

41—Electrical Hazards

500-2. Special Precaution. The intent of Articles 500 through 503 is to require a form of construction of equipment, and of installation that will insure safe performance under conditions of proper use and maintenance. It, therefore, is assumed that inspection authorities and users will exercise more than ordinary care with regard to installation and maintenance.

The explosion characteristics of air mixtures of hazardous gases, vapors, or dusts vary with the specific material involved. Classification of a hazardous mixture into a Class I hazardous location, Group A, B, C or D, involves determinations of maximum explosion pressure, maximum safe clearance between parts of a clamped joint in an enclosure, and the minimum ignition temperature of the atmospheric mixture. For Class II location, Groups E, F, and G, the classification involves the tightness of the joints of assembly and shaft openings to prevent entrance of dust in the dust-ignition-proof enclosure, the blanketing effect of layers of dust on the equipment that may cause overheating, electrical conductivity of the dust, and the ignition temperature of the dust. It is necessary, therefore, that equipment be approved not only for the class of location but also for the specific group of the gas, vapor or dust that will be present.

For purposes of testing and approval, various air mixtures (not oxygen enriched) have been grouped on the basis of their hazardous characteristics, and facilities have been made available for testing and approval of equipment for use in the following atmospheric groups:

For Groups A, B, C and D, see Table 500-2(c)

Group E, Atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys, and other metals of similarly hazardous characteristics.

Group F, Atmospheres containing carbon black, coal or coke dust.

Group G, Atmospheres containing flour, starch, or grain dust.

Certain chemical atmospheres may have characteristics which would require safeguards beyond those required for any of the above groups. Carbon disulfide is one of these chemicals because of its low ignition temperature (100 C) and the small joint clearance required to arrest its flame. For a complete list noting properties of flammable liquids, gases and solids refer to NFPA No. 325M-1969.

(a) Approval for Class and Properties. Equipment shall be approved not only for the class of location but also for the explosion properties of the specific gas, vapor, or dust that will be present. In addition, equipment shall not have exposed any surface that operates at a temperature in excess of the ignition temperature of the specific gas vapor or dust.

The characteristics of various atmospheric mixtures of hazardous gases, vapors, and dusts depend on the specific hazardous material involved.

(b) Marking. Approved equipment shall be marked to show the Class, Group and operating temperature, or temperature range, based on operation in a 40 C ambient for which it is approved.

The temperature range, if provided, shall be indicated in identification numbers, as shown in Table 500-2(b).

Identification numbers marked on equipment nameplates shall be in accordance with Table 500-2(b).

Exception: Equipment of the nonheat-producing type, such as junction boxes, conduit and fittings, are not required to have a marked operating temperature.

For purposes of testing and approval, various atmospheric mixtures (not oxygen enriched) have been grouped on the basis of their hazardous characteristics, and facilities have been made available for testing and approval of equipment for use in the atmospheric groups listed in Table 500-2(c). Since there is no consistent relationship between explosion properties and ignition temperature, the two must be regarded as independent requirements.