

May 2016

Drilling 'Ex d' junction boxes

All the operations that might affect the certification of an Ex product must be done only by who owns the full conformity certificate for the product. However, there is a special case which commonly occurs on the market that does not follow this guideline.

We are talking about the drilling and tapping of 'Ex d' junction boxes. As this is a critical operation, the norms prescribe that only the owner of the certificate should have the responsibility of executing and verifying it.

In reality, on the market, we can often find different scenarios; for example, a third party executing the customization of 'Ex d' junction boxes and also the necessary controls. This often happens for market reasons: the delivery times often do not allow to supply all the locations from a unique facility and the costs of maintaining multiple manufacturing locations are not sustainable by every manufacturer.

1. The normative point of view

Why are the norms so restrictive? Why can't a mechanical workshop drill and tap 'Ex d' enclosures?

The 'Ex d' protection mode is defined in the IEC/EN 60079-1 norm. It can be applied to all low tension equipment that can generate sparks during normal operation.

These appliances are placed inside certified enclosures, the heart of the system. As we know, the main purpose of the 'Ex d' junction box is to prevent the propagation of an explosion to the surrounding atmosphere. This is made possible by the flame-paths which reduce and cool the propagation of flames and hot gases.

The cable entries can happen only by certified cable glands or sealed joints, which have to be attached to the sides of the junction box by threaded joints. The walls of the 'Ex d' junction boxes have to be drilled and tapped to allow for the connection of these joints.

It is clear that, in such type of system, the coupling between threads is critical, since it guarantees that the flames do not propagate to the external environment in case of internal explosion.

2. Customizing 'Ex d' junction boxes

Besides the delivery times, a further problem is the modifications occurred along the way. Generally speaking, these modifications are not permitted in any Ex junction box and this

is especially true for 'Ex d' junction boxes. Usually, in industrial installations, the electrical panels are often modified during installation, directly in the field: entries, terminals, cables and/or cable glands might be added. In the case of 'Ex d' panels, this can never happen and the design has to be perfectly defined before going into production.

All the entries must be done and verified by the manufacturer and must be done within the limits of the full conformity certificate for the junction box. These limits regard the size, number, location and tapping of the holes.

It is easy to understand that the joints must guarantee outstanding mechanical properties, able to withstand and block the propagation of an internal explosion.

All the threaded holes are checked with certified gauges one by one, since the manufacturer has to guarantee the strict tolerance required for flameproof protection mode.

3. What happens in the real world

Unfortunately, for practicality and time constraints, many manufactures have turned a blind eye, allowing third party to drill and customize their junction boxes. In some cases, also allowing the sale of empty 'Ex d' junction boxes, implicitly allowing the client to customize them based on their needs.

This has led to the presence on the market of possibly dangerous equipment both for the health and safety in hazardous areas.

It is important to underline that, in many cases, the fundamental traceability and responsibility chain is unclear for 'Ex d' products customized by third parties. The product might be, in this sense, nonconforming, and thus the full conformity certificate could be void. This can cause issues in during installation or during a possible inspection.

4. IECEx OD 203

Recently a new Operational Document that clarifies some of these aspects has been published by IECEx, the IECEx OD 203.

For the first time this document explicitly allows for the possibility that part of the cabling or final assembly is done by a third party, defined as a "Local Assembler". It should be noted that this third party must be qualified and kept under strict control by the owner of the certificate, using well defined procedures. This is not an approach to allow any client to cable or finalize a product.

TECHNICAL NEWS



To be sure to be safe.

One of the central points of the OD 203 is that it explicitly states that the third part will not be allowed to drill 'Ex d' products.

The publication of this document sheds some light on the confusion between the norms and what is happening on the market: the third parties that are allowed to handle a limited number of operations are called "Local Assemblers" and they cannot drill 'Ex d' junction boxes.

Besides this clarification, the introduction of the OD 203 can be interpreted as a guideline for IECEx's policy on this matter.

It is thus very important for clients, distributors and for manufacturers themselves to understand that, in all likelihood, this "gray area" is going to disappear.