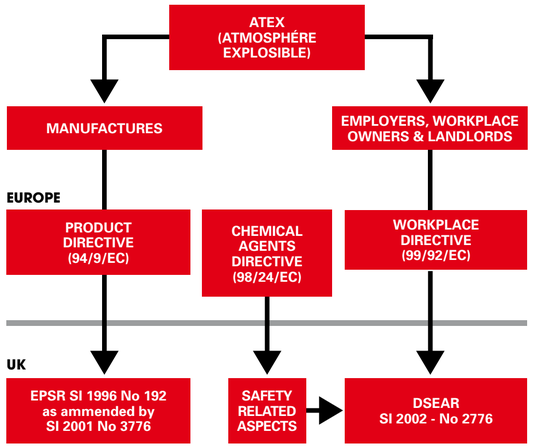
GUIDE TO DSEAR AND ATEX

RELATIONSHIP BETWEEN EUROPEAN AND UK LEGISLATION



ATEX WORKPLACE DIRECTIVE 99/92/EC & DSEAR OVERVIEW

Previsions	DSEAR (UK)	ATEX 99/92/EC	Guidance
Assess the risks and identify the necessary control measures.	Reg. 5	Article 4.1	HSE ACOP's L138 & L136
Implement the necessary technical and organisational measures including suitable provision for accidents and emergencies.	Reg. 6 Schedule 1	Article 3	HSE ACOP L138
Classify the areas where potentially explosive atmospheres may exist into zones.	Reg. 7 Schedule 2	Article 7.1	EN 60079-10 EN 61241-10 Industry Codes
Mark the classified areas using the appropriate warning signage.	Reg. 7 Schedule 4	Article 7.3	
Inspect, assess, modify or replace the equipment on the basis of the level risk and the ability of the equipment to create a source of ignition.	Reg. 5 & 6 Schedule 1	Article 3 & 4.1	EN 60079-17 EN 60079-14 EN 60079-19
Ensure personnel at risk, and others who could potentially be affected, receive appropriate training.	Reg. 9	Annex II 1.1	
Create and maintain and Explosive Protection Document (EPD - ATEX 99/92/EC requirement only) or equivalent document referencing the necessary information (UK only) for the identified hazardous areas. Documentation must include an effective equipment maintenance and inspection regime.	Reg. 5	Article 8	HSE ACOP's L134-L138 EN 60079-17
Regularly review and audit the areas and systems to ensure that they remain effective.	Reg. 5	No specific reference	HSE ACOP L138

Note 1: DSEAR Reg. 7(4), ATEX 99/92/EC, Annex II 2,8 Prior to new plant and facilities being used for the first time, the overall explosion safety shall be verified by competent personnel.
Note 2: DSEAR Reg. 11 Article 6, where workers from several undertakings are present in the same workplace, the employer responsible for that work-place must co-ordinate the health and safety measures.

ZONES AND EQUIPMENT CATEGORIES

Zones				
Gases and Vapours	Dusts	Broad Definitions of Zones (for guidance only)	ATEX Equipment Category	Equipment Integrity Requirements
0	20	Explosive atmosphere is present continuously, for long periods, or frequently.	1	Equipment must be safe under normal operation, expected and rare malfunction.
1	21	Explosive atmosphere is likely to occur under normal operation, occasionally.	2	Equipment must be safe under normal operation, expected malfunction.
2	22	Explosive atmosphere may occur under abnormal operation and only persists for a short period.	3	Equipment must be safe under normal operation.

The higher the probability of an explosive atmosphere occurring and persisting, the higher the integrity requirements of the installed equipment. The relationship between the zones and categories can be varied following a full risk assessment.

RELEVANT STANDARDS AND GUIDANCE

Area of guidance	Standard or Approved Code of Practice (ACOP)
General guidance DSEAR compliance	ACOP L134 - Design of plant, equipment and workplaces ACOP L135 - Storage of dangerous substances ACOP L136 - Control and mitigation measures ACOP L137 - Safe maintenance, repair and cleaning procedures ACOP L138 - Dangerous substances and explosive atmospheres
Hazardous Area Classification	EN 60079-10 - Classification of hazardous areas for explosive gas atmospheres EN 60079-10 - Classification of areas where combustible dusts are or may be present
Electrical Installation of Equipment	EN 60079-14 - Explosive Atmospheres - Part 14: Electrical installations design ,selection and erection
Electrical Equipment Inspection	EN 60079-17 - Explosive Atmospheres - Part 17: Electrical installations inspection and maintenance
Non-Electrical Equipment Ignition Hazard Assessment	EN 13463-1 - Non-electrical equipment for potentially explosive atmospheres, basic method and requirements Note: This standard relates to new equipment but is a useful reference for retrospective assessment of existing equipment

SAFETY OF EQUIPMENT
DIRECTIVE 94/9/EC 'ATEX 95'

Became mandatory 1st July 2003

SCOPE – THE ARTICLES
- Placing on the market and putting into service
- Equipment and protective systems for use in potentially explosive atmospheres
- Conformity assessment procedures

EQUIPMENT GROUPS AND CATEGORIES – ANNEX I

ESSENTIAL HEALTH & SAFETY REQUIREMENTS – EHSR'S – ANNEX II
- Principle of integrated safety approach
- Consideration of environment
- Marking
- Choice of materials
- All potential ignition sources
- Risk caused by software
- Risk from gas, vapours, mist and dust

UK IMPLEMENTATION

The Directive has been implemented in Great Britain by the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations Statutory Instrument SI 1996, No. 192 and amendments.
Office of Public Service Information (www.opsi.gov.uk).

SAFETY OF THE INSTALLATION
DIRECTIVE 99/92/EC 'ATEX 137'

Became mandatory 1st July 2006

SCOPE – THE ARTICLES
- Prevention, avoidance of mitigation of risks
- Assessment of explosion risks
- Classify into hazardous areas
- Explosion protection document (EPD)

CLASSIFICATION OF WORKPLACES WHERE POTENTIALLY EXPLOSIVE ATMOSPHERES MAY OCCUR – ANNEX I
- Hazardous zones – gas, vapours or mist and combustible dusts

MINIMUM REQUIREMENTS FOR IMPROVING SAFETY & HEALTH – ANNEX II
- Training, working procedures
- Criteria for selection of equipment and protective systems

WARNING SIGN WHERE EXPLOSIVE ATMOSPHERES MAY OCCUR – ANNEX III

UK IMPLEMENTATION

Dangerous Substances & Explosive Atmosphere Regulation 2002.
Health & Safety Executive (www.hse.gov.uk/fireandexplosion/dsear.htm).

MARKING FOR GAS HAZARDS

CE Ex xxxx **II 2 G Ex d IIC T4**

- Complies with European Directive
- Notified Body Number
- EC Mark
- Equipment Group
- Equipment Category
- Gas
- Explosion Protection
- Type Of Protection
- Gas Group* A, B or C *if omitted suitable for ALL gas groups
- Temperature Class (T1 to T6)

MARKING FOR DUST OF AIRBORNE FIBRE HAZARDS

CE Ex xxxx **II 2 D Ex tD A21 IP66 T80°C**

- Complies with European Directive
- Notified Body Number
- EC Mark
- Equipment Group
- Equipment Category
- Dust
- Explosion Protection
- Type Of Protection
- Ingress protection level and maximum surface temperature

EQUIPMENT GROUP AND EQUIPMENT CATEGORY

Mining

Industrial

Equipment Group	Equipment Category	Protection Level	Hazard		Use
			Gas	Dust	
I Mining	M1	Very high Protection	-	-	Operatable 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		Zone 2
				D	Zone 22

CLASSIFICATION OF HAZARDOUS AREAS TO EN 60079-10

Area Classification		Zone Criteria
Gases	Dusts	
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)

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.

TYPES OF PROTECTION - GAS

Type of protection	ATEX Code	Standard
General Requirements	–	EN 60079-0
Intrinsic Safety	Ex ia & ib	EN 60079-11
Increased Safety	Ex e	EN 60079-7
Flameproof	Ex d	EN 60079-1
Pressurisation	Ex p	EN 60079-2
Powder Filled	Ex q	EN 60079-5
Encapsulation	Ex ma&mb	EN 60079-18
Oil Immersion	Ex o	EN 60079-6
Non-incendive	Ex n	EN 60079-15

TYPES OF PROTECTION - DUST

Type of protection	ATEX Code	Standard
General Requirements	–	EN 61241-0:2006
Protection by Enclosures	tD	EN 61241-1:2004
Protection	pD	EN 61241-4:2006
Intrinsic Safety	iD	EN 61241-11:2006
Encapsulation	mD	EN 61241-18:2004

TYPE n ACCORDING TO EN60079-15

Enclosed break device	nC
Non-incendive component	nC
Hermetically sealed device	nC
Sealed device	nC
Encapsulated device	nC
Energy limited apparatus & circuits	nL
Restricted breathing enclosure	nR
Non sparking	nA

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.

TEMPERATURE CLASS

T-Class	Max surface temp in °C
T1	450
T2	300
T3	200
T4	135
T5	100
T6	85

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

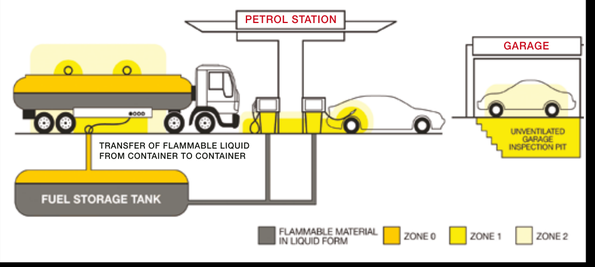
Dust Groups - IEC60079-0 (2007)

Combustible Flyings	IIIA
Non-conductive Dust	IIIB
Conductive Dust	IIIC

A more comprehensive list of dusts is provided in BS 7535.
A database of 'Combustion and Explosion Characteristics of Dusts' is available at www.hvbg.de/e/bia/fac/expl/

Ex ENVIRONMENT

Example of hazardous area zones - Petrol Station Forecourt & Garage



INGRESS PROTECTION RATING (IP)

Protection against solid of foreign objects		Protection against liquids and moisture	
0	No protection.	0	No protection.
1	Protection against objects larger than or equal to 50 mm in diameter.	1	Protection against vertically dripping water.
2	Protection against objects larger than or equal to 12.5 mm in diameter.	2	Protection against dripping when housing is 15 degrees tilted.
3	Protection against objects larger than or equal to 2.5 mm in diameter.	3	Protection against spraying (water sprayed at 60 degrees on either vertical side of housing).
4	Protection against objects larger than or equal to 1.0 mm in diameter.	4	Protection against splashing (water splashing on enclosure from any direction).
5	Protection against dust (dust allowed but it should not interfere with satisfactory operation of product).	5	Protection against jetting (any direction).
6	Protection against dust tight (no dust allowance inside enclosure).	6	Protection against powerful jetting (any direction).
		7	Protection against temporary immersion (30 minutes under 1m of water).
		8	Protection against continuous immersion (based on agreement between manufacturer and user).