



**NATIONAL ARMORED CABLE
MANUFACTURERS ASSOCIATION**

PUBLICATION

The Most Asked Questions about Type AC and MC Cables

1. Where can Type MC Cable be used?

A. Type MC cable can be used for service-entrance conductors, feeders and branch circuits in many applications. Section 330.10 of the National Electrical Code includes the general uses permitted for Type MC cable. Many other uses are permitted in other articles for specific applications. Section 330.12 gives uses not permitted.

2. Does the NEC contain any requirements for termination of the bond wire in Type AC Cable?

A. No. It may simply be cut-off at the end of the armor. However, many electricians wrap the bond wire over the insulating bushing and around the armor to secure the bushing in place.

3. Are Type AC and Type MC cables permitted to be used in the return air space above hung ceilings?

A. Yes. NEC Section 300.22(C) controls the wiring methods for this space used for environmental air and Type MC without an overall PVC jacket and AC cables are allowed in this location.

4. Is Type AC Cable permitted to be used without a separate equipment grounding conductor?

A. Yes. The armor and bond wire combination is recognized as an acceptable equipment grounding conductor in accordance with Section 250.118(8) and 320.108 of the NEC. An additional equipment grounding conductor is required in patient care areas of health care facilities.

5. Can Type MC Cable be used in Wet Locations in accordance with the NEC?

A. Yes. Section 330.10(11) provides the guidance on installations in wet locations. In addition, products are available that are suitable for direct burial and parking deck applications. These products have a continuous PVC outer jacket.

6. Are Type MC and AC Cables permitted to be used as “Fixture-Whips” to supply lay-in fluorescent fixtures?

A. Yes. Sections 410.24(A) and 410.117(C) permit running Type MC and AC branch circuit conductors directly to a lighting fixture. Section 320.30 covers the support requirements for Type AC cable and 330.30 for Type MC cable. These sections allow the last 6 feet of cable to be installed unsupported for connection to lighting fixtures and equipment in accessible ceilings.

7. How can I tell the difference between Armored Cable and Metal-Clad cable, since they both have the same outside appearance?

A. Type AC cable will always have a 16 AWG aluminum bond wire under the armor, and the individual insulated conductors will each have a kraft paper wrap. Type MC cable may or may not contain a ground/bond or individually protected conductors. Unjacketed Type MC cable will always have a marker tape under the armor indicating that it is type MC Cable.

8. Are Type AC and MC Cables permitted to be installed under raised floors in data processing rooms?

A. Yes. According to NEC Section 645.5(E)(2), Type MC and AC cables can be used to supply branch circuit receptacles in this location.

9. What type of fittings is approved for use with armored cables Type AC and MC?

A. Fittings must always be listed for the wiring method installed. Many connectors available today for armored cable products are listed for both Type AC and MC cables. Information is included on the packaging for the fittings to indicate for which cables the fittings are listed.

10. Can I wire a dwelling unit with Armored Cable Products?

A. Yes. This wiring method is excellent for dwelling units since the steel or aluminum armor does not support combustion, is rodent proof, and also offers resistance to nail penetration and crushing.

11. Where 4-conductor Type AC or MC cables are used for a 3-phase, 4-wire branch circuit to supply fluorescent fixtures, do conductor ampacity derating factors apply?

A. Yes. Section 310.15(B)(4) indicates the neutral is considered a current carrying conductor under these conditions. Table 310.15(B)(3)(a) requires the ampacities of conductors be reduced to 80 percent of their ampacity. Where Type ACTHH cable or Type MC cable with THHN or XHHW conductors is used and the cable is not installed in thermal insulation, the derating factor is applied to the ampacities under the 90 C column of Table 310.15(B)(16). The small conductor rule of 240.4(D) must be complied with as well. Derating is not required as provided in 310.15(B)(3)(a)(4) if the cables have not more than 3, 12-AWG current-carrying conductors and not more than 20 current-carrying conductors are bundled, stacked or supported on “bridle rings.”

12. Is derating required for “Home Run” cables?

A. Yes. Section 310.15(B)(3)(a) requires derating if the cable has more than 3 current carrying conductors.

For example, a “home run” cable has 8, 12 AWG copper current carrying conductors with Type THHN insulation. The ampacity adjustment begins from the 90°C column of Table 310.16 as the cables have 90°C insulated conductors. 12 AWG = 30 amperes x 70 percent from Table 310.15(B)(3)(a) = 21 amperes. These conductors can be used for 20-ampere branch circuits unless additional derating for high ambient temperatures is required.

13. What electrical tests are performed at the factory on Armored Cable Products?

A. All finished coils and reels of Type AC and Type MC cables are 100% tested with both a dielectric withstand test of the insulation and a continuity test to insure the integrity of the product.

14. Does connecting the aluminum bond wire of a Type AC cable to the grounding terminal of a duplex receptacle satisfy the requirements of the NEC?

A. No. The bond wire must not be connected to the grounding terminal for several reasons. The terminal on the receptacle may not be suitable for connecting aluminum conductors and the bonding conductor is intended to carry fault current only in conjunction with the cable armor. The armor and bond wire combination connected to the metal box satisfies the requirement of Section 406.4(B) and (C) for an equipment grounding conductor. However, a bonding jumper may be required between the receptacle and the metal box to comply with Section 250.146. See the information provided in the NEMA Bulletin 91 on “Termination of Bonding Strip on Type AC Cable”.

15. May Type AC and MC cables be used to wire high-rise office buildings?

A. Yes. The height of a building does not have any bearing on the use of these wiring methods. They are permitted in buildings of unlimited height.

16. Must insulating bushings be used for both Type AC and MC cable terminations?

A. “Yes” for Type AC, “No” for Type MC. The NEC requires insulated bushings to be inserted between the conductors and the armor at every termination for Type AC cable. (See Section 320.40). Fittings used with Type MC Cable are required to be listed per 330.40 of the NEC. The design of these fittings may or may not include an insulated throat however, they are required to be provided with a smooth, rounded end stop so the metal sheath of the cable will not pass through and the wires will not be damaged in passing over the end stop. Whether or not an insulated throat is part of the listed product, these listed MC fittings do not require an additional anti-short bushing. See the information in NEMA Bulletin No. 90 on the Use of Anti-Short Bushings for Terminating Type MC Cable.

17. What does “cable tray rated” mean as applied to Armored Cable products?

A. This indicates that the cable has passed the 70,000 BTU vertical tray flame test as defined in UL Standard 1685 covering the vertical Fire Propagation test for Electrical and Fiber-Optic cables and that the cable may be installed in cable trays. Type AC and Type MC cables are not required to be marked to indicate suitability for use in cable trays.

18. Does all Type AC Cable require a bond wire? What is the material and size of the bond?

A. Yes. All Type AC cable must have an uninsulated bond wire throughout its entire length. The bond wire must be aluminum or copper and cannot be smaller than 16 AWG. (See Section 320.100) However, UL-4, the product safety standard, requires the bonding conductor to be of aluminum.

19. Is it necessary to insert grommets in steel stud openings before installing armored cable products through the stud?

A. No. Types AC and MC cables are specifically excluded from the requirement for protection by grommets when pulling cables through steel studs. (See 320.17 and 330.17.)

20. Are Type AC and Type MC acceptable wiring methods for patient care areas in a hospital?

A. Yes. Section 517.13 recognizes the use of (1) Type AC cable with a green insulated copper equipment grounding conductor and (2) MC where the armor and ground/bond combination is a recognized ground path (250.118(10)(b)) with a green insulated copper equipment grounding conductor for this application. However, the cable is generally permitted for only the branch circuits supplied by the normal electrical system in Health Care Facilities.

21. Are Armored Cable Products permitted for the Emergency Electrical Systems for Hospitals?

A. Yes, however, only where fished into existing walls or ceilings not otherwise accessible and where not subject to physical damage, in prefabricated headwalls, in listed office furnishings, and where flexible connection to equipment is necessary. (See 517.30(C)(3).) Cables used in patient care areas must also comply with the equipment grounding requirements in 517.13.

22. Can I install Type MC in concrete or against concrete or mortar?

A. Yes, if the cable is listed for the application. Type MC cable is available with an outer PVC jacket and is permitted to be installed in parking decks, concrete pours and for direct earth burial if it is identified for such use. Type MC Cable that is listed and marked for Direct Burial is also suitable for concrete encasement.

23. Can I bury Type MC cable in a wet location?

A. Yes, if the cable is listed for the application. Type MC cable is available with an outer PVC jacket and is permitted to be installed in direct earth burial applications if it is identified for such use.