



Member of the FM Global Group

Specification Test Standard for Impact Resistance Testing of Rigid Roofing Materials by Impacting with Freezer Ice Balls

Class Number 4473

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This test standard states FM Approvals test requirements and procedures for the assessment of impact resistance of new rigid roofing materials. Rigid roofing materials are manufactured in a rigid configuration and remain rigid during usage. These roof materials are manufactured as tiles or planks from materials such as slate, concrete or clay.
- 1.1.2 This test standard does not qualify products for Approval based solely on these test results, as the end use of the product will determine the applicable Approval Standard requirements.
- 1.1.3 An FM Approvals' Specification Tested Listing program per this test standard is available to roofing manufacturers. This program includes FM Approvals Quality Assurance Auditing of the products, wherein the manufacture of test sample material will be monitored by a representative of FM Approvals at the manufacturing facilities. The successful completion of the Listing program requires the manufacturer to reference the FM Approvals name and Hail Impact Resistance Classification on the packaging and on the product.

1.2 Scope

- 1.2.1 This test standard provides a procedure for determining the impact resistance performance of new prepared rigid roofing materials which are intended for use mainly on, but not restricted to, "Steep Slope" roof systems. The test uses the impact forces of freezer ice balls propelled to develop free-fall kinetic energies of the same size hail.
 - 1.2.1.1 Slope as defined by the National Roofing Contractors Association (NRCA) is the incline of the roof expressed either in percent or in the number of vertical units of rise per horizontal unit of run. It is generally measured in inches per foot. The NRCA ranks slope as follows: Low Slope — Less than 3 inches per foot (<3 in 12); and Steep Slope — 3 inches per foot and greater (>3 in 12)
 - 1.2.1.2 Ice balls are used in this test method to simulate hailstones. Hailstones are variable in properties such as shape, density and frangibility. These properties affect factors such as the duration and magnitude of the impulsive force acting on the roof and the area over which the impulse is distributed. Ice balls (with a density, frangibility, and terminal velocity near the range of hailstones) are the nearest hailstone approximation known at this time. Ice balls generally are harder and denser than hailstones; therefore, an ice ball simulates the worst case hailstone. A major difference between ice balls and hailstones is that hailstones are more variable than ice balls. Ice balls can be uniformly and repeatedly prepared to assure a projectile with known properties.
- 1.2.2 This test method defines test specimens and test panels, defines a procedure for determining impact locations on test specimens, provides kinetic energies of propelled ice balls, provides a method for impacting test specimens with ice balls, and specifies parameters that must be recorded and reported.
- 1.2.3 This standard is intended to verify that the product as described will meet minimum specific stated conditions of impact resistance performance. This performance criterion is useful in determining the potential suitability of these products under hailstorm conditions.
- 1.2.4 Exposure of roof coverings to the elements over an extended period of time has a potential to significantly lower the hail resistance of the roof materials. This standard is intended for the testing of new rigid roof cover systems.