

# 3. TECHNICAL PRINCIPLES

## 3.3 EQUIPMENT GROUPS

### Classification pursuant to European Directive 2014/34/EU (ATEX)

The explosion-protected equipment is classified into two groups.

#### Equipment group I

Equipment intended for use in underground mining works and surface mining works that may be exposed to the hazard of firedamp and/or combustible dust.

#### Equipment group II

Equipment intended for use in other areas that may be exposed to an explosive atmosphere.

Electrical equipment for mining works in which in addition to firedamp, gases other than methane may occur, must adhere not only to Group I provisions, but also to the relevant provisions of Group II. Group II equipment is further classified according to application area into equipment for areas exposed to gases, vapours and mist and equipment exposed to dust.

### Classification pursuant to IEC 60079

Two groups were formerly defined for explosion-protected equipment.

#### Group I

Equipment for firedamp-endangered mining works.

#### Group II

Equipment for hazardous areas – apart from mining.

Upon publication of IEC 60079-0 in 2007 Group III was introduced for dust explosion hazardous areas. Group II is reserved for equipment in gas explosion hazardous areas.

#### Group II

Equipment for gas explosion hazardous areas – apart from mining.

#### Group III

Equipment for dust explosion hazardous areas – apart from mining.

Electrical equipment in Group II (gas) is classified according to the characteristics of the explosive atmosphere (for which it is intended) into Groups IIA, IIB and IIC (Table 9). This assignment concerns the flameproof enclosure and intrinsic safety protection types. In the case of flameproof enclosures, it is based on the maximum experimental safe gap (MESG), which is a measure for the discharge behaviour of a hot flame through a narrow gap. The minimum ignition current (MIC) – a variable for the minimum ignition energy of emergent gases and vapours – is definitive for intrinsic safety. Equipment in dust explosion hazardous areas (Group III) is classified according to dust type into Group IIIA (combustible lint), IIIB (non-conductive dust) and IIIC (conductive dust). The latter two groups differ by specific electrical resistance, which for dusts in Group IIIC lies at a value less than or equal to  $10^3 \Omega\text{m}$ .

**Table 9:** Equipment group II classification

Group	Typical gas	Maximum experimental safe gap (MESG) in mm	Minimum ignition current ratio*
IIA	Propane	> 0.9	> 0.8
IIB	Ethylene	0.5 ... 0.9	0.45 ... 0.8
IIC	Hydrogen	< 0.5	< 0.45

\* Minimum ignition current ratio in relation to methane

The substances and thus the hazardous areas in which they occur are therefore classified into groups. The equipment deployed must be designed for the requirements of the groups, which range in ascending order from IIA to IIC and IIIA to IIIC. Equipment that complies with IIC criteria may also be used in IIB and IIA areas. Group IIB equipment may also be used in IIA areas. IIA equipment may only be used in IIA areas. This applies likewise for Group IIIA, IIIB and IIIC equipment.

