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ENVIRONMENTAL RATINGS FOR TRAY CABLE CONNECTORS USED IN OUTDOOR GENERATOR APPLICATIONS

SYNOPSIS: Confusion and misinformation exist regarding NEC and environmental ratings required for Tray Cable connectors. This document reviews the applicable requirements for approved connectors when installing TCER-JP Tray Cable.

Tray Cable is a popular component in today's installations of home standby generators in residential applications. A UL1277 Listed composite Tray Cable is commonly used to cable between the ATS and the generator. NEC compliant, UL 1277 Listed TCER-JP Cable for this application will be marked as both "sunlight-resistant" and "direct burial." Connectors are required at the terminating points of the cable. An important question is what ratings are necessary for these connectors? In determining the acceptability of installations, the AHJ will likely base acceptance on compliance with the NEC. Since most generator installations must be NEC compliant, it is important to understand what, if any, NEC requirements apply to these connectors.

A review of the NEC reveals it has no requirements for environmental ratings for cable connectors. Therefore, where does one go to find requirements covering connectors in this application? The answer is UL 514B, the Standard for Conduit, Tubing, and Cable Connectors. This standard contains the requirements for Tray Cable connectors covering construction, performance testing, environmental ratings, and markings. The UL 514B standard covers Tray Cable connectors rated for use in dry or wet locations, including sunlight exposure. Also included in UL 514B are optional ratings for connectors exposed to oil (not required for generator installations).

Why is UL 514B the source of requirements for Tray Cable connectors in an NEC-compliant installation? **NEC Section 336.6 (70-227*) States, "Type TC Cables and associated fittings shall be listed."** NEC Chapter 9, Informative Annex A, contains a list of product safety standards used for product listing. This list is matched with NEC requirements for listing. Because associated cable fittings are required to be listed, UL 514B is specified in Informative Annex A for Article 336 listing requirements (70-737*).

Tray Cable connectors may have ratings not covered by UL 514B. These include UL Type, NEMA Type, and/or Ingress Protection (IP) ratings. None of these ratings are required for the UL Listing of Tray Cable connectors, as they are not included in the requirements of UL 514B.

Tray Cable connectors with UL Type ratings, NEMA Type ratings, or IP ratings can confuse users. None of these ratings are necessary to meet NEC requirements. **In fact, NEMA ratings, UL Type ratings, and IP Ratings are essentially irrelevant for this application.**

The bottom line: A connector for use with Tray Cable in an outdoor generator application only needs to meet the UL 514B sunlight-resistant requirements. (Note, the 514B sunlight-resistant marking (or application) incorporates wet-location testing. This wet-location testing is equivalent to the testing for a UL Type 3R rating.)

A note on required markings. UL 514B requires Tray Cable connectors or their smallest unit shipping carton to be marked with one or more of the following, as appropriate: "Dry Location," "Sunlight Resistant," "Oil Resistant I," or "Oil Resistant II." Tray Cable connectors or their smallest unit shipping carton are also required to be marked "For Use with Tray Cable (including type TCER-JP) Rated ___°C or Less." A typical rating is 75C.

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Gen-Pro Tray Cable connectors are UL Listed as suitable for use with Tray Cable, including type TCER-JP. They have been evaluated and found to comply with the requirements of UL 514B for Tray Cable connectors. They are rated and marked “Liquid-Tight,” “Sunlight Resistant,” “Oil Resistant I,” and “For use with Tray Cable rated 75C.”

Conclusion: The Gen-Pro UL 514B ratings for Tray Cable connectors fully meet NEC requirements and trump any other declared ratings. The Gen-Pro connectors are application-specific, designed, and tested for outdoor generator installations. They are the Gold Standard for TCER-JP Cable applications. Their use will result in an NEC-compliant installation.

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 connectors, installers should confirm with their local building inspector that the proposed installation meets with their approval.

** These are page numbers in the 2023 Edition of the NEC.*