

Gas Academy

Hazardous Area Certification

April 2020





Hazardous Areas and Product Certification

Certification designed to prevent explosions



Buncefield Fuel Storage Depot, UK
December 2005

Safety Certification – Hazardous Areas



Typical Hazardous Area warning sign – processing plant





The European ATEX Directive

ATEX 95 Equipment Directive



- EU Directive - mandatory compliance with latest standards: EN60079 series etc
- CE Marking Directive - trade barrier reduction
- Relates to product and its usage
- Defines EHSRs (Essential Health & Safety Requirements)
- QMS Requirement (ISO/IEC 80079-34)

ATEX Certificate confirms conditions and limitations (X-mark)

Certificate Number Baseefa14ATEX0012X Issue 1	 	Issued 28 July 2015 Page 1 of 5
--	--	---

1 EC - TYPE EXAMINATION CERTIFICATE

2 Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC

3 EC - Type Examination Certificate Number: Baseefa14ATEX0012X – Issue 1

4 Equipment or Protective System: XgardIQ Fixed Gas Detector

5 Manufacturer: Crowcon Detection Instruments Limited

6 Address: 172 Brook Drive, Milton Park, Abingdon, Oxfordshire, OX14 4SD

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

8 Baseefa, Notified Body number 1180, 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 No's. **See Certificate History**

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0: 2012 +A11: 2013 EN 60079-1: 2007 EN 60079-11: 2012
except in respect of those requirements listed at item 18 of the Schedule.

10 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.

11 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. 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.

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

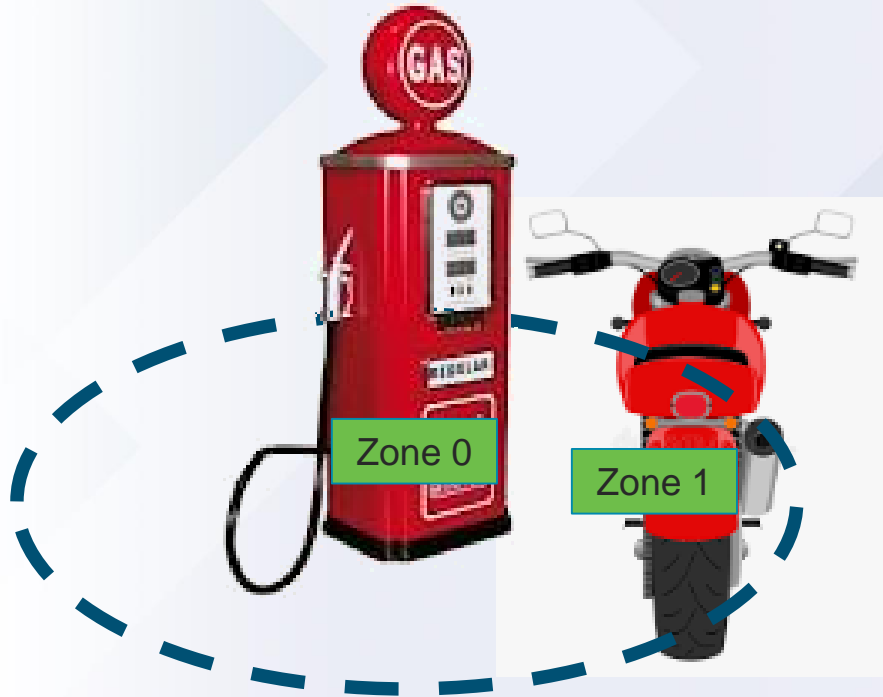
 II 2G Ex d ia IIC T4 Gb (-40°C ≤ T_a ≤ +75°C)

The 'Zone' indicates the likelihood of the presence of a flammable atmosphere (gas or dust)

Zone 0 (20)	Continuous Presence
Zone 1 (21)	Can be present under normal operation
Zone 2 (22)	Can only be present under fault/upset conditions

Note: Zones 0, 1, 2 are gas hazard areas, Zones 20, 21, 22 are dust hazard areas

Safety Certification – Hazardous Area Zones



Zone 2

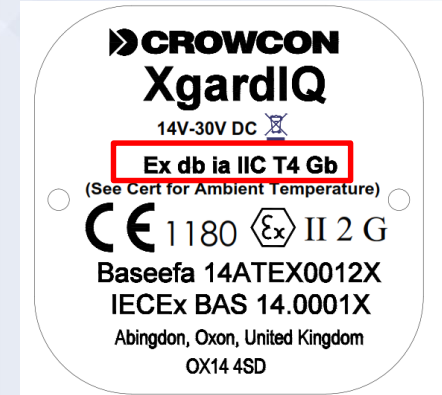


Product Certification - ATEX

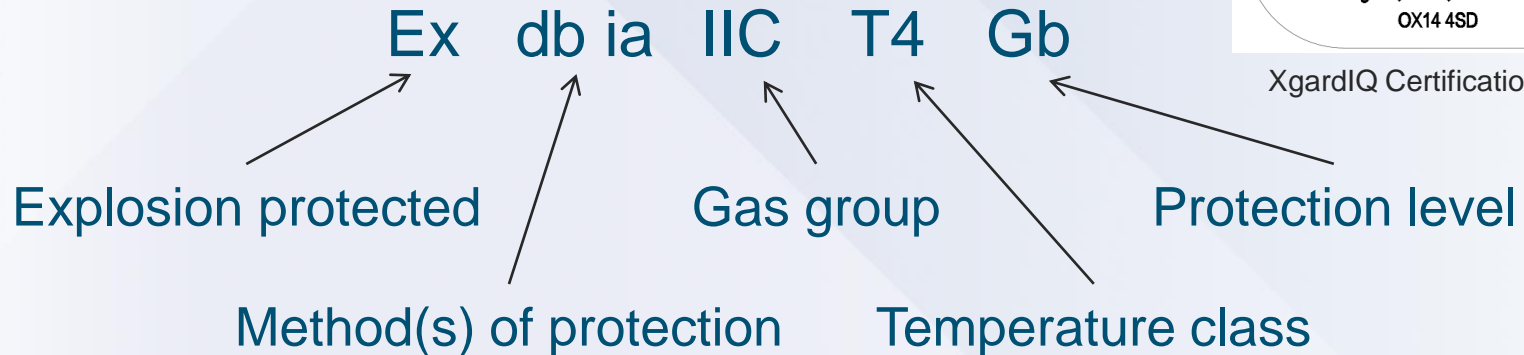
ATEX Product Code Example



Ex db ia IIC T4 Gb
Tamb -40°C to +75°C



XgardIQ Certification Label



Ex db ia IIC T4 Gb

- ia intrinsic safety, two faults Zones 0,1,2
- ib intrinsic safety, one fault Zones 1,2
- ic intrinsic safety, no faults Zone 2
- da flameproof Zones 0,1,2
- db flameproof Zones 1,2
- dc flameproof Zone 2
- eb increased safety Zones 1,2
- ma encapsulation Zones 0,1,2
- mb encapsulation Zones 1,2
- mc encapsulation Zone 2

Ex db ia **IIC** T4 Gb

Mining:

Group I

Methane only

Industrial:

Group II

- IIA Methane, ethane, propane etc (least easy to ignite)
- IIB Ethylene
- IIC Hydrogen, Acetylene, CS₂ (most easy to ignite)

Note for Exd only intermediate Group IIB+H₂

Downward compatibility - IIC covers all

Ex db ia IIC **T4** Gb

Maximum surface temperature °C

- T1 450
- T2 300
- T3 200
- T4 135
- T5 100
- T6 85

Downward compatibility - T6 covers all

Safety Certification – Equipment Protection Level

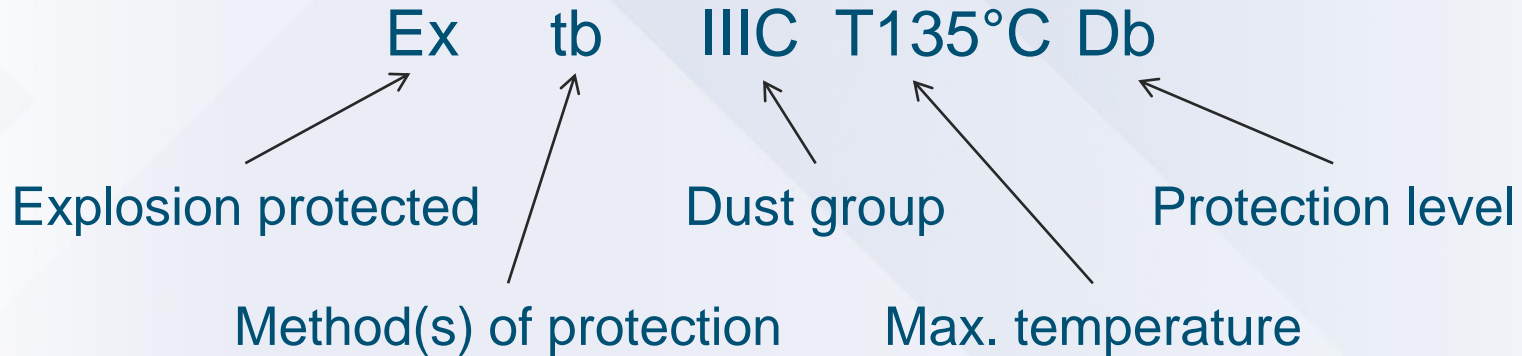
Ex db ia IIC T4 **Gb**

Protection level and Zones

- Ga Gas Zone 0
- Gb Gas Zone 1
- Gc Gas Zone 2

A typical ATEX product code might look like this

Ex tb IIIC T135°C Db (-40°C to ≤75°C)



Safety Certification – Dust Protection Concept

Ex **tb** IIIC T135C Db

- ta enclosure (IP) protection Zones 20,21,22
- tb enclosure (IP) protection Zones 21,22
- tc enclosure (IP) protection Zone 22 only
- iaD intrinsic safety Zones 20,21,22
- ibD intrinsic safety Zones 21,22
- ma encapsulation Zones 20,21,22
- mb encapsulation Zones 21,22
- pD pressurization Zones 21,22

Ex tb **IIIC** T135C Db

- IIIA combustible (organic) dusts (least easy to ignite)
- IIIB non-conductive (mineral) dusts
- IIIC conductive (metal) dusts (most easy to ignite)

Downward compatibility - IIIC covers all

Ex tb IIIC T135C Db

Maximum product surface temperature °C of the product under failure conditions.

This temperature must be lower than the ignition temperature of dusts which may be present in the hazardous area.



Safety Certification – Dust Equipment Protection Level

Ex tb IIIC T135C Db

Protection level and Zones

- Da Dust Zone 20
- Db Dust Zone 21
- Dc Dust Zone 22

Safety Certification – ATEX Marking



Equipment group:

Group I: Mining

Group II: Industrial

Equipment category:

Category 1: Zone 0 (20)

Category 2: Zone 1 (21)

Category 3: Zone 2 (22)

Hazard:

G: Gas

D: Dust

Certificate number: Baseefa 14ATEX0012X



Global Certification

National Electric Code (NEC)

NEC Article 500: Follows the ‘Divisions’ principle

NEC Article 505: Follows the ‘Zones’ principle

Standards:

UL913 Intrinsically Safe Apparatus for Use in Class I, II, III, Division 1, Hazardous (Classified) Locations

UL1203: Explosion-Proof and Dust-Ignition-Proof Electrical Equipment for Use in Hazardous (Classified) Locations



NEC500 Classification: Class/Division/Group

Class

Class I: flammable gases or vapours

Class II: combustible dusts

Class III: easily ignitable fibres and lint

Divisions

Division 1 is High risk (similar to Zones 0, 1)

Division 2 is Lower risk (similar to Zone 2)

Temperature code (eg T6) is similar to those used in ATEX.

NEC500 Classification: Gas Groups

Group A	Acetylene
Group B	Hydrogen
Group C	Ethylene
Group D	Methane, Propane etc
Group E	Metal Dust
Group F	Coal Dust
Group G	Grain Dust

NEC500 Classification

Product marking code example:

Class I Division 1 Group B,C,D



NEC505 certified products will bear a code similar to ATEX

Safety Certification – North America

Certification is to US or Canadian standards, certification Notified Bodies:

US **UL, FM, Intertek (ETL)**

Canada **CSA**

UL can certify to CSA standards as cUL

CSA can certify to UL standards as cUS

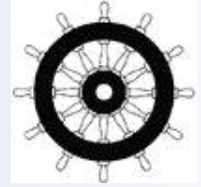


Safety Certification – Marine and Regional

Marine:

Marine Equipment Directive (MED): Mandatory certification for EU-flagged vessels

Marine Type Approval required depending on where a vessel is registered. Examples USCG, DNV, BV, ABS



Global:

IECEX: harmonisation of international Ex standards.



Regional:

Certification is required to regional standards in many countries.
Examples: PESO (India), CCS & CCCF (China), Inmetro (Brazil)