Australian Standard®

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

Method 16: Impact test

1 SCOPE This Standard sets out the test method for evaluating the effects of impact on actuating device operation (see performance requirements in the appropriate device Standard).

2 PRINCIPLE The actuating device is subjected to a specified impact, checked for damage and monitored for alarm or fault state.

3 APPARATUS Suitable apparatus for the impact test is illustrated in Figure 1. Alternative apparatus which applies an equivalent impact to the actuating device may be used.

The apparatus (see Figure 1) consists essentially of a swinging hammer comprising a rectangular section head (striker), with a chamfered impact face, mounted on a tubular steel shaft. The hammer is fixed into a steel boss, which runs on ball bearings on a fixed steel shaft mounted in a rigid steel frame, so that the hammer can rotate freely about the axis of the fixed shaft. The design of the rigid frame is such as to allow complete rotation of the hammer assembly when the specimen is not present.

The striker is of dimensions 76 mm wide x 50 mm deep x 94 mm long (overall dimensions) and is manufactured from aluminium alloy. It has a plane impact face chamfered at 60 ±1° to the long axis of the head. The tubular steel shaft has an outside diameter of 25 ±0.1 mm with walls 1.6 ±0.1 mm thick.

The striker is mounted on the shaft so that its long axis is at a radial distance of 305 mm from the axis of rotation of the assembly, the two axes being mutually perpendicular. The central boss is 102 mm in outside diameter and 200 mm long and is mounted coaxially on the fixed steel pivot shaft, which is approximately 25 mm in diameter, however the precise diameter of the shaft will depend on the bearings used.

Diametrically opposite the hammer shaft are two steel counter balance arms, each 20 mm in outside diameter and 185 mm long. These arms are screwed into the boss so that the length of 150 mm protrudes. A steel counter balance weight is mounted on the arms so that its position can be adjusted to balance the weight of the striker and arms. On the end of the central boss is mounted a 12 mm wide x 150 mm in diameter aluminium alloy pulley and round this an inextensible cable is wound, one end being fixed to the pulley. The other end of the cable supports the operating weight.

In case of a dispute, the result shall be taken to be that which is obtained from apparatus complying with Figure 1.

NOTE: The mass of the operating weight to produce the required impact energy of 1.9 J equals approximately 0.55 kg. In order to achieve a hammer velocity at impact of 1.5 ±0.1 m/s, the mass of the hammer head may need to be reduced by drilling the back face. It is estimated that a head of mass of about 0.56 kg will achieve the specified velocity, but the exact mass should be determined by trial.

4 PROCEDURE The procedure shall be as follows:

(a) Securely mount the actuating device in its normal orientation on a board in accordance with the manufacturer's instructions, and connect the actuating device to its power supply and monitoring equipment.

(b) Rigidly mount the board, with the actuating device attached, in such a position that the blow from the impact machine shall be struck by the centre of the impact face (see Figure 1). The direction of impact relative to the actuating device shall be chosen as that most likely to impair the normal functioning of the unit.

(c) Balance the hammer assembly by adjustment of the counter balance weight with the operating weight removed.

(d) Draw back the hammer arm to the horizontal position ready for release and reinstate the operating weight.

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