

## Hazardous Location Fans & Motors

### Understanding Hazardous Location Fans & Motors

Many areas do or may contain gas, vapor or dust in explosive quantities. These areas must be considered hazardous when selecting a fan. To exhaust these areas a fan with an explosion proof motor must be used, many explosions have been caused by exhausting a potentially explosive area with a fan and motor not designed for use in hazardous areas.

Locations Which May Contain Explosive Gas, Vapor or Dust in the Atmosphere; Oil Refineries; Painting Operations; Welding Shops; Chemical Plants; Grain Elevators; Coal Mines; Grain Mills; Battery Charging Areas; Chemical Storage; Paint Storage; Dry Cleaners; Laboratory Hoods; Feed Mills;

Flour Mills; Electroplating Operations

Most airborne dusts are flammable and potentially explosive, and should be treated as such. Locations containing any amounts of explosive material, no matter how slight, require the use of a fan with a motor rated for hazardous locations and spark resistant construction. Hazardous locations may include, but are not limited to the above list.

All Airmaster fans with explosion proof motors are rated for Class I, Group D, Class II, Groups F & G atmospheres. Some may be rated for Class I, Group D, Class II, Groups E, F & G, they will be listed in the catalog. An explosion proof motor is designed to withstand an explosion of a specific gas or vapor which may occur within it, and prevent the ignition of the gas or vapor which may be surrounding the motor casing. Always be sure that the motor classes and group ratings match the requirements of the hazardous location. Fans and air circulators with explosion proof motors must be hard wired using explosion proof components and in accordance with all local, state, and national codes. Equipment with explosion proof motors should never be supplied with a cord and plug. Plugging a piece of equipment into a wall outlet can cause a spark, which could lead to an explosion.

### National Electrical Code - Explosive Atmosphere Classifications

#### Class I

Group A: Acetylene

Group B: Butadiene, ethylene oxide, hydrogen, propylene oxide, manufactured gasses containing more than 30% hydrogen by volume.

Group C: Acetaldehyde, cyclopropane, diethyl ether, and ethylene.

Group D: Acetone, acrylonitrile, ammonia, benzene, butane, ethanol, ethylene dichloride, gasoline, hexane, isoprene, methane (natural gas), methanol, naphtha, propane, styrene, toluene, vinyl acetate, vinyl chloride, xylene.

#### Class II

Group E: Aluminum, magnesium, and other metal dusts with similar characteristics

Group F: Carbon black, coke or coal dust

Group G: Flour, starch or grain dust

#### Class III

Easily ignitable fibers, such as rayon, cotton, sisal, hemp, cocoa fiber, oakum, excelsior and other fibers of similar nature.

### What Classifies a Hazardous Environment?

The classification of a hazardous atmosphere requires considerable skill and judgment, especially the extent of the hazardous areas.

**Class I, Division I:** Those areas in which hazardous concentrations of flammable gasses, vapor or liquids exist, either continually or periodically during normal operating conditions. In these areas the National Electric Code requires the use of explosion proof motors at all times.

**Class II, Division II:** Those areas in which flammable gasses are handled, processed or used. In these locations the liquid or gas is normally confined in enclosed containers or systems, from which they can escape only in the event of accidental breakdown or abnormal operations. In these areas the National Electric Code requires only that the motors must not have sparking internal contacts (such as centrifugal switches). Normally, three phase TEFC motors are suitable for operation in these atmospheres.

Explosion proof motors are generally not available for Class I, Group A and Class I, Group B locations. When these conditions are encountered, it is usually necessary to isolate the motors from the hazardous location. Also, it is possible to substitute hydraulic or pneumatic motors in place of electric type. All Airmaster axial flow fans and air circulators with explosion proof motors have a cast aluminum propeller or a fabricated propeller with aluminum blades.

Note: All fans must be installed in accordance with all applicable national, state, and local electrical and mechanical codes. For further information, contact Airmaster Engineering.

