TEST: ASTM E648

SCOPE/PURPOSE OF TEST
To measure the ability of a flooring material categorized as “interior floor finish” to limit the progression of a fire through a corridor. The test attempts to simulate a situation where the flooring material in the corridor would be subjected to igniting flames and radiant heat emanating from a fire in a room adjacent to the corridor. The test was designed to achieve a more realistic rating for flooring materials which had been previously tested by the ASTM E84 Tunnel Test, which tests all materials in the ceiling of the test chamber.

FLOORING RADIANT PANEL TEST (ASTM-E648)

FEDERAL FUNDING REQUIREMENTS
The Department of Health & Human Services has adopted the guidelines established in the NFPA Life Safety Code for interior floor finish flammability as pertaining to health care occupancies (hospitals and nursing homes). The code specifies that flooring installed in corridors, lobbies, stairways and exit ways shall be Class I in accordance with the critical radiant flux ratings, interior floor finish. A Class I rating requires a minimum critical radiant flux of 0.45 watts/cm² in accordance with standard test method, NFPA 253 (or ASTM-E648), for critical radiant flux of floor covering systems using a radiant heat energy source. For general commercial construction, the guideline is a minimum average critical radiant flux (CRF) of 0.22 watts/cm² (Class II). This procedure is routinely performed by independent testing laboratories such as SGS United States Testing Company Inc.

What is the E 84 tunnel test and how does it apply to flooring?
The E 84 Tunnel Test has been retired many years ago as a floor covering flammability test. However, it continues to be the most widely used surface flame spread test for wall and ceiling finishes. It was never designed to be a floor covering test and was only adopted for floors as an interim test method. THERE ARE NO CORRELATIONS BETWEEN E-84 DATA AND FLOORING RADIANT PANEL DATA, i.e. a Class A in the E 84 Tunnel Test does not imply a Class I rating in the ASTM E 648, or vice versa.

In this test, a horizontally mounted floor covering system is exposed to radiant energy from a gas/air fuel radiant panel mounted above one end of the sample and inclined at a 30 degree angle. The radiant panel generates a heat profile along the length of the sample. A gas-fired pilot burner is used to ignite the sample, and the distance the floor covering system burns to extinguishment is converted to watts per square centimeter (watts/cm²). This value is reported as the Critical Radiant Flux (CRF) and is the minimum radiant energy needed to sustain flame propagation in the test. A CRF of 0.45 watts/cm² or more, Class I rating, may be requested for floor finish materials installed in corridors and exits of certain buildings, such as health care facilities.