TO: **Whom It May Concern**

FROM: **Encore Wire Codes and Standards Division**

DATE: **8/2020**

RE: **Is Metal-Clad Cable (Type MC) Plenum Rated**

TECHNICAL DOCUMENT

Is Metal-Clad Cable "Plenum" Rated?

NEC Section 300.21 provides clarification to the intend of why the concern about ratings of raceways or cables assemblies for electrical installations in hollow spaces, vertical shafts, and ventilation or air-handling ducts be made so the possible spread of fire or products of combustion, such as smoke, will not be substantially increased. Even before we can begin to determine the various wiring methods that can be utilized in ducts, plenums, or other air-handling spaces, it is critical to fully understand the terminology used when dealing with air-handing systems.

An air distribution system is defined as a continuous passageway for the transmission of air. This distribution system can consist of air ducts, air connectors, duct fittings, dampers, plenums, fans, and accessory air-handling equipment.

An air duct is defined as a conduit for conveying air. Environmental air is air that is supplied, returned, re-circulated, or exhausted from spaces for the purpose of modifying the existing atmosphere within the building.

A plenum is defined in NFPA 90A as a compartment or chamber to which one or more air ducts are connected that form part of the closed air distribution system. A plenum cannot be used as an occupied space or for storage of any materials. Article 100 of the National Electrical Code (NEC) provides the same definition for plenum as that found in NFPA 90A.

The word "plenum" in the NEC is used to describe both an air space and also various types of wiring methods that are specifically designed and tested for installation within these areas.

Section 300.22(A) of the NEC provides information on the installation and uses of electrical wiring and equipment in ducts that are used to transport dust, loose stock, or flammable vapors. These ducts can be used for vapor removal or for ventilation of commercial-type cooking equipment as referenced in the section.

These ducts can be connected into a larger vertical or horizontal shaft or can be installed as a single duct without a shaft connection. No wiring or electrical equipment can be installed in these ducts. Ironically, lighting luminaries are permitted in the commercial cooking hood where they meet all of the conditions stated in Section 410.10(C).

Section 300.22(B) provides requirements for ducts or plenums "specifically fabricated for environmental air". These ducts or plenums, such as metal or fiberglass ducts, pre-constructed or assembled on-site are again dedicated to those specifically fabricated to transport environmental air in a closed system with ducted supply and return ducts.

Under section 300.22(B) the wiring methods permitted are Rigid Metal Conduit (RMC), Intermediate Metal Conduit (IMC), Electrical Metallic Tubing (EMT), Mineral Insulated cable (MI cable), and Metal-Clad Cable (Type MC cable) employing a smooth or corrugated impervious metal sheath without a nonmetallic covering can be used for wiring within these fabricated ducts or plenums.

Electrical equipment and devices are permitted within these ducts or chambers only if they are needed for the direct action on or sensing of the air contained within the duct. Flexible metal conduit (Type FMC) can be used within fabricated ducts to connect adjustable equipment and similar devices but are limited to (4) four feet. If illumination is required inside the fabricated duct to assist in maintenance and repair of equipment located within the duct, an enclosed and gasketed fixture must be used.

This would restrict standard interlocked type Metal-Clad Cable in these "specifically fabricated environmental ducts.

However, an exception was added to section 300.22(B) in the 2017 edition of the NEC to permit any wiring methods found in 300.22(C)(1), such as Interlocked type Metal-Clad Cable for use inside of a “specifically fabricated environmental duct” where necessary to supply equipment or a device located inside the duct that has a direct action upon or sensing of the contained air. This exception also limits the total length of the wiring method or cable assembly to not more than (4) four feet.

It is important to not get confused by this exception. Interlocked Metal-Clad Cable is only allowed if a specifically fabricated duct “Plenum” to supply items such as smoke alarm, airflow sensor, or other listed equipment installed inside the fabricated duct.

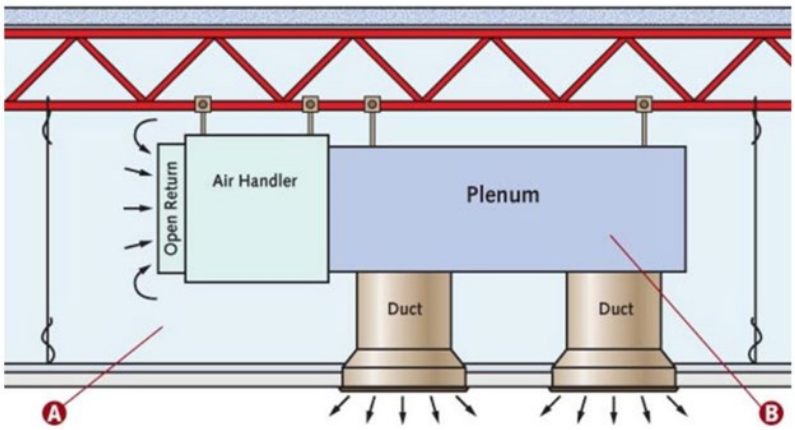
Now lets examine section 300.22(C) as this is where things change for Interlocked Metal-Clad Cable (Type MC Cable).

An “other space used for environmental air” covered in section 300.22(C) is one that is not specifically fabricated for environmental air but is used for transportation of either supply or return air. For example, the space over a dropped or suspended ceiling is a typical “other space.” The same wiring methods can be used in these “other spaces” as used in fabricated ducts, with the addition of Armored Cable (Type AC cable) and Metal-Clad Cable (Type MC cable) of the interlocked style, and totally enclosed, non-ventilated, insulated busway without provisions for plug-in connections.

Factory-assembled multiconductor control or power cable specifically listed for use in these other spaces can be used. Surface metal raceways or metal wireways can also be used. In an “other space for environmental air,” liquidtight flexible metal conduit is permitted in single lengths of 6 feet or less.

In summary, it is important to know that while Interlocked Metal-Clad Cable, without any PVC jacketing, is not technically “Plenum” rated it is perfectly acceptable to be located in an environmental air space, such as the space above a suspended to dropped ceiling in accordance with National Electrical Code section 300.22(C).

Attached is an image that clarifies the spaces mentioned in this article. Location “A” depicts the Environmental Air Space (plenum) where the circulation system is pulling air from the room into the hollow space above a ceiling. The “air” is from the environment. Location “B” is the enclosed portion of the system that is considered the “plenum” space. Location “A” is covered by 300.22(C) and “B” is covered by 300.22(B) above.



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