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## The meaning of “U” and “X” characters in the Ex marking of explosion-proof electrical equipment

Many information must be reported on the marking plate of equipment and components addressed to hazardous areas which often cause several doubts and also disagreements among technicians and inspections supervisors.

The EN 60079-0 standard brings the general Rules about electrical equipment for explosive atmospheres due to the gas presence.

### **1. The information which must be reported on the marking plate**

As EN 60079-0 standard reports, the electrical equipment must be readable marked on the main side of it.

The marking, which can be represented by a firm plate or by a direct marking upon the device or component's body, must report:

- The name of manufacturer or trade-mark.
- The product code.
- The Ex symbol, to indicate that the electrical manufacture corresponds to one or more method of protection.
- A symbol for every type of protection used: (ie. Ex d - Ex p ecc.).
- The symbol of Gas group for which the manufacture is in compliance.
- The temperature class.
- The serial number.
- Name or acronym of the notified body.
- The number of certificate.

We do not want to speak about the above items now, but we are interested to analyse the meaning of “U” and “X” letters that sometimes are reported at the end of the number of certificate.

These two characters often cause a big confusion, because technicians and inspectors of the plants not always know their meaning or are not able to understand it in the right way.

### **2. The “U” letter identifies Ex components**

Ex component denotes an equipment that must not be used alone, but only inside a device or a system along with must be certified.

In the common practice, the most common Ex components are the empty "Ex d" junction boxes, which have passed the explosion proof tests in a qualified laboratory, but they are not certified with a specific electrical contents. These junction boxes should be certificated again by who will commercialize or install them as equipment.

In practice, these junction boxes are tested by the manufacturer to ensure the mechanical strength against a potential internal explosion. The end user, that is who will make the cables entries and install the electrical equipment, should provide, independently, a certification as explosion proof device.

The Ex components should be marked as the main equipment, reporting the "U" letter at the end of the number of certificate, in such a way it's evident that to be installed in areas with potentially explosive atmosphere, must get an additional marking which clearly indicates the compliance to ATEX directive and the number of certificate as manufacture.

Unfortunately, it happens that many end users do not get the necessary knowledges and they are sure to be able to drill the enclosures' sides and to install the most different electrical equipment inside. This goes against the safety principles of equipment and it is absolutely forbidden by the standards.

### 3. The "X" letter indicates the use in peculiar conditions

The "X" symbol at the end of the number of certificate, must be put when the device has peculiar conditions for a safe use.

Let's doing some examples: there may be particular rules if the device is used in specific environmental conditions, such as in case of subnormal temperature or conversely in case of very high temperatures; or the gaskets may require specific treatments if exposed in chemical environments particularly aggressive.

The conditions defined as normal for all equipment by the standard are:

- temperature: from -20°C up to +60°C;
- pressure: from 80 kPa (0,8 bar) up to 110 kPa (1,1 bar);
- air with normal content of oxygen, usually 21 % v/v.

Therefore, the application of electrical equipment in atmospherically conditions outside of those intervals may need special rules.

These rules are prescribed by the laboratory which emits the certificate and must be indicated by the manufacturer on the operating and maintenance instructions that are with the device.

Sometimes the regulation may be directly indicated on the device, for example, if it is not possible using solvents to clean a transparent surface plastic made, other times, being the regulations much long and complex, must be indicated necessarily on the operating instructions.

The “X” letter at the end of the number of certificate has the task to warn the technician, the conductor, the maintenance technician and the inspector about the necessity of applying specific cautions to avoid malfunctioning dangers of the equipment and the consequent lacking of explosion proof protection.

What many ignore, maybe because they have not read carefully the Standard, is that even on the equipment it may be a warning mark as an alternative to the rule of “X” symbol, which reports the indications of use in peculiar conditions.

The manufacturer should ensure that rules relevant to special conditions for a safe use are provided to the buyer along with any specific information.

#### 4. Conclusion

The meaning, often ignored, of “U” and “X” characters inside the certificate, represents one of the problems that frequently cause disagreements through the chain from the manufacturer of junction boxes, to the inspector, passing across the technician. Those are not simple topics to understand and, for this reason, we invite you to study very well the relevant points of the standard which treat them.

In conclusion, we remind that “U” and “X” symbols must not be present at the same time on the same plate, because the previous one indicates a component and the second one a device.