to prevent ignition-capable arcing between the conduit and the coupling, fitting, or enclosure under ground-fault conditions. The use of a bonding jumper in lieu of a wrenchtight connection is not permitted.

Δ **(1) Equipment Provided with Threaded Entries for NPT-Threaded Conduit or Fittings.** For equipment provided with threaded entries for NPT-threaded conduit or fittings, listed conduit, listed conduit fittings, or listed cable fittings shall be used. All NPT-threaded conduit and fittings shall be threaded with a National (American) Standard Pipe Taper (NPT) thread.

NPT-threaded entries into explosionproof equipment shall be made up with at least five threads fully engaged.

Exception: For listed explosionproof equipment, joints with factory-threaded NPT entries shall be made up with at least four and one-half threads fully engaged.

Informational Note No. 1: See ASME B1.20.1, *Pipe Threads, General Purpose (Inch)*, for thread specifications for male NPT threads.

Informational Note No. 2: See ASME B1.20.1, *Pipe Threads, General Purpose (Inch)*, and ANSI/UL 1203, *Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations*, for information on female NPT-threaded entries using modified National Standard Pipe Taper (NPT) threads.

Δ **(2) Equipment Provided with Threaded Entries for Metric-Threaded Fittings.** For equipment with metric-threaded entries, listed conduit fittings or listed cable fittings shall be used. Such entries shall be identified as being metric, or listed adapters to permit connection to conduit or NPT-threaded fittings shall be provided with the equipment and shall be used for connection to conduit or NPT-threaded fittings.

Metric-threaded fittings installed into explosionproof equipment shall have a class of fit of at least 6g/6H and shall be made up with at least five threads fully engaged.

Informational Note: See ISO 965-1, *ISO general purpose metric screw threads — Tolerances — Part 1: Principles and basic data*, and ISO 965-3, *ISO general purpose metric screw threads — Tolerances — Part 3: Deviations for constructional screw threads*, for threading specifications for metric-threaded entries.

(3) Unused Openings. All unused openings shall be closed with blanking elements or close-up plugs that are listed for the location. The thread engagement shall comply with the requirements of 500.8(E)(1) or (E)(2).

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 Part II of Articles 501, 502, or 503, as applicable.

Δ **(G) Equipment Involving Optical Radiation.** The risk of ignition from optical radiation shall be evaluated for laser equipment, optical fiber equipment, and any other convergent light sources or beams where light is focused in one single point within a hazardous area with a wavelength range of 380 nm to 10 µm. This requirement shall include optical equipment that is located outside the explosive atmosphere, but whose 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 that can be applied to minimize the risk of ignition in explosive atmospheres from optical radiation.

ARTICLE 501

Class I Locations

Part I. General

Δ **501.1 Scope.** This article covers the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Division 1 and Division 2 locations where flammable gases, flammable liquid–produced vapors, or combustible liquid–produced vapors are or might be present in the air in quantities sufficient to produce explosive or ignitible mixtures.

Where ignitible concentrations (concentrations within flammable or explosive limits) are present, the atmosphere can be ignited by an arc, spark, or high temperature. NFPA 497, *Recommended Practice for the Classification of Flammable Liquids, Gases, or Vapors and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*, includes information on the flammable limits of liquids and gases.

Electrical equipment that can cause ignition-capable arcs or sparks should be kept out of Class I locations, or the equipment must be identified for the appropriate hazardous location. It is practically impossible to make threaded joints gastight. The conduit system and apparatus enclosure "breathe" due to temperature changes, and any flammable gases or vapors in the room may slowly enter the conduit or enclosure, creating an explosive mixture. If an arc occurs, an explosion could also occur. When an explosion occurs within the enclosure or conduit system, the burning mixture or hot gases must be sufficiently confined within the system to prevent ignition of any explosive mixture outside the system.

501.5 Zone Equipment. Equipment listed and marked in accordance with 505.9(C)(2) for use in Zone 0, 1, or 2 locations shall be permitted in Class I, Division 2 locations for the same gas and with a suitable temperature class. Equipment listed and marked in accordance with 505.9(C)(2) for use in Zone 0 locations shall be permitted in Class I, Division 1 or Division 2 locations for the same gas and with a suitable temperature class.

Part II. Wiring

501.10 Wiring Methods. Wiring methods shall comply with 501.10(A) or (B).