



Factory Fill Unleaded Regular Gasoline

1 Scope

1.1 Material Description. This specification covers unleaded regular grade gasoline containing no oxygenates.

1.2 Symbols. Not applicable.

1.3 Applicability. This gasoline is intended primarily for factory-fill at vehicle assembly plants. Factory-fill gasoline is intended for use in vehicles which are stored for extended periods of time or in storage tanks where the rate of turnover is low.

1.4 Remarks. This specification reflects the final step of a regulatory reduction in the maximum sulfur level of gasoline

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

ASTM D86	ASTM D2699	ASTM D3237	ASTM D5191
ASTM D381	ASTM D2700	ASTM D3703	ASTM D5453
ASTM D525	ASTM D3116	ASTM D3831	ASTM D6378
ASTM D665	ASTM D3120	ASTM D4814	ASTM D7039
ASTM D2622	ASTM D3231	ASTM D5059	CGSB 3.5

2.2 GM Standards/Specifications.

GMW3059	GMW3221
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2.3 Additional References.

TMC003 Material Safety Data Sheet guidance documents (available at www.gmsupplypower.com).

3 Requirements

The fuel shall meet applicable regulations of the United States Environmental Protection Agency (EPA) and the states for United States plants, and Canadian environmental and provincial regulations for Canadian plants. These regulations take precedence over requirements within this specification.

TOP TIER branded gasoline is strongly recommended.

Test requirements given in this specification are, as the case may be, minimum or maximum Acceptance Limits for valid tests. No adjustments for test precision are to be applied as test variability was taken into account in the determination of the requirements.

All ASTM International (ASTM) and Canadian General Standards Board (CAN/CGSB) specified tests shall be performed according to the latest published version unless otherwise required by this specification. Test methods cited in 3.2 and 3.4 are referee methods used in the event of a dispute.

3.1 Requirements on Test Specimens. Reference GMW3221.

3.2 Requirements on Delivery. These specifications apply to samples taken directly from the tank car or wagon. The supplier shall be responsible for meeting the requirements listed in Sections 3.2.1, 3.2.3, and 3.4, even if properties are not directly measured.

3.2.1 Chemical Requirements.

3.2.1.1 Additives. The fuel shall contain a deposit control additive to minimize deposits on fuel injectors and intake valves while causing no deleterious effects in the fuel system, engine, and exhaust treatment systems. The fuel must comply with EPA requirements for deposit control.

3.2.1.1.1 Other additives may also be used to meet the requirements for silver and ferrous corrosion and for oxidation stability. Type and quantity of additives shall be agreed upon by purchaser and seller.

3.2.1.2 Benzene. Fuel supplied to assembly plants in Canada shall not contain more than 1.0 volume percent benzene.

3.2.1.3 Lead. Lead content shall not exceed 2 mg per liter as measured by ASTM D3237, ASTM D3116, or ASTM D5059. No intentional addition.

3.2.1.4 Manganese. Manganese content shall not exceed 0.25 mg/L as measured by ASTM D3831. No intentional addition.

3.2.1.5 Oxygenates. The use of oxygenates is prohibited by this specification.

3.2.1.6 Peroxide Content. Peroxide content shall not exceed 1 mg/kg as measured by ASTM D3703.

3.2.1.7 Phosphorus. Phosphorus content shall not exceed 1.3 mg/L as measured by ASTM D3231. No intentional addition.

3.2.1.8 Silicon. Silicon content shall not exceed 2 mg/kg as measured by inductively coupled plasma/atomic emission spectroscopy (ICP/AES) or X-ray fluorescence. No intentional addition.

3.2.1.9 Sulfur. Sulfur content shall not exceed 40 ppm (0.004% by mass) as measured by ASTM D2622, ASTM D3120, ASTM D5453, or ASTM D7039.

3.2.2 Mechanical Requirements. Not applicable.

3.2.3 Physical Requirements.

3.2.3.1 Volatility. Fuel distributed in the United States shall meet the appropriate schedule for seasonal and geographic volatility classes found in ASTM D4814, Table 4. Fuel distributed in Canada shall meet Area seasonal volatility classes found in CAN/CGSB 3.5, Tables 2A and 2B. Distillation shall be measured by ASTM D86, and vapor pressure shall be measured by ASTM D5191 or ASTM D6378.

3.2.3.2 Contamination. The gasoline shall be clear and bright, visually free of undissolved water and suspended matter, and contain not more than 1.0 mg of sediment per liter. Sediment is determined by vacuum filtering a 3 L sample of gasoline through a 1.2 µm membrane filter. After drying the filter in a vacuum desiccator for 10 minutes, the increase in the mass of the filter is determined.

3.2.4 Additional Requirements. Not applicable.

3.3 Processing Requirements. Not applicable.

3.4 Performance Requirements.

3.4.1 Antiknock Rating. Antiknock Index is defined as:

$$(R+M)/2$$

Where:

R = Research Octane Number (RON)

M = Motor Octane Number (MON)

The antiknock rating shall not be less than 87 as measured by ASTM D2699 (RON) and ASTM D2700 (MON).

3.4.2 Ferrous Corrosion. Ferrous corrosion shall be less than 5% rust as determined by Procedure A of ASTM D665 modified as follows:

- a. Use gasoline rather than turbine oil.
- b. Use a test temperature of 38 °C rather than 60 °C.
- c. Instead of distilled water, use 30 mL of salt water prepared by dissolving the following salts in 1 L of distilled water:
 - 148 mg of Sodium sulfate (Na_2SO_4)
 - 165 mg of Sodium chloride (NaCl)
 - 138 mg of Sodium bicarbonate (NaHCO_3)(This provides a concentration of 100 ppm each of sulfate, chloride, and bicarbonate ions.)

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