TCERDirect®
OUR PRODUCT. YOUR SOLUTION.

TC-ER-JP CABLE IN EV INSTALLATIONS SUBSTANTIATING 75°C CABLE AMPACITIES

SYNOPSIS: Confusion and misinformation exist regarding the acceptable use of TC-ER-JP cable at 75°C ampacities for installations of electric vehicle supply equipment. This whitepaper provides a detailed review of the NEC requirements covering this use and why using 75°C ampacities is acceptable.

AHJ SUMMARY:

This whitepaper supports the use of TC ER JP cable sized at 75°C ampacities in electric vehicle (EV) charging installations by demonstrating compliance with National Electrical Code (NEC) requirements.

PERMITTED USE:

NEC Article 336.10(9) permits TC ER JP cable for branch circuits and feeders in one- and two-family dwellings, confirming its suitability as a fixed wiring method.

AMPACITY DETERMINATION:

TC ER JP cable would typically be limited by the ampacity requirements for non-metallic (NM) cable as described in NEC 334.80. However, an exception in NEC 336.10(9) permits the cable to use the higher 75°C ampacity ratings from NEC Table 310.16, provided the connected equipment has terminals rated at 75°C or higher. Additionally, NEC 336.80 references NEC 392.80(A), which permits cables in cable trays to be sized using Table 310.16. This reinforces the assertion that the ampacity of TC-ER-JP cable may be determined using the 75°C values from NEC Table 310.16.

COMPARISON TO TYPE MC CABLE:

Given that TC ER JP cable meets the same physical and performance requirements as Type MC cable, applying the ampacity determination methods permitted for MC cable is appropriate. Drawing on this comparison to MC cable, installations using TC ER JP cable, connected to terminals rated 75°C or higher, can safely use the 75°C a mpacity values in NEC Table 310.16.

CONCLUSION:

TC ER JP cable, when installed per applicable NEC requirements and connected to equipment with terminals rated 75°C or higher, represents a safe and code-compliant option for permanent wiring in EV charging applications where the cable is sized for 75°C ampacities. This whitepaper clarifies the technical and regulatory basis for these applications.

TCERDirect®
OUR PRODUCT. YOUR SOLUTION.

Using TC-ER-JP Cable at 75°C ampacities in Electric Vehicle Equipment Installations

When used as interior premises wiring, the ampacity of TC-ER-JP cable is determined according to the requirements for Non-metallic (NM) cable, which is covered in NEC Article 334, specifically Section 334.80 titled "Ampacity." This section restricts the ampacity not to exceed that of a 60°C rated conductor. However, there is an exception to NEC 336.10(9), which is shown below, that allows TC-ER-JP cable not to be limited in ampacity by the requirements in Section 334.80. Essentially, this allows the TC-ER-JP cable to use the 75°C ampacities in NEC Table 310.16.

NEC 336.10(9)
Exception: Where used to connect a generator and associated equipment having terminals rated 75°C (140°F) or higher, the cable shall not be limited in ampacity by 334.80.

Although this exception is limited to applications involving connections to a generator and associated equipment, there is no reason it cannot be applied to equipment in general having terminals rated 75°C or higher. The exception is specific to a generator and associated equipment because the proposal to include this exception, which became part of the NEC in the 2017 Edition, was submitted by a generator manufacturer. If the underlined words were removed, the exception would not be limited to a generator and associated equipment. This would enable the TC-ER-JP cable to be used at 75°C ampacities as long as the connected equipment has terminals rated 75°C or higher.

Additionally, the TC-ER-JP cable is quite similar to the Type MC cable in terms of strength and rigidity. It meets the same crush and impact requirements as Type MC cable. Ampacities for Type MC cable can be determined in accordance with NEC Table 310.16. The reference to this table permits Type MC cable to be used at 75°C ampacities as long as the equipment it is connected to has terminals rated 75°C or higher. Considering these wiring methods are equivalent relative to construction and performance requirements, Type TC-ER-JP cable should be able to utilize the same rules applied to Type MC cable for determining ampacity.

Furthermore, NEC 336.80, which covers ampacity requirements for Tray cable, references NEC 392.80(A), which permits cables in cable trays to be sized using Table 310.16. NEC 392.80(A) allows the use of the ampacity values defined in NEC Table 310.16 for most installations, which is significant because it enables the use of 75°C conductor ampacities when the connected equipment has terminals rated 75°C or higher. The reference to NEC 392.80(A) supports sizing TC ER JP cable based on 75°C ampacity values, similar to Type MC cable. This ensures that when equipment terminals are rated 75°C or higher, the cable is not restricted by the lower ampacity requirements typically applied to nonmetallic (NM) cable installations.

Summary:

This whitepaper demonstrates that TC ER JP cable, when sized using 75°C ampacities, is an acceptable permanent wiring method for EV charging installations in one- and two-family dwellings. Although typically governed by NM cable ampacity rules (NEC 334.80), an exception (NEC 336.10(9)) allows the cable to use the higher 75°C ampacity values found in NEC Table 310.16 when connected to equipment with terminals rated 75°C or higher. NEC 392.80(A) further supports this approach by permitting the use of 75°C ampacity for most installations of Tray cable, aligning TC ER JP cable sizing with that of Type MC cable. This ensures that, when properly installed on equipment having terminals rated at 75°C or higher, TC ER JP cable meets the continuous load demands of EV charging systems while remaining code compliant.

TCERDirect®
OUR PRODUCT. YOUR SOLUTION.

Best practice: As local inspectors may not be aware of NEC requirements for TC-ER-JP cable, and to preclude delays in final inspection approval, TCERDirect® and Gen-Pro Products strongly encourage that prior to using TC-ER-JP cable in electric vehicle equipment installations in one- and two family dwellings, installers should confirm with their local building inspector that the proposed installation meets with their approval.

"This information is intended for use by a licensed professional in compliance with all product information and applicable building codes, laws, and regulations. Gen-Pro Products LLC disclaims any liability for injuries to persons or damage to property arising from the improper installation of this product, installation by non-qualified persons, or the use of products for applications other than as specified. The information provided is for guidance only. Please consult with a licensed electrician or local building inspector regarding the applicability, use, and proper installation of all products."