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*Electrical  
Code  
Interpretations  
Committee*

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GENERAL UNIFORM CODE  
INTERPRETATIONS COMMITTEE  
ZIO FRAEDO'S RESTAURANT  
PLEASANT HILL, CALIFORNIA  
DECEMBER 12, 2017

MINUTES

The meeting was called to order at 12:22 p.m. by Chairman Ray Robertson.

**Committee Members**

**In Attendance:**

G. Arcidiacono, L. Diehl, M. Geller, F. Luna, R. Maryatt,  
R. Robertson, G. Stevenson, M. Thomas, R. Walsh

**Others In**

**Attendance:**

T. Anton, S. Arnold, K. Baker, N. Baligod, D. Bartlett, J. Cervantes,  
J. Cevasco, W. Debies, M. Emery, G. Galong, T. Griffith, D. Kent,  
M. Larsen, B. Lee, B. Lilley, J. Losado, D. McGee, D. Medeiros,  
D. Moore, T. Pangilla, T. Pottl, G. Robertshaw, A. Scherbenske,  
C. Schmidt, M. Springer, D. Stratmeyer, M. Straub, R. Thomas,  
D. Timmons, M. Wiens

After self-introductions, it was M/S/C to accept the Minutes of April 19, 2017, as submitted.

REPORT OF SUB-COMMITTEE:

The Chairman reported on the items discussed at the meeting of the Sub-Committee earlier in the day.

1. Electrical Code Quiz: The Committee reviewed an Electrical Code Quiz prepared by Mike Holt from October 2017 dealing with metal-clad (MC) cable, fittings and support as well as NM cable, support and uses. A copy of the NEC "Questions and Answers," is attached to and made a part of these minutes.

2. **Renovating Older Structures without Existing Grounds:** The Committee reviewed a number of situations that typically present themselves when contractors are asked to renovate an older structure built prior to modern grounding practices (circa 1939-1952). Typically, the receptacle boxes contain no ground wire. In the immediate case, the original panels in the multi-family apartment building were 30 amps and the contractor was upgrading to 60 amps. It was the consensus of the committee that if a contractor replaces a main service or subpanel in a unit they would have to run an equipment grounding conductor, as provided in NEC 250-130.

It was noted that there are occasions where public officials make promises to property owners encouraging them to make certain upgrades without having to comply with bringing everything up to code. Contractors were cautioned not to rely on such representations and not to install anything if it does not meet the existing requirements of the National Electrical Code.

3. **UFER Ground and Vapor Barrier Issues:** The Committee reviewed a situation that occasionally occurs in structures such as new parking garages where the subsoil may pose a contamination risk for methane gas and a vapor barrier is required beneath the concrete. In this case the vapor barrier ran to the outside edge of the concrete footing of the building. A UFER ground was utilized as the primary grounding system. The issue presented is whether the vapor barrier prevents sufficient contact with the earth. In this case the structure was nearly a city block. The contractor suggested using an ohm meter to measure resistance at multiple locations using a simple random sampling method to verify sufficient grounding (25 ohm). It was the consensus of the Committee that would be acceptable, although the AJH would probably want to be involved in the selection of the sample points. Driving a ground rod outside the footing would also be an acceptable solution.
4. **Transition from PUC to NEC on Overhead Service Feeds:** Many older buildings fed from the utility with overhead service conductors were installed in conduit within the wall of the building from the weatherhead to the service. There was a minor change in NEC 230.6(5) in the 2014 edition that is causing concern during service changes. NEC 230.6 designates which overhead conductors are to be considered "outside of the building" or other structure. Fire Departments usually require the service disconnect on the first floor which results in no overcurrent protection for the service conductors in the wall of the building. NEC 230.95 provides for the ground fault protection of equipment. Overload protection is provided by the utility but not over-current protection in the service riser for over-head feeds. Ground-fault protection of services does not protect conductors on the supply side of the service disconnecting means. NEC 230.6(5) provides "Where installed in rigid metal conduit (RMC) or intermediate metal conduit (IMC) used to accommodate the clearance requirements in 230.24 and routed directly through an eave but not a wall of a building.

5. **Battery Storage for Solar Systems:** One of the benefits of having a battery backup for a solar system is that in the event of an outage the customer has the ability to draw from stored energy. Question: For a rapid shut off of a solar system in conjunction with a battery pack (such as the TESLA power wall), what safety feature prevents the system from restarting in the event of an outage? Answer: There is a secondary disconnect requirement in case of emergency.

Optional Standby Systems (NEC 702) are different than emergency systems in that life safety does not depend on them. "The supplementary overcurrent protection devices shall be part of a listed transfer equipment." NEC 702.5

**UNFINISHED BUSINESS:**

None.

**NEW BUSINESS:**

The Chairman also distributed copies of a Generation Meter Adapter (GMA) available from Southern California Edison and a Renewable Meter Adaptor (RME) available from San Diego Gas and Electric. Both adaptors represent an alternate interconnection option to traditional supply side connections for solar energy systems. PG&E has recently approved the use of what they call Green Meter Adapters (GMA) for solar systems thereby eliminating the need for service changes in some cases. He noted that the spring meeting of the Committee would attempt to get someone in from PG&E to review any issues with the Green Meter Adapter from PG&E.

There being no further business to come before the Committee, it was M/S/C to adjourn at 1:15 p.m.

Respectfully submitted,



Michael Geller  
Secretary

MG/ss



## NEC Questions and Answers - October 2017

For EC&M Magazine

By Mike Holt, NEC<sup>®</sup> Consultant

Here's the follow-up to yesterday's newsletter. This includes the answers to the questions sent, so you can see how you did.

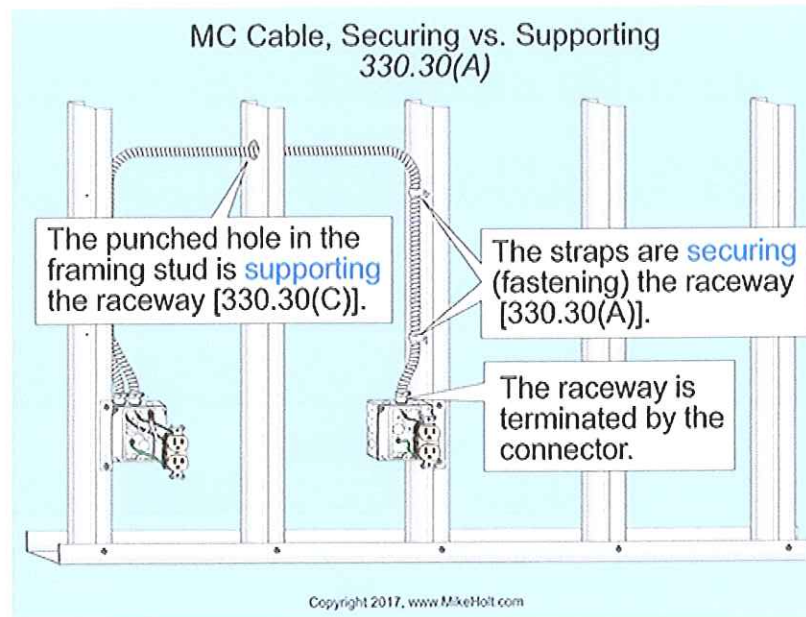


Figure 1

Note: The answers to these questions are based on the 2017 NEC<sup>®</sup>.  
Underlined text indicates a change in the rule for the 2017 NEC.

**Q1. What are the NEC listing requirements for Metal-Clad (Type MC) cable and fittings?**

A1. Type MC cable must be listed. The fittings must be listed and identified for the use [330.6].

**Author's Comment:**

- Type MC cable is made with several types of metal sheaths. Steel and aluminum are the most common. It can also have a PVC jacket for supplemental protection. Fittings must be listed and identified for the specific type of MC cable being installed.
- Type AC cable connectors can also be used if the fitting or container indicates that they can also be used for the Type MC cable being installed.
- The NEC doesn't require anti short bushings (red heads) at the termination of Type MC cable, but if they're supplied it's considered by many to be a good practice to use them.

**Q2. What are the NEC requirements for supporting and securing Metal-Clad (Type MC) cable?**

A2. Type MC cable must be supported and secured by staples, cable ties listed and identified for securing and supporting; straps, hangers, or similar fittings; or other approved means designed and installed so as not to damage the cable [330.30(A)].

**Author's Comment:**

Secured is "fastened" such as with a strap or tie wrap; supported is "held" such with as a hanger or through a hole in a stud, joist, or rafter. **Figure 1**

Type MC cable with four or fewer conductors sized no larger than 10 AWG, must be secured within 12 in. of every outlet box, junction box, cabinet, or fitting and at intervals not exceeding 6 ft [330.30(B)].

Listed Type MC cable with ungrounded conductors 250 kcmil and larger can be secured at 10 ft intervals when installed vertically.

Type MC cable must be supported at intervals not exceeding 6 ft. Cables installed horizontally through wooden or metal framing members are considered secured and supported if such support doesn't exceed 6 ft intervals [330.30(C)].

Type MC cable can be unsupported and unsecured where [330.30(D)]:

- (1) Fished through concealed spaces in a finished building and support is impractical.
- (2) Not more than 6 ft long from the last point of cable support to the point of connection to a luminaire or electrical equipment within an accessible ceiling. For the purposes of this section, Type MC cable fittings are permitted as a means of cable support.
- (3) Not more than 3 ft from the last point where it's securely fastened to provide flexibility for equipment that requires movement after installation, or to connect equipment where flexibility is necessary to minimize the transmission of vibration from the equipment.

### Q3. What are the NEC requirements for supporting and securing Nonmetallic-sheathed (Type NM) cable?

A3. Nonmetallic sheathed cable must be supported and secured by staples, straps, cable ties listed and identified for securing and supporting; hangers, or similar fittings, at intervals not exceeding 4½ ft and within 12 in. of the cable entry into enclosures or fittings [334.30].

Two wire (flat) Type NM cable isn't permitted to be stapled on edge.

Type NM cable installed within a raceway isn't required to be secured within the raceway.

Type NM cable installed horizontally in bored or punched holes in wood or metal framing members, or notches in wooden members is considered secured and supported if the distance doesn't exceed 4½ ft. Type NM cable must also be secured within 1 ft of termination [334.30(A)].

Informational Note: See 314.17(C) for support where nonmetallic boxes are used.

Unsupported Type NM cable is permitted for the following situations [334.30(B)]:

- (1) Where Type NM cable is fished between concealed access points in finished buildings, and support is impracticable.
- (2) Not more than 4½ ft of unsupported cable is permitted from the last point of support within an accessible ceiling for the connection of luminaires or equipment in one-, two-, or multifamily dwellings.

#### Author's Comment:

Type NM cable isn't permitted as a wiring method above accessible ceilings, except in dwellings [334.12(A)(2)].

### Q4. What uses are permitted by the NEC for Nonmetallic-sheathed (NM) cable?

A4. Type NM and Type NMC cables can be used in the following [334.10], except as prohibited in 334.12:

- (1) One- and two-family dwellings of any height, and their attached/detached garages or storage buildings.
- (2) Multifamily dwellings permitted to be of Types III, IV, and V construction.
- (3) Other structures permitted to be of Types III, IV, and V construction. Cables must be concealed within walls, floors, or ceilings that provide a thermal barrier of material with at least a 15-minute finish rating, as identified in listings of fire-rated assemblies.

#### Author's Comment:

See the definition of "Concealed" in Article 100.

Informational Note 1: Building constructions are defined in NFPA 220-2015, *Standard on Types of Building Construction*, the applicable building code, or both.

Informational Note 2: See Annex E of the NEC for the determination of building types [NFPA 220, Table 3-1].

- (4) Cable trays permitted in Types III, IV, or V structures where the cable is identified for the use.
- (5) Where within raceways permitted to be installed in Types I and II construction.

### Q5. What uses are permitted by the NEC for Power and Control Tray Cable (Type TC)?

A5. Uses Permitted [336.10]:

- (1) Power, lighting, control, and signal circuits.
- (2) In cable trays including those with mechanically discontinuous segments up to 1 ft.
- (3) In raceways.
- (4) Outdoor locations supported by a messenger wire.
- (5) Class 1 circuits as permitted in Parts II and III of Article 725.
- (6) Nonpower limited fire alarm circuits if in accordance with 760.49.
- (7) Industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation.
- (8) In wet locations where the cable is resistant to moisture and corrosive agents.
- (9) In one- and two-family dwellings, Type TC-ER cable is permitted in accordance with Part II of Article 334.

**Author's Comment:**

The "ER" marking on Type TC-ER cable identifies the cable as suitable for exposed run use in accordance with UL 1277.

Ex: Where Type TC cable is used to connect a generator and its associated equipment, the cable ampacity limitations of 334.80 or 340.80 don't apply.

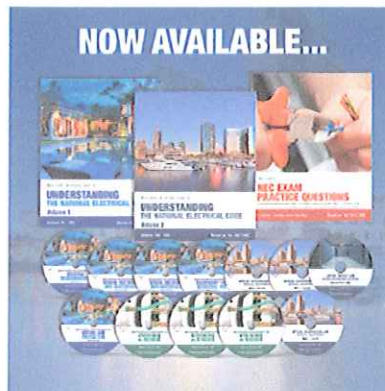
Informational Note 1: Type TC cable that's suitable for pulling through structural members of a dwelling unit will be marked "TC-ER-JP."

**Author's Comment:**

The "JP" marking on Type TC-ER-JP cable identifies the cable as suitable to be pulled through wood framing members because the cable has met the joist pull testing requirements of UL 1277.

Informational Note 2: Control and Class 1 power conductors within the same Type TC cable are only permitted where the conductors are functionally associated with each other in accordance with 725.136.

- (10) Direct buried where identified for direct burial.



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"... as for me and my house, we will serve the Lord" [Joshua 24:15]

C o m m e n t s

Re figure 1 should read 330.30(C) for Supporting horizontal runs thru wood or metal framing.

[Chris Tolbart](#) October 26 2017, 6:19 pm EDT

[Reply to this comment](#)

Reply from: [Mike Culbreath](#) October 27 2017, 12:37 pm EDT

Chris, You are correct. I have updated this graphic by changing the reference to 330.30(B) to 330.30(C). Thanks for the feedback.

[Mike Culbreath](#)

[Reply to Mike Culbreath](#)

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