

Alternative Engine Fuel Conversion

Description:

Emission control systems of internal combustion engines are subject to compliance with EPA regulations. Federal regulations prohibit “tampering” with or removing any component of an certified original manufacturer’s emission control system, with exceptions for limited after market conversions to alternative fuels such as propane as provided in EPA Memorandum 1A, and its revised addendum.

Regulatory Reference

40 CFR PART 80	REGULATION OF FUELS AND FUEL ADDITIVES
40 CFR PART 85	CONTROL OF AIR POLLUTION FROM MOBILE SOURCES
40 CFR PART 86	CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES
40 CFR PART 88	CLEAN-FUEL VEHICLES
<u>40 CFR PART 90</u>	<u>CONTROL OF EMISSIONS FROM NONROAD SPARK-IGNITION ENGINES AT OR BELOW 19 KILOWATTS</u>
<u>40 CFR PART 91</u>	<u>CONTROL OF EMISSIONS FROM MARINE SPARK-IGNITION ENGINES</u>
40 CFR PART 600	FUEL ECONOMY OF MOTOR VEHICLES
<u>40 CFR PART 1048</u>	<u>CONTROL OF EMISSIONS FROM NEW, LARGE NONROAD SPARK-IGNITION ENGINES</u>
<u>40 CFR PART 1051</u>	<u>CONTROL OF EMISSIONS FROM RECREATIONAL ENGINES AND VEHICLES</u>
<u>40 CFR PART 1065</u>	<u>ENGINE-TESTING PROCEDURES</u>
<u>40 CFR PART 1068</u>	<u>GENERAL COMPLIANCE PROVISIONS FOR NONROAD PROGRAMS</u>

Revision to Addendum to EPA Mobile Source Enforcement Memorandum 1A: *Revised Tampering Enforcement Policy for Alternative Fuel Conversions*

Various federal and state regulations prohibit tampering with engine emission controls. Specific state and federal anti-tampering requirements also apply in “non-attainment areas” where vehicle inspection and maintenance programs are mandatory. The Addendum to Memorandum 1A establishes three options that may be used to demonstrate that performance of alternative fuel conversions would not be considered to be “tampering” for engines that are classified as mobile emission sources.

Applies to:

The EPA regulations apply to internal combustion engines with different requirements for mobile applications, stationary sources, and various types of equipment, such as, recreational, industrial trucks, power generators, etc.

General Requirements:

The provisions of Memorandum 1A allow for the conversion of engines to propane, provided that certain conditions are met during and after the conversion process. In lieu of meeting testing requirements under Options 1, 2, or 3 of the Addendum, the following may also apply:

- (1) Compliance for demonstrating a “reasonable basis” may be achieved by completing back-to-back I/M 240 emissions tests as contained in 40 CFR 51, Subpart S for **each** converted vehicle using gasoline in the vehicle or engine’s original configuration and with each operational fuel after conversion provided:
 - (a) All tests are conducted in accordance with the specified protocols under 40 CFR Part 51, Subpart S,
 - (b) The vehicle as tested in the original configuration with gasoline meets the applicable standards under 40 CFR 51.351,
 - (c) The exhaust emissions of each regulated pollutant after conversion using the alternative fuel are no greater than .90 times the emission levels for each pollutant before conversion, except that no hydrocarbon standard shall apply for operation exclusively using CNG,
 - (d) If dual fuel operation is retained, the exhaust emissions of each regulated pollutant after conversion using the original certification fuel are no greater than the emissions levels for each pollutant before conversion, and
 - (e) No party shall convert more than 25 vehicles or engines of any single vehicle/engine family combination in any calendar year under this I/M 240 protocol.
- (2) The final date for both testing and installations under Option 3 of the Addendum is December 31, 2001, for up to and including 2001 model year vehicles and engines. All alternative fuel conversions of model years 2002 and later vehicles and engines may only be performed in accordance with Options 1 or 2 of the Addendum.
- (3) As an alternate to engine dynamometer testing for heavy duty engine conversions under Option 3 for a specific heavy duty engine family, the manufacturer may demonstrate a “reasonable basis” by performing back-to-back chassis dynamometer emission tests in accordance with the Urban Dynamometer Driving Schedule for Heavy Duty Vehicles (UDDS) contained in 40 CFR Part 86 Appendix I, Paragraph (d), provided:
 - (a) The exhaust emissions results for THC, NO_x and CO measured during the UDDS after conversion and when operated exclusively or in combination with the alternative fuel are no greater than .90 times the baseline emissions for THC and NO_x and no greater than 1.00 times CO before conversion, except that NMHC after conversion shall be compared to the baseline THC before conversion in the case of operation exclusively with CNG, and
 - (b) All tests are performed in accordance with all specified protocols in 40 CFR Part 86, Subpart M, including vehicle preparation, dynamometer loading, emissions measurements and driving schedule except that commercially available fuel may be used for vehicle preconditioning and baseline testing.
- (4) As an alternate to engine dynamometer testing for heavy duty engine conversions under Option 3 for a specific heavy duty engine family or the alternate procedures provided in paragraph 3. above or the Addendum, any party may propose an alternate heavy duty vehicle or engine test procedure which operates the subject test engine through a range of

engine speed and load conditions reasonably representative of both urban and highway driving, measures the exhaust emissions specified above on a grams per mile or grams per brake horsepower-hour basis and specifies appropriate pass/fail criteria equivalent to paragraph 3 above for the purpose of demonstrating a “reasonable basis” under EPA’s tampering enforcement policy. Any such proposed procedures shall be submitted to the Director, Air Enforcement Division (2242A), Office of Enforcement and Compliance Assurance, U.S. EPA, 401 M Street, S.W., Washington, D.C. 20460 for consideration and approval, if appropriate, under this policy prior to the initiation of any vehicle procurement, modification or testing.

- (5) The results of federal emissions tests conducted under Option 3 for a specific engine family may be applied as a “reasonable basis” for up to a maximum of three additional engine families to that tested for demonstrating compliance with the applicable Tier 1 emission standards for that class of vehicle or engine as specified in 40 CFR Part 86 provided:
 - (a) The engine family tested in accordance with 40 CFR Part 86 meets the applicable Tier 1 standards for that vehicle or engine class with the application of the appropriate deterioration factor as provided under Option 3,
 - (b) The engine family tested above represents the “worst case” for emissions of the applicable engine families as based on engine or vehicle parameters reasonably expected to adversely affect the emission results such as maximum gross vehicle weight, maximum engine displacement and any other reasonable engineering judgments,
 - (c) The determination of “worst case” is confirmed by conducting I/M 240 emissions tests of one vehicle or engine of each applicable engine family after conversion,
 - (d) The results of the I/M 240 tests of the three additional engine families are no greater than the I/M 240 emission results of the original engine family tested,
 - (e) The additional engine families meet the criteria specified in paragraphs 3.(b)(4)B. through D. of the Addendum, and
 - (f) The evaporative emission control system remains as installed by the original engine manufacturer if gasoline operation is retained.
- (6) For both Low Emission Vehicle (LEV) and Tier 1 vehicles or engines, any additional engine families for which emission data would be carried across under paragraph 5 above or paragraph 3.(b)(4) under Option 3 of the Addendum must be produced by the same vehicle or engine manufacturer as the original engine family tested.
- (7) Any party responsible for demonstrating compliance, installing, converting, selling or marketing alternative fuel conversion systems in accordance with the requirements of the Addendum and this revised policy shall retain the results of all tests, installations and sales of such systems as specified under Option 3 of the Addendum or this Revision for inspection by EPA for five (5) years following completion of the testing, installing or marketing of such systems.
- (8) Any provisions or requirements of the Addendum [to Memorandum 1A] not extended or revised herein remain in effect as provided in the Addendum.

Training Requirements:

There are no specific training requirements associated with the regulations.

Maintenance and Review

Documentation of all pre-conversion and post-conversion emissions testing for each vehicle converted to propane must be maintained on file. The documentation should include all required information including the vehicle identification number (VIN), engine family, model, conversion equipment installed, etc.

Additional Information and Resources

Propane Education and Research Council website: <http://www.propanecouncil.org>

Environmental Protection Agency website: <http://www.epa.gov>

California Air Resources Board website: <http://www.arb.ca.gov/regs/regs.htm>