

AIR RESOURCES BOARD

Effective Date: December 1, 2002

PROCEDURE FOR RECEIVING, HANDLING, AND BLENDING FUEL SAMPLES

SOP No. MV-FUEL-122

Version 3.0

Fuel Analysis & Methods Evaluation Section  
Chemical Analysis & Emissions Research Branch  
Emissions Compliance, Automotive Regulations & Science Division  
State of California

Haagen-Smit Laboratory  
9528 Telstar Ave.  
El Monte, CA 91731

## 1 Introduction

- 1.1 This procedure describes the protocol for receiving, handling, blending, and storing all fuel samples submitted to the Fuel Analysis and Methods Evaluation Section (FAMES) of the Emissions Compliance, Automotive Regulations & Science Division. Some of the specific procedures listed do not apply to samples obtained during Enforcement Division (ED) inspections. These exceptions are noted.

## 2 Summary of Procedure

- 2.1 All fuel samples submitted to the Fuel Analysis and Methods Evaluation Section are checked for any leakage or damage. The sample IDs are matched with those provided on the laboratory analysis request sheet submitted by the client (except inspection samples). Gasoline samples are stored in a refrigerator until all the required analyses are completed (except inspection samples). The remaining portions are returned to the client or discarded.
- 2.2 If samples are received as two or more separate components, hand blending must be performed to generate the finished fuel before analysis.

## 3 Equipment, Apparatus, and Forms

- 3.1 The following items are required in the receiving, handling, logging, and storing of fuel samples in the laboratory:

Explosion-proof refrigerator/freezer  
Fume hood  
Disposable nitrile gloves  
Safety glasses

- 3.2 If hand blending is required then the following additional items are required:

50 mL graduated cylinder  
1000 mL graduated cylinder  
One-liter sample cans with screw-on lids

- 3.3 The Laboratory Analysis Request Sheet (Attachment 1) is used for clients other than ED.

## 4 Safety Precautions

- 4.1 Disposable nitrile gloves and safety glasses must be worn when handling fuel samples.
- 4.2 Petroleum mixtures and related laboratory reagents may be harmful, toxic, carcinogenic or fatal if ingested or inhaled.
- 4.3 Petroleum mixtures and their vapors are extremely flammable. Any possible ignition sources should be avoided or minimized in the fuel laboratory.
- 4.4 Containers should be kept tightly closed.
- 4.5 Fume hoods should always be used with fuels and related materials.

## 5 **Procedure**

### 5.1 **Receiving and Documentation of Samples**

- 5.1.1 Gasoline and diesel samples are typically received in one-liter cans (preferred) or glass bottles. They may be accepted either chilled (iced) or at room temperature. FAMES staff shall encourage clients to submit gasoline samples in duplicate.
- 5.1.2 If the samples have been shipped then the shipping container is inspected for leakage and spillage before opening.
- 5.1.3 Any visible breakage or leakage is documented on the laboratory analysis request sheet provided by the client.
- 5.1.4 Each sample is checked against the list of samples on the laboratory analysis request sheet for correct ID numbers (except inspection samples). Any discrepancy in sample ID numbers must be corrected by the client before any analyses are performed. If a request sheet is not received with the shipment, one must be generated by FAMES staff with the assistance of the client.
- 5.1.5 All applicable sections of the analysis request sheet must be completed. A project ID is mandatory; if the client does not provide one, it shall be generated by the FAMES data coordinator.
- 5.1.6 The laboratory analysis request sheet must be signed and dated by FAMES staff. The sheet is then filed in the appropriate binder. Binders are stored in the laboratory for a minimum of five years.

5.1.7 All samples (except inspection samples) are logged onto the whiteboard in the fuel analysis laboratory. Circles are used to indicate which analyses are to be performed. Analysts draw lines through the circles to indicate which analyses have been completed.

## 5.2 Handling and Blending of Fuel Samples Prior to Analysis

5.2.1 If RVP and/or distillation are requested, the sample must be directed for these analyses first. If duplicate samples are received, one can is reserved for RVP and distillation, and the other for the rest of the analyses.

5.2.2 If a gasoline sample is made up of two separate components, such as CARBOB and denatured fuel ethanol, hand blending must be performed to generate the finished fuel. The client must indicate the desired ethanol percentage.

5.2.2.1 The samples of CARBOB and denatured fuel ethanol are chilled in an ice water bath for approximately 30 minutes if delivered at room temperature. If the samples are delivered on ice, then they need to be chilled for 10 minutes.

5.2.2.2 The 50 mL and 1000 mL graduated cylinders are chilled in a refrigerator (set no higher than 45 °F) for approximately 10 minutes before use.

5.2.2.3 If the final ethanol percentage is to be 5.7% (the most common percentage), then 43 mL of the fuel ethanol and 710 mL of the CARBOB are separately measured into the chilled graduated cylinders. The components are poured into a one liter sample can, ethanol first. The can is quickly capped, shaken and stored for future analysis.

5.2.2.4 If the intended ethanol percentage is a different level, the amounts of ethanol and CARBOB are calculated so as to yield 700-800 mL of blended fuel.

5.2.3 Gaseous fuel samples may come as compressed natural gas (CNG), liquefied natural gas (LNG) or liquefied petroleum gas (LPG). Samples are received in steel or stainless steel cylinders or canisters.

## 5.3 Storage Of Samples

5.3.1 Gasolines are stored in an explosion-proof refrigerator or ice bath until all required analyses are completed (except for non-RVP inspection samples.) Diesel samples may be stored either chilled or at room temperature (preferred.)

5.3.2 After all the required analyses are completed, fuel samples are stored in the flammable storage room until they are returned to the client or discarded as indicated on the laboratory analysis request sheet.

## 6 **Revision History**

Revision No. 1.0 – Effective/Approval Date: Mar 1996

Revision No. 2.0 – Effective/Approval Date: Sept 1996

Revision No. 3.0 – Effective/Approval Date: Sept 2002

Significant changes throughout, aligning the SOP with actual laboratory practice.

**Attachment 1**

Fuel Analysis & Methods Evaluation Section  
California Air Resources Board  
Laboratory Analysis Request Sheet

Sample(s) submitted by: \_\_\_\_\_ Type: ( )gasoline ( )diesel ( )other  
Contact person (if different): \_\_\_\_\_ Date collected \_\_\_\_\_  
Project ID: \_\_\_\_\_ Date needed \_\_\_\_\_  
Affiliation/Phone: \_\_\_\_\_

Indicate test(s) desired.

**Gasoline:** \_\_\_\_\_ Benzene & Aromatics \_\_\_\_\_ DHA \_\_\_\_\_ Distillation  
\_\_\_\_\_ Olefins \_\_\_\_\_ Oxygenates \_\_\_\_\_ RVP  
\_\_\_\_\_ Sulfur \_\_\_\_\_ C/H/O Fraction

**Diesel:** \_\_\_\_\_ Aromatics & PAH \_\_\_\_\_ Sulfur \_\_\_\_\_ Distillation

When the analyses are complete, should the sample(s) be: returned \_\_\_\_\_ discarded \_\_\_\_\_

List the ID number(s) of the sample(s) being submitted:

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FAMES staff signature and date (REQUIRED): \_\_\_\_\_