



Equipment Categories + Groups, Protection Level, Zones, Security Level

| Zone | | Atmosphere | Security level | Equipment group ATEX | Equipment categories (ATEX) | | Equipment group IECEx | | EPL level IECEx | |
|--------|------|---|--------------------------------------|----------------------|-----------------------------|------------|-----------------------|------|-----------------|------|
| Gas | Dust | | | Gas/Dust | Gas | Dust | Gas | Dust | Gas | Dust |
| 0 | 20 | always, long term, often, as cloud | during rare malfunctions | II | 1G | 1D | II | III | Ga | Da |
| 1 | 21 | on occasion in normal operation; as cloud | during expected malfunctions | II | 2G, 1G | 2D, 1D | II | III | Gb | Db |
| 2 | 22 | none or short-term in normal operation | in normal operation | II | 3G, 2G, 1G | 3D, 2D, 1D | II | III | Gc | Dc |
| Mining | | | during rare malfunctions | I | M1 | | I | | Ma | |
| | | | until de-energizing of the equipment | I | M2 | | I | | Mb | |

Marking (Examples)

Electrical equipment (ATEX)

| | | | | | | | | | |
|------|----|------------------|----|----|----|-------|-----|----------|----|
| Gas | CE | NB ¹⁾ | Ex | II | 2G | Ex db | IIB | T4 | Gb |
| Dust | CE | NB ¹⁾ | Ex | II | 2D | Ex tb | IIB | T 120° C | Db |

1) NB = Notified Body Number, 1258 or 0477

Non electrical equipment (ATEX)

| | | | | | | | | | |
|------|----|------------------|----|----|----|------|-----|----------|----|
| Gas | CE | NB ¹⁾ | Ex | II | 2G | Ex h | IIB | T4 | Gb |
| Dust | CE | NB ¹⁾ | Ex | II | 2D | Ex h | IIB | T 110° C | Db |

1) NB = Notified Body Number, 1258 or 0477

IECEx

| | | | | |
|------|-------|-----|----------|----|
| Gas | Ex db | IIB | T4 | Gb |
| Dust | Ex tb | IIB | T 120° C | Db |

Applicable Standards

| Protection Principle | Gas | | | Dust | | | Standard |
|---|-------------|-------------------------|-------------------------|------|------------|-----|-------------------|
| | 0 | 1 | 2 | 20 | 21 | 22 | |
| Zones | | | | | | | IEC/EN 60079-10-1 |
| Equipment Protection Level EPL | Ga | Gb | Gc | Da | Db | Dc | |
| Electrical Equipment | | | | | | | |
| General requirements | • | • | • | • | • | • | IEC/EN 60079-0 |
| Flameproof enclosures | da | db | dc | | | | IEC/EN 60079-1 |
| Pressurised enclosures | | pxb pyb | pzc | | pxb pyb | pzc | IEC/EN 60079-2 |
| Powder filled | | q | q | | | | IEC/EN 60079-5 |
| Liquid immersion | | o | o | | | | IEC/EN 60079-6 |
| Increased safety | | eb | ec | | | | IEC/EN 60079-7 |
| Intrinsically safe | ia | ib | ic | ia | ib | ic | IEC/EN 60079-11 |
| Non-sparking equipment, Restricted breathing, Enclosed sparking equipment | | | nA nR nC | | | | IEC/EN 60079-15 |
| Encapsulation | ma | mb | mc | ma | mb | mc | IEC/EN 60079-18 |
| Intrinsically safe systems | ia | ib | ic | ia | ib | ic | IEC/EN 60079-25 |
| Equipment protection level EPL Ga or Two independent types of protection EPL "Gb" | _a _b+_b | | | | | | IEC/EN 60079-26 |
| Protection against optical radiation | op is | op is op sh op pr | op is op sh op pr | | | | IEC/EN 60079-28 |
| Enclosures | | | | ta | tb | tc | IEC/EN 60079-31 |
| Non electrical equipment | | | | | | | |
| General requirements | h | h | h | h | h | h | ISO/EN 80079-36 |
| Non electrical type of protection constructional safety "c", control of ignition source "b", liquid immersion "k" | • | • | • | • | • | • | ISO/EN 80079-37 |
| Flameproof enclosures | | • | • | | • | • | IEC/EN 60079-1 |
| Pressurised enclosures | | • | • | | • | • | IEC/EN 60079-2 |
| Enclosures | | | | • | • | • | IEC/EN 60079-31 |

• = Standard Applicable

Mining

I Methane, coal dust

Gas Groups (typical)

IIA Butane, Propane
 IIB Ethylene
 IIC Acetylene, Hydrogen

Dust Groups

IIIA Flying combustible
 IIIB Non conductive dust
 IIIC Conductive dust

Gas Temperature class

T Max. Surface Temperature
 T6 85° C
 T5 100° C
 T4 135° C
 T3 200° C
 T2 300° C
 T1 450° C

Ingress Protection of Enclosures

Protection against solids, 1st digit

| IP | Tests |
|----|--|
| 0 | No protection |
| 1 | Protection against solid foreign objects (Ø ≥ 50 mm) |
| 2 | Protection against solid foreign objects (Ø ≥ 12.5 mm) |
| 3 | Protection against solid foreign objects (Ø ≥ 2.5 mm) |
| 4 | Protection against solid foreign objects (Ø ≥ 1.0 mm) |
| 5 | Dust protected, no harmful deposit |
| 6 | Dust tight, no ingress of dust |

Protection against liquids, 2nd digit

| IP | Tests |
|----|--|
| 0 | No protection |
| 1 | Protection against vertically falling drops |
| 2 | Protection against drops falling up to 15° from vertical |
| 3 | Protection against splashing water falling up to 60° from vertical |
| 4 | Protection against splashing water from any direction |
| 5 | Protection against water jets |
| 6 | Protection against powerful water jets |
| 7 | Protection against temporary immersion in water |
| 8 | Protection against continuous immersion in water |
| 9 | Protection against high pressure and temperature water jets |