Spelean Pty Ltd ABN 88 097 086 836

Petzl PIXA 1 / PIXA 2 / PIXA 3

The Petzl PIXA range of headtorches are certified as follows:

- ATEX: Ex II 3 GD, Ex nAnL IIB T4
- HAZLOC: Class I Groups C & D div II, Class II Group G div II,
- IP 67

Note: The ATEX/HAZLOC certification is only guaranteed if the following only alkalaine batteries are used; Nx, Energizer E91, Duracell MN1500, Duracell MX1500.

The Petzl PIXA lamps are compatible with other battery types (eg Lithium and Ni MH rechargeable) but if used the ATEX/HAZLOC certification is no longer guaranteed.

The IP 67 notation corresponds to a completely dustproof product, that is protected against the effects of immersion in liquid.

The attached declaration of conformity is supplied by Petzl, the manufacturer of the Petzl PIXA range, under the authority of the test body, INERIS and in accordance with their ISO 9001 Certification system.

Additional information:
http://www.petzl.com/en/pro/compact-headlamps/pixa-1
http://www.petzl.com/en/pro/compact-headlamps/pixa-2
http://www.petzl.com/en/pro/compact-headlamps/pixa-3

The following pages provide an overview of the ATEX and HAZLOC markings and their meanings. The examples used in the following pages are for the Petzl PIXA range.

Signed of behalf of Spelean Pty Ltd

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10 Sep 2011

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	Standards applicable to equipment for use in potentially explosive atmospheres

"ATEX" derives from the original working title "ATmosphère EXplosible" of the document, which became EC Directive 94/9/EC.

Sereral headlamps in the Petzl range carry some form of ATEX (Ex) certification. What do all the numbers and letter mean? For example the Petzl PIXA range is "**Ex II 3 G, Eex AnL IIB T4**". The applicable entries are shown in italics, in the tables below.

CEI international regulations (CEI standard 79.10 of 1995 and the 94/9/EC; ATEX 95 European directive) describe 3 hazardous areas:

Zone	Expected conditions
0	the explosive atmosphere is always present (gasoline tank)
1	the explosive atmosphere is frequently present: mixture created during the operation of an installation.
2	the explosive atmosphere may be present by accident: installation, malfunction or leak

The table below shows the zone designations, which are divided firstly into the hazardous areas for gases, vapours and mists and secondly into the hazardous areas for dusts, as well as by their risk categories.

Hazard	Risk	Zone	Category	Equipment
Gases, vapours and mists	continuous or long- term or frequent	0	II 1 G	very high level of safety (safe in spite of 2 independent faults)
Gases, vapours and mists	occasional	1	II 2 G	high level of safety (safe even for normally expected fault)
Gases, vapours and mists	occasional, then only briefly	2	***II 3 G***	normal level of safety (safe under normal operation)
Dusts	continuous or long- term or frequent	20	II 1 D	very high level of safety (safe in spite of 2 independent faults)
Dusts	occasional	21	II 2 D	high level of safety (safe even for normally expected fault)
Dusts	occasional, then	22		
	only briefly	conducting dusts	II 2 D	high level of safety
		non-conducting dusts	***II 3 D***	normal level of safety

Ignition protection categories describe the design features of a product, as follows

Ignition protection categories	Identification	For zone	Safety principle
Increased safety	EEx e	1	no arcs, sparks or hot surfaces
Non-sparking equipment	***EEx nA***	2	
Pressurised encapsulation	EEx d	1	controls an internal explosion and extinguishes the flame
Sand encapsulation	EEx q	1	
Enclosed switching device	EEx nC	2	
Intrinsic safety (special)	EEx ia	0	limits the energy of the sparks and the temperature of the surface
Intrinsic safety	EEx ib	1	
Energy-limiting equipment	***EEx nL***	2	
Encapsulation	EEx m	1	separates source of ignition from potentially explosive
Oil encapsulation	EEx o	1	atmosphere
Pressurisation	EEx p	1	
Simplified pressurisation	EEx nP	2	
Vapour-proof housing	EEx nR	2	

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Explosion Groups and Temperature Classes
Equipment for mining is identified as Explosion Group I. Explosion Group II is applicable for all remaining areas with potentially explosive atmospheres, it is subdivided into categories using the letters A, B and C.

Devices are designated according to the maximum surface temperature that may occur. Gases are divided into T-classes and the permitted equipment is marked in the same way.

Explosion groups	Temperature Classes					
	T1	T2	T3	***T4***	T5	T6
Max.surface temperature	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C
II A	Acetone Ammoniac Benzene Acetic acid Ethane Ethyl acetate Ethyl chloride Methanol Naphthalene Phenol Propane	i-Amyl acetate n-Butane n-Butyl alcohol	Gasolines Diesel fuels Heating oils n-Hexane	Acetaldehyde		
II B	Town gas (lighting gas)	Ethylene Ethylene oxide sulphide	Hydrogen	Ethyl ether		
II C	Hydrogen	Acetylene				Carbon disulphide

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The HAZLOC standard

What is HAZLOC?

The HAZLOC certification primarily concerns North America. It aims to control the risks related to explosion in certain environments. It comprises two elements:

- testing and evaluation of products being used
- inspection of the factory

How do you choose equipment that is adapted for an environment at risk of explosion

Hazardous locations are classified in three ways under the HAZLOC standard:- by type- by conditions- by nature of the hazardous substance or material

Types of hazardous environments

Hazardous environments are divided into three classes :

- **Class I :** designates a space that has become dangerous because of the possible presence of certain gases or vapors in sufficient quantity to be potentially flammable or explosive. Examples: petroleum refineries, gas distribution zones, spray finishing zones, etc.
- **Class II :** designates a space that has become dangerous because of the presence of flammable air-borne dust. Examples: grain silos, manufacturers of plastics, aluminum, pharmaceutical products and fireworks, etc.
- **Class III :** designates a space in which airborne fibers and particles can accumulate around a machine or on lighting equipment and become ignited by heat, a spark or a hot metal. Examples: textile factories, flax processing plants, factories that produce wood shavings or flying particles, etc.

Conditions

There are two types of conditions:

- **Division 1 (average conditions):** the risk is present during regular production operations, or during ongoing repair or maintenance operations.
- **Division 2 (unusual conditions):** the dangerous substance is only present in the case of an accidental break or defective functioning.

Nature of the hazardous substance or material

The gases and vapors of Class I hazardous environments are divided into four groups: A, B, C and D (these substances are grouped according to their combustion temperature, their explosion pressure and other combustion characteristics).

The dangerous substances of Class II hazardous environments are divided into three groups: E, F and G (these substances are grouped according to their combustion temperature and their conductivity). Conductivity relates particularly to metal dusts.

Classes	**Groups**	**Divisions**	
		1	2
I Gases, vapors, liquids	A: Acetylene B: Hydrogen, et c. C: Ether, etc. D: Hydrocarbo ns, fuels, solvents, etc.	Explosive and always dangerous	Normally not present in quantities sufficient for explosion (but this situation may accidentally arise)
II Dust	E: Metal dusts (conductive and explosive) F: Carbon dusts (some are conductive and all are explosive) G: Flour, starch, grain, combustible plastic or chemical dusts (explosive)	The quantity of dust is sufficient to be flammable, or the dust is conductive under normal conditions.	Normally not present in quantities sufficient for explosion (but this situation may accidentally arise)
III Air-borne fibers and particles	Textiles, wood debris, etc.	Manipulated or used during manufacture	Stored or manipulated in a storage area (away from manufacturing)

What are the specific features of certified headlamps?

The more restrictive the mode of protection of a headlamp is, the less powerful the lighting will be. The intensity and voltage that is permitted may be low in order to ensure that the device does not produce an arc, spark or dangerous temperature.

What does the marking mean?
All products designed for use in explosive zones have a specific marking on them. This marking contains all the information necessary to determine the zones in which the product may be used.

Example of marking:
Class I Groups C & D div II, Class II Group G div II,

Class: gaseous environment:
- Class I = gas
GROUPS C & D: corresponds to the classes of gas covered by the product(see above)
- div II: present under abnormal conditions
Class II: dusty environment
GROUP G: corresponds to the classes of dust covered by the product (see above)
- div II: present under abnormal conditions