

MODIFICATION OF PROPOSED REGULATORY TEXT – APRIL 2017

Proposed modifications to the regulatory text posted on March 6, 2017, for fuel quality specifications for natural gas motor vehicle fuel are shown below. Proposed deletions are indicated by strikethroughs (~~proposed deletions~~). Proposed additions are shown with a single underline (proposed additions). Earlier versions of the proposed text may be found on the Department's website at <https://www.cdfa.ca.gov/dms/regulations.html>.

DEPARTMENT OF FOOD AND AGRICULTURE DIVISION OF MEASUREMENT STANDARDS

Title 4, Division 9, Chapter 6. Automotive Product Specifications

Article 10. Specifications for Natural Gas Used as a Motor Vehicle Fuel.

4192. Definitions Used in This Article.

- (a) "Natural gas" means a mixture of hydrocarbon compounds consisting of primarily methane in the form of a compressed gas or a cryogenic liquid intended for use as a motor vehicle fuel.
- (b) "Wobbe Index" means the ratio of the higher heating value of a gaseous fuel at specified reference conditions and the square root of its relative density at the same reference conditions.
- (c) "C3" means hydrocarbons having three carbon atoms.
- (d) "C6" means hydrocarbons having six carbon atoms.
- (e) "Heavy hydrocarbons" means hydrocarbons having three or more carbon atoms
- (f) "ppmv" means parts per million calculated using volume
- (g) "Pressure hydrocarbon dewpoint" means the temperature at which heavy hydrocarbons present in natural gas begin to condense at the maximum delivery pressure of the fuel dispenser.
- (h) "Pressure water dewpoint" means the temperature at which water vapor present in natural gas begin to condense at the maximum delivery pressure of the fuel dispenser.

4193. Specifications for Natural Gas Used as a Motor Vehicle Fuel.

Effective July 1, 2018, natural gas fuel sold for use in internal combustion engines shall meet the requirements-below. The test methods listed are those the Department will use in enforcing these specifications. When more than one test method is listed for a component, the first method is the referee method. Other validated methods may be used by utilities, producers, retailers, and private laboratories contracted to perform analyses related to this regulation.

Natural Gas Component	Specification	Test Method(s)
Hydrocarbons (expressed as mole percent):		
Methane	minimum 88.0%	ASTM D7833, ASTM D1945
Ethane	maximum 6.0%	ASTM D7833, ASTM D1945
Sum of C3 and higher hydrocarbons	maximum 3.0%	ASTM D7833, ASTM D1945
Sum of C6 and higher hydrocarbons	maximum 0.2%	ASTM D7833, ASTM D1945
Other Components (expressed as mole percent unless otherwise indicated):		
Water	maximum 5.0 ppmv	ASTM D1142, D5454, or D7904
Hydrogen	maximum 0.1%	ASTM D2650
Carbon monoxide	maximum 0.1%	ASTM D2650
Oxygen	maximum 1.0%	ASTM D7833, ASTM D1945
Inerts - Sum of CO ₂ and N ₂	maximum 4.5 %	ASTM D7833, ASTM D1945
Ammonia	maximum 0.1 ppmv	ASTM D7833, ASTM D1945
Total Sulfur including odorant	maximum 15 ppmv	ASTM D4468, D5504, D6228, and D7551, or D4084

Sum of H ₂ S and OCS <u>carbonyl sulfide as sulfur</u>	maximum 5 ppmv	ASTM D4468, D5504, D6228, or D7551, <u>or D4084</u>
Total particulates	maximum 1.0 mg/kg	ASTM D7651
Particulate size	maximum 5.0 µm	ASTM D7650

Additional Requirements:

Wobbe Index (higher heating value): The Wobbe Index (higher heating value) range for natural gas sold as a motor vehicle fuel shall be 1235-1420 BTU/ft³ (46-53 MJ/m³).

Pressure water dewpoint: The water dewpoint at the vehicle fuel storage container pressure shall be at least 10 degrees F below the 99.0% winter design temperature listed in Chapter 24, Table 1, Climatic Conditions for the United States, in the American Society of Heating, Refrigerating and Air Conditioning Engineer's (ASHRAE) Handbook, 1989 fundamentals volume. Testing for water vapor shall be in accordance with ASTM International Method D1142, utilizing the Bureau of Mines apparatus.

Pressure hydrocarbon dewpoint: The hydrocarbon dewpoint at the vehicle fuel storage container pressure shall be less than or equal to -2 °C. Testing for the hydrocarbon dewpoint shall be by ASTM International Method D1142.

These requirements are interim specifications for natural gas motor vehicle fuel quality. Business and Professions Code Division 5 Chapter 14 §13446 provides that when a standards development organization accredited by the American National Standards Institute publishes a standard for natural gas motor vehicle fuel quality, the Department will be required to adopt that standard by reference, except that the Department may not adopt any specification less stringent than required by any California state law.

Other applications: Natural gas not sold as a motor vehicle fuel is exempt from these fuel quality specifications.

NOTE: Authority cited: Sections 12027 and 13446, Business and Professions Code. Reference: Sections 13400 (b) (9), 13400 (c), 13400 (g), 13400 (p), 13400 (t), 13413 (a), 13413 (b)(1), 13440, 13591, 13592 and 13595 (a), Business and Professions Code.