



INDIANAPOLIS-MARION COUNTY FORENSIC SERVICES AGENCY

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EVIDENCE SUBMISSION GUIDELINE #9

FORENSIC ANALYSIS OF PAINT AND PLASTIC FRAGMENTS

INTRODUCTION

Paint is one of the most common types of physical evidence encountered. Paint is any liquid, liquifiable, or mastic composition which after application to a substrate in a thin layer is converted to an opaque solid film. Paint is used to protect, decorate (such as adding color), or add functionality to an object or surface by covering it with a pigmented coating. An example of protection is to retard corrosion of metal. An example of decoration is to add festive trim to a room's interior. An example of added functionality is to modify light reflection or heat radiation of a surface

Paint evidence can be found in many hit and run and burglary cases where it may prove to have material value. Paint evidence may also be involved in various other types of crimes. Paint films are characterized by a number of physical and chemical features. The physical characteristics may include color, layer sequence and thickness, surface and layer features, contaminants, and weathering. Chemical components may include pigments, polymers, and additives. These features can be determined and evaluated by a variety of macroscopic, microscopic, chemical, and instrumental methods. Limited sample size and sample preservation requirements mandate that these methods be selected and applied in a reasonable sequence to maximize the discriminating power of the analytical scheme. Searching for differences between questioned and known samples is the basic thrust of forensic paint analysis and comparison. However, differences in appearance, layer sequence, size, shape, thickness, or some other physical or chemical feature can exist even in samples known to be from the same source. A forensic paint examiner's goal is to assess the significance of any observed differences. The absence of significant differences at the conclusion of an analysis suggests that the paint samples could have a common origin. The strength of such an interpretation is a function of either or both the type or number of corresponding features. Plastic evidence may also be found in vehicular and other types of incidents.

I. TYPES OF CASES AND WHAT TO COLLECT FOR EACH

A. HIT AND RUN CASES

1. In hit and run cases, the following questioned items should be collected and submitted:
 - Any areas of transfer (paint chips, smears etc.) down to the substrate (metal on a car, wood on a pole, etc.) to insure all layers of paint or plastic are collected.

- All areas of transfer - if there is more than one area of transfer collect these items separately and label where they came from.
 - Any paint, plastic, automotive parts, or other objects found on the ground which may help identify vehicle(s) involved.
 - Clothing from any pedestrian(s) struck by a vehicle - make sure to air dry the clothing before packaging.
2. Additionally, known standards MUST be collected and submitted for comparison purposes:
- Known standards are from all painted or plastic objects involved.
- A known standard is paint or plastic collected from the area of impact that has not been contaminated by the transfer from the other object.***
- The known standard should be collected down to the substrate and should be at least **1/4"** by **1/4"**~
 - If more than one area of transfer is present, standards should be taken from all of these areas, packaged separately, and labeled as to where they came from.
 - If there are broken automotive parts located at the scene, broken pieces from the vehicle should be submitted as standards in order to try to match the pieces from the scene back to the vehicle.
 - Known standards should not be collected from rust spots on the vehicle unless that is the area of paint that may have been transferred.
3. **The submission of standards, when available, is critical in the successful analysis of this type of associative evidence.**

B. UNKNOWN SUSPECT HIT AND RUN CASES

1. When a hit and run occurs and there is no known suspect, paint analysis can still be a very useful tool.
2. The Indiana State Police Laboratory has a system called the Paint Database Query (PDQ), which can be used to help identify the make and model of an unknown vehicle.
3. Additionally, any automotive parts left at the scene may be useful in identifying the make and model of the unknown vehicle.
4. The following actions must be taken in this type of case:
 - Any questioned paint, plastic, or automotive part(s) found should be collected, packaged, labeled, and sent to the lab for analysis.
 - It should be noted that this case is a no suspect hit and run and that PDQ analysis is desired.
 - Known standards from any painted or plastic objects involved (the victim car, a pole, etc.) should be submitted.

C. BURGLARY CASES

1. In a burglary case, the following items should be collected and submitted:
 - Any tools which may have been used to gain entry to a building, vehicle, safe, or other object. These tools may have paint or other substances adhering to them from the object that was pried open.

- Any areas that the tool may have contacted at the crime scene. Paint from the tool(s) may have transferred onto these areas.
2. Additionally, known standards **MUST** be collected and submitted for comparison purposes:
 - Known standards should be submitted from all painted objects and building materials involved:
A known standard is paint collected from the point of entry that has not been contaminated by contact with or transfer from the entry tool
 - The known standard should be collected down to the substrate, and should be at least **1/4" X 1/4"**
 - If more than one point of entry or other area of transfer is present, standards should be taken from all of these areas, packaged separately, and labeled as to their origins.
 3. **The submission of standards, when available, is critical in the successful analysis of this type of associative evidence.**

II. COLLECTING AND PACKAGING EVIDENCE

A. COLLECTING EVIDENCE

WHENEVER POSSIBLE SEND IN TO THE LAB THE WHOLE SECTION OF VEHICLE, WALL, FRAME OR SUSPECT OBJECT WITH PAINT UPON IT.

1. Hit and Run Cases
 - To remove paint or plastic from a vehicle, a sharp metal blade (such as a sharp knife or scalpel) is best used.
 - Use the blade to cut straight down through the paint layers to the substrate and then run the blade across the substrate — use plenty of pressure — this method insures that all layers of the paint are collected.
 - It is acceptable (and often desirable) to have portions of the substrate adhering to the paint layers.
 - Try to get samples that are at least **1/4" X 1/4"**.
 - Use a clean blade for each area sampled — clean the blade often to avoid contaminated samples.
 - Collect standards that are near area of impact but not contaminated by paint transfers.
 - For some plastic items (such as signal lenses), the whole item may be submitted.
 - For large items found at the scene of an incident, the whole item may be submitted.
 - Any clothing or shoes from a hit and run victim should be carefully dried and wrapped in clean butcher paper to avoid loss of evidence.
2. Burglary Cases
 - It is important to collect evidence so that any tool mark impressions are preserved for possible testing.
 - To remove paint from a point of entry, a sharp metal blade (such as a sharp knife or scalpel) is best used.

- Use the blade to cut straight down through the paint layers to the substrate and then run the blade across (or through) the substrate —use plenty of pressure — this method insures that all layers of the paint are collected.
- Also collect a sample of the substrate from the point of entry in the same manner
- Try to get samples at least **1/4" X 1/4"**.
- Use a clean blade for each area sampled and clean the blade often to avoid contaminated samples.
- Submit the whole tool that is suspected of being used in the burglary, wrap end in clean paper to avoid loss of evidence.

B. PACKAGING EVIDENCE

1. Evidence should be packaged in a manner to preserve the integrity of the evidence and to avoid loss and contamination.
2. Small items (such as paint chips and building materials) should be wrapped in a paper bundle and placed into a pill box or glass vial — all openings should be completely sealed to avoid loss and/or contamination of evidence and the box or vial should be placed into a signature sealed plastic bag.
3. Large items (such as vehicle parts) may be placed in a signature sealed, size appropriate plastic or paper bag.
4. Large items that may cut or poke through a bag (such as a tire iron) should be placed into a signature sealed, size appropriate cardboard box.
5. All packaging should be marked with agency name, agency case number, item number and specific source of the sample (for example: R/F fender 1999 blue Ford Taurus, license #ABC123).

For further information please contact the I-MCFSA Laboratory at (317)327-3670.

Evidence Submission Guideline #9 adapted from Indiana State Police Laboratory Physical Evidence Bulletins.

ESG #9
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