



## Standard Guide for Evaluating Test Method Capability and Fitness for Use<sup>1</sup>

This standard is issued under the fixed designation D8146; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This guide covers techniques for evaluating the statistical capability and fitness for use of standard test methods used for measuring properties of petroleum products, liquid fuels, and lubricants. Specifically, this guide provides strategies for evaluating the capability of a test method to provide a sufficiently precise estimate of the intended parameter versus a given level or value of that parameter and for assessing, with sufficient confidence, the fitness for use of a test method for determining the acceptability of products versus specification, regulatory, or manufacturing limits.

1.2 The assessment of capability in this guide is applicable to test methods that always yield non-negative numerical results and have a hard, fixed zero lower limit or fixed upper limit (for example, 100 %). Detailed knowledge of a test method and professional judgement may be required in determining the applicability of this guide to certain test methods.

1.3 In accordance with this guide, the assessment of fitness for use of a test method versus specification, regulatory, or manufacturing limits is generally applicable to test methods that provide numerical results and have applicable reproducibility precision values.

1.4 This guide is intended for use by test method developers, specification setters, and laboratories selecting test methods to evaluate products for specific purposes or versus specific limits.

1.5 This guide is not applicable to test methods that measure temperature to determine properties such as, but not limited to, freeze point, pour point, flash point, and distillations. This guide is not intended for use by laboratories for evaluating laboratory test method execution capability, nor is it intended to evaluate manufacturing process capability.

1.6 The expressions of capability and fitness for use derived from use of this guide should not be the only criteria for selection and use of a given test method. Other factors such as the laboratory's experience with the test method, length of time

to complete an analysis, typical product results relative to the regulatory or manufacturing specification limit, closeness of the results to zero, and cost factors may contribute more significantly to the decision to use a given test method for a specific application.

1.7 This guide draws on statistical approaches covered in other standards supporting petroleum products, liquid fuels, and lubricants, including Practices [D3244](#), [D6259](#), [D6299](#), [D6300](#), [D6792](#) and ISO 4259.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:<sup>2</sup>

- [D3244 Practice for Utilization of Test Data to Determine Conformance with Specifications](#)
- [D6259 Practice for Determination of a Pooled Limit of Quantitation for a Test Method](#)
- [D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance](#)
- [D6300 Practice for Determination of Precision and Bias Data for Use in Test Methods for Petroleum Products and Lubricants](#)
- [D6792 Practice for Quality Management Systems in Petroleum Products, Liquid Fuels, and Lubricants Testing Laboratories](#)

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.