TEMPERATURE CLASSES

The temperature class is one of the parameters to consider in order to choose electrical equipment to be installed in places with danger of explosion.

Very often this parameter is ignored or underestimated while it's one of the main features of the safety equipment.

An electrical device, addressed to classified areas where there might be danger of explosion due to the presence of gases, vapors, mists or dusts, should be chosen considering that, its maximum surface temperature, must not reach, even in case of failure, the ignition temperature of the hazardous substances present in the atmosphere.

Temperature classes for Gas

A standard method of classification defines the temperature classes of a gas.

This standard, defined by IEC, but also acknowledged by CENELEC, is held in IEC 60079-4 Standard "Method of testing ignition temperatures".

According to this method, all gases and vapors are divided into temperature classes.

According to these classes, the equipment maximum surface temperature reached is always lower than the ignition temperature.

The Standard defines in detail the maximum values and the necessary safety net for these temperatures.

Temperature class	Gas group ignition temperature	Equipment max. surface temperature
T1	> 450 °C	450 °C
T2	> 300 … ≤ 450 °C	300 °C
T3	> 200 … ≤ 300 °C	200 °C
T4	> 135 … ≤ 200 °C	135 °C
T5	> 100 … ≤ 135 °C	100 °C
T6	> 85 … ≤ 100 °C	85 °C

Temperature class for Dusts

The standard IEC 31241-2-1 "Electrical apparatus for use in the presence of combustible dust - Part 2: Test methods - Section 1: Methods for Determining the minimum ignition temperatures of dust" defines the ignition temperatures of combustible dusts.

In this case, there're different temperatures depending on whether the dust is in the shape of static layer or in the shape of dynamic clouds.

Equipment max. surface temperature	
Ignition temperature of a layer of dust (accepted temperature)	$T_{acceptd\ dl} = T_{min\ dl} - 75\ K$
Ignition temperature of a cloud of dust (accepted temperature)	$T_{accepted\ dc} = 2/3T_{min\ dc}$
Accepted Temperature $T_{accepted\ dc}$ and $T_{accepted\ dl}$ combined	$T_{accepted} \leq T_{accepted\ dc}$ and $T_{accepted\ dl}$
Equipment Surface Temperature accepted	$T_{max} \leq T_{accepted}$

dl = Layer of dust
dc= Cloud of dust

Common mistakes

Often the concept of surface temperature is incorrectly interpreted. Many technicians believe that the maximum surface temperature is the temperature within a device can be used. So, absurdly, are convinced that higher is the temperature and better is the equipment.
On the contrary, as we have seen, is exactly the opposite. The best devices are those that, in conditions of normal operation and during a fault, have the lowest possible temperature, which cannot ignite the explosive atmosphere.