



Bi-Fuel Pickup, Field Update

3/2/12 v1



GM Bi-fuel Trucks

- 2500 HD Extended Cab with 6.0L V-8 Engine
 - Model meets the needs of the broadest range of customers
- Available with long or short bed
- Available



Partnering with IMPCO

- Collaborating on Engineering, Design and Testing
- IMPCO is a great company with extensive knowledge about CNG
 - 50 years in business
 - Worldwide



are



GM's Bi-fuel Trucks

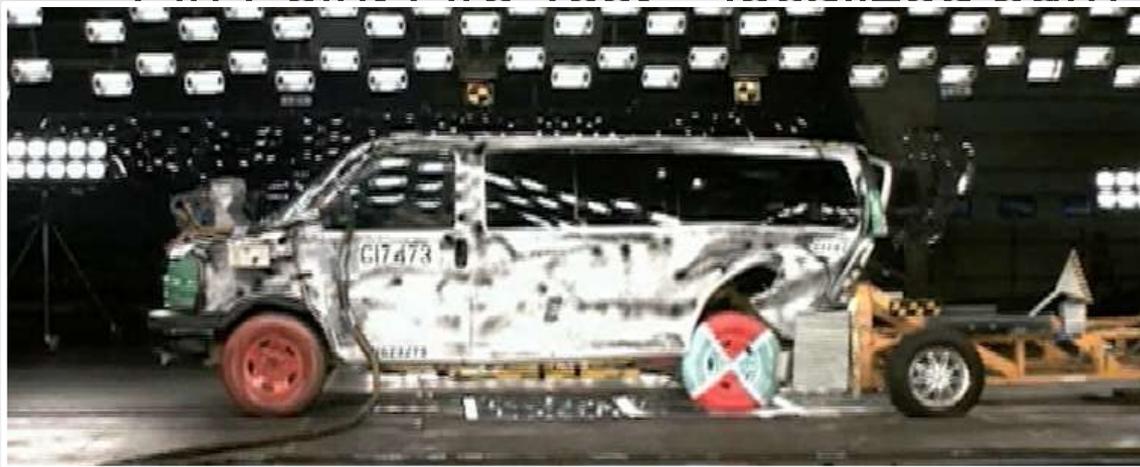
- GM established the parameters
- GM did all of the validation work to ensure system meets all

GM standards:

- Cold Start Validation — Down to -40° F
 - Hot Start Validation — Up to 122° F
 - Altitude Validation — No performance degradation thru 10,000 ft.
 - Corrosion Validation — Minimum of 10 yrs.
 - Safety Testing — FMVSS and GM standards
 - Full Vehicle Durability — Simulating 2 lives up to 200,000 miles
- IMPCO installs the system and is held to GM  **Fleet & Commercial**
CHEVROLET • BUICK • GMC • CADILLAC

GM Bi-fuel Truck Safety Testing

- Fully compliant with applicable motor vehicle safety standards
- GM is mandating 6 tests for each vehicle:
 - 2 frontal tests
 - 1 side impact test
 - 1 rear test
 - 2 side impact pole tests
- Bonfire Robustness Test
- Pin Point Fire Test – localized burn test with multiple fill



GM Bi-fuel Truck System Components

- 6.0L V-8 – gaseous fuel-ready engine with hardened exhaust valves and hardened intake and exhaust valve seats
- Bosch Injection System

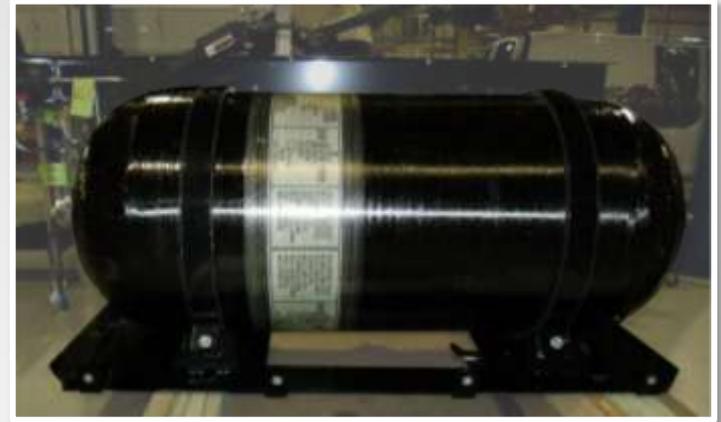


BOSCH

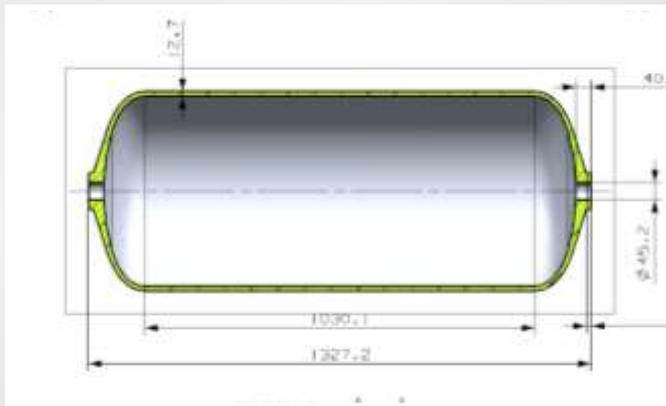


CNG Tank

- Type 3
 - Lightweight
 - Made of composite materials
 - Aluminum liner
 - Carbon fiber wrap
- Valve head collar added for protection
- 17 GGE capacity
 - Safest for space available



Valve head collar



Tank Cover

- Aluminum diamond-plate
- Durable graphite powdercoat finish
- Tank is mounted to frame
- Fuel filler door up high for safety reasons
 - Protected from side impact crashes
 - Easy access to nozzle



Extensive Protection for Entire System



All high pressure fuel lines located between the frame rails



No splicing of wires

Use of weather-pack connectors



How the System Works:

- Truck always starts with gasoline
- System switches to CNG when engine reaches pre-determined operating temperatures
- Driver can switch fuels at any time
- When CNG tank becomes empty, the system automatically switches over to gasoline
- Fuel gauge is installed directly on the dash
 - Simple and reliable



Superior Performance

- Combined range of 17 GGE CNG tank and 36 gallon gasoline tank is more than 650 miles
- Horsepower and torque are same when driving on gasoline
 - Minimal reduction with CNG due to the energy density in natural gas
- Comparable towing capability
- Payload is only reduced by weight of CNG system (450 lbs)
- Drivability tests conducted t
- Meets all Government FMV and emission requirements

3030 South Susan Street Santa Ana, CA 92704 (714) 656-1200 www.isxcommercial.com	Vehicle Emissions Control Information Conforms to 2012 MY
Vehicle Emission Control Information	Conforms to US EPA and California regulations and is certified for sale in California: 2012 MY MDV/MDPV
This vehicle is equipped with a clean alternative fuel conversion system. This Dedicated CNG system has been certified to meet EPA Tier 2 Bin 7 MDV/MDPV emission standards applicable to model year 2012. This vehicle was manufactured and installed consistent with the principles of good engineering judgment and all US EPA regulations. OBD: C4 II	US EPA: T2B7 OBD: CA II CA: SULEV II OBD: CA II Fuel Capacity: 16-24 GGE Fuel: CNG
GM Group: CGM0CT06.0396 Group: C29XT06.0CDA Evp: C29XR0000CDA	2TWC / TWC / 2HO2S(2) / SFI Group: C29XT06.0CDA 6.0L No Adjustments Evp: C29XR0000CDA
6.0L CNG No Adjustments 2TWC/TWC/2HO2S(2)/SFI	LS-131528-010 ABB



CNG Van Offerings

$\frac{3}{4}$ Ton and 1 Ton 135" Wheelbase Cargo



Key elements of our Integrated CNG Solution

- **Hardened 6.0 L Vortec Engine**
- **Dedicated CNG fuel storage and fuel delivery system and installation**
- **Engine controller calibration**
- **Engineered for the same reliability, durability and safety you would expect from all GM products**

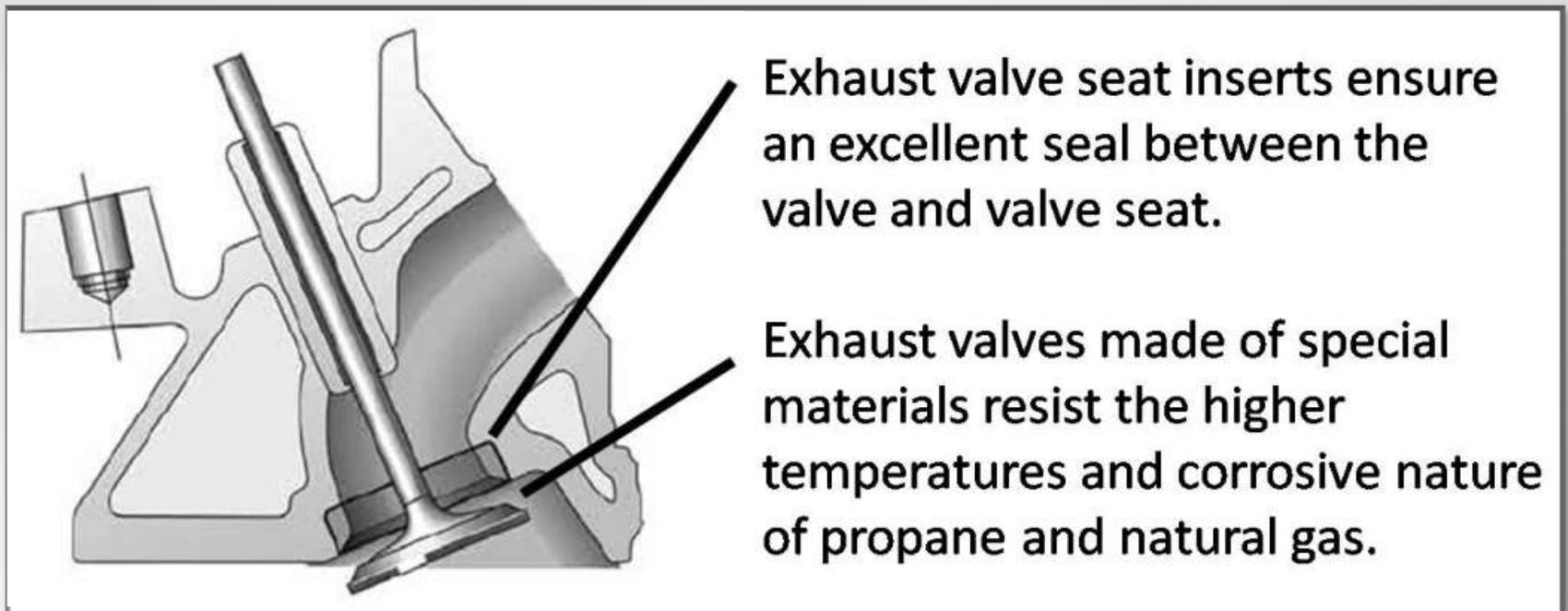




Proven 6.0 L Vortec Engine

The (LC8) 6.0L Vortec gaseous fuel ready engine has:

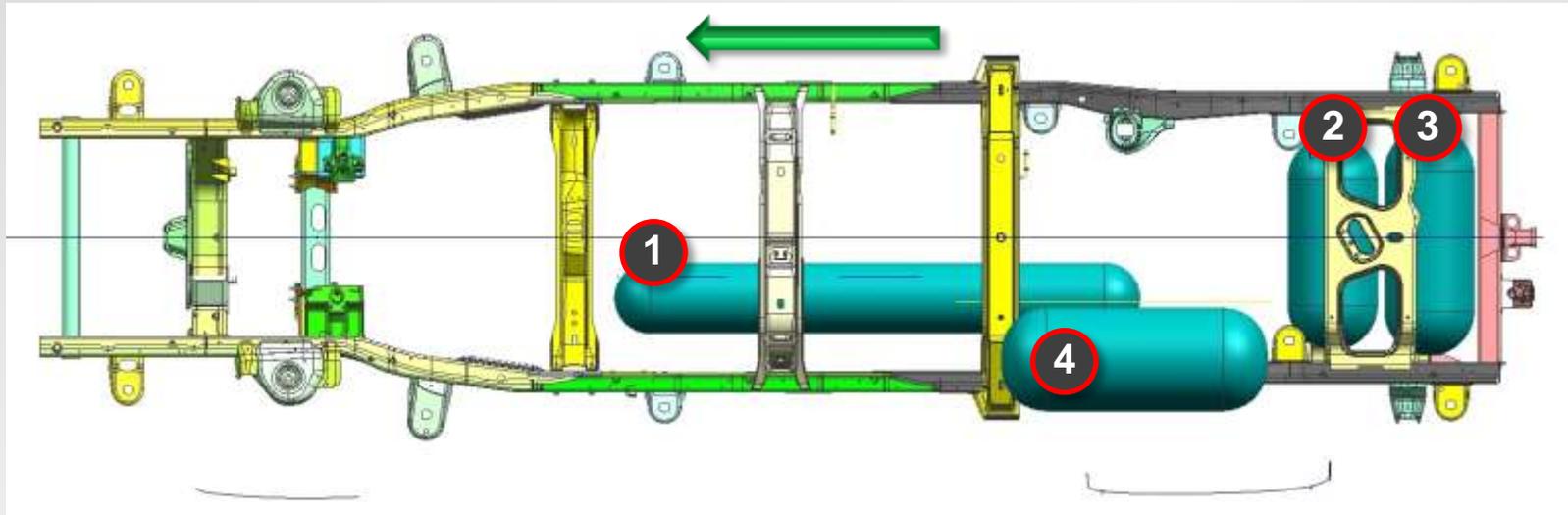
- Hardened exhaust valves
- Hardened intake and exhaust valve seats
- Full 5 year / 100,000 mile Powertrain Warranty





Storage System

- Two different fuel capacities are available
 - 4-Tank / 23 gas gallon equivalent / 300+ mile range



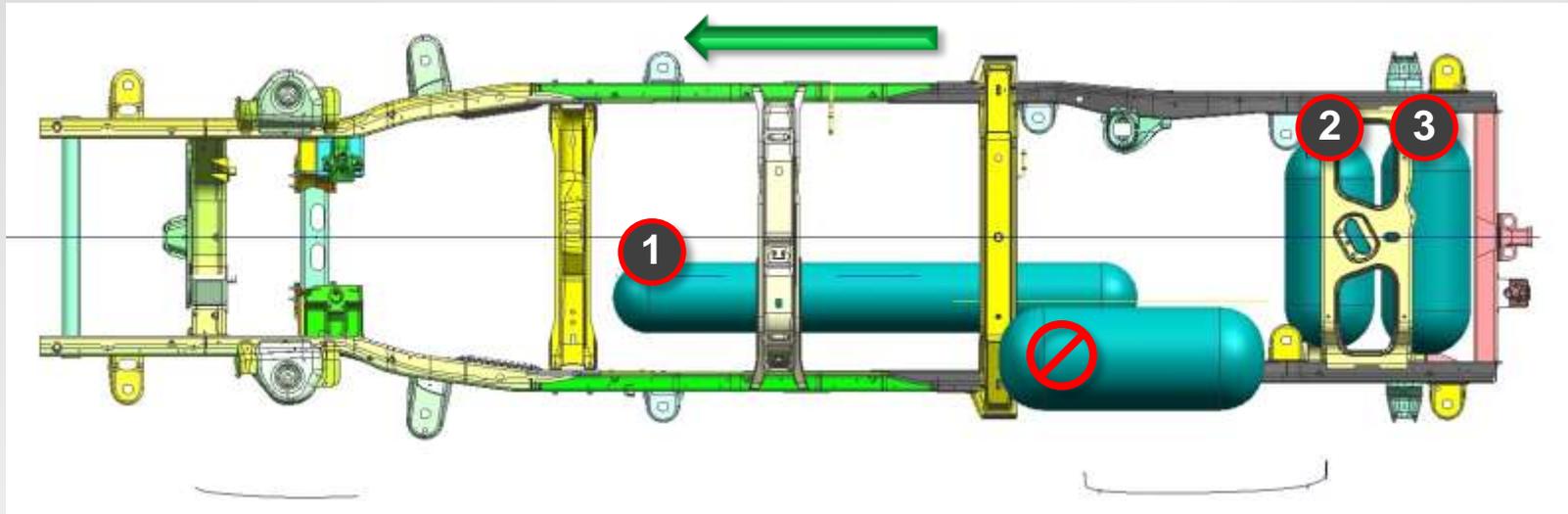
23 GGE
Total

1	10" x 73" = 6.4 GGE	longitudinal, underbody
2	13.2" x 31" = 4.5 GGE	behind rear axle, underbody
3	13.2" x 32" = 4.9 GGE	behind rear axle, underbody
4	15.4" x 39" = 7.2 GGE	interior, cargo floor



Storage System

- Two different fuel capacities are available
 - 3-Tank / 16 gas gallon equivalent / 200+ mile range



16 GGE Total
All underbody

- ① 10" x 73" = 6.4 GGE
- ② 13.2" x 31" = 4.5 GGE
- ③ 13.2" x 32" = 4.9 GGE



Storage System

- All tanks are Type 1, all-steel tanks
 - Low profile, durable, 15-year tanks
 - Manufactured by Faber in Italy
- In addition to industry standard corrosion protection, GM add a textured wax coating to all underbody tanks





Storage System

- All underbody tanks are protected with substantial shielding
 - Road debris
 - Curbing
 - Exhaust and external heat sources





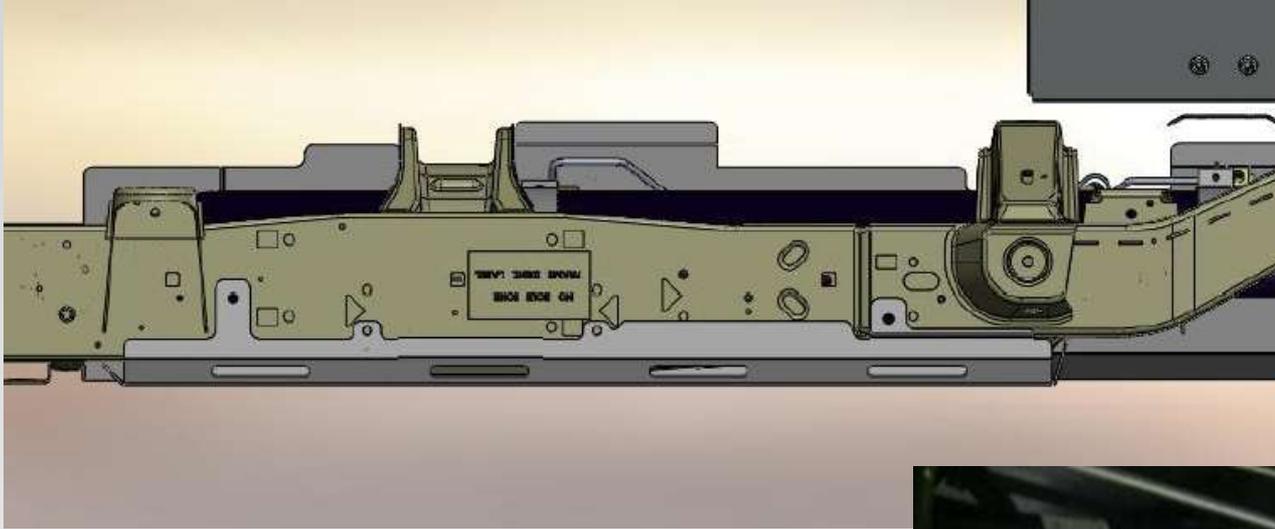
Storage System

- Shielding protects cargo floor tank from shifting cargo





Storage Intergy

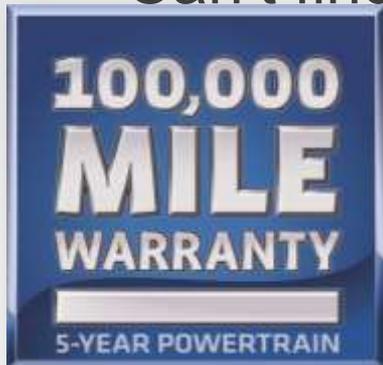


Frame rail depth extension protects longitudinal tank if the vehicle runs over a curb.



GM CNG Systems offer “Peace of Mind”

- Customers get same durability, reliability and safety you would expect from any GM product
- GM’s bi-fuel trucks come with full GM new vehicle warranty
 - Includes the CNG system
- Single source for service — Chevrolet and GMC dealerships
- Can’t find this “Peace of Mind” anywhere else





Attention to Detail

- System additions meet established GM design clearances
- No cutting/rerouting of exhaust pipe
- All fasteners pointed away from tanks
- No spliced wiring
- High pressure lines routed inside of frame rails
- Subjected to full GM durability testing
- Five separate barrier tests to ensure system integrity

Q & A

