



Standard Specification for Climbing and Mountaineering Carabiners¹

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1. Scope

1.1 This specification covers six mechanical tests and the minimum performance requirements for carabiners designed specifically for the sports of climbing and mountaineering.

1.2 Two different types of carabiners are defined in this standard, non-locking carabiners and locking carabiners.

1.3 The values stated in SI units are to be regarded as the standard.

1.4 Tests contained herein are destructive in nature. Carabiners subjected to any of these tests shall not be used in any way after testing except in evaluating the results of such testing.

1.5 This specification does not imply approval of any method of use of climbing and mountaineering carabiners. In addition, the test load values contained herein are not to be interpreted as the forces which a climbing and mountaineering carabiner may be subjected to, or expected to sustain in actual field use.

1.6 This specification is limited to carabiners made of steel or aluminum alloys only.

2. Referenced Documents

2.1 ASTM Standards:

E 4 Practices for Load Verification of Testing Machines²

F 1772 Terminology Relating to Climbing and Mountaineering Practices³

F 1775 Specification for Labeling of Climbing and Mountaineering Equipment³

2.2 Other Standard:

EN 566:1994 Slings [preliminary]

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *carabiner, n*—a self-closing gated, load-bearing, connective device. Some carabiner models may have *cocking* or *blocking* devices, that when activated, override the self-closing features.

3.1.2 *failure, n*—an arbitrary point beyond which a material or product ceases to be functionally capable of its intended use. In this application, the point at which some part of the carabiner physically breaks or distorts to an extent that the test members are released.

3.1.3 *locking carabiner, n*—a carabiner with a mechanism that reduces the possibility of a gate being opened inadvertently. A locking mechanism requires at least two different consecutive manual actions to open the gate.

3.1.4 *nonlocking carabiner, n*—any carabiner that does not have a mechanism that reduces the possibility of a gate being opened inadvertently.

3.1.5 *normal body weight, n*—a standardized weight that represents a typical climber, defined as Function Test Force No. 1.

3.1.6 *ultimate strength, n*—the maximum force sustained by a carabiner during an ultimate force test, prior to its failure.

4. Significance and Use

4.1 *Gate Function During Body Weight Test*—This test simulates a climber's body weight of Function Test Force No. 1 and verifies that the gate functions as intended under body weight force.

4.2 *Major Axis Gate Closed 70 % Force Test*—This test verifies that the gate functions as originally intended after Function Test Force No. 2 has been applied and released.

4.3 *Locking Mechanism Test*—This test verifies that the locking mechanism keeps the gate in the locked position between forces of 0 kN and Function Force Test No. 3.

4.4 *Major Axis Gate Closed Ultimate Strength Test*—This test is intended to show the force required to physically fail the carabiner.

4.5 *Major Axis Gate Open Ultimate Strength Test*—This test simulates a potential inadvertent use of a carabiner. It is intended to show the force required to physically fail the carabiner.

4.6 *Minor Axis Gate Closed Ultimate Strength Test*—This test simulates a potential inadvertent use of a carabiner. It is intended to show the force required to fail physically the carabiner along the minor axis.

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² *Annual Book of ASTM Standards*, Vol 03.02.

³ *Annual Book of ASTM Standards*, Vol 15.07.

5. Responsibility for Quality Assurance

5.1 Quality control is solely the responsibility of the manufacturer or purchaser, or both, and is not addressed by this specification.

6. Apparatus and Condition

6.1 *Tensile Tester*, capable of calibration in accordance with Practices E 4 to the ultimate strength of all carabiners tested.

6.2 *Test Fixtures and Supplies:*

6.2.1 There are four total test pins required, two pins with 6 ± 0.05 -mm radius and two pins with 5 ± 0.05 -mm radius. Pins must be alloy steel and heat-treated to minimum Rockwell hardness, C scale 60. The mean surface roughness, R_a , must not exceed $0.8 \mu\text{m}$ and the peak to valley height, R_{max} , must not exceed $6.3 \mu\text{m}$. The fixture should be designed in such a way that the pins do not rotate and that the carabiner is free to locate itself on the pins when the force is applied. See Figs. 1 and 2.

6.2.2 *Molybdenum-Based Grease.*

6.3 *Test Conditions*—The ambient temperature shall be between 15 and 23°C.

7. Hazards

7.1 Carabiners may disengage or eject parts from the test fixture. Use a safety screen and wear safety glasses while testing. Do not perform this test alone.

8. Sampling

8.1 *Number of Tests*—The number of samples for testing will be specified by the manufacturer’s quality assurance program. A minimum of five will be used, in sequence, for the gate function during body weight, major axis gate closed 70 %, and major axis gate closed ultimate strength tests. A minimum of five will be used for the major axis gage open ultimate strength test. A minimum of five will be used for the minor axis gate closed ultimate strength test.

9. Performance Specifications

9.1 *Gate Function During Body Weight Test:*

9.1.1 Function Test Force No. 1 will be used for this test. Each of the carabiners subjected to the body weight test shall show no evidence of distortion that impairs the designed function.

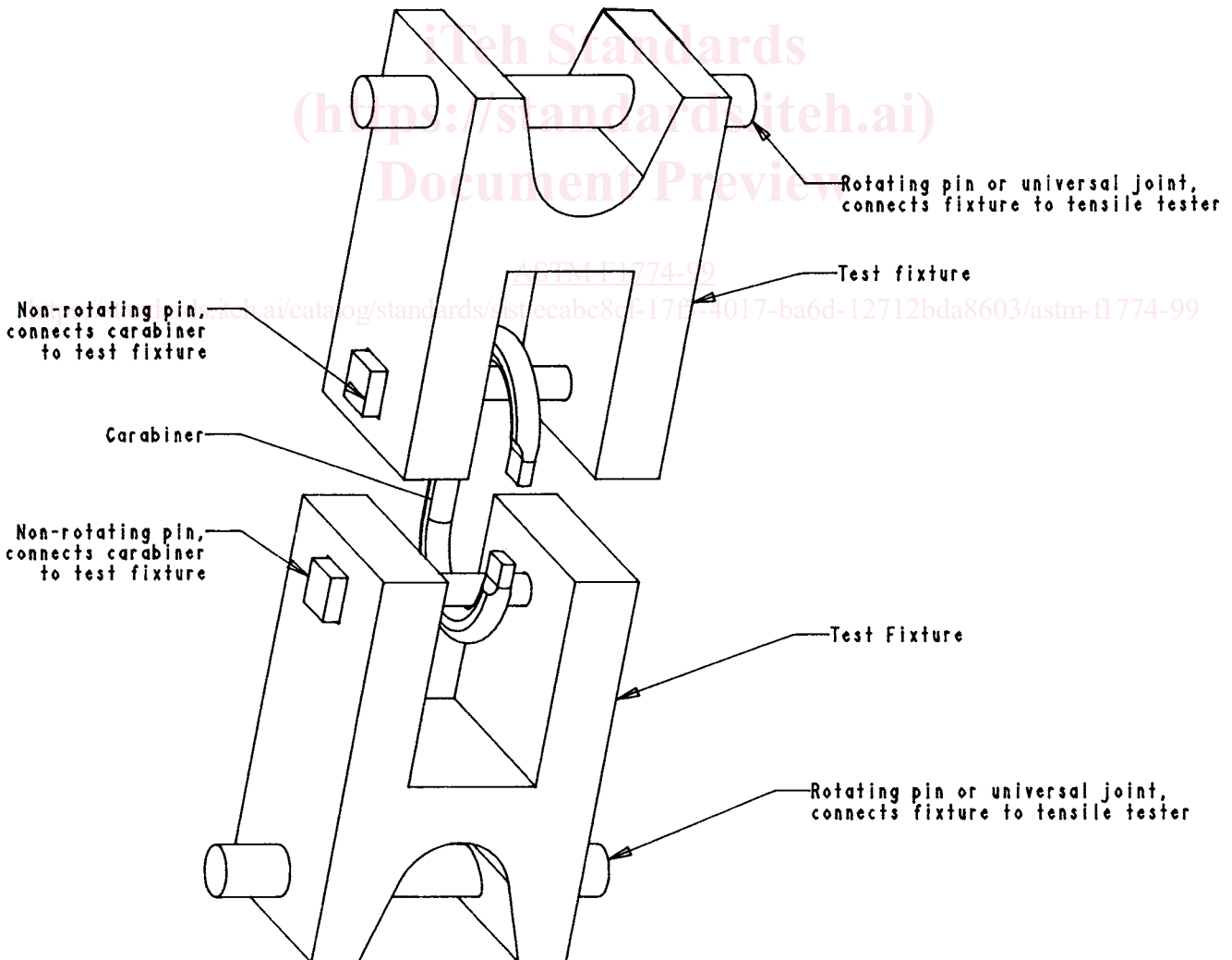
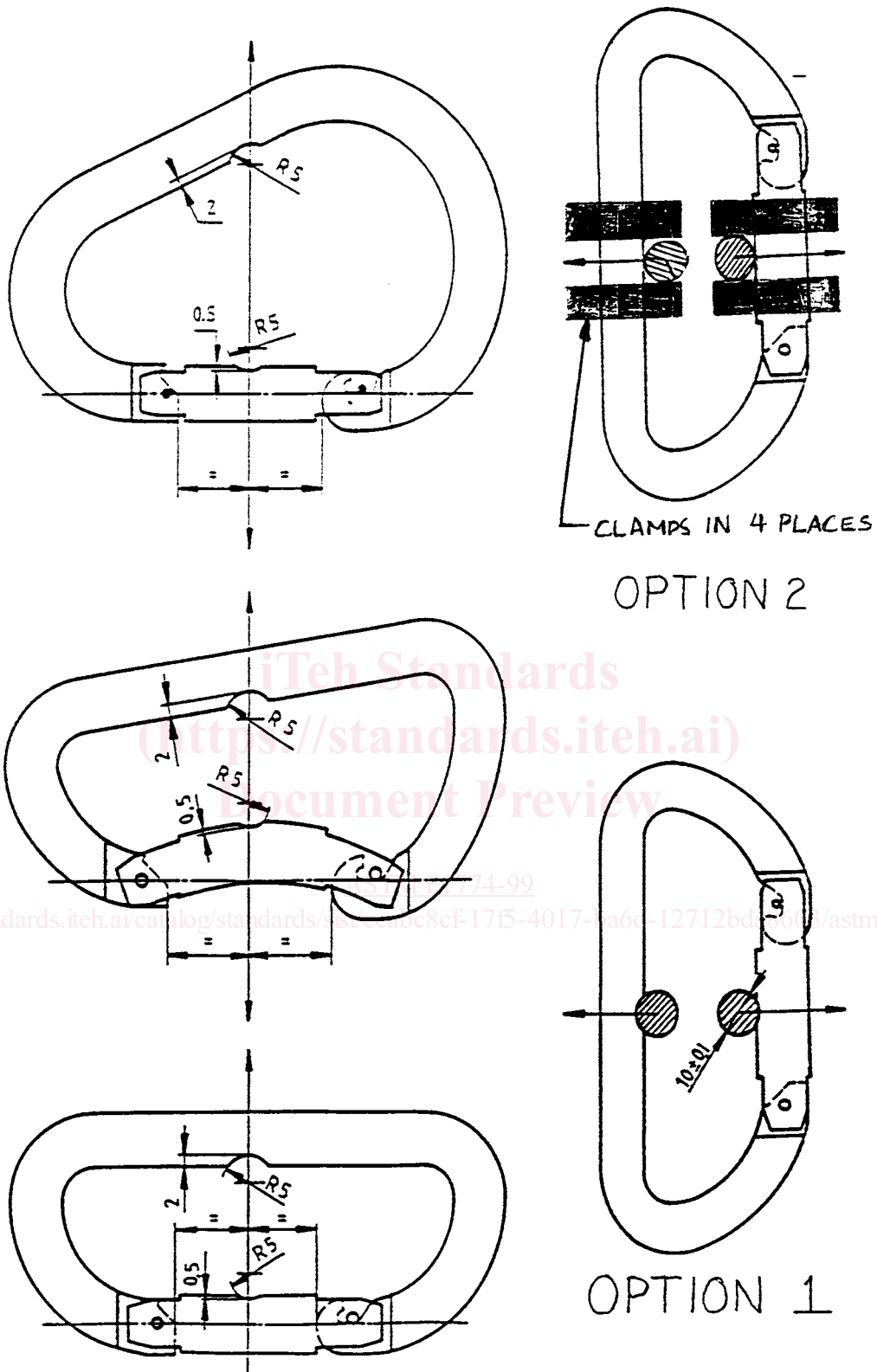


FIG. 1 Major Axis Test Set-Up



NOTE—Dimensions in millimetres.

FIG. 2 Minor Axis Tests