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Electrical Equipment–Hazardous Location Classification System

Fires and explosions in hazardous locations (i.e., flammable gases) are often the result of faulty electrical equipment resulting in significant property damage. Electrical equipment located in hazardous environments should be designed and approved for the location classification contained in Chapter 5 of NFPA 70, *National Electric Code*, published by the National Fire Protection Association (NFPA). The Code establishes classes and divisions that group electrical requirements together based on the type of hazard present. The following summary will help determine the designated NFPA hazard class of an environment.

Class I Locations

The most significant factor in classifying a location as Class I is the presence (or likelihood of presence) of flammable and combustible vapors or gases. The division rating is the probability of those vapors or gases being present.

Class I, Division 1

This classification is used in locations where concentrations of ignitable flammable gases or flammable or combustible vapors exist in the air under normal operating conditions; where concentrations can exist due to the frequency of maintenance operations; or where a failure of operating equipment and the electrical system could produce such concentrations. Electrical equipment for this classification is typically considered “explosion proof” or “intrinsically safe.” Typical locations that are classified as Class I, Division 1 include:

- Flammable storage areas where liquids and gases are transferred between containers
- Paint spraying operations using flammable paints and solvents
- Hot dip operations using flammable coatings

Class I, Division 2

This classification is used for locations where flammable and combustible liquids and gases are handled, but are normally confined to closed containers and piping and where an ignitable concentration would result if a rupture or failure to those containers or piping occurred. Class 1, Division 2 also includes locations where the failure of a positive pressure ventilation system would produce ignitable concentrations of flammable and combustible liquids and gases or when the area is next to a Class 1, Division 1 location where vapors could enter the space if the ventilation system failed. Electrical equipment for this classification is typically considered “hermetically sealed” or as a “purged enclosure.” Typical locations that are classified as Class I, Division 2 include:

- Propane cylinder storage areas
- Sealed drum bulk storage
- Downdraft flammable paint booth control rooms

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Class II Locations

The most significant factor in classifying a location as Class II is the presence (or likelihood) of combustible dust being present. The division rating is the probability of combustible dusts being present.

Class II, Division 1

This classification is used for locations where combustible dust is suspended in the air under normal operating conditions, where a mechanical failure could cause combustible dust to be suspended in the air, or where conductive dust is present in the environment. Electrical equipment for this classification is typically considered "dustproof." Typical locations that are classified as Class II, Division 1 include:

- Grain mills
- Wood-processing operations (i.e., sanding)
- Dust collectors

Class II, Division 2

This classification is used for locations where combustible dust may become suspended in the air because of equipment malfunctions or where a buildup of dust may prevent heat dissipation from electrical equipment. Electrical equipment for this classification is typically considered "dust-tight," and lamp enclosures should minimize the accumulation of dust. Typical locations that are classified as Class II, Division 2 include:

- Scrap paper baling
- Pit balers
- Printing equipment

Class III Locations

The most significant factor in classifying a location as Class III is the presence (or likelihood) of combustible fibers present. The division rating is simply the probability of combustible fibers being present.

Class III, Division 1

This classification is used for locations where materials that produce ignitable fibers, such as textiles, are processed or otherwise handled. These locations produce moderate accumulations of fibrous material that can increase the fuel loading in the area. Electrical equipment, such as motors and circuit breakers, should be fully enclosed and considered "dust-tight." Typical locations that are classified as Class III, Division 1 include:

- Clothing manufacturers
- Wood-working operations (excluding sanding operations)
- Textile processing

Class III, Division 2

This classification is used for locations where materials that produce ignitable fibers, such as textiles, are stored. Electrical equipment, such as motors and circuit breakers, should be fully enclosed and considered "dust-tight." Typical locations that are classified as Class III, Division 2 include:

- Garment packaging and distribution
- Book and periodical distribution
- Wood products storage

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