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Standard Specification for Export Packaged Laboratory Apparatus[1]

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INTRODUCTION

This specification is proposed as a performance standard to be met for items that will be exported. The standard would apply only when requested by the buyer.

1. Scope

1.1 This specification covers the procedures for testing loaded shipping containers. Drop, vibration and compression tests are performed to measure the ability of the shipping container to protect the product from shock, vibration and compressive forces encountered during normal export handling and shipping conditions. This specification is not intended to supplant material specifications or existing preshipment test procedures. This specification is not intended for use with hazardous materials.

1.2 These procedures are suitable for all types of laboratory apparatus, including reusable and disposable macro and micro products.

1.3 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.4 The following precautionary caveat pertains only to the test method portion, Section 4, of this specification: *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D642 Test Method for Determining Compressive Resistance of Shipping Containers, Components, and Unit Loads

D685 Practice for Conditioning Paper and Paper Products for Testing

D999 Test Methods for Vibration Testing of Shipping Containers

D1083 Test Methods for Mechanical Handling of Unitized Loads and Large Shipping Cases and Crates (Withdrawn 2001)[3]

D3951 Practice for Commercial Packaging

D4169 Practice for Performance Testing of Shipping Containers and Systems

D5276 Test Method for Drop Test of Loaded Containers by Free Fall

3. Requirements

3.1 Three individual shipping containers, or one unit consisting of two or more overpackaged individual units are required. Each specimen shall be run through the sequence of tests, in the order given.

3.2 Condition test specimens in accordance with Practice D685. Standard conditions must be maintained throughout the test sequence.

3.3 The packaging shall comply with Practice D3951 except cleanliness of laboratory apparatus shall be as required by the Product Standard, the Quality Assurance Standard, or as agreed upon between the manufacturer and the purchaser.

4. Procedure

4.1 Determine the test levels in accordance with Practice D4169.

4.2 For items less than 100 lb, perform drop test in accordance with Test Method D5276.

4.2.1 Determine the drop test levels of the specimen from the following:

[1] This specification is under the jurisdiction of ASTM Committee E41 on Laboratory Apparatus and is the direct responsibility of Subcommittee E41.01 on Laboratory Ware and Supplies.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] The last approved version of this historical standard is referenced on www.astm.org.

Gross Weight, lb (kg)	Drop Height, in. (mm)
0 to 20 lb (0 to 9.1 kg)	24 in. (610 mm)
20 to 40 lb (9.1 to 18.1 kg)	21 in. (533 mm)
40 to 60 lb (18.1 to 27.2 kg)	18 in. (457 mm)
60 to 80 lb (27.2 to 36.3 kg)	15 in. (381 mm)
80 to 100 lb (36.3 to 45.4 kg)	12 in. (305 mm)

4.2.2 Perform the following drop sequence: bottom at twice specified height; bottom long edge at specified height; bottom adjacent short edge at specified height; bottom corner at specified height; bottom diagonal opposite corner at specified height; and top at specified height.

4.3 For drop test items more than 100 lb, proceed with the following (Test Methods D1083):

4.3.1 Determine the drop test levels in accordance with Practice D4169:

Gross Weight	Drop Height
100 to 500 lb	2 in.
500 lb and Over	9 in.

4.3.2 Perform the following drop sequence: one drop on each bottom edge. The total number of drops shall be four.

4.4 Perform the compression test in accordance with Test Method D642.

4.4.1 Compression test level in accordance with Practice D4169 where $F = 4.4$ and $H = 120$ in.

4.4.2 Use the following test level:

$$L = W\,\frac{(120 - H)}{(H)} \times 4.5 \qquad (1)$$

where:

L = load,
W = weight of one shipping container, and
H = height of one shipping container in in.

5. Acceptable Criteria

5.1 *Disposable Glass*—Completion of testing without breakage occurring in any of the three units tested. In the case of bulk packed items (more than 50 in a shipping container) less than 3 % total breakage in each of the three units tested.

5.2 *All Other*—Completion of testing without breakage occurring in any of the three units tested.

5.3 Outer package must contain product and provide a degree of protection to contents. One complete retest consisting of three (3) new packages is permitted.

6. Report

6.1 Each supplier shall maintain on file laboratory test reports verifying successful testing as outlined in this specification and if required, with each order issue a certification, in writing, that states that packaging complies with this specification.

7. Keywords

7.1 apparatus; export; laboratory; packaging