



Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads¹

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^{ε1} NOTE—Units information was editorially corrected in March 2015.

INTRODUCTION

During construction and occupancy of a building, floor and roof sheathing are subjected to concentrated loads that frequently govern the thickness required. Static loads may simulate either foot traffic, or loads from fixtures, when applied through loading disks of appropriate size. Impact loads will occur during construction and also in service.

Roof sheathing and subflooring are likely to be critical in strength or stiffness, or both, under foot traffic and construction loads, while single-layer floors are generally critical under fixture loads, foot traffic, and in-service impact loads. Subfloors, like single floors, must also support fixture loads, but they will have an additional layer of material, such as underlayment above, which will help to distribute concentrated loads.

1. Scope

1.1 This test method covers procedures for determining the resistance to deflection and damage of floor and roof sheathing used in site-built construction subjected to concentrated static loads as well as impact loads from nonrigid blunt objects. It is applicable to wood and wood-based panels and boards, but is not intended to cover profiled metal decks, nor precast or cast-in-place slabs. Surface indentation is not evaluated separately from deflection.

1.2 Three applications are covered: roof sheathing, subfloors, and single floors. Roof sheathing is tested in both a dry and a wet condition, while subfloors and single floors are both tested in a dry condition, as well as a condition of having dried out after being wet. These moisture conditions are those commonly experienced with site-built construction.

NOTE 1—Where it is anticipated that sheathing will be subjected only to dry conditions during construction and use, or else to greater moisture exposure than is indicated in 7.3.2, the corresponding exposure conditions may be modified by agreement between the interested parties. For example, shop-built construction may be tested dry only, although the possibility of exposure to high humidity or leaks and flooding during use should be considered.

¹ This test method is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.11 on Horizontal and Vertical Structures/Structural Performance of Completed Structures.

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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 *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

D1517 Terminology Relating to Leather

E575 Practice for Reporting Data from Structural Tests of Building Constructions, Elements, Connections, and Assemblies

E631 Terminology of Building Constructions

2.2 *Other Standards:*

Fed. Spec. V-T-291E(1) Linen Thread³

3. Terminology

3.1 See Terminology E631 for terms related to this standard.

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 Available from DLA Document Services, Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, <http://quicksearch.dla.mil>

4. Summary of Test Method

4.1 Roof and floor sheathing specimens are subjected to concentrated loads applied through a 3-in. (76-mm) or a 1-in. (25-mm) diameter loading disk, depending on the intended use and the properties to be evaluated. They are also subjected to the impact of a shot-filled drop bag. Specimens are tested in a horizontal position, mounted on fully supported framing members and with loads applied to the top surface near an edge, or at a location determined to be more vulnerable. Any support framing may be used that is representative of the anticipated service, as the framing is not considered a major test variable.

5. Significance and Use

5.1 The procedures outlined will provide data that can be used to evaluate the structural performance, under concentrated loads, of roof and floor sheathing, separate from the effects of the framing, under simulated conditions representative of those in actual service.

5.2 The procedures are intended to be applied to roof or floor sheathing materials installed directly to framing. They are not intended for the evaluation of the framed assembly as a whole.

6. Apparatus

6.1 *Concentrated Load*—The apparatus for the concentrated load test shall conform to the following requirements (see Fig. 1):

6.1.1 *Supports*—The framing members shall be supported in order not to deflect under the applied loads. The support system shall include provisions for rigidly restraining the ends of the framing members, as with blocking and clamps, to prevent rotation or vertical movement during testing.

6.1.2 *Loading Device*—Any convenient means may be used for applying a compressive load up to ultimate, and for measuring the load within $\pm 1\%$ accuracy. Load shall be applied through a ball-and-socket joint to assure even application.

6.1.3 *Loading Disks*—Two steel disks are required, one having a diameter of 1 in. (25 mm), representing a concentrated load, and one of 3 in. (76 mm) representing foot traffic, each with a thickness of at least 0.50 in. (13 mm). The edge of the loading disk contacting the test specimen shall be rounded to a radius not exceeding 0.06 in. (1.5 mm).

6.1.4 *Deflection Gage*, mounted on a rigid tripod whose legs rest on the sheathing immediately above the framing members

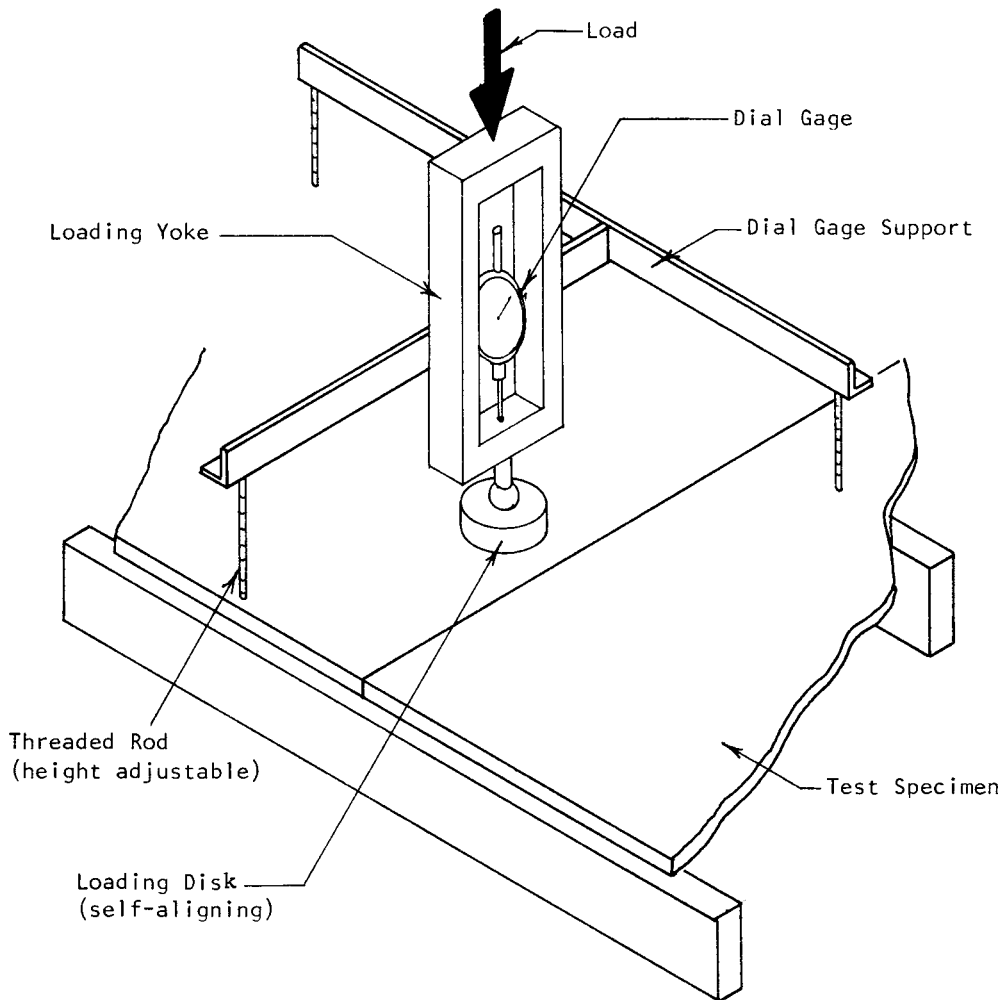


FIG. 1 Concentrated Static Load Apparatus

that are adjacent to the load point (Fig. 1). The deflection gage should have a range exceeding the maximum anticipated deflection, have a maximum error of $\pm 1\%$, and be graduated to 0.001 in. (0.02 mm).

6.2 Impact Load—The apparatus for the impact load test shall conform to the requirements of 6.1.1 – 6.1.4. In addition, the following equipment shall be used:

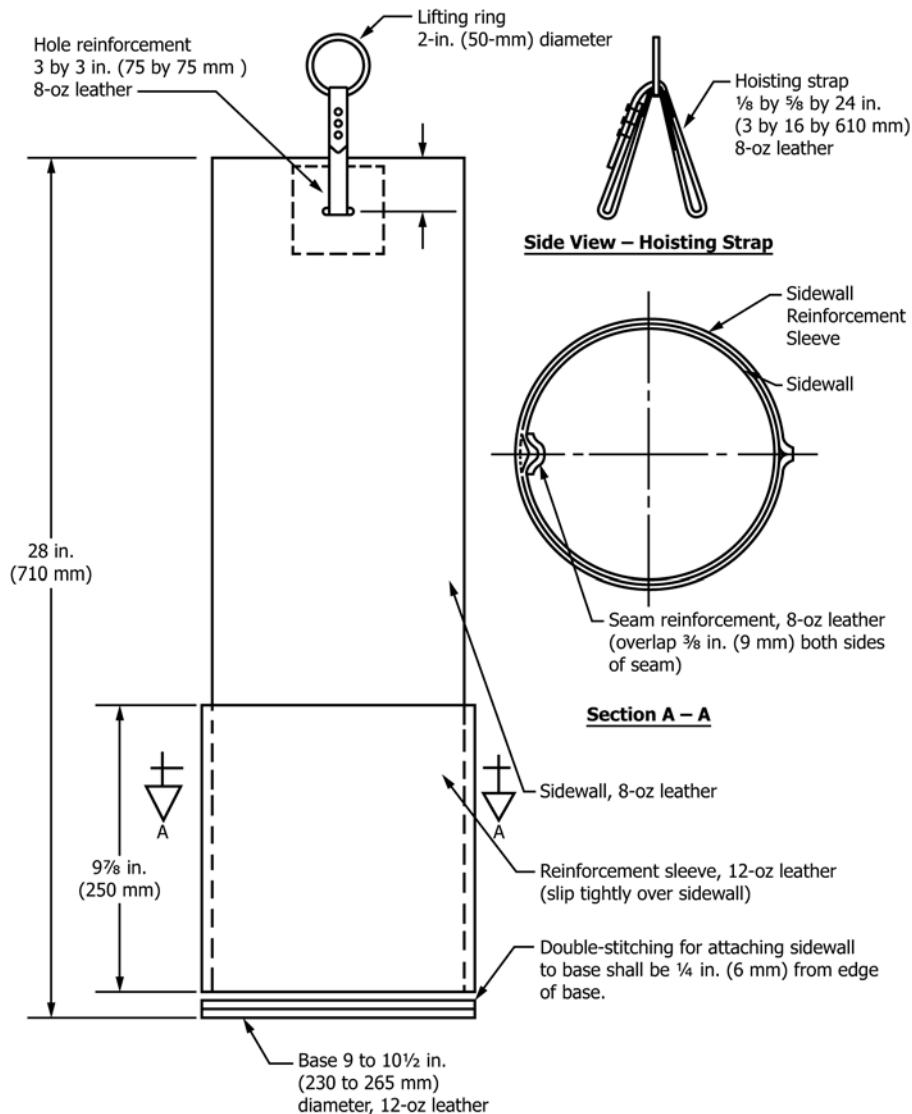
6.2.1 Drop Bag—The bag shall be constructed as in 6.2.1.1 – 6.2.1.3 (see Fig. 2).

6.2.1.1 Leather—The leather used in construction of the bag shall be harness leather (oak tanned from packer hides) or latigo leather (alum and vegetable tanned), or both. It shall be selected from a back or a side to contain enough area of the required thickness. Leather thickness shall be expressed in

ounces (1 oz = $\frac{1}{64}$ in. (0.4 mm)). The above terms are explained in Terminology D1517.

6.2.1.2 Thread—Thread used to fabricate the bag shall be linen, of four or more plies, meeting the requirements for Type B, Class 1 or 2, of Fed. Spec. V-T-291E(1).

6.2.1.3 Fabrication—The bag shall be 28 in. (710 mm) high by 29 in. (735 mm) in circumference, with a sidewall of 8-oz leather $\frac{1}{8}$ in. (3 mm) thick. The vertical edges shall be sewn together flesh side out and the seam shall be reinforced with a piece of 8-oz leather overlapping $\frac{3}{8}$ in. (9 mm) on each side. The side shall then be turned hair side out and sewn to the bottom. The base (bottom disk) shall be 9 to 10½ in. (230 to 265 mm) in diameter of 12-oz leather $\frac{3}{16}$ in. (5 mm) thick. The seam attaching the sidewall to the base shall be $\frac{1}{4}$ in. (6 mm)



(1) Leather—Use harness leather (oak-tanned from packer hides) or latigo leather (alum and vegetable tanned) (see Terminology D1517 for definitions of terms) (1-oz leather = $\frac{1}{64}$ in. (0.4 mm) thick).

(2) Thread—Use linen thread (minimum four-ply) in accordance with Fed. Spec. V-T-291E(1), Type B, Class 1 or 2. Double-stitch sidewall seam and seam attaching sidewall to base.

(3) Metal Shot—Use shot (0.039 to 0.138-in. (1 to 3.5-mm) diameter). Fill bag with shot and cover with two layers of 3-in. (76-mm) foam rubber. Adjust total weight of assembly to 30 lb (13.6 kg) $\pm \frac{1}{2}\%$, or more, when specified (see 6.2.1.4).

FIG. 2 Leather Drop Bag Assembly