A place in which an explosive atmosphere consists of a mixture with air of flammable substances in the form of gas or vapour, or of a cloud of combustible dust in air is likely to occur in normal operation, but if it does occur, will persist for a short period only (usually no longer than 2 hours).

**Gas**

**Zone 0** A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas or vapour is present continuously or for long periods or frequently.

**Zone 1** A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas or vapour is unlikely to occur or, if it does occur, will persist for a short period only.

**Zone 2** A place in which an explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas or vapour is unlikely to occur in normal operation, but if it does occur, will persist for a short period only (usually no longer than 2 hours).

**Dust**

**Zone 20** A zone in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously or for long periods or frequently.

**Zone 21** A zone in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur, occasionally, in normal operation.

**Zone 22** A zone in which an explosive atmosphere in the form of a cloud of combustible dust in air is unlikely to occur in normal operation, but if it does occur, will persist for a short period only.

**Non-electrical equipment for use in potentially explosive atmospheres**

**IP Degree of Protection**

IEC EN 60079

- **Intrinsically Safe Systems**
  - Equipment with equipment protection level (EPL) Category 1 comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.
  - Equipment in this category is intended for use in areas in which explosive atmospheres composed of mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously for long periods or frequently. Equipment in this category must ensure the requisite level of protection, even in the event of new incidents relating to equipment, and is characterized by means of protection such that either in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection, or the requisite level of protection is assured in the event of two faults occurring independently of each other.

- **Encapsulation**
  - Water drops (enclosure tilted 15°)
  - Ethylene, town gas
  - > 85 °C
  - <= 80 °C
  - Water jets (pressure water)
  - Powder filling
  - > 200 °C
  - Temporary immersion in water
  - Water drops protected / protected against splashing water

- **Protection by Intrinsically Safe Equipment (ibD IEC 61241-11)**
  - Db and Da
  - Area in which an explosive atmosphere in the form of any flammable mixture with air is present or is likely to occur.
  - Limited energy (only old edition)
  - Fibres
  - > 440 °C
  - Non-conductive dust

- **Pressurized Enclosures**
  - Equipment in this category is intended for use in areas in which explosive atmospheres composed of mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously for long periods or frequently. Equipment in this category must ensure the requisite level of protection, even in the event of new incidents relating to equipment, and is characterized by means of protection such that either in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection, or the requisite level of protection is assured in the event of two faults occurring independently of each other.

- **Protection by Enclosure**
  - Vertically falling water drops
  - > 135 °C
  - Temporary immersion in water
  - Increased safety

- **Protection by Flameproof Enclosure**
  - > 300 °C
  - Permanent immersion in water
  - Increased protection

- **Protection by Intrinsically Safe Systems**
  - Dc, Db and Da
  - Equipment in this category is intended for use in areas in which explosive atmospheres composed of mixtures of air and gases, vapours or mists or by air/dust mixtures are present continuously for long periods or frequently. Equipment in this category must ensure the requisite level of protection, even in the event of new incidents relating to equipment, and is characterized by means of protection such that either in the event of failure of one means of protection, at least an independent second means provides the requisite level of protection, or the requisite level of protection is assured in the event of two faults occurring independently of each other.

- **Protection by Flammable Enclosure**
  - > 135 °C
  - Temporary immersion in water
  - Increased protection

- **Protection by Powder Filling**
  - > 200 °C
  - Temporary immersion in water
  - Increased protection

- **Protection by Flow Restricting Enclosure**
  - > 195 °C
  - Temporary immersion in water
  - Increased protection

- **Equipment with Equipment Protection Level (EPL) Category 1** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 2** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 3** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 4** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 5** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 6** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 7** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 8** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 9** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 10** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 11** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 12** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 13** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 14** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 15** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 16** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 17** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 18** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 19** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 20** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 21** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 22** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 23** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 24** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 25** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 26** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 27** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 28** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 29** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.

- **Equipment with Equipment Protection Level (EPL) Category 30** comprises equipment designed to be capable of functioning in conformity with the operational parameters established by the manufacturer and ensuring a very high level of protection.