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GB/T 25986-2010

Filling device of natural gas vehicles

汽车用液化天然气加注装置

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Foreword

Appendixes A and B of this Standard are normative.

This Standard was proposed by the National Development and Reform Commission of the People's Republic of China.

This Standard shall be under the jurisdiction of the National Technical Committee for Standardization of Automobiles (SAC/TC 114).

Drafting organizations of this Standard: China Automotive Technology and Research Center, and Beijing Institute of Space Launch Technology.

Main drafters of this Standard: Guo Yong, Chen Song, Qiao Shenghua, Fu Yiping, Yang Junheng, and Wang Jifeng.

Filling device of natural gas vehicles

1 Scope

This Standard specifies the definition, type, technical requirements, test methods, inspection rules, marks, packaging, transportation and storage of the filling device of natural gas vehicles.

This Standard applies to the filling device of natural gas vehicles whose nominal operating pressure is 1.6MPa (all the pressure values described in this Standard refer to gage pressure), and whose working medium meets the requirements specified in the GB/T 19204.

2 Normative references

The provisions in the following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest versions apply to this Standard.

GB/T 191 Packaging – Pictorial marking for handling of goods

GB/T 1220 Stainless steel bars

GB/T 3864 Industrial nitrogen

GB/T 4240 Stainless steel wires

GB/T 4423 Copper and copper-alloy cold-drawn rod and bar

GB/T 9969 General principles for preparation of instructions for use of industrial products

GB/T 10125 Corrosion tests in artificial atmospheres – Salt spray tests

GB/T 19204 General characteristics of liquefied natural gas

GB/T 20734 Mounting requirements for liquefied natural gas vehicle special equipment

GB/T 3764 Thickness series and quality requirements for metallic and

5.2.8 Corrosion resistance

5.2.8.1 USE a 25× magnifier to inspect the components after conducting the corrosion resistance test according to the test methods specified in the Clause 6.10.1. There shall be no cracks on the components.

5.2.8.2 INSPECT the gas tightness of the filling devices after conducting the salt spray test according to the test methods specified in the Clause 6.10.2. The gas tightness shall meet the requirements specified in the Clause 5.2.2.

5.2.9 Vibration resistance

5.2.9.1 After the vibration resistance test is conducted to the filling devices according to the test methods specified in the Clause 6.11, the fasteners shall not be loose, and shall still be able to be turned on or off in the normal way.

5.2.9.2 The test shall be respectively conducted to the filling devices according to the test methods specified in the Clauses 6.4.1.1 and 6.4.2.1. The test results shall meet the requirements specified in the Clause 5.2.2.

6 Test methods

6.1 Test conditions and instrument precision

6.1.1 Test conditions

Unless otherwise specified, the conditions of test environment and the test medium shall meet the following requirements:

- a) The temperature shall be within the range of 15°C to 35°C;
- b) The relative humidity shall not be greater than 85%;
- c) The atmospheric pressure shall be within the range of 86kPa to 106kPa;
- d) The qualified liquid nitrogen and dry air conforming to the provisions specified in the GB/T 3864 shall be used as test medium.

6.1.2 Precision and range of test instruments

Unless otherwise specified, the precision and range of instruments shall meet the following provisions:

- a) Electrotechnical instruments: The precision shall not be lower than Level 1.0, and the range shall be 1.5 ~ 3 times the measured value;
- b) Pressure instruments: The precision shall not be lower than Level 1.5, and

PLACE the test pieces in room temperature. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.8MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.4.1.2 Gas leakage test at high temperature

PLACE the test pieces in the environment at 82°C. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.8MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.4.1.3 Gas leakage test at low temperature

PLACE the test pieces in the environment at -40°C. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.8MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.4.2 Gas leakage test for reclaiming receptacles

6.4.2.1 Gas leakage test at room temperature

PLACE the test pieces in room temperature. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.6MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.4.2.2 Gas leakage test at high temperature

PLACE the test pieces in the environment at 82°C. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.6MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.4.2.3 Gas leakage test at low temperature

PLACE the test pieces in the environment at -40°C. VENTILATE compressed air from the outlet end. Respectively HOLD the pressure at the locations where the pipeline pressure is 1.6MPa and 0.05MPa for 3min. CONDUCT the test afterwards.

6.5 Low-temperature leakage test

6.5.1 Low-temperature leakage test for filling receptacles

VENTILATE liquid nitrogen into the test pieces for precooling. IMMERSE the

SEPARATE the filling device from the reclaiming receptacle after the pressure comes up to 1.6MPa. The one-way valve shall close automatically, so as to keep the pressure in the reclaiming receptacle for no less than 2s. OPEN the outlet end afterwards to release the pressure to 0MPa. Repeatedly OPEN and CLOSE the one-way valve. The cycle frequency for opening and closing shall not be more than 5 times/min. The total number of cycle test shall be 1,000. OBSERVE the sealing condition whenever 200 cycle tests have been conducted. CONDUCT the gas leakage test at room temperature according to the provisions specified in the Clause 6.4.2.1. CONTINUE to conduct the test if there is no leakage.

6.7.2 Full-flow impact test

The starting air supply pressure shall be 1.8MPa at the inlet of the filling receptacle. There are no restrictions on the outlet flow. The duration for each impact shall not be less than 2s. The air supply pressure shall not be lower than 1.3MPa at the end of the impact. RELEASE the pressure at the inlet afterwards to close the one-way valve. CONTINUE to conduct 30 impact tests.

The starting air supply pressure shall be 1.8MPa at the inlet of the reclaiming receptacle. There are no restrictions on the outlet flow. The duration for each impact shall not be less than 2s. The air supply pressure shall not be lower than 1.3MPa at the end of the impact. RELEASE the pressure at the inlet afterwards to close the one-way valve. CONTINUE to conduct 30 impact tests.

6.8 Oxygen aging resistance test

PLACE the non-metallic components of filling devices in contact with the natural gas in the oxygen at $(70 \pm 2) ^\circ\text{C}$ with the pressure of 2.0MPa for 96h.

6.9 Compatibility test

IMMERSE the non-metallic test pieces of filling devices in contact with the natural gas in the natural gas at $(23 \pm 2) ^\circ\text{C}$ with the pressure of 1.8MPa for 70h. Rapidly REDUCE the pressure to 0 afterwards.

6.10 Corrosion resistance test

6.10.1 PUT the brass component maintaining maximum operating stress (generated by mechanical assembly and 1.6MPa atmospheric pressure) and without any greasy dirt on its surface into a 30L sealed test vessel containing 0.6L of aqueous ammonia with the specific gravity of 0.94 at $(35 \pm 2) ^\circ\text{C}$. PLACE the component 40mm above the surface of aqueous ammonia for 10 days.

6.10.2 SEAL the outlet of the filling device. CONDUCT 96-hour salt spray test according to the neutral salt spray test methods specified in the GB/T 10125.

18	Corrosion Resistance Test	6.10	5.2.8		√
19	Vibration Resistance Test	6.11	5.2.9		√
Note: "√" represents the inspection item.					

7.2 Exit-factory Inspection

The exit-factory inspection shall be conducted according to the items specified in Table 1 before the products leave the factory.

7.3 Type Inspection

The type inspection must be conducted according to the items specified in Table 1 under one of the following circumstances. For the newly designed products, the product design review shall also be conducted according to the requirements specified in the Clause 5.1.

- a) When there are significant changes in the new design, design parameters, process, and materials;
- b) Restore the production after stopping production for more than 6 months;
- c) Continuous production for one year.

7.4 For the test pieces passing the inspection, if the inspection items affect their functional performance or service life, the test pieces will not leave the factory as eligible products.

8 Marks, packaging, transportation and storage

8.1 Marks

The filling devices shall have the following permanent marks:

- a) Product name and model;
- b) Manufacturer's name or mark;
- c) Production batch number and date.

8.2 Packaging

8.2.1 ENSURE that the product packaging will not be damaged during the transportation. The product packaging shall conform to the relevant provisions specified in the GB/T 191.

8.2.2 There shall be a product conformity certificate, instruction for use, and necessary packing list in each product packaging box. The following contents

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