safe gap (MESG) value less than or equal to 0.45 mm or a minimum igniting current ratio (MIC ratio) less than or equal to 0.40. [**497**:3.3.5.1.2]

Informational Note: A typical Class I, Group B material is hydrogen.

(3) Group C. Flammable gas, flammable liquid–produced vapor, or combustible liquid–produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value greater than 0.45 mm and less than or equal to 0.75 mm, or a minimum igniting current (MIC) ratio greater than 0.40 and less than or equal to 0.80. [**497**:3.3.5.1.3]

Informational Note: A typical Class I, Group C material is ethylene.

Δ **(4) Group D.** Flammable gas, flammable liquid–produced vapor, or combustible liquid–produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value greater than 0.75 mm or a minimum igniting current (MIC) ratio greater than 0.80. [**497**:3.3.5.1.4]

Informational Note No. 1: A typical Class I, Group D material is propane. [**497**:3.3.5.1.4]

Informational Note No. 2: See ANSI/ASHRAE 15, *Safety Standard for Refrigeration Systems*, for information on the classification of areas involving ammonia atmospheres.

Flammable gases, flammable liquid–produced vapors, and combustible liquid–produced vapors are separated into four Class I groups — A, B, C, and D (or three Class I Zone 0 or Zone 1 groups — IIC, IIB, and IIA; see 505.6), depending on their properties. By grouping explosive mixtures that have similar igniting current ratios and maximum safe clearances between parts of a joint in an enclosure, equipment can be designed for the entire group rather than an individual chemical. This method makes it easier to properly select equipment designed for use in the particular group involved.

Selected combustible materials have been evaluated for the purpose of designating the appropriate gas group — A, B, C, or D (or IIC, IIB, or IIA) — and this information is used to properly select electrical equipment for use in Class I locations. These materials, with their group classification and relevant physical properties, are listed in 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*. For the complete table, refer to NFPA 497, Table 4.4.2.

(B) Class II Combustible Dust Group Classifications. Combustible dust shall be grouped in accordance with 500.6(B)(1) through (B)(3).

(1) Group E. Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment. [**499**:3.3.8.1.1]

Informational Note: Certain metal dusts may have characteristics that require safeguards beyond those required for atmospheres containing the dusts of aluminum, magnesium, and their commercial alloys. For example, zirconium, thorium, and uranium dusts have extremely low ignition temperatures [as low as 20°C (68°F)] and minimum ignition energies lower than any material classified in any of the Class I or Class II groups.

Δ **(2) Group F.** Atmospheres containing combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles (see ASTM D3175-2017, *Standard Test Method for Volatile Matter in the Analysis Sample of Coal and Coke*, for coal and coke dusts) or that have been sensitized by other materials so that they present an explosion hazard. [**499**:3.3.8.1.2] Coal, carbon black, charcoal, and coke dusts are examples of carbonaceous dusts. [**499**:A.3.3.8.1.2]

Informational Note: Testing of specific dust samples, following established ASTM testing procedures, is a method used to identify the combustibility of a specific dust and the need to classify those locations containing that material as Group F.

Δ **(3) Group G.** Atmospheres containing combustible dusts not included in Group E or Group F, including flour, grain, wood, plastic, and chemicals. [**499**:3.3.8.1.3]

NFPA 664, *Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities*, establishes minimum requirements for industrial, commercial, or institutional facilities that process wood or that manufacture wood products, creating wood chips, particles, or dust.

Informational Note No. 1: See NFPA 499, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*, for information on group classification of Class II materials.

Informational Note No. 2: The explosion characteristics of air mixtures of dust vary with the materials involved. For Class II locations, Groups E, F, and G, the classification involves the tightness of the joints of assembly and shaft openings to prevent the entrance of dust in the dust-ignitionproof enclosure, the blanketing effect of layers of dust on the equipment that may cause overheating, and the ignition temperature of the dust. It is necessary, therefore, that equipment be identified not only for the class but also for the specific group of dust that will be present.

Informational Note No. 3: See ANSI/IEEE C2, *National Electrical Safety Code*, Section 127A, Coal Handling Areas. Certain dusts might require additional precautions due to chemical phenomena that can result in the generation of ignitible gases.

Section 500.6(B) separates combustible dusts into three Class II groups — E, F, and G — depending on their properties.

Selected combustible dusts have been evaluated for the purpose of designating the appropriate dust group — E, F, or G — and this information is used to select electrical equipment for use in Class II locations. The selected materials, with their group classification and relevant physical properties, are listed in NFPA 499, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas*. For the complete table, refer to NFPA 499, Table 5.2.3.