



Designation: E661 – 22

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

This standard is issued under the fixed designation E661; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

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.

1.3 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

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 Standard:³

Fed. Spec. A-A-50197A Linen, Thread

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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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 U.S. General Services Administration, 1800 F Street, NW Washington, DC 20405, <https://fedspecs.gsa.gov>.

3. Terminology

3.1 See Terminology E631 for terms related to this standard.

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

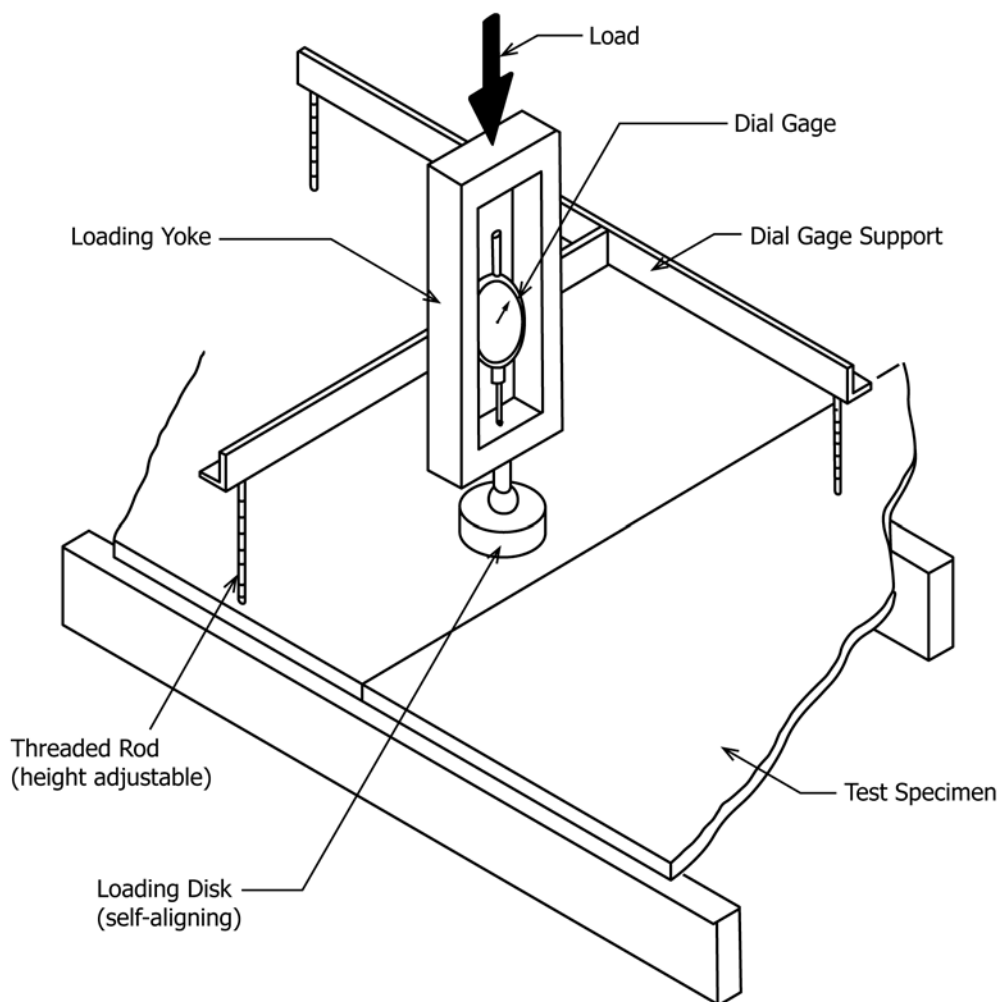


FIG. 1 Concentrated Static Load Apparatus