



Designation: E678 – 07

Standard Practice for Evaluation of Scientific or Technical Data¹

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1. Scope

1.1 This practice establishes criteria for evaluating scientific and technical data, and other relevant considerations, which constitute acceptable bases for forming scientific or technical expert opinions.

1.2 This practice recommends generally acceptable professional practice, although the facts and issues of each situation require specific consideration, and may involve matters not expressly dealt with herein. Deviations from this practice are not necessarily wrong or inferior, but should be documented and justified.

1.3 This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances.

1.4 *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

[E620 Practice for Reporting Opinions of Scientific or Technical Experts](#)

[E860 Practice for Examining And Preparing Items That Are Or May Become Involved In Criminal or Civil Litigation](#)

[E1020 Practice for Reporting Incidents that May Involve Criminal or Civil Litigation](#)

[E1188 Practice for Collection and Preservation of Information and Physical Items by a Technical Investigator](#)

¹ This practice is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.11 on Interdisciplinary Forensic Science Standards.

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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.

3. Significance and Use

3.1 Persons engaged in forensic investigations are responsible for identifying significant data. They then analyze and correlate the data and report conclusions and opinions. These opinions should be supported by the data, reported in a form that is understandable to a layman familiar with the incident, and capable of being evaluated by knowledgeable scientists, engineers, or investigators.

3.2 This practice is intended to serve as a guideline for the scientific or technical expert in conducting an investigation, which includes analyzing and evaluating facts. In addition, this practice may assist others in understanding and evaluating the work performed. Refer to Practice E1188 for guidance pertaining to the actual collection of information and physical evidence, and Practice E1020 for guidance regarding the initial reporting of the incident.

4. Evaluation Procedure

4.1 This section outlines basic principles of evaluation in accordance with accepted scientific and engineering practices.

4.1.1 *Define the Problem Being Considered: The definition should include*—The expert must first define the problem being considered. The definition should include: (1) the allegation(s) made, (2) the scientific or technical issues being addressed, (3) the relationship between the allegation(s) and the scientific or technical issue(s), and (4) the relationship(s) between the scientific or technical issue(s) and the incident(s) to which the allegations(s) refer.

4.1.2 *Identification and Validity of Hypotheses:*

4.1.2.1 State and, if necessary, explain scientific or technical hypotheses and judgmental criteria used in evaluation. Specify the source, scientific and technical basis, and relationship of each hypothesis and criterion to known incident data

4.1.2.2 Address the relative scientific or technical merits of alternate hypotheses supported by the available data.

4.1.3 *Evaluation Techniques:*

4.1.3.1 Prepare and maintain a logical and traceable record of analysis and deduction. The evaluation should be quantified to the extent feasible, but should not assume greater precision than is warranted by the quality of the available data. Numerical probability estimates are acceptable only when based on sound analytical or statistical principles, and when their confidence limits have been calculated.