State of California
AIR RESOURCES BOARD

Resolution 92-9

March 12, 1992

Agenda Item No.: 92-3-2

WHEREAS, sections 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to adopt standards, rules and regulations and to do such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by law;

WHEREAS, in section 43000 of the Health and Safety Code the Legislature has declared that the emission of air contaminants from motor vehicles is the primary cause of air pollution in many parts of the state, and that the control and elimination of those air contaminants is of prime importance for the protection and preservation of the public health and well-being, and for the prevention of irritation to the senses, interference with visibility, and damage to vegetation and property;

WHEREAS, section 43018(a) of the Health and Safety Code, enacted by the California Clean Air Act of 1988, directs the Board to endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the state ambient air quality standards at the earliest practicable date;

WHEREAS, section 43018(b) of the Health and Safety Code directs the Board no later than January 1, 1992 to take whatever actions are necessary, cost-effective, and technologically feasible in order to achieve, by December 31, 2000, a reduction in motor vehicle emissions of reactive organic gases ("ROG") of at least 55 percent and a reduction of motor vehicle emissions of oxides of nitrogen ("NOx"), and the maximum feasible reductions in particulates ("PM"), carbon monoxide ("CO"), and toxic air contaminants from vehicular sources;

WHEREAS, section 43018(c) of the Health and Safety Code provides that in carrying out section 43018, the Board shall adopt standards and regulations which will result in the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuel, including but not limited to reductions in motor vehicle exhaust and evaporative emissions, reductions in in-use vehicular emissions through durability and performance improvements, requiring the purchase of low-emission vehicles by state fleet operators, and specification of vehicular fuel composition;

WHEREAS, section 43104 of the Health and Safety Code directs the Board to adopt test procedures for determining whether new motor vehicles are in compliance with the emission standards established by the Board;

WHEREAS, following a hearing on September 27-28, 1990, the Board in Resolution 90-58 approved Low-Emission Vehicles and Clean Fuels regulations which require the production of low-emission light- and medium-duty vehicles and require that alternative fuels used by these vehicles be made reasonably available to motorists; at the direction of the Board these regulations were subsequently adopted by the Executive Officer in Executive Order G-604;

WHEREAS, the test procedures for certifying new motor vehicles operating on specified alternative fuels to the low-emission standards are contained in the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, which is incorporated by reference in Title 13, California Code of Regulations, section 1960.1(k); test procedures for certifying new heavy-duty engines operating on specified alternative fuels to the Board's heavy duty engine emission standards are contained in the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles and the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles, which are incorporated by reference in Title 13, California Code of Regulations, sections 1956(b) and 1956(d);

WHEREAS, the staff has now proposed adoption of a regulatory action which would establish specifications for certain alternative fuels sold or supplied for use in motor vehicles applicable starting January 1, 1993 ("commercial specifications"); these specifications would cover M-100 fuel methanol, M-85 fuel methanol, E-100 fuel ethanol, E-85 fuel ethanol, compressed and liquified natural gas, liquified petroleum gas, and hydrogen;

WHEREAS, the regulatory action proposed by the staff would also amend, generally applicable starting with the 1994 model year, the alternative fuel specifications currently established for motor vehicle emission certification testing ("certification specifications"); these specifications cover M-100 fuel methanol, M-85 fuel methanol, compressed and liquified natural gas, and liquified petroleum gas;

WHEREAS, the California Environmental Quality Act and Board regulations require that an action not be adopted as proposed where it will have significant adverse environmental impacts if feasible alternatives or mitigation measures are available which would substantially reduce or avoid such impacts;

WHEREAS, the Board has considered the impact of the proposed regulations on the economy of the state;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with the provisions of Chapter 3.5 (commencing with section 11340), Part 1, Division 3, Title 2 of the Government Code; and

WHEREAS, the Board finds that:

The alternative fuel specifications approved herein will help ensure that the fuels used to certify low-emission vehicles are consistent with those available for routine consumer operation of those vehicles; to the extent that alternative clean fuels are used to certify low-emission vehicles, emission reductions will be achieved in customer use only if fuels of similar quality are readily available and used by the vehicle owners;

The alternative fuel commercial specifications approved herein are appropriate and necessary to ensure that commercially available alternative fuels meet consistent standards for quality; fuels of inferior or inconsistent quality may cause the vehicles to operate improperly, resulting in adverse impacts on both the acceptance of low-emission vehicles and emissions;

The regulations approved herein are technologically feasible within the applicable timeframes;

The economic impacts of the regulations approved herein are warranted in light of the public health benefits associated with the regulations;

The modifications to the regulations described in Attachment E hereto are appropriate and necessary to clarify them and improve their effectiveness; and

The amendments approved herein will not have any significant adverse environmental impacts.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves the amendments to sections 1960.1(k), 1956.8(b) and 1956.8(d), Title 13, California Code of Regulations, the adoption of new Article 3 (containing new sections 2290, 2291, 2292.1 through 2292.7) Title 13, California Code of Regulations, as set forth in Attachment A hereto; the amendments to the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-duty Vehicles as set forth in Attachment B hereto; the amendments to the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles as set forth in Attachment C hereto; and the amendments to the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles as set forth in Attachment D hereto; with the modifications to the above regulations and incorporated documents (including new section 2293) described in Attachment E hereto.

BE IT FURTHER RESOLVED that the Board directs the Executive Officer: (1) to incorporate into the approved regulations and incorporated documents the modifications described in Attachment E hereto, and (2) either to adopt the modified regulations, amendments, and new documents after making them available to the public for a supplemental written comment period of 15 days, with such additional modifications as may be appropriate in light of supplemental comments received, or to present the regulations, amendments, and documents to the Board for further considerations if he determines that this is warranted in light of supplemental written comments received.

BE IT FURTHER RESOLVED that the Board hereby determines that the amendments to the motor vehicle emission test procedures approved herein will not cause the California motor vehicle emission standards, in the aggregate, to be less protective of public health and welfare than applicable federal standards.

BE IT FURTHER RESOLVED that the Board hereby finds that separate California emission standards and test procedures are necessary to meet compelling and extraordinary conditions.

BE IT FURTHER RESOLVED that the Board finds that the California emission standards and test procedures as amended herein will not cause the California requirements to be inconsistent with section 202(a) of the Clean Air Act and raise no new issues affecting previous waiver determinations of the Administrator of the Environmental Protection Agency pursuant to section 209(b) of the Clean Air Act.

BE IT FURTHER RESOLVED that the Executive Officer shall, upon adoption, forward the amendments pertaining to the motor vehicle emission standards and test procedures to the U.S. Environmental Protection Agency with a request for a waiver or confirmation that the amendments are within the scope of an existing waiver of federal preemption pursuant to section 209(b) of the Clean Air Act, as appropriate.

BE IT FURTHER RESOLVED the the Board directs the Executive Officer to monitor implementation of the requirements for commercial alternative fuel specifications approved herein, and to report to the Board as appropriate on any significant difficulties encountered by the regulated industries in implementing the requirements, with recommendations for the consideration of any amendments deemed necessary.

I hereby certify that the above is a true and correct copy of Resolution 92-9 as adopted by the Air Resources Board.

Pat Hutchens

Pat Hutchens, Board Secretary

Resolution 92-9

March 12, 1992

Identification of Attachments to the Resolution

Attachment A: Proposed amendments to Title 13, California Code of Regulations, sections 1960.1, 1956.8(b), and 1956.8(d), and proposed new Title 13, California Code of Regulations, sections 2290 through 2292.7, as set forth in Appendix A to the Staff Report.

Attachment B: Amendments to the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles, as set forth in Appendix B to the Staff Report.

Attachment C: Amendments to the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-duty Diesel Engines and Vehicles, as set forth in Appendix C to the Staff Report.

Attachment D: Amendments to the California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy-duty Otto-cycle Engines and Vehicles, as set forth in Appendix D to the Staff Report.

Attachment E: Staff's Suggested Changes to the Proposed Specifications for Alternative Fuels for Motor Vehicles (distributed at the hearing on March 12, 1992).

PROPOSED REGULATION ORDER

Note: Proposed new language is shown in *italics* and proposed deletions are shown in ~~strikeout~~. Modifications to the proposed new language are indicated by *underlining of italicized text* in the case of additions, and ~~*strikeout of italicized text*~~ in the case of deletions.

Amend section 1960.1(k), Title 13, California Code of Regulations to read as follows:

1960.1. **Exhaust Emission Standards and Test Procedures - 1981 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.**

(a) through (j) [No change]

(k) The test procedures for determining compliance with these standards are set forth in "California Exhaust Emission Standards and Test Procedures for 1981 through 1987 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", adopted by the State Board on November 23, 1976, as last amended May 20, 1987, and in "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles", adopted by the state board on May 20, 1987, as last amended ~~July 12, 1991~~ *[insert date of amendment]*, both of which are incorporated herein by reference.

(l) through (o) [No Change]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106 and 43204, Health and Safety Code.

Amend Title 13, California Code of Regulations, section 1956.8(b) and (d) to read as follows:

1956.8. **Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.**

(a) [No Change]

(b) The test procedures for determining compliance with standards applicable to 1985 and subsequent heavy-duty diesel engines and vehicles are set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles", adopted April 8, 1985, as last amended ~~July 12, 1991~~ *[insert date of amendment]*, which is incorporated herein by reference.

(c) [No Change]

(d) The test procedures for determining compliance with standards applicable to 1987 and subsequent model heavy-duty otto-cycle engines and vehicles are set forth in the "California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy Duty Otto-Cycle Engines and Vehicles," adopted April 25, 1986, as last amended ~~July 12, 1991~~ *[insert date of amendment]*, which is incorporated herein by reference.

(e) through (h) [No Change]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43103, and 43104 Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106, and 43204, Health and Safety Code.

Adopt new Article 3, sections 2290 - 2293, Chapter 5, Title 13, California Code of Regulations, to read as follows:

Article 3. Specifications for Alternative Motor Vehicle Fuels

2290. Definitions

(a) For the purposes of this article, the following definitions apply:

(1) "Alternative fuel" means any fuel which is commonly or commercially known or sold as one of the following: M-100 fuel methanol, M-85 fuel methanol, E-100 fuel ethanol, E-85 fuel ethanol, compressed natural gas, ~~liquified natural~~ gas, liquefied petroleum gas, or hydrogen.

(2) "ASTM" means the American Society for Testing and Materials.

(3) "Motor vehicle" has the same meaning as defined in section 415 of the Vehicle Code.

(4) "Supply" means to provide or transfer a product to a physically separate facility, vehicle, or transportation system.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2291. Basic Prohibitions.

(a) Starting January 1, 1993, no person shall sell, offer for sale or supply an alternative fuel intended for use in motor vehicles in California unless it conforms with the applicable specifications set forth in this article 3.

(b) An alternative fuel shall be deemed to be intended for use in motor vehicles in California if it is:

(1) stored at a facility which is equipped and used to dispense that type of alternative fuel to motor vehicles, or

(2) delivered or intended for delivery to a facility which is equipped and used to dispense that type of alternative fuel to motor vehicles, or

(3) sold, offered for sale or supplied to a person engaged in the distribution of motor vehicle fuels to motor vehicle fueling facilities, unless the person selling, offering or supplying the fuel demonstrates that he or she has taken reasonably prudent precautions to assure that the fuel will not be used as a motor vehicle fuel in California.

(c) For the purposes of this section, each retail sale of alternative fuel for use in a motor vehicle, and each supply of alternative fuel into a

motor vehicle fuel tank, shall also be deemed a sale or supply by any person who previously sold or supplied such alternative fuel in violation of this section.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.1. Specifications for M-100 Fuel Methanol

The following standards apply to M-100 fuel methanol (The identified test methods are incorporated herein by reference):

Specifications for M-100 Fuel Methanol

Specification	Value	Test Method
Methanol	96 vol. % (min.)	As determined by the distillation range below
Distillation	4.0 ^{o}C (range)	ASTM D 1078-86. At 95% by volume distilled. Must include 64.6 ± 0.1^{o}C
Other alcohols and ethers	2 mass % (max.)	ASTM D 4815-89
Hydrocarbons, gasoline or diesel fuel derived	2 mass % (max.)	ASTM D 4815-89, and then subtract concentration of alcohols, ethers and water from 100 to obtain percent hydrocarbons
Luminosity		Shall produce a luminous flame, which is visible under maximum daylight conditions.

		throughout the entire burn duration. Applicable ~~1/1/94~~ 1/1/95
Specific gravity	*0.792 ± 0.002 @ ~~20~~/20/20°C*	*ASTM D 891-89*
Acidity as acetic acid	*~~0.003~~ 0.01 mass % (max.)*	*ASTM D 1613-85*
Total chlorine as chloride	*0.0002 mass % (max.)*	*ASTM D 2988-86*
Lead	*2 mg/l (max.) a/*	*ASTM D ~~3237-90~~ 3229-88*
Phosphorus	*0.2 mg/l (max.) b/*	*ASTM D 3231-89*
Sulfur	*~~0.015~~ 0.002 mass % (max.)*	*ASTM D ~~3120-87~~ 2622-87*
Gum, heptane washed	*5 mg/~~100 ml~~l (max.)*	*ASTM D 381-86*
Total particulates	*5 mg/l (max.)*	*ASTM D 2276-89, modified to replace cellulose acetate filter with a 0.8 micron pore size membrane filter*
Water	*~~0.5~~ 0.3 mass % (max.)*	*ASTM E 203-75*
Appearance	*Free of turbidity, suspended matter and sediment*	*Visually determined at 25°C by proc. A of ASTM D 4176-86*
Bitterant	*c/*	
Odorant	*d/*	

a/ No added lead.

b/ No added phosphorous.

c/ The M-100 fuel methanol at ambient conditions must have a distinctive and noxious taste, for purposes of preventing purposeful or inadvertent human consumption. Applicable 1/1/95.

d/ The M-100 fuel methanol upon vaporization at ambient conditions must have a distinctive odor potent enough for its presence to be detected down to a concentration in air of not over 1/5 (one-fifth) of the lower limit of flammability. Applicable 1/1/95.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.2. Specifications for M-85 Fuel Methanol

The following standards apply to M-85 fuel methanol (The identified test methods are incorporated herein by reference):

Specifications for M-85 Fuel Methanol

Specification	Value	Test Method
Methanol plus higher alcohols	~~85~~ 84 vol. % (min.)	Annex A1 to the ASTM D-2 Proposal P-232, Draft 8-9-91
~~Gasoline, unleaded~~ a/	~~14.5 ± .5 vol. %~~	~~Must meet local specifications for commercial unleaded gasoline, except for RVP~~
Higher alcohols (C2 - C8)	2 vol. % (max.)	ASTM D 4815-89
Hydrocarbons + aliphatic ethers a/	13-~~15~~ 16 vol. %	ASTM D 4815-89, and then subtract concentration of alcohols, ethers and water from 100 to obtain percent hydrocarbons
Vapor pressure, dry	b/ ~~Final blend must meet vapor pressure requirements for commercial unleaded gasoline of the area in which it will be sold, with a minimum RVP of 6.5 psi~~	Methods contained in Title 13, Section 2262 must be used. ASTM D 4953-90 is an alternative method, however, in case of dispute about the vapor pressure, the value determined by the methods contained in Title 13, Section 2262 shall prevail over the value calculated by ASTM D 4953-90, including its precision statement
Luminosity		Shall produce a luminous flame, which is visible under maximum daylight conditions, throughout the entire burn duration
Acidity as acetic acid	~~0.003~~ 0.005 mass % (max.)	ASTM D 1613-85

Total chlorine as chloride	0.0002 mass % (max.)	ASTM D 3120-87 modified for the det. of organic chlorides, and ASTM D 2988-86
Lead	~~0.002 g/l~~ 2 mg/l (max.) c/	ASTM D ~~3237-90~~ 3329-88
Phosphorus	~~0.0002 g/l~~ 0.2 mg/l (max.) d/	ASTM D 3231-89
Sulfur	~~0.015~~ 0.004 mass % (max.)	ASTM D ~~3120-87~~ 2622-87
Gum, heptane washed	5 mg/100 ml (max.)	ASTM D 381-86
Total particulates	~~5~~ 0.6 mg/l (max.)	ASTM D 2276-89, modified to replace cellulose acetate filter with a 0.8 micron pore size membrane filter
Water	0.5 mass % (max.)	ASTM E 203-75
Appearance	Free of turbidity, suspended matter and sediment	Visually determined at 25°C by Proc. A of ASTM D 4176-86

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a/ Hydrocarbon fraction shall have a final maximum boiling point of 225 degrees C by ASTM method D 86, oxidation stability of 240 minutes by ASTM test method D 525 and No. 1 maximum copper strip corrosion by ASTM method D 130. Ethers must be aliphatic. No manganese added. Adjustment of RVP must be performed using common blending components from the gasoline stream. Starting on 4/1/96, the hydrocarbon fraction must also meet specifications for benzene, olefin content, aromatic hudrocarbon content, maximum T90 and maximum T50 found in California Code of Regulations, Title 13 sections 2262.3, 2262.4, 2262.7 and 2262.6 (T90 & T50), respectively.

{Staff intends to adjust the boundaries of the areas indicated in the ASTM D 4814-91b document referenced in b/ below to match the Air Resources Board's California air basin boundaries.}

b/ RVP range of 7.0 to 9.0 psi for those geographical areas and times indicated for A, A/B, B/A and B volatility class fuels in Table 2 of ASTM D 4814-91b. RVP range of 9.0 to 10.9 psi for those geographical areas and times indicated for B/C, C/B, C, C/D and D/C volatility fuels. RVP range of 10.9 to 13.1 psi for those geographical areas and times indicated for D, D/E, E/D and E volatility fuels.

c/ No added lead.

d/ No added phosphorus.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.3. Specifications for E-100 Fuel Ethanol

The following standards apply to E-100 fuel ethanol~~:~~

(The identified test methods are incorporated herein by reference):

Specifications for E-100 Fuel Ethanol

Specification	Value	Test Method
Ethanol	92 vol. % (min.)	ASTM D 3545-90 a/
~~Denatured fuel ethanol~~	~~98 vol. % (min.)~~	a/
Other alcohols and ethers	2 mass % (max.)	ASTM D 4815-89
Hydrocarbons, gasoline or diesel fuel derived	5 mass % (max.)	ASTM D 4815-89, and then subtract concentration of alcohols, ethers and water from 100 to obtain percent hydrocarbons
Acidity as acetic acid	0.007 mass % (max.)	ASTM D 1613-85
Total chlorine as chloride	0.0004 mass % (max.)	ASTM D 3120-87 modified for the determination of organic chlorides, and ASTM D 2988-86
Copper	0.07 mg/l (max.)	ASTM D 1688-90 as modified in ASTM D 4806-88
Lead	2 mg/l (max.) b/	ASTM D ~~3237-90~~ 3229-88
Phosphorus	0.2 mg/l (max.) c/	ASTM D 3231-89
Sulfur	~~0.015~~ 0.002 mass % (max.)	ASTM D ~~3120-87~~ 2622-87
Gum, heptane washed	5 mg/~~100 ml~~ 1 (max.)	ASTM D 381-86
Total particulates	5 mg/l (max.)	ASTM D 2276-89, modified to replace cellulose acetate filter with a 0.8 micron pore size membrane filter

Water	1.25 mass % (max.)	ASTM E 203-75
Appearance	Free of turbidity, suspended matter and sediment	Visually determined at 25°C by Proc. A of ASTM D 4176-86

a/ The denaturant Mmust meet the ASTM D 4806-88 specification for denatured fuel ethanol, except the denaturant ~~must be representative of unleaded gasoline that is commercially available~~ cannot be rubber hydrocarbon solvent. ~~blended in a range of 4 to 6 parts by volume gasoline to 100 parts by volume fuel ethanol (including water) to form the denatured fuel ethanol.~~ The final blend specifications for E-100 take precedence over the ASTM D 4806-88 specifications.

b/ No added lead.

c/ No added phosphorus.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.4. Specifications for E-85 Fuel Ethanol

The following standards apply to E-85 fuel ethanol

(The identified test methods are incorporated herein by reference):

Specifications for E-85 Fuel Ethanol

Specification	Value	Test Method
Ethanol	~~81~~ 79 vol. % (min.)	ASTM D 3545-90 a/
~~Denaturated fuel ethanol~~	~~85~~ 84 ~~vol. % (min.)~~	a/
Other alcohols	2 vol. % (max.)	ASTM D 4815-89
~~Gasoline, unleaded~~	~~14.5 ± .5 vol. %~~	b/
Hydrocarbons + aliphatic ethers b/	~~13-19~~ 15-21 vol. %	ASTM D 4815-89, and then subtract concentration of alcohols, ethers and water from 100 to obtain percent hydrocarbons. The denaturant is included in this percentage.

Vapor pressure, dry	c/ ~~Final blend must meet vapor pressure requirements for commercial unleaded gasoline of the area in which it will be sold, with a minimum RVP of 6.5 psi~~	Methods contained in Title 13, Section 2262 must be used. ASTM D 4953-90 is an alternative method, however, in case of dispute about the vapor pressure, the value determined by the methods contained in Title 13, Section 2262 shall prevail over the value calculated by ASTM D 4953-90, including its precision statement
Acidity as acetic acid	0.007 mass % (max.)	ASTM D 1613-85
Total chlorine as chloride	0.0004 mass % (max.)	ASTM D 3120-87 modified for the det. of organic chlorides, and ASTM D 2988-86
Copper	0.07 mg/l (max.)	ASTM D 1688-90 as modified in ASTM D 4806-88
Lead	~~0.002 g/l~~ 2 mg/l (max.) d/	ASTM D ~~3237-90~~ 3229-88
Phosphorus	~~0.0002 g/l~~ 0.2 mg/l (max.)e/	ASTM D 3231-89
Sulfur	~~0.015~~ 0.004 mass % (max.)	ASTM D ~~3120-87~~ 2622-87
Gum, heptane washed	5 mg/100 ml (max.)	ASTM D 381-86
Total particulates	5 mg/l (max.)	ASTM D 2276-89, modified to replace cellulose acetate filter with a 0.8 micron pore size membrane filter
Water	1.25 mass % (max.)	ASTM E 203-75
Appearance	Free of turbidity, suspended matter and sediment	Visually determined at 25°C by proc. A of ASTM D 4176-86

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a/ The denaturant mMust meet the ASTM D 4806-88 specification for denatured fuel ethanol, except the denaturant ~~must be commercially available unleaded gasoline, which is then blended in a range of 4 to 5 parts by volume gasoline to 100 parts by volume fuel ethanol (including water) to form the denatured fuel ethanol,~~ cannot be rubber hydrocarbon solvent. The final blend specifications for E-85 take precedence over the ASTM D 4806-88 specifications.

b/ ~~The denaturant for the denatured fuel ethanol is not included as a part of this percentage, but is included as a part of the total blend volume for percent calculation. The gasoline specified here (not denaturant) must meet local specifications for commercial unleaded gasoline, except for RVP.~~ Hydrocarbon fraction shall have a final maximum boiling point of 225 degrees C by ASTM method D 86, oxidation stability of 240 minutes by ASTM test

method D 525 and No. 1 maximum copper strip corrosion by ASTM method D 130. Ethers must be aliphatic. No manganese added. Adjustment of RVP must be performed using common blending components from the gasoline stream. Starting 4/1/96, the hydrocarbon fraction must also meet specification for benzene, olefin content, aromatic hydrocarbon content, maximum T90 and maximum T50 found in California Code of Regulations, Title 13 sections 2262.3, 2262.4, 2262.7 and 2262.6 (T90 & T50), respectively.

{Staff intends to adjust the boundaries of the areas indicated in the ASTM D 4814-91b document referenced in c/ below to match the Air Resources Board's California air basin boundaries.}

c/ RVP range of 6.5 to 8.7 for those geographical areas and times indicated for A, A/B, B/A and B volatility class fuels in Table 2 of ASTM D 4814-91b. RVP range of 7.3 to 9.4 for those geographical areas and times indicated for B/C, C/B, C, C/D and D/C volatility fuels. RVP range of 8.7 to 10.2 for those geographical areas and times indicated for D, D/E, E/D and E volatility fuels.

d/ No added lead.

e/ No added phosphorus.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.5. Specifications for Compressed and ~~Liquified~~ Natural Gas

The following standards apply to compressed and ~~liquified~~ natural gas (The identified test methods are incorporated herein by reference):

Specifications for Compressed and ~~Liquified~~ Natural Gas

Specification	Value	Test Method
Hydrocarbons (expressed as mole percent)		
Methane	88.0% (min.)	ASTM D 1945-81
Ethane	6.0% (max.)	ASTM D 1945-81
C_3 and higher HC	3.0% (max.)	ASTM D 1945-81
C_6 and higher HC	0.2% (max.)	ASTM D 1945-81

Other species (expressed as mole percent unless otherwise indicated)		
Hydrogen	*0.1% (max.)*	*ASTM D 2650-88*
Carbon monoxide	*0.1% (max.)*	*ASTM D 2650-88*
Oxygen	*~~0.5~~ 1.0% (max.)*	*ASTM D 1945-81*
Inert gases		
Sum of CO_2 and N_2	*~~5.0~~ 1.5-4.5% ~~(max.)~~ (range)*	*ASTM D 1945-81*
Water	*a/*	
Particulate matter	*b/*	
Odorant	*c/*	
Sulfur	*16 ppm by volume*	*Title 17 CAC Section 94112*

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a/ The dewpoint at vehicle fuel storage container pressure shall be at least 10°F below the 99.0% winter design temperature listed in Chapter 24, Table 1, Climatic Conditions for the United States, in the American Society of Heating, Refrigerating and Air Conditioning Engineer's (ASHRAE) Handbook, 1989 fundamentals volume. Testing for water vapor shall be in accordance with ASTM D 1142-90, utilizing the Bureau of Mines apparatus.

b/ The compressed ~~or liquified~~ natural gas shall not contain dust, sand, dirt, gums, oils, or other substances in an amount sufficient to be injurious to the fueling station equipment or the vehicle being fueled.

c/ The natural gas at ambient conditions must have a distinctive odor potent enough for its presence to be detected down to a concentration in air of not over 1/5 (one-fifth) of the lower limit of flammability.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2292.6. Specifications for Liqu~~i~~efied Petroleum Gas

The following standards apply to liqu~~i~~efied petroleum gas (The identified test methods are incorporated herein by reference):

Specifications for Liqu~~i~~efied Petroleum Gas

Specification	Value	Test Method
Propane	*~~80.0~~ 85.0 vol. % (min.) a/*	*ASTM D 2163-87*

Vapor pressure at 100° F	208 psig (max.)	ASTM D 1267-89 ASTM D 2598-88 a/ b/
Volatility residue: evaporated temp., 95% or butane & heavier,	-37°F (max.)	ASTM D 1837-86
	2.5 vol. % (max.)	ASTM D 2163-87
Propene	~~10~~ 5.0 vol. % (max.) c/	ASTM D 2163-87
Residual matter: residue on evap. of 100 ml	0.05 ml (max.)	ASTM D 2158-89
oil stain observ.	pass b/ d/	ASTM D 2158-89
Corrosion, copper, strip	No. 1 (max.)	ASTM D 1838-89
Sulfur	1230 ppmw (max.)	ASTM D 2784-89
Moisture content	pass	ASTM D 2713-86
Odorant	e/	

a/ Propane shall be required to be a minimum of 80.0 volume percent starting January 1, 1993. Starting January 1, 1995 the minimum propane content shall be 85.0 volume percent.

a/ b/ In case of dispute about the vapor pressure of a product, the value actually determined by Test Method ASTM D 1267-89 shall prevail over the value calculated by Practice ASTM D 2598-88.

c/ Propene shall be limited to 10.0 volume percent starting January 1, 1993. Starting January 1, 1995, the propene limit shall be 5.0 volume percent.

b/ d/ An acceptable product shall not yield a persistent oil ring when 0.3 ml of solvent residue mixture is added to a filter paper, in 0.1 ml increments and examined in daylight after 2 min. as described in Test Method ASTM D 2158-89.

e/ The liquefied petroleum gas upon vaporization at ambient conditions must have a distinctive odor potent enough for its presence to be detected down to a concentration in air of not over 1/5 (one-fifth) of the lower limit of flammability.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

*2292.7. **Specifications for Hydrogen***

The following standards apply for hydrogen (The identified test methods are incorporated herein by reference):

Specifications for Hydrogen

Specification	*Value*	*Test Method*
Hydrogen	*98.0 mole % (min.)*	*ASTM D 1946-90*
Combined hydrogen, water, oxygen and nitrogen	*99.9 mole % (min.)*	*ASTM D 1946-90 for hydrogen, nitrogen and oxygen; ASTM D 1142-90 for water using the Bureau of Mines apparatus*
Total hydrocarbons	*0.01 mole % (max.)*	*ASTM D 1946-90*
Particulate matter	*a/*	
Odorant	*b/*	

a/ The hydrogen shall not contain dust, sand, dirt, gums, oils, or other substances in an amount sufficient to be injurious to the fueling station equipment or the vehicle being fueled.

b/ Starting 1/1/95, the hydrogen fuel at ambient conditions must have a distinctive odor potent enough for its presence to be detected down to a concentration in air of not over 1/5 (one-fifth) of the lower limit of flammability. This requirement applies only to hydrogen which is introduced into the vehicle fuel storage system in gaseous form.

NOTE: Authority cited: sections 39600, 39601, 43013, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: sections 39000, 39001, 39002, 39003, 39010, 39500, 40000, 43000, 43016, 43018, and 43101, Health and Safety Code; and Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

2293. Equivalent Test Methods

(a) Whenever sections 2292.1 thru 2292.7 provides for the use of a specified test method, another test method may be used following a determination by the Executive Officer that the other test method produces results equivalent to the results obtained with the specified method.

PROPOSED ALTERNATIVE FUEL CERTIFICATION SPECIFICATIONS

Staff's Suggested Changes to the Original Regulatory Proposal

March 12, 1992

The staff's original proposal included amendments to the alternative fuel certification specifications in the following three documents referenced in the ARB's regulations: the California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles; the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles; and the California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles. In each of the three test procedures the amendments would revise, starting with the 1994 model year, the specifications for alternative fuels previously established in the test procedure. In addition, these revised specifications would be made optional for 1993 model-year vehicles and engines.

The staff is now proposing modifications to the originally proposed alternative fuel specifications for 1994 and subsequent model year vehicles and engines. The modifications would result in the specifications outlined below. The specifications for a listed fuel would apply for each test procedure that currently identifies specifications for that fuel. In addition, as in the original proposal, the 1994 and subsequent model year alternative fuel specifications would be optional for the 1993 model year.

A. Service Accumulation Fuels

In all cases the service accumulation fuel must meet the commercial specification

B. Emission-testing Fuels

1. M-100: Emission-testing fuel specification:

Methanol - 98.0 +/- 0.5 vol. %
Ethanol - 1.0 +/- 0.1 vol. %
Certification gasoline - 1.0 +/- 0.1 vol. %
Remaining commercial specifications must be met
Additive types and amounts are subject to E.O. approval (the values shown above, and in the commercial specifications are applicable to the certification fuel prior to the addition of any additives)

2. M-85: Emission-testing fuel specification:

Certification gasoline is required as the blending gasoline
Remaining commercial specifications must be met

Additive types and amounts subject to E.O. approval (the values shown in the commercial specifications are applicable to the certification fuel prior to the addition of any additives)

3. Compressed Natural Gas: Emission-testing fuel specification:

Methane - 90.0 +/- 1.0 vol. %
Ethane - 4.0 +/- 0.5 vol. %
C3 and higher - 2.0 +/- 0.3 vol. %
Oxygen - 0.5 +/- 0.1 vol.
Inert gases - 3.5 +/- 0.5 vol. %
Remaining commercial specifications must be met

4. LPG: Emission-testing fuel specification:

Propane - 93.5 +/- 1.0 vol. %
Propene - 3.8 +/- 0.5 vol. %
Butane and heavier - 1.9 +/- 0.3 vol. %
Remaining commercial specifications must be met

C. Flexible-fuel Vehicle Emission-testing: M-85 Only

Fuel that meets the commercial M-85 specifications (except that the blending gasoline must be emission-testing gasoline) is used. A blend consisting of this same fuel and certification gasoline, such that the final blend is composed of 35 volume percent methanol (+/- 1 volume percent) is also used.

Attachment E

PUBLIC HEARING ON PROPOSED REGULATIONS ESTABLISHING SPECIFICATIONS FOR ALTERNATIVE FUELS FOR MOTOR VEHICLES

MARCH 12, 1992

Staff's Suggested Changes to the Original Regulatory Proposal

The staff's original proposal included both regulatory text pertaining to specifications for alternative fuels sold or supplied for use in motor vehicles ("commercial specification"), and revisions to the provisions in the Board's motor vehicle emissions certification test procedures which establish the specifications for certain alternative fuels for purposes of motor vehicle emission certification testing ("certification specifications").

The staff is now proposing modifications to the original proposal in both the areas of commercial specifications and certification specifications. Pages 2 through 15 of the attached document contain the text of the staff's proposed modifications to the originally proposed Title 13, California Code of Regulations text, including all provisions pertaining to required commercial specification. Following that, pages 16 through 17 set forth a detailed outline of the staff's proposed modifications to the certification specifications contained in the reference motor vehicle emission certification test procedures. The modifications to the certification specifications would be incorporated into the test procedure texts prior to the 15-day supplemental availability period.

State of California
AIR RESOURCES BOARD

Response to Significant Environmental Issues

Item: Notice of Public Hearing to Consider the Adoption of Specifications for Alternative Fuels for Motor Vehicles

Agenda Item No.: 91-12-2

Public Hearing Date: December 12, 1991
Postponed To: March 12, 1992

Issuing Authority: Air Resources Board

Comment: Comments were received identifying significant environmental issues pertaining to this item. These comments are summarized and responded to in the Final Statement of Reasons, which is incorporated by reference herein.

Response: Resolution 92-9 is also incorporated herein and attached hereto. In the Resolution, the Board made various findings pertaining to potential environmental impacts of the proposed regulations. The Board found that the amendments approved therein would not have any significant adverse environmental impacts.

Certified: Pat Hutchens
Pat Hutchens
Board Secretary

Date: 10/22/92