Δ **(F) Optical Fiber Cables.** An optical fiber cable, with or without current-carrying conductors (hybrid optical fiber cable), shall be installed to address the associated fire hazard and sealed to address the associated explosion hazard in accordance with 505.15 and 505.16.

Δ **(G) Equipment Involving Optical Radiation.** For equipment involving sources of optical radiation (such as laser or LED sources) in the wavelength range from 380 nm to 10 µm, the risk of ignition from optical radiation shall be considered for all electrical parts and circuits that may be exposed to the radiation, both inside and outside the optical equipment. This includes optical equipment, which itself is located outside the explosive atmosphere, but its emitted optical radiation enters such atmospheres.

Informational Note: See ANSI/UL 60079-28, *Explosive Atmospheres — Part 28: Protection of Equipment and Transmission Systems Using Optical Radiation*, for information on types of protection to minimize the risk of ignition in explosive atmospheres from optical radiation.

Exception: All luminaires (fixed, portable, or transportable) and hand lights, intended to be supplied by mains (with or without galvanic isolation) or powered by batteries, with any continuous divergent light source, including LEDs, shall be excluded from this requirement.

505.15 Wiring Methods. Wiring methods shall maintain the integrity of protection techniques and shall comply with 505.15(A) through (C).

Δ **(A) Zone 0.** In Zone 0 locations, equipment protected by intrinsic safety "ia" and equipment protected by encapsulation "ma" shall be connected using intrinsically safe "ia" circuits with wiring methods in accordance with 504.20.

This requirement is one of the most significant differences between the zone and division area classification requirements. The degree of hazard within a Zone 0 area is considered so severe that all wiring in this area must be intrinsically safe (technique "ia"). In general, only instrumentation and signaling circuits installed in accordance with Article 504 can be used in a Zone 0 area.

(B) Zone 1.

Δ **(1) General.** In Zone 1 locations, the following wiring methods shall be permitted:

Informational Note No. 1: See Article 100 for the definition of *restricted industrial establishment [as applied to hazardous (classified) locations]*.

(1) All wiring methods permitted by 505.15(A).
(2) In restricted industrial establishments where the cable is not subject to physical damage, Type MC-HL cable listed for use in Zone 1 or Class I, Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath, an overall jacket of suitable polymeric material, and a separate equipment grounding conductor(s) in accordance with 250.122. Type MC-HL cable shall be terminated with fittings listed for the application and installed in accordance with Part II of Article 330.
(3) In restricted industrial establishments where the cable is not subject to physical damage, Type ITC-HL cable listed for use in Zone 1 or Class I, Division 1 locations, with a gas/vaportight continuous corrugated metallic sheath and an overall jacket of suitable polymeric material. Type ITC-HL cable shall be terminated with fittings listed for the application and installed in accordance with 335.4
(4) Type MI cable terminated with fittings listed for Zone 1 or Class I, Division 1 locations. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.
(5) Threaded rigid metal conduit (RMC) or threaded intermediate metal conduit (IMC), including RMC or IMC conduit systems with supplemental corrosion protection coatings.
(6) Where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade, PVC or RTRC conduit. RMC or IMC conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment grounding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
(7) Intrinsic safety type of protection "ib" using the wiring methods in accordance with 504.20.
(8) Optical fiber cable Type OFNP, Type OFCP, Type OFNR, Type OFCR, Type OFNG, Type OFCG, Type OFN, or Type OFC installed in raceways in accordance with 505.15(B). Optical fiber cable shall be sealed in accordance with 505.16.
(9) In restricted industrial establishments for applications limited to 600 volts nominal or less where the cable is not subject to physical damage, Type TC-ER-HL shall be terminated with fittings listed for the location and installed in accordance with 336.10.

Informational Note No. 2: See ANSI/UL 2225, *Cables and Cable-Fittings for Use in Hazardous (Classified) Locations*, for information on construction, testing, and marking of cables and cable fittings.

(10) In restricted industrial establishments, listed Type P cable with metal braid armor and an overall jacket. Type P cable shall be terminated with fittings listed for the location and installed in accordance with Part II of Article 337.

Informational Note No. 3: See UL 1309A, *Outline of Investigation for Cable for use in Mobile Installations*, for information on construction, testing, and marking of Type P cable.

Informational Note No. 4: See ANSI/UL 2225, *Cables and Cable-Fittings for Use in Hazardous (Classified) Locations*, for information on construction, testing, and marking of cable fittings.