

IEEE Test Standard for Expulsion Fuses in Enclosures

Supplement to

IEEE Standard Design Tests for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories

Sponsor

Switchgear Committee of the
IEEE Power Engineering Society

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Abstract: Procedures are given for performance testing of liquid-submerged and in-air expulsion fuses in enclosures.

Keywords: in-air expulsion fuses, liquid-submerged expulsion fuses

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On page 7 of IEEE C37.41-1988, add to 1.1, Scope, an additional item as follows:

- (9) Liquid-submerged expulsion fuses in switchgear

Add the following reference to Section 2, References:

[9] IEEE C37.20.3-1987, IEEE Standard for Metal-Enclosed Interrupter Switchgear (ANSI).¹

On page 24, add 6.9 and 6.10, as follows:

6.9 Testing Requirements for Liquid-Submerged Expulsion Fuses in Enclosures

6.9.1 General. This section applies to expulsion fuses that are immersed in liquid and used in switchgear (not directly associated with transformers) for alternating current distribution systems. It is intended to provide testing requirements for such fuses in an enclosure. It is not intended to apply to oil cutouts, which are devices covered by ANSI C37.44-1981 and IEEE C37.48-1987.

6.9.2 Test Practices. Additional interrupting test practices are as follows:

6.9.2.1 Condition of the Device to Be Tested. Where parts of a tested assembly are reusable, the manufacturer's guidelines should be followed regarding the number and type of tests. All specified cleaning, inspection, and maintenance steps recommended by the manufacturer shall be followed.

6.9.2.2 Grounding. The enclosure shall be filled with insulating liquid(s) as specified by the manufacturer and grounded.

6.9.2.3 Liquid. When testing liquid-submerged fuses to verify their ratings, the liquid shall not be changed or reconditioned during the tests.

6.9.2.4 Operational Mode of the Test. Manually operated devices should be manually operated or operated with a remotely controlled device that closely simulates typical operating forces and speeds.

6.9.3 Description of Interrupting Performance Tests. Tests shall be made in accordance with Table 14 and shall consist of two series of tests:

Series 1: Verification of operation with available currents equal to the rated interrupting current level.

Series 2: Verification of operation in the long-time melt region 2.7 to 3.3 times fuse link rating.

6.10 Testing Requirements for In-Air Expulsion Fuses in Enclosures

6.10.1 General. The installation of a fuse or fuse and container combination (hereafter termed F/C) in an enclosure results in a total system that should have performance capabilities suitable for the application intended. The fuse or F/C manufacturer's guidelines for installation in an enclosure should be followed. These guidelines should present information on minimum electrical clearances required and minimum construction requirements for the enclosure. To evaluate the total system, certain additional interrupting tests, a continuous current test, and dielectric tests will be conducted to

- (1) Verify that the enclosure containing the fuse or F/C does not adversely affect proper performance and servicing of the fuse or F/C.
- (2) Verify that the operation of the fuse or F/C in an enclosure does not adversely affect the mechanical and dielectric integrity of the enclosure.

The fuse or F/C shall be mounted in the enclosure in its normal service position. Normal ambient temperature conditions may prevail when testing a fuse or F/C having a maximum allowable reference ambient temperature (the temperature of the air surrounding the fuse or F/C) no higher than 55 °C. However, if the maximum allowable reference ambient temperature is higher than 55 °C, testing shall be performed with the fuse or F/C in its maximum allowable reference ambient.

These tests need not be performed on each design modification of a previously qualified design. To assure that overall performance has not been adversely affected as a result of design modification, the manufacturer shall ensure that the modified design will have performance at least equal to the design tested.

¹ The references will be renumbered in the revision of the standard.