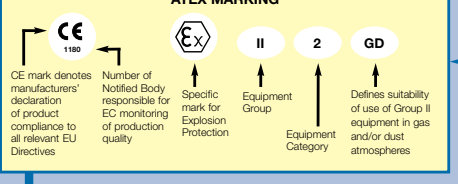
Wolf Safety Lamp Company

ATEX Explained

Ex Equipment

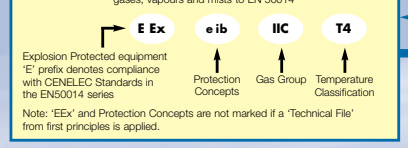
This guide is provided to aid in the selection of Wolf lighting products for use in potentially explosive atmospheres. Information given is based on practice within the EU, as specified in the requirements of the 94/9/EC ATEX (Equipment) Directive and the 99/92/EC ATEX (Workplace) Directive.

ATEX MARKING



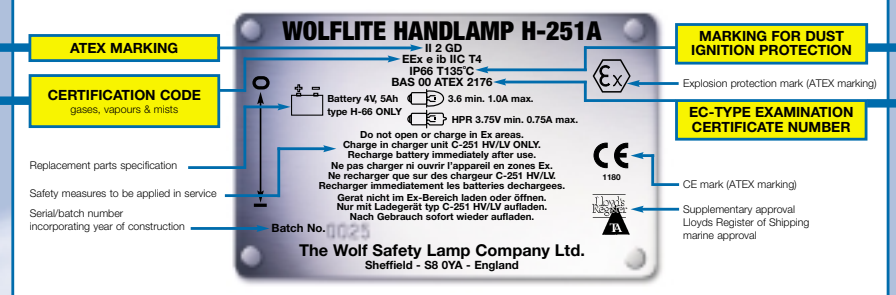
CERTIFICATION CODE

gases, vapours and mists to EN 50014

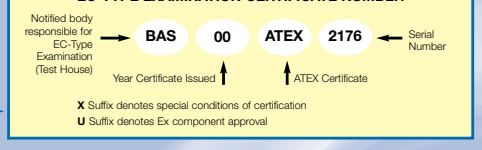


Note: 'EEx' and Protection Concepts are not marked if a 'Technical File' from first principles is applied.

Ex EQUIPMENT LABEL

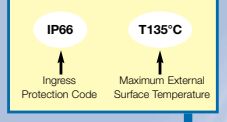


EC-TYPE EXAMINATION CERTIFICATE NUMBER



MARKING FOR DUST IGNITION PROTECTION

to EN 50281-1-1



EC NOTIFIED BODIES

Notified Bodies have been appointed by the governments of individual EC countries as responsible to carry out part or all of the functions specified in the ATEX Equipment Directive, such as EC type examination of equipment and quality assurance assessment of equipment production.

Baseefa (2001) Ltd are responsible for the quality assurance assessment of equipment manufactured by the Wolf Safety Lamp Company, this is identified by their notified body number (1180) appearing below the CE mark on Wolf products.

EQUIPMENT GROUP & EQUIPMENT CATEGORY

Equipment Group	Equipment Category	Protection Level	Hazard: Gas	Hazard: Dust	Use
I (Mining)	M1	Very high protection	–	–	Operable in Ex atmosphere
	M2	High protection	–	–	De-energised in Ex atmosphere
II (Industrial)	1	Very high protection	G		Zones 0,1,2,
				D	Zones 20,21,22
	2	High protection	G		Zones 1,2
				D	Zones 21,22
	3	Normal protection	G		Zones 2
				D	Zones 22

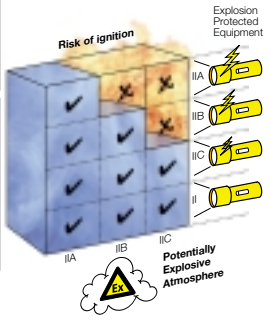
Equipment Group and Category identify the areas in which equipment may be safely used

GAS GROUP

Group	Typical Hazard	Maximum Safe Sparking Energy (Intrinsic Safety Ex ia/ib)	Maximum Safe Gap (Flameproof Ex d)	Applicable Concepts
I	Methane			all concepts
IIA	Propane			Ex d, Ex ia/ib
IIB	Ethylene			
IIC	Hydrogen/Acetylene			
II	All Gases			Ex e, Ex m, Ex p, Ex o, Ex q, Ex n

Equipment sub-grouping segregates gases according to ease of ignitability by sparks or flames. These apply to flameproof Ex d and intrinsically safe Ex ia/ib equipment only.

GROUP II GAS SUBDIVISION



PROTECTION CONCEPTS FOR ELECTRICAL APPARATUS

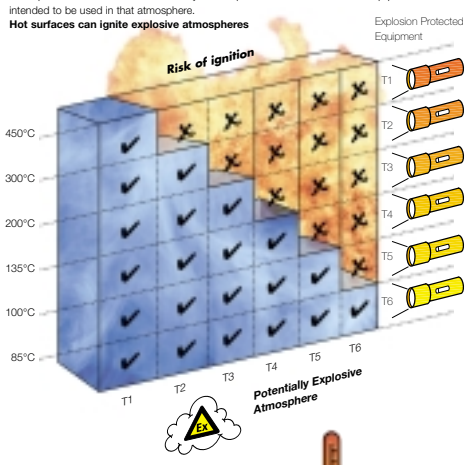
Concept	Symbol	Icon	Description	Category	EN Standard
General req.	–		General requirements	–	EN 50014
Oil immersion	Ex o		explosive gas excluded by immersing ignition source in oil	2	EN 50015
Pressurised	Ex p		explosive gas excluded by surrounding ignition source with pressurised inert gas	2	EN 50016
Powder filled	Ex q		explosive gas excluded by immersing ignition source in sand	2	EN 50017
Flameproof	Ex d		ignition within the apparatus enclosure is contained and will not ignite surrounding explosive atmosphere	2	EN 50018
Increased safety	Ex e		design excludes the possibility of incendive arcs, sparks or hot surfaces	2	EN 50019
Intrinsic safety	Ex ia		energy in circuit and temperature on components reduced to a safe level	1	EN 50020
	Ex ib			2	
Encapsulation	Ex m		flammable gas excluded by encapsulating the ignition source in resin	2	EN 50028
Non-incendive	Ex n		will not ignite explosive gas in normal operation, faults unlikely to occur	3	EN 50021

Protection concept identifies the means by which explosion protection is achieved.

TEMPERATURE CLASS

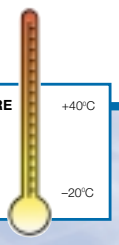
Temperature class relates to the hot surface ignition temperature of a particular explosive atmosphere. It must not be exceeded by the temperature classification of the equipment intended to be used in that atmosphere.

Hot surfaces can ignite explosive atmospheres



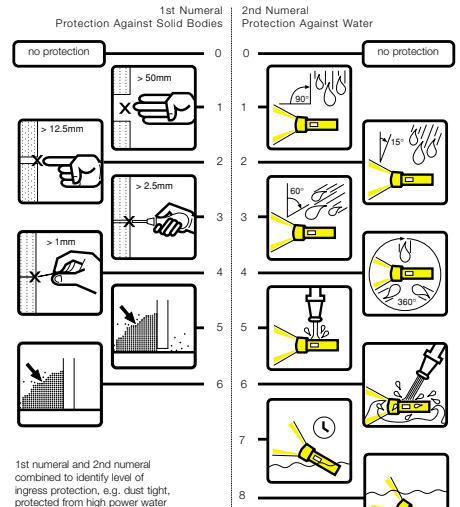
AMBIENT TEMPERATURE

Equipment approved to the CENELEC standard have T. class based on use in an ambient of -20°C to +40°C unless otherwise stated (ie. T amb. = 35°C)



INGRESS PROTECTION (IP) CODE to EN 60529

Ex equipment selection for use in gases, vapours, mists or dusts must take into consideration the environmental conditions of the area in which it is to be used. Apparatus resistance to ingress of both solid bodies and water is identified by use of an "IP rating".



1st numeral and 2nd numeral combined to identify level of ingress protection, e.g. dust tight, protected from high power water jets/heavy seas:–

Ingress Protection rating: **I P 6 6**

APPARATUS GROUPS AND TEMPERATURE CLASSES FOR COMMON EXPLOSIVE GASES AND VAPOURS

Gas/Vapour Temperature	Gas Group	Temperature Class
Acetic acid	IIA	T1
Acetone	IIA	T1
Acetylene	IIC	T2
Ammonia	IIA	T1
Benzene	IIA	T1
Butane	IIA	T2
Cumene	IIA	T2
Cychlohexane	IIA	T3
Ethanol (ethyl alcohol)	IIA	T2
Ethylene	IIB	T2
Hydrogen	IIC	T1
Methane (industrial)	IIA	T1
Methanol	IIA	T1
Petroleum	IIA	T1
Propane	IIA	T1
Toulene	IIA	T1
Turpentine	IIA	T3
Xylene	IIA	T1

A more comprehensive list of gases and vapours is provided in IEC 60079-20

IGNITION TEMPERATURES FOR COMMON COMBUSTIBLE DUSTS

Dust Cloud	Ignition Temperature
Aluminium	590°C
Coal dust (Lignite)	380°C
Flour	490°C
Grain dust	510°C
Methyl cellulose	420°C
Phenolic resin	530°C
Polythene	420°C
PVC	700°C
Soot	810°C
Starch	460°C
Sugar	490°C

A more comprehensive list of dusts is provided in BS 7535

CLASSIFICATION OF HAZARDOUS AREAS

To EN 60079-10

Hazardous areas are classified into zones on the basis of the frequency and duration of the occurrence of an explosive atmosphere. Durations on table are typical.

Area Classification: Gases	Area Classification: Dusts	Zone Criteria
Zone 0	Zone 20	present continuously or for long periods (>1000hrs per annum)
Zone 1	Zone 21	likely to occur in normal operation occasionally (>10hrs, <1000hrs per annum)
Zone 2	Zone 22	unlikely to occur in normal operation, if it does will only be for short periods (<10hrs per annum)

'CE' MARKING AND THE 94/9/EC ATEX DIRECTIVE ON EQUIPMENT AND PROTECTIVE SYSTEMS INTENDED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES.

'CE' marking has been introduced as part of the European Union's new approach to technical harmonisation as a means of identifying products that comply with all relevant EC directives.

Subject to certain safeguards, products bearing the 'CE' mark are permitted to be sold throughout the EU without interference from national regulatory authorities. The Directives have been put in place in order to remove artificial trade barriers within the European Union previously caused by individual countries' national standards, a secondary function is as a means of regulating safety.

The **Explosive Atmospheres 94/9/EC ATEX (Equipment) Directive** came into force on 1 March 1996. The Directive is in transition, where product compliance is optional, until 1 July 2003 when it becomes mandatory.

On this date the existing Explosive Atmospheres and Gassy Mines Directives will be repealed. Thereafter only equipment and systems 'CE' marked as compliant with the ATEX Equipment Directive (and all other relevant mandatory directives) may placed on the market within the EU.

The Directive applies to all equipment and systems for use in potentially explosive atmospheres within the EU. The scope of the directive includes electrical and mechanical equipment for use in Group I (mining) or Group II (industrial) applications, both on and offshore and considers risks of ignition of potentially explosive gas, vapour, mist and dust atmospheres. In addition, devices intended for use outside potentially explosive atmospheres that contribute to the safe functioning of equipment and systems with regard to explosion risk are also included.

Compliance of products to the ATEX Equipment Directive, through conformity assessment, takes a modular approach, and is generally in two stages; design and production.

A common route to product design compliance is to apply to a Notified Body (Ex. Test House) for an EC Type Examination Certificate. To comply, the equipment or system must meet the Essential Health and Safety Requirements (EHSRs) listed in the Directive. Harmonised EU standards have been adopted by CENELEC and CEN, relating to the design, construction and testing of equipment; a product complying with these standards is deemed to meet the EHSRs to which the standards relate. Where apparatus follows a protection concept not covered by these standards, compliance to the 94/9/EC Directive is still possible by compiling a 'Technical File' from first principles, demonstrating compliance through test and assessment to the EHSRs relating to design and construction of equipment for use in explosive atmospheres.

The production quality stage of the conformity assessment procedures ensure continued product compliance in manufacturing. Typically a manufacturer should have a certified ISO 9000 quality management system and comply with one of the quality modules in the ATEX Equipment Directive, however this will vary depending on product equipment category; equipment used in higher risk areas will require more onerous conformity assessment procedures to be applied.

In addition to the 94/9/EC ATEX (Equipment) Directive, products for use in potentially explosive atmospheres may require to be compliant with other directives including the 89/336/EEC Electro-Magnetic Compatibility (EMC) Directive, which became mandatory on 1/1/96. This Directive applies to virtually all electrical and electronic apparatus potentially able to generate interfering emissions or exhibit an undue sensitivity to interference sources.

Once compliance with the relevant directives is complete and an EC Declaration of Conformity issued by the manufacturer, the 'CE' mark may be applied and the product placed on the market.

The ATEX Equipment Directive in full, and EC Commission guidance on the Directive, may be found on the following website: http://europa.eu.int/comm/enterprise/atex/index.htm

99/92/EC ATEX (WORKPLACE) DIRECTIVE ON MINIMUM REQUIREMENTS FOR IMPROVING THE SAFETY AND HEALTH PROTECTION OF WORKERS POTENTIALLY AT RISK FROM EXPLOSIVE ATMOSPHERES.

(mandatory from 1 July 2003)

The Directive covers both Group I and Group II activities, on shore and offshore within the EU, and aims to provide a better level of protection for the health and safety of workers in potentially explosive gas, vapour, mist and dust atmospheres.

It lists a set of obligations and safety measures for employers, requiring the adoption of a coherent risk assessment based strategy for the prevention of explosions. These obligations include:

- Generation of an explosion protection document, evaluating explosion risk, including: likelihood of the presence of the explosive atmosphere, the presence of ignition sources (including electrostatic discharge), identification of the substances and processes in use, definition of specific measures taken to safeguard the health and safety of workers.
- Classification of areas into zones and marking points of entry with safety signs.
- Appropriate training and supervision for workers.
- Use of written instructions and permits to work.
- Special requirements for work equipment:-
  - Equipment in service before 30 June 2003 may continue to be used after this date if the explosion protection document indicates it can be safely used.
  - Equipment brought into service after 30 June 2003 must be CE marked as compliant with the 94/9/EC ATEX (Equipment) Directive.
- Due consideration of explosion protection measures, encompassing issues such as:
  - Control of releases.
  - Use of protective measures appropriate to the greatest potential risk.
  - Selection of appropriate equipment by referencing the explosion protection document.
  - Ensuring equipment is correctly maintained and operated.
  - Minimising the risk of explosion and the effect of explosion in the workplace.
  - Provision of suitable warning and escape facilities.

99/92/EC is a separate directive specifically covering workers in explosive atmospheres, working within the more general **89/391/EEC Directive** on the **introduction of measures to encourage improvements in the safety and health of workers at work.**

The ATEX Workplace Directive in full may be found on the following website: http://europa.eu.int/comm/enterprise/atex/index.htm

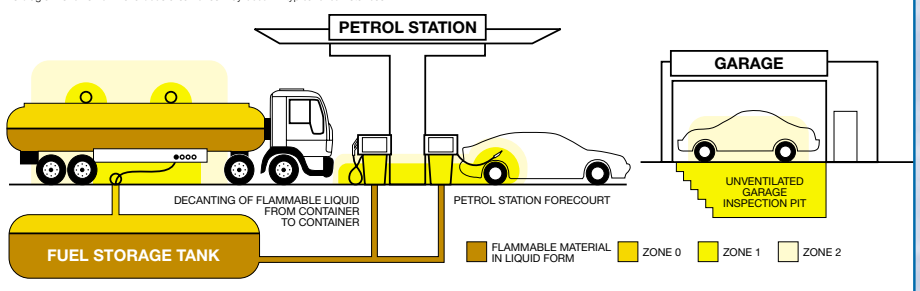
THE DANGEROUS SUBSTANCES AND EXPLOSIVE ATMOSPHERES REGULATIONS 2002.

In the UK the 99/92/EC ATEX workplace Directive will be implemented as The Dangerous Substances and Explosive Atmospheres Regulation 2002 (DSEAR). These regulations will also include the safety aspects of the 98/24/EC Chemical Agents Directive, resulting in flammable and dangerous substances being covered by a simple set of regulations, thus reducing the volume of legislation covering this area.

A copy of the DSEAR regulations is available at: http://www.hmso.gov.uk/si/si2002/20022776.htm
A guide to DSEAR, published by the Health and Safety Executive can be downloaded at: http://www.hse.gov.uk/spd/dsear/htm

EXAMPLE OF HAZARDOUS AREA ZONES

This diagram shows how hazardous area zones may occur in typical circumstances.



Ex Environment

KEY

- Explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist, or a cloud of combustible dust in air.
- Spark
- Ignition
- Flameproof flange gap on Ex d equipment
- < = less than
- > = more than

ASSOCIATED STANDARDS

Explosive Atmospheres. Explosion prevention & protection	
Basic concepts and methodology	EN 1127-1
Electrical equipment for use in potentially explosive gases, vapours and mists - associated non-concept standards	
Classification of hazardous areas	EN 60079-10
Electrical installations	EN 60079-14
Inspection and maintenance of electrical installations	EN 60079-17
Repair and overhaul of apparatus	IEC 60079-19
Data for flammable gases and vapours	IEC 60079-20
Electrical equipment for use in the presence of combustible dusts	
Construction and testing	EN 50281-1-1
Selection, installation and maintenance	EN 50281-1-2
Classification of areas	prEN 50281-3
Non-Electrical Equipment for use in potentially explosive gases, vapours, mists and dusts	
Basic method and requirements	prEN 13463-1

This provisional standard will be supplemented by a number of standards for specific concepts of protection, currently in preparation.

Standards available from: British Standards Institution, 389 Chiswick High Road, London W4 4AL www.bsi-global.com

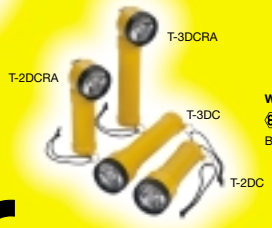
For details of our full range of explosion protected lighting products visit our website listed below or contact Wolf to request data sheets.

Wolf ATEX Turbolite
Ex II 2 GD II T4 (Tamb=55°C) T135°C
SIRA02ATEX5099X

Wolflite Primary Cell Handlamp H-4DCA
Ex II 2 GD EEx e ib IIC T4 IP66 T135°C
BAS00ATEX2203

Wolflite Rechargeable Handlamp H-251A
Ex II 2 GD EEx e ib IIC T4 IP66 T135°C
BAS00ATEX2176

Wolf Hazard Lamp HL-95
Ex II 1 G EEx ia IIC T4
BAS99ATEX1044



Wolf Intrinsically Safe Torches
Ex II 2 G EEx e ib IIB T4
Baseefa02ATEX0181

Wolf LiteTracker™ LT-102
Ex II 1 G EEx ia IIC T4
BAS99ATEX1017

Wolf Ex-Penlite PL-01
Ex II 2 G EEx e ia IIC T4
TÜV00ATEX1529

Wolf ATEX Safety Torches
Ex II 2 GD EEx e ib IIC T6 IP67 T65°C
Ex II 2 GD EEx e ib IIC T4 (Tamb=40/55°C) IP67 T95°C (Tamb=55°C)
BAS02ATEX2220X

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ISO 9001

MMD/CW/4.03/10K