

Hazardous Area Classification

Hazardous Areas are locations where the potential for fire or explosion exists because of gases, dust, or easily ignitable fibers or flyings in the atmosphere.

In **North America**, hazardous area classification is separated by classes, divisions, and groups to define the level of safety required for equipment installed in these locations. Classes define the general form of the flammable materials in the atmosphere. Divisions define the probability of the presence of flammable materials. Groups classify the exact flammable nature of the material.

In **Europe and countries outside of North America**, classification of hazardous areas is accomplished differently. Zones are used to define the probability of the presence of flammable materials. Protection Types denote the level of safety for the device. Groups classify the exact flammable nature of the material. These groups are separated differently than North American Groups. Temperature Identifications convey the maximum surface temperature of the apparatus based on 104° F (40° C) ambient. These temperature codes are selected carefully not to exceed the ignition temperature of the specific gas or vapor to be encountered in the application.

Some hazardous area classifications are not shown here. For further detailed information, see specific standards published by approval organizations.

Classifications Inside North America

Classes	
Class I	Flammable gases or vapors are present in the air in quantities sufficient to produce explosive or ignitable mixtures.
Class II	Combustible or conductive dusts are present.
Class III	Ignitable fibers or flyings are present, but not likely to be in suspension in sufficient quantities to produce ignitable mixtures. (Group classifications are not applied to this class.)
Divisions	
Division 1	The substance referred to by class is present during normal conditions.
Division 2	The substance referred to by class is present only in abnormal conditions, such as a container failure or system breakdown.
Groups	
Group A	Acetylene
Group B	Hydrogen (or gases of equivalent hazard)
Group C	Ethylene (or gases of equivalent hazard)
Group D	Gasoline (or gases of equivalent hazard)
Group E	Metal Dust
Group F	Coal Dust
Group G	Grain Dust

Classification Outside North America

Zones	
Zone 0	Area in which an explosive gas-air mixture is continuously present or present for long periods.
Zone 1	Combustible or conductive dusts are present. Area in which an explosive gas-air mixture is likely to occur in normal operation.
Zone 2	Area in which an explosive gas-air mixture is not likely to occur, and if it occurs it will only exist for a short time.

Protection Types		Zone
d	Flameproof (Explosion proof) Enclosure	1,2
e	Increased Safety	1,2
ia	Intrinsic Safety	0,1,2
ib	Intrinsic Safety	1,2
o	Oil Immersion	2
p	Pressurized Apparatus (Purged Apparatus)	1,2
q	Powder Filling (Sand Filling)	2
m	Encapsulation	1,2
n	Normally Nonsparking and/or Nonincendive Circuits)	2

Temperature Codes		
	°F	°C
T1	842	450
T2	572	300
T3	392	200
T4	275	135
T5	212	100
T6	185	85

Groups	
Group I	For application in below ground installations (mines) where methane (firedamp) and coal dust may be present.
Group IIA	For application in above ground installation where hazards due to propane may exist. This group most closely matches the North American Group D.
Group IIB	For application in above ground installations where hazards due to ethylene may exist. This group most closely matches the North American Group C.
Group IIC	For application in above ground installations where hazards due to hydrogen or acetylene may exist. This group most closely matches the North American Groups A and B.