INTERNATIONAL STANDARD

ISO 16507

First edition
2013-09-01

Timber structures — Uniform, concentrated static and concentrated impact loads on wood-based roof and floor panel assemblies — Test methods

Structures en bois — Assemblages de panneaux en bois pour toitures et planchers sous charges concentrées et réparties, statique et par impact — Méthodes d'essais

Reference number
ISO 16507:2013(E)

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Published in Switzerland

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 165, *Timber structures*.

Introduction

During construction and occupancy of a building, floor and roof sheathing are subjected to uniform and concentrated static and impact 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. Uniform loads may simulate snow, wind, or occupancy loads.

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.

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

The concentrated static and impact test procedures are based upon ASTM E661-03[5]. The uniformly distributed load test is based upon NIST Voluntary Product Standard PS 1-09[3].

Annex A contains non-mandatory sampling and product performance guidelines that correspond to span rating categories found in PS 1, PS 2, and CSA O325. These three structural wood-based panel standards have been referenced in North American building codes for several decades. Over this period of time, the performance guidelines established in these standards have resulted in reliable and satisfactory in-service structural performance.

Timber structures — Uniform, concentrated static and concentrated impact loads on wood-based roof and floor panel assemblies — Test methods

1 Scope

This International Standard is applicable to determining the resistance to deflection and damage of wood-based panels subjected to concentrated impact loads from nonrigid blunt objects, concentrated static loads, and uniformly distributed loads. Surface indentation is not evaluated separately from deflection.

The procedures are intended to simulate loading on roof or floor sheathing materials installed directly to framing. Three applications are covered: roof sheathing, subfloors, and single floors. Panels are tested parallel and/or perpendicular to the panel strength axis. 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.

These procedures do not cover vibration and are not intended for the evaluation of the framed assembly as a whole.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
subfloor
panel that provides the structural integrity of the floor and is directly fastened to the floor framing, in conventional timber framing

3.2
underlayment
panel that provides a smooth surface for direct installation of non-structural finish floor covering, in conventional timber framing

3.3
single floor
panel that performs the function of subfloor and underlayment

3.4
span rating
index number, based on customary inch units, that identifies the recommended maximum centre-to-centre support spacing for the specified end use under normal use conditions

Note 1 to entry: Spans are defined for end uses such as roof, subfloor, and single floor. As a matter of convention, spans are typically specified by a single index number for single floor (e.g. Floor 24 o.c.), while roof and subfloor are often combined in a fractional format (e.g. 32/16).

EXAMPLE A span rating of 32/16 designates a roof span of 813 mm (32 inches) and a subfloor span of 406 mm (16 inches).

4 Symbols

d distance from outer support to the point of maximum deflection for a uniformly loaded two-span system, in mm

S test assembly span as measured from centre to centre of supports, in mm

W specimen width, in mm

5 Specimen conditioning

5.1 Dry

Conditioning to either constant weight or moisture content, or for at least 2 weeks at (20 ± 2) °C and (65 ± 5) % relative humidity.

NOTE 1 Tables A.1 and A.2, footnote a contain alternate conditions for Dry.

NOTE 2 The conditions specified in 5.1 may result in higher results than the conditions permitted for Dry in Tables A.1 and A.2, footnote a.

5.2 Wet

Conditioning to a continuous water spray for three days, applied to the top surface of the specimen at a rate such as to keep this surface continuously wet. The position of the specimen shall preclude water ponding on it, or immersion of any portion.

NOTE A simplified spray tank may be used to support the sheathing in a near vertical position during exposure to the water spray. The tank should be fitted with drains so that water spray does not accumulate, and the sheathing should be placed on blocks to elevate its lower edge above the residual water in the tank bottom.

5.3 Redried

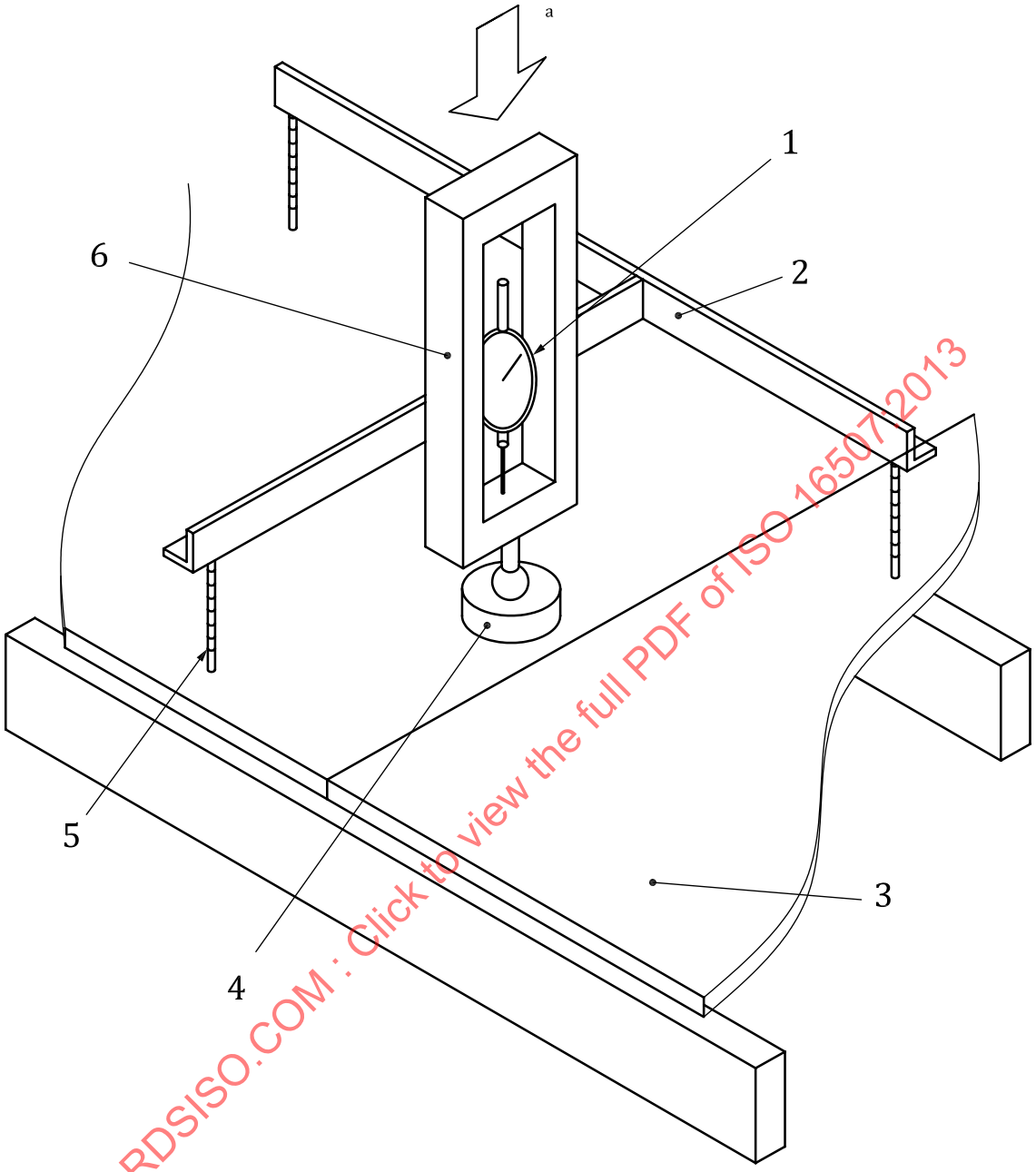
Wet conditioning per 5.2 followed by dry conditioning per 5.1.

NOTE The use of a fan is recommeneded in order to dry specimens to a constant weight or moisture content.

6 Concentrated static load test

6.1 Apparatus

The apparatus for the concentrated load test shall conform to Figure 1 and 6.1.1 to 6.1.4. Alternative methods for measuring deflection shall be permitted (see 6.1.4).



Key

1 dial gauge
2 dial gauge support
3 test specimen
4 loading disk (self-aligning)
5 threaded rod (height adjustable)
6 loading yoke
a Load.

Figure 1 — Concentrated static and impact load apparatus

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, 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 1 % accuracy. Load shall be applied through a ball-and-socket joint to ensure even application.

6.1.3 Loading disk

Two steel disks are required: one having a diameter of 25 mm, representing a concentrated load, and one of 76 mm, representing foot traffic, each with a thickness of at least 13 mm. The edge of the loading disk contacting the test specimen shall be rounded to a radius not exceeding 1,5 mm. Disk diameters in Table 1 shall be used for evaluating strength per 6.3.2. The 76-mm-diameter disk shall be used for evaluating stiffness per 6.3.1.

Table 1 — Disk diameters for concentrated load strength

Dimensions in millimetres

Conditioning	Application		
	Roof	Subfloor	Single floor
Wet	76	76[a]	76[a]
Dry	76	76	25
Redried		76	25

[a] Testing in the wet condition for subfloors and single floors is not common, and is not required in Annex A.

6.1.4 Deflection gauge

The deflection gauge shall be mounted on a rigid tripod whose legs rest on the sheathing immediately above the framing members that are adjacent to the load point (Figure 1). Alternatively, other deflection measuring devices capable of measuring panel deflection separately from deformation of the test apparatus (e.g. supporting frame, load head, etc.) shall be permitted. The deflection gauge shall have a range exceeding the maximum anticipated deflection, have a maximum error of less than 1 %, and have a resolution not more than 0,03 mm.

6.2 Specimen preparation

The specimen shall be installed and its test points are located in the framing assembly per Figure 2. The specimen length perpendicular to the main framing members shall conform to the centre-to-centre spacing, *S*, anticipated in service. Where sheathing is continuous over more than one span, its length shall be equal to the minimum number of spans permitted or recommended for the product used and its intended application, multiplied by the centre-to-centre spacing of the framing members.

The specimen width shall be at least 595 mm for spans up to 610 mm. For greater spans, the specimen width shall be either 1 220 mm or the full panel width, which ever is less. The specimen width shall conform to its nominal full panel width when edges are fully supported. When edges are unsupported or partially supported, the specimen may be trimmed to a width not less than 595 mm.

The specimen shall be cut to the required size prior to conditioning. The specimen shall be conditioned to either dry, wet, or redried (see 5.1 to 5.3).

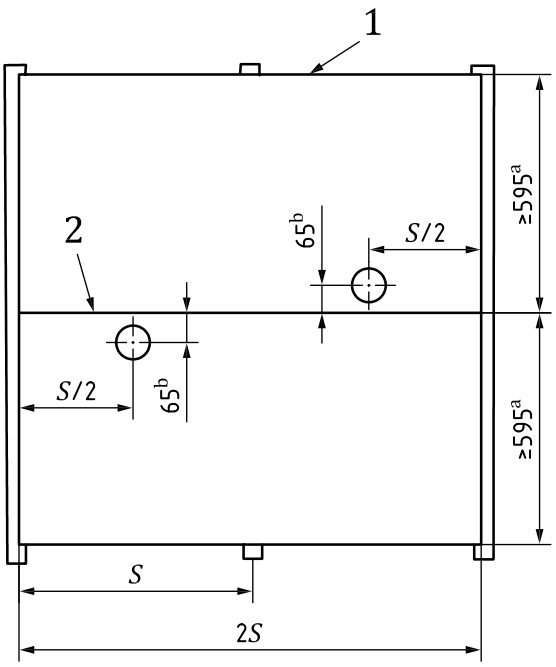
The conditioned specimen shall be installed using the type of framing, fastener schedule, and installation details as planned for use in service. After fabrication, test specimens promptly at ambient laboratory conditions.

Specimens may be used for more than one test provided the test locations are at least 455 mm apart (measured parallel to the framing), occur in different spans (see Figure 2), and show no sign of damage from other tests.

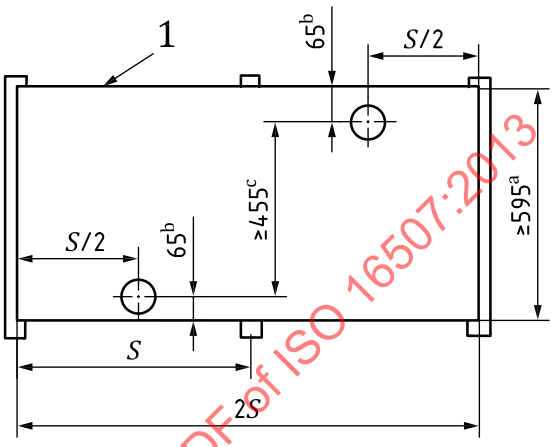
NOTE 1 Annex A contains recommended specimen conditioning requirements

NOTE 2 Where the specimen is installed on wood framing, the framing may be of any species and grade commonly used in construction that has a specific gravity of 0,40 to 0,70, oven-dry basis, with a maximum moisture content of 19 %. If nails are used, they may be double-headed to simplify the disassembly of the specimen upon completion of testing, providing such nails will not damage the testing equipment. Framing may be reused for more than one test, provided it has not been significantly damaged by previous testing. Steel framing and cleats simulating nails may be used instead of wood framing.

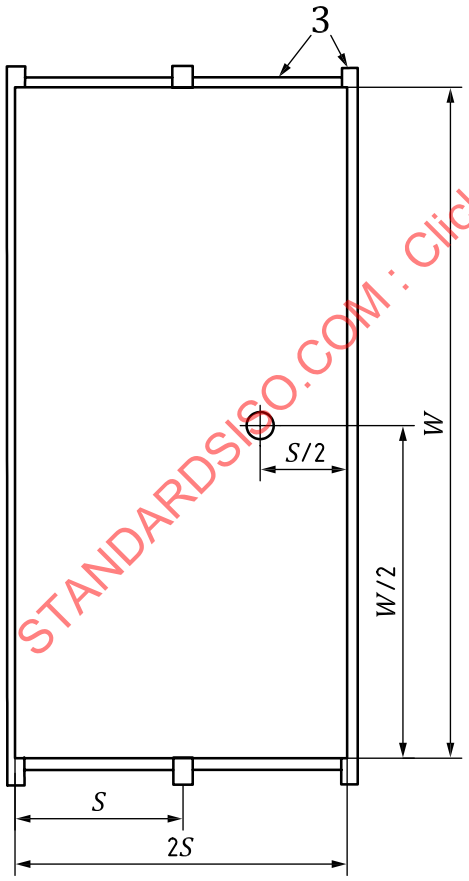
Dimensions in millimetres

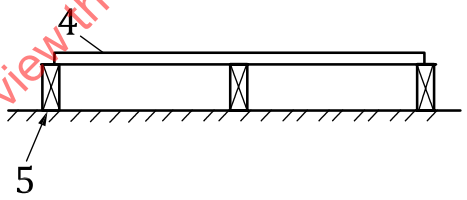


a) Edges partially supported



b) Edges not supported





c) Edges fully supported

Key

1 unsupported edges
2 partially supported edge (T&G, edge clips or similar)
3 framing members
4 sheathing
5 framing members, ends clamped to prevent rotation or vertical movement during testing (framing supported at test locations)
⊕ test location

a 23 ½ in, min.
b 2 ½ in
c 18 in, min.

NOTE Symbols used in Figure 2 are defined in Clause 4.

Figure 2 — Concentrated static load test locations

6.3 Procedure

The concentrated static load shall be applied at one location on the top surface of the specimen, midway between framing members per Figure 2. If the edge of the specimen is fully supported between main framing members, apply the concentrated load at midwidth. If the edge is unsupported, or partially supported, as with clips or a tongue and groove joint, apply the load 65 mm in from the unsupported or partially supported edge as shown in Figure 2.

6.3.1 Stiffness

Load the specimen with the 76-mm-diameter loading disk, to produce deflection at a rate of 2,5 mm/min. Measure the net deflection between 0 N and 890 N. Alternatively, to reduce the effects of specimen settling, measure the net deflection between a preload of 100 N and 990 N. Remove the deflection measuring device. If testing single floor, remove the load and replace the 76 mm disc with the 25 mm disc. Continue to strength testing in 6.3.2.

NOTE The specimen may be seated before commencing the test by loading the specimen to 250 N, then removing the load.

6.3.2 Strength

Following stiffness testing, loading shall be applied at a continuous rate so as to produce the maximum load in 300 s ± 120 s. Record the maximum load.

NOTE The load at which the first significant break on top, the bottom, or both surfaces of the specimen is detected may be recorded. A significant break of the sheathing is defined as a fracture that propagates into or through the specimen, or other deformation that affects its basic stiffness or strength. Minor leafing of the surface which may occur at the test location is not considered a significant break.

6.4 Report

The report shall include the following:

a) specimen thickness after conditioning at the test point;

b) detailed description of the test assembly, including framing and fastening schedule, and other pertinent construction details;

c) conditioning;

d) loading disk size;

e) location of test points;

f) the preload, if used;

g) the sample minimum, maximum, and average deflection under a net 890 N concentrated load;

h) the sample minimum, maximum, and average ultimate concentrated load;

i) the sample minimum, maximum, and average concentrated static load, at which the first significant break on top, bottom, or both surfaces of the specimen is detected (see Note in 6.3.2), if recorded;

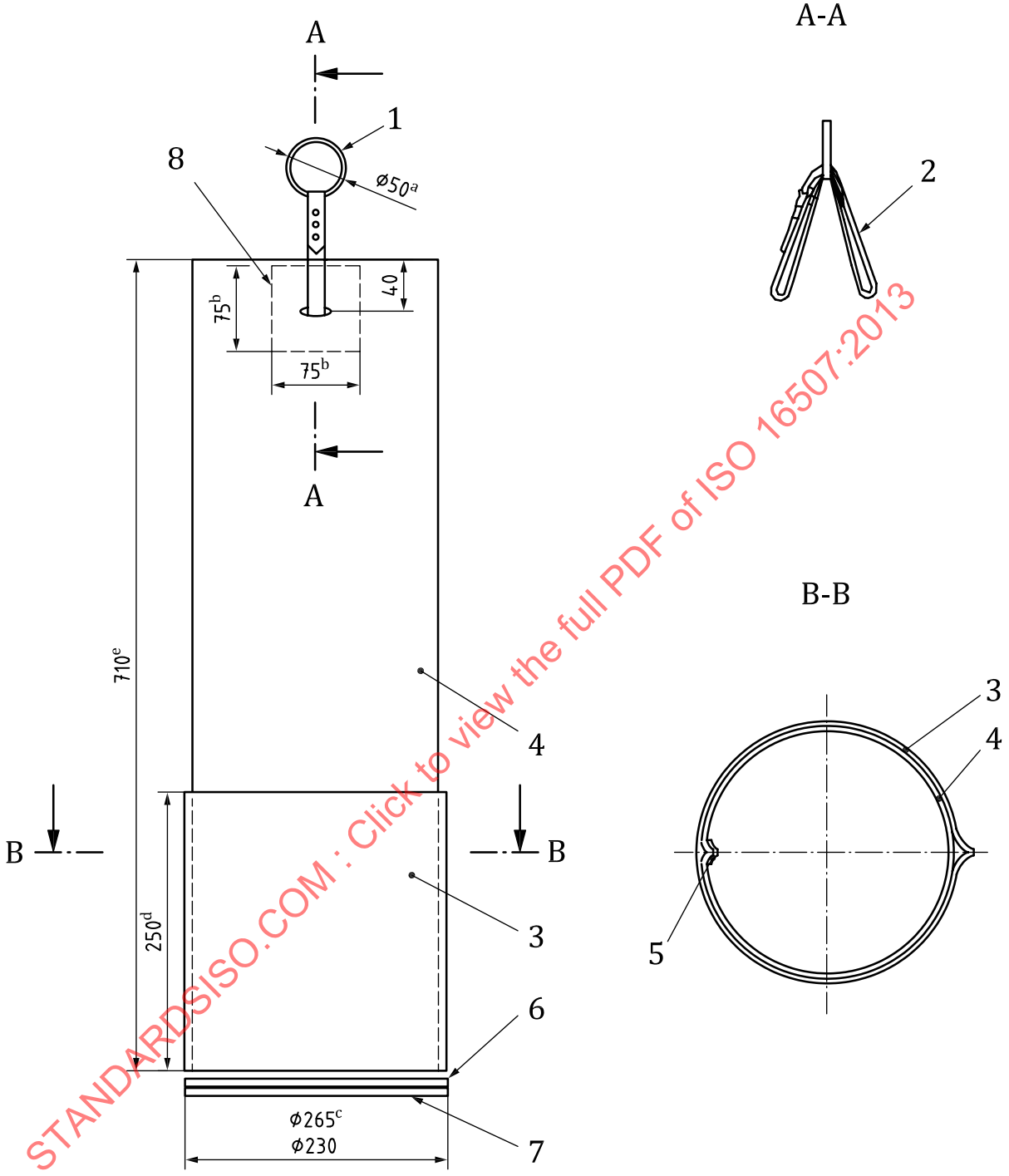
j) the moisture content at time of test.

7 Concentrated impact load test

7.1 Apparatus

The apparatus for the impact load test shall conform to the requirements of 6.1.1 to 6.1.4, in addition to the following equipment.

Dimensions in millimetres



Key

1 lifting ring, 50 mm (2 in) diameter
2 hoisting strap
3 sidewall reinforcement sleeve
4 sidewall
5 seam reinforcement, 8 oz leather [overlap 9 mm (3/8 in) both sides of seam]
6 double-stitching for attaching sidewall to base shall be 6 mm (1/4 in) from edge of base
7 base
8 hole reinforcement
a 2 in
b 3 in × 3 in, 8 oz leather
c 9 in to 10 ½ in, 12 oz leather
d 9 ½ in
e 28 in

NOTE 1 Leather — Use harness leather (oak tanned from packer hides) or latigo leather (alum and vegetable tanned) (see Terminology ASTM D 1517 for definitions of terms) [1 oz leather = 1/64 in (0,4 mm) thick].

NOTE 2 Thread — Use linen thread (minimum four-ply) per Federal Specification V-T-291, Type B, Class 1 or 2. Double-stitch sidewall seam and seam attaching sidewall to base.

NOTE 3 Metal shot — Use shot [1 mm to 3,5 mm (0,039 in to 0,138 in) diameter]. Fill bag with shot and cover with two layers of 76 mm (3 in) foam rubber. Adjust total weight of assembly to 13,6 kg (30 lb) ± 0,5 %, or more, when specified.

Figure 3 — Concentrated static impact apparatus

7.1.1 Drop bag

The bag shall be constructed as in 7.1.1.1 to 7.1.1.3, and per Figure 3.

7.1.1.1 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.

NOTE 1 The above terms are explained in ASTM D 1517 Terminology.

NOTE 2 Leather thickness is commonly expressed in ounces (1 oz = 0,4 mm).

7.1.1.2 Thread

Thread used to fabricate the bag shall be linen of four or more plies, or the equivalent.

NOTE Thread meeting the requirements for Type B, Class 1 or 2, of Federal Specification V-T-291E(1) has been found suitable for this application.

7.1.1.3 Fabrication

The bag shall be 710 mm high by 735 mm in circumfrence, with a sidewall of 8 oz leather, 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 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 230 mm to 265 mm in diameter of 12 oz leather, 5 mm thick. The seam attaching the sidewall to the base shall be 6 mm from the edge of the base. Two rows of stitching shall be used for the vertical sidewall seam and the seam attaching the sidewall to the base.

The strap to hoist the bag shall be made from 8 oz leather, 3 mm thick by 16 mm wide by 610 mm long. The strap shall be passed through holes, diametrically opposite, in the sidewalls 40 mm from the top of the wall. These holes shall be reinforced with pieces of 8 oz leather, 76 mm square. The leather strap shall be passed twice through a 50-mm-diameter lifting ring and the ends fastened by sewing, riveting, or by use of a buckle. To avoid excessive stretching of the leather sidewall or failure of the vertical seam, a sleeve, made from 12 oz leather, of the same type as the base of the bag, shall be fitted to slip tightly over the lower portion of the bag.

NOTE The sleeve should be 250 mm high.

The bag shall be loosely filled with metal shot or pellets with diameters of 1 mm to 3,5 mm. Two layers of 76-mm-thick foam rubber or similar padding shall be placed over the metal shot to prevent spillage during testing. The total weight of the drop bag and metal shot shall be adjusted per Table 2. This value shall be verified before impact tests are conducted. For spans greater than 1 220 mm, the weight of the drop bag shall be as agreed upon between the interested parties.

Table 2 — Drop bag weights for impact load test

Sheathing span S mm	**Total weight of drop bag (including shot)** kg
$S \leq 610$	13,6
$610 < S \leq 1\,220$	27,3
$S > 1\,220$	as agreed upon between the interested parties

7.1.2 Measuring rod

A measuring rod, graduated in 152 mm increments and equipped with a sliding pointer, shall be used to measure the drop height of the bag.

7.2 Specimen preparation

Specimen prepartion shall be per 6.2.

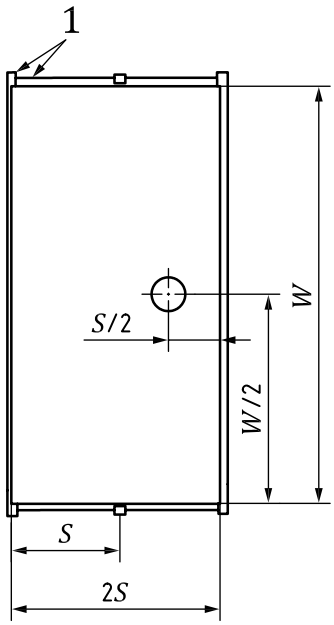
7.3 Procedure

7.3.1 Test location

Apply the impact load at the most severe location per Figure 4 or otherwise determined by preliminary testing of representative specimens. When the bag is dropped near an unsupported or partially supported edge, the impact point shall be 152 mm in from the edge. The weight of the drop bag shall be as specified in Table 2.

NOTE The most severe location may be that which causes either maximum shear stresses or maximum flexural stresses. The former will normally occur near a rigid support. The latter will normally occur midway between framing members. If the sheathing edge is fully supported between main framing members, the critical flexural point will be at midwidth; if the edge is unsupported or partially supported, as with clips or a tongue and groove joint, the critical flexural point will more likely be near the edge.

Dimensions in millimetres



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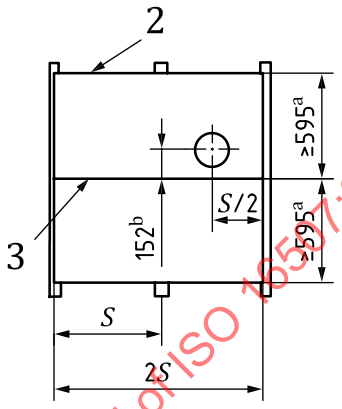

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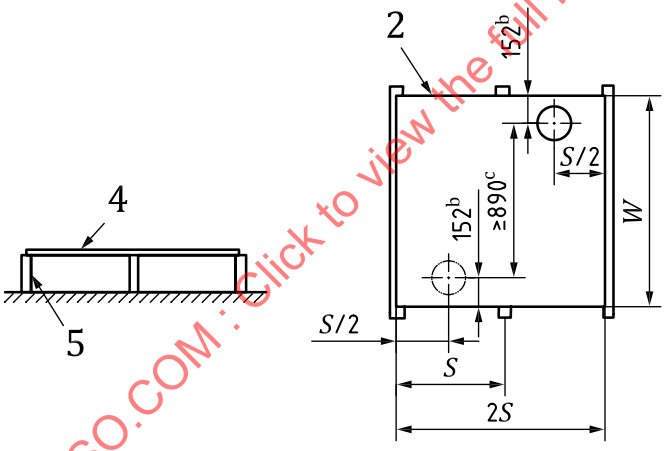


c) Edges not supported

Key

1	framing (typical)	⊕	test location
2	unsupported edge (typical)	⊕	additional test location
3	partially supported edge (T&G, edge clips or similar)	a	23 ½ in, min.
4	sheathing	b	6 in
5	framing members, ends clamped to prevent rotation or vertical movement during testing, framing supported at test locations	c	35 in, min.

NOTE Symbols used in Figure 4 are defined in Clause 4.

Figure 4 — Concentrated impact load test locations

7.3.2 Reusing specimens

Specimens may be used for more than one test provided the test locations are at least 890 mm apart (measured parallel to the framing), occur in different spans (see Figure 4), and show no sign of damage from other tests.

7.3.3 Loading procedure

Specimens shall be tested in the following sequence:

a) Using the concentrated load test apparatus, load the specimen at the impact load point with the 76-mm-diameter loading disk to produce deflection at a rate of 2,5 mm/min. Measure the net deflection with the deflection gauge, between 0 N and 890 N. Alternatively, to reduce the effects of specimen settling, measure the net deflection between a preload of 100 N and 990 N.

NOTE 1 The specimen may be seated before commencing the test by loading the specimen to 250 N, then removing the load.

NOTE 2 Roof, subfloor, and single floor sheathing evaluated per Annex A do not require procedure a).

b) Remove the concentrated load test apparatus, and apply the impact load, using the drop bag.

c) Drop the bag each time at the test location on the top surface of the sheathing, beginning with a drop height of 152 mm and increasing in 152 mm increments during the test. The drop height shall be measured as the distance from the bottom of the bag to the top surface of the specimen.

NOTE Recommended impact values are contained in Table A.1, footnote b.

d) After each drop, apply the concentrated load as in a), and measure the net deflection.

NOTE Roof and subfloor sheathing evaluated per Annex A do not require procedure d). Single floor sheathing evaluated per Annex A only requires procedure d) following the final drop height.

e) Load the specimen with the 76-mm-diameter disk, at a constant rate so as to reach a specified proof load in 300 s ± 120 s. The proof load shall be as agreed upon between the interested parties, with consideration of the intended use of the panel product. Record whether the specimen is capable of supporting the proof load, then remove the load.

NOTE The impact drop height at which the first significant break on top, the bottom, or both surfaces of the specimen is detected may be recorded. A significant break of the sheathing is defined as a fracture that propagates into or through the specimen or other deformation that affects the specimen's basic stiffness or strength. Minor leafing of the surface which may occur at the test location is not considered a significant break.

f) Continue the impact test as in b) to e) until one of the following:

1) a specified drop height is reached;

2) the specimen no longer supports the specified proof load. The drop height at which this occurs determines the ultimate impact load.

NOTE Recommended impact values are contained in Table A.1, footnote b.

7.4 Report

The report shall include information per 6.4 a) to f) in addition to the following:

a) the drop height end point (if specified) for the impact load test;

b) the drop bag weight;

c) the sample minimum, maximum, and average deflection under the concentrated load, for each impact load increment, as required;

d) percentage of specimens in the sample that supported the specified proof load after the impact test reached the specified drop height end point, if 7.3.3 f)1) is followed;

e) the sample minimum, maximum, and average bag drop height at ultimate impact load, if 7.3.3 f)2) is followed;

f) the sample minimum, maximum, and average impact drop height at which the first significant break on top, bottom, or both surfaces of the specimen is detected, if recorded.

8 Uniformly distributed load test

8.1 General

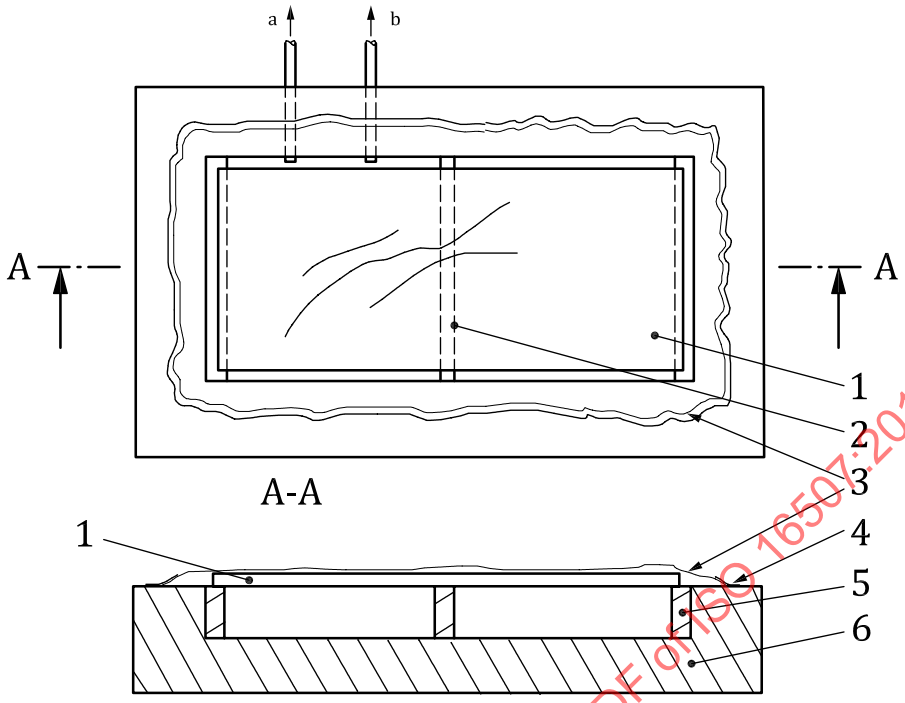
This method determines the performance of structural-use panels under uniform loads such as snow, wind, and occupancy loads. The uniform load is applied by atmospheric pressure as a vacuum is drawn under the test specimen, which is mounted on fully-supported framing members in a vacuum chamber.

8.2 Apparatus

The apparatus for the uniformly distributed load test shall conform to Figure 5 and the following requirements.

8.2.1 Vacuum chamber

The vacuum chamber shall consist of a sealed box with the specimen to be tested forming the top. A 0,15 mm (6 mil) polyethylene sheet or equivalent, the perimeter of which is attached securely with tape, shall seal the top surface of the vacuum chamber. The chamber shall be strong and rigid to resist the applied load without failure or excessive deformation. A vacuum pump shall be used to reduce the air pressure under the specimen. The load shall be measured with absolute pressure gauges for electronic data readout, but manometers or vacuum gauges shall also be permitted.



Key

1 test panel
2 framing member
3 polyethylene sheet taped to top of chamber
4 tape
5 framing member, supported to resist rotation and deflection
6 vacuum chamber
a To vacuum pump.
b To pressure gauge or manometer.

Figure 5 — Vaccum chamber

8.2.2 Joist supports

The framing members shall be supported so as to resist deflection or rotation under applied load.

8.2.3 Deflection gauges

The deflection gauges, with a minimum resolution of 0,03 mm, shall be mounted to rigid tripods whose legs rest above the joists.

8.3 Specimen preparation

The specimen length, perpendicular to the framing member, shall be equal to twice the centre-to-centre spacing. The specimen width shall be at least 595 mm.

The specimen shall be cut to the required size prior to conditioning. The specimen shall be conditioned to either dry, wet, or redried (see 5.1 to 5.3).

The specimen thickness shall be measured after conditioning and recorded.

NOTE 1 Annex A contains recommended specimen conditioning requirements.

NOTE 2 The conditions specified in 5.1 may return higher results than the conditions permitted for Dry in Tables A.1 and A.2, footnote a.

8.4 Test procedure

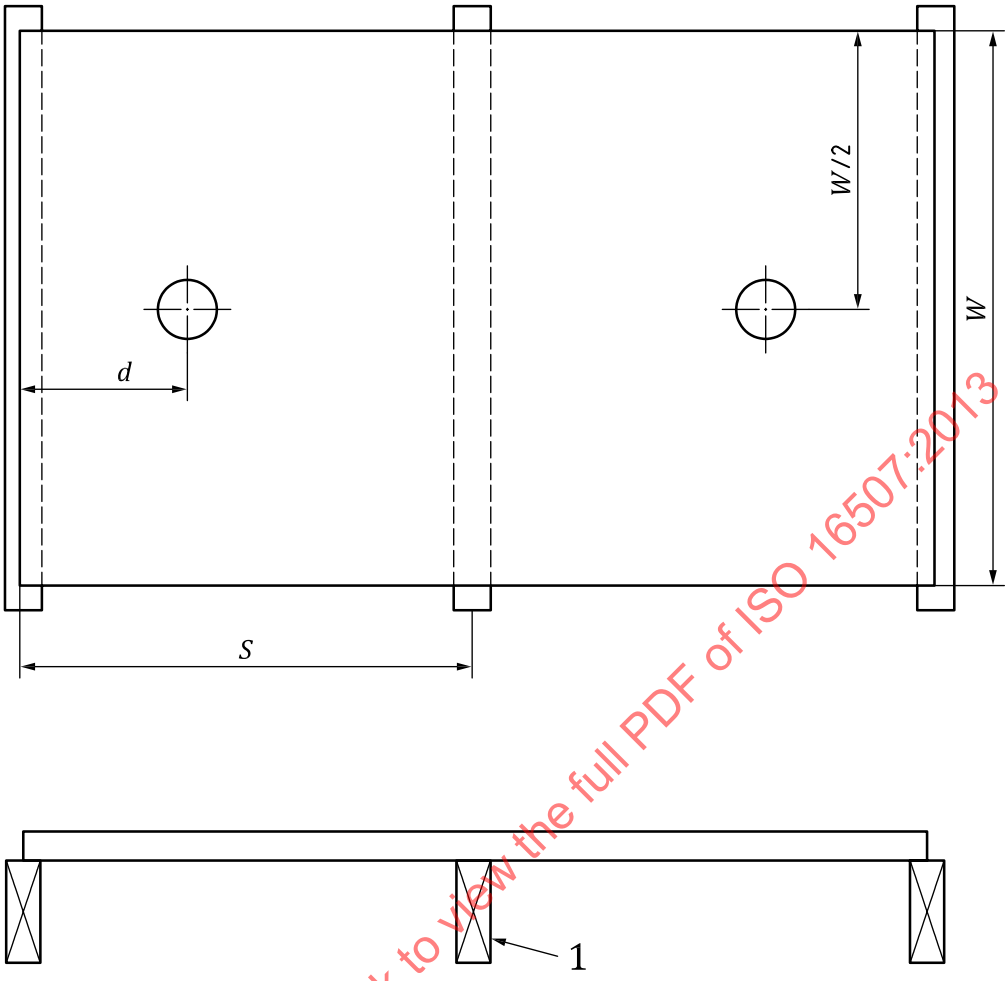
After conditioning, the specimen to be tested shall be mounted on the framing members in the vacuum chamber in accordance with the anticipated joist spacing and the recommended nail size and spacing. Testing without nails will provide conservative results and shall be permitted.

The top of the vacuum chamber shall then be sealed with the polyethylene sheet, and the tripod holding the deflection gauges set in its proper position with the gauges positioned to read deflection at the point of maximum deflection of the two outer spans per Figure 6.

NOTE 1 The point of maximum deflection for a uniformly loaded two-span system occurs at 0,421 5 (S) measured from the centerline of the outer joist, where S equals the centre-to-centre joist spacing.

The panel shall be loaded at a uniform rate of 2,4 kPa per minute and deflections continuously recorded or at 1,2 kPa increments until maximum load is achieved or until the desired proof load is achieved, as required. Deflection data shall be required only in sufficient numbers to develop the straight line portion of the load-deflection curve. In no case shall the number of data points be less than six. Deflection at a given load shall be determined by translating the slope to pass through the origin, thereby correcting for any settling of the system.

NOTE 2 Annex A contains recommended maximum deflection and proof loads requirements.



Key

1 framing member supported to resist rotation and vertical movement

NOTE Symbols used in Figure 6 are defined in Clause 4.

Figure 6 — Uniform load test specimens

8.5 Report

The report shall include the following:

a) specimen thickness after conditioning;

b) detailed description of the test assembly, including framing and fastening schedule, and other pertinent construction details;

c) specimen conditioning;

d) location of deflection points;

e) slope of the straight line portion of the load deflection curve and the deflection at the specific load required by the criteria;

f) ultimate load, or if the specimen achieved the proof load.

Annex A
(informative)

Structural performance requirements for span rating

A.1 General

This annex contains sampling and minimum performance requirements to structurally qualify a defined wood-based panel product for a given span rating (see 3.4). The panel product shall meet all the requirements of A.1.1 to A.1.3 to be designated with the corresponding span ratings contained in Tables A.1 and A.2.

NOTE Tables contain recommended, non-mandatory underlined values. Other values may be used depending on the local jurisdiction.

A.1.1 Sampling

The panel product sampled shall be defined per ISO 12465[1] for plywood or ISO 16894[2] for oriented strand board. The product description shall include, but not be limited to, species mix, panel grade, thickness, and bond classification. Panels selected for testing shall be of near minimum grade and near minimum thickness.

A.1.2 Concentrated static and impact loads

Test a maximum of 20 specimens taken from at least 10 panels. Ten specimens (taken from at least five panels) for each test exposure condition shall be evaluated for both concentrated static and impact loads according to Clauses 6 and 7. Performance and conditioning requirements are found in Table A.1. If additional tests are needed, they shall also consist of 10 specimens, and the results of the two 10-specimen sets shall be combined. Only one additional test set is allowed. If the combined results meet or exceed the minimum passing rate, the sample passes.

A.1.2.1 Deflection

The initial test set shall consist of 10 specimens.

The average deflection shall not be greater than the corresponding span rating requirement in Table A.1.

— If no more than one value is above the requirement, the sample passes.

— If two or three values are above the requirement, test an additional set.

— If four or more values are above the requirement, the sample fails.

— If 10 additional specimens are tested, the combined passing rate shall be at least 85 %.

A.1.2.2 Ultimate load

The initial test set shall consist of 10 specimens.

The average load shall not be less than the corresponding span rating requirement in Table A.1.

— If all of the values meet or exceed the requirement, the sample passes.

— If one of the values is below the requirement, test an additional set.

— If two or more values are below the requirement, the sample fails.