

## **Conducting Motor Vehicle Make-Model-Year Searches Using the National Automotive Paint File (NAPF) Database**

### **1 Introduction**

The FBI Laboratory's National Automotive Paint File (NAPF) is a collection of automotive paint color standards provided by automobile manufacturers and represent the original factory color available on most imported and domestic vehicles marketed in North America. This physical collection can be utilized in hit-and-run investigations to possibly identify manufacturer(s), model(s), and model year(s) information about automotive paint evidence. NAPF can also be used in conjunction with other automotive paint collections such as refinisher color chips and the PDQ database.

### **2 Scope**

This general procedure applies to Chemistry Unit caseworking personnel who use the NAPF reference panels and database for motor vehicle make-model-year searches.

### **3 Equipment/Materials/Reagents**

- a. FBI Laboratory's National Automotive Paint File (NAPF)
- b. NAPF database software (Microsoft Access format)
- c. Munsell Book of Color, Matte and Glossy Collections available from the Macbeth Division of Kollmorgen Instruments Corporation, New Windsor, NY
- d. Munsell Neutral Value Scale, Matte Edition available from the Macbeth Division of Kollmorgen Instruments Corporation, New Windsor, NY
- e. Minolta CHROMA METER CR-241 Colorimeter, or equivalent, with standard calibration plate
- f. PC computer able to run Microsoft Access 2000 (or better)
- g. Stereo microscope (~6X to ~100X) with two different lighting conditions (ring light oriented at ~180° and fiber optic light oriented at ~45° from sample surface).

#### 4 Standards and Controls

Not applicable.

#### 5 Sampling or Sample Selection

Not applicable.

#### 6 Procedure

1. Utilizing Paints and Polymers Standard Operating Procedure(s) determine if a paint specimen is a factory-applied, original equipment manufacturer's (OEM) automotive finish. Refer to *General Approach for Paint and Coatings Casework* for guidance.
2. Assign a Munsell color designation to the color coat layer. For details, refer to the P&P SOP *Visual, Microscopical, and Microchemical Examination of Paint and Coating Evidence*.
3. Conduct a search through the NAPF database using a range for the Munsell color designation.
  - a. The range for the Munsell hue, value, and chroma can be adjusted to narrow or broaden the search results.
  - b. Additional search criteria can be selected (e.g., metallic/non-metallic, visual color, manufacturer) to further narrow the search results.
4. Compare the color and appearance of the sample to the selected paint standards. For details, refer to the P&P SOP *Visual, Microscopical, and Microchemical Examination of Paint and Coating Evidence*.
  - a. Conduct color comparisons at low power magnification (~6X to ~100X) using two different lighting conditions.
  - b. Record the results of the comparisons.
5. A second P&P examiner evaluates and records their results for any potential candidates.
6. If a paint standard is considered a candidate and contains a OEM factory-applied coating, conduct an Fourier transform infrared spectroscopy (FTIR) examination and comparison of the all applicable layers according to the P&P SOP *FTIR Analysis of Paints, Tapes,*

*and Polymers.*

7. If a particular color is a candidate, contact the manufacturer to obtain information regarding model and year information for the color.

## **7 Decision Criteria**

- a. If the paint reference standard compares favorably in color and appearance to the sample, record it as a candidate.
- b. Determine if a particular manufacturer's color is predominant.

## **8 Calculations**

Not applicable.

## **9 Measurement Uncertainty**

Not applicable.

## **10 Limitations**

- a. Not every color of vehicles produced by each manufacturer is represented in NAPF.
- b. A factory-applied, OEM automotive finish is required for a possible motor vehicle make-model-year determination.
- c. Sample size and condition can preclude conducting certain examinations including color assessment and layer structure.

## **11 Precautionary Statements**

- a. The paint formulation of the NAPF panel may not be representative of all chemistries used for a particular color. Chemistries may differ between manufacturing plants and for paints being applied to different substrates.
- b. Some data entry errors may exist in the database. Verify search results using orthogonal resources when practicable.

- c. The primer layer on a paint standard may not be indicative of the primer system used at a particular manufacturing plant.

## 12 Safety

Not applicable.

## 13 References

Cartwright L.J., et al. The Classification of Automotive Paint Primers Using the Munsell Color Coordinate System – A Collaborative Study. *Canadian Society of Forensic Science Journal*, 1984, 17(1): 14-18.

*Conducting Color Comparisons Using Automotive Refinishers Color Chips*, FBI Laboratory, Chemistry Unit - Paints and Polymers SOP

*Conducting Motor Vehicle Make-Model-Year Searches Using the Paint Data Query (PDQ) Databases*, FBI Laboratory, Chemistry Unit - Paints and Polymers SOP

*General Approach to Paint and Coatings Casework*, FBI Laboratory, Chemistry Unit - Paints and Polymers SOP

*Performance Monitoring Protocol (QA/QC) for the for the CHROMA METER CR-241 Colorimeter*, FBI Laboratory, Chemistry Unit - Instrument Operation and Systems Support SOP

Rev. #	Issue Date	History
0	06/21/06	New document that replaces previous document also titled <i>Conducting Motor Vehicle Make-Model-Year Searches Using the National Automotive Paint File (NAPF) Database</i> .
1	09/30/09	Minor equipment changes and added EUCAP as source of some panels.
2	03/14/12	Added “standard calibration plate” to section 4e. Updated microscopic/macrosopic to microscopical/macrosopical where appropriate throughout document. Clarified criteria for procedure usage in section 8, step 6. Updated references in section 15.
3	02/03/14	Changed “macroscopical” to “visual” throughout document to simplify terminology, expanded introductory description of NAPF panel sources, edited Scope to state users should receive hands on training to effectively utilize NAPF, and made minor grammatical edits.
4	09/18/18	Modified scope, deleted “calibration” section, changed section titles as needed to reflect LOM or practice changes; minor changes to grammar throughout.

**Approval**

Redacted - Signatures on File

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