Session 5 – European Directives - ATEX
Before 1978 each European country had its own standard for Hazardous Location equipment, or it accepted one or more of the standards from another country. In 1978, the first set of European standards for electrical products for use in hazardous areas (based on the first EC directive) were issued based on a collective work of all prior standards for use in all listed European Community (EC) countries. This was the framework called the Dresden agreement to harmonize standards in EC countries.

Electrical equipment for use in potentially explosive atmospheres were certified by a State-approved body often referred as the "Laboratory" when it meets the relevant European standards (EN 50014 and upwards) Such equipment was then issued with a European certificate of conformity, entitling it to carry the distinctive Epsilon x mark. This mark opened the way to trading within the European Union and even on occasion outside it.

This system had now been in operation for many years. Although largely beneficial, it has certain drawbacks, notably a lack of flexibility and the absence of a global concept for safety. Certificates of conformity to harmonized standards obtained in compliance with previous directives were valid until June 30 2003, but their validity only covered conformity to the harmonized standards specified in these directives. Application of directive 94/9/EC before the 01 July 2003 was made on a voluntary basis but has been mandatory since this date in all the European Union (old EC) and countries part of the European Free Trade Association.
The ATEX directive, 94/9/EC “Explosive Atmospheres Directive (ATEX)” covers all equipment that is intended for use in potentially explosive atmospheres. All Hazardous Location equipment installed and used in the EC must fulfill the essential health and safety requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres. The manufacturer of the equipment may assume that this is the case if it is designed and certified to harmonize with European Standards or Norms (EN). This directive became applicable in 1996 and has a transition period that ended June 30, 2003. Today, all products used in the EC must conform to the requirements of the ATEX directive.

In order to obtain CENELEC certification to the ATEX directive, the manufacturing facility must first have an ISO certified, quality system. The facility must undergo a quality system audit to verify the facility is continually adhering to the ISO quality procedures, including the special quality requirements which belong to explosion protection. ATEX defines the basic technical requirements of equipment and the protection methods with which the apparatus is brought to market. The safety levels or requirements are not limited to the existing European Standards. Electrical apparatus which does not comply with the European Standards but which provides an equal level of safety can now be “certified” by a test lab.
The ATEX directive 94/9/EC stipulates a type examination for explosion-proof electrical devices of categories 1 and 2. The manufacturer must provide all technical documents required for the test, and also specimen devices if applicable, to a so-called Notified Body. Following successful testing, an EC-type examination certificate is issued on which all information and parameters compulsory for use in hazardous areas are certified. The EC-type examination certificate contains all information required for explosion protection, and is the basis for the operation and connection of several electrical devices in the hazardous zones 0 and 1.

According to the ATEX directive, an EC-type examination certificate is not mandatory for devices of category 3 as specified for use in Zone 2, and the issuing thereof is not permissible either. Instead of this, the manufacturer should issue a declaration (EC certificate of conformity) confirming compliance with the ATEX directive and the harmonized standards applicable to these devices. However, plant users occasionally request a test certificate from an independent organization for these devices as well, or the manufacturer wishes to carry out such a test for self protection.

Various test companies provide their own certification in such cases following testing of the devices which then have a non-official name, e.g. conformity statement or similar. It should again be explicitly mentioned that this is not mandatory in the ATEX guideline. On the contrary, one has intentionally left the device manufacturers with more freedom for own responsibility in order to simplify access to markets.
The ATEX Directive Summary:

- The directive makes no references to product standards.
- It defines basic health and safety requirements.
- It applies to both electrical and non-electrical equipment.
- It applies to environments which are potentially explosive due to gas and dust hazards.
- It takes into consideration all potential hazards equipment may cause.
- It applies to both mines and surface industries.
- It recognizes the European Standards Committee (CEN) and the European Committee for Electrotechnical Standardization (CENELEC) as competent bodies to define the required harmonized standards.

The major difference between the old way of testing and applying electrical equipment for hazardous areas is now saying that they do not have to be anymore in compliance with a series of standards as in the past with the “old approach” but to satisfy essential Health and Safety requirements which is the spirit of the “new approach” directive, in effect allowing an easier means to market for manufacturers and more flexibility for users of EX equipment...

If in fact harmonized standards do not exist for a product, then other standards may be applied such as a country specific standard.
ATEX Directive (ATEX 94/9/EC)

- ATEX = Atmosphères Explosibles
  - Since July 1st 2003, it is illegal to sell equipment that doesn't have the CE marking within the EC
- Total harmonization is mandatory
- Effects All Recognized Hazardous Locations
  - flammable gases, vapors, mists
  - dusts
ATEX Directive (ATEX 94/9/EC)

Equipment categories
- Coal-mining (2 “Zones”)
- Surface Industries (3 “Zones”)

No Local Country Standards Permitted
Must Be In Compliance With All EU Directives
- EMC, LV, Static

Greater Emphasis On Compliance And Follow-up Inspection
ATEX Directive (ATEX 94/9/EC)

- Exemptions to the ATEX Directive....

- Medical devices intended for use in a medical environment.
- Equipment and protective systems where the explosion hazards result exclusively from the presence of explosive substances or unstable chemical substances.
- Equipment intended for use in domestic and non-commercial environments.
- Personal protective equipment covered by directive 89/686/EEC.
- Seagoing vessels and mobile offshore units (such as semi-submersible platforms, drilling jack up platforms), already covered by the IMO convention. Fixed platforms, FPSO and other units not intended for navigation on high seas are not exempt from ATEX.

Exempt....

Not Exempt....
The New ATEX Directive
2014/34/EU

- The previous ATEX Directive had not been updated and harmonized with other Directives that have been published since 1994 most notably the Machinery Directive and PED.
- Questions on the validity of the various Notified Bodies and the Quality of these firms in comparison with each other.

What are the key changes?

- There will be more product surveillance under the new ATEX Directive 2014/34/EU
- All Notified Bodies will have to re-apply to become ATEX Notified Bodies and will have to be re-audited, existing Notified Bodies will not gain automatic Notification.
- All Notified Bodies will have properly accredited and proven competent to be Notified (there may be a lot less ATEX Notified Bodies under 2014-34-EU!)
- CE Declarations will be ‘EU’ D of C, not ‘EC’ D of C and have an expiry date.
- EC Type Examination Certificates will be EU Type under the new Directive.
- Older 94/9/EC ATEX Certificates will remain valid, but will not be possible to have a variation under the old Directive since it has been repealed.
- Goes into effect April 2016 so two years to get up to speed.
Remember that ATEX is only a legal requirement within the EU and EFTA countries so unless you are doing a project within the EU, legally you have nothing to be concerned with.

However, some countries and clients that do projects worldwide do recognize ‘ATEX Certification’ and insist this as part of their specifications (Many countries in the middle east have accepted ATEX ‘certified’ products)

What about IECEx vs. ATEX? Can we just go there?

Note that the EN and IEC Standards are harmonized so from a product standpoint, about 80%+ of the products out there that have ATEX (For Zone 0 & 1 applications) most likely have an IECEx certificate which is valid for other parts of the world (but not Europe....)
An example of a ‘self-certifying’ custom panel certificate. In this case, the panel builder used various Ex certified components, did final heat rise analysis as well as EMC testing following recognized test standards and took responsibility for the certification of the panel in question in consultation with the client. Notice no Notified Body involvement
Self Declaration Marking
IEC 61241-1 Example

EN 61241-1
Type tD
Protection by Enclosure

Sensors Ltd
Chester UK

File Ref: 108112

Technical Documentation file reference or Certificate Number

Series ABC Sensors
Serial No. 00081
Year 2003

IP Rating

Temperature Marking

Practice A to EN 61241-1 Zone 22

Practice A to EN 61241-1 Zone 22

File Ref: 108112

Technical Documentation file reference or Certificate Number

Series ABC Sensors
Serial No. 00081
Year 2003

IP Rating

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Practice A to EN 61241-1 Zone 22
# products within and outside the scope of ATEX

## Annex II: Borderline List - ATEX Products

The List has been confirmed during the Directive 94/9/EC ATEX Working Group meeting 25 June 2008.

Note that this list is not complete, it only clarifies some common inquiries and provide examples of products within or outside the scope of the "ATEX" Directive 94/9/EC. The list does not replace the vital risk assessment of each product and in addition ignition sources and explosion hazards related to the use of all the products shall also always be considered.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Scope of 94/9/EC</th>
<th>Examples of equipment</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clockworks</td>
<td>See 5.2.1 in ATEX Guidelines.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computers</td>
<td>Yes (EL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earthing clamps with and without cord</td>
<td>No/Yes</td>
<td>Should be assessed on a case-by-case basis to determine if the design of the equipment contains any potential ignition sources.</td>
<td></td>
</tr>
<tr>
<td>Electrical motors</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like heat and sparks of electrical origin (e.g. windings, connections) and mechanical origin (e.g. bearings).</td>
<td></td>
</tr>
<tr>
<td>Electrical pump with integrated electrical motor (e.g. canned or split tube motor pump, petrol pump/airscrews for petrol filling)</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like heat and sparks of electrical origin (e.g. motor circuit) and mechanical origin (e.g. pump impeller).</td>
<td></td>
</tr>
<tr>
<td>Electrical fan with integrated electrical motor (e.g. electrical axial fans)</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like heat and sparks of electrical origin (e.g. motor circuit) and mechanical origin (e.g. fan blades).</td>
<td></td>
</tr>
<tr>
<td>Non-electrical fan with integrated air motor (e.g. non-electrical axial fan)</td>
<td>Yes (Non EL)</td>
<td>Non-EL equipment with potential ignition sources like frictional heat and sparks of mechanical origin (e.g. bearings, fan blades).</td>
<td></td>
</tr>
<tr>
<td>Hand operated valves</td>
<td>No</td>
<td>See 5.2.1 in ATEX Guidelines.</td>
<td></td>
</tr>
<tr>
<td>Heating cables</td>
<td>Yes (EL)</td>
<td>Heating cables transmit electricity into heat while cables only transport electricity.</td>
<td></td>
</tr>
<tr>
<td>Mechanical brakes</td>
<td>Yes (Non EL)</td>
<td>Non-EL equipment with potential ignition sources like frictional heat of mechanical origin.</td>
<td></td>
</tr>
<tr>
<td>Mechanical gears</td>
<td>Yes (Non EL)</td>
<td>Non-EL equipment with potential ignition sources like frictional heat and sparks of mechanical origin.</td>
<td></td>
</tr>
<tr>
<td>Phones and similar equipment e.g. walkie-talkies, head phones etc.</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like heat and sparks of electrical origin.</td>
<td></td>
</tr>
<tr>
<td>Plugs and socket outlets</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like sparks of electrical origin (e.g. when connected or disconnected). Note that all countries have special requirements on plugs and socket outlets for domestic use.</td>
<td></td>
</tr>
<tr>
<td>Switches for fixed electrical installations</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like sparks of electrical origin (e.g. when switched on or off).</td>
<td></td>
</tr>
<tr>
<td>Torch</td>
<td>Yes (EL)</td>
<td>EL equipment with potential ignition sources like heat and sparks of electrical origin (e.g. sparks from a switch or heat in a bulb or battery).</td>
<td></td>
</tr>
<tr>
<td>Protective Systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fire extinguisher</td>
<td>No</td>
<td>Intended to be used after an explosion.</td>
<td></td>
</tr>
<tr>
<td>Vent panels (for explosion pressure relief)</td>
<td>Yes</td>
<td>Intended to be used to limit the effects of an explosion.</td>
<td></td>
</tr>
</tbody>
</table>
# Products within and outside the scope of ATEX

## Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Within Scope</th>
<th>Outside Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cables / Cable ladder systems for cable management</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Conduits/tapes, e.g. Fume extraction arms and conduits for electrical installations (except for conduits intended to be used between the flameproof enclosure and the conduit sealing devices)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Cable lift/shutting with and without cord</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Electro Static Discharge (ESD) - Protectors; e.g. wriststraps, standing mats, antistatic bags</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Enclosures</td>
<td>Yes (EI)</td>
<td>Intended to be used for electrical equipment with potential ignition sources.</td>
</tr>
<tr>
<td>Magnetic catchers for doors etc.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>PT 100 sensor</td>
<td>No/Yes</td>
<td>Intended to detect if a sensor is out of the range of values. It is classified as ATEX component if intended to be built into ATEX equipment or protective systems.</td>
</tr>
<tr>
<td>Spark arrestor</td>
<td>Yes (Non EI)</td>
<td>Intended to prevent an explosion, not to limit it. It is an ATEX component if intended to be built into ATEX equipment or protective systems.</td>
</tr>
</tbody>
</table>

## Safety, Controlling or Regulating devices

<table>
<thead>
<tr>
<th>Device controlling the regular safety limits of an industrial process handling flammable liquids, gases, or dusts</th>
<th>No</th>
<th>Shall be protected as potential ignition sources themselves if placed inside hazards areas, but safety devices with respect to risks other than ignition hazards. Monitoring devices providing only an alarm signal, but without direct control function, are outside scope of the directive (with respect to reliability and functional requirements acc to ESRH clause 1.5 and 1.6).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overload or temperature protective devices, inhibiting ignition sources from becoming active (e.g. current-dependent device for line motor) + Initiator devices for explosion protective equipment systems, i.e. suppression systems (triggering)</td>
<td>Yes (IL)</td>
<td>Both categories of devices are within 99/92/EC articles 3.2, with respect to functional and reliability requirements according to the ESRH, clause 1.5 and 1.6.</td>
</tr>
<tr>
<td>Other products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doors</td>
<td>No</td>
<td>No own source of ignition.</td>
</tr>
<tr>
<td>Ladders, irrespective of the material</td>
<td>No</td>
<td>No own source of ignition.</td>
</tr>
<tr>
<td>Paint</td>
<td>No</td>
<td>No own source of ignition.</td>
</tr>
<tr>
<td>Tank</td>
<td>No</td>
<td>No own source of ignition.</td>
</tr>
<tr>
<td>Tools, e.g. hammers, tongs</td>
<td>No</td>
<td>No own source of ignition.</td>
</tr>
</tbody>
</table>

**Note 1:** Additional information can be obtained in the second edition of ATEX Guidelines and Standing Committee Considerations to directive 99/92/EC but also in the Non-binding guide to directive 1999/92/EC.

**Note 2:** Equipment, protective systems, components, safety, controlling, regulating devices and/or other products indicated as not falling within the scope of ATEX 99/92/EC, ignition sources and explosion hazards related to their use shall be considered. Friction impacts and abrasion processes involving rust and light metals (e.g. aluminum and magnesium) and their alloys may initiate an aluminum-thermite reaction, which can give rise to particularly intense sparking.
ATEX Directive (ATEX 2014/34/EU)
Items within the Scope

Apart from the obvious products such as electrical switching devices and heat producing devices, what specific products need certification to the ATEX Directive?

- Gas Dispensers
- V-Belts, Fans, Wheels
  - Made be sold as “ordinary” parts without a conformity assessment, in which case the manufacturer of the assembly must assess them for compliance
- Diesel Engines
- Fork Lift Trucks
- Gas Turbines
  - Suppliers, installer and user jointly responsible
The ATEX guideline 94/9/EC refers generally to "Equipment and protective systems for normal operation in hazardous areas". This includes electrical as well as non electrical equipment. Typical non-electrical equipment which may present a potential danger include motors, gear units, valves, rollers, light metal parts, units which include sources of heat or which could overheat etc.

| EN 13463-1 | Basic method and requirements |
| EN 13463-2 | fr Protection by flow restricting enclosure |
| EN 13463-3 | d Protection by flameproof enclosure |
| EN 13463-5 | c Protection by constructional safety |
| EN 13463-6 | b Protection by control of ignition source |
| EN 13463-7 | p Protection by pressurized enclosure |
| EN 13463-8 | k Protection by liquid immersion |
ATEX Directive Impact on Non Electrical Components..

EN 13463-1 – General Requirements
- Compliance with relevant clauses
- Can just comply with this standard
- Ignition hazard assessment
- Marking
- Instructions

EN 13463-5 :2003 c – Constructional Safety

Good engineering principles to limit the risk of Mechanical failure

- Seals for moving parts
- Lubricants
- Bearings
- Power Transmission systems
  - Gear Drives
  - Belt Drives
  - Chain Drives
  - Hydrostatic, hydrokinetic & pneumatic equipment
  - Clutches & couplings
  - Brakes
  - Conveyor Belts
ATEX Directive (ATEX 2014/34/EU)
Assembly definition

“An assembly formed by combining two or more pieces of equipment... has to be considered as a product falling under... directive 94/9/EC provided that this assembly is placed on the market and/or put into service by a responsible person (who will then be the manufacturer of that assembly) as a single functional unit.”

ATEX Guidelines section 3.7.5 paragraph 1

Otherwise, it is an installation and outside ATEX 94/9/EC
ATEX Directive (ATEX 2014/34/EU)  
Assembly definition – Situation 1

• It is intended for use in a hazardous area, e.g.
  • conveyor made from motor, belt, bearings in a zoned area

  OR

• Creates its own internally potentially explosive atmosphere within which there are potential ignition sources
  • e.g. powder blender
  • also may be large enough to give rise to an external zone e.g. whiskey bottling machine or fuel test batch
ATEX Directive (ATEX 2015/34/EU)
Assembly definition – Situation 2

• The assembly contains components (even though they have a Declaration of Conformity to ATEX), e.g.
  • EX Terminals in a component certified Ex e box
  • mounting an Ex d component-certified gas sensing head in an enclosure
    • Because a component is not stand-alone and the certificate does not cover the equipment in which it is installed

ATEX Guidelines, July 05, section 3.7.5

Note: for zone 0 or 1, an ‘EC-Type Examination’ is required, i.e. Notified Body will need to issue a certificate.
## ATEX Marking (ATEX 2014/34/EU)

### Categories (Annex I)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| **Category 1** | Category 1 comprises equipment designed to function in conformity with the manufacturer’s operational parameters and ensure a very high level of protection. Equipment in this category must ensure the requisite level of protection even in the event of rare equipment malfunctions, and therefore employ protective measures that ensure the necessary level of protection such that:  
  - if one means of protection should fail, at least one other independent means will provide the necessary level of protection or  
  - if two faults should occur independently of each other, the necessary level of protection will still be ensured. |
| **Category 2** | Category 2 comprises equipment designed to function in conformity with the manufacturer’s operational parameters and ensure a high level of protection. The means of protection employed in this category ensure the requisite level of protection even in the event of frequently occurring equipment malfunctions or fault conditions that are not unusual. |
| **Category 3** | Category 3 comprises equipment designed to function in conformity with the manufacturer’s operational parameters and ensure a normal level of protection. Equipment in this category ensures the requisite level of protection during normal operation. |
## ATEX Marking (ATEX 2014/34/EU)

### Ex Marking

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Explosion Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Zone 0)</td>
<td>(Zone 1)</td>
<td>(Zone 2)</td>
<td>IIA Acetone, ethane, benzene, petrol, butane, propane, methane</td>
</tr>
<tr>
<td>EPL Ga</td>
<td>EPL Gb</td>
<td>EPL Gc</td>
<td>IIB Ethylene, town gas</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IIC Hydrogen, acetylene</td>
</tr>
<tr>
<td>Intrinsic safety</td>
<td>Intrinsic safety</td>
<td>Non-sparking</td>
<td>Ex ma II</td>
</tr>
<tr>
<td>Ex la IIC</td>
<td>Ex ia/ib IIC</td>
<td>Ex nC IIC</td>
<td>Pressurized enclosure</td>
</tr>
<tr>
<td></td>
<td>Flameproof enclosure</td>
<td>Limited energy</td>
<td>Ex mb II</td>
</tr>
<tr>
<td></td>
<td>Ex d IIC</td>
<td>Ex nL IIC</td>
<td>Oil immersion</td>
</tr>
<tr>
<td>Encapsulation</td>
<td>Increased safety</td>
<td>Non-sparking</td>
<td>Ex o II</td>
</tr>
<tr>
<td>Ex ma II</td>
<td>Ex e II</td>
<td>Ex nA II</td>
<td>Powder filling</td>
</tr>
<tr>
<td>Optical radiation</td>
<td>Pressurized enclosure</td>
<td>Restricted breathing</td>
<td>Ex q II</td>
</tr>
<tr>
<td>Ex op is II</td>
<td>Ex p II / Ex py II / Ex px II</td>
<td>Pressurized enclosure</td>
<td>Optical radiation</td>
</tr>
<tr>
<td></td>
<td>Encapsulation</td>
<td>Ex pz II</td>
<td>Ex op is II / Ex op pr II</td>
</tr>
<tr>
<td></td>
<td>Ex mb II</td>
<td>Optical radiation</td>
<td>Ex op sh II</td>
</tr>
</tbody>
</table>
ATEX Marking (ATEX 2014/34/EU)

CE Marking

Notified body # - 0518 Sira

European Hazardous mark

Equipment Group – I Mining, II Surface

Equipment Category
1 = Zone 0 or 20
2 = Zone 1 or 21
3 = Zone 2 or 22

Hazardous Atmosphere
G = Gas, D = Dust

Ex – Manufactured to IEC Standards
ed - Protection using “Increased Safety and Flameproof”
IIC – Gas Group (Above ground C)
T4 – Temperature Class
IP 65 – Ingress protection rating

0518 Ex II 2 G Ex ed IIC Gb T4 IP65

Addition Marking Requirements

EPL
ATEX Directive Label Example

ABTECH
HUMBLE, TEXAS, 77338 USA

TYPE SX_________64_________________
RATING______  10______________WATTS
SERIAL No.______  43433_________ 2002

II 2 GD – IP66 – T6  55°C
Ex e II T6 T amb__55__

WARNING!!!
LIVE TERMINALS ISOLATE ELSEWHERE
BEFORE OPENING ENCLOSURE
NA Zone System 505 Marking
Comparison vs. ATEX

Class I, Zone 1
AEx
de
IIC
T6

Type of Protection
May Have Multiple Symbols. Usually Most Important First
d – flameproof, e – increased safety, etc.

II- Industry Group
I = Mining
II = Surface
C-Gas Group
C, B, A

Temperature Code

AEx - US

SOURCE IEx

AEx

US LISTED

US

UL

CSA®
EC-TYPE EXAMINATION CERTIFICATE

Equipment or Protective System Intended for use in potentially explosive atmospheres
Directive 94/9/EC

Certificate number: CESI 05 ATEX 045

Manufacturer: THE Ex-ZONE Ltd.
Address: Unit 12 Airways Industrial Estate, Pinheaden Road, Dyer, Aberdeen,
AB21 7BT, United Kingdom

This equipment or protective system and any acceptable variation thereto is specified in the
schedule to this certificate and the documents therein referred to.

CESI, notified body no. 0322, in accordance with Article 9 of the Council Directive 94/9/EC of
23 March 1994, certifies that this equipment or protective system has been found to comply
with the Essential Health and Safety Requirements relating to the design and construction of
equipment and protective systems intended for use in potentially explosive atmospheres given
in Annex II to the Directive.

The examination and test results are recorded in confidential report n. FX-A.6029.734

Compliance with the Essential Health and Safety Requirements has been assured by
compliance with:

If the sign 'X' is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

This EC-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and
tests of the specified equipment or protective system in accordance to the Directive 94/9/EC.
Further requirements of the Directive apply to the manufacturing process and supply of this
equipment or protective system. These are not covered by this certificate.

The marking of the equipment or protective system shall include the following:

- CE 2C1a EEx d IIB T6 or T5 IP 66/67 85°C or 100°C
- CE 2C1a EEx e IIB T5 or T5 IP 66/67 75°C or 100°C

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Date 27 May 2005 - Translation issued the 27 May 2005

Prepared
Micka Balle

Approved
Uluca Colombo

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Key Details to allow variations on standard product

EC-TYPE EXAMINATION CERTIFICATE n. CESI 05 ATEX 045

Description of equipment (to follow)

Electrical characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24 ± 1000 V a.e.</td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 ± 60 Hz</td>
</tr>
<tr>
<td>Max. current in fuse and contacts</td>
<td>650 A</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>-20 ± 40 °C</td>
</tr>
<tr>
<td>Maximum lamp power</td>
<td>5 W for ambient temperature -20 ± 40 °C</td>
</tr>
<tr>
<td></td>
<td>3 W for ambient temperature -20 ± 55 °C</td>
</tr>
<tr>
<td>Temperature class</td>
<td>T6, T5</td>
</tr>
<tr>
<td>Maximum surface temperature of the units of category II 2 GD and II 2(1) GD</td>
<td>T6 or T5</td>
</tr>
</tbody>
</table>

Maximum values of the power which can be dissipated inside the enclosure E1/6a having the maximum volume

<table>
<thead>
<tr>
<th>Temperature class</th>
<th>+40°C</th>
<th>+55°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T6</td>
<td>600</td>
<td>910</td>
</tr>
<tr>
<td>T5</td>
<td>460</td>
<td>680</td>
</tr>
</tbody>
</table>

Intrinsic safe circuits

The electrical characteristics of the intrinsically safe circuits are indicated on the nameplate of the associated apparatus used, subject of separate certification.

Warning label

"Use screws of quality A2.70 according UNI 7333 with ultimate tensile strength of at least 700 N/mm²."

Additional warnings

In case of enclosures including capacitors:
"After de-energizing, wait 10 minutes before opening".

In case of enclosures of temperature class T5:
"For the enclosure with cable entries temperature > 70 °C, use cables suitable for operating temperatures 2 ... °C"
Schedule

EC-TYPE EXAMINATION CERTIFICATE n. CESI 09 AIREX 045

Report n. EX-A5025239,

Routine tests
The manufacturer shall carry out the routine tests prescribed at paragraph 24 of the EN 50014 Standard and at paragraph 16 of the EN 50018 Standard.

The routine overpressure test shall be carried out with the static method (Clause 12.1.3.1 of EN 50015 standard) at the pressure of:
- 11.9 bar for enclosure size from 1 to 5
- 11.5 bar for enclosure size 6

Descriptive documents (prot. EX-A5025254)
- Technical File n. TF-UK-002 (25 p.)
One copy of all documents is kept in CESI files.
dated 29.03.2005

Special conditions for safe use
None.

Essential Health and Safety Requirements
Assured by compliance to the Standards.

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ATEX Directive (ATEX 137)

99/92/EC (ATEX 137) is intended to complement the previously published 94/9/EC. These two directives cover different areas and are intended to achieve different objectives. Responsibilities and duties are shared between the manufacturer and user (employer).

99/92/EC (ATEX 137)

- Covers health and safety protection of workers
- Duties are placed on the employer
- Intended to ensure that workers enjoy a minimum level of protection throughout all member states

“Think of this like OSHA requirements here in the US....”
ATEX Directive (ATEX 137)

- All new or existing hazardous area equipment made available for use for the first time, prior to 30th June 2003, must comply from that date with the appropriate minimum requirements of Annex II, Part A of ATEX 137.
- All new or existing hazardous area equipment made available for use after 30th June 2003, must comply with the appropriate minimum requirements of Annex II, Parts A and B of ATEX 137.
- All hazardous area workplaces, which are used for the first time after 30th June 2003 must comply with the appropriate minimum requirements of ATEX 137.
- All existing hazardous area workplaces in use before 30th June 2003 must comply with the appropriate minimum requirements of ATEX 137 no later than 30th June 2006.
- The employer must take the necessary steps to ensure all modifications to hazardous area workplaces after 30th June 2003 comply with the appropriate minimum requirements of ATEX 137.
ATEX Directives (ATEX 94/9/EC & 137)

Connection between ATEX 95 and ATEX 137

**ATEX 95**
Product Directive 94/9/EC
Defines the equipment and certification requirements

**EHSRs**
Product requirements

**ATEX 137**
Workers Protection Directive 1999/92/EC
Classifies zones and states the corresponding product category

**Zones**
Risk analysis

- Category 1
- Category 2
- Category 3

- Zone 0/20
- Zone 1/21
- Zone 2/22

Probability, frequency, duration of occurrence of potentially explosive atmosphere
ATEX Directives (ATEX 94/9/EC & 137)
Determining if a Hazardous Location Exists under ATEX 137...

Are flammable substances present [2.2.1]?  
No explosion protection measures necessary

Can sufficient dispersal in air give rise to an explosive mixture [2.2.2]?  
No explosion protection measures necessary

Where can explosive atmospheres occur [2.2.3]?  
No explosion protection measures necessary

Is the formation of an explosive atmosphere possible [2.2.4]?  
No explosion protection measures necessary

Explosion protection measures necessary

Prevent the formation of hazardous explosive atmospheres as far as possible

Is the formation of hazardous explosive atmospheres reliably prevented [2.2.6]?  
Apply adequate explosion protection measures necessary

Further explosion protection measures necessary

To what zones can the places with hazardous explosive atmospheres be assigned [2.2.8]?  
Apply adequate and proportionate mitigation measures

Avoid effective ignition sources in places with hazardous explosive atmospheres as per zoning

Is the ignition of hazardous explosive atmospheres highly improbable [2.2.6]?  
Mitigate the detrimental effects of an explosion so as to ensure the health and safety of workers.
Process for Vendor to meet compliance to the ATEX Directive

Equipment intended for use in the higher risk categories will be required to undergo independent certification by a Notified Body. The actual relationship between the location and the certification requirements is as follows:

Where certification of the product by a Notified Body is required, the manufacturer's quality control system will also need to be independently reviewed and audited.

The Directive requires the machines manufacturer to produce a Technical File containing documentary evidence that the machinery complies with the directive. The form and content of the Technical File is only loosely dictated in the Directive but typically it will contain the following items:

- Drawing(s) of the equipment with information related to explosion protection.
- Copy of installation/user/maintenance manuals
- Wiring and circuit diagrams
- Copies of reports and certification from Notified Body
- Assessment of the electrical system to the appropriate standards
- Assessment of the mechanical equipment to the appropriate standards
- Assessment of the equipment as a whole to the EHSR's of the Directive
- Zoning assessment, calculations and zone diagrams where applicable.
- Ignition hazard assessment report.
- Drawings of markings and labels related to explosion protection and where they are located on the product
- Design calculations
- Copy of the Declaration of Conformity
- Manufacturer's data sheets for safety critical components and sub assemblies.
Process for Vendor to meet compliance to the ATEX Directive

<table>
<thead>
<tr>
<th>CATEGORY OF EQUIPMENT</th>
<th>AREA CLASSIFICATION</th>
<th>CONFORMITY REQUIREMENTS</th>
<th>SUITABLE METHODS OF PROTECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Category 1</strong></td>
<td></td>
<td>All Equipment:</td>
<td>Any two redundant, independent Zone 1 methods of protection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) EC-Type Examination</td>
<td>ia – Intrinsically Safe (2 faults)</td>
</tr>
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<td></td>
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<td>Plus:</td>
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<tr>
<td></td>
<td></td>
<td>(2) Production Quality Assessment; or Product Verification</td>
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<tr>
<td></td>
<td>Gas: Zone 0</td>
<td></td>
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<td></td>
<td>Dust: Zone20</td>
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<tr>
<td><strong>Category 2</strong></td>
<td></td>
<td>Electrical Equipment, and Internal Combustion Engines:</td>
<td>Any Category 1 method of protection or specific type shown below:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) EC-Type Examination</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plus:</td>
<td>ib – Intrinsically Safe (1 fault)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) Product Quality Assessment; or Unit Verification</td>
<td>d – Flame-proof</td>
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<td></td>
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<td>e – Increased Safety</td>
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<td></td>
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<td>p – Pressurized</td>
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<td></td>
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<td></td>
<td>m – Encapsulated</td>
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<td></td>
<td></td>
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<td>o – Oil Immersed</td>
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<td></td>
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<td>q – Powder Filled</td>
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<td></td>
<td></td>
<td>For non-electrical:</td>
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<tr>
<td></td>
<td></td>
<td>(1) Internal Control of production</td>
<td></td>
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<td></td>
<td></td>
<td>Or:</td>
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<tr>
<td></td>
<td></td>
<td>(2) Unit Verification</td>
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<tr>
<td></td>
<td>Gas: Zone 1</td>
<td></td>
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<tr>
<td></td>
<td>Dust: Zone 21</td>
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<tr>
<td><strong>Category 3</strong></td>
<td></td>
<td>All Equipment:</td>
<td>Any category 1 or 2 method of protection or specific type shown below:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1) Internal control of production</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Or:</td>
<td>n – Limited energy</td>
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<tr>
<td></td>
<td></td>
<td>(2) Unit Verification</td>
<td></td>
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<td></td>
<td>Gas: Zone 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dust: Zone 22</td>
<td></td>
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</tr>
</tbody>
</table>

Note: For Category 3 equipment and for Category 2 non-electrical equipment, surveillance audits by a Notified Body are not mandatory.
Under the ATEX Directive, manufacturers can self declare that the product is fit for purpose for Zone 2 applications only. Primarily applicable for special products that might not fit into various other protection concepts....An example of a self declaration certificate is listed below for an Ex nR enclosure for a specific application. The user and vendor must discuss before hand and determine what testing if any needs to be done. However, this does not have to be done by a notified body...
Product Rated EEx nA with inclusion of special display...
Does not fall in standard range of products...
Allows combining with client approval for self certification.

Key point to remember....

Client must approve of this method
With Self Certification comes Client Reluctance...

Clients may be reluctant to approve Zone 2 self-certified equipment for the following reasons....

• Fraud – Without a third party approval, the possibility of unsafe equipment being specified and being used in Zone 2 areas potentially could increase. The onus is even more on the user to confirm whether or not the product is suitable for the application and must have a full understanding of the various protection techniques available and understand the application of these techniques for hazardous locations.
• With the increase of Notified Bodies, the concern is that all of them are following the letter of the law. In theory and by law, users under ATEX must accept test results from any of the Notified Bodies and not be selective in which test house is being used.
• Under ATEX, the concern to testing to a relevant standard is in question. It can be argued that as long as the product meets “relevant” standards, is in compliance with the relevant CE marking requirements, the test standard may not necessarily have to be a EN standard. In potentially could be a IEC standard or another standard such as ANSI, etc. The IEC standards and the EN standards are now harmonized, but not all of the previous standards are yet harmonized....

In general, the level of acceptance for self certification ranges for complete acceptance to reluctance on the part of users....
ATEX Certification Process – Notified Body

A Notified Body:

- Is accredited by a national body (UKAS in the UK)
- Complies with ISO/EC Guide 28:2004 (BS EN4501 in the UK as a minimum
- Has an accredited scope
- Is “Notified” by a national government to the European Commission
- Was known as a “Certification Body” prior to the Directive
- May also comply with ISO/EC 17021:2006 (BS EN45012 in the UK)

When Notified Body is required, there are two options:

EC Type Examination in accordance with Annex III of the ATEX Directive

   Plus

Some form of ATEX-approved Quality System (to EN 13980)

   Or

A Unit Verification in accordance with Annex IX of the ATEX Directive (i.e. inspection of one item or a group of items with respect to compliance with the ATEX Directive.)