



EX-PROOF ELECTRICAL PLANT: CONDUIT INSTALLATION

Once, all electrical explosion proof plants were made according to the "American" system. This meant that all connections between the various boxes were made through metal pipes containing electrical conductors.

Today this system has been replaced thanks to some new Standards: the wiring can be made through armored and un-armored cables while the entry through certified cable glands.

This system, of which we discussed in the previous newsletter, is certainly more flexible than the conduit installation, but the second one, however, has some features that make it necessary in certain conditions.

When use the conduit installation

Conduit installation is certainly the most suitable for applications in all dangerous areas where, in addition to the presence of explosive atmosphere, the problem is to operate in severe weather conditions and where mechanical protection of cables has a particular importance for safety.

In all chemical, petrochemical plants, or other facilities where the production process presents dangerous conditions for the integrity of cables (mechanical stress, intense heat, contact with corrosive agents), the use of conduit system is highly recommended.

Features of conduit system

Conduit system requires that all boxes are manufactures with "Ex de" type of protection and the entries must be made through a conical threaded hole.

The connection between the different boxes is made through steel pipes which protect cables. These tubes are connected to the boxes by means of special certificated fittings.

The key feature of these systems is the use of sealing fittings installed between the ex-proof box and the pipe which holds cables. This fitting does not permit, once sealed with special resins, the transmission of flames through the pipes that carry cables.

In practice, if within an "Ex d" enclosure occurs an explosion, it could spread through the pipes causing a blast impossible to contain with catastrophic results. The sealed joints prevent this event.

The maximum distance between joints and the box which contains sparking equipment must not exceed in any case 450 mm.

Pipelines

Facilities pipelines must be built with steel tubes smooth inside and they must meet the IEC 60614-2-1 standard requirements.

Other type of tubes can also be used, but in this case, the installer must be sure that, internally, there aren't welded seams or other irregularities that may damage the cables. The internal tube diameter must be at least 1.4 times the diameter of the circle circumscribed to the wiring harness to insert.



In addition, on these tubes, must be performed a static test pressure of 40 bar before the curve or of 20 bar after the curve for a time of 5 s. In the case of tubes complying with IEC 60614-2-1 standard the pipe manufacturer achieves these parameters. The pipe is galvanized and marked along its entire length.

The pipelines of a conduit system can be placed on sight, in raceway or tunnels with a lid, or directly buried. If the pipes are buried at a depth less than 60 cm, it's necessary to provide an additional protection that may be a concrete casting. If the depth exceeds 60 cm, cables can also be buried directly without being protected by the tube, but, in this case, the cable entry into the tubes to be brought to the surface must occur at a depth at least equal.

Various types of connections are used for pipes joints and they must be provided with a tapered thread that guarantees a perfect fit. Today, the international regulations allow only the NPT thread. As far as Italy, there is an exemption for the use of the thread complying with UNI 6125.

If may be necessary to create curves, these can be realized directly by bending the tube or using special prefabricated elbows. In any case, in order to ensure a proper wires threading, if there are consecutive curves they cannot exceed a total of 270°.

The threading curved boxes must have a radius of curvature corresponding to at least six times the nominal diameter of the tube.

It's necessary to forecast, even in straight lines, junction boxes with a cover that may be opened in order to facilitate the cables threading.

The tubes, as well as the entrance into enclosures, should be provided with joints even in the transition points from a classified area to a safe area.