

FLAMMABLE FACTS

AREA CLASSIFICATION

	Guideline figures	Flammable atmosphere present continuously >1000hrs/annum	Flammable atmosphere present intermittently >10<1000hrs/annum	Flammable atmosphere present abnormally <10hrs/annum	Standard
IEC/CENELEC/EUROPE	Gas	Zone 0	Zone 1	Zone 2	IEC 60079-10
	Dust	Zone 20	Zone 21	Zone 22	IEC 61241-3
NORTH AMERICA	NEC 505 Gas	Zone 0	Zone 1	Zone 2	Listed in NEC 505-5
	NEC 500 Gas & Dust	Division 1		Division 2	Listed in NEC 500-3(c)

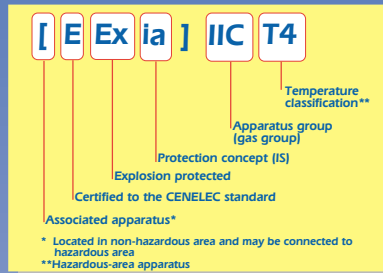
No catalogue?
Contact MTL

GAS GROUPING

Typical gas hazard	IEC 60079-0 CENELEC EN50014	North America NEC Article 500 (Class I)*	Minimum ignition energy (microjoules)
ACETYLENE	IIC	A	20
HYDROGEN	IIC	B	20
ETHYLENE	IIB	C	60
PROPANE	IIA	D	180

*North American hazard categories: Class I (Gases & Vapours); Class II (Dusts); Class III (Fibres)

Certification Code



* Located in non-hazardous area and may be connected to hazardous area
** Hazardous-area apparatus

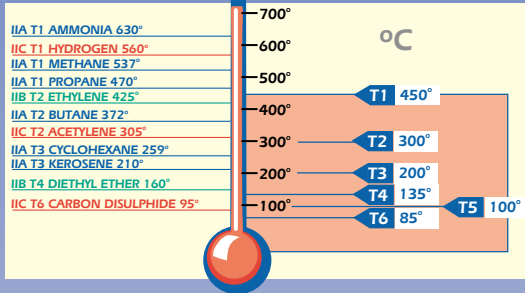
Application notes
Technical papers
Textbooks etc

Training & education on hazardous area instrumentation

SIMPLE APPARATUS

- Passive components**:
- Well defined sources of stored energy considered in safety analysis**:
- Sources of generated energy not more than ~1.5V, 100mA & 25mW**:
- NOT piezoelectric crystal protected components voltage or current enhancement**:

*Note: North America still uses 1.2V and 20 microjoules



APPARATUS TEMPERATURE CLASSIFICATION (T CLASS)

Small component relaxation

SURFACE AREA	T4 CLASSIFICATION
<20mm²	Surface temperature = 275°C
>20mm² <10cm²	Surface temperature = 200°C
>20mm²	Power dissipation = 1.3 W* at 40°C ambient

*Reduced to 1.2 W with 60°C ambient or 1.0 W with 80°C ambient

STANDARDS FOR METHODS OF PROTECTION

	Code	CENELEC EN	IEC 60079	Permitted Zone ATEX category				Remarks
				0	1	2	3	
Explosion prevention & protection-pt. 1 Category M1		1127-1 50303						Basic concepts and methodology. Further sections imminent Mining equipment operated in gas atmosphere
Electrical equipment for dusts (D)		50281-1-1						Enclosure protected - construction and testing
Electrical equipment for dusts (D)		50281-1-2						Enclosure protected - selection, installation & maintenance
GROUP II ELECTRICAL APPARATUS for gas atmospheres								
Category 1G		50284	-26					Permits combined methods of protection
General requirements		50014	-0					Basic electrical requirements
Oil immersion	o	50015	-6					Protection by gas exclusion - transformers
Pressurised	p	50016	-2					Protection by gas exclusion - analysers
Powder filled	q	50017	-5					Protection by gas exclusion - weighing machines
Flameproof	d	50018	-1					Prevention of propagation of internal explosion - dc motors
Increased safety	e	50019	-7					Prevention by design - induction motors
Intrinsic safety ia	ia	50020	-11					Low energy. Safe with two faults - level measurement
Intrinsic safety ib	ib	50020	-11					Low energy. Safe with one fault - displays
Intrinsically safe systems		50039	-25					Considers combination of intrinsically safe apparatus
Encapsulated	m	50028	-18					Protection by gas exclusion - solenoid valves
Type of protection 'n'	n	50021	-15					

Codes of Practice

SUBJECT	STANDARD	IEC 60079-10	IEC 60079-30
Classification of hazardous areas	-10	-10	
Electrical installations	-34	-34	
Inspection and maintenance	-17	-17	
Repair and overhaul	-39	-39	
Data for flammable gases	-20		

BSI standards
+44 (0) 208 996 9001
bsionline@bsi.co.uk

Lightning & surge protection?
consult TELMATIC

Have you received the companion ATEX poster?
+44 (0) 1582 407435

SUB DIVISIONS OF TYPE n

- Restricted breathing enclosures
- Energy limited apparatus
- Simplified pressurised enclosure
- Otherwise protected sparking apparatus
- Non-sparking apparatus

INGRESS PROTECTION (IP) CODES

(IEC/EN 60529)

FIRST NUMERAL Protection against solid bodies	SECOND NUMERAL Protection against liquid
NO PROTECTION	NO PROTECTION
OBJECTS GREATER THAN 50mm	VERTICALLY DRIPPING WATER
OBJECTS GREATER THAN 12mm	ANGLED DRIPPING WATER -75° to 90°
OBJECTS GREATER THAN 2.5mm	SPRAYED WATER
OBJECTS GREATER THAN 1.0mm	SPLASHED WATER
DUST-PROTECTED	WATER JETS
DUST-TIGHT	HEAVY SEAS
	EFFECTS OF IMMERSION
	INDEFINITE IMMERSION

Example: IP65 equipment is dust-tight and protected against water jets

US ENCLOSURE RATINGS

NEMA, UL & CSA type rating	Approximate IEC/IP classification	Abbreviated protection description
1	IP30	Indoor, from contact with contents
2	IP31	Indoor, limited, from dirt & water
3	IP64	Outdoor, from rain, sleet, windblown dust & ice damage
3R	IP32	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 submersion & ice damage
12	IP55	Indoor, from dust, falling dirt & dripping non-corrosive liquids
13	IP65	Indoor, from dust, spraying water, oil & non-corrosive liquids

Worldwide MTL contacts:

- Australia: +61 (0)89 455 2994
- Belgium: +32 (0)3 236 5347
- Canada: +1 905 840 7850
- China: +86 10 6591 5718
- France: +33 (0)4 78 64 98 32
- Germany: +49 (0)21 31 718930
- India: +91 (0)44 220 1252 and 1262
- Italy: +39 02 664 29554
- Japan: +81 (0)3 5420 1281
- Middle East: +971 2 63 22 399
- Netherlands: +31 (0) 48 1450250
- Singapore: +65 487 7887
- UK: +44 (0) 1582 407298
- USA: +1 800 835 7075 (toll free)

Telematic
Telephone: +44 (0) 1582 429464

The MTL Instruments Group plc
Power Court, Luton, Bedfordshire.
England LU1 3JJ
Telephone: +44 (0) 1582 723633
Fax: +44 (0) 1582 422283
E-mail: enquiry@mtl-inst.com
Web site: www.mtl-inst.com