

	TRACE-PM 10.5 Engine Oil & Gasoline Contamination	
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	Document Manager: Cheryl Lozen	Approved By: Jeffrey Nye

10.5 Engine Oil & Gasoline Contamination

10.5.1 Introduction

The following is a list of contaminants that may be added to gasoline or engine oil to adversely effect the operation of the engine. These contaminants are not expected from the normal operation of the engine. The analysis scheme performed will include comparison of the questioned sample to a known sample, or known reference materials such as reference collection samples or published spectra, etc.

- Sugar - See [10.14 Sugar Analysis](#)
- Molasses
- Sand
- Gasoline
- Glycol (antifreeze)
- Water
- Acid or base
- Styrofoam bead (more likely encountered in gasoline contamination)

10.5.2 Minimum Standards and Controls

10.5.2.1 Definitions

Blank: an analysis performed on a laboratory-prepared sample which includes all components of the unknown sample except for the material of interest. All reagents, preparatory steps, and analysis conditions will be identical to that used on the unknown sample.

Control: a test performed on a known sample under identical conditions as that used on the unknown sample.

Verification: a test performed on a known sample as a check of an instrument's output.

Minimum Standard of Analysis: the minimum required analytical tests to be performed in order to report a conclusive finding.

Preliminary Test: an analytical procedure that yields information about a sample but by itself cannot be used as a basis for a conclusive finding.

Confirmatory Test: an analytical procedure that will specifically identify an unknown sample.

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Standards File: a collection of spectra or chromatograms of known materials to be used as a reference for comparison to an unknown sample.

Reagent: any substance used in a reaction for the purpose of detecting, measuring, or analyzing other substances.

10.5.2.2 Instrumentation

10.5.2.2.1

Blanks must be run at the same conditions as the samples. A blank will be run if the preceding instrument run was a positive result.

10.5.2.2.2

All instrument hard copies generated from case exhibits must contain the case number, exhibit number, analyst's initials, and date.

10.5.2.2.3

Pertinent instrument parameter used for an analysis must be documented in the Procedure Manual or in the case record in Forensic Advantage.

10.5.2.2.4

All verification and calibration data must be documented and contain the analyst's initials and date.

10.5.2.2.5

Identification or classification made by comparison to other than in-house standards must be noted in the case record in Forensic Advantage.

10.5.2.2.6

Identification or classification made via computer search must be confirmed by visual comparison to computer's standard and noted in the case record.

10.5.2.2.7

Fourier Transform Infrared Spectrometer (FTIR)

10.5.2.2.7.1

Run a polystyrene calibration standard each day the instrument is in use.

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10.5.2.2.7.2

Blank/Background - a blank or background of any cell or salt plates used will be run before each sample.

10.5.2.2.7.3

Hard copies of IR Spectra must include case number, exhibit number, date, analyst's initials, resolution, number of scans, sample type (KBr pellet, liquid, vapor), frequency range, and mode (absorbance or %T).

10.5.2.2.7.4

Hard copies used for spectra enhancement must include case number, exhibit number, date, and analyst's initials.

10.5.2.2.7.5

All hard copy printouts of case exhibits must be preserved in the case record object repository.

10.5.2.2.8

Mass Spectrometer

Run an autotune each day a case is worked. A copy of the autotune report will be placed in each case record.

10.5.2.2.9

Scanning Electron Microscope with Energy Dispersive X-Ray System

10.5.2.2.9.1

A copper-aluminum calibration standard will be run each day a case sample is run.

10.5.2.2.9.2

Hard copies from EDS will include accelerating voltage, date, peaks identified, case number, exhibit number, and analyst's initials. Method of generation must be included in the case record.

10.5.2.2.10

u-XRAY Fluorescence (see instrument minimum stds and controls)

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10.5.2.3 Documentation

10.5.2.3.1

All exhibits/containers must be marked with case number, exhibit number, date, and analyst's initials.

10.5.2.3.2

Worksheets

10.5.2.3.2.1

State all tests performed and their results.

10.5.2.3.2.2

All non-routine tests will be fully detailed.

10.5.2.3.2.3

An accurate description of the evidence will be recorded.

10.5.2.3.2.4

If the sample is consumed in analysis, a notation will be made.

10.5.2.3.2.5

An accurate description of how the evidence is repackaged will be noted.

10.5.2.4 General

Any of the procedures may be modified to enhance the quality of the data.

10.5.3 Safety Considerations

10.5.3.1

This protocol involves hazardous materials, operations, and equipment. This protocol does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this protocol to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use. Proper caution should be exercised and the use of personal protective equipment

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should be considered to avoid exposure to dangerous chemicals. Consult with appropriate MSDS for each chemical prior to use.

10.5.3.2

NFPA hazard ratings for some chemicals that may be used in this protocol

Chemical	Health	Flammability	Reactivity
Silver Nitrate	2	0	0
Sodium Hydroxide	3	0	1
1-Naphthol	2	1	0
Ammonium Hydroxide	2	1	1
Sulfuric Acid	3	0	0

FIGURE 1: (A suggested course of analysis is listed in the flow chart below - Not all instrumentation listed is available in the MSP-FSD)



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