
Automatic fire detection and alarm systems— Methods of test for actuating devices

Method 17: Sensitivity test

1 SCOPE

This Standard sets out the method of testing the sensitivity and performance of actuating devices with respect to smoke from smouldering fires (see performance requirements in the appropriate device Standard).

2 PRINCIPLE

An actuating device is exposed to an environment containing a measured amount of smoke and its sensitivity is monitored.

3 APPARATUS

3.1 Test facility

A thermally insulated room incorporating facilities for mounting actuating devices on a horizontal surface, and drop-down panels for mounting actuating devices on vertical surfaces.

3.2 Measuring apparatus

3.2.1 *Measuring ionization chamber (MIC)*

The MIC is a standardized measuring chamber whose current is proportional to the quantity of smoke. The chamber shall have a parallel plate electrode configuration (see Figure 1), in which the alpha-source (Americium 241) is part of one of the electrodes. The configuration shall provide a measuring volume in which the ionization is uniform and approximately parallel to a constant electrical field.

The air is drawn through the chamber in order to reduce wind dependence, but the air in the measuring volume between the electrodes is stationary since the drawn air flows in a duct that is separated from the measuring volume by means of a wire mesh. Smoke is transferred from the airflow to the measuring volume by diffusion.

The clean air quiescent current of the chamber shall be 10^{-10} A, corresponding to a chamber voltage of approximately 20 V.

The current in the chamber is measured either directly with an electrometer, or by means of a special amplifier. When the latter method is used, and impedance transforming circuit placed inside the MIC transforms the high impedance level of the ionization chamber to a lower impedance level. The transformation means that the length of the connecting cable between the MIC and the amplifier becomes non-critical.

NOTE: The MIC readings are relative smoke densities express in terms of an 'X' value.