

## DANISH TECHNOLOGICAL INSTITUTE

The Danish Technological Institute is a self-owned and not-for-profit institution. We develop, apply and disseminate research- and technologically-based knowledge for the Danish and International business sectors. As such, we participate in development projects, which are of use to society in close collaboration with leading research and educational institutions both in Denmark and abroad.

### ATEX Certification

Danish Technological Institute's department "Certification & Inspection" is an independent accredited Notified Body – ExNB for electrical and none-electrical equipment Ex-equipment.

Within the scope of our Notified Body no. "0396" we issue the following certificates in accordance with Directive 2014/34/EU:

- ✓ EU Type Examination Certificate – to Annex III (Module B)
- ✓ EU Unit Verification Certificate – to Annex IX (Module G)
- ✓ EU Product Verification – to Annex V (Module F)
- ✓ Internal Production Control – to Annex VIII (Module A)



**DANCERT**

TEKNOLOGISK INSTITUT

Concerning the ATEX Quality modules (PQAN) we issue the below listed certificates through "DANCERT" under the ExNB no. "1073". Dancert is the certification body of the Danish Technological Institute.

- ✓ Notice of Conformity to Type – to Annex VI (Module C1)
- ✓ Production Quality Assurance Notification – to Annex IV (Module D)
- ✓ Product Quality Assurance Notification – to Annex VII (Module E)

### Danish Technological Institute

Gregersensvej 2  
2630 Taastrup  
Denmark  
Telephone +45 72 20 20 00  
<http://www.dti.dk>

### Direct contact:

Steen Christensen: +45 7220 2693  
Jakob Nittegaard: + 45 7220 3466  
<http://www.atexdirektivet.dk>



## ATEX - GUIDE

A short introduction to ATEX Terminology

**CERTIFIED**



## What is Ex-equipment / areas?

Electrical or non-electrical equipment used in an area where there is a risk of presence of a flammable atmosphere (gas or dust) - are popularly called "Ex-equipment" or equipment for use in Hazardous Areas.

**Ex-equipment are typically used in places like:**

- The chemical industry
- Oil refineries
- Off shore installations (platforms)
- Filling stations
- Tunnels/ sewers/ drains
- Milling industry/ printing-house / painting industry
- Farmer's installations
- Mining industry

## Scope of the ATEX Directive 2014/34/EU

**The Directive covers Electrical and Non-electrical equipment!**

- "Equipment": Machines, apparatus, instruments, fixed or mobile devices, control components and so on.
- "Protective systems": e.g. equipment that can stop or delay an explosion
- "Components": Essential parts for the safety but with no autonomous function.
- Safety control and regulation equipment intended to be used outside the Ex-area - but with a function, that secures the safety in the Ex-area.

## Frequently used Standards - (not complete)

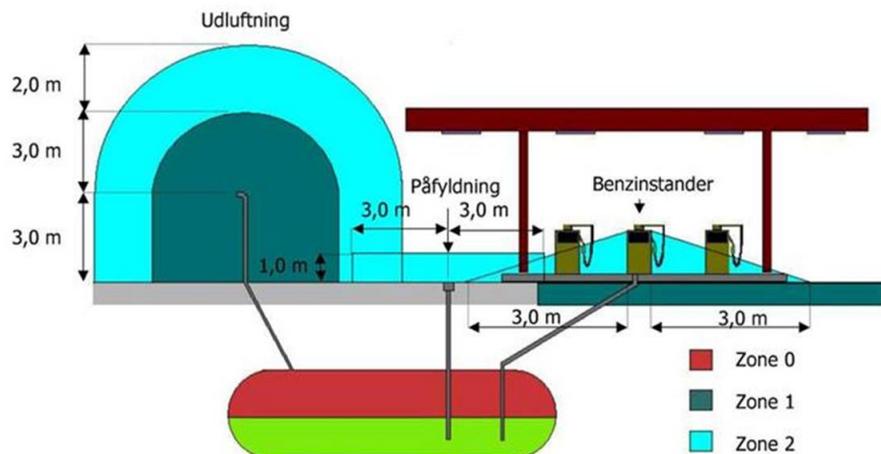
**Electrical / Non-Electrical – Installation – Quality Requirements etc.**

Protection Principles (Gas areas)	Standards
General Requirements	EN 60079-0
Oil Immersion – "o"	EN 60079-6
Pressurized Apparatus – "p"	EN 60079-2
Powder Filling – "q"	EN 60079-5
Flameproof Enclosure – "d"	EN 60079-1
Increased Safety – "e"	EN 60079-7
Intrinsic Safety – "i"	EN 60079-11
Encapsulation – "m"	EN 60079-18
Field Bus Concept (FISCO)	EN 60079-27
Laser Optics/radiation	EN 60079-28
Intrinsically Safe Systems	EN 60079-25
<b>Zone 0 Standard</b> Equipment with equipment protection level (EPL) Ga	EN 60079-26
<b>Zone 2 Standards:</b> Type "n" Protection	EN 60079-15
<b>Dust Standards</b>	
Dust – General requirements	EN 60079-0
Protection by intrinsic "iD"	EN 60079-11
Encapsulation in dust "mD"	EN 60079-18
Protection by enclosure "tD"	EN 60079-31
Construction & test	
Classification of dust areas	EN 60079-10
<b>Non-Electrical</b>	
Basic concepts and methodology	EN 1127-1
Basic Requirements	EN 13463-1 / EN 80079-36
Non-electrical protection principles	EN 13463-2 to -8 / EN 80079-37
Group II engines	EN 1834-1
Petrol filling stations	EN 13012
<b>ATEX Quality Requirements</b>	EN 80079-34
<b>Installations</b>	EN 60079-14
<b>Installations/Inspection/maintenance</b>	EN 60079-17
<b>Equipment repair, overhaul, and reclamation</b>	EN 60079-19
<b>Classification of hazardous areas</b>	EN 60079-10

**Places to find Ex-information / current Harmonized Standards:**

<http://www.teknologisk.dk/ydelsler>  
<http://ec.europa.eu/growth/sectors/mechanical-engineering/atex/>  
<http://ec.europa.eu>  
<http://eur-lex.europa.eu>  
<http://www.ds.dk>

## Example of Zone Classification (Filling Station)



Jf. Brandteknisk vejledning nr. 19

### Remark:

- ▶ In **Zone 0** – Ex-equipment must be designed for **Category 1** use
- ▶ In **Zone 1** – Ex equipment must be designed for **Category 2** use
- ▶ In **Zone 2** – Ex equipment must be designed for **Category 3** use

## IP Classification's – Ingress Protection to EN 60529

Definition 1 <sup>st</sup> code index	Code	IP Class	Code	Definition 2 <sup>nd</sup> code index
No protection	0	Example: <b>IP 5 6</b>	0	No protection
Objects greater than D: 50 mm	1		1	Vertically falling water drops
Objects greater than D: 12,5 mm	2		2	75° to 90° vertically falling water
Objects greater than D: 2,5 mm	3		3	Spraying water 60° from vertical
Objects greater than D: 1 mm	4		4	Splashing water from any direction
Dust protected	5		5	Water jets from any direction
Dust-tight	6		6	Powerful jets from any direction
			7	Protection at immersion
			8	Protected at continuous immersion

(D = Diameter)

## Exclusions from the ATEX Scope

- Medical devices intended for use in medical environment.
- Equipment and protective systems intended to for use in relation with unstable chemical substances.
- Equipment intended to for use in domestic and non-commercial environments where flammable atmosphere is only a result of accidents.
- Personal protective equipment covered by Directive 89/686/EEC. Seagoing vessels and mobile offshore units together with equipment on board such units.
- Means of transport i.e. vehicles, trailers, planes used for transportation. (Vehicles used in potential explosive atmosphere are not excluded).

## Essential Health and Safety Requirements Annex II of Directive 2014/34/EU

- Principle of integrated safety
- Specific conditions of inspection and maintenance
- Environmental conditions
- Marking
- Instructions for use
- Choice of materials
- Design and manufacture
- Risk caused by software
- Ex atmospheres caused by the presence of gas, vapours and mist.
- Explosive atmospheres caused by presence of air-dust mixtures.
- Potential ignition sources:
  - Sparks, flames, electric arcs
  - High surface temperatures
  - Acoustic energy, radiation: optical,
  - Electromagnetic or other sources

## Classification by Group and Category according to intended use - **Surface industry** (not mining)

Area	Category of Equipment to ATEX Definitions	Presence or Duration of Explosive Atmosphere	Level of Protection Faults to Allow for	Comparison with Present Practice
<b>Equipment Group II (surface industry)</b>	<b>1</b>	Continuous presence Long Periods Frequent	<b>Very high level of protection:</b> 2 types of protection or 2 independent faults	Group II <b>Zone 0</b> (gas) Zone 20 (dust)
	<b>2</b>	Likely to occur	<b>High level of protection:</b> 1 type of protection. Habitual frequent malfunction	Group II <b>Zone 1</b> (Gas) Zone 21 (dust)
	<b>3</b>	Unlikely to occur Present for a short period	<b>Normal protection:</b> Required level of protection.	Group II <b>Zone 2</b> (gas) Zone 22 (dust)

Inflammable substances for all 3 Categories can be Gas, Vapours, Mist, or Dust

## Temperature Classes – (T-class)

	T1	T2	T3	T4	T5	T6
<b>Maximum Surface temperature of equipment</b> – taking the maximum Ambient temperature into account.	450 °C	300 °C	200 °C	135 °C	100 °C	85 °C

To ensure Ex-equipment can be safely used, the Gas Group must be known and the Temperature Class must be compared with the spontaneous temperature of the present flammable atmospheres.

GENERAL ELECTRICAL PROTECTION CONCEPTS						
EN / IEC STANDARD		Code		Protection Principle	ZONE	
Gas	Dust	Gas	Dust		Gas	Dust
60079-0				General Requirements		
60079-1		Ex da Ex db Ex dc		Flameproof	0 (gas sensors) 1 2	
	60079-31		Ex ta Ex tb Ex tc	Enclosure		20 21 22
60079-2			Ex pxb Ex pyb Ex pzc	Pressurized	1 1 2	21 22
60079-5			Ex q	Powder Filling	1	
60079-6			Ex o	Oil Filled	1	
60079-7			Ex e	Increased Safety	1	
60079-11			Ex ia Ex ib Ex ic	Intrinsic Safety	0 1 2	20 21 22
60079-15		Ex nA EX nR Ex nC		Non-sparking Restricted breathing Enclosed break	2	
60079-18			Ex ma Ex mb Ex mc	Encapsulation	0 1 2	20 21 22

## Marking Plate Minimum requirements (example)

### Marking Gas

**EX-Safety Corp.**  
Bahnhofstrasse 2  
CH-8712 Buchs

Load Cell Type: 1709Ex, series 116

CE 0396 Ex II 1G,  
DTI 18ATEX 1234X

**Ex ia IIC T6 Ga**

Ui: 28 V, li: 98 mA  
Ci.: 10 nF, Li: 0 mH, Pi: 0,85 W

### Marking Dust

**EX-Safety Corp.**  
Bahnhofstrasse 2  
CH-8712 Buchs

Spotlight Type: Light 20"  
series no. 469

CE 0396 Ex II 1D  
DTI 18ATEX 5678X

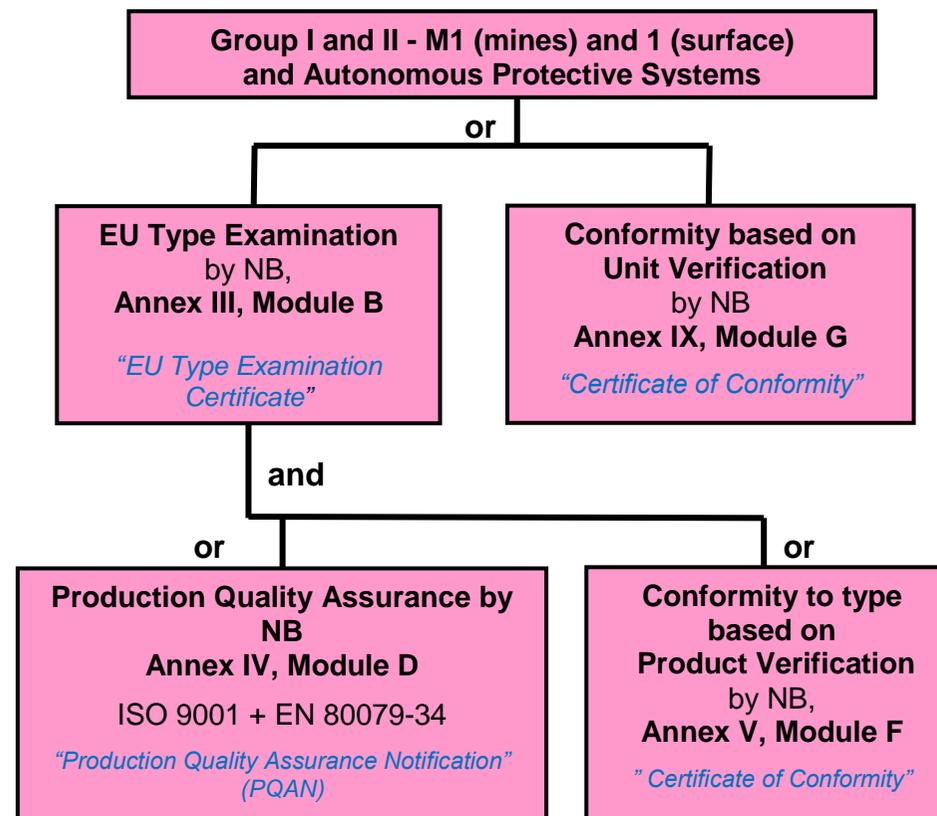
**Ex ma IIIC T120°C Da**

-15 °C < T<sub>amb</sub> < 90 °C

Explosion Groups – Temperature Classification according to MESG (Maximum Experimental Safety Gap)			
Temperature Class	IIA > 0,9 mm	IIB ≤ 0,9 to 0,5 mm	IIC < 0,5 mm
<b>T1</b> > 450 °C	Acetone Ammonia Benzene – pure Ethane Ethyl chloride Carbon monoxide Methane Methanol Naphthalene Phenol Propane Toluene	Town gas	Hydrogen
<b>T2</b> >300... ≤ 450 °C	Ethyl alcohol i-amyl acetone n-butane n-butyl alcohol Cyclohexane Acetic anhydride	Ethylene Ethylene oxide	Ethine (acetylene)
<b>T3</b> >200... ≤ 300 °C	Petroleum spirit – gen. Diesel fuel Jet propulsion fuel Heating fuel DIN 51603 n-hexane	Ethylene glycol Hydrogen sulphide	
<b>T4</b> >135... ≤ 200 °C	Acetaldehyde	Ethyl ether	
<b>T5</b> >100... ≤ 135 °C			
<b>T6</b> >85... ≤ 100 °C			Carbon disulphide

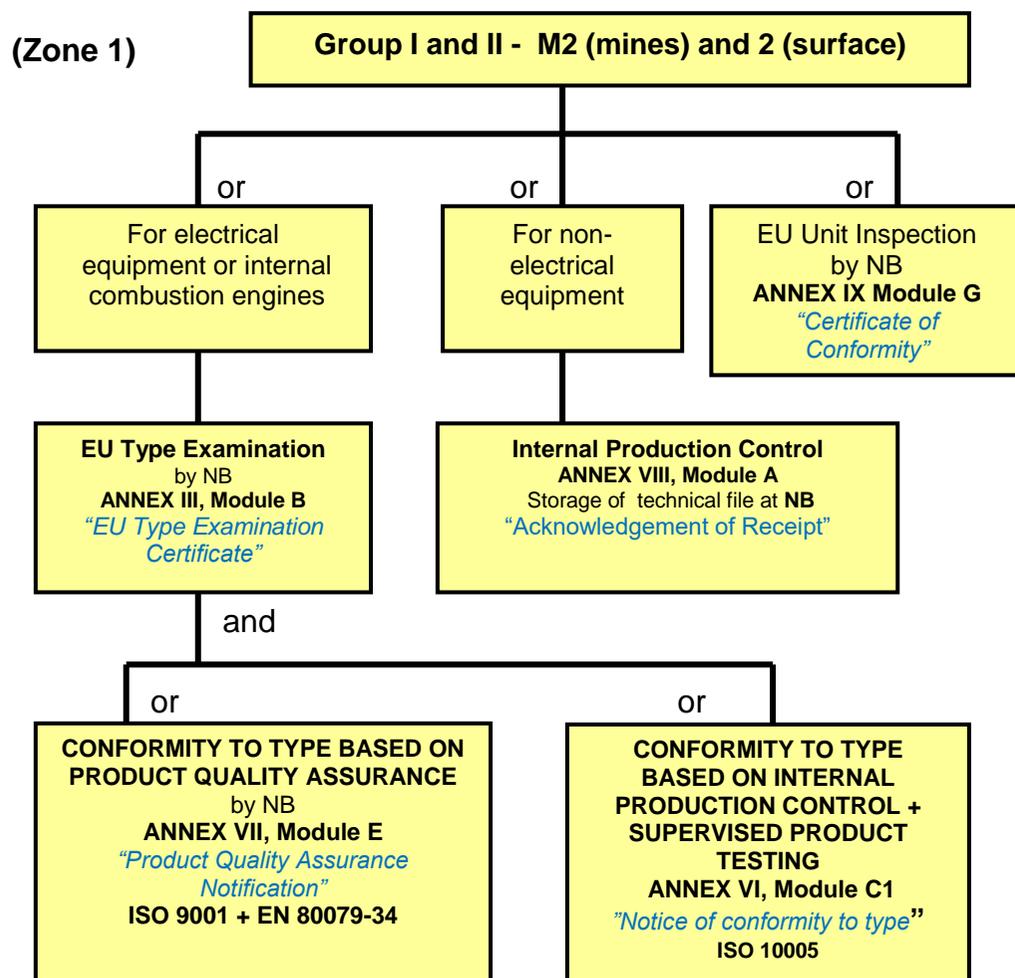
## Conformity assessment procedure - Equipment-Category 1 and M1

(Zone 0)



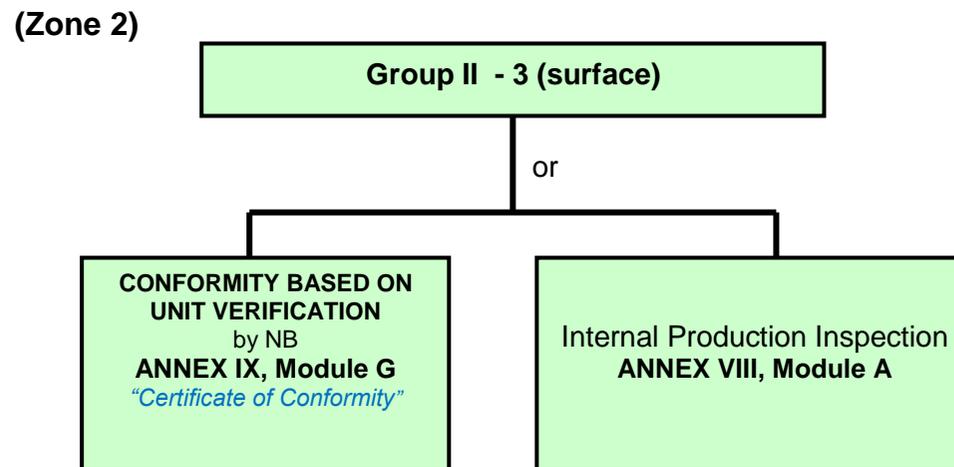
NB: Notified Body

### Conformity assessment procedure, equipment-category 2 and M2



NB: Notified Body

### Conformity assessment procedure, equipment-category 3



### Marking of equipment to 2014/34/EU

In addition to the required CE marking, equipment must carry specific marking for potentially explosives atmospheres:

