



Flame detectors and the European standard EN54-10:2002

The European standard EN54 is a so called; "product standard". Part10 of this standard deals with the product requirements for flame detectors. In several European countries the national design standards refer to the standard EN54-10 for the quality requirements for flame detectors. The standard EN54-10 describes the quality requirements of the flame detector itself but not how the detector should be applied and if the detector is capable to detect a fire in a certain application. The standard EN54- 10 describes which laboratory tests the flame detector should pass; these are especially ambient and electrical aspects. The standard also describes a number of laboratory test fires, the flame detector must be exposed to and, after the tests, classifies the detector in one of three sensitivity classes. The EN54-10 will be revised by the PrEN54-10:2012. Sense-WARE thinks the changes are all positive although the standard is still strongly focused on avoiding false alarms. However, unfortunately, being able to detect flames under heavy EMC, ESD, shock or vibration conditions is not part of the tests. Also resistance to false stimuli is not a part of the revised standard. The scope is extended from "Buildings" to "In- and around buildings". In the PrEN a difference is made between flame detectors that are used mostly outdoors and mostly indoors. The PrEN practically excludes non-hydrocarbon fires such as Hydrogen, Munitions and Metals fires. And a fourth sensitivity class is added: "X" for flame detectors that can detect the standard fires at a distance of more than 25 m.

The national design standards and directives describe quality requirements of components and systems and also provides design guidelines for the fire safety in buildings.

'Buildings' in design standards and/or directives always mean public buildings (offices, hospitals etc.) The design guidelines in these national design standards and directives are typically suitable for point smoke detectors. In public buildings flame detectors are hardly applied. Flame detectors are used in a versatile range of applications. The detection system design of flame detectors in an Alcohol storage in a Hospital differs significantly from the detection system design of flame detectors utilized for monitoring a Generator Room. When designing the flame detection system it is necessary to follow the instructions of the manufacturer, rather than following the guidelines of the national design directive and frequently ask for the assistance of the manufacturer or his representative. The supplier considers in its design guidelines also the features of the application, such as monitoring of the contamination of the detector window, sensor self-test, and the aspects of detection of e.g. non-hydrocarbon fires.

It is possible to get an EN 54-10 approval for a simple UV flame detector in the highest sensitivity class, which is NOT suitable for 90% of the applications.

UV flame detectors are typically used for the detection of light- or non-hydrocarbon fires. UV flame detectors are not suitable for applications with the following false alarm and inhibitor risks: arc welding, unshielded halogen lamps and e.g. Corona. Blinding of the UV flame detector can take place by occurrence of Smoke, Gases, Vapors, Oil films, Silicones and Salt films. These limitations are not mentioned in the standard EN 54-10. A certificate of conformity with the standard EN54 part 10 however, is not a guarantee that the UV flame detector is the right choice for a certain application. For industrial objects a thorough analysis is necessary of the object and of the fires to be expected, the possible fire alarm sources and false alarm sources and also from pollution sources, which might negatively influence the sensitivity of the flame detector. In industrial applications in which hydrocarbon fires can occur in oily environments an IR flame detector, which is sensitive for radiation in the 4.3 micron range, are more suitable than a UV flame detector. Whilst the IR flame detector might be classified in the lowest sensitivity class (3) and the UV flame detector in the highest (1). Therefore the sensitivity class in the standard EN54-10 is not a guarantee for a proper performance in a certain application.

The sensitivity classification in the standard EN54-10 might suggest that a flame detector in the highest sensitivity class is automatically the best flame detector in all applications.

There is only a limited number of applications in which a very high sensitivity flame detector is important. Often the most sensitive flame detector is recommended, presuming this is always the right choice. There are more important factors, determining type and quantity of the detectors for a certain project. Important factors are for example the shadow effect and zone classification. For industrial projects the design guidelines of the manufacturer should be obeyed and the know-how of the supplier should be involved. For the project the supplier can make a project description of the application including a justification of the choice of the flame detector type. The national design standards and directives and the standard EN 54-10 do not add to a design of flame detection systems in industrial applications.