

# 3. TECHNICAL PRINCIPLES

## 3.4 IGNITION TEMPERATURE AND TEMPERATURE CLASSES

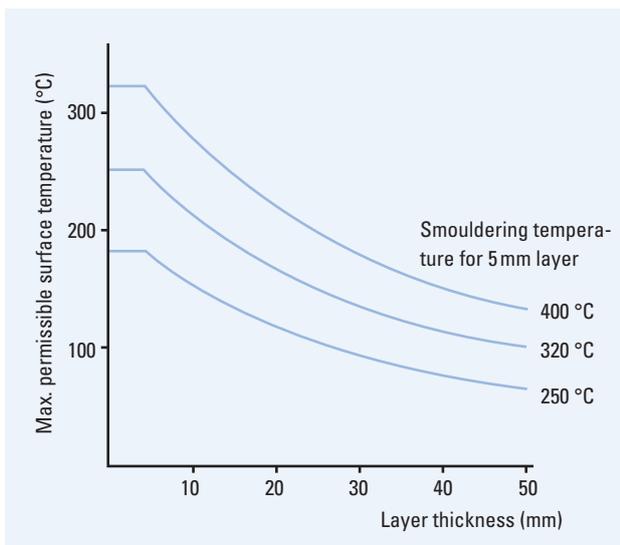
The ignition temperature of an explosive gas atmosphere or dust cloud is the lowest temperature of a heated surface at which a mixture of air and combustible substances in the form of gas, vapour or dust may ignite in the specified conditions.

### **Combustible gases**

Combustible gases and vapours are classified into temperature classes according to their flammability. The maximum surface temperature of electrical equipment must always be lower than the ignition temperature of the gas or vapour and air mixture in which it is used. Of course, equipment classified in a higher temperature class (e.g. T5) may also be used for applications in which a lower temperature class is required (e.g. T2 or T3). North America has a system with further classification into temperature subclasses.

**Table 10:** Temperature classes

Ignition temperature of gases and vapours in °C	Temperature class	Maximum surface temperature of the equipment in °C
> 450	T1	450
> 300 to 450	T2	300
> 200 to 300	T3	200
> 135 to 200	T4	135
> 100 to 135	T5	100
> 85 to 100	T6	85

**Figure 4:** Establishment of the max. surface temperature for dust layers of 5 mm to 50 mm

## Combustible dusts

Combustible dusts are not classified into temperature classes. The minimum ignition temperature of the dust cloud is compared with the maximum surface temperature of the equipment, taking a safety factor into account. The maximum equipment surface temperature must not exceed two thirds of the dust cloud ignition temperature. Since dust can also settle on equipment, the ignition temperature of the dust layer (smouldering temperature) must also be considered. The smouldering temperature is the lowest temperature of a hot surface on which a dust layer of 5 mm can ignite.

Adjustment based on the maximum equipment surface temperature is performed with a safety factor of 75 K. As heat insulation increases with thicker layers the maximum permissible equipment surface temperature should be reduced accordingly. This is established according to the diagram (Fig. 4) in IEC 60079-14. If the layer is thicker than 50 mm, the smouldering temperature must be determined by laboratory tests. This also applies to layers thicker than 5 mm when the smouldering temperature is lower than 250 °C. Laboratory tests are also required when equipment is completely covered with combustible dust. Critical equipment surfaces may not be hotter than the lower of the two permissible surface temperatures with reference to the dust cloud and layer.