

EPA Policies for Vehicle/Engine Conversions to Clean Alternative Fuels

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Alternative Fuel Conversion

- Conversion systems modify vehicles and engines so they can run on different fuels than the ones for which they were designed
- Involves reconfiguring a gasoline or diesel vehicle or engine to operate on natural gas, propane, alcohols, or electricity, or on a blend of conventional and alternative fuels.
- Opens new fuel supply choices and can help consumers address concerns about fuel costs, energy security, and emissions



Alternative Fuel Conversion

- Any change to the original configuration of a certified vehicle or engine, including alternative fuel conversion, is a potential violation of CAA Section 203(a)(3) prohibition against tampering
- Important because poorly designed modifications can increase emissions
- EPA has established protocols through which conversion manufacturers may seek exemption from the tampering prohibition
- Demonstrating that emission controls in converted vehicle or engine will continue to function properly and that pollution will not increase as a result of conversion



History of Fuel Conversions Regulations

- Clean Air Act prohibits tampering with a certified vehicle or engine
- Regulations were originally promulgated in 1994 in 40 CFR part 85, subpart F
 - Required certification to achieve the regulatory tampering exemption
 - Adopted certification process designed for original vehicle/engine manufacturers
- EPA proposed updated regulations in May 2010 seeking to reduce burden where appropriate while maintaining environmental safeguards
- Final rule published in CFR Part 85 Subpart F on April 8, 2011 and became effective immediately



Key Features of New Regulation

- Scope
 - Fuel neutral – covers all fuels (gaseous, alcohol, electricity, etc)
 - Light-duty vehicles, heavy-duty highway vehicles and engines
- Age-based compliance categories
 - New compliance options for older vehicle and engine conversions
 - Certification only required for “new” vehicles and engines
- All converters must submit technical info for EPA evaluation, but specific demonstration requirement depends on vehicle/engine age
- Maintains some fundamental features of historical program
 - Test group/engine family as unit of compliance (but more flexible grouping criteria)
 - Small volume manufacturer flexibilities
 - Warranty and vehicle/packaging labeling requirements
 - Broad EPA authority for compliance oversight, including testing
- EPA can request additional data to support converter’s demonstration and may conduct confirmatory and in-use compliance testing
- Exemption void if conditions are not satisfied or if system is misapplied
- Includes technical amendments that simplify gaseous fuel test requirements for both converters and OEMs



Changes from 1994 Rule to 2011 Rule

- New age based program provides compliance options for vehicles inside and outside EPA's defined useful life
- New rules provides regulatory structure to create "conversion test groups/engine families." Conversion test groups previously only defined in EPA guidance documents.
- New rules no longer require converters to renew certificates
- New testing options for select heavy-duty vehicles (< 14K GVWR)
- New rule creates Intermediate Age and Outside Useful Life programs which require basic check on functionality of OBD system when operating on the alternative fuel in lieu of certification like OBD demo
- New rules adjust test results from higher mileage vehicles using scaled deterioration factors.



Summary of Age-Based Program

Age Category	Demonstration Requirement	Exhaust	Evap	OBD
New < 2 years old	Certification	FTP data	Evap + refueling data	OBD data
Intermediate > 2 years old but inside UL	Meet standards Technical description	FTP data	Evap + refueling data	Attestation + OBD scan
Outside Useful Life	Technical description	Technical description	Technical description	Attestation + OBD scan



In Summary, New Regulations:

- Create a three tiered, age-based program for tampering exemption that:
 - Requires certification for conversion on vehicles/engines < 2 yrs old
 - Offers a cost saving alternative program for vehicles/engines > 2 yrs but < FUL
 - Provides a workable pathway for vehicles/engines > FUL
- Allow EPA oversight to ensure environmental compliance
- Introduce a “scaled deterioration factor” concept that acknowledges the reality of testing older higher mileage vehicles
- Employ a web-based data submission process that simplifies the delivery of the necessary information
 - Uses Excel and Macros for IAV and OUL programs
- Provide lists of conversions that qualify for tampering exemptions for all three age-based programs
- Publish technical amendments that provide testing efficiencies for OEMs and fuel converters

1	2	3	4	5	6	7	8	9	10	11	12	
Light-Duty and Heavy-Duty Chassis Certified Clean Alternative Fuel Conversions												
Converted to Operate On	Original Fuel	Conversion Manufacturer	Original Vehicle Information					Conversion Information				
			Original Model Year	Original Manufacturer	OEM Test Group	OEM Evap Families	Eng Di	Conversion Certificate Number	Conversion Evap Famil	Conversion Test Group	Conversion Models Covered	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXV02.5VEF	AFMXR0155GAV	2.5	BAECV02.5VEA-001	BAECR0155GA1	BAECV02.5VEA	Altech-Eco Corporation: Fusion, Milan	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.46VR	AFMXF0250NBS	5.4	BAECT05.46VB-013	BAECF0250NB1	BAECT05.46VB	Altech-Eco Corporation: F250 2WD BED DELETE, F250 4WD BED DELETE, F350 2WD BED DELETE, F350 4WD BED DELETE	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.46VR	AFMXR0250NBS	5.4	BAECT05.46VB-014	BAECR0250NB1	BAECT05.46VB	Altech-Eco Corporation: F250 PICKUP 2WD, F250 PICKUP 4WD, F350 2WD, F350 4WD	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXT04.64D3; AFMXT04.63DF; AFMXT04.63D2	AFMXR0265NBC	4.6	BAECT04.64DB-017	BAECR0265NB2	BAECT04.64DB	Altech-Eco Corporation: F150 Pickup 2WD, F150 Pickup 4WD, F150 SFE 2WD	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.47V8	AFMXF0120GAS	5.4	BAECD05.46VA-003	BAECF0120GA1	BAECD05.46VA	Altech-Eco Corporation: F350 INCOMPLETE 2WD, F350 INCOMPLETE 4WD	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.46VX; AFMXD05.47V8; AFMXD05.47VT	AFMXF0250NBS	5.4	BAECD05.46VA-004	BAECF0250NB1	BAECD05.46VA	Altech-Eco Corporation: F250 2WD BED DELETE, F250 4WD BED DELETE, F350 2WD, F350 2WD BED DELETE, F350 4WD, F350 4WD BED DELETE	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.46VX; AFMXD05.47V8; AFMXD05.47VT	AFMXF0260GAS	5.4	BAECD05.46VA-005	BAECF0260GA1	BAECD05.46VA	Altech-Eco Corporation: F350 INCOMPLETE 2WD, F350 INCOMPLETE 4WD	
CNG	Gasoline	Altech-Eco Corporation	2010	Ford Motor Company	AFMXD05.46VX	AFMXR0250NBS	5.4	BAECD05.46VA-006	BAECR0250NB1	BAECD05.46VA	Altech-Eco Corporation: F250 PICKUP 2WD, F250 PICKUP 4WD, F350 2WD, F350 4WD	
CNG	Gasoline	BAF Technologies	2011	Ford Motor Company	BFMXT06.27HL	BFMXR0250NBS; BFMXF0250NBS; BFMXF0265GAS	6.2	BBAFT06.27HL-005	BBAFR0000001	BBAFT06.27HL	BAF Technologies: Ford F250/350	
CNG	Gasoline	BAF Technologies	2011	Ford Motor Company	BFMXT02.01DV	BFMXR0125NBB	2.0	BBAFT02.01DV-003	BBAFR0000001	BBAFT02.01DV	BAF Technologies: Ford Transit Connect	



Alt Fuel Conversions: Things to Consider

- Environmental Impact and Benefits
- Cost and Range
- Fuel Availability
- Warranty



Environmental Impact and Benefits

- Some fuels have a reputation of being inherently “clean” but in today’s vehicles and engines, it is not the fuel alone but rather the sophisticated integration of engine, fueling, exhaust and evaporative emission control system designs that determine how clean a vehicle will be.
- Fuel conversion systems must retain a sophisticated and integrated design logic and functionality in order for emissions to remain low.
- Conversion to alternative fuels can be environmentally beneficial, but conversion does not necessarily reduce pollution.
- Manufacturers of EPA-compliant fuel conversion systems must demonstrate that the converted vehicle or engine meets the same standards as the original vehicle or engine, or, for older vehicles and engines, that emissions do not increase as a result of conversion.



Cost and Range

- The cost of running a vehicle on an alternative fuel will depend on fuel price and on how far you can travel on each unit of fuel.
- The amount of fuel you need will depend on the fuel's energy density, and on whether the converted vehicle is optimized to take advantage of the alternative fuel characteristics.
- Operating costs may be either higher or lower for a conversion than for the original configuration.
- Alternative fuel prices tend to fluctuate considerably more from region to region than gasoline and diesel fuel prices.
- The U.S. Department of Energy maintains an up-to-date report on alternative fuel prices around the country at http://www.afdc.energy.gov/afdc/price_report.html.
- Electricity, gaseous fuels, and alcohol fuels are generally less energy dense than gasoline and diesel fuel.
- Depending on how much alternative fuel you can store onboard, you may not be able to travel as many miles on a "fill-up" and may need to refuel more frequently.



Fuel Availability

- As with fuel price, alternative fuel availability varies greatly from region to region.
- The U.S. Department of Energy maintains an alternative fueling station locator at <http://www.afdc.energy.gov/afdc/fuels/stations.html>.



Warranty

- Consumers considering conversion should investigate warranty implications in advance.
- Warranty liability for certain failed components in a converted vehicle or engine may transfer from the original equipment manufacturer to the conversion manufacturer.
- Generally, the conversion manufacturer maintains liability for problems that occur as a result of conversion, while the original manufacturer retains responsibility for the performance of any covered parts or systems that retain their original function following conversion and are unaffected by the conversion.
- Consumers should be aware that liability in a given conversion situation may not be clear, creating potential for confusion and even for dispute over which manufacturer is responsible for repair.



Misconceptions Still Abound

- Converting modern low emitting gasoline fueled vehicles to a “clean” fuel such as CNG always results in lower emissions - *No*
- There are no requirements for converting old vehicles - *No*
- EPA certifies test laboratories doing emission testing - *No*
- There is no need for conducting EPA confirmatory testing - *No*
- Expired certificates must still be renewed - *No*
- There are no requirements for converting non-road engines to alternative fuels - *No*
- Conversions to full battery electric must demonstrate compliance with one of the new age based programs - *No*



Alternative Fuels Conversion Website

- <http://www.epa.gov/otaq/consumer/fuels/altfuels/altfuels.htm>
 - Link to Enviroflash
 - Link to Document Index System (OEM Certificates, Applications, and Certificate Summary Information)
 - Instructions for Notification Process and Templates
 - Links to Lists of Certified Conversions, Intermediate Age Conversions, and Outside Useful Life Conversions
 - Guidance Letters
 - Other Information
 - CAFV April 8, 2011 Final rule, April 27, 2011 webinar, Consumer Information (e.g. warranty)
 - Links to: DOE fuel prices/alt fuel filling station locations, Clean Cities website, EPA LD/HD cert regs (stds), CARB alt fuels policy



Questions

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