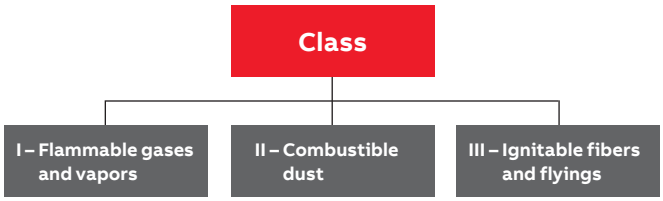
Hazardous locations
Classification

Areas where the possibility of explosion and fire is created by the presence of flammable gases, vapors, liquids, dust, fibers or flyings.



Class I – Gases, vapors or liquids

Class I locations are those in which flammable gases, flammable liquid-produced vapors or combustible liquid-produced vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Typical class I locations
Petroleum refineries and gasoline storage and dispensing areas
Industrial firms that use flammable liquids in dip tanks for parts cleaning or other operations
Petrochemical companies that manufacture chemicals from gas and oil
Dry cleaning plants where vapors from cleaning fluids can be present
Companies that have spraying areas where they coat products with paint or plastics
Aircraft hangars and fuel serving areas
Utility gas plants and operations involving storage and handling of liquified petroleum gas or natural gas

Class II – Combustible dusts

Class II locations are those that are hazardous because of the presence of combustible dust.

Typical class II locations
Grain elevators, flour and feed mills
Plants that manufacture, use or store magnesium or aluminum powders
Plants that have chemical or metallurgical processes: producers of plastics, medicines and fireworks, etc.
Producers of starch or candies
Spice-grinding plants, sugar plants and cocoa plants
Coal preparation plants and other carbon handling or processing areas

Class III – Fibers and flyings

Class III locations are those that are hazardous because of the presence of easily ignitable fibers or where materials producing combustible flyings are handled, manufactured or used, but in which such fibers/flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

Typical class III locations
Textile mills, cotton gins, cotton seed mills and flax processing plants
Any plant that shapes, pulverizes or cuts wood and creates sawdust or flyings

Fibers and flyings are not likely to be suspended in the air but can collect around machinery or on lighting fixtures and where heat, a spark or hot metal can ignite them.

Division 1 – Normally hazardous

Hazardous gases, vapors or dusts are present under normal operation conditions or during frequent repair and maintenance activity.

Division 2 – Not normally hazardous

Hazardous gases, vapors or dusts are not present under normal operating conditions.

Area classification | Divisions versus zones		
Continuous hazard	Intermittent hazard	Hazard under abnormal conditions
Zone 0	Zone 1	Zone 2
	Division 1	Division 2

These are simplified definitions. Complete data is in the U.S. National Electrical Code (NEC) and the Canadian Electrical Code (CEC).

Groups A, B, C, D

The gases and vapors of Class I locations are broken into four groups by the code A, B, C and D. These materials are grouped according to the ignition temperature of the substance, its explosion pressure and other flammable characteristics.

Groups E, F, G

Class II dust locations groups E, F and G are classified according to the ignition temperature and the conductivity of the hazardous substance.

Hazardous locations
Zone classification

Zone system
Hazardous locations per the Zone system are classified according to its Zone which can be gas or dust. For gas atmospheres electrical equipment is further divided into Groups and Subgroups.

Zone – The Zone defines the probability of the hazardous material, gas or dust, being present in sufficient quantities to produce explosive or ignitable mixtures.

1. Gas
a. **Zone 0** – Ignitable concentrations of flammable gases or vapors which are present continuously or for long periods of time.
b. **Zone 1** – Ignitable concentrations of flammable gases or vapors which are likely to occur under normal operating conditions.
c. **Zone 2** – 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.

2. Dust
a. **Zone 20** – An area where combustible dusts or ignitable fibers and flyings are present continuously or for long periods of time.
b. **Zone 21** – An area where combustible dusts or ignitable fibers and flyings are likely to occur under normal operating conditions.
c. **Zone 22** – 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.

Group
Electrical equipment is divided into three groups:

Group I – Equipment intended for use in mines susceptible to firedamp (flammable mixture of gases naturally occurring in a mine).

Group II – Equipment intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp. Group II equipment is subdivided into three subgroups.
- **Group IIA** – Atmospheres containing propane, or gases and vapors of equivalent hazard.
- **Group IIB** – Atmospheres containing ethylene, or gases and vapors of equivalent hazard.
- **Group IIC** – Atmospheres containing acetylene or hydrogen, or gases and vapors of equivalent hazard.

Group III – Equipment intended for use in places with an explosive dust atmosphere. Group III equipment is subdivided into three subgroups.
- **Group IIIA** – Atmospheres containing combustible flyings.
- **Group IIIB** – Atmospheres containing non-conductive dust.
- **Group IIIC** – Atmospheres containing conductive dust.

Comparison between Zones and Classes/Divisions

Standards	NEC 505	NEC 500
Atmosphere		
Gases, vapors	**Zone 0** **Zone 1**	**Class I, Div. 1**
	Zone 2	**Class I, Div. 2**
Dusts	**Zone 20** **Zone 21**	**Class II, Div. 1**
	Zone 22	**Class II, Div. 2**

Zone system: Gas groups

Gas groups	Representative gas
IIA	**Propane**
IIB	**Ethylene**
IIB H_2	**Hydrogen**
IIC	**Acetylene**

Zone system: Dust groups

Dust groups	Dust type
IIIC	**Combustible and conductive dust (metal dusts)**
IIIB	**Combustible and non-conductive (not metal) dust**
IIIA	**Combustible flyings**