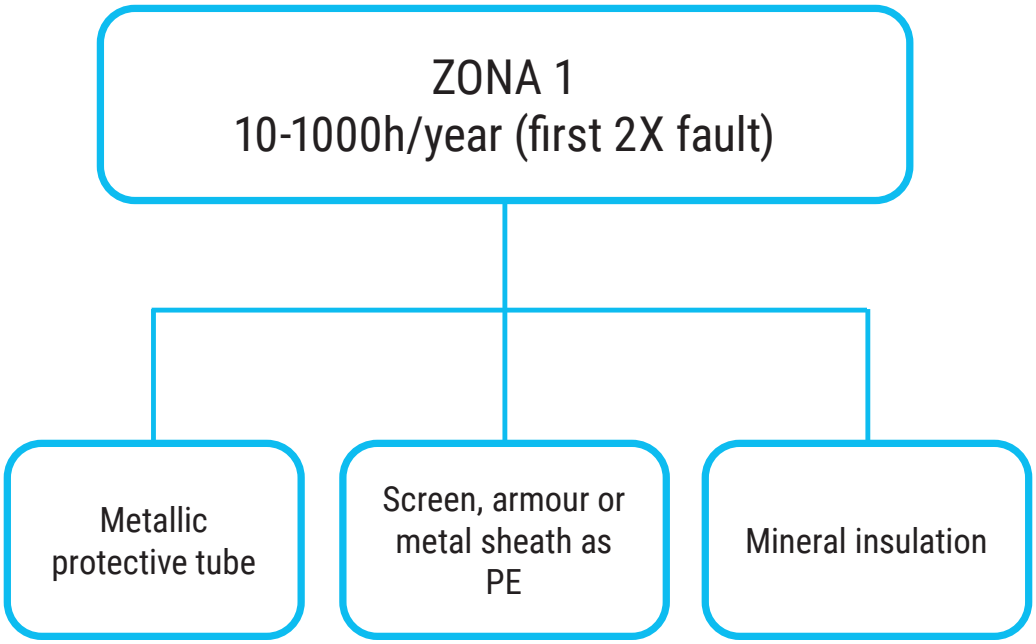
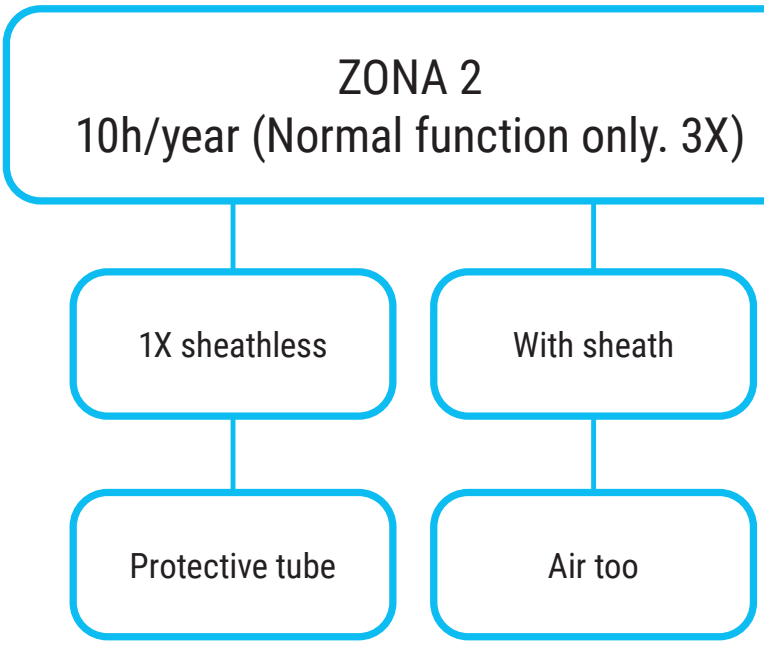
ATEX

Conductor – Cable Types – GAS





CABLES in ATEX systems:

The ATEX EN60079-14 standard regarding cables considers them to be passive elements, so construction instructions are given according to the type of system chosen by the designer, but it does not define a specific certification or test method or approval, so we can say that there is no “ATEX” certification for cables.

The general and main requirements for cables used in the ATEX zone provide that the sheath must be compact and extruded in a way that is integral with the internal “compression” cable (not in a tube) and as circular as possible, such as to allow the cable gland to tighten the cable compactly, both on the outside of the sheath and inside.
The sheaths must be resistant to the UV rays and chemical agents present in the system. If this is not possible, the cable must be laid inside a suitable pipe following the provisions of EN60079-14.
In particularly heavy systems, where the risks of mechanical damage and chemical agents are high, armed and shielded cables must be used.

With regard to the fire propagation protection in the standard, it is prescribed that the cables must be flameproof according to the IEC60332.3-22 standards, otherwise they must be laid in tunnels filled with sand.
With regard to the laying of cables in systems where they may be present, even only in case of failure of the toxic and/or corrosive gas, and that run from the field to the safe area (control room or manned technical areas), it is essential to ensure that no gas can travel through the cable inside it, due to the “chimney effect”, and enter the manned rooms, causing intoxication or fire/explosion. To do this, there are two methods: the most widely-used method is the use of buffered cable glands (so-called ‘three-part glands’) that, once installed, are filled with a special blocking resin, or there are even more high-performance buffered cable glands for more demanding situations.
Otherwise, as provided for in Annex “E” of the EN60079-14 standard, buffered cables must be used inside that do not allow the air/gas to circulate according to a precise test.
With regard to EEx-d systems, since the signals or power supplies that travel through the dangerous area inside the cable are not protected (e.g. by an IS barrier in a safe area), it is extremely important to protect the cable mechanically from damage caused from the outside. This can be done by putting the cables inside conduit pipes or by arming the cable with galvanised iron.

As far as the EEX-I systems are concerned, the signals inside the cables are protected by the intrinsically safe barriers located in the control room, so even if the cable accidentally breaks, it could not cause any damage or ignition of explosive mixtures.
Consequently, when armed cables or cables with mechanical protections (e.g. cables in tubes) are used, it is only for system reasons and so as not to risk losing the signals in the event of cable damage.
Meanwhile, for cables in intrinsically safe systems, it is essential to pay attention to any energy chains between the pairs or induced magnetic fields that could come from other external cables.

For this reason, it is essential to use suitably shielded cables (usually in aluminium/PET tape with drainage), possibly also on the single pairs plus the total of the pairs, and to place all the screens on the ground in one place on a special ground bar in the control room and segregate the circuits so as to keep the cables with IS signals distant or in channels separate from all the other cables containing other circuits. In addition, it is forbidden to put other non-EEx-I signals inside the EEx-I circuit cables.
Usually a quality cable for intrinsically safe circuits should have the lowest possible capacity values, </= 200pF/mt, as the cable could act as a capacitor, accumulating energy inside it, which when added to the energy delivered by the barrier could cause triggering in the dangerous zone and should have inductance values that are equally low, </= 1microH/mt. This is because the inductance generated by the single pairs of the cable could create inductive fields that could chain an energy in the adjacent pairs, which when added to the energy generated by the barrier could generate triggering in the dangerous zone and a degree of insulation of the cable of at least 500V.

For EEx-e systems, the same rules apply as those for EEx-d systems.