



# Safety Flashlights



"Lumens" of a bulb is a measurement of the entire output of the bulb. (Focus is not considered.)



"Lumens" of LEDs is a measurement of all the light inside the "beam angle".



"Peak beam candlepower" is a measure of the brightest spot in a focused beam.

## GUIDELINES FOR CHOOSING A SUITABLE FLASHLIGHT FOR YOUR WORK:

HOW BRIGHT?			BATTERY TYPE?						
For close-up work	Long range beam		Infrequent usage		Frequent usage				
LED	Incandescent		Disposable		Rechargeable				
<ul style="list-style-type: none"><li>• Solid state construction</li><li>• Durable, long-life</li><li>• Soft focus, short range</li><li>• Extremely long runtimes (100's of hours) at low illumination levels</li></ul>	Halogen	Xenon	Alkaline	Lithium	Nickel Cadmium (NiCd)	Lithium Ion	Rechargeable Alkaline	Nickel Metal Hydride (NiMH)	Lead Acid
	Blackens less with age. Affordable easy to replace.	Energy efficient, lasts longer than halogen bulbs, has no filament.	Smaller capacity than lithium.	Very high energy density, higher than alkaline. More costly. Toxic. Longer shelf-life than alkaline.	Banned from most uses by EU in 2004. Cadmium is toxic. Possesses memory effect.	Best energy-to-mass ratios. Slow self-discharge. No memory effect.	Few recharge cycles. Capacity drops every time it's recharged.	Not recommended for Flashlights. No memory effect.	Very high power density.
	<ul style="list-style-type: none"><li>• Requires periodic replacement</li><li>• Fails on extreme impact</li><li>• Hi-output natural white light</li><li>• Top choice for long range</li></ul>		<ul style="list-style-type: none"><li>• Longer runtime than rechargeables</li><li>• Lower initial purchase price</li><li>• Easy access to spare batteries</li><li>• Seldom as bright</li><li>• High operating expense</li><li>• 7 to 10 years storage life</li></ul>		<ul style="list-style-type: none"><li>• Higher initial purchase price</li><li>• Supports brighter bulbs or LEDs</li><li>• Stores conveniently</li><li>• Low operating expense</li><li>• Self-discharge at higher rates in storage</li></ul>				

\*Memory effect, or battery memory, is an effect whereby the battery appears to "remember" the previous leftover energy capacity. A battery with memory effect gradually loses its maximum energy capacity after being recharged before it is fully discharged.

It is important to know if you'll be working in a hazardous environment and exactly what type of hazards may be present. There are several types of locations in which it can be extremely dangerous to use any light that has not been specifically designed and approved for that kind of location. It is crucial that your light be safety-rated for specific kind of environment if you would like to use a flashlight in any potential hazardous location.



# safety flashlights

The US-based National Electric Code (NEC) defines hazardous locations by “class” and “division”. Products that have an NEC classification are protected within the environments specified by their classification. Hazardous areas outside North America are classified by gas groups and zones. Zones are used to define the probability of the presence of flammable materials and groups classify the exact flammable nature of the material.

## Difference between US Classification & Europe Classification



### Class I Locations are made hazardous by the presence of flammable gases, liquids or vapors

US Classification  
Division 1  
Where ignitable concentrations of flammable gases, vapours or liquids can exist all of the time or some of the time under normal operating conditions.

Division 2  
Where ignitable concentrations of flammable gases, vapours or liquids are not likely to exist under normal operating conditions.

Europe Classification  
Zone 0  
Where ignitable concentrations of flammable gases, vapours or liquids are present continuously or for long periods of time under normal operating conditions.

Zone 1  
Where ignitable concentrations of flammable gases, vapours or liquids are likely to exist under normal operating conditions.

Zone 2  
Where ignitable concentrations of flammable gases, vapours or liquids are not likely to exist under normal operating conditions.

Groups	
Division 1 & 2: A - Acetylene B - Hydrogen C - Ethylene D - Propane	Zone 0, 1 & 2: IIC - Acetylene, Hydrogen IIC - Acetylene, Hydrogen IIB - Ethylene IIA - Propane



### Class II Locations are hazardous because combustible dusts are present

US Classification  
Division 1  
Where ignitable concentrations of combustible dusts can exist all of the time or some of the time under normal operating conditions.

Division 2  
Where ignitable concentrations of combustible dusts are not likely to exist under normal operating conditions.

Europe Classification  
Zone 20  
Where combustible dusts or ignitable fibers and flyings are present continuously or for long periods of time in quantities sufficient to be hazardous.

Zone 21  
Where combustible dust or ignitable fibers and flyings are present continuously or long periods of time in quantities sufficient to be hazardous.

Zone 22  
Where combustible dust or ignitable fibers and flyings are not likely to occur under normal operation in quantities sufficient to be hazardous.

Groups	
Division 1 & 2: E - Metals - Div. 1 only F - Coal G - Grain	Zone 0, 1, 2: None



### Class III Locations contain easily ignitable fibers or flyings

US Classification  
Division 1  
Where easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used.

Division 2  
Where easily ignitable fibers are stored or handled.

Europe Classification  
Group  
None

Temperature Codes			
US Classification		Europe Classification	
T1	< 450	T1	< 450
T2	< 300	T2	< 300
T2A	<280		
T2B	< 260		
T2C	< 230		
T2D	< 215		
T3	< 200	T3	<200
T3A	< 180		
T3B	< 165		
T3C	< 160		
T4	< 135		
T4A	< 120	T4	< 135
T5	< 100	T5	< 100
T6	< 85	T6	< 85

\* Information in this page has been obtained from Underwriters Laboratories Inc.