

**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 Scope<sup>1</sup>**

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 his or her 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 dependent upon legal rules imposed by the court or jurisdiction in which it is offered.

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<sup>1</sup> 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.

### **III. Conclusions Regarding Forensic Comparison of Glass Fragments**

The examiner may offer any of the following conclusions:

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

#### **Fracture fit**

‘Fracture 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 decision 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 ‘fracture fit’ conclusion is an examiner’s decision 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 ‘fracture fit’ conclusion is the statement of an examiner’s opinion (an inductive inference<sup>2</sup>) that the probability that the glass fragments were not part of the same examined broken glass object is so small that it is negligible. A ‘fracture fit’ conclusion is not based upon a statistically-derived or verified measurement or an actual comparison to all broken glass sources in the world.

#### **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.

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<sup>2</sup> 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).

The chance of finding coincidentally indistinguishable glass is significantly higher when elemental composition data has not been acquired than when it has been acquired.<sup>3</sup> 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 decision that two or more glass fragments are indistinguishable in their assessed physical characteristics, refractive index, and elemental composition.

**Inclusion with No 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’ with no elemental composition conclusion is an examiner’s decision that two or more glass fragments are indistinguishable in their assessed physical characteristics and refractive index.

**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 decision that two or more glass fragments are different in their assessed physical properties, refractive index, or elemental composition.

**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 decision that the glass fragments are too limited in size or quality to determine whether they could have originated from the same broken glass source.

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<sup>3</sup> 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, or micro-X-ray fluorescence spectroscopy (μXRF).

#### **IV. Qualifications and Limitations of Forensic Glass Examinations**

- 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.
- When offering a ‘fracture fit’ conclusion, an examiner shall not assert that the fragments originated from the same broken glass object to the exclusion of all other broken glass sources. This may wrongly imply that a ‘fracture fit’ conclusion is based upon a statistically-derived or verified measurement or actual comparison of the glass fragments to all other broken glass sources in the world, rather than an examiner’s expert opinion.
- An examiner shall not offer an ‘inclusion’ conclusion unless he or she explains that the glass fragments could also have originated from another broken glass source that exhibits the same assessed characteristics. When elemental composition data has not been acquired, 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 it has been acquired.
- 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.
- An examiner shall not cite the number of forensic glass examinations performed in his or her career as a direct measure for the accuracy of a proffered conclusion. An examiner may cite the number of forensic glass examinations performed in his or her career for the purpose of establishing, defending, or describing his or her qualifications or experience.
- An examiner shall not use the expressions ‘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.<sup>4</sup>

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<sup>4</sup> See *Memorandum from the Attorney General to Heads of Department Components* (Sept. 9, 2016), <https://www.justice.gov/opa/file/891366/download>.