# UL 2218A

## STANDARD FOR SAFETY

Impact Resistance of Roofing Systems

UL Standard for Safety for Impact Resistance of Roofing Systems, UL 2218A

First Edition, Dated August 2, 2019

***SUMMARY OF TOPICS***

***The First Edition of ANSI/UL 2218A, dated August 2, 2019, test method provides impact resistance data for the evaluation of low slope roofing systems.***

The new requirements are substantially in accordance with Proposal(s) on this subject dated April 19, 2019.

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## Standard for Impact Resistance of Roofing Systems

**First Edition**

**August 2, 2019**

This ANSI/UL Standard for Safety consists of the First Edition.

The most recent designation of ANSI/UL 2218A as an American National Standard (ANSI) occurred on August 2, 2019. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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## INTRODUCTION

### 1 Scope

1.1 This test method provides impact resistance data for the evaluation of low slope roofing systems. For purposes of this standard, roofing systems consist of various component materials installed on combustible or noncombustible decking.

1.2 Impact resistance testing for the evaluation of prepared roof covering materials are covered under UL 2218, Impact Resistance of Prepared Roof Covering Materials.

1.3 The test evaluates the effect of impact from the steel ball at locations on the assembly selected to be most vulnerable, such as (but not limited to) edges, corners, unsupported sections and joints.

1.4 This test method does not evaluate the effect of weathering, temperature, aging or similar effects on the impact resistance of roofing system components. These and other factors, including time, roof slope, roof system configuration and application influence the performance of roofing materials in the field. It is not the objective of this test to address all of these factors.

### 2 Units of Measurement

2.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

## PERFORMANCE

### 3 General

3.1 Representative samples of the roof covering system construction, assembled to test decks as described in Preparation of Samples, Section 4, are to be subjected to the impact tests described in Test Apparatus, Section 5, and Test Procedure, Section 6.

### 4 Preparation of Samples

#### 4.1 General

4.1.1 Representative samples of a roof covering system are to be applied, as described in 4.3, to test decks constructed as described in 4.2. The assemblies are to be conditioned in accordance with 4.4 prior to testing.

#### 4.2 Preparation of test decks

4.2.1 The test decks are to be 3 ft by 3 ft (0.91 m by 0.91 m) consisting of 15/32 in (11.9 mm) thick plywood securely nailed to a trade size 2- by 4-in [nominal 1-1/2 by 3-1/2 in (38.1 by 89 mm)] wood batten frame, with an additional trade size 2- by 4-in vertical support batten, midspan of the deck. The plywood is to be PS-1 Grade exterior, placed "A" side up. The perimeter battens are to be located under and flush with the outer edges of the deck.

#### 4.3 Application

4.3.1 The roof covering material to be tested is to be applied in accordance with the manufacturer's instructions to the test deck. The material is to extend to and be flush with the edges of the deck.

### 4.4 Conditioning

4.4.1 The test assemblies are to be stored indoors at a temperature of 73.4 ±3.4°F (23.0 ±1.8°C) for the period of time necessary to cure the material as determined by the test sponsor; or stored under other conditions until moisture determinations indicate that the deck lumber has a maximum 12 percent moisture content. Test decks are to be stored so that each will be surrounded by freely circulating air.

## 5 Test Apparatus

5.1 The test apparatus shall be as described in the Standard for Impact Resistance of Prepared Roof-covering Materials, UL 2218, Section 5, Test Apparatus, and in accordance with the steel ball diameters and drop heights shown by Table 5.1 below.

**Table 5.1**
**Drop height and kinetic energy**

| Class | Steel ball diameter | | Distance | | Kinetic energy | |
|---|---|---|---|---|---|---|
| | Inches | (mm) | Feet | (m) | ft-lbf | (J) |
| 1 | 1-1/4 | (31.8) | 12.0 | (3.7) | 3.53 | (4.78) |
| 2 | 1-1/2 | (38.1) | 15.0 | (4.6) | 7.35 | (9.95) |
| 3 | 1-3/4 | (44.5) | 17.0 | (5.2) | 13.56 | (18.37) |
| 4 | 2 | (50.8) | 20.0 | (6.1) | 23.71 | (32.12) |



## 6 Test Procedure

6.1 Tests are to be conducted in a room at a temperature of 73.4 ±7.3° F (23.0 ±4.0° C). Each test assembly is to be subjected to a series of two coincident drops from a specific size steel ball at each of six locations selected based upon examination for vulnerability. These locations are to include but not be limited to edges, corners, unsupported areas, overlaps and joints. The drop shall be considered coincident when the approximate center of the impact depression of the second drop is measured to be within 1/2 in (12.7 mm) of the first.

6.2 After the assembly has been subjected to all drops at the selected impact locations the roofing system is to be carefully examined on the top surface at the impacted areas.

6.3 Visual damage observations are to be facilitated by examining the samples under 5X magnification and the observations recorded for each impact location, based upon the acceptance criteria in Section 7 and the report information specified in Section 8.

## 7 Acceptance Criteria

7.1 The roof covering system is to be examined after being subjected to the test procedure described in Section 6, Test Procedure. The roof covering system exposed surface shall show no evidence of tearing, fracturing, cracking, splitting, rupture, crazing or other evidence of opening.

## REPORT

## 8 General

8.1 The report shall include the following:

a) Description of the sample preparation and deck construction;

b) Description of the sample;

c) Sample conditioning procedure, including duration of cure time;

d) Size of steel ball and impact locations;

e) Observations and measurements of each impact location, including:

1) Any tearing, fracturing, cracking, splitting, rupture, crazing, or other evidence of opening of the roofing system outermost layer.

2) Under layers/components examined for any tearing, fracturing, cracking, splitting, rupture, crazing, or other evidence of damage to the roofing system.

3) Any chipping or spilling of concrete tile or fiber cement roofing systems.

f) Determination of pass or fail.

## 9 Classes of Prepared Roof Coverings for Impact Resistance

9.1 Prepared roof coverings evaluated in accordance with this method are of the following four classes (also as shown in Table 5.1):

a) *Class 1* – Passes acceptance criteria of 1-1/4 in diameter ball.

b) *Class 2* – Passes acceptance criteria of 1-1/2 in diameter ball.

c) *Class 3* – Passes acceptance criteria of 1-3/4 in diameter ball.

d) *Class 4* – Passes acceptance criteria of 2 in diameter ball.