

Hazardous Classified Locations Classes & Divisions vs. Zones

A Hazardous Classified Location is an area where fire or explosion hazards exist due to flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings. The locations can be defined by Classes, Divisions, Groups, and Temperature Codes or by Zones.

- Classes: Classes define an area with respect to type of hazard presiding in the area.
- Divisions: Divisions further define an area with respect to whether potentially explosive conditions reside normally or abnormally.
- Groups: Groups further define areas by explosive characteristics of the hazardous materials such as ignition temperature, explosion pressure, flammability, and conductivity.

Temperature Codes

Because mixtures of hazardous gases and air may ignite in contact with a hot surface, equipment that is certified for hazardous locations receives a temperature code indicating the maximum surface temperature of the equipment. These range from a T6 rating of 185 F to a T1 rating of 842 F.

Below is a summary from the National Electric Code (NEC) Articles 501-503 and referenced in OSHA's Hazardous Classified Locations Outreach Training for the Construction Industry.

Summary of Class I, II, III Hazardous Locations				
Class		Group	Division	
			1	2
I	Gases, Vapors, Liquids Examples include: Petroleum refineries, spray finishing area, and pharmaceutical manufacturing plants.	A. Acetylene	Normally Explosive and Hazardous	Not normally present in an explosive concentration (but may accidentally exist). *EVAHL
		B. Atmospheres such as butadiene, ethylene oxide, propylene oxide, acrolein, or hydrogen (or gases or vapors equivalent in hazard to hydrogen)		
		C. Atmospheres such as cyclopropane, ethyl ether, ethylene, or gas or vapors of equivalent hazard		
		D. Atmospheres such as acetone, alcohol, ammonia, benzene, benzol, butane, gasoline, hexane, lacquer solvent vapors, naphtha, natural gas, propane, or gas or vapors of equivalent hazard		
II	Dusts Examples include: Grain elevators, flour mills, coal preparation plants, and pharmaceutical manufacturing plants.	E. Metal Dusts. Aluminum and magnesium dusts and other metal dusts of similar nature.	Ignitable quantities of dust normally are or may be in suspension, or conductive dust may be present.	Dust not normally suspended in an ignitable concentration (but may accidentally exist). Dust layers are present. *EVAHL
		F. Atmospheres containing such materials as carbon black, charcoal dust, coal, and coke dust.		
		G. Grain dusts, flour, starch, cocoa, and similar types of materials.		
III	Fibers and Flyings Examples include: Textile Mills, cotton gins, and saw mills.	H. Textiles, woodworking, etc (easily ignitable, but not likely to be explosive)	Handled or used in manufacturing. *EVAHL	Stored or handled in storage (exclusive of manufacturing). *EVAHL

*The Bullard EVAHL Powered Air-Purifying Respirator is certified by CSA International for Class I, Division 2, Groups A, B, C, D; Class II, Division 2, Groups F, G; and Class III (certificate 2510928)

Zones

Zones are another method of classifying hazardous locations per NEC Article 505 and OSHA 1910.307 Hazardous Classified Locations.

1910.307(a)(4)

Division and zone classification. In Class I locations, an installation must be classified as using the division classification system meeting paragraphs (c), (d), (e), and (f) of this section or using the zone classification system meeting paragraph (g) of this section. In Class II and Class III locations, an installation must be classified using the division classification system meeting paragraphs (c), (d), (e), and (f) of this section.

Though the zone system is more prevalent internationally it is accepted in the United States. Following are several tables depicting a simplified comparison between the Zone Standards and Class/Division Standards:

For Gases		
Zone 0	Zone 1	Zone 2
Where ignitable concentrations of flammable gases, vapors or liquids are present continuously or for long periods of time under normal operating conditions	Where ignitable concentrations of flammable gases, vapors, or liquids: <ul style="list-style-type: none"> • Are likely to exist under normal operating conditions • May exist frequently because of repair, maintenance operations, or leakage 	Where ignitable concentrations of flammable gases, vapors, or liquids: <ul style="list-style-type: none"> • Are not likely to exist under normal operating conditions • Occur for only a short period of time • Become hazardous only in case of an accident or some unusual operating condition
Division 1		Division 2
Where ignitable concentrations of flammable gases, vapors, or liquids: <ul style="list-style-type: none"> • Are likely to exist under normal operating conditions • May exist frequently because of repair, maintenance operations, or leakage 		Where ignitable concentrations of flammable gases, vapors, or liquids: <ul style="list-style-type: none"> • Are not likely to exist under normal operating conditions • Are normally confined within closed containers or closed systems and will be present only through accidental rupture, breakage or unusual faulty operation

Zone	Class/Division
IIC – Acetylene and Hydrogen	A – Acetylene
	B – Hydrogen (and similar)
IIB – Ethylene	C – Ethylene (and similar)
IIA – Propane	D – Propane (and similar)

For Dusts, Fibers/Flyings		
Zone 20	Zone 21	Zone 22
Where ignitable concentrations of combustible dusts are present continuously or for long periods of time under normal operating conditions	Where ignitable concentrations of combustible dusts: <ul style="list-style-type: none"> • Are likely to exist under normal operating conditions • May exist frequently because of repair, maintenance operations, or leakage 	Where ignitable concentrations of combustible dusts: <ul style="list-style-type: none"> • Are not likely to exist under normal operating conditions • Occur for only a short period of time • Become hazardous only in case of an accident or some unusual operating condition
Division 1		Division 2
Where ignitable concentrations of combustible dusts: <ul style="list-style-type: none"> • Are likely to exist under normal operating conditions • May exist frequently because of repair, maintenance operations, or leakage 		Where ignitable concentrations of combustible dusts: <ul style="list-style-type: none"> • Are not likely to exist under normal operating conditions • Are normally confined within closed containers or closed systems and will be present only through accidental rupture, breakage or unusual faulty operation

Americas:
Bullard
 1898 Safety Way
 Cynthiana, KY 41031-9303 • USA
 Toll-free within USA: 877-BULLARD (285-5273)
 Tel: +1-859-234-6616
 Fax: +1-859-234-8987

Europe:
Bullard GmbH
 Lilienthalstrasse 12
 53424 Remagen • Germany
 Tel: +49-2642 999980
 Fax: +49-2642 9999829

Asia-Pacific:
Bullard Asia Pacific Pte. Ltd.
 LHK Building
 701, Sims Drive, #04-03
 Singapore 387383
 Tel: +65-6745-0556
 Fax: +65-6745-5176

