

Hazardous Locations: Understanding the Basics of Global Compliance Requirements

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What is a Hazardous Location?

In short:

A hazardous location is any area where there is a *potential* for an explosive concentration of gases and vapours or combustible dusts to be present.

Note: There are two ways of Classifying these areas the Division system and the Zone system

UL Marks Indicate

- **A product is compliant with the applicable Standards.**

The UL Guide Card will determine applicable standards for different equipment types and/or protection method.

- **The manufacturer demonstrates ability to product a compliant product through factory visits.**
- **Four unannounced visits to manufacturing locations a year to verify products.**

UL Standards

- **Standards are based on protection method: intrinsic safety, explosion proof, purge/pressurized, etc.**
- **Both Zone and Divisions have separate standards.**

Hazardous Locations Classifications

Class, Division, Group

Class I – Vapor/Liquid		Class II – Dust		Class III – Fiber/Flying	
Divisions	Zone	Division	Zone	Division	Zone
Division 1	Zone 0	Division 1	Zone 20	Not Divided	Not Divided
	Zone 1		Zone 21		
Division 2	Zone 2	Division 2	Zone 22		

Class I – Vapor/Liquid		Class II – Dust		Class III – Fiber/Flying	
Group A	Group IIC	Group E	Group IIIC	Not divided	Group IIIA
Group B	Group IIC or IIB + H ₂	Group F	N/A		
Group C	Group IIB	Group G	Group IIIB		
Group D	Group IIA				

IECEX is a

***“Conformity Assessment Tool”
providing confidence that
Products, Services and Personnel
covered by an IECEx Certificate
meet specified requirements,
(International Standards).***

Today's Challenges

- Avoiding Multiple Tests/Retesting
- Delays in accessing markets
- Obstacles preventing access to new products by smaller markets
- Exporting products globally

Foundation for IEC CA Systems (including IECEx)

- One single set of Rules and Operational Procedures for ALL TLs and CBs to follow
- ALL TLs and CBs undergo the single assessment process (based on Peer Assessment)
- Single Test Report and Certificate Format used by ALL TLs and CBs
- Use of Internet “On-Line” Systems for Certificates

How the IECEx Works (Cert. Equip. Scheme)

- Ex equipment Manufacturers, apply to any **ExCB**
- Conformity is Assessed/Documented – **ExTR**, **QAR**, and **CoC** provided
- Option 1 – Equip, needs no further certification in order to enter the market, e.g. Australia
- Option 2 – Mfr submits **ExTR** and **QAR** to foreign ExCB for National Certification, e.g. Europe
- Go to IECEx.com for more info on other Schemes

Introduction to the ATEX Directive

Key Terms:

- Certificate of Conformity
- EC Declaration of Conformity
- Equipment Group
- Equipment Category
- Equipment Protection Level



Directives

- A Directive is a binding piece of EU legislation.
- Directives are addressed to each Member State.
- Member States are under a legal obligation to implement Directives into their own constitutional systems.

ATEX

- Directive of the European Parliament and the Council on the approximation of the laws of the Member States concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
- 94/9/EC (OJ L100, April 19, 1994)

ATEX vs. IECEx

ATEX Directive	IECEx System
Mandatory for Ex products in Europe	Voluntary system to reduce certification expense/time
Notified Bodies – designated by national governments	Testing Labs and Certification Organizations - accredited by IECEx
Quality System certificate (PQAN) required for Zone 0 and Zone 1 equipment.	Test Reports may be issued without a Quality Audit. Audits required for certificates only.
No centralized directory of certificates	All certificates published online
Manufacturer prepares a Declaration of Conformity (DoC)	No such document in IECEx system

Equipment Categories

Equipment Category indicates the Zone Location for which the equipment is suitable

<u>ATEX Category</u>	<u>Zone Designation</u>	
	<u>Gas</u>	<u>Dust</u>
1	0	20
2	1	21
3	2	22
M1	Zone 0 Mines	
M2	Zone 1 Mines	

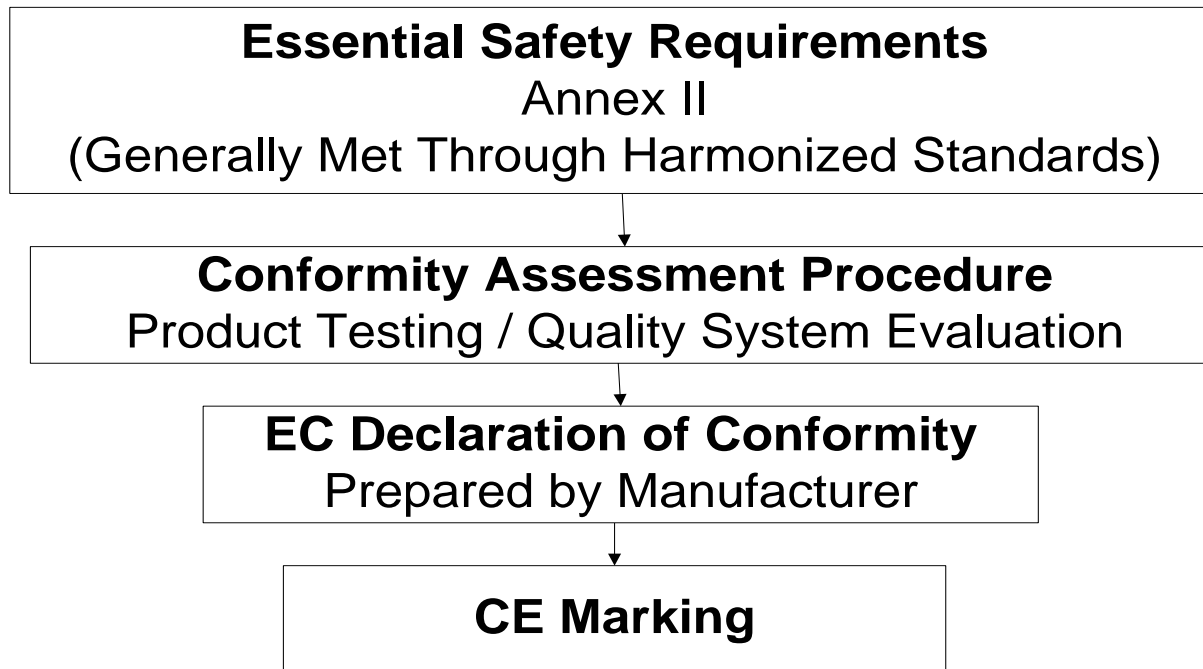
Equipment Protection Levels

EPLs are a new way to describe equipment's risk of ignition

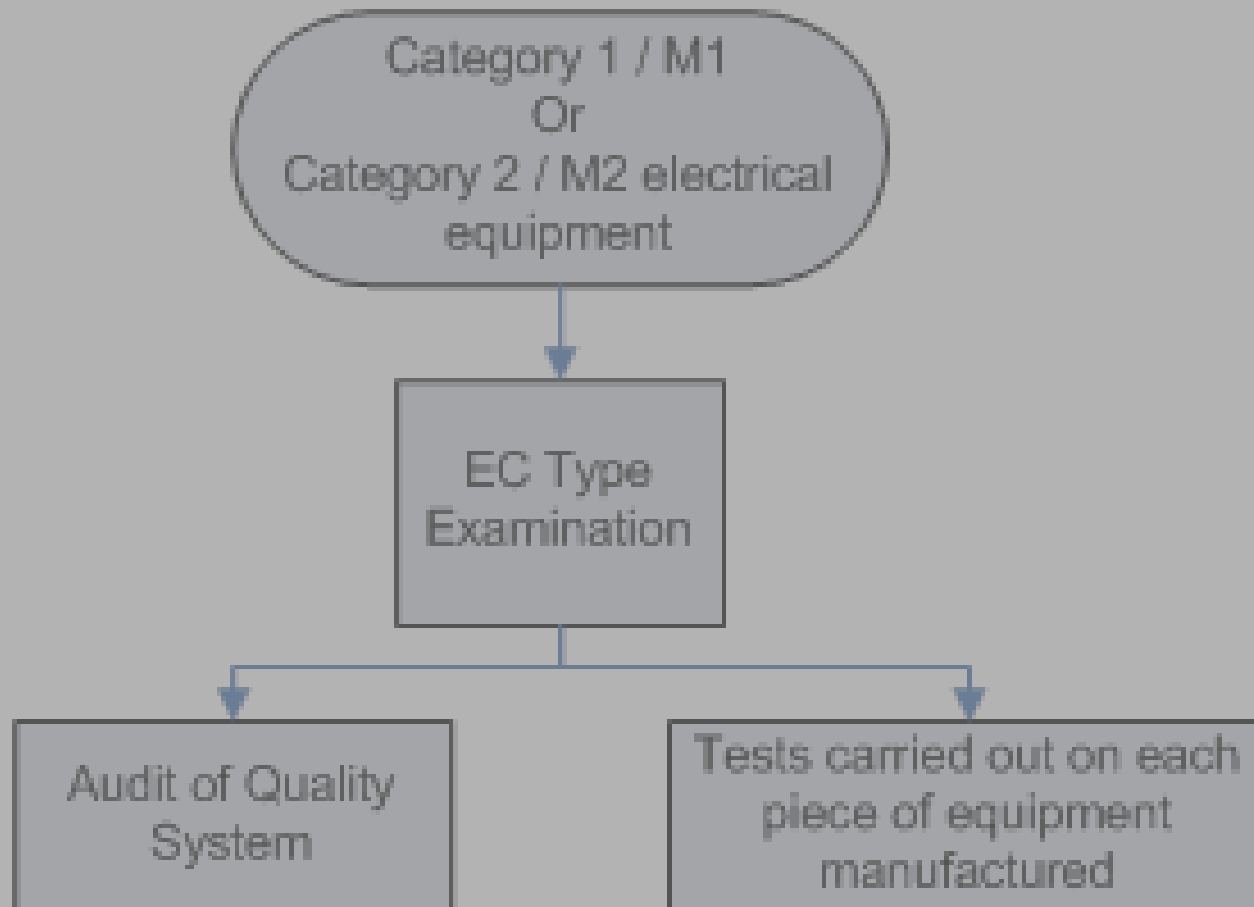
EPL	Zone
Ga	0
Gb	1
Gc	2
Da	20
Db	21
Dc	22

Directive 94/9/EC (ATEX) Quick Reference Guide

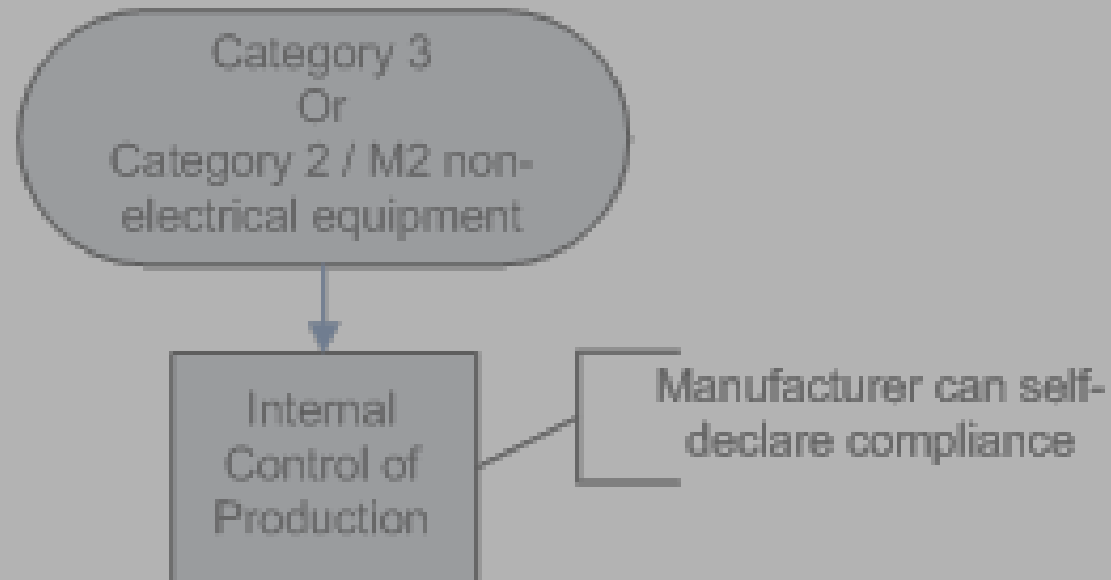
CONFORMITY ASSESSMENT PROCEDURES



Conformity Assessment Procedure – Zone 0 &1



Conformity Assessment Procedure – Zone 2



Although manufacturers can self declare for Category 3 under the ATEX system, many opt to seek certification from a 3rd party
(called a Type Examination Certificate, without the “EC”)

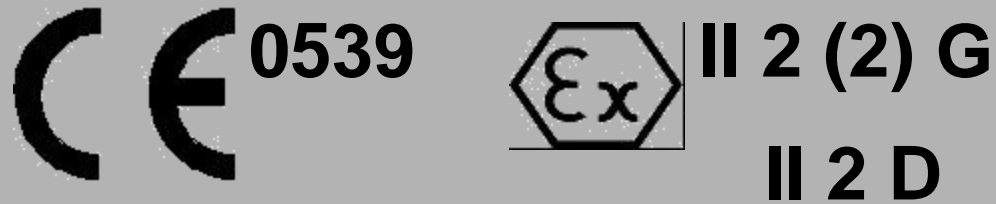
Quality Audits: U.S. vs. Europe

- Quality Systems are assessed to EN/ISO/IEC 80079-34
- Manufacturer receives a certificate for the quality system, called a PQAN(ATEX) or QAR(IECEX)
- PQANs and QAR expire after three years
- Audits are performed every 18 months

Changes to Requirements: U.S. vs. Europe

- As European standards are revised, old certificates remain valid
- Products are evaluated to newer editions of standards only when there is a substantive change in construction
- No need to resubmit to a test lab when standards change

Marking Example – IEC 60079-0:2004



Ex de [ib] IIC T6

Ex tD A21 IP66 T120 C

DEMKO 09 ATEX 12345 X

-40 C <Ta< +60 C

Global Harmonization

Technical standards are based on IEC 60079 series, with minor national differences:

- EN 60079 Europe
- IEC 60079 IECEx
- UL 60079 USA
- CSA E60079 Canada

**One combined evaluation and test program
can cover all standards at once**

Summary



- UL provides certification for global applications, US, Canada, IECEx System, ATEX Directive.
- IECEx System compliance is optional
- ATEX Directive compliance is mandatory for Europe
 - 3rd party verification is required for Category 1 and 2 equipment.
- Differences are procedural, rather than technical
 - Except when transferring between the Zone and Division Systems
- How to get started: **hazloc@ul.com**

Q&A

- **We will have limited time to discuss questions during our time here. For further questions you can contact me at:**

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