



Forensic Paint Analysis

Forensic Science

Copyright and Terms of Service

Copyright © Texas Education Agency, 2011. These materials are copyrighted © and trademarked ™ as the property of the Texas Education Agency (TEA) and may not be reproduced without the express written permission of TEA, except under the following conditions:

- 1) Texas public school districts, charter schools, and Education Service Centers may reproduce and use copies of the Materials and Related Materials for the districts' and schools' educational use without obtaining permission from TEA.
- 2) Residents of the state of Texas may reproduce and use copies of the Materials and Related Materials for individual personal use only, without obtaining written permission of TEA.
- 3) Any portion reproduced must be reproduced in its entirety and remain unedited, unaltered and unchanged in any way.
- 4) No monetary charge can be made for the reproduced materials or any document containing them; however, a reasonable charge to cover only the cost of reproduction and distribution may be charged.

Private entities or persons located in Texas that are **not** Texas public school districts, Texas Education Service Centers, or Texas charter schools or any entity, whether public or private, educational or non-educational, located **outside the state of Texas** *MUST* obtain written approval from TEA and will be required to enter into a license agreement that may involve the payment of a licensing fee or a royalty.

Contact [TEA Copyrights](#) with any questions you may have.

Comparison of Paint

- Paint is composed of a binder and pigments, and other additives that are dissolved or dispersed in a solvent
- Automobile paint is the most common type of paint examined in crime labs



Comparison of Paint (continued)

- Layers of automobile paint
 - Electrocoat primer – applied to the steel body of a car for corrosion resistance; colors range from black to grey
 - Primer surfacer – applied to the primer to completely smooth it out and hide any seams or imperfections; highly pigmented (light grey for lighter colored cars and red oxide for darker cars)



Comparison of Paint (continued)

- Layers of automobile paint (continued)
 - Basecoat – the actual color of the vehicle
 - Clearcoat – unpigmented; improves gloss, durability, and appearance

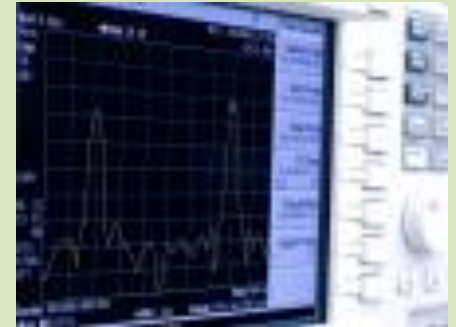


Microscopic Examination of Paint

- The microscope is the most important instrument for locating and comparing paint specimens
- Color is the most distinctive forensic characteristic of paint
- An examiner observes color layers and tries to match the number and sequence of colors. This process can connect paints to a common origin
- Unfortunately, most paint specimens do not have layers that can be individualized to a single source, so a chemical analysis must be done

Techniques Used in Paint Comparisons

- Characterization of paint binders
 - Pyrolysis gas chromatography



- Many solids cannot be injected into a gas chromatograph, so items must be heated, or pyrolyzed, to high temperatures so they will decompose into gaseous products
- Then they are put into a chromatograph, and a pyrogram is produced showing the chemical makeup of the binder
- Even the smallest of paint chips can be pyrolyzed and sent through the gas chromatograph
- Pyrograms can distinguish one polymer from another

Techniques Used in Paint Comparisons (continued)

- Characterization of paint binders (continued)
 - Infrared spectrophotometry
 - Binders absorb infrared radiation to yield a spectrum that is characteristic to that specimen

Techniques Used in Paint Comparisons (continued)

- Characteristics of paint pigments
 - Emission spectrograph
 - Can detect 15 – 20 elements in auto paint simultaneously
 - Some are common to all paints, but others have significant forensic uniqueness



Significance of Paint Evidence

- How to tell if two similar paints come from the same surface
 - Paint layers beneath the surface layer offer valuable points of comparison
 - Color charts for automobile finishes are available from manufacturers
 - Paint Data Query (PDQ)
 - A database that provides information on paints based on make, model, and year
 - Maintained by the Royal Canadian Mounted Police



Collection and Preservation of Paint Evidence

- Paint evidence is mostly involved in burglaries and hit-and-run incidents
- Paint chips should be picked up with forceps and placed in a paper druggist fold or a glass or plastic container



Collection and Preservation of Paint Evidence (continued)

- If paint is smeared on or embedded into something, package the entire item
- With hit-and-run cases, collect uncontaminated paint from an undamaged area as a reference for comparison
- 1/4-inch square samples are sufficient, but you must go all the way to bare metal

Resources

- Saferstein, Richard. *Forensic Science: An Introduction*. New Jersey: Pearson Prentice Hall, 2008
- Saferstein, Richard. *Forensic Science: An Introduction*. 2nd ed. New Jersey: Pearson Prentice Hall, 2011
- Saferstein, Richard. *Criminalistics: An Introduction to Forensic Science*. 8th ed. Upper Saddle River, NJ; Pearson Prentice Hall, 2004B
- http://en.wikipedia.org/wiki/Murder_of_Vicky_Lynn_Hoskinson