



Standard Performance Requirements for Plastic Chaise Lounges, With or Without Moving Arms, With Adjustable Backs, for Outdoor Use¹

This standard is issued under the fixed designation F 1988; 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.

1. Scope

1.1 These performance requirements establish nationally recognized performance requirements for Class A (residential) and Class B (nonresidential) plastic chaise lounges, with or without moving arms, with adjustable backs, intended for outdoor use.

1.2 The performance requirements are not applicable to upholstered chairs, or other types of furniture.

1.3 These performance requirements cover the performance of the product regarding aspects of outdoor weathering, impact, static load for seat and back, and arm testing.

1.4 Products may be manufactured from recycled plastics as long as the performance requirements are met.

1.5 The values stated in inch-pound units are to be regarded as the standard. The values in parentheses are for information only.

1.6 *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

- D 638 Method for Tensile Properties of Plastics
- D 2565 Practice for Xenon Arc Exposure of Plastics Intended for Outdoor Applications
- D 4329 Practice for Fluorescent UV Exposure of Plastics
- G 23 Practice for Operating Light-Exposure Apparatus (Carbon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials³

3. Terminology

3.1 Definitions:

¹ These performance requirements are under the jurisdiction of ASTM Committee F15 on Consumer Products and are the direct responsibility of Subcommittee F15.33 on Outdoor Plastic Lawn Furniture.

Current edition approved June 1, 2004. Published June 2004. Originally approved in 1999. Last previous edition approved in 1999 as F 1988 – 99.

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 Withdrawn.

3.1.1 *plastic chaise lounges with adjustable backs, n—for the purposes of these requirements, a molded, upright piece of furniture with arms, intended for seating one person, having a seat height not less than 9 in. (229 mm) and not greater than 15 in. (381 mm) with the seat and back in the most upright position; having a seat width not less than 22 in. (559 mm) and not greater than 27 in. (686 mm); and having an overall length not less than 70 in. (1778 mm) and not greater than 78 in. (1981 mm) (see Fig. 1).*

3.1.1.1 *Discussion*—These requirements are applicable to folding plastic chaise lounges with adjustable backs (see Fig. 2), non-folding plastic chaise lounges with adjustable backs (see Fig. 3), and solid stacking plastic chaise lounges with adjustable backs (see Fig. 4).

3.1.1.2 *Discussion*—Class A (residential) plastic chaise lounges are intended for outdoor use by the customer around the house.

3.1.1.3 *Discussion*—Class B (nonresidential) plastic chaise lounges are intended for outdoor use by the customer in all other areas, including those defined as Class A.

4. Significance and Use

4.1 Tests and criteria as outlined determine the overall usability and stability of chairs in an environment simulating the conditions of use.

4.2 Tests simulate two types of surfaces:

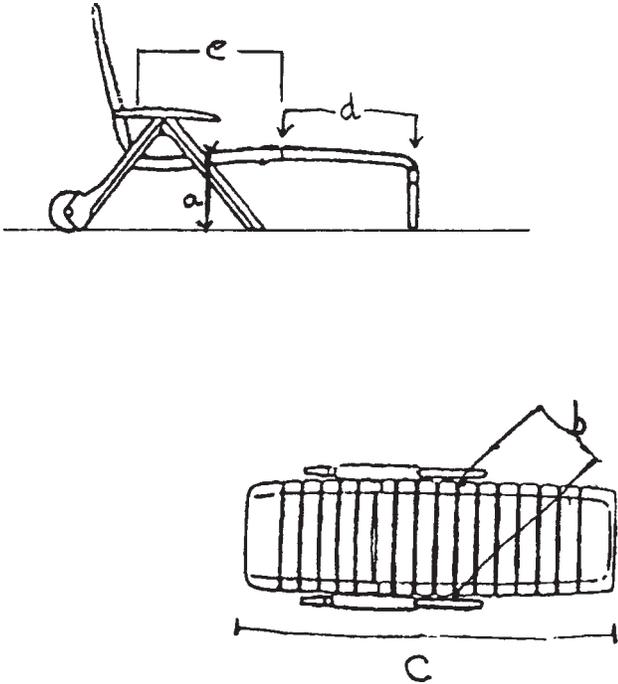
4.2.1 Smooth surfaces such as linoleum, wet pool decks, etc. The glass testing base (see Fig. 5) is used to simulate this surface.

4.2.2 Rough surfaces such as wooden decks, outdoor natural surfaces, etc. The plywood testing base (see Fig. 6) is used to simulate this surface.

5. Apparatus

5.1 *Plastic Chaise Lounges*, with or without moving arms, with adjustable backs, which have been inspected and met a manufacturer's internal quality standards.

5.2 *One-Heavy-Weight Canvas or Leather Bag*, 16 in. \pm 0.2 in. (406 mm \pm 4 mm) in diameter, which shall be measured prior to testing to determine stretching, having a total measurement not to exceed 17.5 in. (445 mm) in diameter when filled with steel or lead shot 0.09 to 0.12 in. (2.3 to 3.0 mm) in diameter) to a total weight of 150 \pm 1.5-lb (681 \pm 0.7-kg). The



NOTE 1—
 a = seat height with the chaise lounge seat and back in the most upright position,
 b = seat width,
 c = overall length,
 d = the geometric center is at the center of these points and sides of leg rest, and
 e = the geometric center is at the center of these points and sides of seat.

FIG. 1 Measurements of a Plastic Chaise Lounge

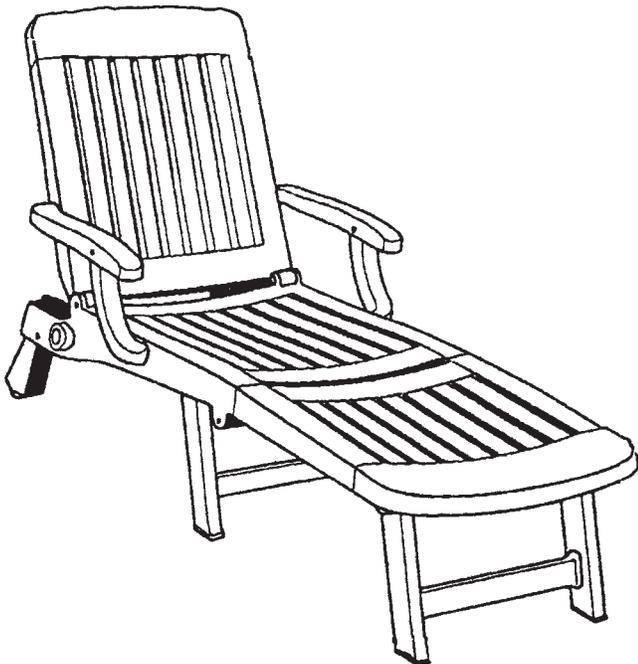


FIG. 2 Folding Plastic Chaise Lounge with Adjustable Back

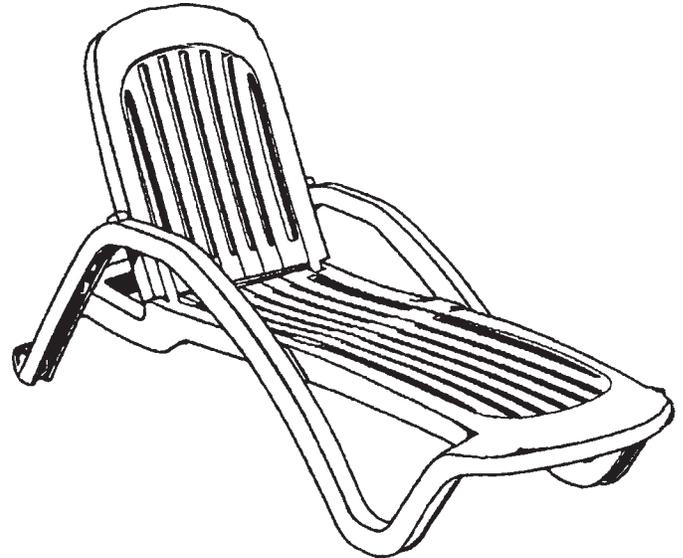


FIG. 3 Non-folding Plastic Chaise Lounge with Adjustable Back

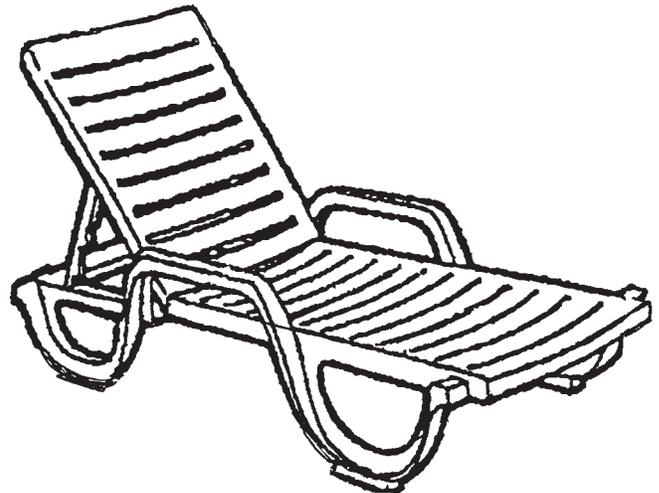


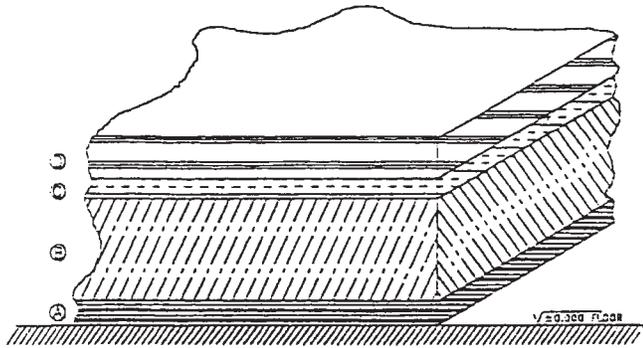
FIG. 4 Solid Stacking Plastic Chaise Lounge with Adjustable Back

5.3 *One Heavy-Weight Canvas or Leather Bag*, identical to the bag in 5.2; however, the weight is increased by addition to the bag of 100 ± 1.0 -lb (45.4 ± 0.45 -kg) of either (1) additional steel or lead shot, or (2) barbell weights evenly distributed on top of the steel or lead shot for a total weight of 250 ± 2.5 -lb (114 ± 1.1 -kg).

5.4 *One-Heavy Weight Canvas or Leather Bag*, identical to the bag in 5.2; however, the weight is increased by addition to the bag of 150 ± 1.5 -lb (68 ± 0.7 -kg) of either (1) additional steel or lead shot, or (2) barbell weights distributed evenly on top of the steel or lead shot for a total weight of 300 ± 3 -lb (136 ± 1.4 -kg).

5.5 *One-Heavy Weight Canvas or Leather Bag*, identical to the bag in 5.2; however, the weight is increased by addition to the bag of 250 ± 2.5 -lb (114 ± 1.1 -kg) of either (1) additional steel or lead shot, or (2) barbell weights distributed evenly on top of the steel or lead shot for a total weight of 400 ± 4 -lb (182 ± 1.8 -kg).

bag shall be fitted with a safety cable to prevent it from hitting the glass testing base but should not interfere with the test.



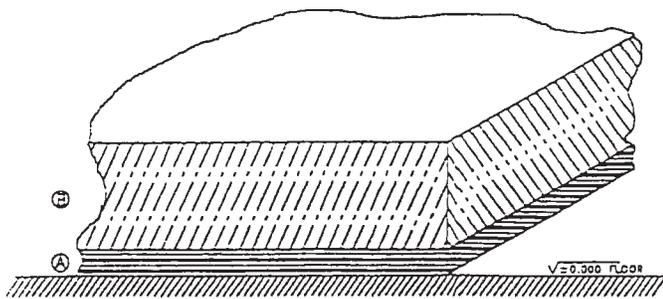
NOTE 1—

A = poly(methyl methacrylate) 0.25 ± 0.03 in. (6 ± 0.1 mm) thickness, B = AC exterior glue fir plywood 0.75 ± 0.1 in. (19 ± 2 mm) or greater thickness,

C = polypropylene microfoam 0.7 ± 0.01 lb/ft³ (11 ± 0.2 kg/m³) density and 0.13 ± 0.01 in. (3 ± 0.03 mm) thickness, and D = glass/tempered 0.38 ± 0.04 in. (10 ± 0.1 mm) thickness.

NOTE 2—A, B, C, and D are sheets roughly 48 in. (1219 mm) on a side or greater to accommodate the length of the chaise lounge.

FIG. 5 Glass Testing Base



NOTE 1—

A = poly(methyl methacrylate) 0.25 ± 0.03 in. (6 ± 0.1 mm) thickness, and B = AC exterior glue fir plywood 0.75 ± 0.1 in. (19 ± 2 mm) or greater thickness.

NOTE 2—A and B are sheets roughly 48 in. (1219 mm) on a side or greater to accommodate the length of the chaise lounge.

FIG. 6 Plywood Testing Base

5.6 *Glass Testing Base*, as described in Fig. 5.

5.7 *Plywood Testing Base*, as described in Fig. 6.

5.8 *Back Weight Apron*, one heavy-weight canvas or leather apron, 19 ± 0.2 in. (483 ± 4.8 mm) in width and 28 ± 0.3 in. (711 ± 7.1 mm) in length, having six pockets, (6 ± 0.6 in. (152 ± 1.5 mm) in width and 10 ± 0.1 in. (254 ± 2.5 mm) in height, having appropriate straps, clips or clamps to hold the apron in place (see Fig. 7).

5.9 *250 Lb. Arm Testing Block*, one block of suitable material such as wood or metal, 42 ± 0.4 in. (1067 ± 10.7 mm) in length and 7.0 ± 0.7 in. (178 ± 1.8 mm) in height and 4.0 ± 0.4 in. (102 ± 1.0 mm) in width, having additional weights or supporting structure to obtain a total weight of 250

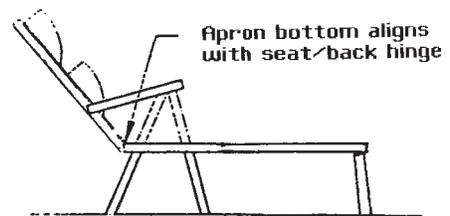
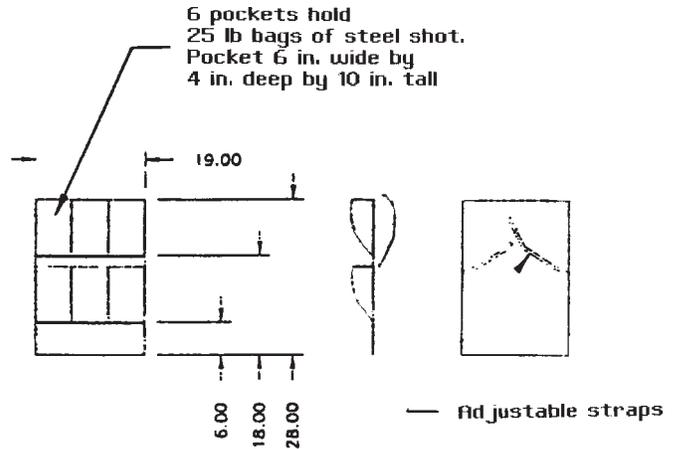
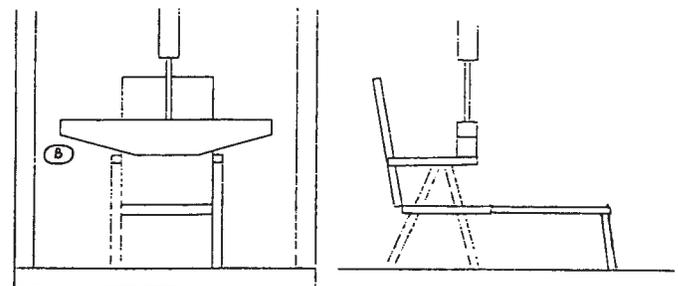
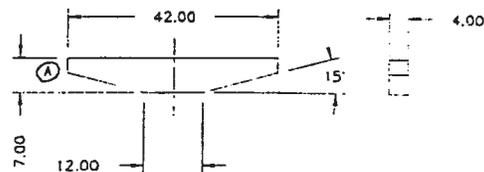


FIG. 7 Back Weight Apron



NOTE 1—

A = block, and

B = application of block to plastic chaise lounge.

FIG. 8 250 lb Arm Testing Block

± 2.5 -lb (114 ± 1.1 -kg).⁴ The base of the block shall be 12 ± 0.1 in. (305 ± 3.1 mm) at the center, with the sides at a 15° angle (see Fig. 8).

5.10 *Steel or Lead Shot*,⁵ Six 25-lb (11-kg) bags.

⁴The 250-lb weight of the arm block may also be achieved by use of a combination of a block of the dimensions as described above, and the use of the force of an air cylinder to achieve a total applied weight of 250-lb.

⁵No. 2 to No. 8 shot, as normally purchased at a sporting goods store.

6. Conditioning

6.1 Precondition all plastic chaise lounges for a minimum of 48 h at 65 to 75°F (18 to 24°C) and a relative humidity of 50 ± 15 % and test subsequently under the same conditions.

7. General Requirements

7.1 All plastic chaise lounges meeting the performance requirements shall be made from polymeric materials that meet the requirements for outdoor weathering in Section 8 for Class A (residential) or Section 9 for Class B (nonresidential).

8. Test Procedure-Class A (residential)

8.1 *Initial Inspection*—Inspect each chaise lounge thoroughly for breaks, fractures, cracks, or other structural damage prior to testing. Any chaise lounges exhibiting structural damage shall not be tested.

8.2 Separate chaise lounges may be used to conduct the tests listed in 8.3-8.9 to comply with 11.1 and 11.2.

8.3 Weatherability Test:

8.3.1 Polymeric material used outdoors shall be exposed for weatherability using accelerated weathering chambers and shall retain at least 70 % of its original testing strength.

8.3.2 Specimens to be tested shall be normal 0.125 ± 0.01-in. (3.2 ± 0.03-mm) thick Type I tensile test bars injection molded from the same material used in finished chaise lounges or tensile bars cut from finished parts, as described in Test Method D 638.

8.3.3 *Tensile Test*—Test exposed and non-exposed (control samples) tensile bars, in accordance with Test Method D 638, at a testing rate of 2 in. (51 mm)/min.

8.3.4 The specimens are to be exposed according to one of the following procedures: (1) 1000 h in accordance with Procedure B of Practice D 2565 using Type B or BH xenon-arc apparatus; (2) 720 h in accordance with Practice G 23 using a Type E carbon-arc weathering device; (3) 1000 h in accordance with Cycle A of Practice D 4329, using UVB313 bulbs; or (4) 2000 h in accordance with Cycle A of Practice D 4329, using UVA-340 bulbs. For Practice D 2565 or Practice G 23, the test cycle shall consist of 102 min of light followed by 18 min of light and spray. For Practice D 4329, the test cycle shall consist of 8 h of light followed by 4 h or dark with condensation. If Practice G 23, is used, the blackbody temperature shall be 145 ± 5°F (63° ± 3°C).

8.4 Static Load Test for Seat:

8.4.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with back locked in most forward position.

8.4.2 Apply the 300 ± 3-lb (136 ± 1.4-kg) bag at a speed not to exceed 6 in. (152 mm)/s to the geometrical center of the seat.

8.4.3 Withdraw the weight from the seat after 10 ± 1 s.

8.4.4 Allow 10 ± 1 s of recovery time.

8.4.5 Repeat 8.4.2-8.4.4 eight additional times.

8.4.6 Repeat 8.4.2 one time, allowing the weight to remain on the seat for 30 min ± 10 s, and then withdraw the weight from the seat.

8.4.7 Observe and report any breaks, cracks, fractures, or other structural damage.

8.4.8 Position the chaise lounge on the plywood testing base (see Fig. 6) and as near as possible to the center of the plywood with back locked in most forward position.

8.4.9 Repeat steps 8.4.2-8.4.7

8.5 Static Load Test for Back

8.5.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with the back resting in the further reclining position.

8.5.2 Apply the 150 ± 1.5-lb. (68 ± 0.7-kg) bag as a counterbalance load at a speed not to exceed 6 in. (152 mm)/s to the geometrical center of the seat. Allow the weight to remain on the seat for the duration of the static load test for back.

8.5.3 Attach the back weight apron to the back (see Fig. 7). Place a 25-lb (11-kg) bag of steel or lead shot in each of the six pockets, starting from the lower left pocket, and ending with the upper right pocket.

8.5.4 Increase counterbalance load in 8.5.2, as needed, to keep chaise lounge from tipping over.

8.5.5 Allow the back weight apron to remain on the back for 60 min ± 10 s, and then remove the back weight apron from the back and the counterbalance weight from the seat.

8.5.6 Verify back still operates. Observe and report any breaks, cracks, fractures, or other structural damage.

8.5.7 Position the chaise lounge on the plywood testing base (see Fig. 6) and as near as possible to the center of the plywood with the back testing in furthest reclining position.

8.5.8 Repeat steps 8.5.2-8.5.6.

8.6 Static Load Test for Leg Rest:

8.6.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with back locked in most forward position.

8.6.2 Apply the 300 ± 3-lb (136 ± 1.4-kg) bag at a speed not to exceed 6 in. (152 mm)/s to the geometrical center of the leg rest.

8.6.3 Withdraw the weight from the seat after 10 ± 1 s.

8.6.4 Allow 10 ± 1 s of recovery time.

8.6.5 Repeat steps given in 8.6.2-8.6.4 eight additional times.

8.6.6 Repeat 8.6.2 one time, allowing the weight to remain on the leg rest for 30 min ± 10 s, and then withdraw the weight from the leg rest.

8.6.7 Observe and report any breaks, cracks, fractures, or other structural damage.

8.6.8 Position the chaise lounge on the plywood testing base (see Fig. 6) and as near as possible to the center of the plywood with back locked in most forward position.

8.6.9 Repeat steps 8.6.2-8.6.7.

8.7 Impact Test for Seat:

8.7.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with back locked in most forward position.

8.7.2 Position the 150 ± 1.5 lb (68 ± 0.7-kg) bag at a height of 6 ± 0.1 in. (152 ± 2.5 mm) above the center of the chaise lounge seat, at rest.

8.7.3 Allow the bag to free-fall onto the center of the chaise lounge seat.

8.7.4 Repeat the steps given in 8.7.2 and 8.7.3 nine additional times.

8.7.5 Observe and report any breaks, cracks, fractures, or other structural damage.

8.7.6 Position the chaise lounge on the plywood testing base (see Fig. 6) as near as possible to the center of the glass, with back locked in most forward position.

8.7.7 Repeat the steps given in 8.7.2-8.7.5.

8.8 *Impact Test for Leg Rest:*

8.8.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with back locked in most forward position.

8.8.2 Position the 150 ± 1.5 -lb (68 ± 0.7 -kg) bag at a height of 6 ± 0.1 in. (152 ± 2.5 mm) above the center of the leg rest.

8.8.3 Allow the bag to free-fall onto the center of the leg rest.

8.8.4 Repeat steps 8.8.2 and 8.8.3 nine additional times.

8.8.5 Observe and report any breaks, cracks, fractures, or other structural damage.

8.8.6 Position the chaise lounge on the plywood testing base (see Fig. 6) and as near as possible to the center of the plywood with back locked in most forward position.

8.8.7 Repeat the steps given in 8.8.2-8.8.5 nine additional times.

8.9 *Arm Test:*

8.9.1 Position the chaise lounge on the glass testing base (see Fig. 5) as near as possible to the center of the glass, with back locked in most forward position.

8.9.2 Apply the arm testing block at the center point of the horizontal portion at a speed not to exceed 6 in.(152mm)/s. Clamps may be used, if necessary, to prevent the weight from rolling forward.

8.9.3 Withdraw the weight from the arm testing block after 60 ± 10 s.

8.9.4 Observe and report any breaks, cracks, fractures, or other structural damage.

8.9.5 Position the chaise lounge on the plywood testing base (see Fig. 6) and as near as possible to the center of the plywood with back locked in most forward position.

8.9.6 Repeat steps 8.9.2-8.9.4.

9. Test Procedure-Class B (Nonresidential)

9.1 *Initial Inspection*—Inspect each chaise lounge thoroughly for breaks, fractures, cracks, or other structural damage prior to testing. Any chaise lounges exhibiting structural damage shall not be tested.

9.2 Separate chaise lounges may be used to conduct the tests listed in 9.3-9.9 to comply with 11.1 and 11.2.

9.3 *Weatherability Test*—Repeat the steps given in 8.3.1 and 8.3.2.

9.4 *Static Load Test for Seat*—Repeat the steps given in 8.4.1-8.4.9 using a 400 ± 4 lb (182 ± 1.8 kg) bag.

9.5 *Static Load Test for Back*—Repeat the steps given in 8.5.1-8.5.8.

9.6 *Static Load Test for Leg Rest*—Repeat the steps given in 8.6.1-8.6.9 using a 400 ± 4 -lb (182 ± 1.8 -kg) bag.

9.7 *Impact Test for Seat*—Repeat the steps given in 8.7.1-8.7.7 using a drop height of $8 \pm .1$ in. (203 ± 2.5 mm).

9.8 *Impact Test for Leg Rest*—Repeat the steps given in 8.8.1-8.8.7 using a drop height of $8 \pm .1$ in. (203 ± 2.5 mm).

9.9 *Arm Test*—Repeat the steps given in 8.9.1-8.9.6.

10. Report

10.1 Report the following information:

10.1.1 Manufacturer's name and manufacturing lot number.

10.1.2 Number of chaise lounges tested.

10.1.3 Initial observations (8.1 or 9.1)

10.1.4 Dimensions (see Fig. 1).

10.1.5 Observations and noted structural damage, if any.

10.2 For Class A (residential) also include the results obtained following the weatherability test (8.3), the static load test for seat (8.4), static load test for back (8.5), static load test for leg rest (8.6), impact test for seat (8.7), impact test for leg rest (8.8), and arm test (8.9) in the test report.

10.3 For Class B (nonresidential) also include the results obtained following the weatherability test (9.3), the static load test for seat (9.4), static load test for back (9.5), static load test for leg rest (9.6) impact test for seat (9.7), impact test for leg rest (9.8), and arm test (9.9) in the test report.

11. Performance Criteria

11.1 If any single chaise lounge collapses or tips over at any point during the testing procedure, it shall be reported as a failure whether it recovers or not, and no further testing is required.

11.2 *Class A (residential)*—There shall be no collapse or any visible evidence of structural damage such as breaks, fractures or cracks after all of the chaise lounges have been tested in accordance with 8.3-8.9.

11.3 *Class B (nonresidential)*—There shall be no collapse or any visible evidence of structural damage such as breaks, fractures or cracks after all of the chaise lounges have been tested in accordance with 9.3-9.9.

12. Precision and Bias

12.1 Insufficient data are currently available to determine the interlaboratory and intralaboratory reproducibility of these test procedures. Following publication of these performance requirements, it is expected that sufficient laboratories will become involved and a round robin will be initiated.

13. Keywords

13.1 casual furniture; outdoor furniture; patio furniture; plastic chaise lounge; recycled plastics

 **F 1988 – 99 (2004)**

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