

## NEW FACTORY-BUILT CNG & LNG VEHICLES

# UNDERSTANDING CANADIAN COMPLIANCE REQUIREMENTS

## INTRODUCTION

New factory-built compressed natural gas (CNG) and liquefied natural gas (LNG) vehicles that are manufactured in or imported into Canada must be in compliance with Transport Canada and Environment Canada regulations and standards. The various Canadian requirements with respect to safety and emissions compliance are outlined below including general considerations and natural gas-specific considerations. Also described in this summary is information related to the National Safety Mark, impact loading requirements, and an alternate compliance option for vehicles other than school buses.

## DISCLAIMER

The following information regarding compliance with Canadian requirements for new vehicles manufactured in or imported into Canada is for information purposes only. The authors assume no responsibility for the accuracy or reliability of the statutory and regulatory information provided. This information is not to be relied upon as the legal basis for compliance with Canadian regulations or standards. Vehicle manufacturers and importers are encouraged to **contact Transport Canada or Environment Canada** directly with respect to compliance issues.

## GENERAL CONSIDERATIONS

### Canada's Motor Vehicle Safety Act, Regulations & Standards

Canada's **Motor Vehicle Safety Act** (the Act) ensures that vehicles entering the Canadian marketplace for use on Canadian roads meet a minimum level of safety. The Act provides the Minister of Transportation with the authority to promulgate regulations and standards through the Transport Canada Road Safety Directorate. Enforcement, penalties, and recall requirements are also provided for in the Act.

Canada's **Motor Vehicle Safety Regulations** (MVSR) are based on the Act. These Regulations provide the details of

the requirements mandated by the Act. In particular, the MVSR describe the standards that each vehicle must meet as well as how the compliance label and National Safety Mark (NSM) need to be applied by the vehicle manufacturer or the importer to indicate that the vehicle is compliant. Companies that manufacture vehicles in Canada, dealers or agents for manufacturers of vehicles in Canada or companies who import new vehicles into Canada for sale in Canada can self-certify to the MVSR requirements.

## National Safety Mark Requirements

The National Safety Mark (NSM), a national trade mark, can be used by companies under the authorization of Transport Canada. Those companies must be registered companies in Canada who:

- a. **Manufacture vehicles in Canada;**
- b. **Act as dealers or agents of a manufacturer of vehicles in Canada; or**
- c. **Import vehicles into Canada.**



In essence, the NSM is a statement by the vehicle manufacturer that the vehicle complies with all applicable Canadian Motor Vehicle Safety Standards (CMVSS).

Manufacturers who are authorized and who apply the NSM to vehicles that they manufacture or alter do not need additional third-party certification for systems or components installed by them on those vehicles provided they hold the applicable NSM for the installation in question.

To apply for an NSM, companies must provide Transport Canada with a package as defined in the *“National Safety Mark Application for Vehicles Manufactured in Multiple Stages.”* The documentation requested in the application provides Transport Canada with proof that the company is a legal Canadian entity and can prove that the modifications they perform on new vehicles result in vehicles that are fully compliant with the CMVSS.

## Importing Vehicles Without an NSM

A vehicle without an NSM may be imported from the United States, but the importer must apply to bring the vehicle into Canada through the applicable processes as defined in the Act and Regulations. If the vehicle complies with the US Federal Motor Vehicle Safety Standards and is labeled this way, it may come through the Registrar of Imported Vehicles, however it must be brought into compliance with all applicable CMVSS. Changes made to the vehicle to comply with all applicable CMVSS must be made by the importer. These changes do not require the importer to have the authorization to apply the

NSM, since the Importer of Record takes the responsibility for the vehicle in Canada. On the other hand, if the manufactured vehicle is compliant with CMVSS and appropriately labeled, the Canadian importer of record for the vehicle must get approval from Transport Canada through approved channels. The same documentation must be provided as for a Canadian company applying for an NSM. This is necessary because Transport Canada wants to be confident that the company importing the vehicle is familiar with the requirements of the Act and Regulations, just like a manufacturer.

## Emissions Compliance

In most cases, the engines and emission system being used in a new vehicle will likely have a US Environmental Protection Agency (EPA) emissions certificate, which is valid in Canada through Environment Canada regulations. However, if this type of certificate is unavailable, then the engine and emissions system must: (a) be tested as per the EPA regulations; and (b) the company must apply to Environment Canada for a National Emissions Mark (NEM) that must be applied to any vehicle with the subject engine.

If a vehicle has an EPA certificate and is sold in the US, then the same vehicle can be imported into Canada on the basis of its EPA compliance. The vehicle is then subject to the certification and in-use standards referred to in the EPA certificate. In addition, the Importer of Record must also demonstrate compliance with Transport Canada’s safety regulations for any vehicles imported into Canada.

# NATURAL GAS VEHICLE-SPECIFIC CONSIDERATIONS

## CMVSS 301.2 Including Vehicle Impact Loading Requirements

CNG vehicles must comply with *CMVSS 301.2 – CNG Fuel System Integrity*. At present, there is no comparable CMVSS that applies to liquefied natural gas (LNG) vehicles and issues related to cryogenic fuel storage systems.

The CMVSS 301.2 Regulation requires that manufacturers of CNG vehicles demonstrate compliance by: (a) providing vehicle crash test data; or (b) demonstrating compliance with Section 4 of *CSA B109 – Natural Gas for Vehicles Installation Code* that is in effect 24 months before:

- the date of the last manufacturing operation performed by the manufacturer who installed the fuel system, as shown on the manufacturer's information label; or
- the date of manufacture of the completed vehicle, as shown on the compliance label.

Note that school buses must be crash tested and are not allowed to demonstrate compliance by means of option (b).

For vehicles other than school buses to demonstrate compliance with *CSA B109*, a report must be submitted and maintained that details how each subsection within *Section 4 – System Requirements* is met. All 43 subsections must be addressed with either an appropriate statement regarding the subsection, supplier compliance or test documents for the components referred to in the subsection, photographs of the components showing installation and appropriate markings, or third party test documents or the manufacturer's own test documents, whichever is most appropriate for the subsection.

Section 4 of *CSA B109* also details impact loading requirements. The CNG fuel cylinders or assembly must be mounted on the vehicle so that,

*“The force necessary to separate the fuel cylinder from the vehicle is greater than 20 times the weight of the full fuel cylinder in the longitudinal direction (forward/backward) of the vehicle, and 8 times the weight of the full fuel cylinder in the transverse (side to side) direction. When tested, these forces shall be continuously applied for a duration of not less than 5 s.”<sup>1</sup>*

A final consideration related to compliance via *CSA B109* is that vehicles equipped with CNG fuel systems may comply with Section 4 of the code except for the following two requirements which do not apply:

- (a) any requirement to obtain an approval from, or to act under the supervision of, an authority having jurisdiction or the boiler and pressure vessel inspection authority of a province or territory; and
- (b) any requirement respecting inspection, service or repair after the main assembly of the vehicle has been completed.

<sup>1</sup> It is proposed that the impact loading requirements in *CSA B109* be lowered for heavy vehicles. If the proposed changes are adopted, they will be incorporated in *CSA B109* in 2014. This change would harmonize Canadian requirements for heavy vehicles with those of the U.S. by including a container attachment requirement of 8 g in all directions for heavy vehicles above 4,536 kg.

## CNG Fuel Cylinder - Marking Requirements

Only a CNG cylinder that is marked in accordance with the requirements of one of the following standards to indicate that the cylinder complies with that standard may be installed on a CNG vehicle:

- Canadian Standards Association Standard *CSA B51, Part 2, High-Pressure Cylinders for the Onboard Storage of*

*Natural Gas as a Fuel for Automotive Vehicles; or*

- American National Standard *ANSI/AGA - NGV2, Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers*

## Natural Gas Vehicles & NSM Process

In 2012, the first application was delivered to Transport Canada by a Canadian company requesting a NSM to install a natural gas fuel system in a light complete vehicle under the requirements of *CMVSS 301.2 - CNG Fuel System Integrity*. That company was the first to be granted a NSM under the categories:

- **Intermediate Stage - fuel system conversion**
- **Vehicle Alterer - fuel system conversion**

By applying the NSM for “fuel system conversion” to new vehicles that they “manufacture” (i.e. by modifying the fuel system), the company is taking responsibility for the modifications they have made as indicated by the NSM applied to the vehicle. The NSM and accompanying compliance label essentially state that the vehicle complies with all applicable CMVSS in effect at the time of manufacture of the vehicle.

Prior to this application, much of the history of natural gas vehicle use in Canada was based on aftermarket converted vehicles that have been brought to the market by systems convertors certifying their products through provincial regulatory agencies responsible for pressure vessel and gas installation certifications. For these types of aftermarket conversions, the convertors must secure Canada Registration Numbers (CRNs) for all pressure vessels and pressure components.

The NSM process adopted by Transport Canada under the authority of the Act and attendant regulations provide an important avenue for manufacturers to provide **new** CNG-equipped vehicles to the marketplace without requiring provincial certification of the CNG fuel storage cylinders. In other words, natural gas vehicles that are brought to the market using the NSM process are treated as new vehicles that fall under Transport Canada’s and Environment Canada’s jurisdiction, so Canadian Registration Numbers (CRNs) are not required on the CNG cylinders. In addition, the vehicles can be moved between provinces and be in compliance with all federal requirements.

For additional information on the subject of natural gas vehicles and the NSM process, please contact the Canadian Natural Gas Vehicle Alliance (CNGVA) for a copy of the technical report,

***CNGVA – Technical Guideline for National Safety Mark & Emissions Compliance with Regards to Natural Gas-Powered Vehicles Manufactured in Canada or Imported into Canada from the USA (October 2012)***

# ANNEX

## Definitions Related to Transport Canada Compliance

### COMPLETED VEHICLE

A vehicle that needs no further manufacturing operations to perform its intended function, other than the addition of readily attachable components, such as mirrors or tire and rim assemblies, or minor finishing operations such as painting.

### INCOMPLETE VEHICLE:

A vehicle:

- (a) other than a vehicle imported temporarily for special purposes, that is capable of being driven and that consists, at a minimum, of a chassis structure, power train, steering system, suspension system and braking system in the state in which those systems are to be part of the completed vehicle, but requires further manufacturing operations to become a completed vehicle; or

- (b) that is an incomplete trailer.

### INCOMPLETE VEHICLE MANUFACTURER

A company that manufactures an incomplete vehicle by assembling components none of which, taken separately, constitutes an incomplete vehicle.

### INTERMEDIATE MANUFACTURER

A company, other than an incomplete vehicle manufacturer or final-stage manufacturer that performs manufacturing operations on an incomplete vehicle.

### FINAL-STAGE MANUFACTURER

A company that performs the manufacturing operations on an incomplete vehicle that turn the incomplete vehicle into a completed vehicle.

In addition, when referring to an **alterer**, Transport Canada is actually referring to companies that alter vehicles between the time they are certified as complete or final manufacture

has been completed and certified, and the first retail sale per MVSR, Section 9:

### ALTERED VEHICLE

9. (1) If a company alters a vehicle, other than an incomplete vehicle or a truck tractor not fitted with a fifth wheel coupling, that was in conformity with these Regulations in such a manner that its stated Gross Vehicle Weight Rating and Gross Axle Weight Rating are no longer accurate, or if the company alters the vehicle otherwise than by the addition, substitution or removal of readily attachable components such as mirrors or tire and rim assemblies or by minor finishing operations, the company shall:

- (a) ensure that the compliance label and information label, if applicable, remain on the vehicle;

(a.1) respect the gross axle weight ratings and gross vehicle weight rating of the vehicle recommended by the original manufacturer or, where the company increases the ratings, ensure that they are:

- (i) increased in accordance with the original manufacturer's written recommendations, or
- (ii) within the load-carrying capacity of the vehicle's components when the altered vehicle is loaded for its intended use;

## ANNEX

### Definitions Related to Transport Canada Compliance (cont'd)

#### **ALTERED VEHICLE (cont'd)**

(b) ensure that the vehicle conforms to the standards referred to in subsection 5(2), in respect of the work carried out by the company to alter the vehicle; and

(c) subject to subsection (2), apply to the vehicle an additional label displaying:

(i) the words "THIS VEHICLE WAS ALTERED BY / CE VÉHICULE A ÉTÉ MODIFIÉ PAR" followed by the name of the company that altered the vehicle,

(ii) the month and year during which the alteration of the vehicle was completed,

(iii) the drawing referred to in paragraph 6(1)(c),  
(iv) in accordance with paragraph 6(1)(e), the new gross vehicle weight rating and gross axle weight ratings of the vehicle as altered, where they differ from those shown on the original compliance label,

(v) in accordance with paragraph 6(1)(f), the type of vehicle, where it differs from the type shown on the original compliance label, and

(vi) in the case of a multi-purpose passenger vehicle or bus manufactured from a cutaway chassis, a motor home or a recreational trailer, the information referred to in subsection 6(8).

**All definitions are as per Transport Canada's Motor Vehicle Safety Regulations, Section 2 - Interpretation.**