



Standard Guide for Straightness Measurement of Arrow Shafts¹

This standard is issued under the fixed designation F 1889; 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.

INTRODUCTION

Arrow shaft straightness is a desired characteristic. Unfortunately, straightness is currently measured using varying methods at varying span lengths. The archery industry, as well as consumers, have recognized that it is difficult to compare measurements at these various spans using different measurement methods.

This guide proposes the use of a fixed span distance, for all but a few very short shafts, instead of using various spans based on various manufactured shaft lengths. The span length of 28 in. was selected based on typical manufactured shaft lengths, as well as other AMO/ASTM industry standards. Using this arrow shaft straightness guide will benefit consumers as well as the archery industry.

1. Scope

1.1 This guide covers the formulation and designation of straightness measurement standards and nomenclature for arrow shafts.

1.2 This guide is designed to provide manufacturers and consumers a means for measuring the straightness of arrow shafts with tools and devices available in the archery industry and sport.

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

2. Terminology

2.1 Definitions of Terms Specific to This Standard:

2.1.1 *arrow straightness, n*—the conformance of the material or load axis of an arrow shaft to the true linear, longitudinal axis of the shaft.

2.1.2 *standard total indicator reading (TIR), n*—total indicator reading of arrow shaft straightness obtained through methods outlined in this guide.

3. Significance and Use

3.1 The measurement system presented in this guide is intended to ensure uniform arrow shaft straightness measurement standards to avoid confusion of the consumer, which results from the use of different straightness measurement systems.

4. Measurement Guidelines for Arrow Shaft Straightness

4.1 *Straightness Measurement*—The most prevalent and commonly accepted method of measuring arrow shaft straightness involves supporting the arrow shaft along a known, fixed span, and using an indicator device while the arrow shaft is rotated about its axis on wheels or bearings. For this guide, a span type measurement is to be used. The length of the arrow shaft to be tested, the span distance to be used, and the equipment to be used are defined as follows:

4.1.1 *Shaft Length*—The shaft length to be used for straightness measurement is the actual manufactured shaft length of each arrow shaft size/type.

4.1.2 *Span Distance*—The length of the span to be used for this test is 28 in. (0.711 m) with a length tolerance of ± 0.125 in. (3.2 mm). For those shafts, which are manufactured 29 in. in length or less, the span distance to be used is 25 in. (0.635 m) and adjusted to an equivalent 28 in. reading using the formula:

28-in. straightness value = 25-in. straightness value \times 283/253
For example:

straightness at 25 in. = 0.0030 in.

straightness at 28 in. = 0.0030 in. \times 283/253

where $283/253 = 1.4049$,

straightness at 28 in. = 0.0030 in. \times 1.4049 = 0.0042 in.

4.1.3 *Measurement Location*—Arrow shafts shall be measured for straightness at the center of the span. The tolerance for the measurement location shall be equal to or better than ± 0.250 in. (6.35 mm).

4.1.4 *Measurement Equipment*—Measurements shall be taken with a noncontact laser type optical measurement device.

4.1.5 *Support Wheels*—Support wheels must feature low-friction bearings and exhibit a positive crown in order to limit

¹ This guide is under the jurisdiction of ASTM Committee F-08 on Sports Equipment and Facilities and is the direct responsibility of Subcommittee F08.16 on Archery Products.

Current edition approved June 10, 1998. Published February 1999.