

Classification of Hazardous Areas

What types of Ex zones are there?
Risk from GASes: Zones 0, 1 and 2
Risk from DUSTs: Zones 20, 21 and 22

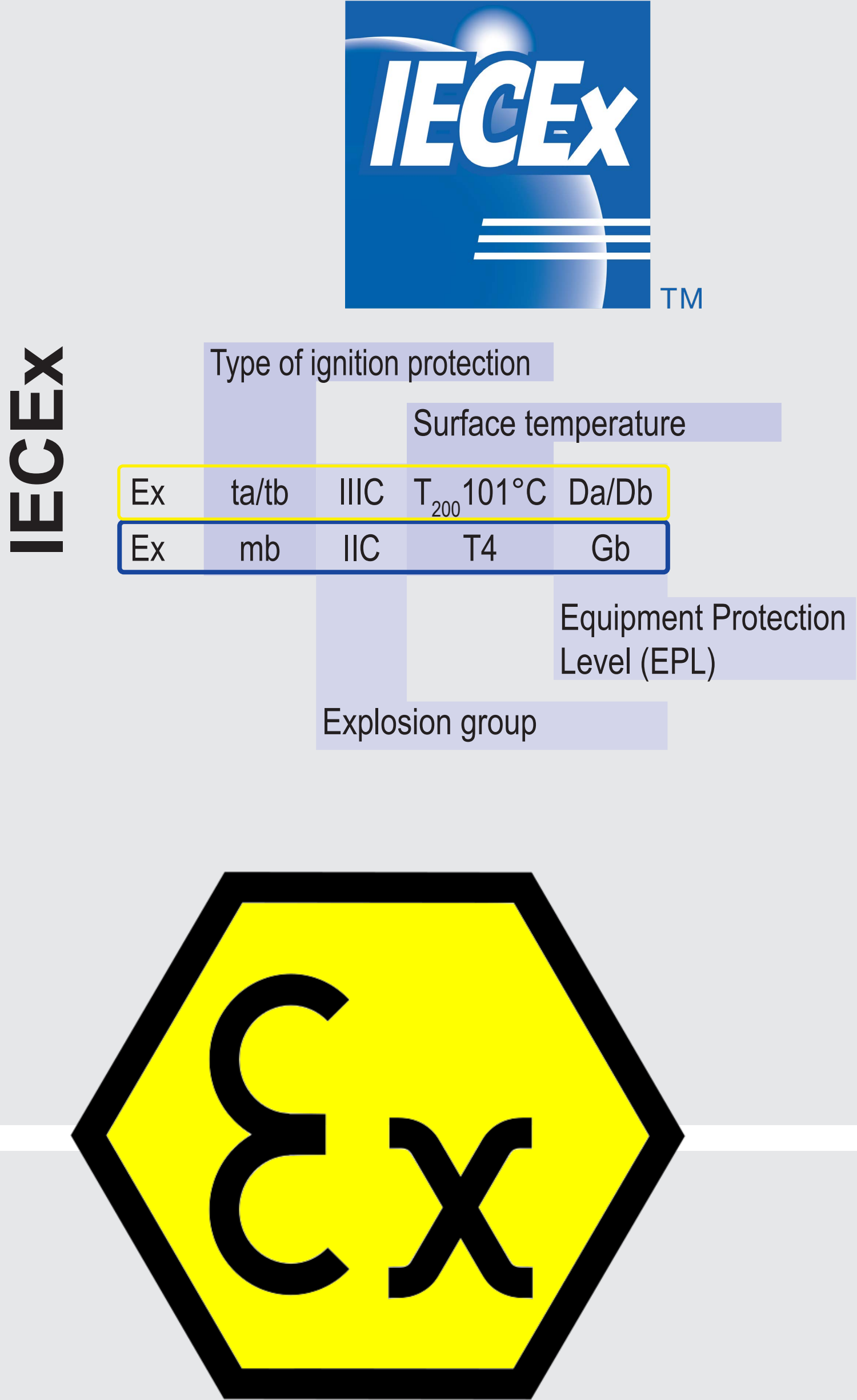
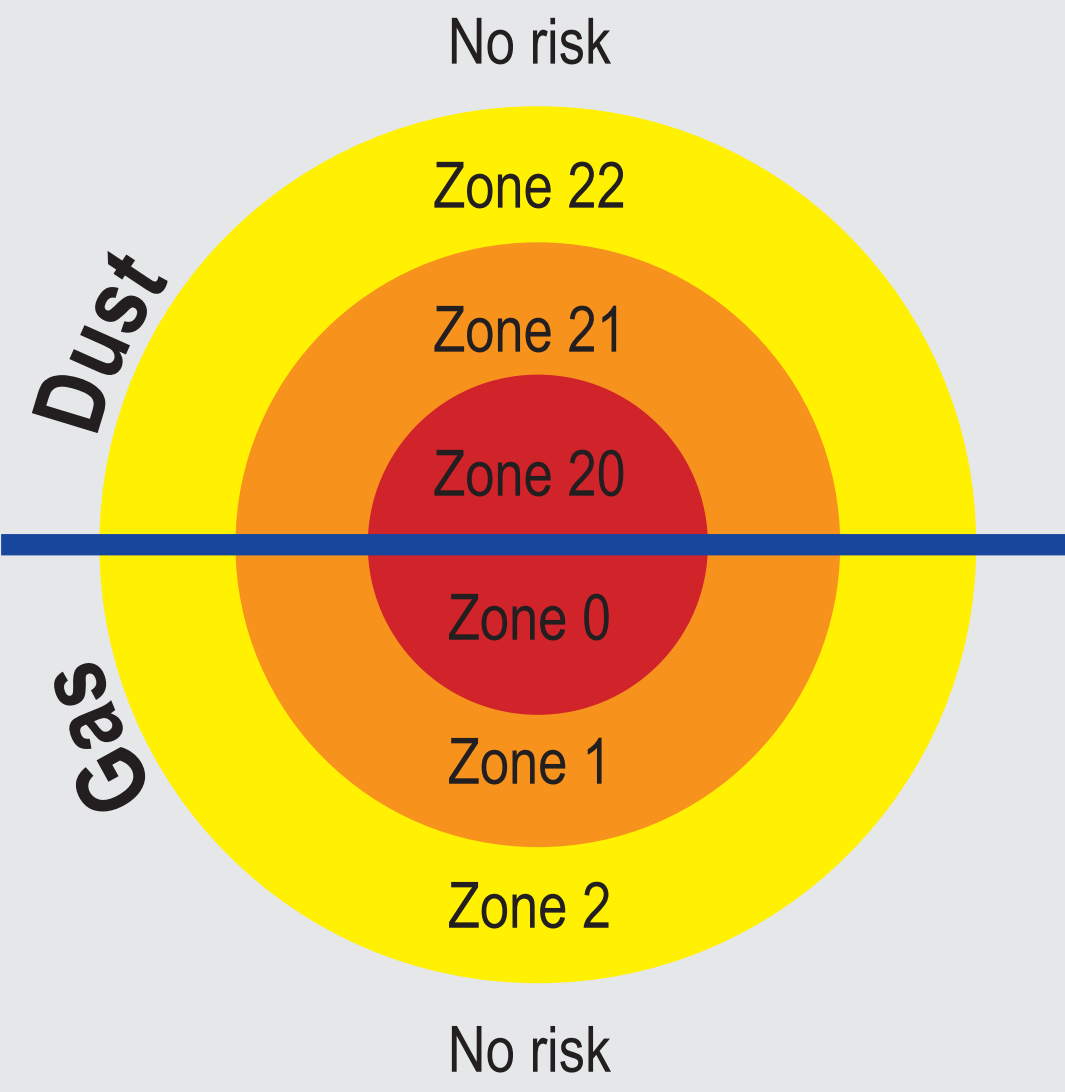
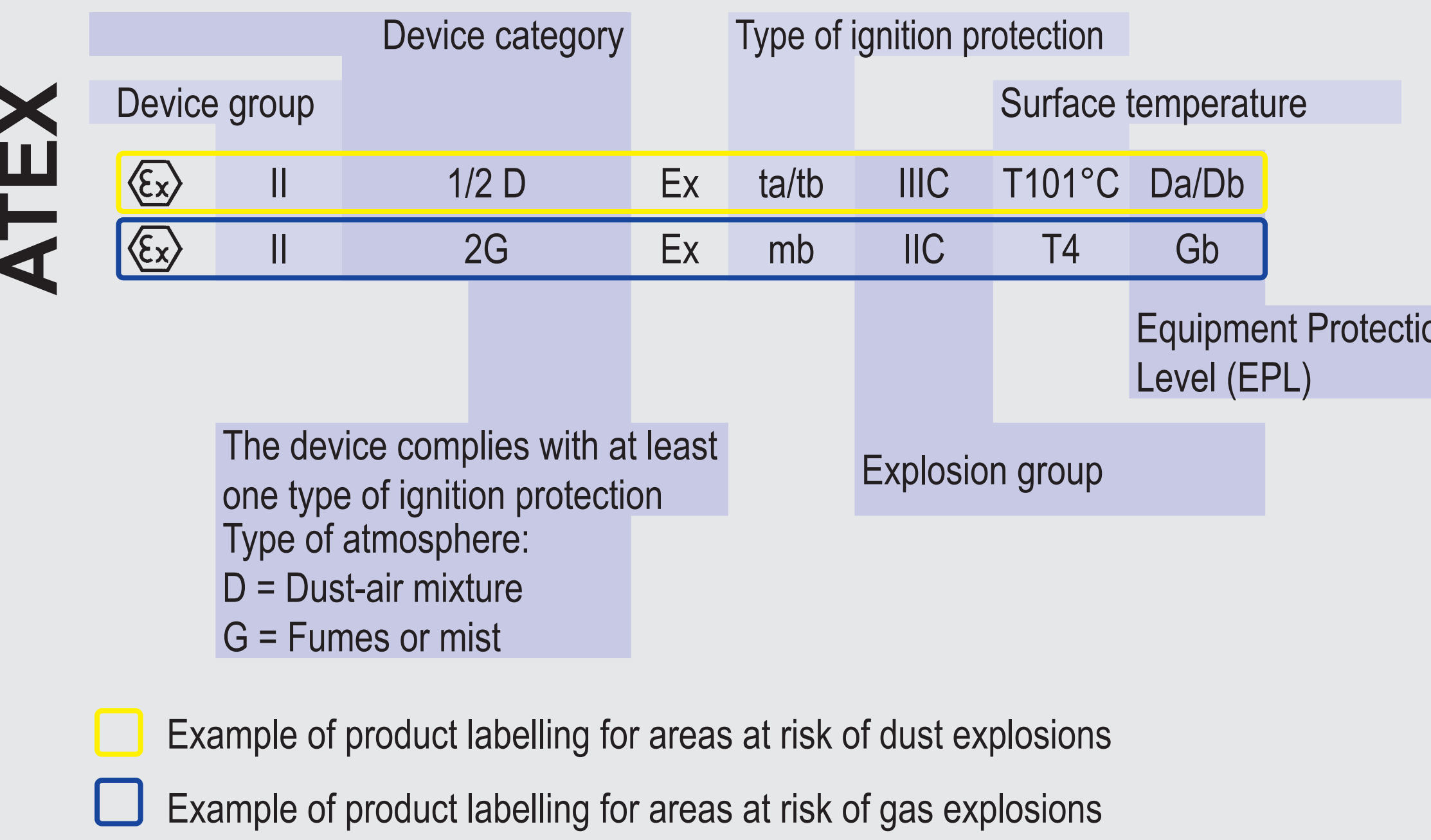
ATEX

How does the company determine which hazardous zones exist in the relevant operational area?
The classification of Ex zones is based on a risk assessment in accordance with the German Industrial Safety Regulation (BetrSichV). Every company is obliged to systematically assess the risk of explosive atmospheres and to classify the affected areas accordingly. This task is usually carried out by the Ex-Officer, who analyses the relevant work and production processes and classifies the zones taking into account the potential hazard.

The Ex-Officer defines the Ex-zones on the basis of the identified potential hazard.

Product Labelling

Approved devices bear the following marking:
• The **CE** mark indicating the certifying body (0158 = DEKRA Testing and Certification GmbH) for products that comply with standards and are eligible for free movement within the EU.
• Information regarding the intended use:
This information must be clearly and permanently marked on the device (e.g. by laser marking).



Explosion Group

Explosion group II: Equipment or protective system in a gas-hazardous area		Explosion group III: Equipment or protective system in a potentially explosive atmosphere (dust)	
Gas Groups	Typical gases are	Dust groups	Typically these are
IIA	Propane	IIIA	Combustible fluff
IIB	Ethylene	IIIB	Non-conductive dust
IIC	Hydrogene	IIIC	Conductive dust

Temperature Classification

Flammable substances are classified between T1 and T6 according to their flash point, with T6 being the lowest flash point and therefore the most critical.

Temperature classes	Maximum surface temperature of the equipment	Ignition temperatures of flammable substances
T1	450 °C	> 450 °C
T2	300 °C	> 300 °C
T3	200 °C	> 200 °C
T4	135 °C	> 135 °C
T5	100 °C	> 100 °C
T6	85 °C	> 85 °C

Surface Temperature

Examples of ignition temperatures of selected materials:

Ignition temperature IEC 50281-2-1	
Cotton	350 °C
Cereals	290 °C
Wood flour	300 °C
Cocoa	460 °C
Carbon disulfied	95 °C
Concentrated feed	295 °C
Starch	290 °C
Tea	300 °C
PVC	380 °C

Classification of Zones for Gases, Vapours, Mists and Dusts			
Zone		Definition	Potential risk
Gas	Dust		
0		An area in which an explosive atmosphere, consisting of a mixture of air and flammable gases, vapours or mists, is present continuously, for long periods or frequently.	Constantly
	20	An area in which an explosive atmosphere, in the form of a cloud of combustible dust suspended in the air, is present continuously, for long periods or frequently.	Constantly
1		An area in which, during normal operation, an explosive atmosphere may occasionally form as a mixture of air and flammable gases, vapours or mists.	Occasionally
	21	An area in which, during normal operation, an explosive atmosphere may occasionally form in the form of a cloud of combustible dust suspended in the air.	Occasionally
2		An area in which, during normal operation, a hazardous explosive atmosphere consisting of a mixture of air and flammable gases, vapours or mists does not normally occur, and if it does, then only rarely and for a short period of time.	Briefly
	22	An area in which, during normal operation, an explosive atmosphere in the form of a cloud of combustible dust suspended in the air does not normally occur, or occurs only for a short period.	Briefly

Device Groups

Device group I	Equipment intended for use in underground mine workings and associated surface facilities that may be at risk from firedamp and/or combustible dusts.
Device group II	Equipment for use in other areas that may be at risk from an explosive atmosphere.

Device Categories

Device category	Equipment Protection Level (EPL)	Typical zoning
1G	Ga	Device suitable for zone 0, 1, 2
1D	Da	Device suitable for zone 20, 21, 22
2G	Gb	Device suitable for zone 1, 2
2D	Db	Device suitable for zone 21, 22
3G	Gc	Device suitable for zone 2
3D	Gc	Device suitable for zone 22

Types of Ignition Protection

The EN 60079-0 standard describes the types of protection and how equipment should be protected. The product marking indicates which type of protection the equipment is designed for.

Types of ignition protection GAS / DUST		
Protection rating	ATEX Code	Norm
General requirements	-	EN 60079-0
Pressure-resistant enclosure	Ex d	EN 60079-1
Pressurised enclosure	Ex p	EN 60079-2
Sand encapsulation	Ex q	EN 60079-5
Oil sealing	Ex o	EN 60079-6
Enhanced security	Ex e	EN 60079-7
Intrinsic safety	Ex i	EN 60079-11
Intrinsically safe circuits must not be capable of causing ignition in the event of a single fault (ib) or two faults (ia).		
Non-sparking	Ex n	EN 60079-15
Encapsulation	Ex m	EN 60079-18
Protection provided by the housing	Ex t	EN 60079-31

RECHNER Sensors offers sensors with the following protection classes: encapsulation (m), enclosure protection (t), intrinsic safety (i) and non-sparking (n).

IP Protection Classes (IP = International Protection)

1. Digit: Protection against solid objects		2. Digit: Protection against liquids	
IP 0	No protection	0	No water protection
IP 1	Protection against foreign objects Ø > 50 mm	1	Protection against vertically falling water droplets
IP 2	Protection against foreign objects Ø > 12,5 mm	2	Protection against dripping water when the housing is tilted up to 15°
IP 3	Protection against foreign objects Ø > 2,5 mm	3	Protection against spray
IP 4	Protection against foreign objects Ø > 1 mm	4	Protection against splashes
IP 5	Protection against harmful dust build-up, dust-proof	5	Protection against water jets
IP 6	Protection against live parts. Protection against the ingress of dust; dust-tight	6	Protection against powerful jets of water
7		Protection against water ingress during temporary submersion (up to a depth of 1 m for 30 minutes)	
8		Protection during prolonged immersion in water, in accordance with the manufacturer's specifications	
9		Protection against water ingress caused by high-pressure water jets or steam jet cleaning under specified conditions	

IP XX
↓
2. Digit: Protection against liquids
↓
1. Digit: Protection against solid objects

Sensors and Probes
Gas Zone 0, 1 and 2

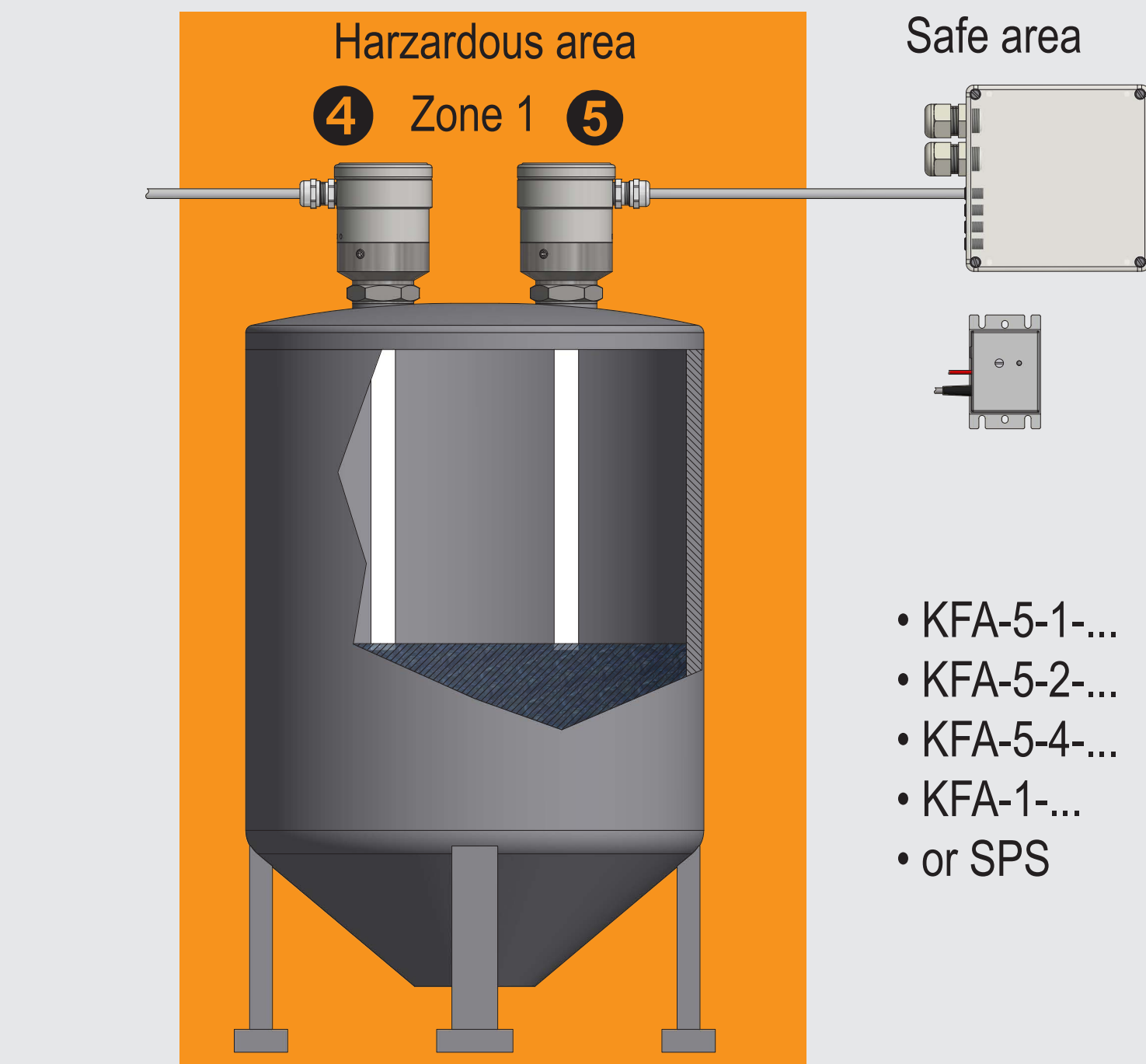
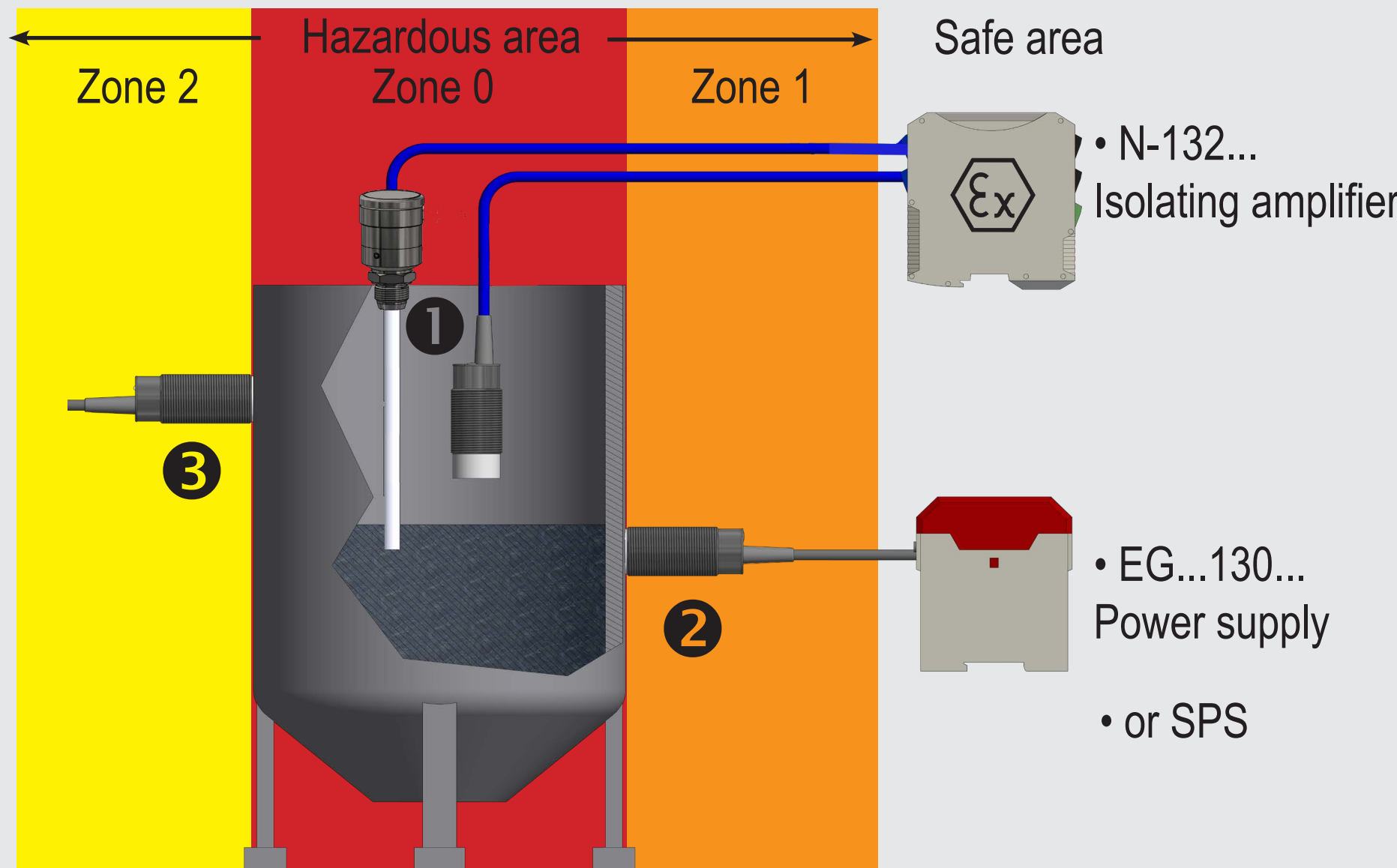
Zone 0
1 = IAS-30-...-1G / KAS-40-...-1G / KFI-1-...-1G
inductive / capacitive NAMUR sensor / capacitive level probe
The device is located in zone 0.
The isolating amplifier is placed outside of the hazardous area.

Zone 1
2 = IAS-10/20-...2G, KAS-70/80-...2G (= All-in-One sensor)
The sensor is located in zone 1.
The power supply is placed outside of the hazardous area.

Zone 2
3 = KAS-70/80-...3G with manufacturer certificate.
E.G. The level is measured via a non-metallic sight glass.
The sensor is located in zone 2.
The power supply is placed in the safe area.

Zone 1
4 = KFX-5-...-2G, binary, 1 - 2 switch points.
The probe is located in zone 1.
The signal processing electronics KFA-5-... or KFA-1-... are in the safe area.

Zone 1
5 = KFS-5-...-2G, binary, 1 - 2 switch points / KFS-1-...-2G, analogue
The probe is located in zone 1.
The signal processing electronics KFA-5-... or KFA-1-... are in the safe area.



Dust Zone 20, 21 and 22

Zone 20
1 = IAS-30-...-1D / KAS-40-...-1D / KFI-1-...-1D
inductive / capacitive NAMUR sensor / capacitive level probe
The device is located in zone 20.
The isolating amplifier is placed outside of the hazardous area.

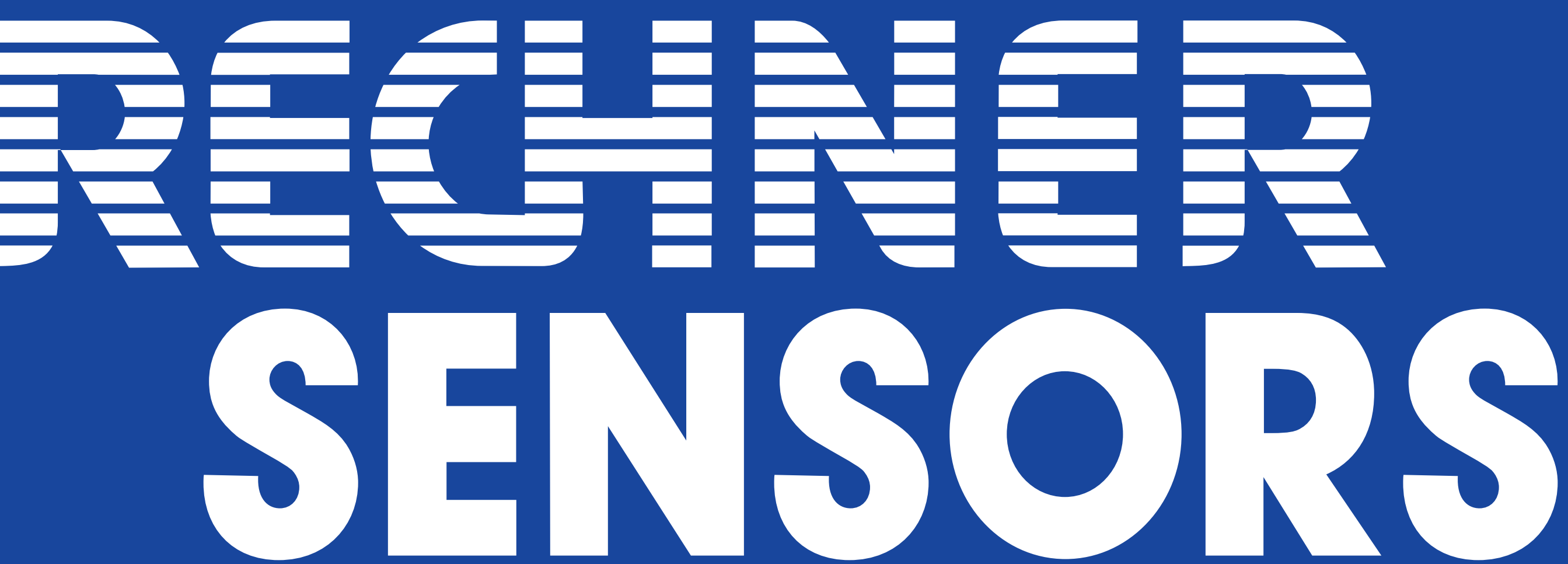
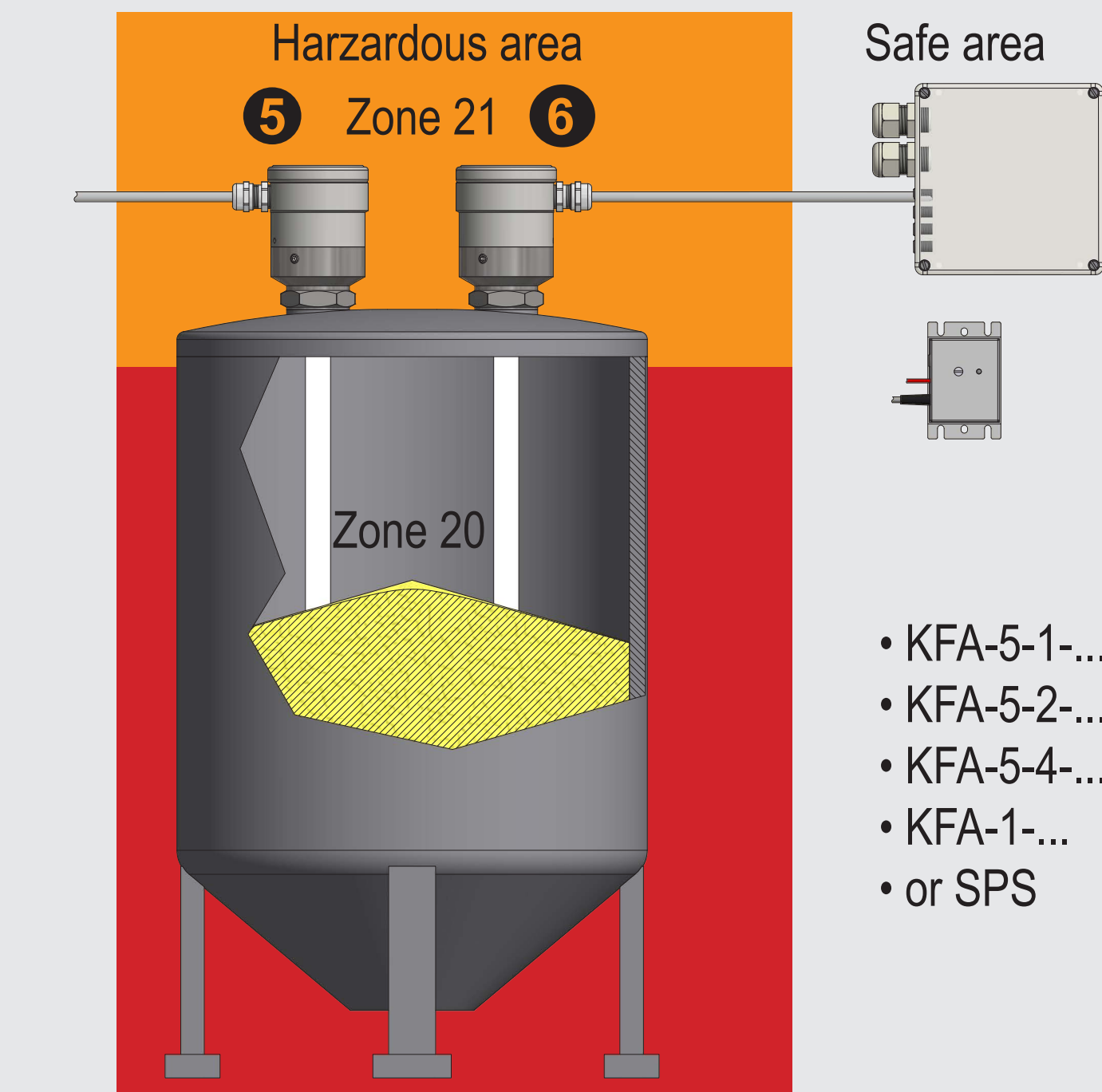
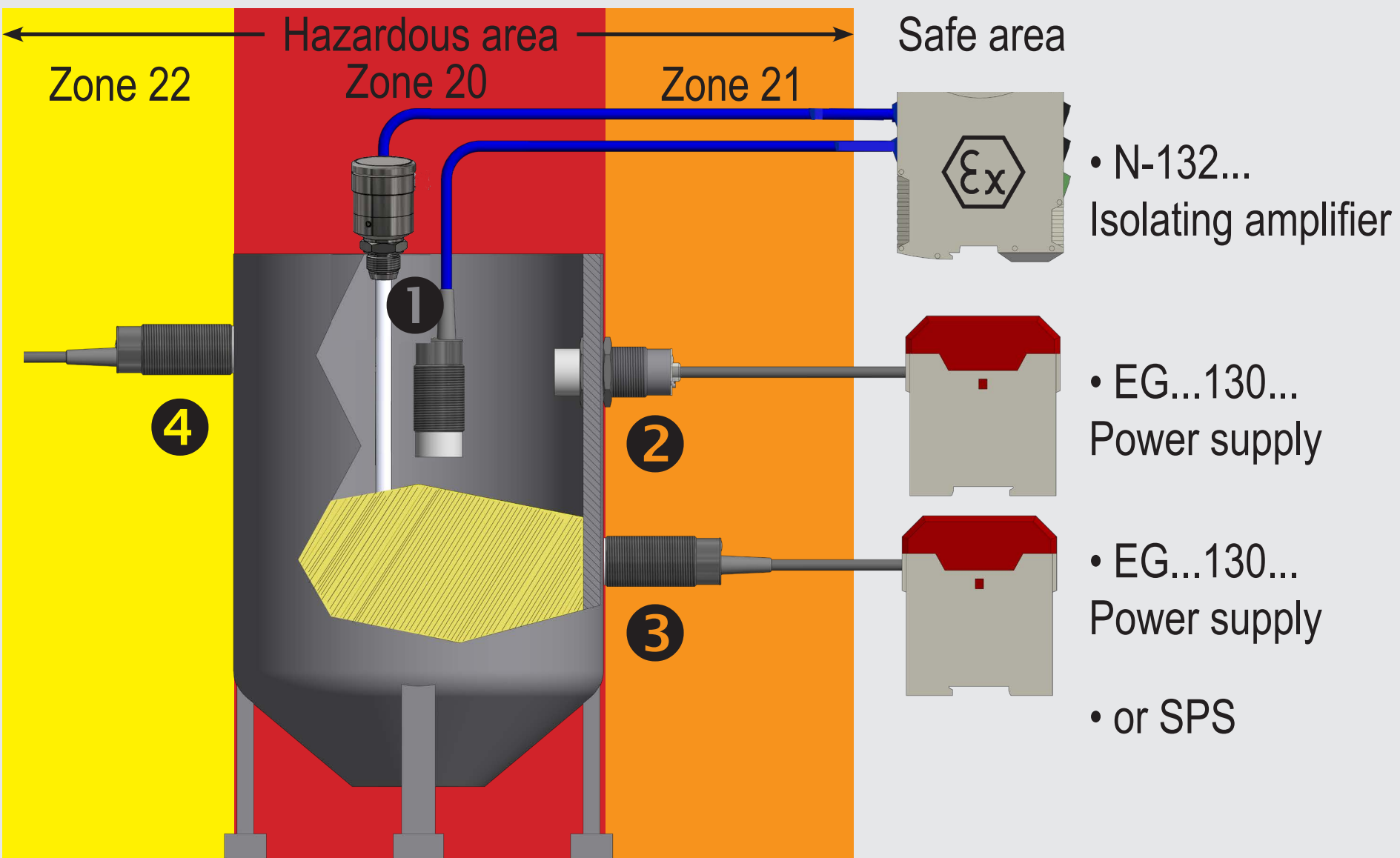
Zone 20 / 21
2 = IAS-10/20-...-1/2D, KAS-70/80-...-1/2D (= All-in-One Sensor)
The active area of the sensor is in zone 20 and the cable exit side is in zone 21.
The power supply is placed in the safe area.

Zone 21
3 = IAS-10/20-...-1/2D, KAS-70/80-...-1/2D (= All-in-One Sensor)
The sensor is located in zone 21.
The power supply is placed in the safe area.

Zone 22
4 = IAS-10/20-...-3D, KAS-70/80-...-3D with manufacturer certificate.
E.G. The level is measured via a non-metallic sight glass..
The sensor is located in zone 22.
The power supply is placed in the safe area.

Zone 20 / 21
5 = KFX-5-...-1/2D, binary, 1 - 2 switch points.
The active area of the probe is in zone 20 and the connection head is in zone 21.

Zone 20 / 21
6 = KFS-5-...-1/2D, binär, 1 - 2 Schaltpunkte / KFS-1-...-1/2D, analog
The active area of the probe is in zone 20 and the connection head is in zone 21.
The signal processing electronics KFA-5-... or KFA-1-... are in the safe area.



The information provided is for guidance only. The diagrams are schematic representations. Please observe the applicable national and international regulations. Errors and changes reserved without prior notice. All rights reserved.

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