



Standard Specification for Determining the Rating Velocities of an Archery Bow¹

This standard is issued under the fixed designation F1544; 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 This specification covers the testing technique to determine the rating velocities of a compound bow.

1.2 This specification will provide only a certification of performance, that is, the velocities at which a given bow will launch arrows of specified weights under standard conditions.

1.3 This specification is not intended to provide any engineering or structural evaluation of the bow that would determine its fitness for the use intended, safe function, or any other attribute except as stated.

1.4 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.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 4, of this specification: *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. Terminology

2.1 *Definitions of Terms Specific to This Standard:*

2.1.1 *archery trade association (ATA) draw length, n*—the distance at the archer's full draw from the string at the nocking point to a vertical line through the pivot point of the bow grip $1\frac{3}{4}$ in. ($+\frac{1}{4}$ in., -0 in.) (44 + 6.4 – 0 mm).

2.1.2 *draw length pressure point (DLPP) draw length, n*—the distance at the archer's full draw from the string at the nocking point to a vertical line through the distal or pivot point of the bow grip.

2.1.3 *force-draw curve*—the graph curve generated by recording the draw force readings of an archery bow at 1.0-in. (25.4-mm) intervals or less, from brace height through set weight and to the center of the valley (if present), in order to reveal the energy storage characteristics of the bow.

¹ This specification is under the jurisdiction of ASTM Committee F08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.16 on Archery Products.

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2.1.4 *rating velocities, n*—the initial velocity of an arrow weighing 5 grains per pound (0.073 g/N) of the bow's Peak Draw Force (± 0.5 grains on total arrow weight) (± 0.073 g) from a bow set at no more than $70 \pm \frac{1}{2}$ lb (311.4 N) Peak Draw Force and 30 in. (762 mm) ATA actual draw length. Example: a 70-lb Peak Draw Force bow requires the use of a 350 grain arrow (± 0.5 grains on total arrow weight) (± 0.073 g). A minimum of (5) shots for each test must be performed. Test shot velocities will then be averaged to determine the ATA Compound Bow Rating Velocity.

2.1.5 *shooting machine*—a device, equipped with a mechanical release, that secures a bow and releases an arrow to obtain highly repeatable shooting results for various testing purposes.

2.1.6 *stored energy*—the energy required to draw a bow from brace height to full draw, usually expressed in foot-pounds (joules).

3. Significance and Use

3.1 This specification will be used to determine a velocity under standard test conditions for rating an archery bow.

4. Test Methods

4.1 *Force Draw Data:*

4.1.1 For bows with adjustable draw force, adjust peak or maximum draw force to no more than $70 \pm \frac{1}{2}$ lb (311.4 \pm 1 N). The center of the valley of the force-draw curve (lowest force) attained after having passed through the peak or maximum draw force shall be located at $28\frac{1}{4}$ -in. (717.6 mm) DLPP, $+\frac{1}{4}$ –0 in. (6 mm).

4.1.2 If the bow's draw force cannot be adjusted to 70 ± 0.1 lb (311.4 N) and an appropriate weight arrow cannot be obtained, the test can be performed with a 350 ± 0.5 grain (22.75 ± 0.03 g) arrow and the rating velocity can be adjusted mathematically to the 70 lb (311.4 N) level of draw force (refer to 4.5.2).

4.1.3 Measure and record the draw force at 1.0-in. (25.4-mm) (or less) increments from brace height to at least $28\frac{1}{4}$ -in. (717-mm) DLPP (30-in. (762-mm) ATA) draw length.

4.1.4 From the force-draw curve (obtained in 4.1.3), determine the peak or maximum draw force that occurs between the brace position of the bow and the full draw length of $28\frac{1}{4}$ -in. (717-mm) DLPP (30-in. (762-mm) ATA).