STEEL TUBE INSTITUTE

Steel Conduit

TECH TALKS

FIELD-CUT THREADS IN CLASSIFIED LOCATIONS

Technical information about steel conduit and electrical metallic tubing

FIELD-CUT THREADS

Article 300.6(A) of the National Electrical Code® (NEC®) requires, among other things, that field-cut threads in steel conduit be protected from corrosion if installed in an area that requires corrosion protection for the raceway. The NEC states that the protection must be "approved," which is defined as being acceptable to the authority having jurisdiction. While there is currently one product that has been tested and listed for this purpose, the Code leaves product selection open to any "electrically conductive, corrosion-resistant compound."

The situation can become slightly more complex when the installation is within the boundaries of a classified (hazardous) location. When this issue is discussed at meetings, there is always a lively conversation among the installers, inspectors, engineers and testing lab representatives.

NEC REQUIREMENTS

Let us dissect the relevant requirements in the NEC:

1. Section 90.3 gives us guidance on Code layout and hierarchy. The important statement is that the provisions of Chapters 1–4 apply throughout, unless modified by a specific rule in Chapters 5, 6 or 7.
2. Section 90.4 assigns final authority for approval of materials and installation to the AHJ.
3. Section 110.3 offers criteria to the AHJ and others on acceptability of products. Part A of that section lists items that might be considered in deciding on the safety and suitability of a product.
4. As stated earlier, Article 300.6(A) requires field-cut threads in metal conduit to be protected from corrosion by an approved compound.
5. Article 500.8(E) addresses threads and how threaded entries for conduit are to be installed; specifically, the conduit threads must be "wrench-tight" and have five threads fully engaged for standard National Pipe Thread entries. (There are somewhat different requirements for metric threads.)
6. Several other articles address specific classified locations, including permissible wiring methods. All of those articles are silent on protection of field-cut threads for metal raceways, so the requirement defaults to Article 300.6(A), per Section 90.3.

Q&A

With the preceding analysis, it should be clear that corrosion protection of field-cut threads is mandatory throughout the NEC if the metal conduit is in an area subject to corrosion. There are other considerations raised about this practice by many in the industry:

Question: "If a product is used to protect the threads, whether a brush-on or spray-on product, does it inhibit the venting of pressure from within the system in the event of an explosion within the equipment?"

Answer: This should not be of concern. There is no code or standard that requires an escape path for hot, expanding gases within the raceway. There is only a requirement that if there is a place for those gases to escape, there must be sufficient length and tightness to allow the gases to cool before being expelled into the surrounding atmosphere. This is accomplished through the design of mating surfaces between the body and cover of enclosures, and the requirement for metal conduit to have five threads fully engaged (NEC 500.8(E)(1)). If the corrosion protection seals the threaded joint to the point that no gas can escape, then there is no chance that the surrounding atmosphere can be ignited, resulting in a safe installation. Please note that any corrosion protection applied should be allowed to dry before installing.

Question: "What coating should I use to protect field-cut threads in hazardous locations if there are no tested and listed compounds currently available?"

Answer: After taking a closer look, we find that there is neither a standard to test to, nor a code rule to adhere to. The only requirement is that the coating be an electrically conductive and corrosion-resistant compound approved by the AHJ. In fact, threaded rigid steel conduit and threaded intermediate steel conduit are the only acceptable wiring methods in many classified location installations. This is because of the inherent strength and safety of these products.

It should be noted that the threads on these metal raceways serve two crucial functions: to allow any hot, expanding gases to cool before being expelled into the atmosphere, and to provide a long-term, low-impedance path back to the source of the system in the event of a ground fault. This path must not allow for any arcing under a fault condition, because virtually any arc has the potential to be a source of ignition. When properly installed and well maintained, steel conduit systems will function well in this regard.

The answer to the initial question (corrosion protection or no corrosion protection for field-cut threads in hazardous locations) now seems obvious. Doing something is better than doing nothing — and doing something to comply with the code (Article 300.6) is the right thing for you and your customers.