



HAZARDOUS LOCATION

LIGHTING FOR CLASSIFIED ENVIRONMENTS



PARAMOUNT INDUSTRIES, INCORPORATED

HAZARDOUS LOCATION INFORMATION

This guide outlines the National Electric Code requirements for luminaires in locations where fire or explosive hazards may exist due to flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers or flyings.

Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts or fibers that may be present and the likelihood that a flammable or combustible concentration or quantity is present. Each room, section or area shall be considered individually in determining its classification.

Within each class there are varying degrees of hazard, so each class is subdivided into two divisions. The classification by division is based on the likelihood the material will be present. The requirements for Division 1 of each class are more stringent than those for Division 2. The materials on the three classes are defined as follows: Class I, flammable gases or vapors; Class II, combustible dust; and; Class III,

combustible fibers or flyings.

Paramount Industries, Inc. manufactures both fluorescent and high intensity discharge luminaires Listed by Underwriters Laboratories as suitable for use in the following classified environments: *CLASS I, DIVISION 2, GROUP A, B, C AND D; CLASS II, DIVISION 2, GROUP F AND G; AND, CLASS III, DIVISIONS 1 AND 2.*

Please note that equipment suitable for one class and group is not necessarily suitable for any other class and group. To protect against explosions in hazardous locations, all luminaires exposed to the hazardous atmospheres are required to be suitable for each location. Do not take for granted that luminaires suitable for Class I use are also suitable for Class II use. Grain dust, for example, will ignite at a temperature lower than most flammable vapors.

CLASS I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures (See Table 1).

CLASS I DIVISION 1: A Class I Division 1 location is a location (1) In which ignitable concentrations of flammable gases or vapor can exist under normal operating conditions.

(2) In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage.

(3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.

CLASS I DIVISION 2: A Class I Division 2 location is a location (1) In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment.

(2) In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operation or the ventilating equipment.

(3) That is adjacent to a Class I Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.



Robotic Paint Booth System
Warren, Michigan

CLASS I GROUP CLASSIFICATIONS as follows;

GROUP A: Atmospheres containing acetylene.

GROUP B: Atmospheres containing hydrogen, fuel and combustible process gases containing more than 30% hydrogen by volume, or gases or vapors or equivalent hazard such as butadiene, ethylene oxide, propylene oxide, and acrolein.

GROUP C: Atmospheres such as ethyl ether, ethylene, or gases or vapors of equivalent hazard.

GROUP D: Atmospheres such as acetone, ammonia, benzene, butane, cyclopropane, ethanol, gasoline, hexane, methanol, methane, natural gas, naphtha, propane, or gases or vapors of equivalent hazard.

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

CLASS II DIVISION 1:

- (1) In which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures.
- (2) Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electrical equipment, through operation or protection devices, or from other causes.
- (3) In which combustible dusts of an electrically conductive nature may be present in hazardous quantities.

CLASS II DIVISION 2:

- (1) Where combustible dust is not normally in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical or other apparatus, but combustible dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment.
- (2) Where combustible dust accumulations on, in, or in the vicinity of the electrical equipment may be sufficient to interfere with the safe dissipation of heat from electrical equipment or may be ignitable by abnormal operation or failure of electrical equipment.

CLASS II GROUP CLASSIFICATIONS as follows:

GROUP E: Atmospheres containing combustible metal dusts, including aluminum, magnesium, and their commercial alloys, or other combustible dusts whose particle size, abrasiveness, and conductivity present similar hazards in the use of electrical equipment. Where Class II, Group E dusts are present in hazardous quantities, there are only Division 1 locations.

GROUP F: Atmospheres containing combustible carbonaceous dusts, including carbon black, charcoal, coal, or dusts that have been sensitized by other materials so that they present an explosion hazard.

GROUP G: Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic, and chemicals.

CLASS III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

CLASS III DIVISION 1:

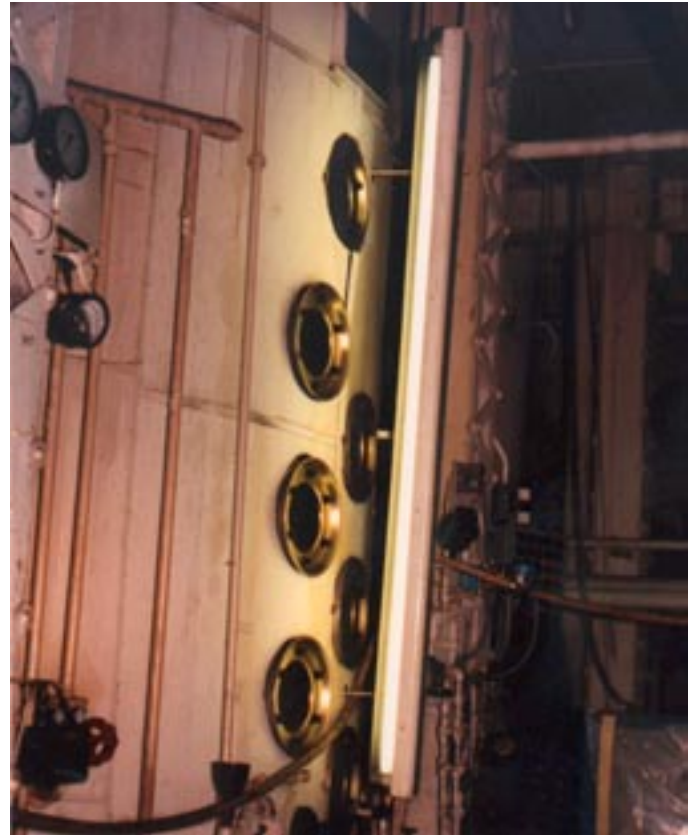
(1) A location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

CLASS III DIVISION 2:

(1) A location in which easily ignitable fibers are stored handled other than in the process of manufacture.

There are no group designations for Class III locations.

Luminaires manufactured by Paramount Industries, Inc. for Class III locations carry a Class II, Division 2, Group G label issued by Underwriters Laboratories.



Agricultural processing facility
Croswell, MI



Airlines Replating Facility Class 1, Division 2
Tulsa, Oklahoma

Classification of Hazardous Locations

SELECTED FLAMMABLE GASES AND VAPORS OF LIQUIDS CLASSIFIED AS CLASS I, GROUP A, B, C, & D.

Table 1

Group Classification and Autoignition Temperature (AIT) of Selected Flammable Gases and Vapors of Liquids having Flash Points below 100 °F (37.8 °C).		<i>MATERIAL</i>	<i>GROUP</i>	<i>MATERIAL</i>	<i>GROUP</i>	Group Classification and Autoignition Temperature (AIT) of Vapors of Selected Liquids Having Flash Points 140° F (60°C) or Greater, but less than 200°F (93.3°C).					
<i>MATERIAL</i>	<i>GROUP</i>					<i>MATERIAL</i>	<i>GROUP</i>				
Acetaldehyde	C	Gasoline	D	Styrene	D	Acetone Cyanohydrin	D				
Acetone	D	Heptane	D	Tetrahydrofuran	C	Adiponitrile	D				
Acetonitrile	D	Heptene	D	Toluene	D	Aniline	D				
Acetylene	A	Hexane	D	Triethylamine	C	Benzyl Chloride	D				
Acrolein (inhibited)	B	2-Hexanone	D	Tripropylamine	D	n-Butyl Formal	C				
Acrylonitrile	D	Hexenes	D	Turpentine	D	t-Butyl Toluene	D				
Allyl Alcohol	C	Hydrogen	B	Unsymmetrical Dimethyl		n-Butyric Acid	D				
Allyl Chloride	D	Hydrogen Cyanide	C	Hydrazine (UDMH)	C	Chloroacetaldehyde	C				
Ammonia	D	Hydrogen Selenide	C	Valeraldehyde	C	1-Chloro-1-Nitropropane	C				
n-Amyl Acetate	D	Hydrogen Sulfide	C	Vinyl Acetate	D	Cresol	D				
sec-Amyl Acetate	D	Isoamyl Acetate	D	Vinyl Chloride	D	Cyclohexanol	D				
Benzene	D	Isoamyl Alcohol	D	Vinylidene Chloride	D	n-Decaldehyde	C				
1,3-Butadiene	B	Isobutyl Acrylate	D	Xylenes	D	n-Decanol	D				
Butane	D	Isobutyraldehyde	C	Group Classification and Autoignition Temperature (AIT) of Vapors of Selected Liquids Having Flash Points 100 °F (37.8 °C) or Greater, but less than 140 of (60 °C)				Diacetone Alcohol	D		
1-Butanol	D	Isoprene	D					Acetic Acid	D	o-Dichlorobenzene	D
2-Butanol	D	Isopropyl Acetate	D					Acetic Anhydride	D	1,1-Dichloro-1-Nitroethane	C
n-Butyl Acetate	D	Isopropylamine	D					Acrylic Acid	D	Diethylaminoethanol	C
iso-Butyl Acetate	D	Isopropyl Ether	D					Allyl Glycidyl Ether	B	Diethylene Glycol Monobutyl Ether	C
sec-Butyl Acetate	D	Isopropyl Glycidyl Ether	C					t-Butyl Acetate	D	Diethylene Glycol Monomethyl Ether	C
Butylamine	D	Liquefied Petroleum Gas	D					n-Butyl Acrylate (inhibited)	D	N-N-Dimethyl Aniline	C
Butylene	D	Manufactured Gas						N-Butyl Glycidyl Ether	B	Dimethyl Sulfate	D
Butyl Mercaptan	C	(more than 30% H ₂)	B					Cumene	D	Dipropylene Glycol Methyl Ether	C
n-Butylaldehyde	C	Mesityl Oxide	D					Cyclohexanone	D	Dodecene	D
Carbon Monoxide	C	Methane	D					p-Cymene	D	Ethylene Glycol Monobutyl Ether	C
Chlorobenzene	D	Methanol	D					Decene	D	Ethylene Glycol Monobutyl Ether Acetate	C
Chloroprene	D	Methyl Acetate	D					Diethyl Benzene	D	2-Ethyl Hexanol	D
Crotonaldehyde	C	Methylacetylene	C	Di-isobutyl Ketone	D	2-Ethyl Hexyl Acrylate	D				
Cyclohexane	D	Methulacetylene-Propadiene (stabilized)	C	Dimethyl Formamide	D	2-Ethyl-3-Propyl Acrolein	C				
Cyclohexene	D	Methyl Acrylate	C	Dipentene	D	Furfural	C				
Cyclopropane	D	Methylamine	D	Ethyl sec-Amyl Ketone	D	Furfural Alcohol	C				
1,1-Dichlorethane	D	Methylcyclohexane	D	Ethyl Butanol	D	Hexanol	D				
1,2-Dichloroethylene	D	Methyl Ether	C	Ethyl Butyl Ketone	D	Isodecaldehyde	C				
1,3-Dichloropropene	D	Methyl Ethyl Ketone	D	Ethylene Chlorohydrin	D	Iso-octyl Alcohol	D				
Dicyclopentadiene	C	Methyl Formal	C	Ethylene Glycol Monoethyl Ether	C	Isophorone	D				
Diethyl Ether	C	Methyl Formate	D	Ethylene Glycol Monoethyl Ether Acetate	C	Methylcyclohexanol	D				
Diethylamine	C	Methyl Isobuty Ketone	D	Ethylene Glycol Monomethyl Ether	D	2-Methyl-5-Ethyl Pyridine	D				
Di-isobutylene	D	Methyl Isocyanate	D	2-Ethylhexaldehyde	D	Monoethanolamine	D				
Di-isopropylamine	C	Methyl Mercaptan	C	Ethyl Silicate	D	Monoisopropanolamine	D				
Dimethylamine	C	Methyl Methacrylate	D	Formic Acid (90%)	D	Monomethyl Aniline	C				
1,4-Dioxane	C	2-Methyl-1-Propanol	D	Fuel Oils	D	Nitrobenzene	D				
Di-n-propylamine	C	2-Methyl-2-Propanol	D	sec-Hexyl Acetate	D	Nonyl Alcohol	D				
Epichlorohydrin	C	Monomethyl Hydrazine	C	Hydrazine	C	n-Octyl Alcohol	D				
Ethane	D	Naphtha (Petroleum)	D	Iso-octyl Aldehyde	C	Phenylhydrazine	D				
Ethanol	D	Nitroethane	C	Kerosene	D	Propiolactone	D				
Ethyl Acetate	D	Nitromethane	C	Methyl Amyl Alcohol	D	Propionic Anhydride	D				
Ethyl Actylate (inhibited)	D	Nonane	D	Methyl n-Amyl Ketone	D	Tetrahydronaphthalene	D				
Ethylamine	D	Norene	D	o-Methylcyclohexanone	D	Tridecene	D				
Ethyl Benzene	D	Octane	D	alpha-Methyl Styrene	D	Triethylbenzene	D				
Ethyl Chloride	D	Octene	D	Morpholine	C	Undecene	D				
Ethylene	C	Pentane	D	Naphtha (Coal Tar)	D	Vinyl Tuolene	D				
Ethylenediamine	D	1-Pentanol	D	1-Nitropropane	C						
Ethylene Dichloride	D	2-Pentanone	D	2-Nitropropane	C						
Ethylenimine	C	1-Pentene	D	Propionic Acid	D						
Ethylene Oxide	B	Propane	D	Tetramethyl Lead	C						
Ethyl Formate	D	1-Propanol	D								
Ethyl Mercaptan	C	2-Propanol	D								
n-Ethyl Morpholine	C	Propionaldehyde	C								
Formaldehyde (Gas)	B	n-Propyl Acetate	D								
		Propylene	D								
		Propylene Dichloride	D								
		Propylene Oxide	B								
		n-Propyl Ether	C								
		Propyl Nitrate	B								
		Pyridine	D								

SELECTED NONCONDUCTIVE DUSTS CLASSIFIED AS CLASS II, GROUP F and G.

Table 2

Ignition Sensitivity Equal to or Greater than 0.2; Explosion Severity Equal to or Greater than 0.5.

AGRICULTURAL DUSTS

Alfalfa Meal
Almond Shell
Apricot Pit
Cellulose
Cherry Pit
Cinnamon
Citrus Peel
Cocoa Bean Shell
Cocoa, natural, 19% fat
Coconut Shell
Corn
Corncob Grit
Corn Dextrine
Cornstarch, commercial
Cornstarch, modified
Cork
Cottonseed Meal
Cube Root, South Amer.
Flax Shive
Garlic, dehydrated
Guar Seed
Gum, Arabic
Gum, Karaya
Gum, Manila (copal)
Gum, Tragacanth
Hemp Hurd
Lycopodium
Malt Barley
Milk, Skimmed
Pea Flour
Peach Pit Shell
Peanut Hull
Peat, Sphagnum
Pecan Nut Shell
Pectin
Potato Starch, Dextrinated
Pyrethrum
Rauwolfia Vomitoria Root
Rice
Rice Bran
Rice Hull
Safflower Meal
Soy Flour
Soy Protein
Sucrose
Sugar, Powdered
Tung, Kernels, Oil-Free
Walnut Shell, Black
Wheat
Wheat Flour
Wheat Gluten, gum
Wheat Starch
Wheat Straw
Woodbark, Ground
Wood Flour
Yeast, Torula

CARBONACEOUS DUSTS

Asphalt, (Blown Petroleum Resin)
Charcoal
Coal, Kentucky Bituminous

MATERIAL

Coal, Pittsburgh Experimental
Coal, Wyoming
Gilsonite
Lignite, California
Pitch, Coal Tar
Pitch, Petroleum
Shale, Oil

CHEMICALS

Acetoacetanilide
Acetoacet-p-phenetidide
Adipic Acid
Anthranilic Acid
Aryl-nitrosomethylamide
Azelaic Acid
2,2-Azo-bis-butyronitrile
Benzoic Acid
Benzotriazole
Bisphenol-A
Chloroacetoacetanilide
Diallyl Phthalate
Dicumyl Peroxide 40-60
Dicyclopentadiene Dioxide
Dihydroacetic Acid
Dimethyl Isophthalate
Dimethyl Terephthalate
3,5 - Dinitrobenzoic Acid
Dinitrotoluamide
Diphenyl
Ditertiary Butyl Paracresol
Ethyl Hydroxyethyl Cellulose
Fumaric Acid
Hexamethylene Tetramine
Hydroxyethyl Cellulose
Isocto Anhydride
Methionine
Nitrosoamine
Para-oxy-benzaldehyde
Paraphenylene Diamine
Paratertiary Butyl Benzoic Acid
Pentaerythritol
Phenylbetanaphthylamine
Phthalic Anhydride
Phthalimide
Salicylanilide
Sorbic Acid
Stearic Acid, Aluminum Salt
Stearic Acid, Zinc Salt
Sulfur
Teraphthalic Acid

DRUGS

2-Acetyl-amino-5-nitrothiazole
2-Amino-5-nitrothiazole
Aspirin
Gulasonic Acid, Diacetone
Mannitol
Nitropropidone
1-Sorbose
Vitamin B1, mononitrate
Vitamin C (Ascorbic Acid)

DYES, PIGMENTS, INTERMEDIATES

Beta-naphthalene-azo-Dimethylaniline
Green Base Harmon Dye

MATERIAL

Red Dye Intermediate
Violet 200 Dye

PESTICIDES

Benzethonium Chloride
Bis(2-Hydroxy-5-chlorophenyl) methane
Crag No. 974
Dieldrin (20%)
2,6-Ditertiary-butyl-paracresol
Dithane
Ferbam
Manganese Vancide
Sevin
 α,α Trithiobis (N,N Dimethylthioformamide)

THERMOPLASTIC RESINS AND MOLDING COMPOUNDS

Acetal Resins
Acetal, Linear (Polyformaldehyde)
Acrylic Resins
Acrylamide Polymer
Acrylonitrile Polymer
Acrylonitrile - Vinyl Pyridine Copolymer
Acrylonitrile-Vinyl Chloride-Vinylidene Chloride Copolymer (70-20-10)
Methyl Methacrylate Polymer
Methyl Methacrylate - Ethyl Acrylate Copolymer
Methyl Methacrylate-Ethyl Acrylate-Styrene Copolymer
Methyl Methacrylate-Styrene-Butadiene-Acrylonitrile Copolymer
Methacrylic Acid Polymer
Cellulosic Resins
Cellulose Acetate
Cellulose Triacetate
Cellulose Acetate Butyrate
Cellulose Propionate
Ethyl Cellulose
Methyl Cellulose
Carboxymethyl Cellulose
Hydroxyethyl Cellulose
Chlorinated Polyether Resins
Chlorinated Polyether Alcohol
Nylon (Polyamide) Resins
Nylon Polymer (Polyhexa-methylene Adipamide)
Polycarbonate Resins
Polycarbonate
Polyethylene Resins
Polyethylene, High Pressure Process
Polyethylene, Low Pressure Process
Polyethylene Wax
Polymethylene Resins
Carboxypolymethylene
Polypropylene Resins
Polypropylene (No Antioxidant)
Rayon Resins
Rayon (Viscose) Flock
Styrene Resins
Polystyrene Molding Cmpd.
Polystyrene Latex
Styrene-Acrylonitrile (70-30)

MATERIAL

Styrene-Butadiene Latex (> 75% Styrene; Alum Coagulated)
Vinyl Resins
Polyvinyl Acetate
Polyvinyl Acetate/Alcohol
Polyvinyl Butyral
Vinyl Chloride - Acrylonitrile Copolymer
Polyvinyl Chloride - Dioctyl Phthalate Mixture
Vinyl Toluene - Acrylonitrile Butadiene Copolymer

THERMOSETTING RESINS AND MOLDING COMPOUNDS

Allyl Resins
Allyl Alcohol (Derivative CR-39)
Amino Resins
Urea Formaldehyde Molding Compound
Urea Formaldehyde - Phenol Formaldehyde Molding Compound (Wood Flour Filler)
Epoxy Resins
Epoxy
Epoxy - Bisphenol A
Phenol Furfural
Phenolic Resins
Phenol Formaldehyde
Phenol Formaldehyde Molding Cmpd (Wood Flour Filler)
Phenol Formaldehyde, Polyalkylene - Polyamine Modified
Polyester Resins
Polyethylene Terephthalate
Styrene Modified Polyester - Glass Fiber Mixture
Polyurethane Resins
Polyurethane Foam, No Fire Retardant
Polyurethane Foam, Fire Retardant

SPECIAL RESINS AND MOLDING COMPOUNDS

Alkyl Ketone Dimer Sizing Compound
Cashew Oil, Phenolic, Hard
Chlorinated Phenol
Coumarone-Indene, Hard
Ethylene Oxide Polymer
Ethylene-Maleic Anhydride Copolymer
Lignin, Hydrolized, Wood-Type, Fines
Petri Acrylate Monomer
Petroleum Resin (Blown Asphalt)
Rosin, DK
Rubber, Crude, Hard
Rubber, Synthetic, Hard (33% S)
Shellac
Sodium Resinate
Styrene - Maleic Anhydride Copolymer



PARAMOUNT INDUSTRIES, INC.



CROSWELL, MICHIGAN



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INDUSTRIES, INCORPORATED

304 North Howard St. P.O. Box 259 Croswell, MI 48422
Telephone: (800) 521-5405 Fax: (800) 852-7154

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