

June 2024 #24-071

General

AS/NZS 60335.2.25 Household and similar electrical appliances—Safety: Part 2.25: Particular requirements for microwave ovens including combination microwave ovens, clause 22.106 is a construction clause testing the fail-safe design of door interlocking systems. In this test if fuses are used, fuses are required to operate and render the appliance inoperable. The testing of alternate fuses requires careful scrutiny, as different fuses have different 'let through current' characteristics.

Requirement

For certification of microwave ovens in the EESS, there shall be documentation to ensure that any listed alternative fuses are adequately assessed. This requires either:

- the IEC certificate of the alternative fuses shows they have identical electrical characteristics or not (not 'similar' the requirement is 'identical') to the fuse tested in the *accredited type test* test report.
- where a fuse has different electrical characteristics to the fuse tested in the *accredited type test* test report, the test of clause 22.106 is required to be reported in an accredited test report showing the test repeated with each of the alternative fuses that are not 'identical'.

Background

The test of clause 22.106 requires that the supervision device of each door interlock renders the microwave oven inoperable if the interlock fails. This is commonly achieved using fuses in combination with the supervision device.

The clause includes:

If an internal fuse in the circuit supplying the microwave generator ruptures, the fuse is replaced, and the test is carried out two more times. The internal fuse shall rupture each time.

The test is carried out three more times but with an impedance of $(0,4 + j 0,25) \Omega$ in series with the supply source. The internal fuse shall rupture each time.

It is commonplace for manufacturers to have additional alternative components listed in the critical component list. Careful scrutiny needs to be applied as there are many different fuse types with different characteristics. The mere existence of an IEC certificate against the alternate component may not be sufficient to ensure compliance with this clause. The voltage, current and response time ratings are not sufficient to determine that a fuse is identical.

A fuse with a different characteristic may have higher or lower 'let through current and therefore needs to be assessed to ensure the fuse ruptures and opens the circuit without damaging the supervision device and remains operational. **Let-through current** is the current passed by a fuse while the fuse is interrupting a fault within the fuse's current-limiting range.

As an example, a glass fuse has different characteristics to a ceramic fuse with same current and voltage ratings. Note: Glass fuses are not suitable for high current episodes as occurs when a supervision device is required to operate.