ENCLOSURE D

State of California
AIR RESOURCES BOARD

PROPOSED 15-DAY MODIFICATIONS

**CALIFORNIA EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES
FOR 2001 AND SUBSEQUENT MODEL MOTOR VEHICLES**

Adopted: August 5, 1999
Amended: June 22, 2006
Amended: October 17, 2007
Amended: December 2, 2009
Amended: September 27, 2010
Amended: [INSERT DATE OF AMENDMENT]

Note: The following text contains staff's suggested modifications to these test procedures as originally proposed December 7, 2011. The originally proposed amendments to this document are shown in underline to indicate additions and strikeout to indicate deletions compared to the test procedures as last amended September 27, 2010. Modifications to the originally proposed language made available in connection with this "15-Day Notice" are shown in double underline to indicate additions and double strikeout to indicate deletions compared to the test procedures as proposed December 7, 2011. Staff is proposing modifications to limited portions of the original proposal; for some portions where no modifications are proposed the text has been omitted and the omission indicated by "* * * *."

Amend "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," as incorporated by reference in Title 13, California Code of Regulations, Section 1976(c) to read:

* * * *

CALIFORNIA EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR 2001 AND SUBSEQUENT MODEL MOTOR VEHICLES

The provisions of Title 40, Code of Federal Regulations (CFR), Part 86, Subparts A and B (as adopted or amended as of July 1, 1989); Subpart S (as adopted or amended on May 4, 1999); and, such sections of these Subparts as last amended on such other date set forth next to the 40 CFR Part 86 section title listed below, insofar as those subparts pertain to evaporative emission standards and test procedures, are hereby adopted as the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Years," with the following exceptions and additions:

GENERAL CERTIFICATION REQUIREMENTS FOR EVAPORATIVE EMISSIONS

* * * *

E.   Emission Standards

1.   Evaporative Emission Standards for 2001 and Subsequent Model Year Vehicles Other Than Motorcycles.

* * * *

(e) For 2015 and subsequent model motor vehicles, the following evaporative emission requirements apply:

(i) A manufacturer must certify all vehicles subject to this section to the emission standards specified in either Option 1 or Option 2 below.

* * * *

(B) Option 2. The total hydrocarbon evaporative emissions from 2015 and subsequent model motor vehicles, tested in accordance with the test procedure sequence set forth in Part III, shall not exceed:

* * * *

(3)   Calculation of Hydrocarbon Credits or Debits for the Fleet-Average Option.

(A) Calculation of Hydrocarbon Credits or Debits. For each emission standard category in the model year, a manufacturer shall calculate the hydrocarbon credits or debits, as follows:

[(Applicable Hydrocarbon Emission Standard for the Emission Standard Category) – (Manufacturer's Fleet-Average Hydrocarbon Emission Value for the Emission Standard Category)] X (Total Number of Affected Vehicles)

where "Total Number of Affected Vehicles" = the total number of vehicles in the evaporative families participating in the fleet-average option, which are produced and delivered for sale in California, for the emission standard category of the given model year.

A negative number constitutes hydrocarbon debits, and a positive number constitutes hydrocarbon credits accrued by the manufacturer for the given model year. Hydrocarbon credits earned in a given model year shall retain full value through the fifth model year after they are earned. At the beginning of the sixth model year, the hydrocarbon credits will have no value.

(B) Procedure for Offsetting Hydrocarbon Debits. A manufacturer shall offset hydrocarbon debits with hydrocarbon credits for each emission standard category within three model years after the debits have been incurred. If total hydrocarbon debits are not equalized within three model years after they have been incurred, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalties applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the hydrocarbon debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's emission standards shall be determined by dividing the total amount of hydrocarbon debits for the model year in the emission standard category by the applicable hydrocarbon emission standard for the model year in which the debits were first incurred.

Additionally, ~~a manufacturer may use the excess hydrocarbon credits from the emission standard categories of (1) passenger cars and light-duty trucks 6,000 pounds GVWR and under, and 0 - 3,750 pounds LVW and (2) light-duty trucks 6,000 pounds GVWR and under, and 3,751 - 5,750 pounds LVW to equalize the hydrocarbon debits that remain at the end of the three model year offset period of any emission standard category.~~ to equalize the hydrocarbon debits that remain at the end of the three model year offset period: (1) hydrocarbon credits may be exchanged between passenger cars and light-duty trucks 6,000 pounds GVWR and under and 0-3,750 pounds LVW, and light-duty trucks 6,000 pounds GVWR and under and 3,751-5,750 pounds LVW and (2) hydrocarbon credits may be exchanged between light-duty trucks 6,001-8,500 pounds GVWR and medium-duty passenger vehicles, and medium-duty vehicles and heavy-duty vehicles.

(4)   Vehicle Canister Bleed Emission. Compliance with the canister bleed emission standard shall be determined based on the Bleed Emission Test Procedure described in section III.D.12. of these procedures and demonstrated on a stabilized canister system. Vehicles with a non-integrated refueling canister-only system are exempt from the canister bleed emission standard.

(ii) Phase-In Schedule. For each model year, a manufacturer shall certify, at a minimum, the specified percentage of its vehicle fleet to the evaporative emission standards set forth in section I.E.1.(e)(i), according to the implementation schedule set forth below. For the purpose of this section I.E.1.(e)(ii), the manufacturer's vehicle fleet consists of the vehicles produced and delivered for sale by the manufacturer in California that are subject to the emission standards in section I.E.1.(e)(i). All 2015 through 2022 model motor vehicles that are not subject to these standards pursuant to the phase-in schedule shall comply with the requirements for 2004 through 2014 model motor vehicles, as described in section I.E.1.(d).

Model Years	_Minimum Percentage of Vehicle Fleet_[1][2]
2015, 2016, and 2017	Average of vehicles certified to section I.E.1.(c) in model years 2012, 2013, and 2014[3][4]
2018 and 2019	60
2020 and 2021	80
2022 and subsequent	100

(1)   For the 2018 through 2022 model years only, a manufacturer may use an alternate phase-in schedule to comply with the phase-in requirements. An alternate phase-in schedule must achieve equivalent compliance volume by the end of the last model year of the scheduled phase-in (2022). The compliance volume is the number calculated by multiplying the percent of vehicles (based on the manufacturer's projected sales volume of all vehicles) meeting the new requirements in each model year by the number of years implemented prior to and including the last model year of the scheduled phase-in, then summing these yearly results to determine a cumulative total. The cumulative total of the five year (60/60/80/80/100) scheduled phase-in set forth above is calculated as follows: (60*5 years) + (60*4 years) + (80*3 years) + (80*2 years) + (100*1 year) = 1040. Accordingly, the required cumulative total for any alternate phase-in schedule of these emission standards is 1040. The Executive Officer shall consider acceptable any alternate phase-in schedule that results in an equal or larger cumulative total by the end of the last model year of the scheduled phase-in (2022).

(2)   Small volume manufacturers are not required to comply with the phase-in schedule set forth in this table. Instead, they shall certify 100 percent of their

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2022 and subsequent model year vehicle fleet to the evaporative emission standards set forth in section I.E.1.(e)(i)(A) or section I.E.1.(e)(i)(B).

(3)   The percentage of vehicle fleet averaged across the 2015, 2016, and 2017 model years shall be used to determine compliance with this requirement.

~~(3)~~ (4)   The minimum percentage required in the 2015, 2016, and 2017 model years is determined by averaging the percentage of vehicles certified to the emission standards in section I.E.1.(c) in each of the manufacturer's 2012, 2013, and 2014 model motor vehicle fleets. For the purpose of calculating this average, a manufacturer shall use the percentage of vehicles produced and delivered for sale in California for the 2012, ~~and~~ 2013, and 2014 model years~~, and the percentage of projected sales in California for the 2014 model year~~. A manufacturer may calculate this average percentage using the projected sales for these model years in lieu of actual sales.

(iii) Carry-Over of 2014 Model-Year Evaporative Families Certified to the Zero-Fuel Evaporative Emission Standards. A manufacturer may carry over 2014 model motor vehicles certified to the zero-fuel (0.0 grams per test) evaporative emission standards set forth in section I.E.1.(c) through the 2018 model year and be considered compliant with the requirements of section I.E.1.(e). If the manufacturer chooses to participate in the fleet-average option for the highest whole vehicle diurnal plus hot soak emission standard, the following family emission limits are assigned to these evaporative families for the calculation of the manufacturer's fleet-average hydrocarbon emission value.

Vehicle Type	Highest Whole Vehicle Diurnal + Hot Soak (grams per test)
Passenger Cars	0.300
Light-Duty Trucks 6,000 lbs. GVWR and under, and 0 - 3,750 lbs. LVW	0.300
Light-Duty Trucks 6,000 lbs. GVWR and under, and 3,751 – 5,750 lbs. LVW	0.400
Light-Duty Trucks 6,001 - 8,500 lbs. GVWR	0.500

(iv) Pooling Provision. The following pooling provision applies to the fleet-average option for the Highest Whole Vehicle Diurnal Plus Hot Soak Emission Standard in section I.E.1.(e)(i)(B). and to the phase-in requirements in section I.E.1.(e)(iii).

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(A) For the fleet-average option set forth in section I.E.1.(e)(i)(B), a manufacturer must demonstrate compliance, for each model year, based on one of two options applicable throughout the model year, either:

Pooling Option 1: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section I.E.1.(e)(i)(B), and are produced and delivered for sale in California; or

Pooling Option 2: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section I.E.1.(e)(i)(B), and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's evaporative emission standards set forth in section I.E.1.(e)(i) for that model year pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

(B) For the phase-in requirements in section I.E.1.(e)(iii), a manufacturer must demonstrate compliance, for each model year, based on one of two options applicable throughout the model year, either:

Pooling Option 1: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section I.E.1.(e)(i), and are produced and delivered for sale in California; or

Pooling Option 2: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section I.E.1.(e)(i), and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's evaporative emission standards set forth in section I.E.1.(e)(i) for that model year pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

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(C) A manufacturer that selects Pooling Option 2 must notify the Executive Officer of that selection in writing prior to the start of the applicable model year or must comply with Pooling Option 1. Once a manufacturer has selected compliance Option 2, that selection applies unless the manufacturer selects Option 1 and notifies the Executive Officer of that selection in writing before the start of the applicable model year.

(D) When a manufacturer is demonstrating compliance using Pooling Option 2 for a given model year, the term "in California" as used in section I.E.1.(e) means California, the District of Columbia, and all states that have adopted California's evaporative emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

(E)   A manufacturer that selects Pooling Option 2 must provide to the Executive Officer separate values for the number of vehicles in each evaporative family produced and delivered for sale in the District of Columbia and for each individual state within the average.

(v) Optional Certification for 2014 Model Motor Vehicles. A manufacturer may optionally certify its 2014 model motor vehicles to the evaporative emission standards set forth in section I.E.1.(e)(i), using the test fuel specified in section III.F.2.

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PART III.   EVAPORATIVE EMISSION TEST PROCEDURES FOR LIGHT- AND MEDIUM-DUTY VEHICLES

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D.   Test Procedure

The test sequence described in 40 CFR §86.130 through §86.140 shall be performed with the following modifications:

1.   General Requirements

1.0.   The following language shall be applicable in lieu of 40 CFR §86.130-78:

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1.1.   The test sequence shown in Figure 2 (Figure 3A or 3B for hybrid electric vehicles) describes the steps encountered as the vehicle undergoes the three-day diurnal sequence and the supplemental two-day diurnal sequence to determine conformity with the standards set forth. Methanol measurements may be omitted when methanol-fueled vehicles will not be tested in the evaporative enclosure. <u>Ethanol shall be accounted for via measurement or mass adjustment factor, using the methods described in this test procedure, for vehicles tested with the gasoline set forth in part II, section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles."</u> Ambient temperature levels encountered by the test vehicle throughout the entire duration of this test sequence shall not be less than 68°F nor more than 86°F, unless otherwise specified. The temperatures monitored during testing shall be representative of those experienced by the test vehicle. The test vehicle shall be approximately level during all phases of the test sequence to prevent abnormal fuel distribution. The temperature tolerance of a soak period may be waived for up to 10 minutes to allow purging of the enclosure or transporting the vehicle into the enclosure.

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10.   Diurnal Breathing Loss Test

10.1.   A three-day diurnal test shall be performed in a variable temperature enclosure, described in section III.A.1. of this test procedure. The test consists of three 24-hour cycles. For purposes of this diurnal breathing loss test, all references to methanol shall be applicable to alcohol, <u>unless specific instructions for ethanol are noted</u>.

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10.15.   The two-day diurnal test shall be performed in an enclosure, described in section III.A.1. of this test procedure. The test consists of two 24-hour diurnals. The test procedure shall be conducted according to 40 CFR §86.133-90, revised by sections III.D.10.3.1. through III.D.10.3.14., except that only two consecutive 24-hour diurnals shall be performed. For the purposes of this diurnal breathing loss test, all references to methanol shall be applicable to alcohol, <u>unless specific instructions for ethanol are noted</u>.

*   *   *   *

11.   Calculations: Evaporative Emissions
11.0.   Revise 40 CFR §86.143-90 as follows:

11.1.   Revise subparagraph (a) to read: The calculation of the net hydrocarbon plus <u>ethanol (or</u> methanol<u>)</u> mass change in the enclosure is used to determine the diurnal, hot soak, and running loss mass emissions. If the emissions also include

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alcohol components other than methanol and ethanol ~~and other alcohol components~~, the manufacturer shall determine an appropriate calculation(s) which reflect characteristics of the alcohol component similar to the equations below, subject to the Executive Officer approval. The mass changes are calculated from initial and final hydrocarbon~~,~~ and ~~me~~thanol concentrations in ppm carbon, initial and final enclosure ambient temperatures, initial and final barometric pressures, and net enclosure volume using the ~~following~~ equations of this section III.D.11~~.~~: Diurnal, hot soak, and running loss mass emissions for methanol-fueled vehicles shall be conducted according to 40 CFR §86.143-96, as amended August 23, 1995.

11.2.   Revise subparagraph (a)(1) to read:
~~Methanol calculations shall be conducted according to 40 CFR §86.143-96(b)(1)(i), as amended March 24, 1993.~~

For ethanol in an enclosure:

$$M_{C2H5OH} = (V_n - 50) \times \left[\frac{(C_{S1f} \times AV_{1f}) + (C_{S2f} \times AV_{2f})}{V_{Ef}} \right] - \left[\frac{(C_{S1i} \times AV_{1i}) + (C_{S2i} \times AV_{2i})}{V_{Ei}} \right] + (M_{C2H5OHout} - M_{C2H5OHin})$$

where: M_{C2H5OH} is the ethanol mass emissions (µg)

V_n is the enclosure nominal volume. (ft^3)

C_S is the GC concentration of sample (µg/ml)

AV is the volume of absorbing reagent in impinger (ml)

V_E is the volume of sample withdrawn (ft^3). Sample volumes must be corrected for differences in temperature to be consistent with determination of V_n, prior to being used in the equation.

i = initial sample

f = final sample

1 is the first impinger

2 is the second impinger

$M_{C2H5OH,\ out}$ is the mass of ethanol exiting the enclosure from the beginning of the cycle to the end of the cycle; this only applies to diurnal testing in fixed-volume enclosures (µg); For variable-volume enclosures, $M_{C2H5OH,\ out}$ is zero

$M_{C2H5OH,\ in}$ is the mass of ethanol entering the enclosure from the beginning of the cycle to the end of the cycle; this only

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<u>applies to diurnal testing in fixed-volume enclosures (µg); For variable-volume enclosures, $M_{C2H5OH, in}$ is zero</u>

<u>The enclosure ethanol mass (M_{C2H5OH}) determined from the equation above goes into the equations of subsequent sections to calculate the total mass emissions, where $M_{C2H5OHhs}$ is the ethanol mass emissions from the hot soak test, $M_{C2H5OHdi}$ is the ethanol mass emissions from the diurnal test, and $M_{C2H5OHrl(n)}$ is the ethanol mass emissions from the running loss test for phase n of the test. For diurnal testing, this calculation shall be made for each 24-hour diurnal period.</u>

    11.3.   Revise subparagraph (a)(2) to read:

    11.3.1.   For hydrocarbons <u>in an enclosure</u>:
             (a) ~~Hot soak HC mass.~~ <u>Hot soak and diurnal testing in an enclosure:</u> For fixed volume enclosures, the ~~hot soak~~ enclosure <u>hydrocarbon</u> mass is determined as:

$M_{HC\cancel{hs}}$ = [2.97x (V_n - 50) x10^{-4} x {P_f (C_{HCe2} - r$C_{C2H5\cancel{3}OHe2}$)/T_f - P_i (C_{HCe1} - r$C_{C2H5\cancel{3}OHe1}$)/T_i}] <u>$\pm$</u> <u>$M_{HC, out}$ - $M_{HC, in}$</u>

        where: $M_{HC\cancel{hs}}$ is the ~~hot soak~~ HC mass emissions (grams)

                   V_n is the enclosure nominal volume ~~if the running loss enclosure is used or the enclosure volume at 105°F if the diurnal enclosure is used~~. (ft^3)

                   P_i is the initial barometric pressure (inches Hg)

                   P_f is the final barometric pressure (inches Hg)

                   C_{HCe2} is the final enclosure hydrocarbon concentration including FID response to ~~methanol~~ in the sample (ppm C)

                   C_{HCe1} is the initial enclosure hydrocarbon concentration including FID response to ~~methanol~~ in the sample (ppm C)

                   $C_{C2H5\cancel{3}OHe2}$ is the final ~~methanol~~ concentration ~~calculated according to §86.143-90 (a)(2)(iii)~~ (ppm C equivalent).

$$= \frac{2.088 \times 10^{-3} \times T_f}{P_f \times V_E} \times \left[(C_{S1f} \times AV_{1f}) + (C_{S2f} \times AV_{2f}) \right]$$

$C_{C_2H_5OHe1}$ is the initial ~~methanol~~ concentration ~~calculated according to §86.143-90 (a)(2)(iii)~~ (ppm C equivalent)

$$= \frac{2.088 \times 10^{-3} \times T_i}{P_i \times V_E} \times [(C_{S1i} \times AV_{1i}) + (C_{S2i} \times AV_{2i})]$$

r is the FID response factor to ~~methanol~~

T_i is the initial enclosure temperature (°R)

T_f is the final enclosure temperature (°R)

$\underline{V_E}$ is the volume of sample withdrawn (ft³). Sample volumes must be corrected for differences in temperature to be consistent with determination of $\underline{V_n}$, prior to being used in the equation.

$\underline{C_S}$ is the GC concentration of sample (μg/ml)

AV is the Volume of absorbing reagent in impinger (ml)

1 is the first impinger

2 is the second impinger

i = initial sample

f = final sample

$\underline{M_{HC,\,out}}$ is the mass of hydrocarbon exiting the enclosure from the beginning of the cycle to the end of the cycle; this only applies to diurnal testing in fixed-volume enclosures (grams)

$\underline{M_{HC,\,in}}$ is the mass of hydrocarbon entering the enclosure from the beginning of the cycle to the end of the cycle; this only applies to diurnal testing in fixed-volume enclosures (grams)

For vehicles tested in an enclosure with the gasoline set forth in part II, section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" only, measured ethanol values can be omitted so long as the resultant M_{HC} is multiplied by 1.08. If this option is used, then all terms accounting for ethanol in the applicable equations of this section III.D.11 (including ethanol concentration values of the above equation) shall equal zero.

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The enclosure HC mass (M_{HC}) determined from the equation above goes into the equations of subsequent sections to calculate the total mass emissions, where M_{HChs} is the HC mass emissions from the hot soak test, M_{HCdi} is the HC mass emissions from the diurnal test, and $M_{HCrl(n)}$ is the HC mass emissions from the running loss test for phase n of the test if the enclosure method is used for running loss testing. For diurnal testing, this calculation shall be made for each 24-hour diurnal period.

For variable volume enclosures, calculate the ~~hot soak~~ enclosure HC mass (M_{HChs}) according to the equation used above except that P_f and T_f shall equal P_i and T_i and $M_{HC, out}$ and $M_{HC, in}$ shall equal zero.

        (b)   Running loss ~~HC~~ mass.

The running loss HC mass per distance traveled is defined as:

$$M_{HCrlt} = (M_{HCrl(1)} + M_{HCrl(2)} + M_{HCrl(3)})/(D_{rl(1)} + D_{rl(2)} + D_{rl(3)})$$

where: M_{HCrlt} is the total running loss HC mass per distance traveled (grams HC per mile)

                    $M_{HCrl(n)}$ is the running loss HC mass for phase n of the test (grams HC)

                    $D_{rl(n)}$ is the actual distance traveled over the driving cycle for phase n of the test (miles)

The running loss ethanol mass per distance traveled is defined as:

$$M_{C2H5OHrlt} = (M_{C2H5OHrl(1)} + M_{C2H5OHrl(2)} + M_{C2H5OHrl(3)})/(D_{rl(1)} + D_{rl(2)} + D_{rl(3)})$$

where: $M_{C2H5OHrlt}$ is the total running loss ethanol mass per distance traveled (grams ethanol per mile)

                    $M_{C2H5OHrl(n)}$ is the running loss ethanol mass for phase n of the test (grams ethanol)

For the point-source method:

Hydrocarbon emissions:

$$M_{HCrl(n)} = (C_{HCs(n)} - C_{HCa(n)}) \times 16.88 \times V_{mix} \times 10^{-6}$$

where: $C_{HCs(n)}$ is the sample bag HC concentration for phase n of the test (ppm C)

$C_{HCa(n)}$ is the background bag concentration for phase n of
the test (ppm C)

16.88 is the density of pure vapor at 68°F (grams/ft³)

V_{mix} is the total dilute CVS volume (std. ft³)

and: V_{mix} is calculated per 40 CFR §86.144-90

~~Me~~Ethanol emissions:

$$M_{C_2H_5OHrl(n)} = (C_{C_2H_5OHs(n)} - C_{C_2H_5OHa(n)}) \times \text{~~37.74~~} \underline{54.25} \times V_{mix}$$

where: $C_{C_2H_5OHs(n)}$ is the sample bag ~~methanol~~ concentration for phase n of the test (ppm C equivalent)

$C_{C_2H_5OHs(n)}$ is the background bag concentration for phase n of the test (ppm C equivalent)

~~37.74~~ 54.25 is the density of pure vapor at 68°F (grams/ft³)

V_{mix} is the total dilute CVS volume (std. ft³)

and: V_{mix} is calculated per 40 CFR §86.144-90

<u>For vehicles tested for running loss using the point source method with the gasoline set forth in part II, section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" only, measured ethanol values can be omitted so long as the resultant $M_{HCrl(n)}$ is multiplied by 1.08. If this option is used, then all terms accounting for ethanol in the applicable equations of this section III.D.11 shall equal zero and both $C_{HCs(n)}$ and $C_{HCa(n)}$ in the above equation shall include the FID response to ethanol (the FID response to ethanol shall not be subtracted).</u>

For the enclosure method:

$M_{HCrl(n)}$ is the running loss HC mass for phase n of the test (grams HC) and shall be determined by the ~~same~~ method ~~as the hot soak hydrocarbon mass emissions determination~~ specified in section III.D.11.3.1.(a).

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(c) Diurnal mass. For fixed volume enclosures, the HC mass for each of the three diurnals is defined for an enclosure as:

$$M_{HCd} = [2.97 \times (V - 50) \times 10^{-4} \times [P_f (C_{HCe2} - rC_{CH3OHe2})/T_f - P_i (C_{HCe1} - rC_{CH3OHe1})/T_i]] + M_{HC, out} - M_{HC, in}$$

where: M_{HCd} is the diurnal HC mass emissions (grams)

V is the enclosure volume at 65° F (ft³)

P_i is the initial barometric pressure (inches Hg)

P_f is the final barometric pressure (inches Hg)

C_{HCe2} is the final enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

C_{HCe1} is the initial enclosure hydrocarbon concentration including FID response to methanol in the sample (ppm C)

$C_{CH3OHe2}$ is the final methanol concentration calculated according to 40 CFR §86.143-90 (a)(2)(iii)

$C_{CH3OHe1}$ is the initial methanol concentration calculated according to 40 CFR §86.143-90 (a)(2)(iii)

r is the FID response factor to methanol

T_i is the initial enclosure temperature (°R)

T_f is the final enclosure temperature (°R)

$M_{HC, out}$ is the mass of hydrocarbon exiting the enclosure from the beginning of the cycle to the end of the cycle (grams)

$M_{HC, in}$ is the mass of hydrocarbon entering the enclosure from the beginning of the cycle to the end of the cycle (grams)

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For variable volume enclosures, calculate the HC mass for each of the three diurnals (M_{HCd}) according to the equation used above except that P_f and T_f shall equal P_i and T_i and $M_{HC, out}$ and $M_{HC, in}$ shall equal zero.

11.3.2. Revise subparagraph (a)(3) to read:

The total mass emissions shall be adjusted as follows:

(1) $M_{hs} = M_{HChs} + (\text{14.2284/32.042}\ \underline{28.44/46.07}) \times 10^{-6}\ M_{C2H5OHhs}$

(2) $M_{di} = M_{HCdi} + (\text{14.3594/32.042}\ \underline{28.66/46.07}) \times 10^{-6}\ M_{C2H5OHdi}$

(3) $M_{rl} = M_{HCrlt} + (\text{14.2284/32.042}\ \underline{28.44/46.07}) \times 10^{-6}\ M_{C2H5OHrlt}$

11.3.3. Revise subparagraph (b) to read: The final evaporative emission test results reported shall be computed by summing the adjusted evaporative emission result determined for the hot soak test (M_{hs}) and the highest 24-hour result determined for the diurnal breathing loss test (M_{di}). The final reported result for the running loss test shall be the adjusted emission result (M_{rl}), expressed on a grams per mile basis.

12.   Bleed Emission Test Procedure (BETP)

12.1.   Carbon Canister System Stabilization. The carbon canister system shall be stabilized to a 4,000-mile test condition using one of the following methods:

12.1.1. Stabilization on a vehicle. The canister system shall be installed on a representative vehicle, and the vehicle shall be driven for 4,000 miles using ~~California certification fuel~~ the gasoline set forth in part II., section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." The last part of this drive shall consist of an Urban Dynamometer Driving Schedule (UDDS), specified in appendix I of 40 CFR §86.

12.1.2.   Carbon Canister System Purge/Load Cycling with Fuel Vapor. The carbon canister system shall be cycle aged no less than 10 cycles using ~~California certification fuel~~ the gasoline referenced in section III.D.12.1.1 by loading the canister system to 2-gram breakthrough with either a mixture of fuel vapor and nitrogen (50 ± 15 percent fuel vapor by volume) or a mixture of fuel vapor and air (50 ± 15 percent fuel vapor by volume), at a fuel vapor fill rate of 40 to 80 grams per hour. Each loading is followed by purging the canister system with 300 canister bed volume exchanges at 0.8 cfm.

12.1.3.   Alternative Carbon Canister System Purge/Load Cycling with Fuel Vapor. The carbon canister system shall be aged no less than 10 cycles using ~~California certification fuel~~ the gasoline referenced in section III.D.12.1.1 by loading and purging the carbon canister system with a method approved in advance by the Executive Officer. The alternative method shall be demonstrated to yield test results equivalent to

or more stringent than, those resulting from the use of the method set forth in section III.D.12.1.1 or III.D.12.1.2.

12.2.   Fuel Tank Drain/Fill and Soak. A fuel tank that represents the worst case as determined by engineering evaluation shall be drained and filled to 40 percent with ~~California certification fuel~~ the gasoline referenced in section III.D.12.1.1. The tank shall be soaked for a minimum of 6 hours to a maximum of 72 hours at 65 ± 3°F. The canister system load (section III.D.12.3) and soak (section III.D.12.4) can be performed in series or in parallel with the 6 to 72 hour fuel tank soak.

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F.   Fuel Specifications

1.   For 2001 through 2014 model motor vehicles (except for 2014 model year vehicles certifying to the evaporative emission standards set forth in section I.E.1.(e)), the ~~Evaporative~~ evaporative emission test fuel shall be the fuel specified for exhaust emission testing ~~as specified~~ in part II. section A.100.3. of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001 and Subsequent~~ 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," except as provided in section III.G. of these test procedures.

2.   All ~~2015~~ 2014 through 2019 model gasoline-fueled motor vehicles certifying to evaporative emission standards set forth in the section I.E.1.(e) (except those vehicles produced by a small volume manufacturer, as noted below, and those vehicles belonging to carry-over families allowed per section I.E.1.(e)(iii)) shall be tested for evaporative emissions on the gasoline set forth in part II., section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles~~"~~." All ~~2015~~ 2014 through 2019 model gasoline-fueled motor vehicles not certifying to evaporative emission standards set forth in the section I.E.1.(e) that are not tested using this gasoline shall ~~may~~ conduct evaporative emission testing with ~~use~~ the test fuel specified in section III.F.1.

All 2020 and subsequent model gasoline-fueled motor vehicles (except those vehicles produced by a small volume manufacturer, as noted below) shall be tested for ~~both exhaust and~~ evaporative emissions on the gasoline set forth in part II., section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles"; evaporative emission testing by the Executive Officer will be performed using said test fuel ~~for both exhaust and evaporative emission testing~~.

A small volume manufacturer shall certify all 2022 and subsequent model motor vehicles to ~~both exhaust and~~ the evaporative emission requirements using the gasoline

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~~specified for exhaust emission testing described~~ set forth in part II., section A.100.3.1.2. of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles"; evaporative emission testing by the Executive Officer will be performed using said test fuel ~~for both exhaust and evaporative emission testing~~. All 2015 to 2021 model motor vehicles produced by a small volume manufacturer that are not tested using this gasoline shall conduct evaporative emission testing with ~~use~~ the test fuel in section III.F.1.

3. For 2015 and subsequent model motor vehicles other than gasoline-fueled vehicles (except for flexible fuel vehicles certifying to evaporative emission standards set forth in the section I.E.1.(d), as noted below), the evaporative emission test fuel shall be the applicable fuel specified for ~~exhaust~~ evaporative emission testing in part II. section A.100.3.3 – A.100.3.6 of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles."

For 2015 and subsequent model flexible fuel vehicles certifying to the evaporative emission standards set forth in the section I.E.1.(d), the evaporative emission test fuel shall be either the fuel specified for exhaust emission testing in part II. section A.100.3. of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," or the applicable fuel specified for evaporative emission testing in part II. section A.100.3.4 of the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles."

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