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The use of drain valves in flameproof enclosure

The systems installed in areas with danger of explosion are often placed in zones where the presence of vapours and mists is a constant or very frequent.

Many refineries and several chemical plants, for logistical reasons, are located by the sea and, in addition to salt corrosion problems, which we have often discussed in previous newsletter, they have problems of condensation inside switchboards, junction boxes for terminals and increased safety enclosures.

The flameproof enclosure (EN 60079-1), by their nature, do not guarantee a complete seal to moisture, which penetrates right through the same flanges which, in the case of internal explosion, allow the discharge of the pressure, the cooling and the exit of the burnt gases, thus avoiding the explosion of the junction boxes.

The water particles which form the moisture, naturally present in suspension in the air, penetrate inside the box causing the formation of condensation, favoured by the continuous heat exchange with the exterior of the junction box, especially because of the thermal excursion of day and night.

If the problem of condensation in an industrial waterproof housing is limited and easily resolved with appropriate ventilation openings, such a practice cannot be used in an explosion-proof enclosure, whether it is flame-proof, such as increased safety or intrinsically safe, because the openings are obviously not permitted, except during some maintenance periods.

Therefore, over the years, have been studied components capable of draining the condensate water, formed on the bottom of the box, without maintenance operations that would provide for the periodic opening of the enclosures.

The amount of water that may condense on the inside of the junction box can be so high as to affect the operation and the safety of the enclosure itself. Consequently, the water must be removed with programmed cyclic interventions.

The drain valves, made of stainless steel and, sometimes, aluminium or nickel-plated brass, are normally constituted by a cylinder with suitable grooves and by a piston. The piston, moving inside the cylinder, allows the outflow of the condensation. The construction, although simple, must be mechanically very precise, because the nip between the piston and the cylinder, must be sufficient to allow the flow of water, but must be such as to act as flame path in the case of internal deflagration of the junction box, in addition to ensuring the degree of mechanical protection IP.

The material, for excellence, as we wrote above, is the stainless steel, AISI 304 or AISI 316, which provides high protection against corrosion. This is necessary because, in the absence of lubricants, it is essential to ensure the movement of the piston inside the cylinder in any condition.

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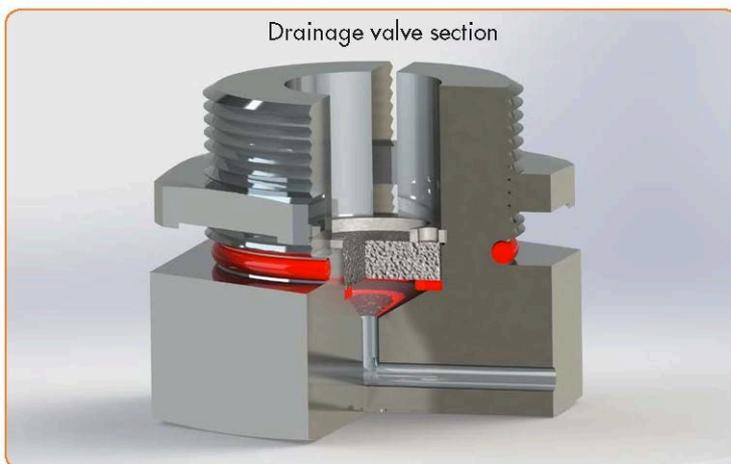


To be sure to be safe.

The problem of internal condensation, however, is not an exclusive problem of the flameproof enclosure, but is also present in the increased safety junction box.

Even in these cases must be used drainage valves and, for this reason, Cortem Group has designed a type of valve based on a different principle: instead of the movement between the piston and the cylinder, a sintered material is used inside the cylinder, which acts as a mesh, allowing the passage of the liquid.

In this way, the drainage valves are automatic and ensure a continuous drainage of the junction box protecting it in an optimal way without the need for manual intervention.



New ECDE series drain valve