



Standard Guide for Analysis and Interpretation of Proficiency Test Program Results¹

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1. Scope*

1.1 This guide covers the analysis and interpretation of proficiency test (PT) program results. For participants in interlaboratory proficiency test (PT) (or crosscheck, check scheme, etc.) programs, this guide describes procedures for assessing participants' results relative to the PT program results and potentially improving the laboratory's testing performance based on the assessment findings and insights. For the committees responsible for the test methods included in interlaboratory proficiency testing programs, this guide describes procedures for assessing industry's ability to perform test methods and for potentially identifying needs for method improvement.

1.2 *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. Referenced Documents

2.1 ASTM Standards:²

- D1266 Test Method for Sulfur in Petroleum Products (Lamp Method)
- D2622 Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-ray Fluorescence Spectrometry
- D4294 Test Method for Sulfur in Petroleum and Petroleum Products by Energy Dispersive X-ray Fluorescence Spectrometry
- D4951 Test Method for Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectrometry
- D5185 Test Method for Multielement Determination of

Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES)

- D5453 Test Method for Determination of Total Sulfur in Light Hydrocarbons, Spark Ignition Engine Fuel, Diesel Engine Fuel, and Engine Oil by Ultraviolet Fluorescence
- D6259 Practice for Determination of a Pooled Limit of Quantitation
- D6299 Practice for Applying Statistical Quality Assurance and Control Charting Techniques to Evaluate Analytical Measurement System Performance
- D6617 Practice for Laboratory Bias Detection Using Single Test Result from Standard Material
- D6792 Practice for Quality System in Petroleum Products and Lubricants Testing Laboratories
- D7039 Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Biodiesel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E456 Terminology Relating to Quality and Statistics
- E2655 Guide for Reporting Uncertainty of Test Results and Use of the Term Measurement Uncertainty in ASTM Test Methods

3. Terminology

3.1 Definitions:

- 3.1.1 *accuracy*, *n*—closeness of agreement between an observed value and an accepted reference value. **E177, E456**
- 3.1.2 *assignable cause*, *n*—factor that contributes to variation and that is feasible to detect and identify. **E456**
- 3.1.3 *bias*, *n*—systematic error that contributes to the difference between a population mean of the measurements or test results and an accepted reference or true value. **E177, E456**
- 3.1.4 *control limits*, *n*—limits on a control chart that are used as criteria for signaling the need for action or for judging whether a set of data does or does not indicate a state of statistical control. **E456**
- 3.1.5 *in-statistical-control*, *adj*—process, analytical measurement system, or function that exhibits variations that can only be attributable to common cause. **D6299**

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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.