

## ENCLOSURE A

### PROPOSED THIRD 15-DAY MODIFICATIONS TO THE PROPOSED AMENDMENTS TO THE LEV III CRITERIA POLLUTANT REQUIREMENTS FOR LIGHT- AND MEDIUM-DUTY VEHICLES, THE HYBRID ELECTRIC VEHICLE TEST PROCEDURES, AND THE HEAVY-DUTY OTTO-CYCLE AND HEAVY-DUTY DIESEL TEST PROCEDURES

The following text contains staff's suggested third 15-day modifications to the "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles."

The modifications to this test procedure are needed to delete references to a number of documents that were erroneously identified as references within the proposed new "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles." Staff has, upon closer examination, determined that such documents do not constitute technical, theoretical, or empirical studies, reports or similar documents that the Board relied upon in approving for adoption the proposed amendments.

Unless otherwise indicated below, the text of the originally proposed regulatory language is shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. Modifications to the originally proposed language made available in connection with the first "15-Day Notice" are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions. Modifications to the originally proposed language made available in connection with the second "15-Day Notice" are shown in dotted underline to indicate additions and ~~italics double strikeout~~ to indicate deletions. Supplemental modifications being made in connection with this third "15-Day Notice" are shown in broken underline to indicate additions and ~~SMALL CAPS DOUBLE STRIKEOUT~~ to indicate deletions. Staff is proposing modifications to limited portions of the original proposal; for some portions of the original proposal for which no modifications are proposed, the text has been omitted and the omission indicated by [No change] or "\* \* \* \*".

There are no additional suggested modifications to the originally proposed amendments to sections 1900, 1956.8, 1961.2, 1962.2, 1965, 1976, and 1978, title 13 of the California Code of Regulations (CCR) or to the incorporated test procedures.

California Environmental Protection Agency  
AIR RESOURCES BOARD

**PROPOSED THIRD 15-DAY MODIFICATIONS**

**CALIFORNIA NON-METHANE ORGANIC GAS  
TEST PROCEDURES FOR 2017 AND SUBSEQUENT MODEL  
YEAR VEHICLES**

Adopted: [INSERT DATE OF ADOPTION]

~~Emissions Compliance, Automotive Regulations and Science Division~~  
~~Monitoring and Laboratory Division, Southern Laboratory Branch~~  
~~Mobile Source Division~~  
9528 Telstar Avenue  
El Monte, California 91731

NOTE: Mention of any trade name or commercial product does not constitute endorsement or recommendation of this product by the Air Resources Board. The following text contains staff's suggested modifications to these test procedures as originally proposed September 2, 2014. Modifications to the originally proposed language made available in connection with the first "15-Day Notice" are shown in double underline to indicate additions and ~~double-strikeout~~ to indicate deletions. Modifications to the originally proposed language made available in connection with the second "15-Day Notice" are shown in dotted underline to indicate additions and ~~italics-double-strikeout~~ to indicate deletions. Supplemental modifications being made in connection with this third "15-Day Notice" are shown in broken underline to indicate additions and ~~SMALL CAPS DOUBLE STRIKEOUT~~ to indicate deletions. Staff is proposing modifications to limited portions of the original proposal; for some portions of the original proposal for which no modifications are proposed, the text has been omitted and the omission indicated by [No change] or "\* \* \* \*".

\* \* \* \*

**Part C**

**DETERMINATION OF ALCOHOLS  
IN AUTOMOTIVE SOURCE SAMPLES  
BY GAS CHROMATOGRAPHY**

**METHOD NO. 1001**

\* \* \* \*

**8. QUALITY CONTROL**

\* \* \* \*

8.7 Limit of Detection - The LOD for the target alcohols must be determined for new instruments, after making instrument modifications that can affect the LOD and at least once every year.

\* \* \* \*

The LOD must be calculated using the following equation ~~[REF. 10]~~:

$$\text{LOD} = t * s$$

\* \* \* \*

**Part D**

**DETERMINATION OF C<sub>2</sub> TO C<sub>5</sub> HYDROCARBONS  
IN AUTOMOTIVE SOURCE SAMPLES BY GAS CHROMATOGRAPHY**

**METHOD NO. 1002**

**1. INTRODUCTION**

1.1 This document describes a gas chromatographic method of measuring C<sub>2</sub> to C<sub>5</sub> hydrocarbons (light-end hydrocarbons) in the ppbC range from automotive source samples. This method, ~~BASED ON AN ASTM METHOD [REF. 7]~~, does not include sample collection procedures.

\* \* \* \*

8. **QUALITY CONTROL**

\* \* \* \*

8.7 Limit of Detection – The LOD for the target hydrocarbons in the control standard must be determined for new instruments and after making instrument modifications that can affect linearity and/or sensitivity and at least once every year unless a daily check of the instrument response indicates that the LOD has not changed. \* \* \* \*

The LOD must be calculated using the following equation ~~[REF. 10]~~:

$$\text{LOD} = t * s$$

\* \* \* \*

**Part E**

**DETERMINATION OF C<sub>6</sub> TO C<sub>12</sub> HYDROCARBONS  
IN AUTOMOTIVE SOURCE SAMPLES BY GAS CHROMATOGRAPHY**

**METHOD NO. 1003**

1. **INTRODUCTION**

1.1 This document describes a gas chromatographic method of measuring C<sub>6</sub> to C<sub>12</sub> hydrocarbons (mid-range hydrocarbons) in the ppbC range from automotive source samples. This method, ~~BASED ON A U.S. EPA METHOD [REF. 6]~~, does not include sample collection procedures.

\* \* \* \*

8. **QUALITY CONTROL**

\* \* \* \*

8.7 Limit of Detection - The LOD for the target hydrocarbons in the control standard must be determined for new instruments and after making instrument modifications that can affect linearity and/or sensitivity and at least once every year unless a daily check of the instrument response indicates that the LOD has not changed. \* \* \* \*

The LOD must be calculated using the following equation ~~[REF. 10]~~:

$$\text{LOD} = t * s$$

\* \* \* \*

## Part F

# DETERMINATION OF ALDEHYDE AND KETONE COMPOUNDS IN AUTOMOTIVE SOURCE SAMPLES BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

## METHOD NO. 1004

### 1. INTRODUCTION

1.1 This document describes a method of analyzing automotive source samples for aldehyde and ketone compounds (carbonyls) using impingers, containing acidified 2,4-dinitrophenylhydrazine (DNPH) absorbing solution, or DNPH-impregnated cartridges. Carbonyl masses ranging between 0.02 to 200 µg are measured by this method. The “target” carbonyls (compounds of interest) that shall be measured and reported by this method are listed in Appendix 1. All of these carbonyl compounds, when measured in concentrations above the LOD, shall be reported.

1.1.1 For the purpose of calculating NMOG for vehicles tested on exhaust emission test fuel containing ethanol (see Part G, Determination of NMOG Mass Emissions):

1.1.1.1 The only carbonyl compounds that need to be reported from this method are formaldehyde and acetaldehyde.

1.1.1.2 The additional carbonyls listed in Appendix 1 are within the scope of this analytical method and their measurement may provide meaningful information to the laboratory. However, their measurement is not required.

~~1.2 THIS PROCEDURE IS DERIVED FROM A METHOD USED BY HULL [REF. 8].~~

~~1.3~~ 1.2 Other applicable forms of instrumentation and analytical techniques may be used if shown to yield results equivalent to those specified in this procedure and if approved in advance by the Executive Officer of the Air Resources Board.

1.34 All definitions and abbreviations are contained in Appendix 2 of these test procedures.

\* \* \* \*

5. **REAGENTS AND MATERIALS**

\* \* \* \*

5.7 The carbonyl/DNPH complexes ~~[Ref. 9]~~ listed in Table F1 may be purchased (e.g., Radian Corporation, in 1.2 mL ampules) or prepared in the laboratory. In-house standards must be recrystallized at least three times from 95 percent ethanol.

\* \* \* \*

8. **QUALITY CONTROL**

\* \* \* \*

8.7 Limit of Detection - The LOD for the target analytes must be determined for new instruments, after making instrument modifications which can affect the LOD and at least once per year. \* \* \* \*

The LOD must be calculated using the following equation ~~[Ref. 10]~~:

$$LOD = t * s$$

\* \* \* \*

**APPENDIX 3**

**REFERENCES**

[1] Code of Federal Regulations, Title 40, Part 1066

[2] Code of Federal Regulations, Title 40, Part 86, Subpart B

[3] Code of Federal Regulations, Title 40, Part 1065

[4] SAE J1151, "Methane Measurement Using Gas Chromatography," (revised December 1991)

[5] U.S. Environmental Protection Agency, *Characterization of Exhaust Emissions from Methanol and Gasoline Fueled Automobiles*, EPA 460/3-82-004.

~~[6] U.S. ENVIRONMENTAL PROTECTION AGENCY, COMPENDIUM OF METHODS FOR THE DETERMINATION OF TOXIC ORGANIC COMPOUNDS IN AMBIENT AIR,~~

~~(METHOD T03-15) EPA 600/4-89-017 RESEARCH TRIANGLE PARK, NORTH CAROLINA, JUNE, 1989.~~

- ~~[7] STANDARD TEST METHOD FOR C<sub>1</sub> THROUGH C<sub>6</sub> HYDROCARBONS IN THE ATMOSPHERE BY GAS CHROMATOGRAPHY, AMERICAN STANDARDS FOR TESTING MATERIALS (ASTM) STANDARDS ON CHROMATOGRAPHY (1981).~~
- ~~[8] HULL, L.A., PROCEDURES FOR 2,4-DINITROPHENYLHYDRAZONE ALDEHYDE-KETONE AIR ANALYSIS, INTERNAL REPORT AT U.S. EPA.~~
- ~~[9] SHRINER, R.L. AND FUSON, R.C., IDENTIFICATION OF ORGANIC COMPOUNDS, 2ND. ED., JOHN WILEY AND SONS, INC., 1940, P. 143.~~
- ~~[10] KEITH, L. H., TAYLOR, J.K., ET AL, "PRINCIPLES OF ENVIRONMENTAL ANALYSIS", ANALYTICAL CHEMISTRY, VOL. 55, NO. 14, DECEMBER 1983.~~