HAZARDOUS FUNDAMENTALS GUIDE

CLASSES

Class I, Gas or Vapor

(NEC Article 500-5, 5001-9)

Areas where inflammable gases or vapors may be present in sufficient quantities to produce an explosive or flammable mixture.

Class II, Dust

(NEC Article 500-6, 502-11)

Areas where combustible dusts are present in sufficient quantities to produce a hazardous environment.

Class III, Fiber

(NEC Article 500-7, 503-9)

Areas where ignitable fibers or flyings are present in sufficient quantities to produce ignitable mixtures.

DIVISIONS

Division 1, Always Present

(NEC Article 500-5a, 500-6a, 500-7a, 502-11a)

Areas where the hazardous condition is normally present, either continuously or periodically.

Division 2, Not Normally Present

(NEC Article 500-5b, 500-6b, 500-7b, 500-9b, 502-11b)

Areas where the hazardous condition is present due to accidental rupture, release, breakage, or unusual faulty operation of a closed container or system.

GROUPS (NEC Article 500-2, 500-3)

Class I	Class II
Group A - Acetylene	Group E - Metal Dust
Group B- Hydrogen	Group F - Coal Dust
Group C - Ether	Group G - Grain Dust
Group D - Gasoline	

ZONAL CLASSIFICATIONS

IEC publication 79-10 defines the guidelines for classifying hazardous area. Instead of using Classes and Divisions, the term Zones is used as defined below.

Zone 0 - Is an area in which an explosive gas or vapor is continuously present or present for long periods, typically more than 1,000 hours per year. Generally, most industrial users try to keep all electrical equipment out of the Zone 0 area. The only equipment approved is intrinsically safe equipment.

Zone 1 - Is an area in which an explosive gas atmosphere is likely to occur in normal conditions for more than 10 hours per year and less than 1,000 hours per year.

Zone 2 - Is defined as an area in which explosive gas or vapor atmospheres are not likely to occur and if it does, it is only for a short period of time, typicaly less than 10 hours per year.

Zone 20 - Is an explosive atmosphere, resulting from dust which is present continuously.

Zone 21 - This is defined as an atmosphere where dust is occasionally present.

Zone 22 - This is defined as an atmosphere where dust is not normally present.

NOTE: Class III locations (fibers & flyings) are covered in Zone 20, 21, & 22.

CLASSIFICATION COMPARISONS

Hazardous Material	NEC U.S. Standards	IEC Euronorm Standards
Gas or Vapor	Class I, Div. 1	Zone 0 & Zone 1
	Class I, Div. 2	Zone 2
Dust	Class II, Div. 1	Zone 20 and Zone 21
	Class II, Div. 2	Zone 22
Fibers or Flyings	Class III, Div. 1	Zone 20 and Zone 21
	Class III, Div. 2	Zone 22

TEMPERATURE MARKINGS

Maximum Surface Temperatures		T-Code*	Maximum Surface Temperatures		T-Code*
°C	°F		°C	°F	
450	840	T1	180	356	T3A
300	572	T2	165	329	T3B
280	536	T2A	160	320	T3C
260	500	T2B	135	275	T4
230	446	T2C	120	248	T4A
215	419	T2D	100	212	T5
200	392	T3	85	185	T6

* Based on 40°C (104°F) ambient

For complete information, refer to the National Electric Code (NEC)

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IP (International Protection) CODE

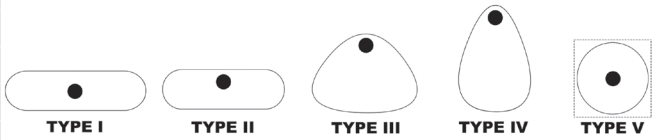
IP Code is a coding system to indicate the degree of protection by an enclosure against access to hazardous parts, ingress of solid objects, ingress of water, and to give additional information in connection with such protection.

First Character indicates the degree of protection against the ingress of solid objects.		**Second Character** indicates the degree of protection against the ingress of water with harmful effects.	
0	Non-protected	**0**	Non-protected
1	Protected against solid foreign objects of 50 mm diameter or greater	**1**	Protected against vertically falling water drops
2	Protected against solid foreign objects of 12.5 mm diameter or greater	**2**	Protected against vertically falling water drops as the enclosure is tilted 15°
3	Protected against solid foreign objects of 2.5 mm diameter or greater	**3**	Protected against spraying water
4	Protected against solid foreign objects of 1.0 mm diameter or greater	**4**	Protected against splashing water
5	Dust-protected	**5**	Protected against water jetting
6	Dust-tight	**6**	Protected against powerful water jetting
		7	Protected against temporary immersion
		8	Protected against continuous immersion

UL STANDARDS

Number	Title
844	Luminaires for Use in Hazardous (Classified) Locations
924	Emergency Lighting and Power Equipment
1598	Luminaires
1598A	Supplemental Requirements for Luminaires For Installation on Marine Vessels
8750	LED Equipment

ANSI/IES LATERAL LIGHT DISTRIBUTIONS

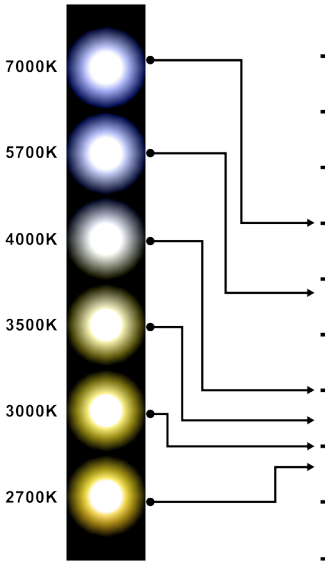


TYPE I	TYPE II	TYPE III	TYPE IV	TYPE V
Asymmetrical Long and Narrow	Asymmetrical	Asymmetrical	Asymmetrical Forward Throw	Symmetrical

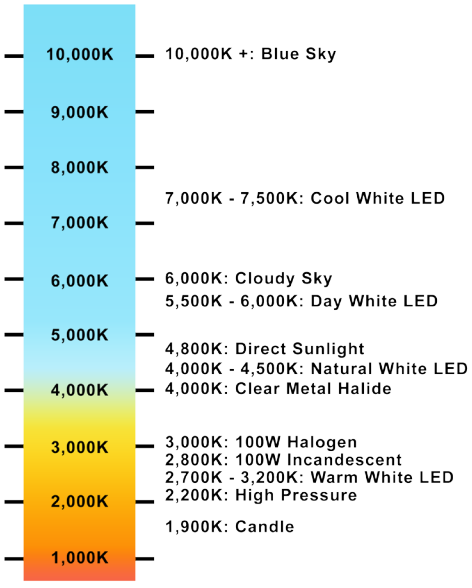
IES RECOMMENDED LIGHTING LEVELS

Task Area	Footcandles	Task Area	Footcandles
Paint Booths	100 - 150	Areas with VDTs	75
Corridors/Stairways/Rest rooms	10 - 20	Classrooms	50 - 75
Storage Rooms	10 - 50	Cafeterias	50
Conference Rooms	20 - 50	Gymnasiums	30 - 50
General Offices	50 - 100	Manufacturing Assembly	50 - 500
Drafting/Accounting	100 - 200	Parking Areas (uncovered)	1 - 2

Basic LED Example



Kelvin Color Temperature



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