Data-communications cables in air ducts and plenums

The 2011 National Electrical Code is exacting in its requirements about the placement of cables in these spaces.

BY STANLEY KAUFMAN, CABLESAFE INC.

The National Electrical Code is published by the National Fire Protection Association (NFPA) with revisions on a three-year schedule. The 2011 NEC, which replaces the 2008 NEC, was released by NFPA in August 2010. There were many changes of interest to manufacturers, installers and users of communications cable and connectivity products.

This is the third article in a series of nine articles, sponsored by the Communications Cable and Connectivity Association (CCCA), concerning those relevant changes in the NEC. The initial article was an introduction to the NEC and its coverage of data/communications (data/comm) cables. The second article dealt with the plethora of raceway types for data/comm cables and the beginning of a consolidation of these raceway types.

This article deals with changes in the wiring rules for the following data/comm plenum cables.

1. Type CL2P, Class 2 Plenum Cable
2. Type CL3P, Class 3 Plenum Cable
3. Type OFNP, Nonconductive Optical Fiber Plenum Cable
4. Type OFCP, Conductive Optical Fiber Plenum Cable
5. Type CMP, Communications Plenum Cable
6. Type CATVP, Cable TV Plenum Cable
7. Type FPLP, Power-Limited Fire Alarm Plenum Cable

Listing requirements for plenum cable

All data/comm plenum cables are listed for use in “ducts, plenums, and other spaces used for environmental air.” All plenum cables are required to have low flame spread and low smoke-producing characteristics.

Because the NEC Style Manual prohibits mandatory references to other standards (section 4.2), the NEC does not contain mandatory testing requirements for plenum cables. It does, however, contain informational notes (previously called fine print notes) that inform the reader that one way of testing plenum cable is to use NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, and that the pass/fail criteria are a maximum flame spread distance of 5 feet and smoke emissions having a maximum peak optical density of 0.5 and a maximum average optical density of 0.15.

The NEC is a model code that is
suitable for adoption as law by governments. If it contained mandatory references to other standards and those standards were changed, the changed referenced standard would be part of the law that the government had adopted. In effect, the adopting government would have permitted a standards-issuing organization to change its law without going through the appropriate legislative process.

Other NFPA standards are permitted to have mandatory references to other standards; NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems, has specific pass/fail requirements for testing plenum cables in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces in sections 4.3.11.2.6.1 for cables in ceiling cavity plenums and identical requirements in sections 4.3.11.4.6 (air-handling unit room plenums) and 4.3.11.5.5.1 (raised floor plenums).

The plenum cable testing requirements in NFPA 90A are referenced in informational notes in 2011 NEC sections 770.113(C), 800.113(C), 820.113(C) and 830.113(C).

**Note:** Because of the influx of non-compliant cable being imported into the U.S. market, contractors, AHJs and users should take precautions and make a special effort to carefully examine cable markings and package labels to be sure the cable is, in fact, listed and displays an authorized mark from either UL or ETL/Intertek.

### NFPA 90A terminology vs. NEC (NFPA 70) terminology

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### Section 300.22 Wiring Methods

The basic rules for wiring in air handling spaces are in section 300.22, which has the title “Wiring in Ducts Not Used for Air Handling, Fabricated Ducts for Environmental Air, and Other Spaces for Environmental Air (Plenums).” As the title indicates, the NEC has its own unique terminology for air handling spaces that is different from the terminology in NFPA 90A. Notwithstanding the fact that the NFPA Standards Council has assigned primary responsibility for fire protection requirements for materials in air handling spaces to the Technical Committee on Air-Conditioning and (1) in the 2008 NEC, which lists all the permissible wiring methods for other spaces used for environmental air, includes only one type of cable tray system, “solid bottom metal cable tray with solid metal covers.”

This provision applies to some data/comm cables but not to all because Chapter 8, which includes communications and CATV cables, is independent and permits Types CMP and CATVP to be supported by open cable trays in a plenum and other spaces used for environmental air. Even though Article 770, which covers optical fiber cables, is not independent, the provision for solid bottom cable trays only applies to “electric wiring.” The requirement for a solid bottom metal cable tray with solid metal covers does apply to data wiring (CL2P and CL3P) and fire alarm cable (FPLP).

Requiring solid bottom metal cable trays with solid metal covers (equivalent to a metal raceway) to support plenum cables that are permitted to be run exposed to the airflow is an oversight that has been fixed in the 2011 NEC. Section 300.22(C)(2) now permits plenum cables to be supported by open metal cable trays in a typical ceiling cavity plenum or raised floor plenum (other spaces used for environmental air) installation.

### Cable trays

Plenum cables are often installed in plenums supported by open metal cable trays. However, section 300.22(C) to "electric wiring.” The requirement for a solid bottom metal cable tray with solid metal covers does apply to data wiring (CL2P and CL3P) and fire alarm cable (FPLP).
Applications of data/comm plenum cables
The listing requirements and applications of data/comm cables are aligned with their permitted applications. In the 2008 NEC, communications, CATV, optical fiber and power-limited fire alarm cables are permitted to be installed in “ducts, plenums, and other spaces used for environmental air.”

The permitted applications for Class 2 and Class 3 plenum cables in the 2008 NEC are not as clear as the permitted applications of the other data/comm cables. The “Other Articles” requirements in 725.3(C) require compliance with 300.22 but have an exception for Types CL2P and CL3P installed in “other spaces used for environmental air in accordance with 725.154(A). However, section 725.154(A) permits these cables to be installed in “ducts, plenums, and other spaces used for environmental air.” Consequently, it is clear that Types CL2P and CL3P are permitted to be installed in plenums and other spaces used for environmental air, and not clear whether they are permitted to be installed in air ducts.

Permitting installation of unlimited quantities of plenum cables in air ducts conflicts with the requirements of NFPA 90A. Section 4.3.4.4 permits only four feet of plenum wiring in an air duct if the wiring is “directly associated with the air distribution system.”

In the 2011 NEC, the applications and installation rules for optical fiber, communications, and CATV plenum cables were correlated with the NFPA 90A restriction on wiring in air ducts by limiting them to only 4 feet of wiring associated with the air distribution system.

There were no changes to the applications of Class 2, Class 3 and power-limited fire alarm plenum cables in
the 2011 NEC. Consequently, unlimited quantities of Type FPLP cables are permitted in air ducts, which is in conflict with NFPA 90A. Unlimited quantities of CL2P and CL3P may also be permitted depending on how the conflicting requirements in 725.3(C) and 725.154(A) are interpreted.

The 2014 NEC

The NFPA Standards Council has assigned primary responsibility for controlling combustibles in plenums to the Technical Committee on Air-Conditioning and its document NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems. Proposals to improve the correlation of NFPA 70 (NEC) with NFPA 90A are needed.

The deadline for proposals for the 2014 NEC is November 4, 2011.

My next article will deal with how the NEC addresses data-communications cables in riser applications.

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STANLEY KAUFMAN, Ph.D. is principal of CableSafe Inc. and a consultant to the Communications Cable and Connectivity Association (CCCA: www.cccassoc.org). He is a member of NEC Panel 12 (responsible for Article 645) and Panel 16 (responsible for optical fiber and communications cables).