



Utah County  
2008-2  
CNG Supplement

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CNG (compressed natural gas) powered vehicles, also known as NGV (natural gas vehicle), have peaked the interest of many Utah motorists searching for relief from high gasoline prices. Utah has one of the lowest CNG prices in the nation which has resulted in Utah becoming a dumping ground for CNG vehicles from other states.

The Utah County Bureau of Air Quality encourages the use of clean alternative motor vehicle fuels. However, some people think that just because a vehicle runs on natural gas it is automatically a clean vehicle. This is not the case. Natural gas contains 70-90% Methane (CH<sub>4</sub>) which is a Hydrocarbon fuel and therefore can produce high levels of carbon monoxide if the proper air/fuel ratio is not maintained. This is unfortunately demonstrated each winter when someone dies from carbon monoxide poisoning caused by a natural gas fired home heating furnace that had a malfunction in the flue or fire box.

NGVs are some of the cleanest vehicles on the road but without proper testing and certification there is no way to verify their low exhaust emissions. This is why only EPA or CARB certified conversion kits may be installed on in-use motor vehicles. These companies have proven that their systems run clean and will continue to run clean throughout the useful life of the vehicle.

#### **Conversion Kits:**

Section 203 (a) (3) of the Clean Air Act (also known as the tampering prohibition law) clearly addresses alternative fuel conversions, and any other modification. This section has been inaccurately interpreted and misunderstood by a number of vehicle owners as well as shop owners. The key phrase is: *“The following acts and causing thereof are prohibited--for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this title prior to its sale and delivery to the ultimate purchaser, or for any person knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser”*

The above paragraph states that it is a violation to remove an emission control component such as a catalytic converter, AIR system, EGR, etc. It also prohibits rendering inoperative a device which would include reprogramming an ECM or adding an O<sub>2</sub> emulator to “spoof” the ECM into thinking everything is fine. But the most misunderstood phrase is *“element of design”*. An element of design is anything that the OEM engineered into the design of the vehicle to meet the Federal Test Procedure (FTP) at the time of manufacture. Changing an element of design could be as simple as adjusting idle speed outside the manufacturers maximum or minimum window or adjusting the timing out of spec, adjusting the air/fuel ratio outside the manufacturers range or changing the fuel type from the original certification, etc..

Non certified conversion kits clearly violate section 203(a). Certified kits are exempt from this section because they have met the requirements outlined in sections 202 and 206 of this law.

(Over)

**Testing and certification:** We have been asked many times why a new vehicle can not be converted using an uncertified system then tailpipe readings used to determine conformity. There is wide spread confusion and misunderstanding in regards to the different types of emission testing and why it is difficult or impossible to compare one test to another. Hopefully the following will clarify the differences.

FTP (Federal Test Procedure). This is the test that vehicle manufacturers must subject their vehicles to prior to receiving a certificate of conformity. FTP is a very comprehensive test that measures all emissions from a vehicle. This not only includes tailpipe emissions it also includes evaporative emissions from fuel, paint, rubber, carpet, glues, etc. The vehicle is tested during cold start, running under various speeds and loads, hot restart, hot soak, etc. The emissions are sampled under laboratory conditions and reported in grams per mile. This test, or a portion of this test, is currently used to certify aftermarket conversion kits.

I/M 240. This is a vehicle in-use test developed to emulate a portion of the FTP. The test lasts 240 seconds and measures exhaust gases using a CVS (Constant Volume Sample) system. The vehicle is tested under acceleration, hard acceleration, deceleration, and cruise. The tailpipe emissions are reported in calculated grams per mile. This was an alternative test allowed until 2002 to certify aftermarket conversion kits.

TSI Tailpipe (Two Speed Idle). This is a 207b approved “short test” and the test that 1968-95 vehicles receive in Utah County. The tailpipe test was developed as a quick and easy test that could be performed on in-use vehicles to identify gross polluters that needed repairs. Vehicles are tested with no load at idle and 2500 RPM. A four gas infrared analyzer measures HC, CO, CO<sub>2</sub> and O<sub>2</sub>. The emissions are reported in percentage. There is no correlation between grams per mile and percentage. Theoretically, a 1 cylinder engine and a 12 cylinder engine can show identical emission readings expressed in percentage while the 12 cylinder engine is emitting roughly twelve times the volume of gasses. TSI has never been an acceptable alternative test to certify aftermarket conversion kits.

OBDII. (On Board Diagnostics second generation) This is also considered a 207b approved “short test” and the test that 1996 and newer vehicles receive in Utah and other I/M Counties. How does OBDII measure tailpipe emissions?....It doesn't. OBDII vehicles monitor their own systems and components constantly. Each time the vehicle is driven it is performing an emission test on itself. The manufacturers have programed specific parameters into the vehicles and if during the vehicle self-test, or drive cycle, the values are outside these parameters the MIL is illuminated. The manufacturer has calculated and proven that a particular malfunction may increase tailpipe emission 150% from the original grams per mile certification levels. OBDII is the most accurate in-use vehicle emission test ever developed. A vehicle will notify the driver the moment an emission test failure has been detected.

## **Conclusion.**

Consumers. We suggest to anyone contemplating purchasing or converting a CNG vehicle to read, research and ask questions. CNG is a great alternative fuel but it is not for everyone. There are Pro's and Con's that should be carefully considered before you make your final decision.

Shop Owners. Although CNG vehicles represent less than 1 % of the vehicle fleet there is a need for competent installers and repair technicians. If you are considering adding this service to your business we strongly encourage you to do it safely and legally. Rest assured, EPA is watching Utah and the CNG conversion activity. History shows that EPA does not make hasty moves but rather watches activity carefully while gathering ample evidence before they swoop in and shut down multiple businesses while gaining national news coverage.