



EQUIPMENT CLASS TEMPERATURE

Recently, we have received some requests from our products users regarding the equipment maximum surface temperature. We realized that there's no clarity among technicals on what maximum surface temperature means.

Let's go step by step. We know that a mixture composed of combustion-comburent requires certain energy to be triggered. This energy is normally provided by a spark or an arc. But, in some cases, the high surface temperature of the equipment in contact with the mixture can trigger it.

Therefore, in addition to the minimum ignition energy (MIE), two other chemical and physical properties of the flammable substances must be considered of maximum importance in order to determine their degree of risk and in order to classify them. The two parameters are the *Flashpoint* and the *Ignition Temperature*.

FLASHPOINT

The Flashpoint is the lowest temperature at which a flammable liquid releases steam on its free surface in quantities sufficient in order to form a mixture with air that can be triggered by a source of energy (see Table 1).

IGNITION TEMPERATURE

The Ignition Temperature, also called self-ignition, is the minimum temperature at which a flammable mixture, in the more flammable concentration (MIE), may ignite spontaneously without any electricity (see Table 1).

This element is extremely important in order to determine the maximum surface temperature that can reach a device placed in a zone where a substance is present.

Substance	Flashpoint (C°)	Ignition Temperature
Acetylene	- 18	305
Ethylene	Gas	450
Hydrogen	Gas	560
Methane	Gas	538
Propane	- 104	466
Octano	13	210

Table 1 – Flashpoint and Ignition Temperature of some substances



HIGH SURFACE TEMPERATURE

How cause a rise of the surface temperature and what may happen? Think about an alight lamp: if the external glass temperature become higher than the mixture Ignition Temperature, the conditions of the Triangle of Fire will happen and the mixture will be triggered.

This is an important factor to consider, both during the design of an equipment addressed to hazardous areas and during the design of a system in which flammable substances will be presence. Now, all certified equipment addressed to areas with risk of explosion due to the presence of gas or flammable dust, has a label that indicates the maximum surface temperature.

Here often arises the misunderstanding. Several technicians not familiar with the explosion-proof equipment, mistakenly believe that more higher is the degree of the surface temperature, better is the equipment. That is believed that the number indicates the maximum operating temperature at which a device may works. The opposite is true. More low is the temperature, lower will be the risk of trigger an explosive atmosphere and, therefore, better is the equipment.

Maximum temperature	Class
450 °C	T1
300 °C	T2
200 °C	T3
135 °C	T4
100 °C	T5
85 °C	T6

Table 2

As shown in Table 2, the equipment of class T1 can reach the surface temperature of 450° C, while in Class T6, the maximum temperature is just 85° C.

This means that many mixtures with substances that we have seen in Table 1 could, under normal operating conditions, be triggered by a device with temperature class T1, while none could be triggered by a device with temperature class T6, T5 or T4 also.

Only the Octane, which has a minimum ignition temperature of 210° C could be triggered by a device with temperature class T2.

So, when you are choosing a product, you must pay attention to the temperature rating: the lower it is, better will be the equipment.