
Training Outline for the Examination of Headlight and Bulb Evidence

1.0 Purpose – This document provides an outline for training in the examination of headlight and bulb evidence, including the requisite competency testing.

2.0 Scope – This training outline shall be followed by all trainees in the examination of headlight and bulb evidence, regardless of experience level.

3.0 Module 1 – Lamp Examinations

3.1 Objectives: Through completion of this module, the trainee shall have developed and demonstrated the theoretical knowledge of:

3.1.1 Evidence handling, evidence collection, evidence packaging, and chain of custody for filament-related evidence.

3.1.2 Procedures for taking notes and marking evidence.

3.1.3 Principles of the operation of bulbs, markings on bulbs and lamps, and factors that may cause damage in vehicular collisions.

3.1.4 Techniques employed in the analysis of lamps and bulbs.

3.2 Reading Assignments

3.2.1 State Crime Laboratory Evidence Guide.

3.2.2 Baker, J. S., et al. *Lamp Examination for On or Off in Traffic Accidents*. Northwestern University Center for Public Safety, 2003.

3.2.3 Noon, Randall K. *Engineering Analysis of Vehicular Accidents*. CRC press, 1994, pp. 83-90.

3.2.4 Saferstein, Richard. *Forensic Science Handbook*. Chapter 4, “Forensic Glass Comparisons.” pp. 139-182.

3.2.5 Published Journal Articles

3.2.5.1 Dolan, D. N. “Vehicle Lights and Their Use as Evidence.” *Journal of Forensic Science Society* 2.2 (1971).

3.2.5.2 Fries, Thomas R. and Richard O. Lapp. “Accident Reconstruction-Response of Halogen Light Filaments during Vehicle Collisions.” *Society of Automotive Engineers* 890856.

3.2.5.3 Haas, M. A., M. J. Camp, and R. F. Dragen. “A Comparative Study of the Applicability of the Scanning Electron Microscope and the Light Microscope in the Examination of Vehicle Light Filaments.” *Journal of Forensic Sciences* 20 (1975): 91-102.

- 3.2.5.4** Hagstrom, A. L. and S. Soder. "Light Filaments of Incandescent Lamps Studied by Auger Electron Microscopy." *Journal of Forensic Sciences* 25.1 (1980): 103-112.
- 3.2.5.5** Kawakami, Akira, Hibenobu Sekimora, and Akira Shinohara. "Accident Information for Traffic Accident Reconstruction-The Role of the Automobile Lamp Filament." *Society of Automotive Engineers* 930661.
- 3.2.5.6** Keskin, A. Taner, Walter S. Reed, and Richard L. Friedrich. "Brake Light Filament Deformation for Vehicular Collisions." *Society of Automotive Engineers* 880233.
- 3.2.5.7** Severy, D. M. "Headlight-Tailight Analysis from Collision Research." *Society of Automotive Engineers* 660786.
- 3.2.5.8** Stone, I. C. "Forensic Laboratory Support of Accident Reconstruction." *Society of Automotive Engineers* 870427.

3.3 Exercises

- 3.3.1** Read literature pertaining to this module.
- 3.3.2** Perform casework with qualified Forensic Scientists. This shall involve in-depth participation including note taking, sample selection, sample preparation and evidence handling and marking.
- 3.3.3** Under the supervision and guidance of the training officer the trainee shall learn to operate and use equipment, instruments, and techniques for the examination of lamp evidence.
 - Use of a stereomicroscope to observe details of damaged bulbs.
 - Use of photography to record the condition of bulbs.
 - Use of an ohmmeter to measure continuity of filaments.
 - Techniques for opening sealed beam headlights safely.
- 3.3.4** The trainee shall study the analysis of bulb filaments using Scanning Electron Microscopy (SEM).
- 3.3.5** Using the skills learned in this block of instruction, the trainee shall examine ten different bulbs. Where applicable, the following observations shall be made on each bulb:
 - Condition of glass
 - Condition of filament
 - Oxidation
 - Distortion
 - Welded glass on filament

4.0 Module 2 – Preparation for Court

4.1 Objectives: Upon completion of this module, the trainee shall be able to:

- 4.1.1** Demonstrate courtroom procedures.
- 4.1.2** Present the results of a filament examination in court effectively.
- 4.1.3** Describe the legal and ethical obligations of an expert witness.
- 4.1.4** Describe the admissibility standards set by *Daubert* and *Frye*.

4.2 Reading Assignments

- 4.2.1** CVs or Statements of Qualifications of other Forensic Scientists.
- 4.2.2** *Daubert v. Merrill Dow Pharmaceuticals*, 509 U.S. 579 (1993).
- 4.2.3** *Frye v. United States*, 293 F. 1013 (DC Cir. 1923).
- 4.2.4** Feder, H.A. and M.M. Houck. *Succeeding as an Expert Witness*. 4th ed. Boca Raton: CRC Press, 2008.
- 4.2.5** Kogan, J.D. “On Being a Good Expert Witness in a Criminal Case.” *Journal of Forensic Sciences* 23.1(1978): 190-200.
- 4.2.6** Philipps, K.A. “The Nuts and Bolts of Testifying as a Forensic Scientist.” *Journal of Forensic Sciences* 22.2 (1977): 457-463.
- 4.2.7** Ron Smith and Associates, Inc. “Courtroom Testimony Techniques: Success Instead of Survival.” Collinsville, Mississippi.
- 4.2.8** Tanton, R.L. “Jury Preconceptions and Their Effect on Expert Scientific Testimony.” *Journal of Forensic Sciences* 24.3 (1979): 681-691.

4.3 Exercises

- 4.3.1** Read literature pertaining to this module.
- 4.3.2** Prepare or update a CV or Statement of Qualifications reflective of experience in filament examination.
- 4.3.3** Prepare a series of qualifying questions and answers to those questions for use in a voir dire.
- 4.3.4** Observe pretrial conferences and courtroom testimony of qualified Forensic Scientist, if possible.

5.0 Evaluation

- 5.1** A written examination shall be given to evaluate overall proficiency in the examination of bulb and lamp evidence.
- 5.2** A mock case with a minimum of 2 unknowns shall be given. This exercise shall include generating an entire case record and draft report.
- 5.3** Successfully complete a moot court or roundtable discussion.

6.0 Records

- Training file
- Training checklist

7.0 Attachments – N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	Original ISO Document
10/18/2013	2	Added issuing authority to header
08/29/2014	3	Updated header to Physical Evidence Section – Trace Unit, issuing authority to Physical Evidence Section Forensic Scientist Manager. Updated all references in procedure from Trace Evidence Section to Trace Unit.