



Changes to “NFPA 52 -- Vehicular Natural Gas Fuel Systems Code” Affecting Heavy Trucks & Buses

Quon Kwan

Federal Motor Carrier Safety Administration

Natural Gas Vehicle Technology Forum

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Outline

- Background & Purpose
- National Fire Protection Association (NFPA)
- States that Adopted NFPA 52
- Organization of NFPA 52 by Chapters
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- Changes in Chapter 15, Automotive Fuel & Safety Systems
- Changes in Annexes

Background & Purpose

- In March 2013, Federal Motor Carrier Safety Administration (FMCSA) published “Natural Gas Systems: Suggested Changes to Truck and Motorcoach Regulations and Inspection Procedures”
- Over 90% of FMCSA’s suggested changes were adopted into “National Fire Protection Association (NFPA) 52 -- Vehicular Natural Gas Fuel Systems Code”
- Purpose: to describe updates in the 2016 version of NFPA 52 affecting heavy trucks & buses

National Fire Protection Association (NFPA)

- NFPA is a voluntary consensus standards organization
- Voluntary consensus standards are especially recognized by Federal Office of Management & Budget's Circular A-119
- NFPA Code – popular examples
 - Fire Code (NFPA 1)
 - Flammable & Combustible Liquids Code (NFPA 30)
 - National Electrical Code (NFPA 70)
- NFPA Codes are adopted by state and local Authorities Having Jurisdiction (AHJs)
 - State and local fire marshals (buildings & structures)
 - Commercial vehicle enforcement agencies

History of NFPA 52

- 1981 - American Gas Association (AGA) petitions NFPA
- 1982 - NFPA establishes technical committee on compressed natural gas (CNG) vehicular fuel systems
- 1984 - 1st edition of NFPA 52 issued
- 1988, 1992, 1995, 1998, & 2002 - NFPA 52 revised
- 2006 - NFPA 57, Liquefied Natural Gas (LNG) Vehicular Fuel Systems Code, combined into NFPA 52
- 2013 – H₂ systems transferred from NFPA 52 to a new NFPA 2, “Hydrogen Technologies Code”
- April 26, 2016 – NFPA 52 (2016 edition) supersedes all previous editions & approved as American National Standard

States that Adopted NFPA 52*

- Alabama
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Hawaii
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Nebraska
- New Hampshire
- Rhode Island
- Texas
- Vermont
- West Virginia
- Wisconsin

* Personal communication with NFPA, 2015

Organization of NFPA 52 by Chapters

- 1 – Administration
- 2 – Referenced Publications
- 3 – Definitions
- 4 – Facility Management
- 5 – Facility Fire Protection
- 6 – Facility Gas Detection, Alarm & Emergency Shutdown Systems
- 7 – Fuel Quality
- 8 – Facility Equipment
- 9 – Outdoor Storage

[red indicates a change affecting heavy truck or bus]

Organization of NFPA 52 by Chapters

- 10 – Indoor Storage
- 11 – Compressed Natural Gas (CNG) Fueling
- 12 – Residential CNG Fueling
- 13 – Liquefied Natural Gas (LNG) Fueling
- 14 – Automotive Equipment (onboard)
- 15 – Automotive Fuel & Safety (onboard)
- 16 – Installation Requirements for ASME Tanks for LNG
- Annex A – Explanatory Material
- Annex B – Sample Ordinance Adopting NFPA 52
- Annex C – Pressure Relief Devices (PRDs)

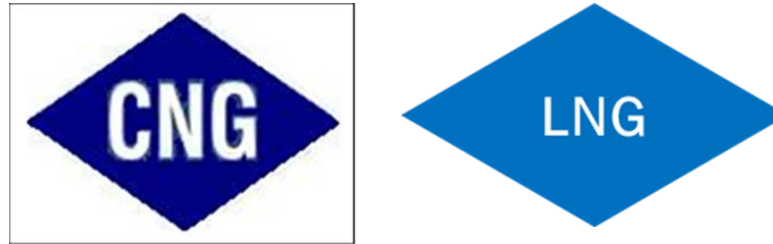
Changes in Chapters 2 & 3

- Chapter 2, Referenced Publications – additions:
 - CGA C-6.4, “Methods for External Visual Inspection of Natural Gas & Hydrogen Vehicle Containers”
 - CGA S-1.1, “Pressure Relief Devices – Part 1”
 - 49 CFR 390.5, Definitions
 - 49 CFR 390.21, Marking of Commercial Motor Vehicles

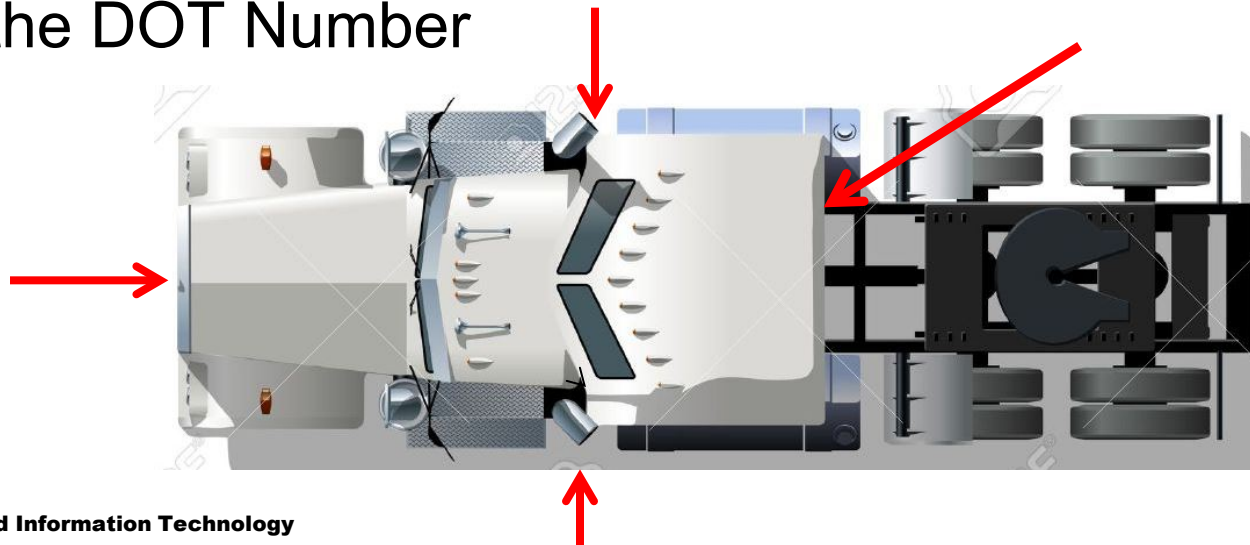
- Chapter 3, Definitions (given by section number)
 - 3.3.22, DOT Number
 - 3.3.32, LCNG (formerly L/CNG)
 - 3.3.47, Power Unit (examples given in Annex A3.3.47)
 - 3.3.65.1, Commercial Motor Vehicles (reference to 49 CFR 383.5 corrected to 49 CFR 390.5)

Changes in Chapter 15 for Vehicle Labeling

- § 15.2.11.5 – In addition to right rear, “CNG” or “LNG” labels are to be affixed to each side of the power unit



- All four sides of the power unit are to be labeled
- If a DOT Number is required, the label is to be near the DOT Number



Changes in Chapter 15 for CNG Vehicle Labeling

- § 15.2.11.6 – Vehicles with roof-mounted CNG tanks are to have a label with vehicle's clearance height visible to the driver



Changes in Chapter 15 for CNG Pressure Relief Devices

- § 15.3.3.8.3 – Pressure Relief Devices (PRDs) are to be on CNG tanks and installed in same compartment
- § 15.3.3.8.4.2 – PRD vent tubes or hoses are to be electrically conductive
- § 15.3.3.8.4.5 – PRD vents are NOT to discharge into or toward:
 - Wheel wells
 - CNG storage systems
 - Front of vehicle
 - Exhaust system
 - Emergency exit
 - Passenger, luggage, or engine compartment



Changes in Chapter 15 for CNG Pressure Relief Devices

- § 15.3.9.4 – Pressure Relief Devices (PRDs) are not to be repaired or reworked without written authorization of the manufacturer. Any activated PRDs shall be removed from service.



Changes in Chapter 15 for CNG PRD Vent Locations

- § 15.3.3.10 – PRD Vents are to be
 - Located at top of the heavy vehicle
 - Directed to release gas upwards
 - Labelled with a 3”x5” sign nearby as follows:



Changes in Chapter 15 for CNG Tanks

- § 15.3.5.1 – If a *CNG tank* is involved in
 - Accident,
 - Fire, or
 - Over-pressurization
> 1.25x service pressure



Then the

- *CNG tank* is to be inspected, replaced, or retested and
 - Mechanic is to document the work
- § 15.3.9.3 – *CNG tank* inspections are to accord with:
 - Vehicle manufacturer,
 - Container manufacturer, or
 - Compressed Gas Association (CSA) Circular C-6.4

Changes in Chapter 15 for CNG Fuel Systems

- § 15.3.5.2 – If a *CNG fuel system* is involved in
 - Accident or
 - Fire



Then

- *CNG fuel system* is to be repaired and retested and
 - Mechanic is to document the repair and retesting
- § 15.3.8.2 – Retesting requires pressurization to check
 - Each connection having no bubbles in 3 minutes,
 - Correcting any leakage revealed by bubbles, and
 - Leak checking again after correction

Changes in Chapter 15 for CNG Engine Compartment

- § 15.3.6.1(1)(a) – Label is to show the year (edition) of the NFPA 52 code to which the CNG fuel system was designed and installed
- § 15.3.6.1(1)(d) – Label is to show installer or *converter's*
 - Name or company
 - Contact information



Changes in Chapter 15 for CNG Qualified Mechanic

- § 15.3.9.7.1 – Only qualified mechanics may:
 - Discharge CNG vehicle containers
 - Inspect, maintain, repair, replace, remove, & test CNG fuel systems
- § 15.3.9.7.2 – Qualified mechanic is qualified by recognized degree, certification, professional standing, or skill [§ 3.3.5.2]



Changes in Chapter 15 for LNG Pressure Relief Valves

- § 15.4.5.1.1.10 – LNG pressure relief valve (PRV) discharge outlets are to aim upward near the highest point on the vehicle -- NOT at:
 - Wheel well
 - Exhaust or any other ignition source
 - Engine, passenger, or cargo compartment
- § 15.4.5.1.1.11 – LNG PRV discharge lines are to be secured at intervals to minimize damage or loosening
- § 15.4.5.1.1.12 – LNG PRV discharge outlets behind a shield or obscured from view are to be labeled with a warning

Changes in Chapter 15 for LNG Engine Compartment

- § 15.4.6.1.1 – Label is to show
 - Vehicle is LNG-fueled
 - Year (edition) of NFPA 52 code to which the system was designed and installed
 - Maximum allowable working pressure of LNG tank
 - Installer or converter's name or company & contact information



Changes in Chapter 15 for LNG Fuel Systems

- § 15.4.8.2 – If a *LNG tank and/or fuel system* is involved in
 - Accident or
 - Fire



Then

- *LNG tank or fuel system* is to be inspected and/or replaced in accordance with vehicle manufacturer
- § 15.4.8.2.1 – Facility performing the inspection, repair, replacement or retesting to document the work
- § 15.4.8.2.2– Facility documenting the work must give its contact information and identify the vehicle

Changes in Chapter 15 for LNG Qualified Mechanic

- § 15.4.8.3.1 – Only qualified mechanics may inspect, maintain, repair, remove, & test LNG fuel systems
- § 15.4.8.3.2 – Qualified mechanic is qualified by recognized degree, certification, professional standing, or skill [§ 3.3.5.2]



Change in Chapter 15 for LNG On-Board Gas Detection

- § 15.4.9.1.3 – On-board gas detection system is to function continuously when the engine is on and for at least 15 mins. after the engine is turned off.

[Previously, gas detection system had to be on at all times even when the engine is off. It was relaxed because no battery exists to power a gas detection system for 8 hours.]



Contact Information

Quon Y. Kwan

Technology Division, W68-305, MC-RRT

Federal Motor Carrier Safety Administration

U.S. Department of Transportation

Washington, DC 20590

quon.kwan@dot.gov

202-366-2389

