

Cal/EPA Fuels Guidance Document



Acknowledgements

This guidance document was compiled and written by a multi-agency group consisting of the main state regulatory agencies overseeing motor vehicle fuels in commerce in California. Although the primary contributors are listed we would like to thank all those who contributed to this document through their input and assistance.

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I. Introduction

Biofuels have become an issue of national attention. There are at least four major reasons why biofuels have come to the forefront of both policy and public attention. Concerns about global warming have led to a movement away from conventional fossil fuels and toward renewable biofuels. Increasing demand for energy is a major driver of growth in all fields of fuel production, including biofuels. National security is seen by many as being threatened by continuous import of fuels or crude oils from countries that may be seen as hostile toward the United States, and the feed stocks for biofuels can be grown domestically or imported from more politically appealing countries. Lastly there is a movement by some individuals to lead more locally based lifestyles and it is possible to produce some biofuels on an individual or community scale.

It is the responsibility of the government of California to ensure that as new fuels enter into commercial and individual use in California, they do so in a way that is protective of the health of its populace and extraordinary environment. The state agencies who contributed to this document are the primary state agencies involved in the regulation of new fuels in California. The contributors to this document are the Air Resources Board (ARB), the California Department of Food and Agriculture-Division of Measurement Standards (CDFA), CAL FIRE - Office of the State Fire Marshal (CAL FIRE - OSFM) and the State Water Resources Control Board (SWRCB). These agencies regulate the health, safety, environment, and fair practices for Californians who buy fuels in the marketplace.

To those not immersed in the subject, the regulation of fuels can be confusing and difficult to understand. The purpose of this document is to help potential fuel users and producers to find answers about the regulations affecting their fuel of choice with a limited foray into technical and commercial issues associated with these fuels.

This document is separated into three main parts. In Chapter II there is a fuels matrix which identifies the major current and future fuels likely to enter the California market, and the technical or regulatory requirements of each agency participating in this document. In Chapter III the fuels are defined, for those not familiar with them, and the technical or regulatory requirements are described in detail. Chapter IV lists each fuel and the specific technical or regulatory requirements for each fuel that remain to be completed before that fuel will be ready for introduction into commerce. It should be noted that some of the requirements listed in this document are not within the control of the agencies participating in this document and may be controlled by third party organizations.

Please note this document does not address in detail all the different fuel requirements pertaining to tank vehicles and/or tank cars. There is limited information and requirements found in Title 24 California Code of Regulations, California Fire Code, Chapter 34 Flammable and Combustible Liquids. Additional requirements for transporting fuels in tank vehicles and/or tank cars on streets and highways are regulated by Federal Department of Transportation, California Highway Patrol, Caltrans and possibly other regulatory agencies.

This document is not meant to cover federal regulations or local ordinances. The U.S. Environmental Protection Agency is the federal agency regulating fuels:

U.S. EPA:

<http://www.epa.gov/otaq/fuels.htm>

Please note that this document makes reference to California statutory and regulatory law, and that the most up to date legal language can be found at <http://www.oal.ca.gov/>. In addition there are references in this document to standards developed by non-governmental standards agencies, these standards are copyrighted and must be purchased from the relevant agency for personal or commercial use.

This document is not intended to, nor can it, replace personal assurance of compliance with the programs and regulations addressed herein. If you are unsure of compliance please contact the applicable regulatory agency to ensure compliance with their programs and regulations.

All percentages referred to in this document are volumetric unless otherwise noted.

This document and the issues discussed within it are in a continual state of flux. To access the most current version of this document please go to:

<http://www.calepa.ca.gov/biofuels/>

Air Resources Board:

Contact: Chief, Criteria Pollutants Branch
California Air Resources Board
(916) 322-6020
P.O. Box 2815
Sacramento, CA 95812

Scope of Program:

The California Air Resources Board (ARB) is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government.

The Mission of the California Air Resources Board is: To promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state.

ARB is authorized to adopt standards, rules and regulations 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. ARB's regulations can be found under the California Code of Regulations under Division 3 of Titles 13 and 17.

In addition to reduction of direct and indirect air pollutants ARB is authorized by the Global Warming Solutions Act of 2006 (AB 32) to take necessary actions to reduce the emissions of Greenhouse Gases to 1990 levels by 2020. This includes fuel based measures.

ARB is the state air pollution agency. There exist in California local air pollution agencies, commonly called Air Districts that have separate but related authority to regulate air pollution sources. Generally, ARB has authority to regulate mobile sources in California and the Air Districts have authority to regulate stationary sources. ARB has the sole regulatory authority of air pollution from transportation fuels in California.

ARB's website:

<http://www.arb.ca.gov/>

ARB's Fuels website:

<http://www.arb.ca.gov/fuels/fuels.htm>

ARB's AB32 website:

<http://www.arb.ca.gov/cc/ab32/ab32.htm>

Air District Rules Database:

<http://www.arb.ca.gov/drdb/drdb.htm>

CDFA, Division of Measurement Standards:

Contact: Allan Morrison, Supervising Chemist,
Petroleum Products Laboratory
CDFA, Division of Measurement Standards
(916) 229-3046
6790 Florin Perkins Rd, Suite 100
Sacramento CA 95828

Scope of Program:

Through the authority granted by Division 5 of the California Business and Professions Code, California Department of Food and Agriculture, Division of Measurement Standards (CDFA) regulates the quantity and quality of motor vehicle engine fuels. The mission of CDFA is to protect the public and ensure fair competition within industry. It is the responsibility of CDFA to prevent inaccurate delivery of quantity by type approving all metering devices and by overseeing the activities of county weights and measure officials in testing and certifying every fuel delivery system used within the State. In addition, CDFA is responsible for maintaining the quality of the fuel delivered to consumers through establishing and enforcement of quality standards. Furthermore, CDFA enforces advertising and labeling standards to ensure that the people of California are properly informed and can make accurate value comparison of the fuels they purchase.

The laws and regulations governing the activities of CDFA can be found in the California Business and Profession Code (B&P code) Division 5, Chapters 1 to 17 and the California Code of Regulation (CCR) Title 4, Division 9 Chapter 1 to Chapter 12 and the National Institute of Standards and Technology (NIST) Handbook 44.

The programs within CDFA that have jurisdiction over fuel are:

California Type Evaluation Program (CTEP):

The California Type Evaluation Program is responsible for all commercial weighing and measuring devices including fuel delivery systems. All systems must be evaluated, tested and approved by CDFA before use in California. This process is known as "type evaluation". The Division works with the National Type Evaluations Program (NTEP) within the National Conference of Weights and Measure (NCWM) to type approve all motor fuel delivery systems from bulk delivery to retail dispensers. (B&P code § 12500 et seq, CCR Title 4 Division 9 Chapter 2 and NIST Handbook 44).

Measurement Compliance Program:

The Measurement Compliance Program oversees all fueling devices use within California and insures that they are approved for use with the fuel they are delivering. The program oversees the Registered Service Agency program. State law requires any person, firm, corporation, or association who installs or repairs commercial weighing

and measuring devices for payment of any kind to be a service agency and must be registered with CDFA (B&P code § 12531 and § 12532)

Metrology Program:

The Metrology Program maintains, in concert with the National Institute of Standards and Technology, the State's standards of measurement. These standards are used to certify the field standards used by state, county and industry to ensure all fuels are delivered accurately. (B&P Code § 12300 et seq)

Petroleum Products Program:

The principal task of the Petroleum Products Program is to regulate and enforce the advertising, labeling, quantity and quality specifications for motor oils, engine fuels, gear oils, brake fluids, automatic transmission fluids, engine coolants and alternative fuels. The program investigators along with county inspectors routinely inspect retail fueling stations for compliance, handle consumer complaint, and conduct investigation into fraudulent activities. (B&P code Division 5, Chapters 14 and 15, CCR Title 4, Division 9 Chapter 6 and Chapter 7)

State law gives CDFA the authority to regulate the quality of spark-ignition engine fuel and compression-ignition engine fuel. The law requires that CDFA adopts by reference the latest standards established by a recognized consensus organization or standards writing organization such as the ASTM International or SAE International. A fuel can only be use when such a standard has been developed. (B&P code § 13440 and § 13450)

Variances for Developmental Engine Fuels:

State law gives CDFA the authority to grant a variance from these specifications for developmental engine fuels, for the purpose of collecting information to assist with the development of a consensus organization standard, so long as certain conditions are met. (B&P code § 13405)

Hydrogen Program:

State law gives CDFA the authority to regulate hydrogen fuels for use in internal combustion engines and fuel cells in motor vehicles, The Hydrogen program is taking the lead in the development of hydrogen quantity testing systems in order to type approval and field test of hydrogen dispersers. In addition, in the absence of a consensus standard the CDFA has developed interim quality standards, and it is assisting with the development of test methods (B&P code § 13446)

California Agricultural Commissioners and Sealers:

Under the general direction and oversight of CDFA, county sealers and their staff enforce the laws and regulations of the California Business and Professions Code. They have the authority to enforce fuel quality, quantity, and advertising laws and regulations, and are responsible for testing and sealing commercial devices that

dispense fuel. These enforcement programs protect and promote the local economy and commerce of each county.
(B&P Code Division 5, Chapters 1 § 12001 et seq)

Related Links:

California Department of Food and Agriculture, Division of Measurement Standards
Home page: (www.cdfa.ca.gov/dms)

Extracts from the California Business and Profession Code pertaining to Weights and Measures and Petroleum Products January 2011
(http://cdfa.ca.gov/dms/programs/general/2011_BPCCode.pdf)

Link to complete California Business and Profession Code:
(<http://www.leginfo.ca.gov/calaw.html>)

Link to California Department of Food and Agriculture, Division of Measurement Standards Field reference Manual 2011 with extracts for the California Code of Regulation:
(http://cdfa.ca.gov/dms/programs/general/2011_FieldReferenceManual.pdf)

Link to complete California Code of Regulation, Title 4, Division 9:
(<http://ccr.oal.ca.gov/linkedslice/default.asp?SP=CCR-1000&Action=Welcome>)

National Type Evaluations Program NTEP within the National Conference of Weights and Measure: (<http://www.ncwm.net>)

National Institute of Standards and Technology Handbook 44:
(<http://ts.nist.gov/WeightsAndMeasures>).

ASTM International: Fuels Standards and Testing Methods
(<http://www.astm.org/>)

SAE International: Fuel Standards
(<http://www.sae.org/>)

Contacts for California County Agricultural Commissioners and Sealers
(http://www.cdfa.ca.gov/exec/county/county_contacts.html)

CAL FIRE - Office of the State Fire Marshal:

Contact: Vickie Sakamoto, Division Chief
CAL FIRE – Office of the State Fire Marshal
(916) 324-4770
1131 S Street
Sacramento, CA 95811

Scope of Program:

CAL FIRE – Office of the State Fire Marshal is part of the Natural Resources Agency. The mission of the CAL FIRE - Office State Fire Marshal (OSFM) is to protect life and property through the development and application of fire prevention engineering, education and enforcement. The Health and Safety Code Section 13108 authorizes State Fire Marshal to prepare and adopt building standards regulations by establishing minimum requirements for the prevention of fire, and for the protection of life and property against fire and panic which is including but not limited to regulations for storage, handling and use of hazardous materials and storage and/or dispensing fuels. The OSFM is responsible for the adoption of the regulations as authorized under Health and Safety Code Section 18935. The following codes are under the OSFM's responsibility.

The 2007 California Code of Regulations (CCR) Title 24 is known as the California Building Standards Code and consists of 12 parts: Part 1 California Building Standards Administrative Code; Part 2 California Building Code; Part 3 California Electrical Code; Part 4 California Mechanical Code; Part 5 California Plumbing Code; Part 6 California Energy Code; Part 7 California Elevator Safety Construction Code (no longer published in Title 24, see Title 8, CCR); Part 8 California Historical Building Code; Part 9 California Fire Code; Part 10 California Existing Building Code; Part 11 2008 California Green Building Standards Code (CALGREEN) and Part 12 California Reference Standards Code.

The 2007 California Fire Code (CFC) contains the requirements for motor fuel-dispensing facilities (including above/underground fuel tanks); storage, use and handling of flammable and combustible liquids, compressed gases, cryogenic fluids and liquefied petroleum gases, many other hazardous materials and storage and/or dispensing fuels. CCR Title 19 is the general fire and panic safety standards to establish minimum standards for the prevention of fire and for the protection of life and property against fire, explosion and panic.

The OSFM is the enforcing authority having jurisdiction on all state owned/occupied facilities throughout the state. The local city and county fire departments and fire protection districts are the enforcing authority having jurisdiction for facilities within their

respective jurisdiction. Within the local government, there are local Unified Program Agencies (UPA), who are responsible for the inspection and enforcement activities of the Hazardous Materials Release Response Plan and Inventory, California Accidental Release Prevention, Underground Storage Tank, Aboveground Petroleum Storage Act, Hazardous Waste Generator and Onsite Hazardous Waste Treatment, and California Fire Code Hazardous Materials Management Plan programs within their jurisdiction. Most UPA's have been established as a function of a local environmental health or fire department.

Health and Safety Code Section 41956 authorizes the State Fire Marshal shall be the only agency responsible for determining whether any component or system creates a fire hazard. All phase 1 and 2 vapor recovery equipment shall be approved and certified by the OSFM.

Related Links:

Office of the State Fire Marshal: <http://osfm.fire.ca.gov/>
http://osfm.fire.ca.gov/strucfireengineer/strucfireengineer_vapor_recovery.php

Title 24 California Code of Regulations California Code of Regulations:
http://www.bsc.ca.gov/title_24/t24_2007ried.htm
<http://publicecodes.citation.com/st/ca/st/b200v07/index.htm?bu=CA-P-2007-999999>
<http://publicecodes.citation.com/st/ca/st/b300v07/index.htm?bu=CA-P-2007-999999>

California Code of Regulations Title 19:
<http://government.westlaw.com/linkedslice/default.asp?Action=TOC&RS=GVT1.0&VR=2.0&SP=CCR-1000>

Underwriters Laboratories Inc.: <http://www.ul.com/global/eng/pages/>
<http://www.ul.com/global/eng/pages/corporate/contactus/faq/industries/e85/>
<http://www.ul.com/global/eng/pages/offerings/industries/chemicals/flammableandcombustiblefluids/development/>

National Fire Protection Association: <http://www.nfpa.org/>

California Fuel Cell Partnership: www.er.ca/cafcp.org

State Water Resources Control Board:

Contact: Laura S.Fisher, Chief, UST Technical Unit
State Water Resources Control Board
(916) 341-5870
1001 I Street
Sacramento, CA 95814

Scope of Program:

The State Water Resources Control Board (State Water Board) is a part of the California Environmental Protection Agency, an organization which reports directly to the Governor's Office in the Executive Branch of California State Government. The mission of the State Water Board is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.

Underground tanks used for the storage of hazardous substances and wastes are potential sources of contamination of the ground and underlying aquifers, and may pose other dangers to public health and the environment. The protection of the public and the environment from releases of hazardous substances is a statewide concern. The Legislature therefore declared that it is in the public interest to establish a continuing program for the purpose of preventing contamination from, and improper storage of, hazardous substances stored underground. It is the intent of the Legislature to establish orderly procedures that will ensure that newly constructed underground storage tanks meet appropriate standards and that existing tanks be properly maintained, inspected, tested, and upgraded so that the health, property, and resources of the people of the state will be protected.

The State Water Board provides regulatory oversight and technical guidance to the local implementing agencies to facilitate consistent and accurate implementation of the UST Program as developed by the State Water Board.

The laws and regulations governing USTs can be found in the Code of Federal Regulations Parts 280 and 281, California Health and Safety Code, Chapter 6.7 commencing with Section 25280, and the California Code of Regulations, Title 23, commencing with Section 2610.

Related Links:

State Water Board UST Program Website
http://www.waterboards.ca.gov/water_issues/programs/ust/

State Water Board UST Statutes and Regulations

http://www.waterboards.ca.gov/water_issues/programs/ust/regulatory/index.shtml#regs

Code of Federal Regulations Part 280 and 281

<http://www.epa.gov/oust/fedlaws/cfr.htm>

UST Program Guidance

http://www.waterboards.ca.gov/water_issues/programs/ust/leak_prevention/lgs/index.shtml

California Approved Leak Detection Equipment

http://www.waterboards.ca.gov/water_issues/programs/ust/leak_prevention/lq113/index.shtml

Federal Approved Leak Detection Equipment

<http://www.nwqlde.org/>

Underwriters Laboratories Certifications Directory

<http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/index.html>

Underwriters Laboratories Alternative Fuels

<http://www.ul.com/global/eng/pages/offerings/industries/energy/alternative/>

II. Fuels Matrix

Requirements (Status)	Gasoline w/ E10 (●)	E85 (▲)	Diesel w/o B5 (●)	Diesel w/ B5 (●)	E15 (■)	E20 (■)	E30 (■)	E100 Fuel (■)	Gasoline w/butanol 16% (■)	B6-B20 (▲)	B21-B100 Fuel (■)	R1-R100 Fuel (●)	CNG (●)	LNG (●)	LPG (●)	Biogas (▲)	Liquid Biogas (▲)	H ₂ (■)	Electricity (●)	(Diesel Exhaust Urea* (●))
Future Fuels and Requirements Status-Air Resources Board Issues																				
ASTM	D4814	D5798	D975	D975	D4814	D4814	D4814	None	D4814	D7467	None	D975	None	None	D1835	None	None	None	None	None
Authority to regulate	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Regulations	●	●	●	●	■	■	■	■	■	■	■	■	●	●	●	●	●	●	●	N/A
U.S. EPA Requirements	●	●	●	●	■	■	■	■	■	■	■	■	●	●	●	●	●	●	●	●
Multimedia	●	●	●	●	■	■	■	■	■	■	■	■	●	●	●	■	■	●	●	N/A
Compatible with Petroleum Pipelines	▲	▲	●	▲	▲	▲	▲	▲	●	▲	▲	●	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vapor Recovery	●	▲	●	●	■	■	■	■	■	●	●	●	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vehicle Issues	●	▲	●	▲	▲	▲	▲	■	▲	▲	■	●	▲	▲	▲	▲	▲	▲	▲	▲
Production Issues	●	●	●	●	●	●	●	■	●	●	▲	■	●	●	●	■	■	■	●	●
Fueling Issues	●	●	●	●	■	■	■	■	■	●	●	●	●	●	●	●	●	■	■	■
Future Fuels and Requirements Status-CDFA, Division of Measurement Standards Issues																				
ASTM/SAE	●	●	●	●	▲	▲	▲	■	●	●	■	●	●	●	●	●	●	●	N/A	N/A
Authority to regulate	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Regulations	●	●	●	●	▲	▲	▲	▲	●	●	▲	●	●	●	●	▲	▲	●	▲	N/A
Quality Standard for fuel use	●	●	●	●	▲	▲	▲	▲	●	●	▲	●	●	●	●	▲	▲	▲	N/A	N/A
Quality test methods	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	▲	N/A	●
Quality test equipment	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	▲	N/A	●
Metering systems	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	▲	●	●
Quantity test methods	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	▲	●	●
Quantity test equipment	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	▲	●	●
Method of Sale	●	●	●	●	▲	▲	▲	▲	●	●	▲	●	●	●	●	▲	▲	▲	▲	●
Labeling	●	●	●	●	▲	▲	▲	▲	●	●	▲	●	●	●	●	▲	▲	▲	▲	●
Advertising	●	●	●	●	▲	▲	▲	▲	●	●	▲	●	●	●	●	▲	▲	▲	▲	●
Future Fuels and Requirements Status-CAL FIRE Office of The State Fire Marshal Issues																				
ASTM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Regulated by CA Fire Code	●	■	●	●	●	●	■	■	●	●	●	●	●	●	●	●	●	●	●	N/A
NFPA Standards	●	■	●	●	●	●	■	■	●	●	●	●	●	●	●	●	●	●	●	N/A
Vapor Recovery & Dispenser	●	■	●	●	●	●	■	■	●	●	●	●	●	●	●	●	●	●	●	N/A
Tanks	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	N/A
Future Fuels and Requirements Status - State Water Resources Control Board (UST Program)																				
ASTM	●	●	●	●	●	●	■	●	●	●	■	▲	●	●	●	●	●	●	●	●
Regulated by CA Health and Safety Code	●	●	●	●	●	●	●	●	●	●	●	●	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Leak Detection Functional Testing	●	●	●	●	■	■	■	■	■	†	■	■	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Testing Organization Approval	●	●	●	●	●	●	●	■	■	†	■	■	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Industry Code and Engineering Standards	●	●	●	●	●	●	●	■	■	†	■	■	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- = There are no technical, or regulatory issues, but there may be local regulations that limit use.
- ▲ = There are surmountable technical issues, or the fuel can meet existing regulations but it is difficult to do so.
- = There are significant technical issues, additional regulations are needed, or fuel does not meet existing regulations.

†Regulatory exclusion/variance expires June 2012.

*Urea is not a fuel, it is added post combustion to reduce emissions of Nitrogen Oxides by catalytic reduction.

III. Definitions of Fuels and Fuel Requirements

This chapter consists of definitions for current and future fuels, as well as descriptions of the technical or regulatory requirements of each participating agency for those fuels.

Fuel Definitions:

Gasoline w/ E10: A volatile mixture of liquid hydrocarbons with up to 10 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for gasoline is ASTM D4814.

E85: A blend of ethanol and hydrocarbons, usually gasoline, where the ethanol is between 79 to 83 percent. Although ASTM allows less ethanol this range is determined by ARB specifications. E85 is not actually 85 percent ethanol because the E100 that is mixed with gasoline to create E85 already contains a small amount of gasoline or other hydrocarbon denaturant, also there are regional considerations for cold temperature operation. The applicable ASTM standard for E85 is ASTM D5798.

Diesel w/o B5: A petroleum-distillate fuel used in compression-ignition engines that does not contain biodiesel. The applicable ASTM standard for Diesel w/o B5 is ASTM D975.

Diesel w/ B5: A petroleum-distillate fuel used in compression-ignition engines that contains up to 5 percent biodiesel. The applicable ASTM standard for Diesel w/ B5 is ASTM D975.

E15: A volatile mixture of liquid hydrocarbons with up to 15 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for E15 is ASTM D4814.

E20: A volatile mixture of liquid hydrocarbons with up to 20 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for E20 is ASTM D4814.

E30: A volatile mixture of liquid hydrocarbons with up to 30 percent ethanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for E30 is ASTM D4814.

E100 Fuel: Dry ethanol which has been rendered toxic or otherwise undrinkable, and in some cases dyed for use as a vehicle fuel. E100 generally contains a small amount of gasoline. ASTM has not adopted a standard for E100 fuel, however the applicable ASTM standard for E100 blendstock is D4806.

Gasoline w/butanol 16%: A volatile mixture of liquid hydrocarbons with 16 percent butanol, generally containing small amounts of additives, suitable for use as a fuel in spark-ignition internal combustion engines. The applicable ASTM standard for Gasoline w/ butanol 16% is ASTM D4814.

B6-B20: A blend of petroleum-distillate and biodiesel fuel used in compression-ignition engines that contains between 6 and 20 percent biodiesel. The applicable ASTM standard for B6 to B20 is ASTM D7467.

B21-B100 Fuel: A blend of petroleum-distillate and biodiesel fuel used in compression-ignition engines that contains between 21 and 100 percent biodiesel. ASTM has not adopted a standard for B21 to B100 fuel. The applicable ASTM standard for B100 blendstock is ASTM D6751.

R1-R100 Fuel: A blend of petroleum-distillate and renewable diesel fuel used in compression-ignition engines that contains between 1 and 100 percent renewable diesel. The applicable ASTM standard for R1 to R100 is ASTM D975.

CNG (Compressed Natural Gas): A mixture of hydrocarbon gases, principally methane together with varying quantities of ethane, propane, butane, and other gases

LNG (Liquefied Natural Gas): Natural gas that has been pressurized and cooled so as to liquefy it for use as a vehicle fuel. ASTM has not adopted a standard for CNG.

LPG (Liquefied Petroleum Gases): A mixture of petroleum gases, principally propane and butane that have been pressurized and cooled so as to liquefy it for use as a vehicle fuel. The applicable ASTM standard for LPG is ASTM D1835.

Biogas: A gaseous mixture of methane and other hydrocarbons produced by bacterial or thermal degradation of organic matter and used as a fuel. ASTM or SAE has not adopted a standard for Biogas.

Liquid Biogas: A liquid mixture of hydrocarbons produced by bacterial or thermal degradation of organic matter and used as a fuel. ASTM or SAE has not adopted a standard for Liquid Biogas.

H₂ (Hydrogen): A fuel composed of the chemical hydrogen intended for consumption in an internal combustion engine or fuel cell. ASTM or SAE has not adopted a standard for hydrogen fuel.

Electricity: Electric current used as a source of power for a vehicle, typically stored as chemical potential energy in a battery. ASTM or SAE has not adopted a standard for electricity.

Urea (Diesel Exhaust Fluid): An aqueous urea solution of high-purity urea in demineralized water. This urea is commonly called "diesel exhaust fluid" (DEF) and is

injected into the diesel exhaust gases before they reach the catalytic converter to reduce nitrogen oxides (NO_x), a known air pollutant. ASTM or SAE has not adopted a standard for urea.

Fuel Blending Components Definitions:

Butanol: A four carbon alcohol, also called butyl alcohol. Butanol can be derived from biological sources through fermentation in a process similar to ethanol production.

Biodiesel: A liquid fuel consisting of Fatty Acid Alkyl Esters, produced from biologically derived fats, or oils and an alkyl alcohol. The most common form of biodiesel is Fatty Acid Methyl Ester (FAME). Multiple feedstocks such as vegetable oil, animal fat or waste oil can be used in biodiesel production; soybean oil is currently the predominant biodiesel feedstock in the United States. Biodiesel is produced through a process called transesterification wherein a fat or oil feedstock undergoes reaction with an alcohol, typically methanol, and a catalyst, typically lye, yielding biodiesel, waste alcohol and glycerin.

Ethanol: A two carbon alcohol primarily known as ethyl alcohol. Fuel alcohol is distinct from drinking alcohol as it contains a toxic denaturant, commonly gasoline, to render it exempt from consumable alcohol taxes. Ethanol can be produced using any feedstock that is high in sugar such as corn, sugarcane or sugar beets. Corn is currently the predominant ethanol feedstock in the United States. Ethanol is produced commercially through fermentation, wherein a feedstock high in sugar is reacted with yeast and water yielding ethanol, waste water and carbon dioxide. Ethanol can also be produced from grasses using advanced production techniques wherein the feedstock need only contain cellulose, a primary component of plants.

Renewable Diesel: A liquid hydrocarbon fuel distinct from biodiesel but derived from biological feedstocks. Renewable diesel contains hydrogen and carbon atoms with trace amounts of other elements (oxygen, nitrogen, and sulfur) and are generally completely saturated paraffins. Renewable diesel can be produced from the same feedstocks as biodiesel, but goes through a distinctly different production process. Currently there are four pathways under development for Renewable diesel. The first is produced through a process called hydrotreating, wherein a fat or oil is reacted with hydrogen gas and a catalyst, yielding a renewable. The second is biomass gasification followed by a Fischer-Tropsch synthesis with a final conversion to a renewable diesel. The third pathway is biomass pyrolysis with a conversion to a renewable diesel. The fourth is a biological production of a hydrocarbon oil with conversion to a renewable diesel.

Air Resources Board Terms & Descriptions:

ASTM:

The consensus standard development organization ASTM International (fka American Society for Testing and Materials) standard specification for the fuel if one exists. ASTM enacts its specifications based on a consensus ruling of working groups consisting of people in the fuel production and engine manufacturing communities.

ASTM has not introduced specifications for natural gas in any form for use as a motor vehicle fuel, but there are other specifications available for this fuel. For the remaining new liquid fuels, ASTM usually introduces a specification before U.S. EPA will issue specifications, making the fuel legal for entry into commerce.

Authority to Regulate:

This indicates whether the statutory authority to regulate the fuel in question has been granted to the Air Resources Board by the California Legislature.

Regulations:

New fuels that are sold commercially must have specifications set by ARB or CDFG to be legal. Generally if one specification is more restrictive it trumps the less restrictive specification.

U.S. EPA Requirements:

For fuels to be sold in the United States they must be compliant with all U.S. EPA requirements. All gasoline or diesel fuels must be registered according to part 211 of the Clean Air Act.

Multimedia:

Multimedia evaluation is a statutory requirement for an assessment of the potential impacts of new fuels on human and environmental health including air, water and soil. The language for this requirement can be found in the Health and Safety Code section 43830.8. Multimedia evaluations are conducted jointly between lead agency ARB and the other boards and departments of the Cal/EPA. The outcome of a multimedia evaluation is decided upon by the California Environmental Policy Council which consists of the chairs and directors of the boards and departments of Cal/EPA.

California statutory law requires ARB to undergo a multimedia evaluation any time it creates a new fuel specification or modifies an existing fuel specification. In order for this requirement to be met, any new fuel specification or a fuel undergoing changes to its specification must undergo a multimedia evaluation or have had an ARB specification prior to the enactment of the statutes.

Compatible with Petroleum Pipelines:

Whether or not a fuel can be transported by conventional petroleum pipeline is determined by the pipeline company, and is based primarily on its compatibility with jet

fuel. Some fuels may also have more tendency to pick up water during transport than petroleum fuels, which is a major concern for pipeline companies.

Fuels which are currently not compatible with petroleum pipelines will remain so, unless a major policy decision is made by the pipeline companies, which is unlikely, or a new pipeline for specific fuels is built. Although a fuel may not be compatible with petroleum pipelines this does not mean there is no way to transport that fuel. Fuels that are not compatible with petroleum pipelines can still be transported by truck or rail to their destination.

Vapor Recovery:

All vapor recovery system for gasoline marketing operations must be certified by the Air Resources Board in accordance with Health and Safety Code Section 41954 and Title 17 California Code of Regulations Section 94010 et seq.

Vehicle Issues:

These rows address any incompatibility issues. For example many existing gasoline vehicles will give a check engine light for gasoline with ethanol content above 10%. Other equipment regulated by ARB such as non-road and marine equipment may also have incompatibility issues.

Technology Issues:

These rows address the current state of technology. With further investment and innovation these issues would presumably disappear. Production includes processing and refining. Delivery means reliable mass delivery to consumers. Fueling means the infrastructure required to bring the fuel to vehicle fuel tanks.

CDFA, Division of Measurement Standards Terms & Descriptions:

ASTM/SAE:

The consensus standard development organization ASTM or SAE standard specification for the fuel if one exists. Both ASTM and SAE enact specifications based on a consensus ruling of working groups consisting of fuel producers, fuel users and general interest organizations including state and federal governmental agencies.

The Department is required under the Business and Profession Code **Sections § 13440 and § 13450** to adopt by reference either ASTM or SAE standards for a spark or compression ignition fuel once ASTM or SAE has established such a standard. If such a standard does not exist for a fuel, the Department may establish intern standard until such time ASTM or SAE develops a standard for that fuel.

Authority to regulate:

The Department has the authority under Division 5 of the Business and Professions Code to regulate the sale of fuel, including but not limited to the enforcement of quality and quantity standards, method of sale, and advertising and labeling requirements.

Regulations:

The Department has established regulations in Title 4, Division 9 of the California Code of Regulations to enforce fuel quality and quantity standards, method of sale, and advertising and labeling requirements.

Quality standard for fuel use:

ASTM or SAE has a recognized quality standard for the fuel. In the absence of an approved standard, the State has established a standard for the fuel. State law requires that if a consensus standard development organization approved by the American National Standards Institute (ANSI) develops a fuel standard for hydrogen, that CDFA adopt the standard.

Quality test methods:

ASTM or SAE, or State test methods exist for fuel quality analyses.

Quality test equipment:

The Department has adequate equipment and instrumentation to perform fuel quality analyses.

Metering systems:

Prototype fuel dispensing systems have successfully passed type evaluation testing and commercial fuel dispensing systems are available for use in the sale of the fuel.

Quantity test methods:

National Type Evaluation Program or California Type Evaluation Program test methods have been established to conduct type evaluation tests. National Institute of Standards

and Technology or State test methods have been established to conduct field accuracy tests.

Quantity test equipment:

National Type Evaluation Program or California Type Evaluation Program reference standards have been established and the Department possesses adequate test equipment to conduct type evaluation tests. In addition, the Department possesses adequate field standards and test equipment to conduct field accuracy tests.

Method of sale:

Fuels shall be sold by weight, volume, or energy content. The method of sale shall contain accurate and adequate information so that purchasers can make price and quantity comparisons.

Labeling:

Dispensers and storage tanks shall be labeled with product identity and other legally required information, e.g. brand and grade. Containers and consumer packages shall contain a declaration of identity, net quantity, and statement of responsibility.

Advertising:

Every person offering a fuel for sale to the public must display a clearly visible sign advertising the product name, price, brand, grade of fuel and other legally required information.

CAL FIRE - Office of the State Fire Marshal Terms & Descriptions:

Approved:

Acceptable to the code official or authority having jurisdiction.

[California Fire Code, Chapter 2, Section 202]

Approved Equipment (Alternate Fuels):

Cylinders, containers and tanks; pressure relief devices, including pressure valves; hydrogen vaporizers; pressure regulators; and piping used for gaseous hydrogen systems shall be designed and constructed in accordance with [Section 3003](#), [3203](#) or NFPA 55. [California Fire Code, Chapter 22]

Approved Listing Agency:

Is any agency approved by the enforcing agency, unless otherwise provided by statute, which is in the business of listing and labeling and which makes available at least an annual published report of such listings in which specific information is included that the product has been tested to recognized standards and found to comply. [California Building Code, Chapter 2]

Approved Testing Organization:

Means any person, firm, corporation or association which conforms to all of the following:

- (1) Equipped or has access to facilities which are equipped to perform tests in accordance with required test procedures.
- (2) Employment of personnel who are qualified for testing. Evidence of such qualifications may include persons possessing registration as a Professional
- (3) Approved by the State Fire Marshal. Persons, firms, corporations, or associations desiring approval as a testing organization may initiate a request and present to the State Fire Marshal evidence of their qualifications which in the judgment of the State Fire Marshal. [Title 19 California Code of Regulations Section 1918.23]

Approved Testing Agency:

Is any agency, which is determined by the enforcing agency, except as otherwise provided by statute, to have adequate personnel and expertise to carry out the testing of systems, materials, types of construction, fixtures or appliances.

[California Building Code, Chapter 2]

Dispensing Device:

A unit assembly approved for installation consisting of a power-operated pumping unit, strainers, metering devices, valves, dispensing outlet(s) for hoses and dispensing nozzles designed to stop the discharge of liquid automatically when the control level of the dispensing nozzle is released. [Title 19 California Code of Regulations Section 1918.11(a)]

Dispensing Nozzle:

A regulating mechanism with spout approved for installation in conjunction with a "dispensing device" which controls the flow of gasoline into fuel tanks, and returns vapors to an underground tank. [Title 19 California Code of Regulations Section 1918.11(b)]

Emergency Shutoff Valve:

A valve designed to shut off the flow of gases or liquids. [California Fire Code, Chapter 2, Section 202]

Emergency Shutoff Valve, Automatic:

A fail-safe automatic-closing valve designed to shut off the flow of gases or liquids initiated by a control system that is activated by automatic means. [California Fire Code, Chapter 2, Section 202]

Emergency Shutoff Valve, Manual:

A manually operated valve designed to shut off the flow of gases or liquids. [California Fire Code, Chapter 2, Section 202]

Fire Code Official:

The fire chief or other designated authority charged with the administration and enforcement of the code, or a duly authorized representative. [California Fire Code, Chapter 2, Section 202]

Flame Arrestor:

A device approved for installation in piping carrying a flammable vapor/air mixture, to prevent flame travel beyond the point of installation of the device. [Title 19 California Code of Regulations Section 1918.12]

Impact Valve:

A device approved for installation in piping which automatically closes by the activation of a fusible link through exposure to fire or severe physical impact, or both. [Title 19 California Code of Regulations Section 1918.14]

Labeled:

Labeled shall mean Systems or components bearing the label, symbol, or other identifying mark of a testing laboratory approved by the State Fire Marshal, or the label of the State Fire Marshal. [Title 19 California Code of Regulations Section 1918.15]

Listed:

Listed shall also mean equipment or materials accepted by the State Fire Marshal as conforming to the provisions of the State Fire Marshal's regulations and which are included in a list published by the State Fire Marshal. [California Building Code, Chapter 2]

Equipment or materials included on a list published by an approved testing laboratory, inspection agency or other organization concerned with current product evaluation that maintains periodic inspection of production of listed equipment or materials, and whose listing states that equipment or materials comply with approved nationally recognized standards and have been tested or evaluated and found suitable for use in a specified manner. [California Fire Code, Chapter 2, Section 202]

Listed Equipment (Alternate Fuels):

Hoses, hose connections, compressors, Alternate Fuels generators, dispensers, detection systems and electrical equipment used for Alternate Fuels shall be listed for use with Alternate Fuels. Alternate Fuels motor fueling connections shall be listed and labeled for use with hydrogen. [California Fire Code, Chapter 22]

Vapor Assist System:

A system whereby mechanical and/or chemical means are used to capture and retain, with or without processing, gasoline vapors emitted during dispensing operations. [Title 19 California Code of Regulations Section 1918.18(c)]

Vapor Balance System:

A system designed to capture and retain, solely by means of displacement with or without processing, gasoline vapors emitted during dispensing operations. [Title 19 California Code of Regulations Section 1918.18(b)]

Vapor Processing Unit:

Vapor Processing Equipment in one contiguous unit. Vapor processing unit shall not be construed interpreted to include inline flame arrestors, inline fire checks, pressure vacuum valves, inline check valves, and dispenser flow regulators. [Title 19 California Code of Regulations Section 1918.18(d)]

Vapor Recovery (Labeled):

"Labeled" shall mean systems or components bearing the label, symbol, or other identifying mark of a testing laboratory approved by the State Fire Marshal, or the label of the State Fire Marshal. [Title 19 California Code of Regulations Section 1918.15(a)]

Vapor Recovery Labels:

Every gasoline vapor recovery system or component which is certified by the State Fire Marshall, shall bear a label conforming to the provisions of this section. Labels shall be placed in a conspicuous location and shall be attached by the manufacture during production or fabrication. [Title 19 California Code of Regulations Section 1918.22(a)]

Vapor Recovery System:

A "vapor recovery system" consists of a vapor gathering system capable of collecting the hydrocarbon vapors and gases discharged and a vapor disposal system capable of processing such hydrocarbon vapors and gases so as to prevent their emission into the atmosphere, with all tank gauging and sampling devices gastight except when gauging or sampling is taking place. [Health and Safety Code Section 41952]

State Water Resources Control Board Terms & Descriptions:

Underground Storage Tank (UST):

UST means any one or combination of tanks, including pipes connected thereto, that is used for the storage of hazardous substances and that is substantially or totally beneath the surface of the ground. [California Health and Safety Code, Chapter 6.7, Section 25281]

Hazardous Substance:

Hazardous substance means either of the following:

(1) All of the following liquid and solid substances, unless the department, in consultation with the board, determines that the substance could not adversely affect the quality of the waters of the state:

- (A) Substances on the list prepared by the Director of Industrial Relations pursuant to Section 6382 of the Labor Code.
- (B) Hazardous substances, as defined in Section 25316.
- (C) Any substance or material that is classified by the National Fire Protection Association (NFPA) as a flammable liquid, a class II combustible liquid, or a class III-A combustible liquid.

(2) Any regulated substance, as defined in subsection (2) of Section 6991 of Title 42 of the United States Code, as that section reads on January 1, 1989, or as it may subsequently be amended or supplemented.

[California Health and Safety Code, Chapter 6.7, Section 25281]

Leak Detection Functional Testing:

A third party shall evaluate and approve all leak detection methods. An third party testing laboratory includes testing organizations, consulting firms, test laboratories, not-for-profit research organizations and educational institutions with no financial interest in the matters under consideration. The term includes only those organizations which are not owned or controlled by any client, industrial organization, or any other institution with a financial interest in the matter under consideration. [Title 23, California Code of Regulations, § 2610 and § 2643]

Testing Organization Approval:

Independent testing organization means an organization which tests products or systems for compliance with voluntary consensus standards. To be acceptable as an independent testing organization, the organization shall not be owned or controlled by any client, industrial organization, or any other person or institution with a financial interest in the product or system being tested. For an organization to certify, list, or label products or systems in compliance with voluntary consensus standards, it shall maintain formal periodic inspections of production of products or systems to ensure that a listed, certified, or labeled product or system continues to meet the appropriate standards. An independent testing organization approval is required for tanks, piping and other components used to construct the containment system.

[Title 23, California Code of Regulations, § 2610 and § 2631]

Industry Code and Engineering Standards:

Non integral secondary containment shall be designed and constructed according to an engineering specification by a state registered professional engineer or according to a nationally recognized industry code or engineering standard. [Title 23, California Code of Regulations, § 2631]

IV. Specific Requirements for Fuels in California

This chapter covers the technical or regulatory requirements of each participating agency that remains to be addressed, organized by each individual fuel.

Gasoline w/ E10 Requirements:

ARB:

Compatible with petroleum pipelines: E10 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Gasoline is pipelined and then mixed with ethanol and transported by truck to its ultimate destination. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

ARB Specifications: Gasoline with up to 10 percent ethanol must comply with the specifications in 13 CCR section 2250-2273.5.

CDFA:

There are no outstanding requirements for gasoline with up to 10% ethanol.

CAL FIRE - OSFM:

There are no other additional requirements for gasoline with up to 10% ethanol. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

There are no outstanding requirements for gasoline with up to 10% ethanol.

E85 Requirements:

ARB:

Compatible with petroleum pipelines: E85 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E85, however ARB has issued variances to the Phase 3 vapor recovery requirements for current E85 stations.

Vehicle Issues: E85 can only be used in flex fuel vehicles specifically designed to run on E85.

ARB Specifications: E85 must comply with the specifications in 13 CCR section 2290-2293.5.

Fueling: E85 dispensing devices have been approved for use by UL.

~~UL has not approved certain portions of the hanging hardware on ethanol dispensers for materials compatibility UL must approve the hanging hardware for to meet this requirement.~~

CDFA:

There are no outstanding requirements for E85.

CAL FIRE - OSFM:

There are no other additional requirements for E85. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

~~Regulated by CA Fire Code: E85 product has not met California Fire Code Section 2206.7.1 which states that electrical equipment, dispensers, hose, nozzles and submersible or subsurface pumps used in fuel dispensing systems shall be listed. Currently there is no listed dispenser for E85. Alternate Means of Protection may be considered by the local authority having jurisdiction as stated in the California Fire Code Section 111.2.4 and Title 19 California Code of Regulations Section 2.01.~~

~~NFPA Standards: E85 shall comply with NFPA Standard 30A (Motor Fuel Dispensing Facilities). This document may be obtained from National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269 or (800) 344-3555.~~

Vapor Recovery & Dispenser: E85 product does not meet Title 19 California Code of Regulations Section 1918.82 which states:

(a) General. Equipment utilized in gasoline vapor recovery shall be tested according to the requirements set forth in the following applicable standards.

(1) Flame Arrestors. Flame Arrestors to be installed in either fuel, vapor, or vent lines shall be tested in accordance with the requirements of U.L. Standard 525, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(2) Hose Nozzle Valves. Hose nozzle valves used in conjunction with gasoline vapor recovery systems shall be tested in accordance with the requirements of U.L. Standard 842, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(3) Carbon/Charcoal Canisters. Carbon/charcoal canisters utilized in gasoline vapor recovery systems shall withstand, without failure, a test pressure of plus or minus 150% of the maximum operating pressure. The canister material shall also be able to withstand temperatures created by the materials contained therein.

(4) Pressure Regulators. Gasoline vapor pressure regulators utilized in a vapor recovery system shall be approved for the intended use.

(5) Ignition Controls. Ignition controls including, but not limited to, such devices as flame detectors, flame sensors, ignition transformers, electrical control units, alarms, flame indicators, utilized as a component of a gasoline vapor recovery system shall be approved by the State Fire Marshal for its intended use.

(6) Refrigeration Units. Refrigeration units utilized in processing vapors in gasoline vapor recovery systems shall be approved for their intended use.

(7) Pressure/Vacuum Valves. Pressure/vacuum valves utilized in gasoline vapor recovery systems shall be approved by the State Fire Marshal for their intended use.

(8) Internal Explosion/Ignition Test. The processing unit shall be subjected to a series of internal explosion/ignition tests, during performance/operation safety testing, such that ignition of an explosion air/gasoline vapor mixture occurs within the confines of the processing unit piping. The explosion shall not propagate beyond the inlet Flame Arrestor(s). The processing unit and Flame Arrestors shall provide a degree of isolation between other installation components and the processing unit, and between the processing unit and the remainder of the installation, and between the processing unit and the storage tank. The operating function of the unit, shall not be impaired as a result of such tests. Adequate sensors shall be utilized to insure that: (1) an explosive gasoline/air vapor mixture was present; (2) that an ignition of the vapor mixture did occur; and (3) that the safeguards installed in the processing unit did function.

~~(9) Other Equipment. Such other equipment which may be utilized in gasoline vapor control systems shall also be tested to applicable standards as may be determined necessary by the State Fire Marshal.~~

SWRCB:

Third-party leak detection functional testing: Various manufacturers have either opted to not obtain approval for cost prohibitive reasons, or cannot obtain approval because components as originally manufactured are not compatible with high blends of ethanol Therefore E85 equipment availability is limited.

Independent testing organization approvals, industry codes, and engineering standards: Such standards and approvals are available for E85 however various manufacturers have either opted to not obtain such approvals for cost prohibitive reasons, or cannot obtain necessary approval because components as originally manufactured are not compatible for use with high blends of ethanol Therefore E85 equipment availability is limited.

Diesel w/o B5 Requirements:

ARB:

ARB Specifications: Diesel without B5 must comply with the specifications in 13 CCR section 2280-2283.

CDFA:

There are no outstanding requirements for diesel without B5.

CAL FIRE - OSFM:

There are no other additional requirements for diesel without B5. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

There are no outstanding requirements for diesel without B5.

Diesel w/ B5 Requirements:

ARB:

Compatible with petroleum pipelines: B5 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing biodiesel.

ARB Specifications: Diesel with B5 must comply with the specifications in 13 CCR section 2280-2283.

CDFA:

There are no outstanding requirements for diesel with B5.

CAL FIRE - OSFM:

There are no other additional requirements for diesel with B5. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

There are no outstanding requirements for diesel with B5.

~~Third-party leak detection functional testing: Manufacturers of leak detection equipment have not conducted appropriate third-party functional testing to obtain the proper approvals; a regulatory variance is in place for 36 months to obtain such approvals. This variance expires June 2012.~~

E15 Requirements:

ARB:

Multimedia: Ethanol up to 10 percent is the only oxygenate currently allowed in gasoline used in California. In order to increase the amount of ethanol allowed in gasoline a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Compatible with petroleum pipelines: E15 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E15. If E15 were to be approved as an oxygenate in California UL would have to approve vapor recovery devices for use with E15.

ARB Specifications: ARB has not set specifications for this fuel.

Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with E15 fuel due to possible corrosion of fuel systems and negative interaction with emission control devices.

Fueling: Fueling hardware compatible with E15 would need to be approved by UL if E15 were to be approved as an oxygenate in California.

CDFA:

ASTM/SAE: ASTM D4814 needs to be modified to include ethanol up to 15 volume percent, a new ASTM or SAE standard developed, or CDFA would need to establish an internal standard to allow sale of this fuel.

Regulations: Once ASTM or SAE specification exists regulations can be written to allow sale of this fuel.

Quality Standard for fuel use: ASTM or SAE has not adopted specifications for this fuel. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation.

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for E15. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional test methods, conducted testing, or obtained approval for E15.

E20 Requirements:

ARB:

Multimedia: Ethanol up to 10 percent is the only currently allowed oxygenate in gasoline used in California. In order to increase the amount of ethanol allowed in gasoline a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Compatible with petroleum pipelines: E20 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E20. If E20 were to be approved as an oxygenate in California UL would have to approve vapor recovery devices for use with E20.

ARB Specifications: ARB has not set specifications for this fuel.

Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with E20 fuel due to possible corrosion of fuel systems and negative interaction with emission control devices.

Fueling: Fueling hardware compatible with E20 would need to be approved by UL if E20 were to be approved as an oxygenate in California.

CDFA:

ASTM/SAE: ASTM D4814 needs to be modified to include ethanol up to 20 volume percent, a new ASTM or SAE standard developed, or CDFA would need to establish an intern standard to allow sale of this fuel.

Regulations: Once ASTM specification exists regulations can be written to allow sale of this fuel.

Quality Standard for fuel use: No ASTM specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation

Advertising: Requirements for advertising need to be developed and adopted by regulation

CAL FIRE - OSFM:

There are no other additional requirements for E20. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional test methods, conducted testing, or obtained approval for E20.

E30 Requirements:

ARB:

Multimedia: Ethanol up to 10 percent is the only currently allowed oxygenate in gasoline used in California. In order to increase the amount of ethanol allowed in gasoline a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Compatible with petroleum pipelines: E30 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E30. If E30 were to be approved as an oxygenate in California UL would have to approve vapor recovery devices for use with E30.

ARB Specifications: ARB has not set specifications for this fuel.

Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with E30 fuel due to possible corrosion of fuel systems and negative interaction with emission control devices.

Fueling: Fueling hardware compatible with E30 would need to be approved by UL if E30 were to be approved as an oxygenate in California.

CDFA:

ASTM/SAE: ASTM D4814 needs to be modified to include ethanol up to 30 volume percent, a new ASTM standard developed, or CDFA would need to establish an intern standard to allow sale of this fuel.

Regulations: Once ASTM or SAE specification exists regulations can be written to allow sale of this fuel.

Quality Standard for fuel use: No ASTM or SAE specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

Regulated by CA Fire Code: E30 product has not met California Fire Code Section 2206.7.1 which states that electrical equipment, dispensers, hose, nozzles and submersible or subsurface pumps used in fuel-dispensing systems shall be listed. Currently there is no listed dispenser for E30. Alternate Means of Protection may be considered by the local authority having jurisdiction.

NFPA Standards: E30 shall comply with NFPA Standard 30A (Motor Fuel Dispensing Facilities). This document may be obtained from National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269 or (800) 344-3555.

Vapor Recovery & Dispenser: E30 product does not meet Title 19 California Code of Regulations Section 1918.82 which states:

(a) General. Equipment utilized in gasoline vapor recovery shall be tested according to the requirements set forth in the following applicable standards.

(1) Flame Arrestors. Flame Arrestors to be installed in either fuel, vapor, or vent lines shall be tested in accordance with the requirements of U.L. Standard 525, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(2) Hose Nozzle Valves. Hose nozzle valves used in conjunction with gasoline vapor recovery systems shall be tested in accordance with the requirements of U.L. Standard 842, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(3) Carbon/Charcoal Canisters. Carbon/charcoal canisters utilized in gasoline vapor recovery systems shall withstand, without failure, a test pressure of plus or minus 150% of the maximum operating pressure. The canister material shall also be able to withstand temperatures created by the materials contained therein.

(4) Pressure Regulators. Gasoline vapor pressure regulators utilized in a vapor recovery system shall be approved for the intended use.

(5) Ignition Controls. Ignition controls including, but not limited to, such devices as flame detectors, flame sensors, ignition transformers, electrical control units, alarms, flame indicators, utilized as a component of a gasoline vapor recovery system shall be approved by the State Fire Marshal for its intended use.

(6) Refrigeration Units. Refrigeration units utilized in processing vapors in gasoline vapor recovery systems shall be approved for their intended use.

(7) Pressure/Vacuum Valves. Pressure/vacuum valves utilized in gasoline vapor recovery systems shall be approved by the State Fire Marshal for their intended use.

(8) Internal Explosion/Ignition Test. The processing unit shall be subjected to a series of internal explosion/ignition tests, during performance/operation safety testing, such that ignition of an explosion air/gasoline vapor mixture occurs within the confines of the processing unit piping. The explosion shall not propagate beyond the inlet Flame Arrestor(s). The processing unit and Flame Arrestors shall provide a degree of isolation between other installation components and the processing unit, and between the processing unit and the remainder of the installation, and between the processing unit and the storage tank. The operating function of the unit, shall not be impaired as a result of such tests. Adequate sensors shall be utilized to insure that: (1) an explosive gasoline/air vapor mixture was present; (2) that an ignition of the vapor mixture did occur; and (3) that the safeguards installed in the processing unit did function.

(9) Other Equipment. Such other equipment which may be utilized in gasoline vapor control systems shall also be tested to applicable standards as may be determined necessary by the State Fire Marshal.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional test methods, conducted testing, or obtained proper approval for E30.

E100 Fuel Requirements:

ARB:

ASTM: ASTM D4806 was adopted as a specification for E100 ethanol as a blending component. ASTM has not yet adopted specifications for E100 ethanol for use as a fuel.

Compatible with petroleum pipelines: E100 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing ethanol. Additionally ethanol containing fuels have a high tendency to corrode pipelines and introduce water impurities, which contribute to their incompatibility with petroleum pipelines.

Vapor Recovery: Vapor recovery devices have not been approved for E100.

Vehicle Issues: E100 can only be used in vehicles specifically designed to run on E100.

ARB Specifications: E100 must comply with the specifications in 13 CCR section 2290-2293.5.

Fueling: Fueling hardware compatible with E100 would need to be approved by UL if E100 were to become commercially available.

CDFA:

ASTM/SAE: A new ASTM or SAE standard needs to be developed, or CDFA would need to establish an internal standard to allow sale of this fuel.

Regulations: Once ASTM or SAE specification exists regulations can be written to allow sale of this fuel.

Quality Standard for fuel use: No ASTM or SAE specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation.

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

Regulated by CA Fire Code: E100 product has not met California Fire Code Section 2206.7.1 which states that electrical equipment, dispensers, hose, nozzles and submersible or subsurface pumps used in fuel-dispensing systems shall be listed. Currently there is no listed dispenser for E100. Alternate Means of Protection may be considered by the local authority having jurisdiction.

NFPA Standards: E100 shall comply with NFPA Standard 30A (Motor Fuel Dispensing Facilities). This document may be obtained from National Fire Protection Association, Batterymarch Park, Quincy, Massachusetts 02269 or (800) 344-3555.

Vapor Recovery & Dispenser: E100 product does not meet Title 19 California Code of Regulations Section 1918.82 which states:

(a) General. Equipment utilized in gasoline vapor recovery shall be tested according to the requirements set forth in the following applicable standards.

(1) Flame Arrestors. Flame Arrestors to be installed in either fuel, vapor, or vent lines shall be tested in accordance with the requirements of U.L. Standard 525, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(2) Hose Nozzle Valves. Hose nozzle valves used in conjunction with gasoline vapor recovery systems shall be tested in accordance with the requirements of U.L. Standard 842, available from Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062, and as approved by the State Fire Marshal.

(3) Carbon/Charcoal Canisters. Carbon/charcoal canisters utilized in gasoline vapor recovery systems shall withstand, without failure, a test pressure of plus or minus 150% of the maximum operating pressure. The canister material shall also be able to withstand temperatures created by the materials contained therein.

(4) Pressure Regulators. Gasoline vapor pressure regulators utilized in a vapor recovery system shall be approved for the intended use.

(5) Ignition Controls. Ignition controls including, but not limited to, such devices as flame detectors, flame sensors, ignition transformers, electrical control units, alarms, flame indicators, utilized as a component of a gasoline vapor recovery system shall be approved by the State Fire Marshal for its intended use.

(6) Refrigeration Units. Refrigeration units utilized in processing vapors in gasoline vapor recovery systems shall be approved for their intended use.

(7) Pressure/Vacuum Valves. Pressure/vacuum valves utilized in gasoline vapor recovery systems shall be approved by the State Fire Marshal for their intended use.

(8) Internal Explosion/Ignition Test. The processing unit shall be subjected to a series of internal explosion/ignition tests, during performance/operation safety testing, such that ignition of an explosion air/gasoline vapor mixture occurs within the confines of the processing unit piping. The explosion shall not propagate beyond the inlet Flame Arrestor(s). The processing unit and Flame Arrestors shall provide a degree of isolation between other installation components and the processing unit, and between the processing unit and the remainder of the installation, and between the processing unit and the storage tank. The operating function of the unit, shall not be impaired as a result of such tests. Adequate sensors shall be utilized to insure that: (1) an explosive gasoline/air vapor mixture was present; (2) that an ignition of the vapor mixture did occur; and (3) that the safeguards installed in the processing unit did function.

(9) Other Equipment. Such other equipment which may be utilized in gasoline vapor control systems shall also be tested to applicable standards as may be determined necessary by the State Fire Marshal.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional test methods, completed testing, or obtained the proper approval for E100.

Independent testing organization approvals, industry codes, and engineering standards:

Such standards and approvals are available for E100 however various manufacturers have either opted to not obtain such approvals for cost prohibitive reasons, or cannot obtain approval because components as originally manufactured are not compatible with high blends of ethanol. Therefore E100 equipment availability is limited.

Gasoline w/butanol 16% Requirements:

ARB:

ASTM: The applicable ASTM standard for gasoline with 16 percent butanol is ASTM D4814. ASTM has not established a standard for butanol blendstocks.

Multimedia: Ethanol up to 10 percent is the only oxygenate currently allowed in gasoline used in California. In order to approve butanol as an oxygenate in gasoline a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Vapor Recovery: Vapor recovery devices have not been approved for butanol. If butanol were to be approved as an oxygenate in California UL would have to approve vapor recovery devices for use with butanol.

ARB Specifications: ARB has not set specifications for this fuel, if the multimedia shows equivalent or lower emissions than ethanol in gasoline specifications may be unnecessary.

Vehicle Issues: Current vehicles designed to run on gasoline may be incompatible with butanol due to possible corrosion of fuel systems and negative interaction with emission control devices.

Production Issues: There are currently no commercial scale facilities that produce butanol in the United States.

Fueling: Fueling hardware compatible with butanol would need to be approved by UL if butanol were to be approved as an oxygenate in California.

CDFA:

There are no outstanding requirements for gasoline w/butanol 16%.

CAL FIRE - OSFM:

There are no other additional requirements for gasoline w/butanol 16%. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional test methods, completed testing, or obtained approval for gasoline w/16% butanol.

Independent testing organization approvals, industry codes, and engineering standards:
Industry has not yet developed standards, conducted testing, or obtained approval for gasoline w/16% butanol.

B6-B20 Requirements:

ARB:

Multimedia: In order for ARB to set a specification for B6 to B20 in California a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Compatible with petroleum pipelines: B6 to B20 is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing biodiesel.

ARB specifications: ARB has not set specifications for B6 to B20.

Vehicle Issues: Current vehicles designed to run on diesel may be incompatible with B6 to B20 fuel due to possible plugging of fuel systems and possible cold temperature operability issues. However, widespread adherence to ASTM standards for biodiesel may alleviate or eliminate these possible vehicle issues.

CDFA:

There are no outstanding requirements for diesel with B6 – B20.

CAL FIRE - OSFM:

There are no other additional requirements for B6-B20. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approvals for biodiesel blends B6 – B20. A regulatory variance is in place for 36 months to develop test methods, conduct testing, and obtain approval. This variance expires June 2012.

Independent testing organization approvals, industry codes, and engineering standards:

Industry has not yet developed standards, conducted testing, or obtained approvals for biodiesel blends B6 – B20. A regulatory variance is in place for 36 months to develop standards, conduct testing and obtain approval. This variance expires June 2012.

B21-B100 Fuel Requirements:

ARB:

ASTM: ASTM has not adopted specifications for B21 to B100 fuel. However ASTM D6751 was adopted as a specification for B100 biodiesel as a blending component.

Multimedia: In order for ARB to set a specification for B21 to B100 fuel in California a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

Compatible with petroleum pipelines: B21 to B100 fuel is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for fuels containing biodiesel.

ARB specifications: ARB has not set specifications for B21 to B100 fuel.

Vehicle Issues: Current vehicles designed to run on diesel may be incompatible with B6 to B20 fuel due to possible plugging of fuel systems and possible cold temperature operability issues.

Production Issues: There is no ASTM specification for B21 to B100 fuel so there is no standard for producers to ensure quality product.

CDFA:

ASTM/SAE: A new ASTM or SAE standard needs to be developed, or CDFA would need to establish an internal standard to allow sale of this fuel.

Regulations: Once ASTM specification exists regulations can be written to allow sale of this fuel.

Quality Standard for fuel use: No ASTM specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation.

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for B20-B100 fuel. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party leak detection functional test methods, conducted testing, or obtained approval for biodiesel blends B20 – B100.

Independent testing organization approvals, industry codes, and engineering standards:
Industry has not yet developed standards, conducted testing, or obtained approval for biodiesel blends B20 – B100.

R1-R100 Fuel Requirements:

ARB:

Multimedia: In order for ARB to set a specification for R1-R100 in California a multimedia assessment must be approved in accordance with Health and Safety Code 43830.8.

ARB specifications: ARB has not set motor vehicle fuel specifications for R1-R100 fuel in title 13, CCR, section 2292.

Regulations: R1-R100 must comply with the requirements set forth in the Low Carbon Fuel Standard (17 CCR 95480-95490), including a requirement that all biomass-based diesel, such as R1-R100, sold under the LCFS meet ASTM D975.

Production Issues: There is only one commercial scale plant in the United States producing R1 to R100.

CDFA:

ASTM/SAE: No issues if fuel meets ASTM D975. Regulations: Current regulation allow the sale of this fuel if the fuel meets ASTM D975. Quality Standard for fuel use: . By regulation fuel must meet ASTM D975. Labeling: FTC labeling requirements have been adopted by regulation.

Advertising: Requirements for advertng have been develop and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for R1-R100 fuel. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Third-party leak detection functional testing: Industry has not yet developed third-party functional testing methods necessary to obtain the proper approvals for R1 – R100.

Independent testing organization approvals, industry codes, and engineering standards: Industry has not yet developed standards and approvals for biodiesel blends R1 – R100.

ASTM: This fuel must meet an ASTM standard in order for underground storage equipment to be granted approval by Underwriter Labs. ASTM does not recognize R1-R100 as D975 because of a single item requirement for the fuel to be petroleum distillate.

CNG Requirements:

ARB:

ARB Specifications: CNG must comply with the specifications in 13 CCR section 2290-2293.5.

Vehicle Issues: CNG can only be used in vehicles that were specifically designed for CNG or retrofit to accommodate the specific equipment required by CNG vehicles. For example CNG vehicles require a different fueling system than vehicles not designed for use with CNG.

CDFA:

No issues.

CAL FIRE - OSFM:

There are no other additional requirements for CNG. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not Applicable.

LNG Requirements:

ARB:

ARB Specifications: LNG must comply with the specifications in 13 CCR section 2290-2293.5.

Vehicle Issues: LNG can only be used in vehicles that were specifically designed for LNG or retrofit to accommodate the specific equipment required by LNG vehicles. For example LNG vehicles require a different fueling system than vehicles not designed for use with LNG.

C DFA:

No issues

CAL FIRE - OSFM:

There are no other additional requirements for LNG. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.

LPG Requirements:

ARB:

ARB Specifications: LPG must comply with the specifications in 13 CCR section 2290-2293.5.

Vehicle Issues: LPG can only be used in vehicles that were specifically designed for LPG or retrofit to accommodate the specific equipment required by LPG vehicles. For example LPG vehicles require a different fueling system than vehicles not designed for use with LPG.

CDFA:

No issues.

CAL FIRE - OSFM:

There are no other additional requirements for LPG. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.

Biogas Requirements:

ARB:

Multimedia: Currently there is no differentiation between feedstocks for natural gas fuels, however if biogas cannot meet the current natural gas fuels specification and a new specification needs to be developed to accommodate it a multimedia evaluation will be required.

Vehicle Issues: Biogas can only be used in vehicles that were specifically designed for biogas or retrofit to accommodate the specific equipment required by biogas vehicles. For example biogas vehicles require a different fueling system than vehicles not designed for use with biogas.

ARB Specifications: Biogas must comply with the specifications in 13 CCR section 2290-2293.5.

Production Issues: Biogas production is generally not introduced into natural gas pipelines and is available in limited quantities usually for fleet use.

CDFA:

ASTM/SAE: A new ASTM or SAE standard needs to be developed, or CDFA would need to establish an intern standard to allow sale of this fuel.

Regulations: Once ASTM specification exists regulations can be written to allow sale of this fuel

Quality Standard for fuel use: No ASTM specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for Biogas. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.

Liquid Biogas Requirements:

ARB:

Multimedia: Currently there is no differentiation between feedstocks for natural gas fuels, however if liquid biogas cannot meet the current natural gas fuels specification and a new specification needs to be developed to accommodate it a multimedia evaluation will be required.

Vehicle Issues: Liquid biogas can only be used in vehicles that were specifically designed for liquid biogas or retrofit to accommodate the specific equipment required by liquid biogas vehicles. For example liquid biogas vehicles require a different fueling system than vehicles not designed for use with liquid biogas.

ARB Specifications: Liquid biogas must comply with the specifications in 13 CCR section 2290-2293.5.

Production Issues: Liquid biogas production is generally not introduced into natural gas pipelines and is available in limited quantities usually for fleet use.

CDFA:

ASTM/SAE: A new ASTM or SAE standard needs to be developed, or CDFA would need to establish an intern standard to allow sale of this fuel.

Regulations: Once ASTM specification exists regulations can be written to allow sale of this fuel

Quality Standard for fuel use: No ASTM specification for fuel exists. Current quality standards for existing fuels can be used.

Labeling: Labeling requirements need to be developed by FTC and adopted by regulation

Advertising: Requirements for advertising need to be developed and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for Liquid Biogas. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.

H₂ Requirements:

ARB:

ASTM: ASTM has not adopted specifications for hydrogen.

Compatible with petroleum pipelines: Hydrogen can be piped using a separate pipeline designed for transporting Hydrogen. Some petroleum or CNG pipelines can be converted to move hydrogen by installing new pumps and seals designed for hydrogen.

Vehicle Issues: Hydrogen fuel can be utilized by both internal combustion engines and fuel cell vehicles utilizing an electric motor. Conventional liquid fuel vehicles, such as gasoline and diesel fuel vehicles, are not compatible with Hydrogen. The fueling nozzle design will not allow these vehicles to be filled with hydrogen. Vehicle deployment is occurring in clusters to ensure that proper service and maintenance can be addressed in an economical manner.

ARB Specifications: Hydrogen fuel must comply with the specifications in 13 CCR section 2290-2293.5. This specification is specifically for hydrogen for use in combustion engines.

Production Issues: Currently hydrogen is economically produced and sold in California for refining and petrochemical industry. It can be economical for transportation use if produced at centralized plants close to the vehicle refueling facility. Small scale on-site production of hydrogen is not yet economical.

Fueling: Currently, hydrogen fueling stations are few in number. Fueling stations and vehicles are being deployed in clusters to maximize fuel throughput at the stations.

CDFA:

ASTM/SAE: CDFA has established an intern standard to allow sale of this fuel. Once an ASTM or SAE standard is developed it will be adopted.

Quality test methods: Test methods are currently being developed.

Quality test equipment: Test equipment is depended on test method development.

Meter Systems: Currently under development

Quantity test methods: Currently under development

Quantity test equipment: Currently under development

Method of Sale: Currently under development

Labeling: Labeling requirements need to be develop by FTC and adopted by regulation

Advertising: Requirements for adverting need to be develop and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for Hydrogen. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 though 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code,

California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards 52 and 55.

SWRCB:

Not applicable.

Electricity Requirements:

ARB:

Compatible with petroleum pipelines: Electricity is not a liquid fuel and cannot be pipelined. However electrical transmission wires are currently in place and can transport electricity.

Fueling: There is currently a lack of charging infrastructure to refuel electric vehicles at homes and workplaces. The need for public charging stations has not yet been well established. ARB requires vehicles to make use of the Society of Automotive Engineers (SAE) J1772 charging connector standard in order to earn credit under ARB's ZEV Regulation.

CDFA:

ASTM/SAE: Not applicable as neither organization has jurisdiction over electricity.

Authority to Regulate: CDFA has limited authority to regulate sub-metering. CDFA does have jurisdiction over type approval of meters.

Regulation: CDFA has regulations for non-governmental or non-California Public Utility Commission regulated selling of electricity. Further regulations would need to be developed if authority to regulate as a motor vehicle is authorized.

Method of sale: Needs to be defined.

Labeling: Labeling requirements need to be develop and adopted by regulation.

Advertising: Requirements for adverting need to be develop and adopted by regulation.

CAL FIRE - OSFM:

There are no other additional requirements for Electricity. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 though 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.

Urea (Diesel Exhaust Fluid) Requirements:

ARB:

Multimedia: Urea is not a fuel and therefore is not subject to the multimedia evaluation requirements for setting a new specification.

Compatible with petroleum pipelines: Urea is not compatible with petroleum pipelines primarily due to its incompatibility with jet fuel. It will remain so unless a new pipeline is built specifically for urea.

Vehicle Issues: Generally only new vehicles are equipped with devices that use urea. Some older vehicles may have been retrofit with devices that use urea.

ARB specifications: ARB has not set specifications for urea.

Fueling: Most fueling stations are not currently equipped with urea refueling equipment.

CDFA:

No issues.

CAL FIRE - OSFM:

There are no other additional requirements for Urea. This product shall comply with all the current adopted regulation requirements found in Title 24 California Code of Regulations Parts 1 through 9 (California Administrative Code, California Building Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Elevator Safety Construction Code, California Historical Building Code, California Fire Code, California Existing Building Code, California Referenced Standards Code), Title 19 California Code of Regulations and National Fire Protection Association Standards.

SWRCB:

Not applicable.