

## Cables Used in Intrinsically Safe Circuits

An Intrinsically Safe Circuit is “a circuit in which any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.” It is part of an Intrinsically Safe System. Intrinsically Safe Systems may be used in hazardous (classified) locations as described in NEC Articles 500 through 504.

Article 504 of the 2008 NEC addresses Intrinsically Safe Systems. Sub-article 504.20 “Wiring Methods” permits any of the wiring methods suitable for unclassified locations including those covered in Chapter 7 “Special Conditions”, which includes Okonite PLTC, FPL & ITC cables, and Chapter 8 “Communication Circuits”. Also, since the NEC does not place any special requirements on the cable used in Intrinsically Safe Systems, UL does not have a test program for an “intrinsically safe cable” design. Therefore, from a cable design and manufacture, there are no additional or special requirements for cable used in an Intrinsically Safe System. UL does investigate and permit labeling of cable types PLTC, ITC and FPL. Again, an intrinsically safe cable listing does not exist.

Sub-article 504.80 “Identification” has specific requirements that the cables used in an intrinsically safe circuit be labeled. The circuits need to be identified at the terminals and junctions. Cable raceways, trays and other wiring methods must also be identified with permanent labels stating “Intrinsic Safety Wiring” or equivalent visible and traceable throughout the entire length of the circuit (except for underground portions of the circuit)

Sub-article 504.80 (C) permits (but does not require) the use of color coding to identify intrinsically safe conductors. If color coding is used, the coloring shall be light blue. Also, raceways, cable trays, and junction boxes are permitted to be identified with light blue coloring. If they are, they must contain only intrinsically safe wiring. Users often request the outer cable jacket be identified with the light blue covering.

Please review Article 504 for complete details regarding Intrinsically Safe Systems and, specifically, sub-articles 504.20 “Wiring Methods” and 504.80 “Identification”.

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