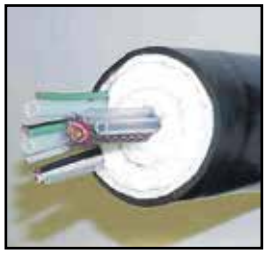
Installing Non-Heating Wires Within a Tube Bundle

PRODUCT / APPLICATION INFORMATION

For many years tubing bundles have been the product of choice for process instrument impulse lines and extractive analyzer sample tubing. They are most often designed to reduce heat loss from the tube(s) to ambient, and often include electrical heat tracing to maintain design temperatures. Compared to bare tubing that is field traced and insulated, most know that prefabricated tube bundles increase the overall long term reliability and safety of the entire system.

Type TC Tray Cable



TubeTrace Heat Traced Tubing

Many engineers and designers have come to realize that they can further reduce the overall installed cost of an instrument installation by including auxiliary conductors within the bundle. These can supply power to equipment and/or instrumentation associated with the analyzer or other equipment.

Occasionally questions are asked about this practice and whether it meets the requirements of the National Electrical Code (NEC). Other codes and standards will be relevant in other countries, but generally the NEC is well respected globally.

NEC Requirements

Sometimes engineers and inspectors attempt to apply NEC 300.8 which states, “Raceways or cable trays containing electric conductors shall not contain any pipe, tube, or equal for steam, water, air, gas, drainage, or any service other than electrical”.

However, NEC Article 100 defines a “Raceway” as “An enclosed channel of metal or non-metallic materials designed expressly for holding wires, cables, or busbars ...”

A tube bundle is obviously not a raceway, but rather factory fabricated equipment that consists of, but is not limited to, tubes, thermal insulation and a polymer weatherproofing jacket. When installed with a process instrument or analyzer, it becomes an integral part of that system, particularly if heat traced.

As such tube bundles with auxiliary conductors are more appropriately covered by NEC Article 300: “Wiring Methods” and more specifically NEC 300.1(b): Integral Parts of Equipment. “The provisions of this article are not intended to apply to the conductors that form an integral part of …factory assembled control equipment…”

Hazardous (Classified) Areas

In Class 1, Division 2 hazardous (classified) areas, Thermon electrical heat tracing, as approved by numerous nationally recognized testing laboratories, has TubeTrace electrically heated tubing bundles accepted by the authorities having jurisdiction. However, analytical systems are configured in many ways to fit a wide range of unique applications with probe heaters and temperature sensors integral to the tubing bundle(s). It is not economically practical to pursue a separate equipment approval for every different application.

Alternately, Thermon constructs equipment with components that are approved by a nationally recognized testing laboratory. This is consistent with tube bundles that contain electrical heat tracing approved for use in hazardous (classified) areas. This is also consistent with instrument tubing bundles that contain MI, MC, MV, or TC cable (Reference NEC 501-4(b), 340-4).

Conclusion

The spirit of the NEC is to provide guidelines for safe wiring practices. Installing non-heating insulated conductors in an instrument tubing bundle that has been designed and manufactured to be safe, and appropriately labeled along its entire length, is consistent with these objectives.

