



Designation: D7372 – 21

An American National Standard

# Standard Guide for Analysis and Interpretation of Proficiency Test Program Results<sup>1</sup>

This standard is issued under the fixed designation D7372; 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 guide covers the evaluation and interpretation of proficiency test program (PTP) results. For proficiency test program participants, this guide describes procedures for assessing participants' results relative to the collective PT program results and potentially improving the laboratory's testing performance based on the assessment of findings and insights. For the committees responsible for the test methods included in PT programs, this guide describes procedures for assessing industry's ability to perform test methods and for potentially identifying opportunities for improvements.

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

1.3 *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>

- D4175 Terminology Relating to Petroleum Products, Liquid Fuels, and Lubricants
- 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

<sup>1</sup> This guide is under the jurisdiction of ASTM Committee D02 on Petroleum Products, Liquid Fuels, and Lubricants and is the direct responsibility of Subcommittee D02.94 on Coordinating Subcommittee on Quality Assurance and Statistics. Current edition approved May 1, 2021. Published September 2021. Originally approved in 2007. Last previous edition approved in 2017 as D7372 – 17. DOI: 10.1520/D7372-21.

<sup>2</sup> 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.

- D6617 Practice for Laboratory Bias Detection Using Single Test Result from Standard Material
- D6792 Practice for Quality Management Systems in Petroleum Products, Liquid Fuels, and Lubricants Testing Laboratories
- D7915 Practice for Application of Generalized Extreme Studentized Deviate (GESD) Technique to Simultaneously Identify Multiple Outliers in a Data Set
- E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
- E456 Terminology Relating to Quality and Statistics
- E2586 Practice for Calculating and Using Basic Statistics
- E2655 Guide for Reporting Uncertainty of Test Results and Use of the Term Measurement Uncertainty in ASTM Test Methods

2.2 ASTM standards used only in Appendix X3 are also listed in X3.1.

## 3. Terminology

### 3.1 Definitions:

3.1.1 More extensive lists of terms related to quality, statistics, and related terms are found in Terminology D4175.

3.1.1.1 In the event of disagreement between the quoted text and the latest in the referenced standard, the latter supersedes the text in this standard.

3.1.2 *accuracy, n*—closeness of agreement between an observed value and an accepted reference value. E177, E456

3.1.2.1 *Discussion*—The term accuracy, when applied to a set of test results, involves a combination of a random component and of a common systematic error or bias component. E177

3.1.3 *analytical measurement system, n*—a collection of one or more components or subsystems, such as sample handling and preparation, test equipment, instrumentation, display devices, data handlers, printouts or output transmitters, that are used to determine a quantitative value of a specific property for an unknown sample in accordance with a standard test method.

3.1.4 *Anderson-Darling Resolution Sensitive Statistic, AD<sub>rs</sub>, n*—a goodness-of-fit statistical tool used to objectively test for normality of proficiency testing data.

3.1.4.1 *Discussion*—AD<sub>rs</sub> is a modified version of the Anderson-Darling Statistic (see D6299) and was developed

\*A Summary of Changes section appears at the end of this standard