Hazardous Locations Classifications for Electrical Equipment: Zone System

Safety Talk

What's at Stake?

Hazardous Locations are defined as premises, buildings or parts thereof where fire or explosion hazards may exist due to the presence of flammable gases or vapors, flammable liquids, combustible dusts, or easily ignitable fibers.

What's the Danger?

- Electrical equipment installed in these atmospheres are a risk for fire and explosion.
- Electric arcs, sparks, and/or heated surfaces can serve as a source of ignition in such environments – and can be found in aircraft hangars, gasoline stations, paint-finishing locations or grain bins (among other locations).
- If not properly handled, these locations pose an extreme risk for not only workers, but for the public too.

How to Protect Yourself

The best way to protect yourself and others is by understanding the risks for various hazardous locations. There are two major systems to classify hazardous location electrical codes and standards. Today, will focus on the "Zone System," used worldwide, and more recently in North America, to classify specifically gases and vapors.

The Zone System of classification follows the international method of area classification as developed by the International Electrotechnical Commission (IEC).

Zones – defines the general nature (or properties) of the hazardous material – if it's a gas or dust, and the probability of the hazardous material in the surrounding atmosphere.

Material Type	Zone	Nature/ Probability of Hazards
Gases, Vapors, and Mist	z0	Ignitable concentrations of flammable gases or vapors which are **present continuously or for long periods of time.**
	z1	Ignitable concentrations of flammable gases or vapors which are **likely to occur under normal operating conditions.**
	z2	Ignitable concentrations of flammable gases or vapors which are **not likely to occur under normal operating conditions and do so only for a short period of time.**
Dust	z20	An area where combustible dusts or ignitable fibers and flyings are **present continuously or for long periods of time.**
	z21	An area where combustible dusts or ignitable fibers and flyings are **likely to occur under normal operating conditions.**
	z22	An area where combustible dusts or ignitable fibers and flyings are **not likely to occur under normal operating conditions and do so only for a short period of time.**

Groups – defines the type of the hazardous material and (partly) the location of the surrounding atmosphere. Groups are divided into three sub-groups.

Group	Type of Hazardous Material and Location of Atmosphere
I	**Mines** susceptible to firedamp (flammable mixture of gases naturally occurring in a mine).
II	**Explosive gas atmosphere** other than mines susceptible to firedamp, subdivided into three subgroups:
	A: Atmospheres containing propane, acetone, benzene, butane, methane, petrol, hexane, paint solvents or gases and vapors of equivalent hazard.
	B: Atmospheres containing ethylene, propylene oxide, ethylene oxide, butadiene, cyclopropane, ethyl ether, or gases and vapors of equivalent hazard.
	C: Atmospheres containing acetylene, hydrogen, carbon disulfide or gases and vapors of equivalent hazard.
III	**Explosive dust atmosphere**, subdivided into three subgroups:
	A: Atmospheres containing combustible flyings.
	B: Atmospheres containing non-conductive dust.
	C: Atmospheres containing conductive dust.

Final Word

Classification and understanding the risks posed by various hazardous locations is the first step in preventing accidents and injuries in these locations.