

Chevrolet 2016 Bi-Fuel Impala



2015 CNG IMPALA



Fleet & Commercial



KEY MESSAGES

- Seamlessly integrated compressed natural gas (CNG) capability in Chevrolet's highly regarded full-size sedan
- Bi-fuel CNG fuel system eliminates range anxiety, while allowing for cleaner emissions and reduced fuel costs
- Fully validated to meet GM requirements for quality, durability and safety
- CNG fuel system is covered by GM's Limited Warranty and can be serviced by Chevrolet dealers

PRODUCTION PROCESS

- Base vehicle built at Oshawa
- Vehicle shipped to Roush in Plymouth, Michigan, for CNG system installation
- Vehicle shipped to final destination



POWERTRAIN

3.6L V6 (LFR)

- Port Fuel Injection
- DOHC with Variable Valve Timing
- Naturally aspirated
- Horsepower/torque (lb.-ft.)
 - 230/218 (CNG)
 - 260/247 (gasoline)

6-SPEED AUTOMATIC TRANSMISSION (M7W)

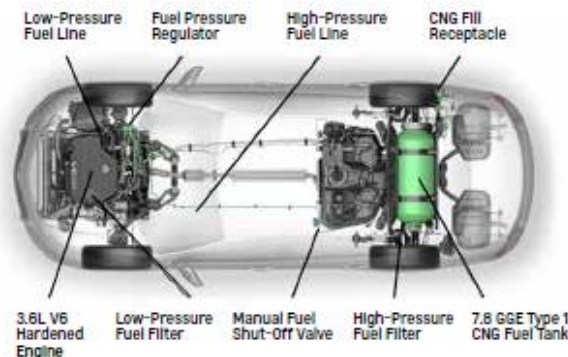
- Front-wheel drive

ORDERING INFORMATION

- Fleet and retail ordering begins late April 2014
- Production begins summer 2014 as a 2015 model
- Available in specific FL and LT trim levels
- CNG option price not yet determined
- Engine block heater (K05) is optional
- Restricted options
 - Manual HVAC is standard
 - 18-inch wheels only (steel on FL, aluminum on LT)
 - Chevrolet MyLink™ radio with Navigation (I06), Bose® Centerpoint® Surround Sound premium 11-speaker system (UQS) and power sunroof (C3U) not available

CNG FUEL SYSTEM

- Single "Type 1" steel CNG tank
 - 7.8 gasoline-gallon equivalent (GGE)
 - Horizontally positioned in trunk behind rear seatback
 - 10 cu. ft. of cargo volume (18.8 cu. ft. for non-CNG version)
 - Retains compact spare tire under trunk floor
- Estimated maximum range (miles)*
 - 150 (CNG)
 - 350 (gasoline)
 - 500 (combined)
- CNG fill receptacle conveniently located within gasoline fuel filler door
- EPA- and CARB-certified emissions
- Adds about 400 lbs. of mass with full CNG fill
- Quantum Technologies is Tier 1 supplier



*EPA estimates not yet final. An approximately 8 GGE CNG tank mounted in the Impala's trunk is expected to provide up to 150 miles of additional vehicle range for a total vehicle range of up to 500 miles. GM Internal use only.

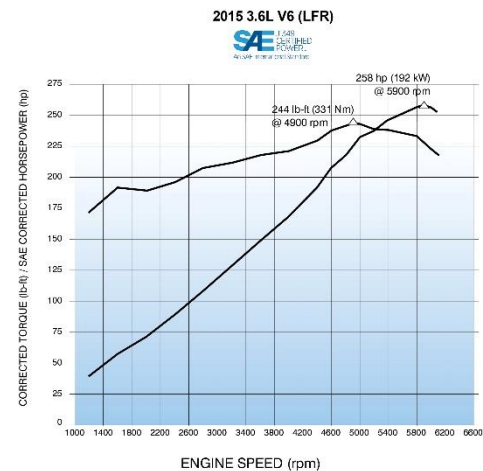
CNG Impala Powertrain

Engine optimized for CNG operation

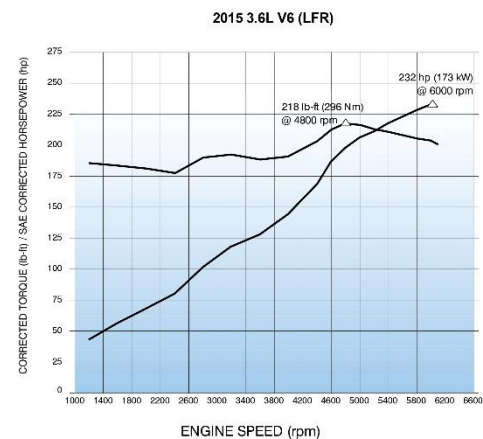
- ✓ Hardened valve train components to manage CNG's low lubricity
- ✓ Port Fuel Injection architecture engineered for on both gasoline and CNG
- ✓ 2 sets of injectors
- ✓ 5 year/100,000 GM powertrain warranty that includes CNG fuel system



Chevrolet Impala Bi-Fuel



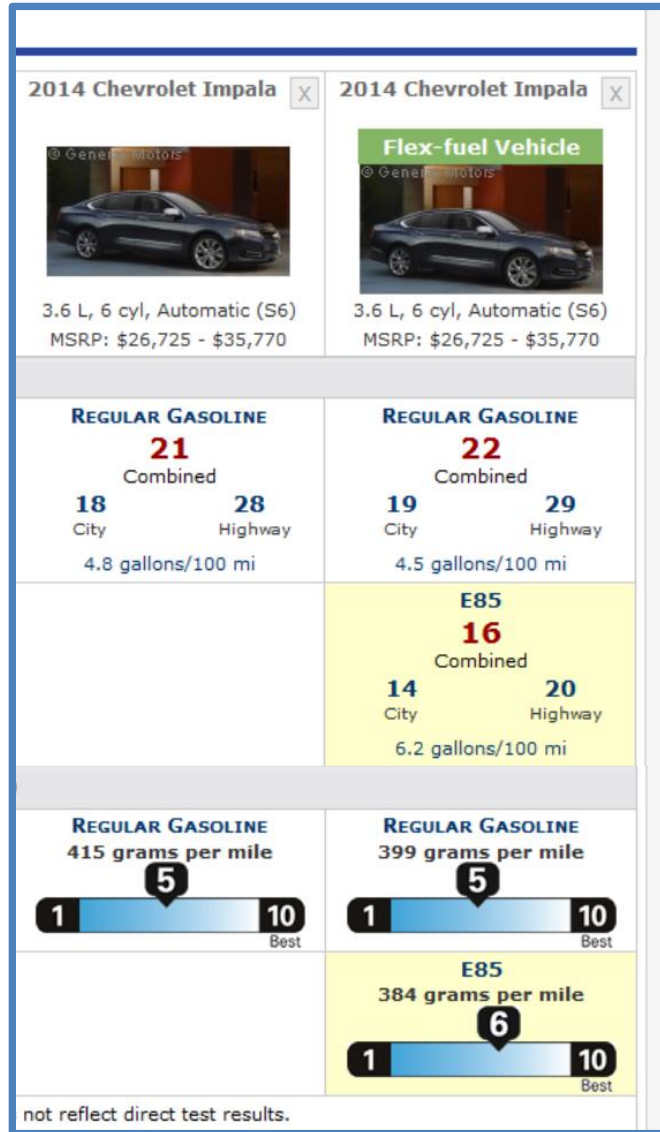
Chevrolet Impala Gas



Chevrolet Impala CNG

2015 3.6L V-6 VVT PTI (LFR)

Fuel Economy



The rounded derived 5-cycle fuel economy estimates for CNG Impala are (based on results of 2-cycle testing):

Gasoline:

City - 17 mpg

Highway - 25 mpg

Combined - 20 mpg

CNG:

City - 16 mpg

Highway - 24

Combined - 19

CNG fuel range 150 miles on full tank at 3,600 psi

Fuel Mode Operation

Fuel Mode Operation

- ✓ Starts in same fuel mode as last key off.
- ✓ The vehicle can cold start on CNG when ambient above 0 deg. C / 35 deg. F
- ✓ CNG and gasoline can default to each other upon low fuel level. When CNG cannot maintain driving demand, ECM will auto-switch to gasoline mode
- ✓ Upon malfunction in either fuel mode, CNG and gasoline can default to each other if it is safe to do so.
- ✓ Running out of CNG creates an auto-switch to gasoline, with low fuel warning
- ✓ Running out of Gasoline results in a switch to CNG (if there is CNG fuel)

Features on the CNG Impala

Fuel Optimization

- ✓ Electronic CNG regulator allows as much CNG fuel to be used as possible – depends on vehicle demand in low CNG level conditions.
- ✓ After an out-of fuel gasoline transition, upon refill of CNG vehicle restarts on CNG
- ✓ In gasoline low fuel level conditions, (LOW RANGE) vehicle will use CNG on-board then revert back to gasoline operation. LOW RANGE is generally >30 miles

Two models, 2FL and 3LT

- ✓ 2 models 2FL and 3LT. \$9,500 option, \$37,535, \$40,660

Fuel Gauge & Fuel Transition

Fuel Mode Transition

- ✓ Seamless transition
- ✓ ECM manages conditions for transitions and starts

Fuel Gage indicates CNG or Gasoline

- ✓ IP fuel gauge displays the level of the fuel being used
- ✓ DIC page available that displays level of the non-operating fuel
- ✓ IP switch allows manual change of fuels



Yellow LED on the switch
On: CNG operation
Off: Gasoline operation
Flashing: In transition

CNG Impala Fuel Mode Transition



The fuel gauge reads the fuel in operation.

The alternate fuel can be displayed in the DIC, if desired.



Display shown when conditions are not met on a requested fuel mode transition.



Fuel Economy and Range Displays



CNG Metric Units



Range Display



CNG US Units

Fuel Range Display

- ✓ Display shows total estimated range along with both gasoline and CNG ranges.

CNG specific units in Fuel Economy displays

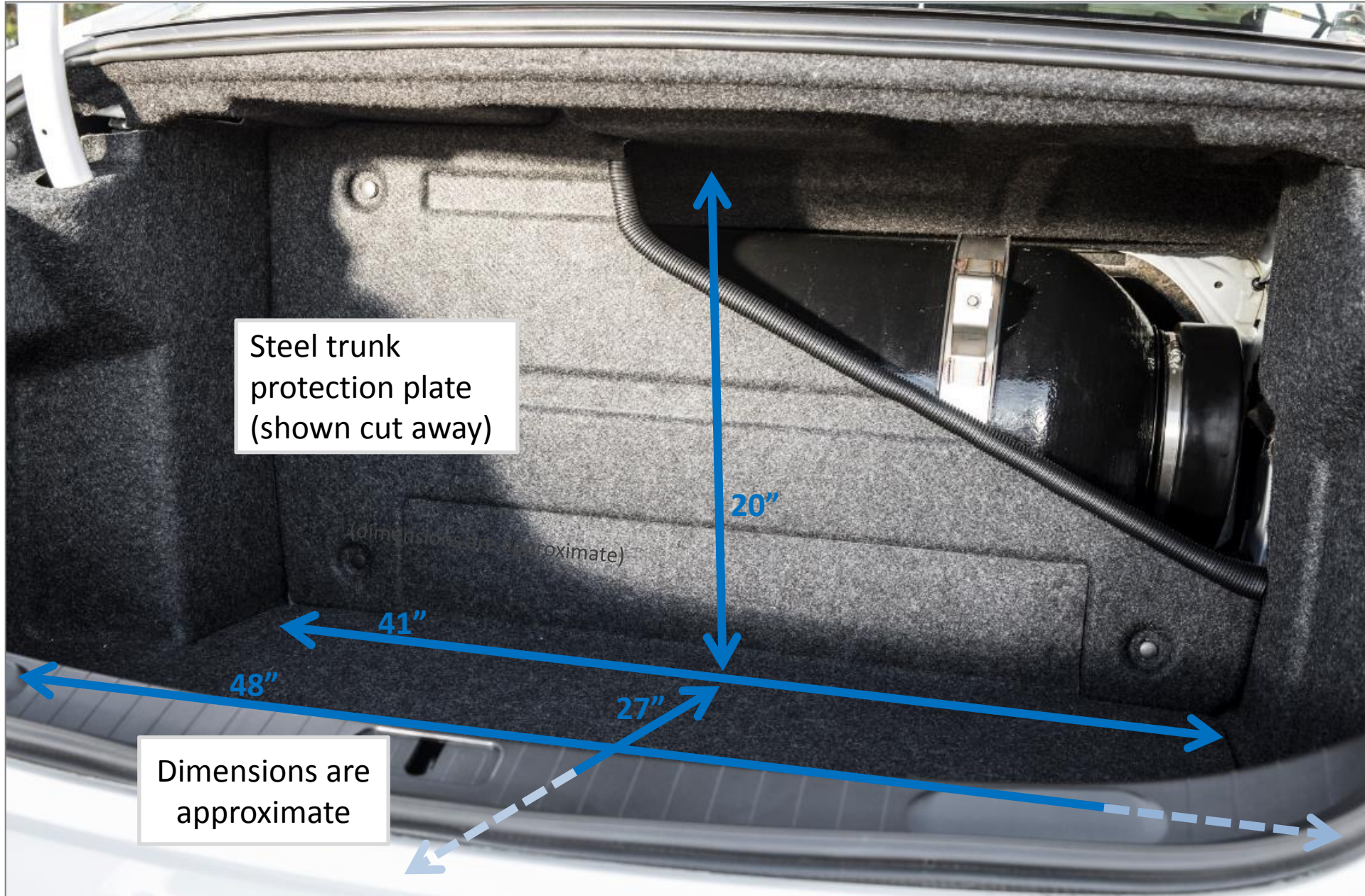
CNG Impala Tank Packaging 7.8 gallons

Optimized tank package

- ✓ Tank mounted transversely behind 2nd row seats
- ✓ Tank size/ volume optimized, no pass-thru feature
- ✓ To allow assembly and service of tank in the vehicle
- ✓ Allows removal of compact spare (standard on both 2FL and 3LT)
- ✓ Maximizes cargo volume – 10 cubic feet of storage



2015 CNG Impala Trunk Dimensions



Steel trunk protection plate (shown cut away)

(dimensions are approximate)

20"

41"

48"

27"

Dimensions are approximate

CNG Impala Tank Package



Safety Testing

Bonfire Test

- ✓ The Bonfire Test is performed to ensure that the CNG tank's pressure relief valves are operational, and prevent the tank from rupturing in the event of a fire.
- ✓ Both Industry and Chevrolet unique tests are conducted.

Penetration Test

- ✓ The tank is filled to 3,600 PSI, and is shot with a 7.62 mm armor piercing bullet.
- ✓ Ensures that tank maintains integrity with no failure of the tank, seams, etc.

Barrier Tests

- ✓ Tests include the standard collisions performed on gasoline-only models, including side-impact and rear-impact collisions, as well as head-on.

Cycle and Burst Tests

- ✓ Tests designed to test the long-term structural integrity of the tank.



Features on the CNG Impala

Common fuel fill location for gasoline and CNG

- ✓ Integrated engineering, no exterior valve
- ✓ Under vehicle shut-off valve

