Australian Standard®

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

Method 1: Heat sensitivity testing of types, A, B, C and D heat detectors

1 SCOPE. This Standard sets out the method for determining the alarm state temperature and actual time of activation for Type A, B, C and D heat detectors. (See performance requirements in the appropriate device Standard.)

2 PRINCIPLE. The detector is placed in an oven which is heated at a controlled rate until the detector enters an alarm state. The elapsed time and the oven temperature when the detector enters an alarm state are recorded.

3 APPARATUS. The test apparatus consists of the following:

3.1 General.

(a) A closed-circuit oven equipped with an adjustable fan to produce the required draught, heating units and controls, equipment for measuring the temperature of the air in the working space, and a monitoring circuit to register the operation of the detectors.

(b) An anemometer for measuring the air speed.

(c) Automatic timing devices for measuring the elapsed time to activation with an accuracy of ±0.5 s.

3.2 Test oven. The test oven shall conform to the design and dimensions given in Figure 1. It is essentially a continuous duct of 305 mm × 200 mm rectangular cross- section, constructed from 0.50 mm zinc-coated steel sheet. It is 3050 ±25 mm long and 610 ±15 mm high. The exterior is painted flat black, and the interior is left unpainted.

Three movable windows of methyl-methacrylate sheet are fitted to the side of the upper section of the duct to serve as observation windows and as means for inserting line detectors and for adjusting the thermocouples. Into the top of the oven is bolted a sheet of close fitting building hardboard for mounting single point detectors, and, if required, hooks are fitted at appropriate centres for suspending line detectors. A baffle of brass wire mesh complying with the requirements for a 600 μm sieve as specified in AS 1152 is fitted across the leading edge of the upper section of the duct.

3.3 Draught fan. At one end of the lower section of the oven a 180 mm nominal diameter fan is mounted to provide the required draught. The fan is driven through a flexible shaft by means of a motor, mounted external to the duct, provision being made for adjustment of the air speed in the working space of the oven by varying the pitch of the fan blades or the speed of the motor, or both. The direction of the draught shall be through the wire mesh baffle into the working space of the oven.

In Figure 1, the heater, fan and baffle are at the right-hand end of the oven and the draught direction is anti-clockwise. It may, however, be convenient to have the heater, fan and baffle at the left-hand end, in which case the direction of the draught will be clockwise.

3.4 Heating system. Flat heating elements shall be mounted parallel to the air stream as shown in Figure 1.

NOTE: Twelve 140 mm × 130 mm 600 W 'toaster' type elements have been found to be satisfactory for this purpose.

The control circuit for the heater shall be capable of varying the power input to give nominal rates of temperature rise of 0.5 K per minute, 2 K per minute, 6 K per minute and 22 K per minute.