May, 15 2020

WEBINAR

#LAUMASKNOWHOW

ATEX – IECEx – EAC Ex

LAUMAS®

Innovation in Weighing

What is ATEX?

- From French “**AT**mosphère **EX**plosible”
- Protecting people in places where an explosive atmosphere may occur
- Cause: **gas** or **dust**
- European «equipment» directive **2014/34/EU**
- European «workplace» directive **99/92/EC**

What is IECEx?

- IECEx System is an **international and voluntary certification** promoted by IEC (International Electrotechnical Commission, basically the ones who make the standards), sharing with ATEX the same technical regulations.

- IECEx and ATEX aims are in fact the same, but the first one is extended **also** to non-EU markets.

- It can be converted into any national certificate if recognized by the country

IECEx participant countries

- **Accepting ExTR (reports) for national certifications:**
  Brazil, Canada, China, India, Israel, Japan, Korea, Malaysia, Norway, Russia, South Africa, Switzerland, Turkey, United Arab Emirates, USA, most EU countries

- **Legally accepting IECEx:**
  Australia, New Zealand, Singapore

- There are currently 59 Accepted Certification Bodies (ExCBs) in 28 countries

Schema IECEx

Equipment Scheme

Certificate of Conformity
Component Certificate
Unit Verification

Services Scheme

Certification of service providers

Certified Persons Scheme

Certification of competences

Certification process

ExTR
Assessment and Test Report

+

QAR
Quality Assessment Report

=

Certificate of Conformity

What is EAC Ex?

- It is basically ATEX for EACU (EurAsian Customs Union) countries: Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia
- Same technical standards as ATEX and IECEx: IEC 60079 family
- The local harmonized standard is TR CU 012

EAC Ex

https://commons.wikimedia.org/wiki/File:Eurasian_Economic_Union_(orthographic_projection)_-_**Crimea_disputed.svg#/media/File:Eurasian_Economic_Union**_(orthographic_projection)_-_Crimea_disputed.svg

What is HazLoc?

- Regulation equivalent to ATEX for USA and Canada
- The standard is NEC 500 (a chapter of the main American regulation for electrical sector, the NFPA 70)
- Technically different from ATEX and IECEx; ex.:
  - Not 3 zones, but 2 divisions
  - Fibers besides Gas and Dusts
- Certification markings are American main laboratories' brands: FM, UL, ETL

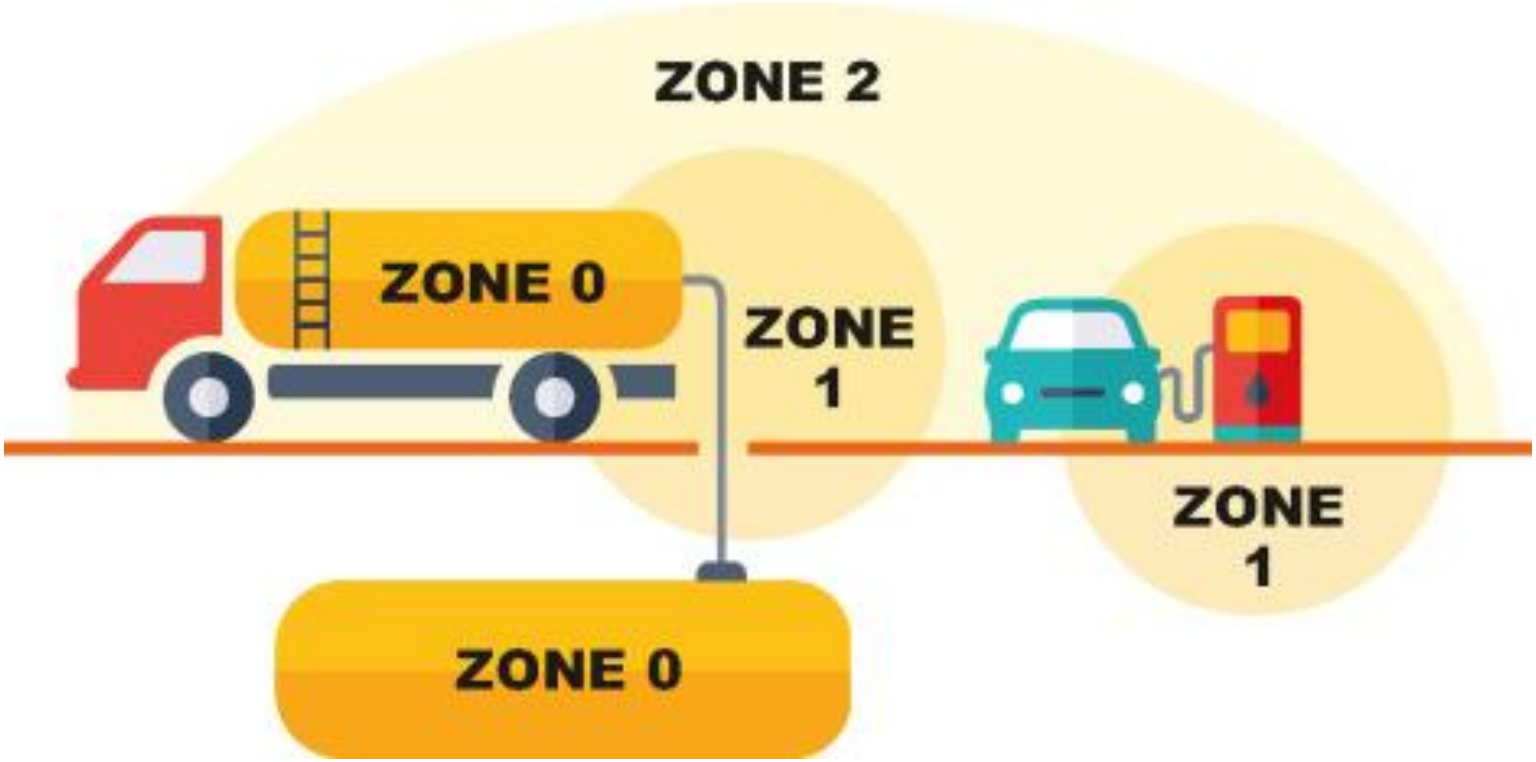
HazLoc vs IECEx

- In the USA there is also NEC 505 (another chapter of NFPA 70)
- In fact, it is IECEx!
- Formally IECEx is accepted in the USA (convertible in a NEC 505 certificate), but in practice the market usually requires traditional NEC 500
- We foresee to obtain HazLoc for our IECEx products in 2021

Hazardous places: from 99/92 EC

	GAS	DUST
Explosive atmosphere present continuously or for **long** periods or frequently	ZONE 0	ZONE 20
Explosive atmosphere present **occasionally** in normal operation	ZONE 1	ZONE 21
explosive atmosphere **not likely** and for a short period only	ZONE 2	ZONE 22

Hazardous places: zone example



Categories, protection level and zones

- A device valid for zone 0 is also valid for zones 1 and 2, and so on…

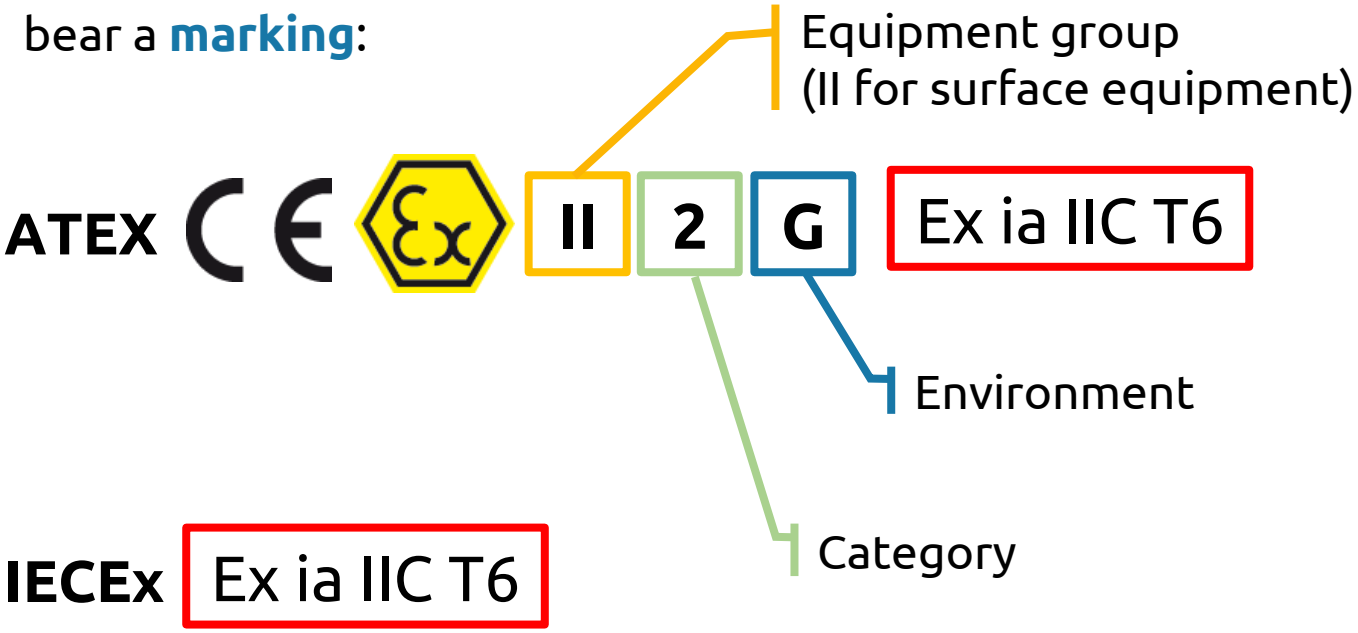
- **Zones classification**: it must be done by **skilled personnel**, according to EN 60079-10

ATEX category	IECEx instruments protection level	Installation zone
1G / 1D	Ga / Da	0 / 20
2G / 2D	Gb / Db	1 / 21
3G / 3D	Gc / Dc	2 / 22

ATEX and IECEx devices

All electric devices, and some mechanical ones, installed in hazardous areas must:

- be **suitable for the zone**
- bear a **marking**:



Complete marking

Typical ATEX & IECEx Marking (*ATEX only)

Our protection modes: Ex i

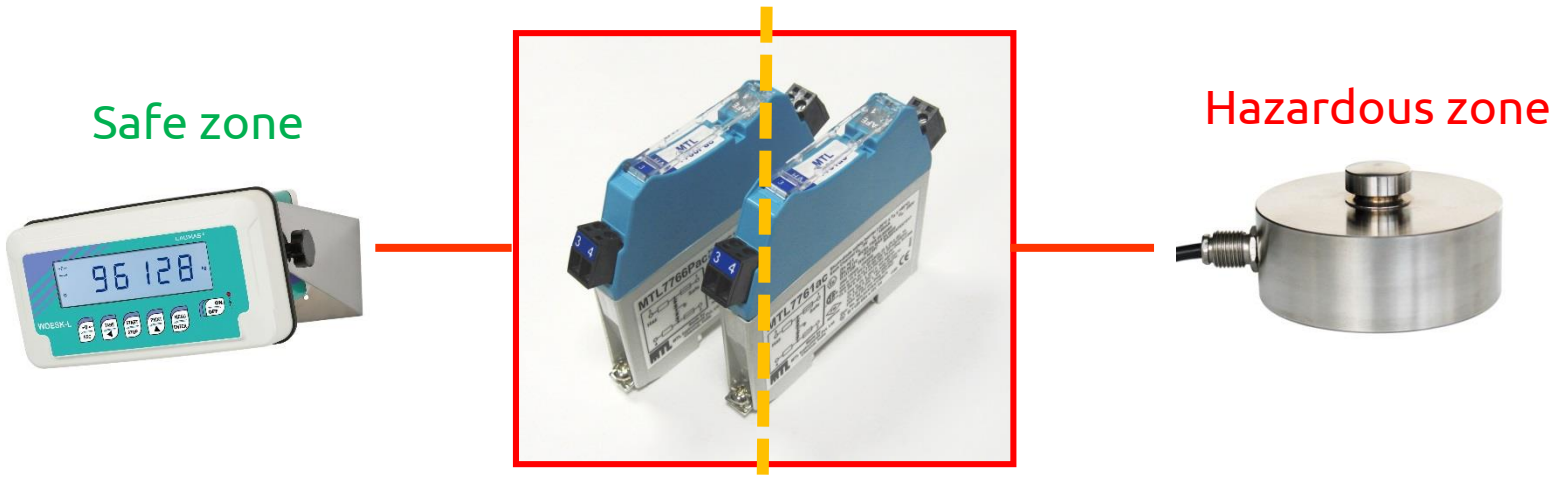
Intrinsically safe

- The circuit is designed such that cannot trigger an explosion
- Most of the signal and control instruments for telecommunications
- General rule: if a device is Ex i, the barrier is required!
- LAUMAS products: load cells, junction boxes (only gas)

Our protection modes : Ex i

Intrinsically safe: BARRIERS

- Intrinsic devices work correctly if they don't receive too much power.
- Barriers (associated equipment) are usually placed in a safe zone (they are not protected against explosions, unless they are kept in an ATEX case), but they protect other components connected to them (junction boxes or load cells).
- We usually have to use **Zener barriers** between an indicator and a load cell:



Our protection modes : Ex i

Intrinsically safe: SYSTEM

- While composing an I.S. system (including load cells and barriers) it is necessary to have "**coordinating calculations**" performed.

- Our barriers are always working with our load cells, but the **installers** must have an **official document with calculations**.

- If they cannot, LAUMAS offers the **EXCERT certificate**, including the entire weighing systems composed as following: **instrument + barriers in safe zone** and **junction box + load cells in hazardous zone**.

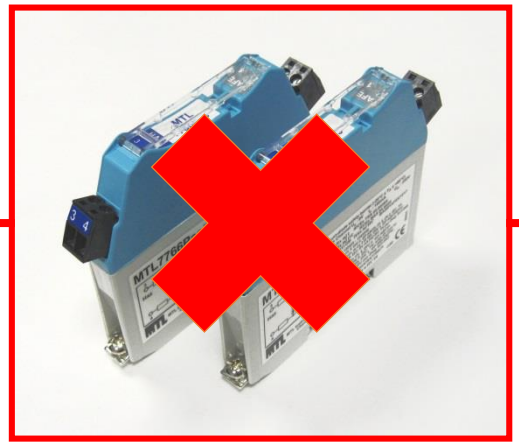
Our protection modes : Ex i

Intrinsically safe: EXEMPTION FROM BARRIERS

- Both LAUMAS instruments and load cells in zone 2 / 22: **no barriers!**

- It is proved that the component powering the load cells is already sufficient to limit the power and works as a «barrier» integrated in the instrument.

ATEX instrument in safe zone or zone 2/22



Zone 2 / 22

Our protection modes : Ex t

Protection by enclosure (dust)

- It is based mostly on the enclosure, similar to an IP protection, but mantaining it also over time.
- The enclosure does not allow dust to enter and the surface temperature cannot trigger ignition.
- Junction boxes (dust)
- Electronics (dust)

Our protection modes : Ex nR

Restricted breathing (gas)

- «Simplified» mode, only for zone 2
- The enclosure is restricting the ingress of explosive gases.
- Elettronics (gas)

Our protection modes : Ex d

Explosion proof

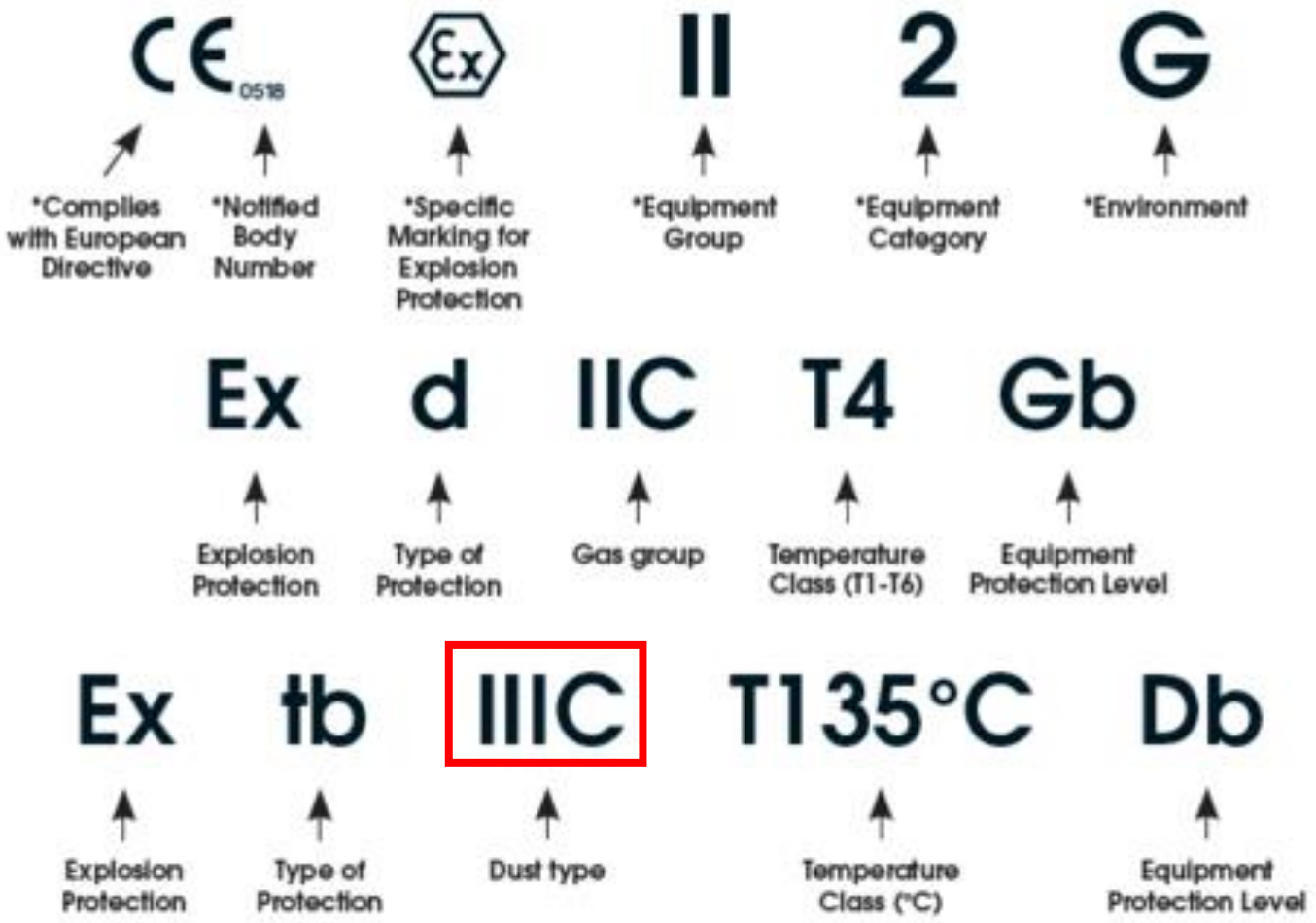
- The enclosure contains the possible blast and avoids that it spreads outside
- ADPE products

GAS group

Typical ATEX & IECEx Marking (*ATEX only)

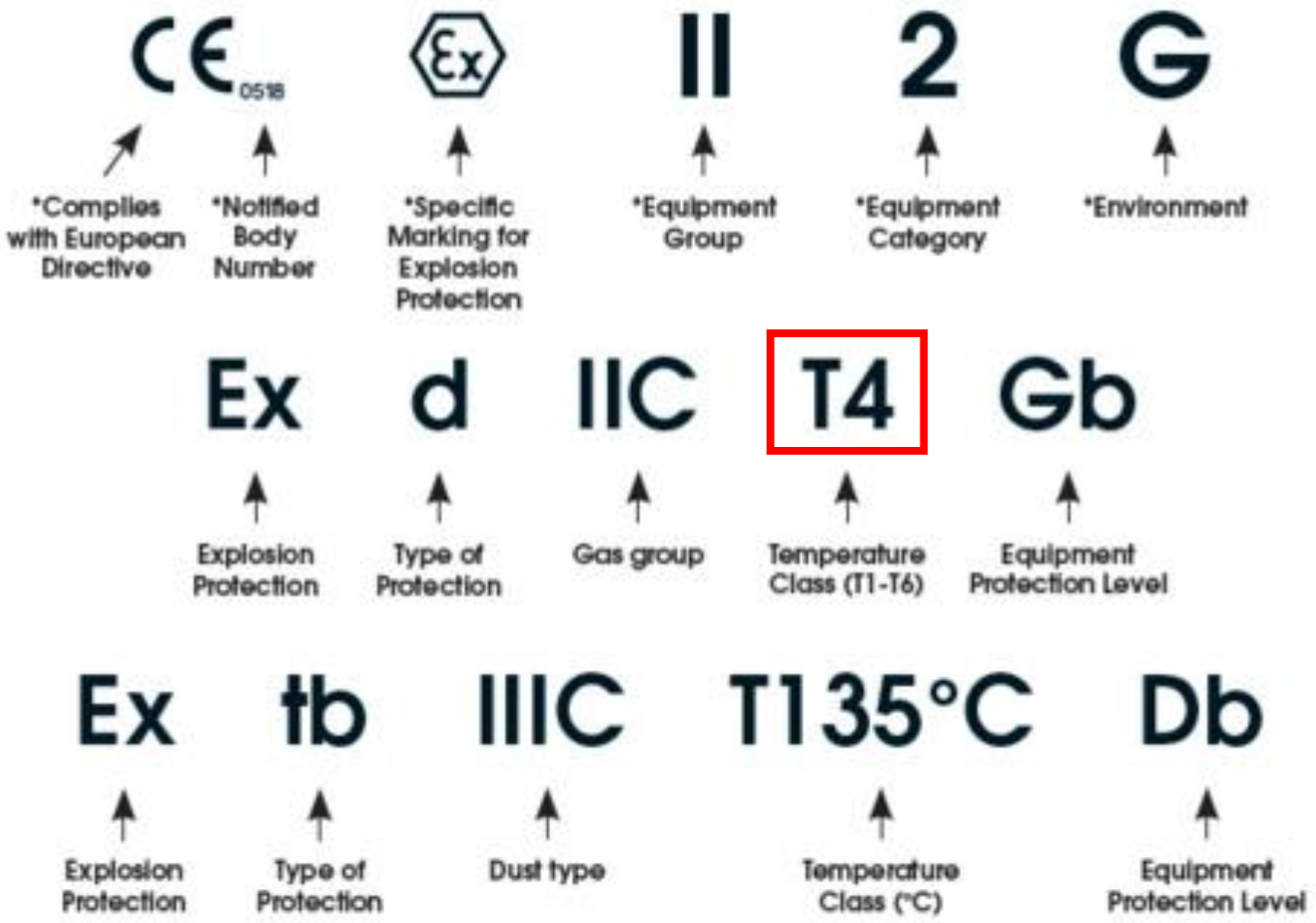
DUST group

Typical ATEX & IECEx Marking (*ATEX only)



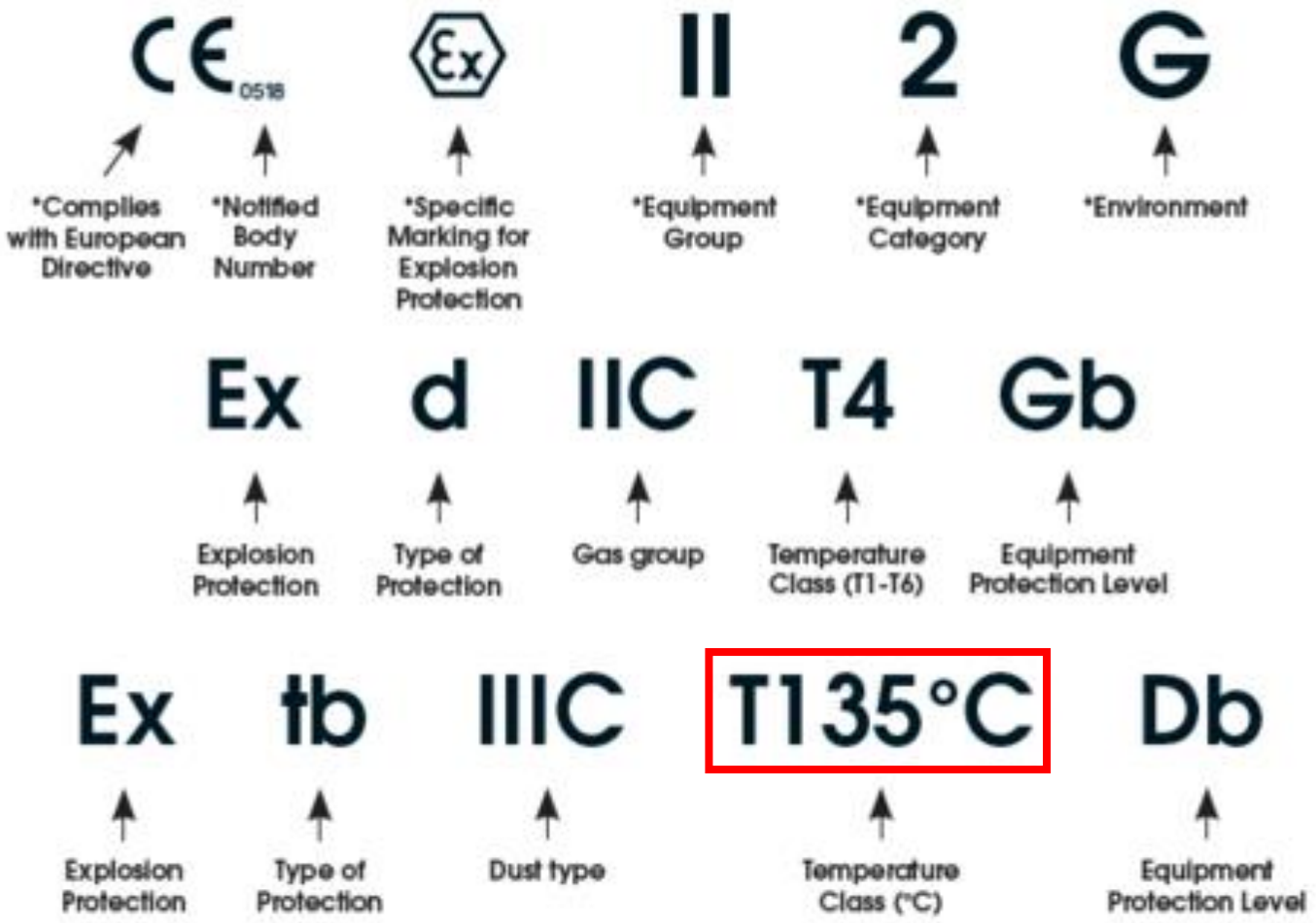
Surface temperature: GAS

Typical ATEX & IECEx Marking (*ATEX only)



Surface temperature: DUST

Typical ATEX & IECEx Marking (*ATEX only)



LAUMAS products for hazardous zones

Zone 0 / 20

Zone 1 / 21

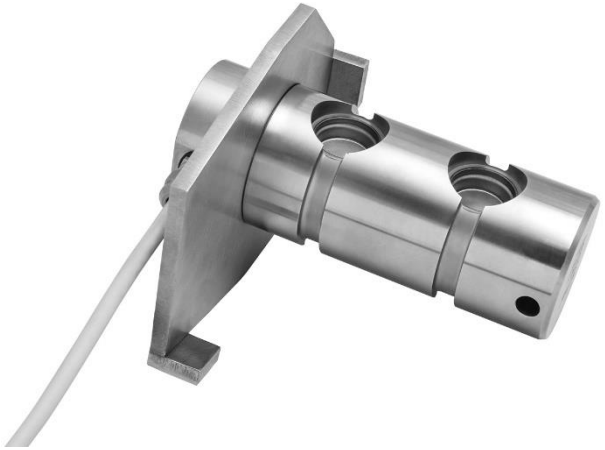
Zone 2 / 22

Load cells

Almost every model, up to zones 0 / 20!

Customized load cells

Customized solutions to solve specific problems or needs related to applications in special conditions

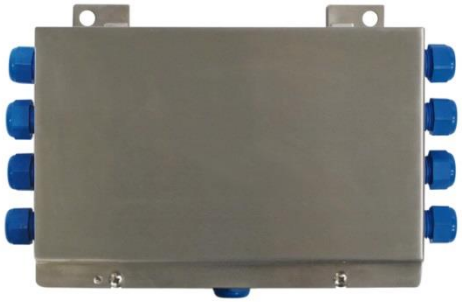


Junction boxes

Up to **zone 0 / 20**

CE41ATEX

- 1-4 load cells
- complete of trimmers
- lightning protection devices



CE81ATEX

- 5-8 load cells
- complete of trimmers
- lightning protection devices

CE41PATEX

- 1-4 load cells
- complete of trimmers
- compact size

Indicators zone 1/21

Explosion proof enclosures

ADPE W200

Indicator W200 complete of certified Zener barriers

ADPE W100RIP

Indicator W100 (remote display function)

ADPEALIM

Power supply ALI24DIN2A

Indicators zone 2/22

WINOX

WDESK

Other Indicators and Transmitters Zone 2/22

Zone 2/22
W200BOX (IP67)

Zona 22
W200BOX-EC (IP64)

Zone 2/22
TLS, TLS485, TLU, TLL, THFPROFI, TLE

CASTLATEX

CASTLTASTATEX

Cables

ATEX cables don’t exist!

- No marking is foreseen for ATEX / IECEx cables, but they must be compact (in order to prevent the gas to enter and expand inside).
- They must be properly **protected by the risk of mechanical damaging** (usually armoured cable or protective tube).
- **Barriers** are necessary only for cables going to an I.S. device!
- I.S. cables must stay **separate from the non-I.S. ones**.
- Generally, it is forbidden to connect and disconnect connectors under tension, unless exceptions indicated in the documents provided together with the connector.

ATEX / IECEx / EAC Ex installation types

Hazardous area installations that we meet the most frequently are:

- **Entire weighing system** to be installed in **zone 2-22**
- **Entire weighing system** to be installed in **zone 1-21**
- **Load cells and junction box** to be installed in **zone 1/21** or **2/22** with electronic instruments to be installed in safe zone.

Zone 2/22 – LAUMAS solutions

In this case **all components must be certified** based on area classification and the weighing systems composition will be the following one:

- ATEX / IECEx / EAC Ex certified load cells
- ATEX / IECEx / EAC Ex certified junction box (if necessary)
- ATEX / IECEx / EAC Ex certified weighing indicator or transmitter for zone 2/22

The use of intrinsically safe barriers is not necessary.

Zone 1/21 – LAUMAS solutions

In this case **all components must be certified** based on area classification and the weighing systems composition will be the following one:

- ATEX / IECEx / EAC Ex certified load cells
- ATEX / IECEx / EAC Ex certified junction box (if necessary)
- ATEX / IECEx / EAC Ex certified weight indicator or transmitter for zone 1/21, placed inside an explosion proof enclosure, **together with intrinsically safe barriers**.

Zone 2/22 + Safe Zone – LAUMAS solutions

In this case it is not necessary to have all the components certified and we usually have:

In Hazardous Zone:

- ATEX / IECEx / EAC Ex certified load cells
- ATEX / IECEx / EAC Ex certified junction box (if necessary)

In Safe Zone:

- Weight indicator / transmitter

  If:

  - The weight indicator / transmitter is certified ATEX for zone 2/22, even if in safe zone, intrinsically safe barriers are not required
  - The weight indicator / transmitter is not certified ATEX for zone 2/22, intrinsically safe barriers are required

Zone 1/21 + SafeZone – LAUMAS solutions

In this case it is not necessary to have all the components certified and we usually have:

In Hazardous Zone :

- ATEX / IECEx / EAC Ex certified load cells
- ATEX / IECEx / EAC Ex certified junction box (if necessary)

In Safe Zone:

- Wight indicator or transmitter always along with intrinsically safe barriers

Comparative table for ATEX – IECEx – EAC Ex

RISK ANALYSIS AND ZONE CLASSIFICATION IS CUSTOMER'S RESPONSIBILITY

IN ACCORDANCE WITH ATEX/IECEx		WEIGHING PLATFORMS AND MODULES	LOAD CELL	CUSTOM LOAD CELL	JUNCTION BOXES	WEIGHT INDICATOR with EXPLOSION PROOF BOX	WEIGHT INDICATORS ATEX only	WEIGHT INDICATORS		ZENER BARRIERS
					CE41ATEX CE81ATEX CE41PATEX	ADPEW200	WDESK CASTLATEX CASTLTASTATEX	WINOX W200BOX	W200BOXEC	
		Ex ia	**Ex ia**	**Ex ia**	**Ex ia Ex ta**	**Ex d Ex td**	**Ex nR Ex tc**	**Ex nR Ex tc**	**Ex tc EAC Ex**	**[Ex ia]**
			EAC Ex		**EAC Ex**	**EAC Ex**		**EAC Ex**	**EAC Ex**	
GAS	ZONE 0	●	●	●	●	-	-	-	-	●[1]
	ZONE 1	●	●	●	●	●	-	-	-	●[1]
	ZONE 2	●	●	●	●	●	●	●	-	●[1]
DUST	ZONE 20	●	●	●	●	-	-	-	-	●[1]
	ZONE 21	●	●	●	●	●	-	-	-	●[1]
	ZONE 22	●	●	●	●	●	●	●	●	●[1]

1) Barriers must be installed in safe areas and interfaced with load cells installed in 0, 1, 2, 20, 21, 22 classified zones (for instruments series W100, W200, WDESK, WDESKLIGHT, WINOX, WTAB, TLB, TLS, THFPROFI, TLE, TLL and TLU, the barriers are optional in the zone 2 and 22).

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