 6A]

(2) **Support Wires.** The installation shall comply with the provisions of 300.11(A). The enclosure shall be secured, using methods identified for the purpose, to ceiling support wire(s), including any additional support wire(s) installed for that purpose. Support wire(s) used for enclosure support shall be fastened at each end so as to be taut within the ceiling cavity. [See Fig. 6B]



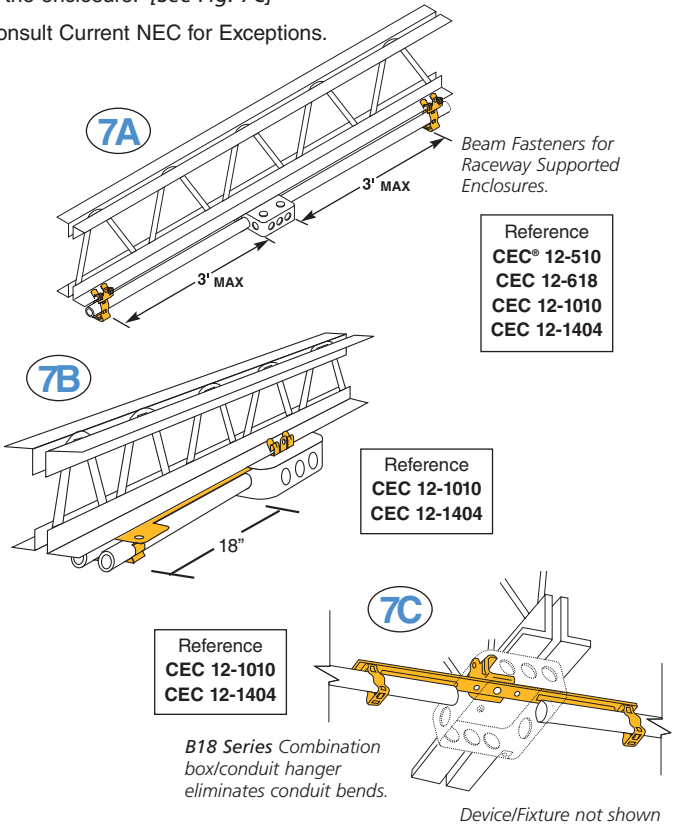
314.23 Supports. (continued)

(E) Raceway Supported Enclosure, Without Devices, Luminaires (Fixtures), or Lampholders. Each conduit shall be secured within 900 mm. (3 ft.) of the enclosure, or within 450 mm. (18 in.) of the enclosure if all conduit entries are on the same side. [See Fig. 7A & 7B]

Consult Current NEC® for Exceptions.

(F) Raceway Supported Enclosures, with Devices, Luminaires (Fixtures), or Lampholders. Each conduit shall be secured within 450 mm. (18 in.) of the enclosure. [See Fig. 7C]

Consult Current NEC for Exceptions.



314.27 Outlet Boxes.

(B) Maximum Luminaire (Fixture) Weight. Outlet boxes or fittings installed as required by 314.23 shall be permitted to support luminaires (lighting fixtures) weighing 23 kg. (50 lb.) or less. A luminaire (lighting fixture) that weighs more than 23 kg. (50 lb.) shall be supported independently of the outlet box unless the outlet box is listed for the weight to be supported. [See Fig. 6B on page 6]

2005 NEC® Article 320 Armored Cable: Type AC

320.2 Definition.

Armored Cable, Type AC. A fabricated assembly of insulated conductors in a flexible metallic enclosure. See 320.100.

320.17 Through or Parallel to Framing Members.

Type AC cable shall be protected in accordance with 300.4...where installed through or parallel to framing members.

320.30 Securing and Supporting.

General. Type AC cable shall be supported and secured by staples, cable ties, straps, hangers, or similar fittings, designed and installed so as not to damage the cable.

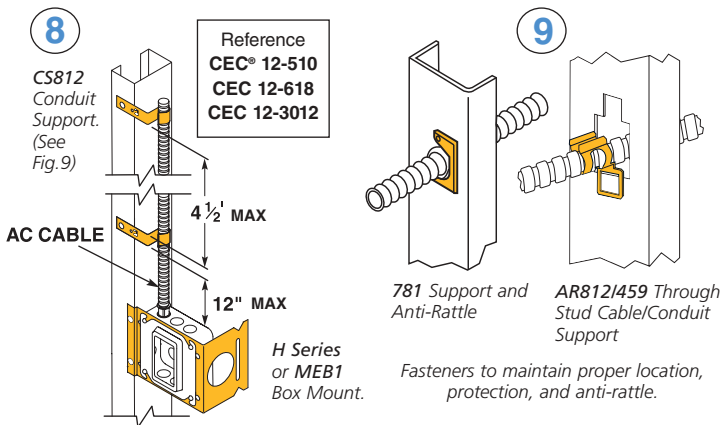
Securing. Unless otherwise provided, Type AC cable shall be secured within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting and at intervals not exceeding 1.4 m (4-1/2 ft) where installed on or across framing members.

Supporting. Unless otherwise provided, Type AC cable shall be supported at intervals not exceeding 1.4 m (4-1/2 ft).

Horizontal runs of Type AC cable installed in wooden or metal framing members or similar supporting means shall be considered supported where such support does not exceed 1.4-m (4-1/2-ft) intervals.

320.80 Ampacity.

The ampacity shall be determined by 310.15. [See Fig. 5 on page 6].



2005 NEC Article 330 Metal-Clad Cable: Type MC

330.2 Definition.

Metal Clad Cable, Type MC. A factory assembly of one or more insulated circuit conductors with or without optical fiber members enclosed in an armor of interlocking metal tape, or a smooth or corrugated metallic sheath.

330.17 Through or Parallel to Framing Members.

Type MC cable shall be protected in accordance with 300.4...where installed through or parallel to framing members.

330.30 Securing and Supporting.

General. Type MC cable shall be supported and secured by staples, cable ties, straps, hangers, or similar fittings or other approved means designed and installed so as not to damage the cable.

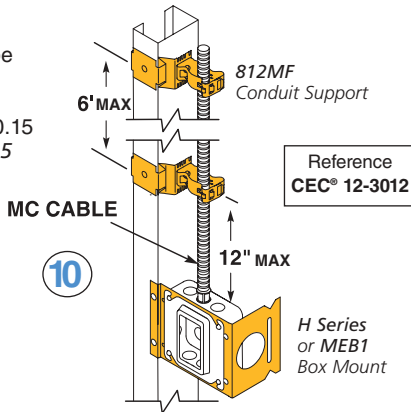
Securing. Unless otherwise provided, cables shall be secured at intervals not exceeding 1.8 m (6 ft). Cables containing four or fewer conductors sized no larger than 10 AWG shall be secured within 300 mm (12 in.) of every box, cabinet, fitting, or other cable termination.

Supporting. Unless otherwise provided, cables shall be supported at intervals not exceeding 1.8 m (6-ft).

Horizontal runs of Type MC cable installed in wooden or metal framing members or similar supporting means shall be considered supported and secured where such support does not exceed 1.8-m (6-ft) intervals.

330.80 Ampacity.

The ampacity of Type MC cable shall be determined in accordance with 310.15 or 310.60. [See Fig. 5 on page 6].



2005 NEC® Article 334

Nonmetallic-Sheathed Cable: Types NM, NMC, and NMS

334.2 Definition.

Nonmetallic-Sheathed Cable. A factory assembly of two or more insulated conductors having an outer sheath of nonmetallic material.

334.17 Through or Parallel to Framing Members.

Types NM, NMC, or NMS cable shall be protected in accordance with 300.4 where installed through or parallel to framing members. Grommets used as required in 300.4(B)(1) shall remain in place and be listed for the purpose of cable protection. [See Fig. 1 on page 3]

334.30 Securing and Supporting.

Nonmetallic-sheathed cable shall be supported and secured by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4-1/2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting.

(A) Horizontal Runs through Holes and Notches. In other than vertical runs, cables installed in accordance with 300.4 shall be considered supported and secured where such support does not exceed 1.4 m (4-1/2 ft.) intervals and the nonmetallic sheathed cable is securely fastened in place by an approved means within 300 mm. (12 in.) of each box, cabinet, conduit body, or other nonmetallic sheathed cable termination.

2005 NEC® Article 342

Intermediate Metal Conduit: Type IMC

342.30 Securing and Supporting.

IMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 342.30(A) and (B).

(A) **Securely Fastened.** Each IMC shall be securely fastened within 900 mm. (3 ft.) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination. Fastening shall be permitted to be increased to a distance of 1.5 m. (5 ft.) where structural members do not readily permit fastening within 900 mm. (3 ft.). Where approved, conduit shall not be required to be securely fastened within 900 mm. (3 ft.) of the service head for above-the-roof termination of a mast. [See Fig. 6 on page 6]

(B) **Supports.** IMC shall be supported in accordance with one of the following:

(1) Conduit shall be supported at intervals not exceeding 3 m. (10 ft.).

[See Fig. 12A]

(2) The distance between supports for straight runs of conduit shall be permitted in accordance with Table 344.30(B)(2), provided the conduit is made up with threaded couplings and such supports prevent transmission of stresses to termination where conduit is deflected between supports.

2005 NEC Article 344

Rigid Metal Conduit: Type RMC

344.30 Securing and Supporting.

RMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 344.30(A) and (B).

(A) **Securely Fastened.** RMC shall be securely fastened within 900 mm.

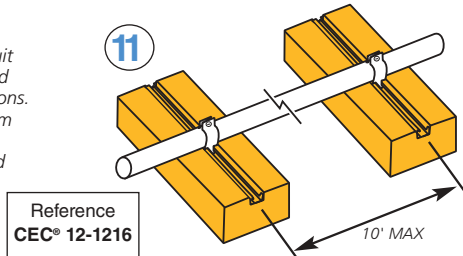
(3 ft.) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination. Fastening shall be permitted to be increased to a distance of 1.5 m. (5 ft.) where structural members do not readily permit fastening within 900 mm. (3 ft.). Where approved, conduit shall not be required to be securely fastened within 900 mm. (3 ft.) of the service head for above-the-roof termination of a mast. [See Fig. 6]

(B) **Supports.** RMC shall be supported in accordance with one of the following.

(1) Conduit shall be supported at intervals not exceeding 3 m. (10 ft.).

(2) The distance between supports for straight runs of conduit shall be permitted in accordance with Table 346.30(B)(2), provided the conduit is made up with threaded couplings, and such supports prevent transmission of stresses to termination where conduit is deflected between supports. [See Fig. 11]

Pipe Pier™ Pipe and Conduit Support: Alternative to wood blocks for roof top applications. Engineered UV-resistant foam blocks with integral strut protects roof membrane and connections for long term system integrity.



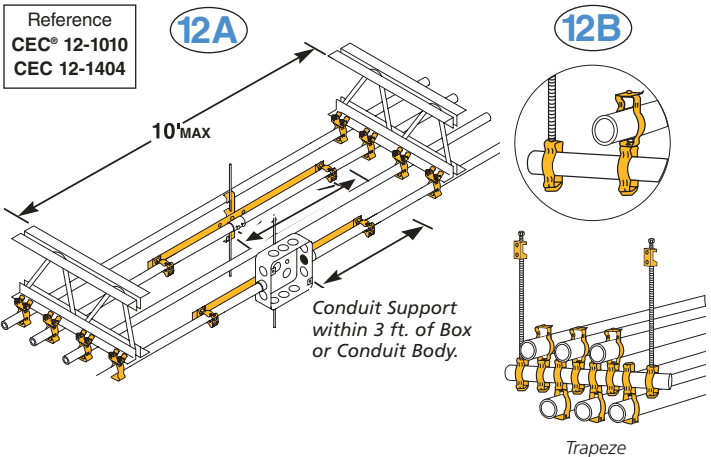
2005 NEC® Article 358
Electrical Metallic Tubing: Type EMT

358.30 Securing and Supporting.

EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30(A) and (B).

(A) Securely Fastened. EMT shall be securely fastened in place at least every 3 m. (10 ft.). In addition, each EMT run between termination points shall be securely fastened within 900 mm. (3 ft.) of each outlet box, junction box, device box, cabinet, conduit body, or other tubing termination. [See Fig. 12A]

(B) Supports. Horizontal runs of EMT supported by openings through framing members at intervals not greater than 3 m. (10 ft.) and securely fastened within 900 mm. (3 ft.) of termination points shall be permitted. [See Fig. 12A & 12B]



2005 NEC Article 362
Electrical Nonmetallic Tubing: Type ENT

362.2 Definition.

Electrical Nonmetallic Tubing (ENT). A nonmetallic pliable corrugated raceway of circular cross section with integral or associated couplings, connectors, and fittings for the installation of electric conductors. ENT is composed of a material that is resistant to moisture and chemical atmospheres and is flame retardant. A pliable raceway is a raceway that can be bent by hand with a reasonable force, but without other assistance.

362.30 Securing and Supporting.

ENT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 362.30(A) and (B).

(A) Securely Fastened. ENT shall be securely fastened at intervals not exceeding 900 mm. (3 ft.). In addition, ENT shall be securely fastened in place within 900 mm. (3 ft.) of each outlet box, device box, junction box, cabinet, or fitting where it terminates. [See Fig. 13]

2005 NEC® Article 392 Cable Trays

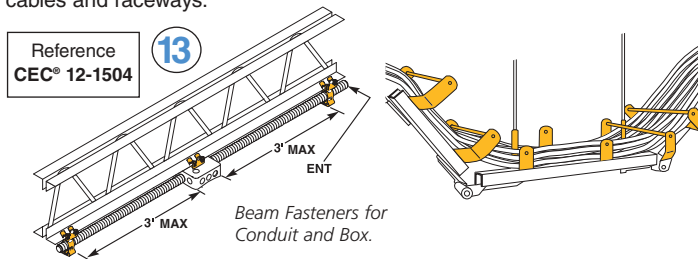
392.1 Scope.

This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

FPN: For further information on cable trays, see ANSI®/NEMA®-VE 1-1998, *Metal Cable Tray Systems*; NEMA-VE 2-1996, *Metal Cable Tray Installation Guidelines*; and NEMA-FG-1998, *Nonmetallic Cable Tray Systems*.

392.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

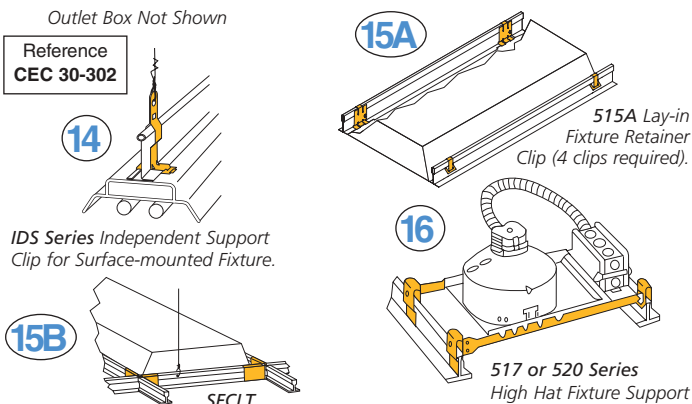


2005 NEC Article 410 Luminaires (Lighting Fixtures), Lampholders, and Lamps

410.16 Means of Support.

Outlet Boxes. Outlet boxes or fittings installed as required by 314.23 and complying with the provisions of 314.27(A) and 314.27(B) shall be permitted to support luminaires (fixtures). [See 6B on page 6]

(C) Suspended Ceilings. Framing members of suspended ceiling systems used to support luminaires (fixtures) shall be securely fastened to each other and shall be securely attached to the building structure at appropriate intervals. Luminaires (fixtures) shall be securely fastened to the ceiling framing member by mechanical means such as bolts, screws, or rivets. Listed* clips identified for use with the type of ceiling framing member(s) and luminaire(s) [fixture(s)] shall also be permitted. [See Fig. 14, 15A, 15B & 16]



410.16 Means of Support. (continued)

[Article 100-Definitions]

***Listed.** Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards or has been tested and found suitable for a specified purpose.

FPN: The means for identifying listed equipment may vary for each organization concerned with product evaluation, some of which do not recognize equipment as listed unless it is also labeled. Use of the system employed by the listing organization allows the authority having jurisdiction to identify a listed product.

410.104 Fastening. Lighting track shall be securely mounted so that each fastening will be suitable for supporting the maximum weight of luminaires (fixtures) that can be installed. Unless identified for supports at greater intervals, a single section 1.2 m. (4 ft.) or shorter in length shall have two supports, and, where installed in a continuous row, each individual section of not more than 1.2 m. (4 ft.) in length shall have one additional support. [See Fig. 17A & 17B]

590.4 General.

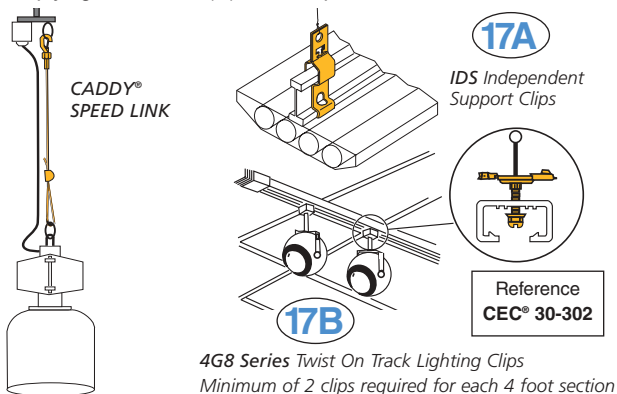
Support. Cable assemblies and flexible cords and cables shall be supported in place at intervals that ensure that they will be protected from physical damage. Support shall be in the form of staples, cable ties, straps, or similar type fittings installed so as not to cause damage. Vegetation shall not be used for support of overhead spans of branch circuits or feeders.

Exception: For holiday lighting in accordance with 590.3(B), where the conductors or cables are arranged with proper strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch circuit conductors or cables.

604.6 Construction.

Securing and Supporting. Manufactured wiring systems shall be secured and supported in accordance with the applicable cable or conduit article for the cable or conduit type employed.

Luminaires (Fixtures). Installation of listed electric-discharge luminaires (fixtures) complying with 410.30(C) shall be permitted.



4G8 Series Twist On Track Lighting Clips
Minimum of 2 clips required for each 4 foot section

2005 NEC® Article 725

Class 1, Class 2, and Class 3 Remote Control, Signaling, and Power-Limited Circuits

725.8 Mechanical Execution of Work.

Class 1, Class 2, and Class 3 circuits shall be installed in a neat and workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also conform with 300.4(D).

2005 NEC Article 760

Fire Alarms

760.8 Mechanical Execution of Work.

Fire alarm circuits shall be installed in a neat workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also conform with 300.4(D).

2005 NEC Article 770

Optical Fiber Cables and Raceways

770.24 Mechanical Execution of Work.

Optical fiber cables shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also conform with 300.4(D) and 300.11.

FPN: Accepted industry practices are described in ANSI®/NECA®/BICSI® 568-2001, *Standard for Installing Commercial Building Telecommunications Cabling*, and other ANSI-approved installation standards.

2005 NEC Article 800

Communications Circuits

800.24 Mechanical Execution of Work.

Communications circuits and equipment shall be installed in a neat and workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged by normal building use. Such cables shall be secured by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall also conform with 300.4(D) and 300.11.

FPN: Accepted industry practices are described in ANSI®/NECA®/BICSI® 568-2001, *Standard for Installing Commercial Building Telecommunications Cabling*, and other ANSI-approved installation standards.

2005 NEC® Article 800
Communications Circuits (continued)

800.133 Installation of Communications Wires, Cables, and Equipment

Support of Conductors. Raceways shall be used for their intended purpose. Communications cables or wires shall not be strapped, taped, or attached by any means to the exterior of any conduit or raceway as a means of support.

800.154 Applications of Listed Communications Wires and Cables and Communications Raceways.

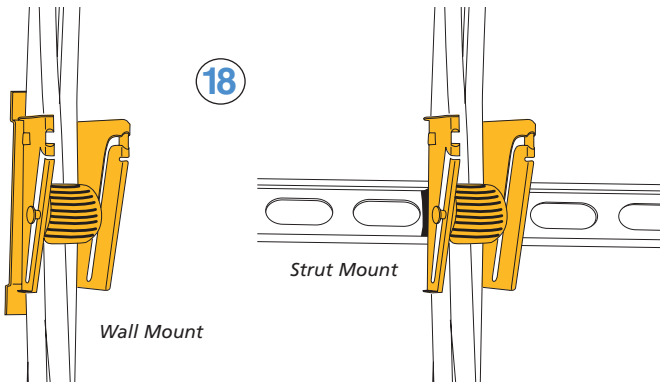
(B) Riser. Cables installed in risers shall comply with 800.154(B)(1), (B)(2), or (B)(3).

(1) Cables in Vertical Runs. Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft, shall be Type CMR. Floor penetrations requiring Type CMR shall contain only cables suitable for riser or plenum use. Abandoned cables shall not be permitted to remain. Listed riser communications raceways shall be permitted to be installed in vertical riser runs in a shaft from floor to floor. Only Type CMR and CMP cables shall be permitted to be installed in these raceways. [See Fig. 18]

(E) Other Wiring Within Buildings.

(2) In Raceways. Listed communications wires that are enclosed in a raceway of a type included in Chapter 3 shall be permitted.

CADDY® CABLECAT Vertical Backbone Cable Supports



ERICO® Commentary

Article 300-11 has resulted in more phone calls to ERICO than ever regarding code compliance. As a result we have discussed the code with electricians and inspectors from coast to coast. The following is a summation of these conversations. Always check with your local inspectors prior to installation.

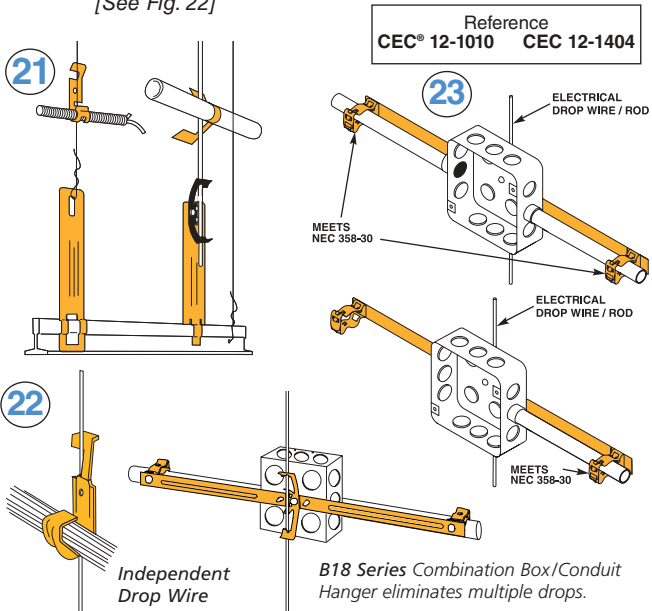
Additional Drop-Wire and Drop-Rod Supports:

Although wiring can no longer be attached to drop wires/rods that support the suspended ceiling, additional dedicated wires/rods can be dropped separately to support wiring assembly. These drop wires/rods shall be properly secured (anchored) at both ends.

Fig. 21 EC311 Independent Electrical Drop-Wire Securing Clip attaches to the ceiling grid. Its bright yellow color allows it to be distinguished from ceiling wires and easily identified by inspectors.

Fig. 22 In case of a fire emergency in which the ceiling grid may be torn down, ERICO recommends the use of a clip that will release without stress on the electrical system.

Fig. 23 B18 Series: Using B18 series will reduce the number of drop wires needed. B18 series supports conduit on either side of a junction box. Holes in opposite ends of 18" bar accommodate 812M, 16M, 8P, 12P (etc.) conduit clips. A center hole accepts M24S, 4Z34, 6Z34 fasteners for attachment to threaded rod. Also complies with NEC® Article 358.30. 2005 code now applies to low voltage cabling [See Fig. 22]



ERICO® Commentary (continued)

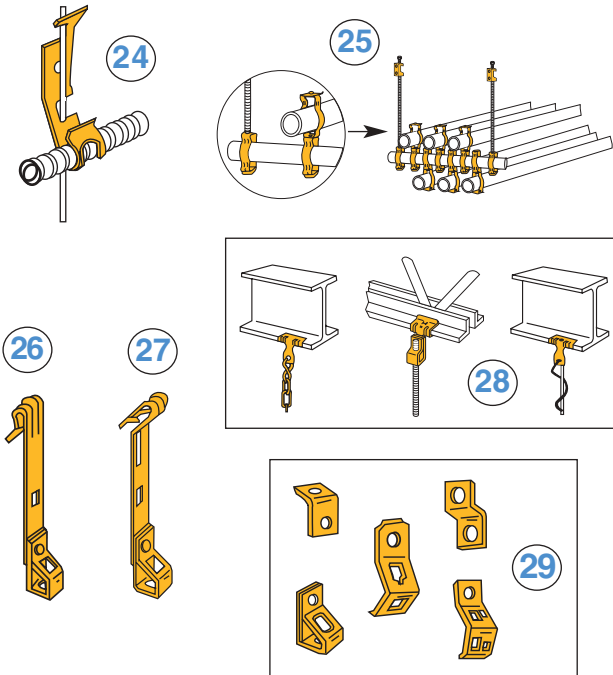
Fig. 24 PCS Series: Supports wiring from independent drop wires/rods. These will support MC/AC, 1/2 in. and 3/4 in. EMT and MC/AC cable. PCS will not bend the drop wire/rod, and is 25% faster to install than other methods.

Fig. 25 Trapeze: First attach threaded rods to the support structure with the CADDY® BC Series. Then, support the trapeze by using CADDY 16M4I series light weight trapeze clips. Use back-to-back M series to support 3/8 in. MC/AC cable through 1 in. conduits.

Fig. 26 and 27 For purlin applications: AF14 or VF14 series is designed for “C” [Fig. 24] or “Z” [Fig. 25] purlin that fits flanges from 1/16 in. to 1/4 in. There is a special tool, VAFT, designed for installing these fasteners from the ground - eliminating the need for ladders.

Fig. 28 Hammer-on clips can be installed directly to I-beams.

Fig. 29 Angle brackets are available for hanging plain or threaded rod to support raceway systems.



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CEC 2002 Section 12 Wiring Methods

Nonmetallic Sheathed Cable

12-510 Running of Cable Between Boxes and Fittings

- (1) Where the cable is run between boxes and fittings, it shall be supported by straps or other devices located within 300 mm. of every box or fitting and at intervals of not more than 1.5 m. throughout the run. [See Fig. 2, 6 & 9]

12-516 Protection for Cable in Concealed Installations

- (1) Where the cable is run through studs, joists, or similar members, the outer surfaces of the cable shall be kept distant at least 32 mm. from the edges of the members or the cable shall be effectively protected from mechanical injury. [See Fig. 1, 3 & 3B]
- (2) Where the cable is run through or along metal studs, joists, sheathing, or cladding, it shall be:
 - (a) Protected where it passes through a member by an insert approved for the purpose and adequately secured in place; and [See Fig. 1]
 - (c) Supported where it runs along or parallel to a member by a support of insulating material to ensure isolation from the metal. [See Fig. 2]
- (3) Where the cable is installed immediately behind a baseboard, it shall be effectively protected from mechanical injury from driven nails. [See Fig. 3]

Armoured Cable

12-616 Concealed Armoured Cable Installation

- (1) Where armoured cable is run through studs, joists, or similar members, the outer surfaces of the cable shall be:
 - (a) Located so that the outer circumference is at least 32 mm. from the nearest edge of the members; or
 - (b) Protected from mechanical injury where it passes through the holes in the members. [See Fig. 1 & 3]
- (2) Where armoured cable is installed immediately behind baseboards, it shall be protected from injury from driven nails. [See Fig. 3]

12-618 Running of Cable Between Boxes, Etc.

Armoured cable shall be supported between boxes and fittings in accordance with Rule 12-510. [See Fig. 2, 6 & 9]

Rigid and Flexible Metal Conduit

12-1010 Maximum Spacing of Conduit Supports

- (1) All rigid metal conduit of one size shall be securely attached to hangers or to a solid surface with the maximum spacings of the points of support not greater than:
 - (a) 1.5 m. for 16 (1/2) and 21 (3/4) trade size conduit;
 - (b) 2 m. for 27 (1) and 35 (1 1/4) trade size conduit;
 - (c) 3 m. for 41 (1 1/2) trade size conduit and larger.
- (2) Where rigid metal conduits of mixed sizes are run in a group, the conduit supports shall be so arranged that the maximum support spacing will be that shown in subrule (1) for the smallest conduit.

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- (3) When flexible metal conduit is installed, it shall be secured at intervals not exceeding 1.5 m. and within 300 mm. on each side of every outlet box or fitting except where flexible metal conduit is fished and except for lengths of not over 900 mm. at terminals where flexibility is necessary. *[See Fig. 6, 7, 8, 12A & 22]*

Rigid RTRC Conduit

12-1216 Conduit Supports

Where rigid RTRC conduit Type AG is run in accordance with Rule 12-1202(2) it shall be supported with hangers or clamps:

- (a) In such a manner as to permit adequate linear movement to allow for expansion and contraction due to temperature change; and
- (b) With spacings of the supports not greater than permitted by Rule 12-1010. *[See Fig. 11]*

Electrical Metallic Tubing

12-1404 Supports

Electrical metallic tubing shall be installed as a complete system and shall be securely fastened in place within 1 m. of each outlet box, junction box, cabinet, coupling, or fitting, and the spacing between supports shall be in accordance with those specified in Rule 12-1010. *[See Fig. 6, 7, 8, 12A, 12B & 22]*

Electrical Non-Metallic Tubing

12-1504 Supports

Electrical nonmetallic tubing shall be securely fastened in place within 1 m. of each outlet box, junction box, cabinet, coupling or fitting, and the spacing between supports shall be not more than 1 m. *[See Fig. 5 & 13]*

Installations of Boxes, Cabinets, Outlets, and Terminal Fittings

12-3012 Outlet box Supports

- (1) Except as permitted by Subrule (6), boxes and fittings shall be firmly secured to studs, joists, or similar fixed structural units other than wooden, metal, or composition lath, in accordance with this Rule.
- (4) Where boxes are mounted on metal studs, additional support shall be provided to prevent movement of the box after the drywall is installed. *[See Fig. 9 & 10]*

CEC 2002 Section 30 Installation of Lighting Equipment

30-302 Supports

- (1) Every luminaire and lampholder shall be securely supported. *[See Fig. 5A, 5B, 14, 15, 16, 17A & 17B]*
- (3) Where the weight of a luminaire does not exceed 13 kg., the luminaire shall be permitted to be supported by a wall outlet box attached directly to the building structure or by a wall outlet box attached to a bar hanger. *[See Fig. 5A]*
- (4) Where the weight of a luminaire does not exceed 23 kg., the luminaire shall be permitted to be supported by a ceiling outlet box attached directly to the building structure or by a ceiling outlet box attached to a bar hanger. *[See Fig. 5B & 15]*

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