



SALLAB

EXPLOSION PREVENTION



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EXPLOSION PREVENTION TECHNIQUES : GASSES & VAPOURS

TECHNIQUE	EX CODE	BASIC CONCEPT OF PROTECTION	EPL	TYPICAL ZONES
Flameproof IEC/SANS 60079-1	Ex db Ex dc	Contains the explosion, quench flame	Gb or Mb Gc	1 & 2 2
Increased Safety IEC/SANS 60079-7	Ex e	No arcs, sparks or hot surfaces	Gb or Mb and Gc	1 & 2
Intrinsically Safe IEC/SANS 60079-11	Ex ia Ex ib Ex ic	Limit the energy of sparks and the surface temperature	Ga or Ma Gb or Mb and Gc	0, 1 & 2 1 & 2 2
Encapsulation IEC/SANS 60079-18	Ex ma Ex mb Ex mc	Keep the flammable gas out	Ga or Ma Gb or Mb and Gc	0, 1 & 2 1 & 2 2
Non-sparking (Ex nA, Ex nC, Ex nL* and Ex nR) *Incorporated into other standards IEC/SANS 60079-15	Ex "n"	No arcs, sparks or hot surfaces	Gc	2
Pressurisation IEC/SANS 60079-2	Ex pv Ex px Ex py Ex pz	Keep the flammable gas out	Gb or Gc Gb or Mb Gb Gc	1 & 2 1 & 2 1 & 2 2
Powder filling IEC/SANS 60079-5	Ex q	Quench the flame	Gb or Mb	1 & 2
Oil Immersion IEC/SANS 60079-6	Ex o	Keep the flammable gas out	Gb	1 & 2

EXPLOSION PREVENTION TECHNIQUES : DUSTS

TECHNIQUE	EX CODE	BASIC CONCEPT OF PROTECTION	EPL	TYPICAL ZONES
Enclosure IEC/SANS 60079-31	Ex ta Ex tb Ex tc	Standard protection for dusts, rugged tight enclosure	Da Db Dc	20 21 22
Intrinsic Safety IEC/SANS 61241-11	Ex ia Ex ib Ex ic	Similar to t, but with some relaxations if circuit is IS	Da Db Dc	20 21 22
Encapsulation IEC/SANS 61241-18	Ex ma Ex mb Ex mc	Protection by encapsulation of incendive parts	Da Db Dc	20 21 22
Pressurisation IEC/SANS 61241-2	Ex pD	Protection by pressurisation of enclosure	Da or Dc	21 & 22

ENCLOSURE PROTECTION (FOR EQUIPMENT)

FIRST CHARACTERISTIC NUMERAL									
IP RATING	IP1X	IP2X	IP3X	IP4X	IP5X	IP6X			
DESCRIPTION	Objects ≥50mm	Objects ≥12.5mm	Objects ≥2.5mm	Objects ≥1.0mm	Dust test: Slight entry of dust	Dust test: No entry of dust			
SECOND CHARACTERISTIC NUMERAL									
IP RATING	IPX1	IPX2	IPX3	IPX4	IPX5	IPX6	IPX7	IPX8	IPX9
DESCRIPTION	Drip Box 1mm/min	Drip Box 3mm/min	Oscillating tube 60°	Oscillating tube 180°	Water jet 6.3mm nozzle	Water jet 12.5mm nozzle	Immersion tank	Immersion tank	Fan jet

MATERIAL GROUPS / SUB GROUPS

ENVIRONMENT	GAS, VAPOUR OR DUST (SUB) DIVISION	PERMITTED EQUIPMENT GROUP
Underground Mines	I	I
Gas and Vapour, Surface	IIA	II, IIA, IIB, or IIC
	IIB	II, IIB, or IIC
	IIC	II or IIC
Dust, Surface	IIIA	IIIA, IIIB or IIIC
	IIIB	IIIB or IIIC
	IIIC	IIIC

REGULATIONS

ARP 0108	Regulatory requirement for explosion protected apparatus
SANS 10108	Classification of hazardous areas and selection of equipment
SANS 10086-1 & -2	Use, inspection and maintenance of Ex equipment
SANS 10086-3	Repair of Ex equipment

EQUIPMENT PROTECTION LEVEL (EPL)

ENVIRONMENT CODE	LEVEL CODE	ZONE (TYPICAL)	
Underground Mining	M	Very High Protection a	Zone 0 / Zone 20
Gasses / Vapours	G	High Protection b	Zone 1 / Zone 21
Surface Dusts	D	Normal Protection c	Zone 2 / Zone 22

TEMPERATURE CLASS

UNDERGROUND COAL MINES (GROUP I)
≤150°C (T4) where gas and dust occur or 450°C where dust is removed regularly (such as on some mobile machines)

GASSES / VAPOURS (GROUP II)

TEMPERATURE CLASS REQUIRED BY THE AREA CLASSIFICATION	IGNITION TEMPERATURE OF GAS OR VAPOUR (°C)	MAXIMUM SURFACE TEMPERATURE OF EQUIPMENT (°C)	SUITABLE EQUIPMENT TEMPERATURE CLASS
T1	>450	≤450	T1 – T6
T2	>300	≤300	T2 – T6
T3	>200	≤200	T3 – T6
T4	>135	≤135	T4 – T6
T5	>100	≤100	T5 – T6
T6	>85	≤85	T6

DUSTS (GROUP III)

Ex ID PRACTICE A EX Id / Ex pD / Ex mD	SAFETY MARGIN	Ex ID PRACTICE B	SAFETY MARGIN
Dust clouds	Tmax ≤ 2/3 TCL	Dust clouds	Tmax ≤ 2/3 TCL
Dust Layers ≤5mm	Tmax ≤ T5 mm – 75 °C	Dust Layers ≤12mm	Tmax ≤ T12mm – 25 °C
Dust Layers >5-50mm	Tmax ≤ T5 mm – 75+ °C		
Dust Layers >50mm	Tmax ≤ TL – 75+ °C	Dust Layers >50mm	Tmax ≤ TL – 75+ °C

EX RATINGS

EXAMPLE				
Ex	d	IIA	T4	Gb
Explosion Protected (Suitable for explosive atmospheres)	Technique Used (Ex Code)	Equipment Group	Temperature Class	Equipment Protection Level

LOCAL INSPECTION AUTHORITY NUMBERS (I.A. CERTIFICATE NUMBERS)

EXAMPLE : MS-SAL/19.52246 X (OR U)

MS -	Mining and / or Surface use
SAL /	Laboratory Code
19.	Year of Certification
52246	Unique Number
X	Specific Condition of Use
U	Certified Component Only

Contact us

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