

FLAME and SMOKE TESTS (CSA, FM, ICEA, IEC, IEEE, MSHA, NFPA, UL) (Standard names appear alphabetically)

CSA FT 1 Vertical Flame Test per CSA C22.2 No. 0.3-92 Para 4.11.1. A finished cable shall not propagate a flame or continue to burn for more than one minute after 5 - 15second applications of the 500W or 1700BTU test flame. There is an interval of 15seconds between flame applications. The flame test shall be performed in accordance with CSA 22.2 No. 0.3. In addition, if more than 25% of the indicator flag is burned, the test cable fails. This test is similar to the UL 1581-1080 (VW1) flame test.

CSA FT 2 Horizontal Flame Test per CSA 22.2 No. 0.3 Section 4.11. In this test, a bunsen burner 500W or 1700BTU flame is applied to a horizontal sample for 5 - 15second applications. The charred portion must not exceed 100mm from end to end, and there shall be no flaming particles dropping from the sample. This test is used as a minimum requirement for flexible cords.

CSA FT 4 Vertical Flame Test - Cables in Cable Trays per CSA C22.2 No. 0.3-92 Para 4.11.1. The FT4 test, with a 70,000BTU flame source, is similar to the UL 1581-1160 Vertical Flame Test, but is more severe. The FT4 test has its burner mounted at 20° from the horizontal with burner ports facing up. The UL 1581-1160 Vertical Tray has its burner mounted at 0° from the horizontal. The FT4 samples must be larger than 13mm (.512”) in diameter. The UL1581-1160 Vertical Tray does not distinguish on cable size. The FT4 has a maximum char height of 1.5mtr (59”) measured from the lower edge of the burner face. The UL1581-1160 has a flame height allowable up to approximately 78” measured from the burner.

CSA FT 5 Horizontal Flame Test is similar to the FT 2 fire test but with a larger burner. The flame must extinguish in less than 4 minutes and the burn length shall not exceed 150mm. The FT5 test applies to portable cables used in underground work areas such as mines and tunnels.

CSA FT 6 Horizontal Flame and Smoke Test per CSA 22.2 No. 0.3-92 Appendix B. Cables passing this test are designated FT6 where the trade number appears. In this test, cable samples on a horizontal tray are burned at 300,000BTU for 20minutes. Flame spread is not to exceed 1.5meters, with a smoke density during the test of 0.5 peak and 0.15 average. The FT6 test is used for cable in return air plenums and is similar to the NFPA 262 (UL 910) test.

CSA AG14 low acid gas emitting per CSA 22.2 refers to the acid gas given off during the burning of plastics used in cable. Normal PVC would produce approximately 30%, by weight, of acid gas during combustion. AG14 indicates materials will produce less than 14% acid gas during combustion. AG14 is used for jackets on armored cables such as TECK90 types.

FM GP-1 per Factory Mutual Standard 3972 is a non self-sustained flame test which establishes the classification for cable fire propagation through Piloted Ignition and Fire Propagation Test Methods. The test is applicable to various electrical cables, including fiber optic cables.

ICEA T-29-520 Vertical Flame Test is similar to the UL1581 Vertical Flame Test except that 1) a 210,000BTU flame source is used instead of 70,000BTU and 2) the distance from flame source to cable is 200mm instead of 75mm.

IEC 60331 specifies testing for electric cable for circuit integrity under fire conditions. The standard is divided into parts, each of which describe different test modes, conditions, and equipment to use.

IEC 60332-1 is a vertical flame test which tests for vertical flame propagation for a single wire/cable greater than 20mm in diameter. The test requires that the sample is self-extinguishing and does not spread fire.

IEC 60332-2 is a vertical flame test which tests for vertical flame propagation for a single wire/cable less than 20mm in diameter. The test requires that the sample is self-extinguishing and does not spread fire.

IEC 60332-3 is a vertical flame test is used to assess the vertical flame spread of vertically mounted bunched wires or cables, electrical or optical, under defined conditions. This test is similar to the UL 1581-1160 Vertical Flame Test