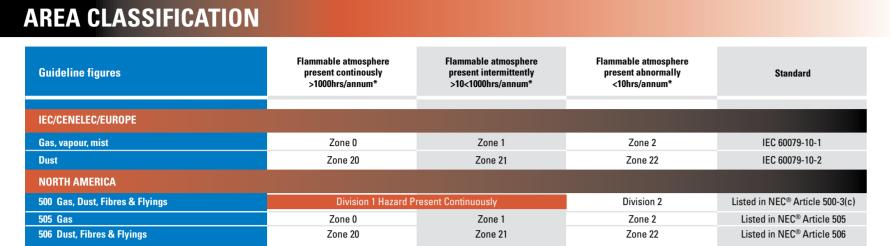
## **CROUSE-HINDS**



**FIRST NUMERICAL** Protection against solid bodies

**OBJECTS GREATER THAN 50mm** 

**OBJECTS GREATER THAN 12mm** 

**OBJECTS GREATER THAN 2.5mm** 

OBJECTS GREATER THAN 1.0mm

Equipment is dust-tight and protected against water jets.

Mechanical Impacts (IK) Code EN50102

Degrees of protection provided by enclosures for electrical equipment against mechanical impacts

NO PROTECTION

DUST PROTECTED

**EXAMPLE IP65** 

DUST TIGHT

APPARATUS/GAS GROUPS						
Typical gas hazard	IEC 60079-0 IEC CENELEC	North America NEC Article 500 (Class I)	Minimum ignition energy (microjoules)			
ACETYLENE	IIC	A	20			
HYDROGEN	IIC	В	20			
ETHYLENE	IIB	C	60			
PROPANE	IIA	D	180			

ATEX EQUIPMENT GROUPS & CATEGORIES						
Mining			Industrial			
Equipment Group	Equipment Category	Protection Level	Hazard		Use	
			Gas	Dust		
l Mining	M1	Very high		-	Operable in Ex atmosphere	
	M2	High	-	-	De-energised in Ex atmosphere	
II Surface Industries	1	Very high	Ga		Zones 0, 1, 2	
				Da	Zones 20, 21, 22	
	2	High	Gb		Zones 1, 2	
				Db	Zones 21, 22	
	3	Normal	Gc		Zone 2	
				Dc	Zone 22	

INGRESS PROTECTION (IP) CODES (IEC/EN 60529)

SECOND NUMERICAL

2 ANGLED DRIPPING WATER -75° TO 90°

Protection against liquid

1 VERTICALLY DRIPPING WATER

0 NO PROTECTION

3 SPRAYED WATER

4 SPLASHED WATER

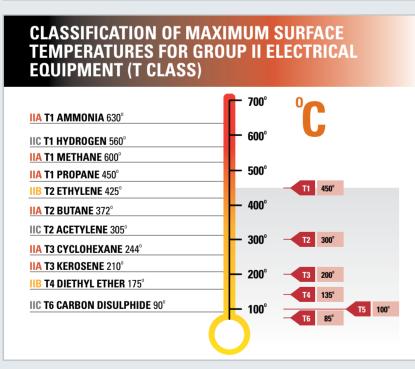
8 INDEFINITE IMMERSION

5 WATER JETS

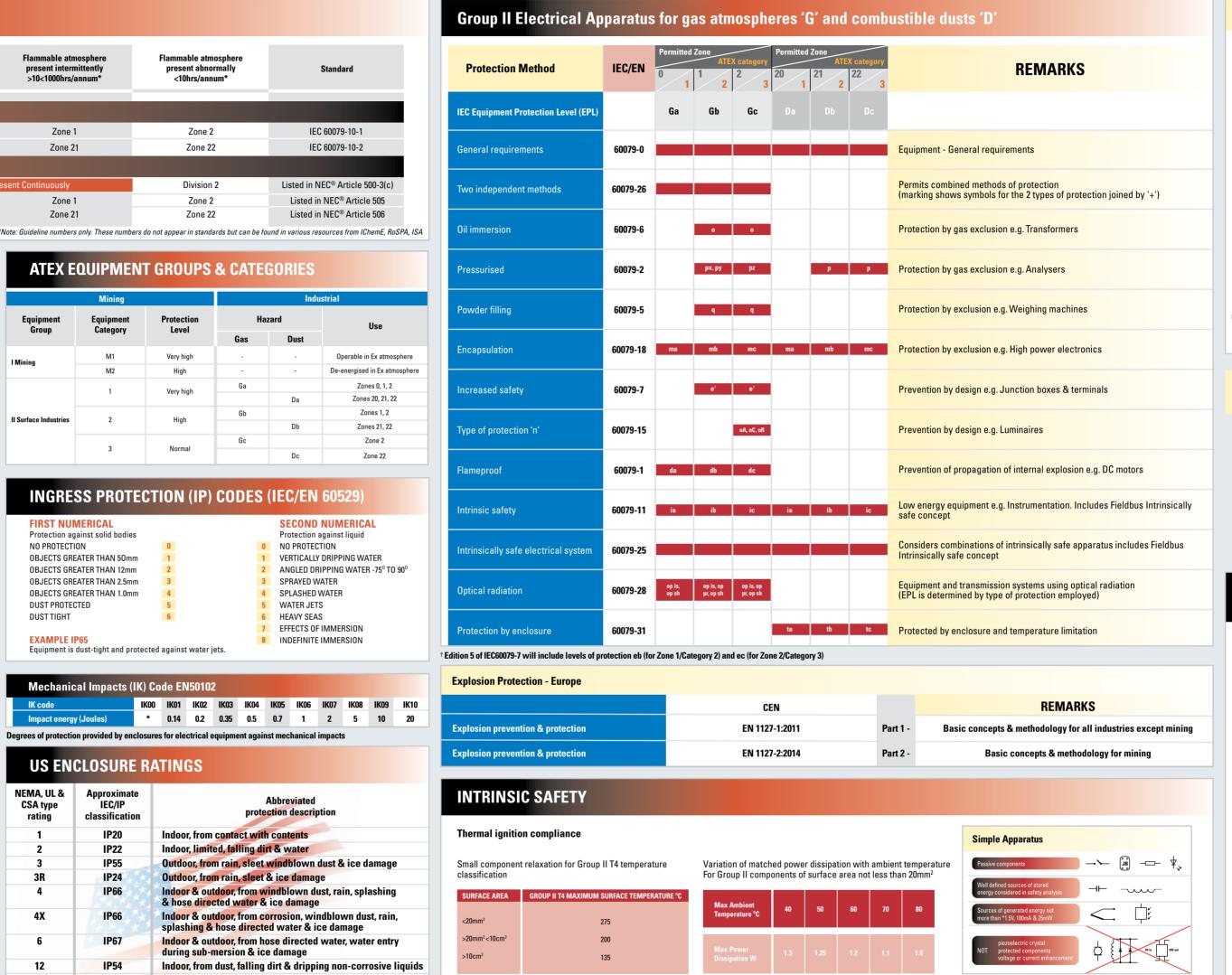
6 HEAVY SEAS 7 EFFECTS OF IMMERSION

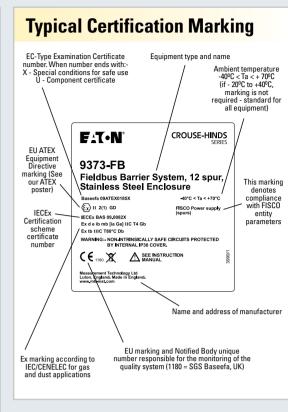
\* 0.14 0.2 0.35 0.5 0.7 1 2 5 10 20





NEMA, UL & CSA type rating	Approximate IEC/IP classification	Abbreviated protection description		
1	IP20	Indoor, from contact with contents		
2	IP22	Indoor, limited, falling dirt & water		
3	IP55	Outdoor, from rain, sleet windblown dust & ice damage		
3R	IP24	Outdoor, from rain, sleet & ice damage		
4	IP66	Indoor & outdoor, from windblown dust, rain, splashing & hose directed water & ice damage		
4X	IP66	Indoor & outdoor, from corrosion, windblown dust, rain, splashing & hose directed water & ice damage		
6	IP67	Indoor & outdoor, from hose directed water, water entry during sub-mersion & ice damage		
12	IP54	Indoor, from dust, falling dirt & dripping non-corrosive liquids		
13	IP54	Indoor, from dust, spraying water, oil & non-corrosive liquids		





## What is a 'dust'

Combustible dust is defined as finely divided solid particles, 500um or less in nominal size Conductive or non-conductive (IEC 60079-0 Section 3.11.1)

Combustible flyings are defined as solid particles or fibres greater than 500µm in nominal size

(IEC 60079-0 Section 3.11.2)

## **Functional Safety**

Safety Instrumented systems are widely used in industrial process plants where there is threat to life or environment should something go wrong. The IEC 61508 set of standards 'Functional safety of electrical/ electronic/ programmable electronic safety-related systems' are now considered industry 'good practice' for both manufacturers and users designing products and systems for safety related applications.

Eaton are accredited as a Functional Safety Management (FSM) company.

Request a copy of the Functional Safety poster now or visit www.mtl-inst.com/fsm

Our application note AN9025 provides an introduction to the subject.

MTL Instruments are members of 'The 61508 Association







International (IEC) standards International (IECEx) explosive atmosphere standards European (CENELEC) standards National Electrical Codes (NEC®)







**Eaton Electric Limited,** 

Great Marlings, Butterfield, Luton, Beds, LU2 8DL, UK.

Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283

Tel: +61 1300 308 374 Fax: +61 1300 308 463

Tel: + 86 21 2899 3817 Tel: +33 (0)4 37 46 16 53 Tel: +31 (0)418 570290

Tel: +49 (0)22 73 98 12 - 0 Fax: +49 (0)22 73 98 12 - 2 00 Tel: +91 (0)44 24501660/24501857

Tel: +39 02 959501 Tel: +81 (0)3 6430 3128

Tel: +47 66 77 43 80 Tel: +7 (495) 981 3770

SINGAPORE Tel: +65 6 645 9888 Fax: +65 6 487 7997

Tel: +82 6380 4805

UNITED ARAB EMIRATES Tel: +971 2 44 66 840 Fax: +971 2 44 66 841 UNITED KINGDOM

Tel: +44 (0)1582 723633

Tel: +1 281-571-8065 Fax: +1 281-571-8069

www.mtl-inst.com mtlenquiry@eaton.com

For technical advice or further information call:

+44 (0)1582 723633