

CTI TECHNICAL BULLETIN

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Cable Tray Systems in Ducts, Plenums and Other Air Handling Space

The objective of this article to provide clear information as to the use of cable tray in those areas covered by Section 300-22 of the 1996 National Electrical Code.

Section 318-4 Uses Not Permitted states that "Cable tray systems shall not be used in environmental air spaces except as permitted in Section 300-22 to support wiring methods recognized for use in such spaces. The wiring methods allowed under Section 300-22 that utilize cable tray must follow the installation and safety requirements as covered in Section 318 - Cable Tray."

Many of the misinterpretations about cable tray are due to the fact that those misinterpretations are made with the thought that cable tray is a raceway. It is not a raceway and it has never been a raceway in the National Electrical Code. Cable tray is a mechanical support system just as strut is a mechanical support system. To install a metal support system in an area rarely presents a fire safety problem. It is the cables that are being supported by the cable trays that limit where a cable tray wiring system may be installed. The only limitation on the cable tray is that it can't be used in hoistways or where subject to severe physical damage. Any type of cable tray may be installed in the areas covered by Sections 300-22(b), 300-22(c) and 300-22(d).

Installations for: Section 300-22(b). Ducts or Plenums for Environmental Air.

The section states that Type MI (Mineral Insulated) cable or Type MC (Metal Clad) cable employing an impervious metal sheath without an overall non-metallic covering may be installed in Ducts or Plenums Used for Environmental Air. For such installations, both of these cable types may be supported by cable tray.

Section 318-3(a)(1) states that Type MI cable may be installed in cable tray for support. Section 330-12. Exception No. 2. states that "Type MI cable installed in cable trays shall comply with Section 318-8(b)." Ladder or ventilated trough cable tray is an ideal support system for Type MI cable. Where small numbers of Type MI cables are involved, ventilated channel cable tray is the ideal support system. Type MI cable is an excellent cable for critical circuits. It has a UL two hour fire resistive rating when properly installed. It is safest wiring method available.

Sections 318-3(a)(4) and 334-3(6) state that Type MC cable may be installed in cable tray for support. Section 334-10(b) states that "Type MC cable installed in cable tray shall comply with Article 318." Large amounts of the various types of Type MC cable have been installed in cable tray. The performance record has been excellent.

Installations for: Section 300-22(c) Other Spaces Used for Environmental Air.

The Cable Tray Institute's Hot Line has received many requests for technical clarification assistance concerning Section 300-22(c). There are two problems with the material relating to cable tray in this section.

1. The wording in the second paragraph "*or solid bottom metal cable trays with solid metal covers*" implies that the types of insulated single conductors that are installed in raceways may also be installed in solid bottom cable trays with solid metal covers. Due to the present wording of Section 300-22(c), there have been some installations made that are not in compliance with Article 318. The cable tray was basically used as a wireway and in such cases the rules of Article 362 (Wireways) should apply. Depending on the specific installation, there may or may not be safety problems with such installations but Section 318-3(b) doesn't allow insulated single conductors to be installed in solid bottom cable trays.

Single conductor installations in cable tray have the following limitations:

1. The circuit conductors must be 1/0 AWG or larger [Section 318-3(b)(1)].(b). They must be installed in ladder, ventilated trough or ventilated channel cable tray [Section 318-3(b)].
 2. Such installations are limited to qualifying industrial establishments [Section 318-3(b)].
2. Some individuals have made erroneous interpretations of Section 300-22(c) concerning the types of cable tray that may be installed in "Other Space Used for Environmental Air." They assume that the wording of the second paragraph means that only solid bottom metal cable tray with solid metal covers may be installed in these installations. This is incorrect. Ladder, ventilated trough, ventilated channel or solid bottom cable tray may be installed to support the applicable types of cables specifically listed for the use.

Allowable Wiring Methods that may be supported by Cable Tray for Section 300-22(c) Installations.

Type MI cables, Type MC cables without an overall non-metallic covering, Type AC cables and other factory-assembled multiconductor control, power and signal cables that are specifically listed for the use. Some of the multiconductor cables that are listed as plenum cables with adequate fire-resistance and low smoke producing characteristics are Type PLTC Cables (Article 725), Fire Protective Signaling Cables (Section 760), Optical Fiber Cables (Article 770) and Communication and Multipurpose Cables (Article 800).

Installations for: Section 300-22(d). Data Processing systems.

The appropriate types of cables that are used for branch circuit conductors and data handling or signal cables may be supported by cable tray under raised floors. The branch circuit cables in Section 645-5(d)(2) that may be supported in cable trays are Type MI cable, Type MC Cable and Type AC Cable. Section 645-5(d)(5) and Section 645-5(d)(5) Exception No. 3. list the various types of data and signal plenum cables with adequate fire-resistance and low smoke producing that may be installed in data processing facilities. These cables can be installed in any cable tray type. Due to the high wiring density, most raceway wiring methods are impractical for use in such installations while cable trays have the features which make them ideal for modern wiring methods.

Wiring changes can be made easily where the wiring method is cables in cable trays. Cable trays are the way to go for a state of the art wiring method that can easily accommodate changes at minimum cost in short time schedules.

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