



Designation: D 2777 – 98

Standard Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D-19 on Water¹

This standard is issued under the fixed designation D 2777; 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 practice establishes uniform standards for estimating and expressing the precision and bias of applicable test methods for Committee D-19 on Water.

1.2 Except as specified in 1.3, 1.4, and 1.5, this practice requires the task group proposing a new test method to carry out a collaborative study from which statements for precision (overall and single-operator standard deviation estimates) and bias can be developed. This practice provides general guidance to task groups in planning and conducting such determinations of precision and bias.

1.3 If a full-scale collaborative study is not technically feasible, due to the nature of the test method or instability of samples, the largest feasible scaled-down collaborative study shall be conducted to provide the best possible limited basis for estimating the overall and single-operator standard deviations.

1.3.1 Examples of acceptable scaled-down studies are the local-area studies conducted by Subcommittee D19.24 on microbiological methods because of inherent sample instability. These studies involve six or more completely independent local-area analysts who can begin analysis of uniform samples at an agreed upon time.

1.3.2 If uniform samples are not feasible under any circumstances, a statement of single-operator precision will meet the requirements of this practice. Whenever possible, this statement should be developed from data generated by independent multiple operators, each doing replicate analyses on independent samples of a specific matrix type, which generally fall within specified concentration ranges (see 7.2.5.2(3)).

1.3.3 This practice is not applicable to methodology involving continuous sampling or measurement, or both, of specific constituents and properties.

1.3.4 This practice is also not applicable to open-channel flow measurements.

1.4 A collaborative study that satisfied the requirements of the version of this practice in force when the study was conducted will continue to be considered an adequate basis for

the precision and bias statement required in each test method. If the study does not satisfy the current minimum requirements for a collaborative study, a statement listing the study's deficiencies and a reference to this paragraph shall be included in the precision and bias statement as the basis for an exemption from the current requirements.

1.5 This paragraph relates to special exemptions not clearly acceptable under 1.3 or 1.4. With the approval of Committee D-19 on the recommendation of the Results Advisor and the Technical Operations Section of the Executive Subcommittee of Committee D-19, a statement giving a compelling reason why compliance with all or specific points of this practice cannot be achieved will meet both ASTM requirements **(1)**² and the related requirements of this practice. Precision and bias statements authorized by this paragraph shall include the date of approval by Committee D-19.

1.6 In principle, all test methods are covered by this practice.

1.7 In Section 11 this practice shows exemplary precision and bias statement formats for: (1) test methods yielding a numerical measure, (2) test methods yielding a non-numerical report of success or failure based on criteria specified in the procedure, and (3) test methods specifying that procedures in another ASTM test method are to be used with only insignificant modifications.

1.8 All studies, even those exempt from some requirements under 1.3 or 1.5, shall receive approval from the Results Advisor before being conducted (see Section 8) and after completion (see Section 12).

2. Referenced Documents

2.1 ASTM Standards:

- D 1129 Terminology Relating to Water³
- D 1141 Specification for Substitute Ocean Water³
- D 1193 Specification for Reagent Water³
- D 4375 Terminology for Basic Statistics in Committee D-19 on Water³
- D 5790 Test Method for Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas

¹ This practice is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.02 on General Specifications, Technical Resources, and Statistical Methods.

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² The boldface numbers in parentheses refer to the list of standards at the end of this practice.

³ *Annual Book of ASTM Standards*, Vol 11.01.