



Standard Test Method for Snowboard Step-in Bindings¹

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1. Scope

1.1 This test method specifies the essential requirements for a snowboard step-in binding—boot system (see 3.1.2); hereafter referred to as step-in snowboard bindings.

1.2 This test method is applicable to step-in snowboard bindings for adults and children. This type of binding system utilizes a mechanical interlocking mechanism, and the interlock mechanism of the system will be specific to the particular manufacturer. Compatibility between different systems is not expected or anticipated thus each potential combination of boot and binding requires testing.

1.3 For snowboard boots interfacing with ski binding, see ISO 11634.

1.4 For snowboard plate bindings, see ISO 14790.

1.5 For snowboard strap bindings made for soft boots, see ISO 14573.

1.6 For snowboard step-in bindings, see ISO 15344.

1.7 This standard does not address how or under what circumstances a snowboard binding with programmable release modes should release in its intended modes nor does it address the safety, desirability, or efficacy of any programmable release mode for snowboard bindings; any testing of such bindings to this standard must be performed with the release modes disabled or adjusted to their highest release value.

1.8 *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.*

¹ This test method is under the jurisdiction of ASTM Committee F27 on Snow Skiing and is the direct responsibility of Subcommittee F27.30 on Skiing and Snowboarding Equipment.

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2. Referenced Documents

2.1 *ASTM Standards*:²

F1107 Terminology Relating to Snowboarding

2.2 *ISO Standards*:³

ISO 554:1976 Standard Atmospheres for Conditioning and/or Testing—Specifications

ISO 6004 Alpine Skis—Ski Binding Screws—Requirements

ISO 10958-1 Snowboards—Binding Mounting Area—Part 1: Requirements and Test Methods for Snowboards without Inserts

ISO 10958-2 Snowboards—Binding Mounting Area—Part 2: Requirements and Test Methods for Snowboards with Inserts

ISO 11634 Snowboard Boots—Interface with Ski Binding

ISO 14573 Snowboard Strap Bindings for Soft Boots

ISO 14790 Snowboard Plate Bindings

ISO 15344 Snowboard Step-in Bindings—Requirements and Test Methods

3. Terminology

3.1 *Definitions*:

3.1.1 *snowboard plate binding for hard boots*—a connecting system between a hard boot and a snowboard that is accomplished by means of a plate binding system. For reference only—not covered by this test method.

3.1.2 *snowboard step-in binding—boot system*—an interlocking system that connects a snowboard boot and a snowboard that utilizes a step-in interface.

3.1.3 *snowboard step-in binding type A*—binding suitable for riders over 45 kg body mass (adults).

3.1.4 *snowboard step-in binding type C*—binding suitable exclusively for a body mass up to 45 kg (children).

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 American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

3.1.5 *snowboard strap binding for soft boots*—a connecting system between a soft boot and a snowboard that is accomplished by means of compression straps or other similar devices. For reference only—not covered by this test method.

3.2 Refer to Terminology F1107 for terminology specific to snowboarding.

4. Testing Parameters

4.1 This test method describes the steps required to evaluate a step-in snowboard binding system function. The test method consists of a series of laboratory tests that evaluate resistance to static and dynamic loading, function under cold and icy conditions, impact and fatigue behavior and assessment of potential false positive release. All tests must be passed.

4.2 All possible strains on the boot can be attributed to one torque M and one force F each on every axis X, Y, Z of a system of coordinates (see Fig. 1). The point of origin of the coordinates is agreed to be in the center of the ankle joint which is located approximately 100 mm from the plantar surface and 80 mm from the back of the heel.

4.3 The torques and forces illustrated in the drawing in Fig. 1 are positive. The corresponding parameters acting in opposite direction are given negative signs. The arrowheads indicate the sense of rotation of the snowboard boot movement.

5. Apparatus

5.1 One artificial leg with fixed ankle joint of 80° without toe section (see Fig. 2). Test size appropriate to the mid range of the sizing for the boot-binding system being tested.

5.2 A rigid plate (for example, steel plate of at least 10-mm thickness) with the appropriate mounting hole pattern for mounting the binding capable of supporting the applied loads and moments.

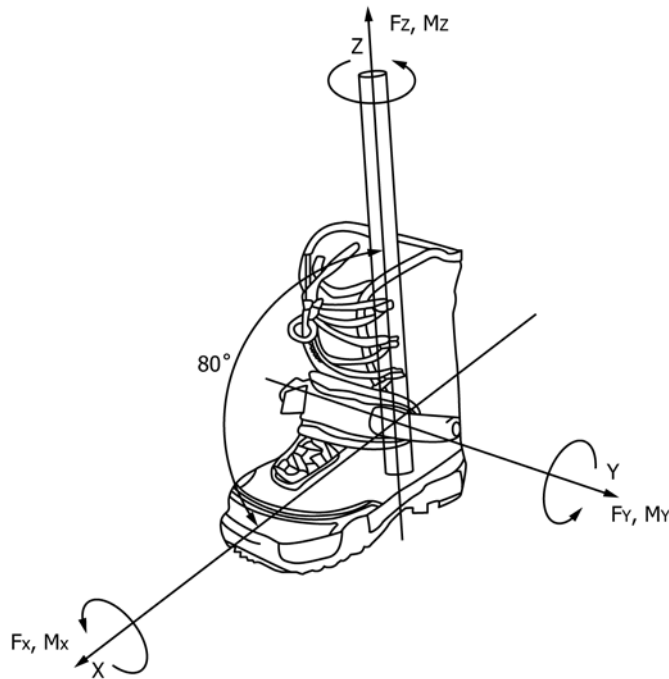
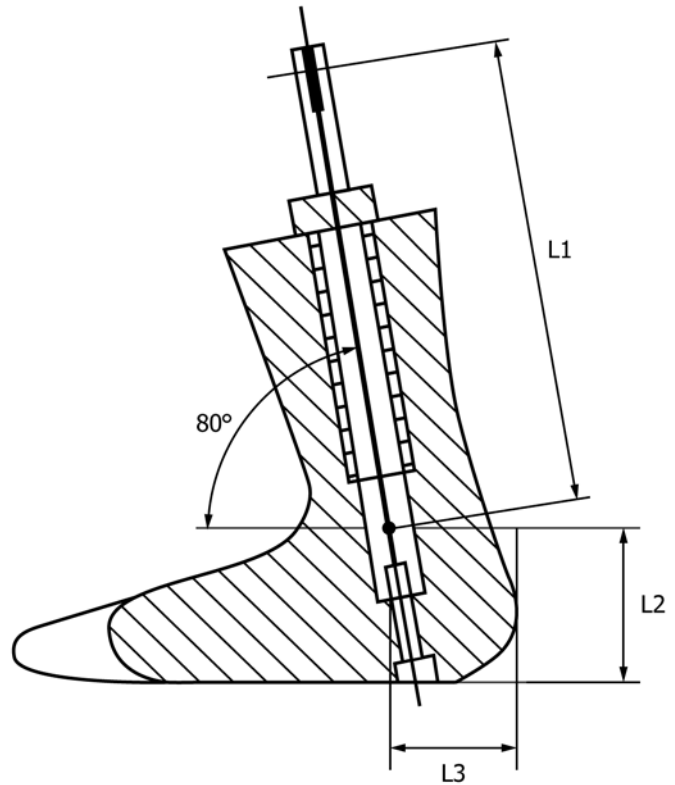


FIG. 1 Torques and Forces



Dimension	Length	Test
L ₁	1000 mm	Static Bending
L ₁	300 mm	Impact and Fatigue
L ₂	100 mm	All Tests
L ₃	80 mm	All Tests
L ₄	Min = L ₅ × 0.85	Optional Shortened Foot
L ₅	L ₅	Acceptable for All Tests
		Full Length Foot
		Acceptable for All Tests

FIG. 2 Schematic Drawing of Artificial Leg for Binding Tests

TABLE 1 Static Bending Loads—Direction and Torque

Direction	Type A	Type C
± M _x	150 N·m	80 N·m
± M _y	300 N·m	180 N·m
± M _z	150 N·m	100 N·m

5.3 Test device capable of applying the described forces and moments. The test device shall be designed to allow application of a torque (see Table 1) with a force applied at the upper part of a 1000-mm shaft connected to the artificial leg (see Fig. 2).

5.4 Fatigue test device for cyclic loading at the prescribed rates.

5.5 Impact test device capable of delivering a minimum of 120 J of energy at impact speeds up to 6 m/s.

6. Sampling and Conditioning

6.1 Three sample pairs of snowboard boots and bindings are to be used for lab testing. Use one new sample for each potentially destructive test method.

6.2 Unless otherwise noted, all tests shall be performed at room temperature (see ISO 554:1976). All sample boots and bindings shall be preconditioned at -20°C for a minimum of 90 min prior to testing. Unless otherwise noted, each test shall start within 2 min from when samples were removed from the cold. Surface temperature measurements should be made to ensure that sufficient conditioning time had been achieved.

7. Loading Rates

7.1 Perform the test quasi-statically, ensuring that the following indicative values of the torque gradient are respected:

7.1.1 Torsion Values:

$$\frac{d_{M_z}}{dt} \leq 50 \text{ Nm/s} \quad (1)$$

7.1.2 Forward Bending Value:

$$\frac{d_{M_y}}{dt} \leq 220 \text{ Nm/s} \quad (2)$$

7.1.3 Lateral Bending:

$$\frac{d_{M_x}}{dt} \leq 50 \text{ Nm/s} \quad (3)$$

where:

M = torque in the x , y or z direction in Newton-meters (Nm), and

t = time (duration) of load application in seconds.

NOTE 1—The measurement error of the value in torsion and in forward bending shall be no more than $\pm 2\%$.

8. System Requirements

8.1 Function:

8.1.1 The snowboard binding shall retain the boot to the snowboard under normal winter snowboarding conditions. This requirement is considered to be met if, after all testing is completed in accordance with Section 9:

8.1.1.1 There are no fractures, cracks or other indications of permanent deformations in the binding.

8.1.1.2 The binding can attach the boot in accordance with the manufacturer's instructions.

8.1.1.3 The attached boot does not slip out of the binding.

8.1.1.4 The boot can be removed from the binding in the original manner in accordance with the manufacturer's instructions.

NOTE 2—The loads defined in Table 1 are in line with the predicted forces normally seen under carving and all-mountain riding conditions. These loads do not consider the effects of impacts, falls, jumping, etc.

8.2 Retaining Leash and Mounting Point for Retaining Leash:

8.2.1 The mounting points for the retaining leash shall be indicated by the manufacturer.

8.2.2 The minimum breaking force of the mounting point and of the retaining leash shall be 500 N.

8.2.3 The mounting instructions shall indicate that a retaining leash or anti-runaway device shall be applied to the binding for use when snowboarding.

8.3 *Snow Pack*—The snowboard binding shall latch with a minimum of 2 mm of snow pack between the boot sole and the binding.

9. Testing Procedures

9.1 The series of tests shown in 9.2 – 9.6 are to be used to evaluate the step-in boot-binding system function.

9.2 *False Positive Lock and Clearance*—Place a minimum 2-mm (± 0.1 -mm) thick shim of polyethylene, roughly the same shape as the outsole under the boot and verify that the step-in function still works in accordance with the manufacturer's instructions. Insert the boot into the binding and perform the static bending tests described in 9.3.

9.3 *Static Bending Tests*—Mount the snowboard binding on the rigid plate. Place the foot form in the boot and fasten tightly. Mount the boot on the binding and place the entire assembly in the environmental chamber. After the snowboard binding and mounting plates have been preconditioned, mount the cold fixture in the test frame and apply a moment in accordance with Table 1 in both directions with the cold boot and artificial leg at -20°C .

9.4 *Impact Testing*—Insert the artificial leg into a new boot. Attach a new binding to the base plate of the impact test device. Attach the boot to the binding. Precondition the sample at -20°C for a minimum of 90 min. Apply impact in F_x direction (to create M_y , see Fig. 1). A minimum velocity of 4 m/s and minimum energy absorption of 82 J shall be achieved. The test shall be performed within 5 min.

9.5 *Fatigue Testing*—Mount the test sample on the test plate at 15° ($\pm 3^{\circ}$) off x -axis as shown in Fig. 3. Attach the boot to the binding and test the system for 50 000 sinusoidal load cycles with a frequency of 1 Hz (minimum) to 3 Hz (maximum) in the $\pm MV$ direction.

9.5.1 Apply a test torque load of ± 100 N-m ($\pm 5\%$) for Type A bindings (adults).

9.5.2 Apply a test torque load of ± 66 N-m ($\pm 5\%$) for Type C bindings (children).

NOTE 3—This test to be performed at -20°C (in an environmental chamber).

9.6 Testing Under Icy Conditions:

9.6.1 Step-in Function with a Frozen Binding:

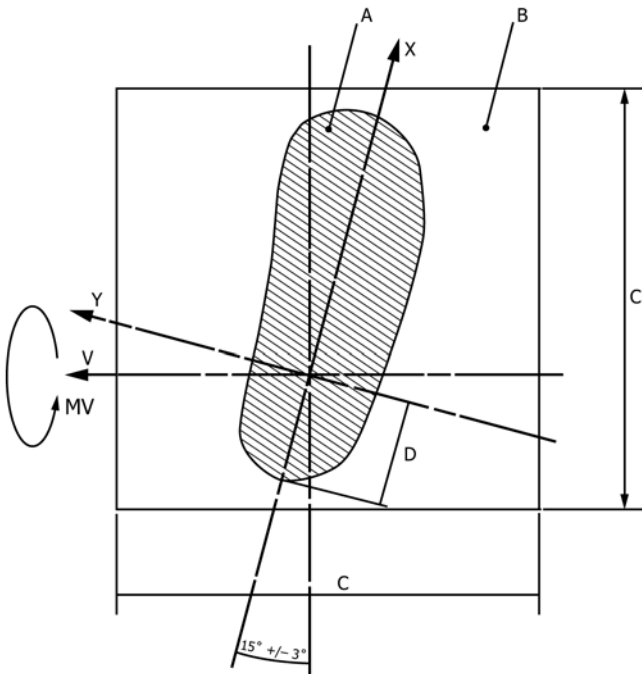
9.6.1.1 Shower the mounted snowboard binding, without boot installed, in horizontal position with water at $23 \pm 5^{\circ}\text{C}$ for 2 min. Then position vertically for 1 min to remove excess water. Finally freeze the entire system to -20°C in a horizontal position for at least 30 min.

9.6.1.2 Test the binding function by performing the step-in procedure using the boot and artificial leg.

9.6.2 Step-in Release Function with a Frozen Binding:

9.6.2.1 Shower the mounted snowboard binding, without boot installed, in horizontal position with water at $23 \pm 5^{\circ}\text{C}$ for 2 min. Then position vertically for 1 min to remove excess water. Finally freeze the entire system to -20°C in a horizontal position for at least 30 min.

9.6.2.2 Test the binding function by removing the boot and artificial leg from the binding.



Key:
 A—Test Sample
 B—Steel Plate 10 mm thick (minimum)
 C—220 mm (minimum)
 D—80 mm

FIG. 3 Fatigue Test Orientation

10. Mounting Screws

10.1 The snowboard binding shall be supplied with all parts necessary for mounting the binding to the board in accordance with the manufacturer's instructions.

10.2 Metric screws shall be used, preferably M6 class 6g for snowboards with inserts (see ISO 10958-2). Unless otherwise noted by the binding manufacturer, the mounting screw protrusion length shall be 5.5 ± 0.5 mm from base of binding, when screws are fully tightened.

10.3 For snowboards without inserts, ski-binding screws shall be used in accordance with ISO 6004 (see ISO 10958-1).

11. Marking

11.1 Snowboard bindings shall be marked with the following data:

11.1.1 For children's snowboard bindings, the maximum mass of the rider (45 kg) shall be clearly visible after mounting.

11.1.2 The name or trademark, or both, of the manufacturer, supplier, or importer shall be clearly marked.

NOTE 4—Markings may be permanently molded into product or the markings may be in the form of a sticker or printing placed directly on the product.

12. Mounting Instructions

12.1 Each snowboard binding shall be provided with mounting instructions, preferably with illustrations, which shall comprise the following items:

12.1.1 Reference to the range of application (children/adults).

12.1.2 Information which enables the correct mounting of the snowboard binding.

12.1.3 Information for adjustment for the binding to the boot and its position on the board.

12.1.4 A note that the mounting instructions shall be given to the customer.

12.1.5 Indication that a retaining leash or a braking device shall be applied for the use of snowboards.

12.1.6 An appropriate antiskid pad may be fitted on, or included as part of, the snowboard.

13. Instructions for Use

13.1 Each snowboard binding shall be supplied with instructions for use, if possible with illustrations, which shall be comprised of the following items:

13.1.1 Indication of the scope of application (children/adults).

13.1.2 Indication how to close and open the binding.

13.1.3 Indication that for proper function the boot sole and binding shall be cleaned of snow, ice and dirt.

13.1.4 Recommendations for maintenance and care, in particular the regular inspection of all screw connections and adjustments to the boots and bindings.

13.1.5 Indication of how and where to attach the retaining leash and recommendations to the user that the leash or runaway retention device should be used at all times when snowboarding and when carrying the snowboard.

13.1.6 Indication of how to install and use the antiskid pad.

13.1.7 Information on the boot requirements and system compatibility.

13.1.8 A note that the mounting instructions shall be given to the customer.

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