

**UNITED STATES DEPARTMENT OF JUSTICE
UNIFORM LANGUAGE FOR TESTIMONY AND REPORTS
FOR THE FORENSIC GLASS DISCIPLINE**

I. Application

This document applies to Department of Justice examiners who are authorized to prepare reports and provide expert witness testimony regarding the forensic examination of glass evidence. This document applies to reports and to testimony based on reports that are finalized after its effective date. Section III is limited to conclusions that result from the comparison of two or more glass fragments. Section IV is applicable to all forensic glass examinations unless otherwise limited by the express terms of an individual qualification or limitation.

II. Purpose and Scope¹

The Uniform Language for Testimony and Reports is a quality assurance measure designed to standardize the expression of appropriate consensus language for use by Department examiners in their reports and testimony. This document is intended to describe and explain terminology that may be provided by Department examiners. It shall be attached to, or incorporated by reference in, laboratory reports or included in the case file.

Department examiners are expected to prepare reports and provide testimony consistent with the directives of this document. However, examiners are not required to provide a complete or verbatim recitation of the definitions or bases set forth in this document. This is supplemental information that is intended to clarify the meaning of, and foundation for, the approved conclusions.

This document should not be construed to imply that terminology, definitions, or testimony provided by Department examiners prior to its effective date that may differ from that set forth below was erroneous, incorrect, or indefensible. It should also not be construed to imply that the use of different terminology or definitions by non-Departmental forensic laboratories or individuals is erroneous, incorrect, or indefensible.

This document does not, and cannot, address every contingency that may occur. For example, an examiner may not have an opportunity to fully comply with this document's directives during a testimonial presentation due to circumstances beyond the examiner's control. In addition, this document does not prohibit the provision of conclusions in reports and testimony that fall outside of its stated scope. Finally, the substantive content of expert testimony may be subject to legal rules imposed by the court or jurisdiction in which it is provided.

¹ This document is not intended to, does not, and may not be relied upon to create any rights, substantive or procedural, enforceable by law by any party in any matter, civil or criminal; nor does it place any limitation on otherwise lawful investigative or legal prerogatives of the Department of Justice.

III. Conclusions Regarding Forensic Comparison of Glass Fragments

An examiner may provide any of the following conclusions:

1. Physical fit
2. Inclusion (i.e., included)
3. Exclusion (i.e., excluded)
4. Inconclusive

Physical fit

‘Physical fit’ is an examiner’s conclusion that two or more glass fragments were once part of the same broken glass object. This conclusion is an examiner’s opinion that two or more glass fragments show sufficient correspondence between their macro- and microscopic characteristics to indicate that they once comprised a single object and insufficient disagreement between their macro- and microscopic characteristics to conclude that they originated from different objects. This conclusion can only be reached when two or more glass fragments physically fit together.

The basis for a ‘physical fit’ conclusion is an examiner’s opinion that the observed macro- and microscopic characteristics of the glass fragments provide extremely strong support for the proposition that they were once part of the same broken glass object and extremely weak support for the proposition that the glass fragments originated from different broken glass objects.

A ‘physical fit’ conclusion is the statement of an examiner’s opinion (an inductive inference²) that the probability that the glass fragments were not part of the same examined broken glass object is so small that it is negligible.

Inclusion

‘Inclusion’ is an examiner’s conclusion that two or more glass fragments could have originated from the same broken glass source, or from another broken glass source with indistinguishable characteristics. An inclusion may be reached with or without an elemental composition examination.³

² Inductive reasoning (inferential reasoning):

A mode or process of thinking that is part of the scientific method and complements deductive reasoning and logic. Inductive reasoning starts with a large body of evidence or data obtained by experiment or observation and extrapolates it to new situations. By the process of induction or inference, predictions about new situations are inferred or induced from the existing body of knowledge. In other words, an inference is a generalization, but one that is made in a logical and scientifically defensible manner.

OXFORD DICTIONARY OF FORENSIC SCIENCE 130 (Oxford Univ. Press 2012).

³ Elemental composition data in this document refers to highly discriminating methods such as inductively coupled plasma (ICP)-optical emission spectroscopy (OES), ICP-mass spectrometry (MS), laser ablation-ICP-MS (LA-ICP-MS), or micro- X-ray fluorescence spectroscopy (μXRF).

The chance of finding coincidentally indistinguishable glass is significantly higher when elemental composition data has not been acquired than when it has been acquired. This limitation must be explained when reporting and testifying about inclusions in which elemental composition data has not been acquired.

Inclusion with elemental composition examination:

If elemental composition data has been acquired, an examiner may conclude two or more glass fragments either originated from the same broken glass source or from another source that is indistinguishable in all assessed physical characteristics, refractive index, and elemental composition.

The basis for an ‘inclusion’ with elemental composition conclusion is an examiner’s opinion that two or more glass fragments do not exhibit any exclusionary differences⁴ in their assessed physical characteristics, refractive index, and elemental composition.

Inclusion without elemental composition examination:

If elemental composition data has not been acquired, an examiner may conclude that two or more glass fragments either originated from the same broken glass source or from another source that is indistinguishable in all assessed physical characteristics and refractive index.

The basis for an ‘inclusion without elemental composition conclusion is an examiner’s opinion that two or more glass fragments do not exhibit any exclusionary differences in their assessed physical characteristics and refractive index. An ‘inclusion without elemental composition’ conclusion relies on less discriminating methods.

Exclusion

‘Exclusion’ is an examiner’s conclusion that two or more glass fragments are excluded as having originated from the same broken glass source.

The basis for an ‘exclusion’ conclusion is an examiner’s opinion that two or more glass fragments show exclusionary differences in their assessed physical properties, refractive index, or elemental composition.

⁴ Exclusionary difference:

A difference in one or more characteristics between compared items that is sufficient to determine that the compared items did not originate from the same source, are not the same substance, or do not share the same composition or classification.

Organization of Scientific Area Committees for Forensic Science Lexicon (Oct. 16, 2023).

Inconclusive

‘Inconclusive’ is an examiner’s conclusion that no determination can be reached as to whether two or more glass fragments could have originated from the same broken glass source.

The basis for an ‘inconclusive’ conclusion is an examiner’s opinion that the glass fragments are too limited in size or quality to determine whether they could have originated from the same broken glass source.

IV. Qualifications and Limitations of Forensic Glass Examinations

- A conclusion provided during testimony or in a report is ultimately an examiner’s decision and is not based on a statistically-derived or verified measurement and comparison to all other broken glass sources. Therefore, an examiner shall not:
 - assert that a ‘physical fit’ conclusion is based on the ‘uniqueness’⁵ of an item of evidence.
 - use the terms ‘individualize’ or ‘individualization’ when describing a ‘physical fit’ conclusion.
 - assert that two or more glass fragments were once part of the same broken glass object to the exclusion of all other broken glass sources.
- An examiner shall not assert that two or more glass fragments were once part of the same broken glass object unless the fragments physically fit together.
- An examiner shall not provide an ‘inclusion’ conclusion unless the examiner explains that the glass fragments could also have originated from another broken glass source that exhibits the same assessed characteristics. When an ‘inclusion without elemental composition’ conclusion has been reached, an examiner shall report and explain that the chance of finding glass that is coincidentally indistinguishable in all assessed characteristics is significantly higher than when an elemental composition examination has occurred.
- An examiner shall not assert that forensic glass examinations are infallible or have a zero error rate.
- An examiner shall not provide a conclusion that includes a statistic or numerical degree of probability except when based on relevant and appropriate data.

⁵ As used in this document, the term ‘uniqueness’ means having the quality of being the only one of its kind.

- An examiner shall not cite the number of forensic glass examinations performed in the examiner's career as a direct measure for the accuracy of a conclusion provided. An examiner may cite the number of forensic glass examinations performed in the examiner's career for the purpose of establishing, defending, or describing the examiner's qualifications or experience.
- An examiner shall not use the expressions 'absolute certainty,' '100% certainty,' 'reasonable degree of scientific certainty,' 'reasonable scientific certainty,' or similar assertions of reasonable certainty in either reports or testimony unless required to do so by a judge or applicable law.⁶

⁶ See *Memorandum from the Attorney General to Heads of Department Components* (Sept. 9. 2016), <https://www.justice.gov/opa/file/891366/download>.