



# Ex - Agency 60 years of experience on the safe side

## GUIDE TO EXPLOSION PROTECTION

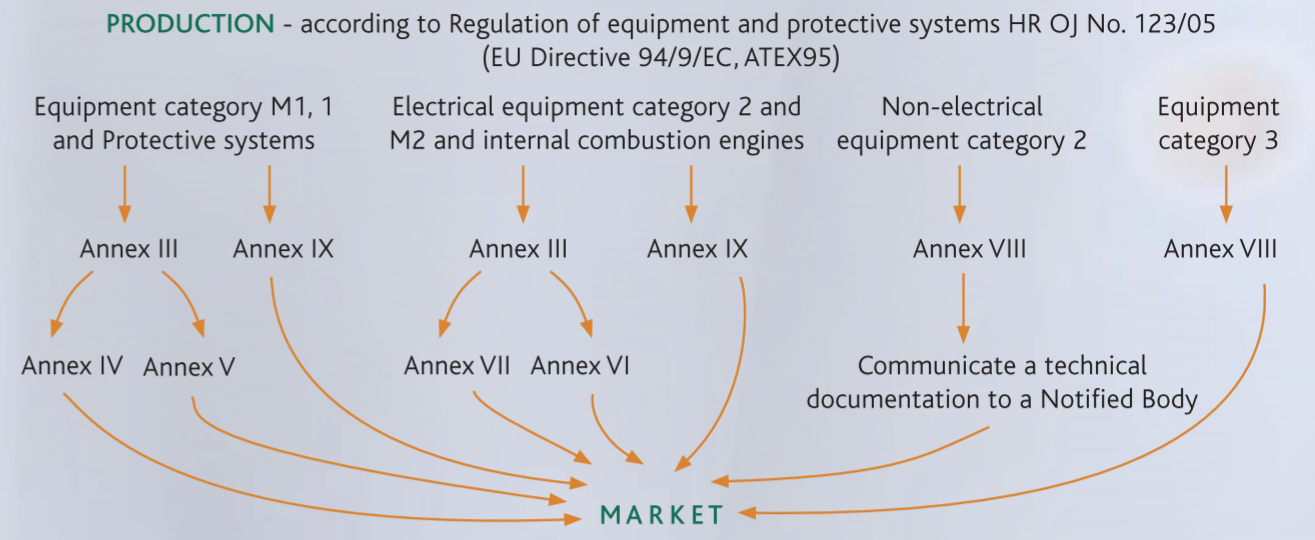
### EX-PROTECTION CONCEPTS

Type of protection	Standard	Concept	Symbol	Category (EU)	EPL (IEC)	Zone
Types of protection for explosive atmosphere of flammable gases (HRN/EN/IEC 60079-0)						
Flameproof	HRN/EN/IEC 60079-1		d	2G M2	Gb Mb	1
Pressurized	HRN/EN/IEC 60079-2		px py pz	2G, M2 2G, M2 3G	Gb, Mb Gb, Mb Gc	1 1 2
Powder filling	HRN/EN/IEC 60079-5		q	2G M2	Gb Mb	1
Oil-immersion	HRN/EN/IEC 60079-6		o	2G M2	Gb Mb	1
Increased safety	HRN/EN/IEC 60079-7		e	2G M2	Gb Mb	1
Intrinsic safety	HRN/EN/IEC 60079-11		ia, ib, ic	1G, 2G, 3G M1, M2	Ga, Gb, Gc Ma, Mb	0, 1, 2
Type of protection 'n'	HRN/EN/IEC 60079-15		nA	3G	Gc	2
			nC			
			nL			
			nR			
Encapsulation	HRN/EN/IEC 60079-18		ma, mb, mc	1G, 2G, 3G M1, M2	Ga, Gb, Gc Ma, Mb	0, 1, 2

Types of protection for explosive atmosphere of flammable dusts (HRN/EN/IEC 61241-0; HRN/EN/IEC 60079-0)						
Protection by enclosures	HRN/EN/IEC 61241-1 HRN/EN/IEC 60079-31		tD ta, tb, tc	1D, 2D, 3D	Da, Db, Dc	20, 21, 22
Pressurized	HRN/EN/IEC 61241-4		pD	2D, 3D	Db, Dc	21, 22
Intrinsic safety	HRN/EN/IEC 61241-11		iaD, ibD	1D, 2D, 3D	Da, Db, Dc	20, 21, 22
Encapsulation	HRN/EN/IEC 61241-18 HRN/EN/IEC 60079-18		maD, mbD	1D, 2D, 3D	Da, Db, Dc	20, 21, 22

Types of protection for non-electrical equipment (HRN/EN 13463-1)						
Flow restricting	HRN/EN 13463-2		fr	3G, 3D	/	2 22
Flameproof	HRN/EN 13463-3		d	2G, 2D M2	/	1, 21
Constructional safety	HRN/EN 13463-5		c	1G, 2G, 3G 1D, 2D, 3D M2	/	0, 1, 2 20, 21, 22
Control of ignition sources	HRN/EN 13463-6		b	1G, 2G, 3G 1D, 2D, 3D M2	/	0, 1, 2 20, 21, 22
Liquid immersion	HRN/EN 13463-8		k	1G, 2G, 3G 1D, 2D, 3D M1, M2	/	0, 1, 2 20, 21, 22
Pressurized	HRN/EN/IEC 60079-2		p	2G, 2D 3G, 3D	/	1, 21 2, 22

### CONFORMITY ASSESSMENT



#### Conformity assessment annexes

- III - Type examination (B)
- IV - Production quality assurance (D)
- V - Product verification (F)
- VI - Conformity to type (C)
- VII - Product quality assurance (E)
- VIII - Internal control of production (A)
- IX - Unit verification (G)

### TECHNICAL SUPERVISION

Regulations of minimum safety requirements and worker's health protection, and technical supervision of plants, equipment, installations and apparatus in hazardous areas (HR OJ No. 39/06, 106/07) EU Directive 1999/92/EC (ATEX 137)

#### TECHNICAL SUPERVISION

by authorized body (Ex-Agency) include

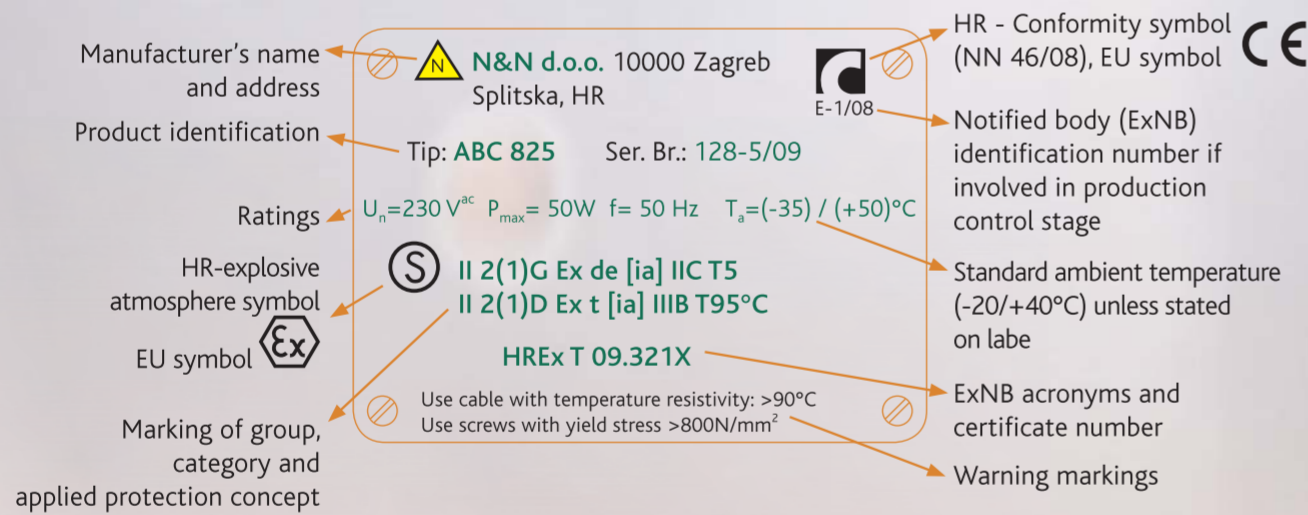
#### ACTIVITIES

- Repair (HRN EN 60079-19)
- Installation (HRN EN 60079-14)
- Maintenance (HRN EN 60079-17) of Ex-equipment and technical report is issued.

#### PLANTS

- Area classification (HRN EN 60079-10-1/-2)
- Electrical power equipment (HRN EN 60079-0)
- Electrical instrumentation equipment (HRN EN 60079-0)
- Electrical installations of power equipment (HRN EN 60079-14)
- Electrical installations of instrumentation equipment (HRN EN 60079-14)
- Non-electrical equipment (HRN EN 13463-1) and technical report is issued.

### EX-EQUIPMENT MARKING



### CATEGORIES / PROTECTION LEVELS / ZONES

Areas	Categories (ATEX)	EPL (IEC)	Zones	Explosive atmosphere
Mining - I	M1	Ma	/	/
	M2	Mb		
Other than mines - II	1G, 1D	Ga, Da	0, 20	Continuously, long periods or frequently
	2G, 2D	Gb, Db	1, 21	Likely to occur, occasionally
	3G, 3D	Gc, Dc	2, 22	Not likely to occur, short period only

EPL - Equipment Protection Level

### TEMPERATURE CLASS / GROUP

Temperature Class	Maximum Surface Temperature
T1	450 °C
T2	300 °C
T3	200 °C
T4	135 °C
T5	100 °C
T6	85 °C

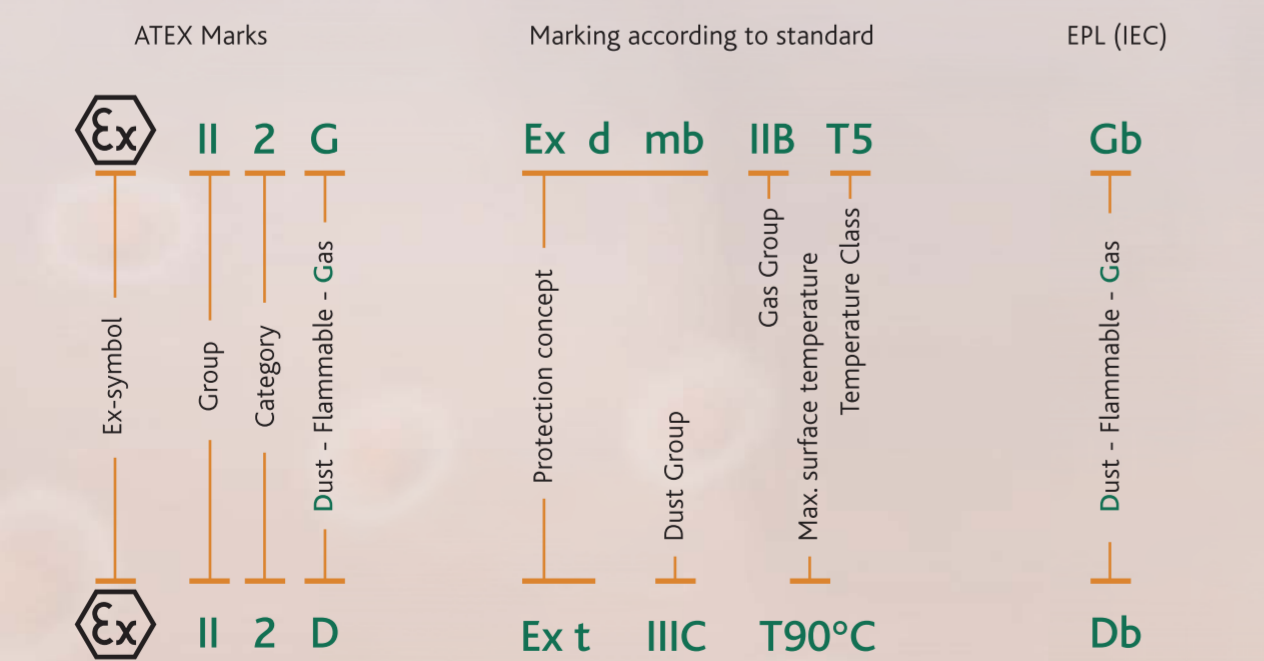
### IP - PROTECTION

Degrees of protection IP-code		
First numeral	Second numeral	Description of protection
1	-	Protection against solid objects >50 mm (hand protection)
2	-	Protection against solid objects >12,5 mm (finger protection)
3	-	Protection against solid objects >2,5 mm
4	-	Protection against solid objects >1 mm
5	-	Dust protected
6	-	Dust tight
-	1	Protection against vertically dripping water
-	2	Protection against dripping water (15° tilted)
-	3	Protection against spraying water (angle up to 60°)
-	4	Protection against splashing water from any direction
-	5	Protection against water jets
-	6	Protection against powerful water jets
-	7	Temporary immersion (0,15m/1m; 30 min)
-	8	Continuous immersion depth >1 m

Dust Groups	
IIIA	Combustible flyings
IIIB	Non-conductive dust
IIIC	Conductive dust

Gas Group	Representative Gas
I	Methane
IIA	Propane
IIIB	Ethylene
IIC	Hydrogen, Acetylene

### EX-MARKS



#### Ex-Agency services:

- Ex-equipment testing and determination of the explosive properties of flammable media
- Ex-equipment certification
- Technical supervision of plants with hazardous area
- Technical supervision of the quality management in production, repair & overhaul, inspection & maintenance and installation of Ex-equipment
- Personnel education (Ex-Training) & publishing (S-Bilten)

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