"Exposed Run" Tray Cables

This Wire Wisdom addresses some of the most frequently asked questions regarding a supplemental rating for type TC, ITC and PLTC tray cables—the "ER" rating for cables used in Exposed Runs.

What is an ER Rating?

In the 1990s, a new "ER" rating for unarmored but physically rugged instrumentation and control tray cables was made possible by changes in NEC[1] and UL[2] requirements. The new rating was created for type TC tray cables, type ITC instrumentation tray cables and for type PLTC power limited tray cables. If these UL cable types meet certain additional crush and impact test requirements, UL permits the manufacturer to add an "-ER" suffix to the basic Listing printed on the cable, i.e., "TC-ER", "ITC-ER" or "PLTC-ER". The "-ER" signifies that the cable is sufficiently rugged to permit its use as exposed wiring. Exposed wiring is wiring that is not installed in a tray, conduit or other raceway. It is also sometimes referred to as open wiring.

Why the Interest in ER Rated Cables?

In short—potentially lower installed cost!

Tray cable types TC, ITC and PLTC are, of course, permitted in cable trays by the NEC. However, if more than 1.8 meters (6 feet) of cable is brought out of the tray for a connection to a motor or other electrical device, cables without an ER rating must be either armored (type MC) or installed in conduit or some other type of raceway. Cables with an ER rating, on the other hand, can extend up to 50 feet or more outside the tray if given adequate protection and support. Thus, in some applications, the use of ER rated cables can eliminate the cost of installing conduit between the tray and an electrical device or the cost of using armored cables.

[1] NFPA 70, National Electrical Code, published by the National Fire Protection Association, Inc., Quincy, Massachusetts.
[2] UL 13, 1277 and 2250, Standards for Safety, published by Underwriters Laboratories, Northbrook, Illinois.

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Cable Markings

The jacket of ER rated tray cables must be marked (printed) with the letters "TC-ER", "ITC-ER" or "PLTC-ER" as appropriate for the specific cable. Industry codes and standards require the markings so the electrical inspector at the job site can confirm that the cable meets applicable requirements. Prior to 2005, exposed run cables were marked with the words "open wiring" instead of the "-ER" suffix.

Grounding Conductor Requirements

With type TC-ER cables, the NEC requires that an equipment grounding conductor be provided within the cable.[3] However, in 6 AWG and smaller cables any insulated conductor in the cable is permitted to be identified as the equipment grounding conductor at the time of installation. This can be accomplished by stripping the insulation from the entire exposed length, coloring the exposed insulation green, or marking the exposed insulation with green tape or green labels.[4] Cable types ITC-ER and PLTC-ER are not required to have an equipment grounding conductor.[5]

Additional Requirements

The NEC has several additional requirements that must also be met before ER rated cables can be used in exposed runs. These include:

- Exposed runs are permitted only in industrial establishments where the conditions of maintenance and supervision ensure that qualified persons service the installation.
- The exposed run must be between a cable tray and equipment such as a motor.
- Type ITC cables are limited to 15 m (50 ft) in length between tray and equipment. Type TC and type PLTC cables have no length restrictions.
- Cables must be supported and protected against physical damage using mechanical protection such as struts, angles or channels.
- Cables must be secured at least every 1.8 m (6 ft).

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[3] 2005 NEC Article 336.10(7)
[4] 2005 NEC Article 250.119(B)
[5] 2005 NEC Articles 725.61(D)(4) and 727.4(6)