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QC/T 1004-2015

Performance Requirements and Bench Test Methods of Automobile Electric Vacuum Pump

汽车电动真空泵性能要求及台架试验方法

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Appendix:

Number, Name and Initial Implementation Date of 1 Automobile Industry Standard

S.N.	Standard no.	Standard name	No. of replaced standard	Initial implementation date
49	QC/T 1002-2015	*Test Method of Durability in CH-DY for Motorcycles and Mopeds*		January 1, 2016
50	QC/T 1003-2015	*Determination of Precious Metal in Metal Support Catalytic Converter for Motorcycles*		January 1, 2016
51	QC/T 1004-2015	*Performance Requirements and Bench Test Methods of Automobile Electric Vacuum Pump*		January 1, 2016
52	QC/T 200-2015	*Performance Requirements and Test Methods of Reservoir for Air Brake Equipment of Automobile and Trailer*	QC/T 200-1995	January 1, 2016
53	QC/T 35-2015	*Automobile and Trailer – Specifications and Bench Test Methods of Pressure Control Equipment*	QC/T 35-1992 QC/T 36-1992	January 1, 2016
54	QC/T 37-2015	*Automobile and Trailer – Specifications and Test Methods of Bench for Pressure Regulator and Protector*	QC/T 37-1992 QC/T 38-1992	January 1, 2016
55	QC/T 77-2015	*Specifications and Bench Test Methods of Automobile Hydraulic Brake Wheel Cylinder*	QC/T 77-1993	January 1, 2016
56	QC/T 1005-2015	*Specifications and Bench Test Methods of Automobile Antilock Braking System Electromagnetic-Hydraulic Modulator*		January 1, 2016
57	QC/T 1006-2015	*Specifications and Bench Test Methods of Automobile Antilock Braking System Solenoid Modulator for Pneumatic*		January 1, 2016
58	QC/T 1007-2015	*Evaluating Filtration Performance of Fuel Filters for Automobiles – Method of Particle Counting*		January 1, 2016
59	QC/T 1008-2015	*Specifications of Tank Ventilation Filters*		January 1, 2016

Table of Contents

Foreword

This Standard was drafted in accordance with the rules given in GB/T 1.1-2009, *Directives for Standardization – Part 1: Structure and Drafting of Standards*.

This Standard was proposed by and shall be under the jurisdiction of the National Technical Committee of Auto Standardization (SAC/TC 114).

The main drafting organizations of this Standard: Zhejiang VIE Science and Technology Co., Ltd., Beijing Automotive Group Co., Ltd., Anhui Jianghuai Automobile Group Corp., Ltd., Suzhou UL Meihua Certification Co., Ltd.

The main drafters of this Standard: Chen Feng, Hou Zonggang, Zhan Wenzhang, Dong Liang, Li Xiaopan.

Performance Requirements and Bench Test Methods of Automobile Electric Vacuum Pump

1 Application Scope

This standard specifies the terms and definitions, performance requirements and bench test methods of electric vacuum pumps used in automobile braking system.

This standard applies to electric vacuum pumps providing independent vacuum source for vacuum booster servo in automobile braking system.

This Standard does not apply to electric auxiliary vacuum pumps.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition dated applies to this document. For undated references, the latest edition of the referenced documents (including all amendments) applies to this Standard.

GB/T 4942.1-2006, *Degrees of Protection Provided by the Integral Design of Rotating Electrical Machined (IP Code) – Classification*

GB/T 10125-1997, *Corrosion Tests in Artificial Atmospheres – Salt Spray Tests*

GB/T 10587, *Specifications for Salt Mist Testing Chambers*

GB/T 18655-2010, *Vehicles, Boats and Internal Combustion Engines – Radio Disturbance Characteristics – Limits and Methods of Measurement for the Protection of On-board Receivers*

3 Terms and Definitions

For the purposes of this Standard, the following terms and definitions apply.

3.1

electric vacuum pump

The electromagnetic disturbance performance of electric vacuum pump shall be as specified in the requirements for the parts radiation disturbance limit grade 1 in GB/T 18655-2010.

5 Test Apparatus and Test Conditions

5.1 Test apparatus

5.1.1 Test apparatus used for test shall be as specified for related test items; they shall not have adverse effects on the function of test sample.

5.1.2 The accuracy of instruments and meters for measuring and indicating all parameters in durability test shall not be lower than grade 2.0.

5.1.3 The temperature control error of high-temperature and low-temperature test apparatus shall be ± 2°C.

5.1.4 Salt spray test chamber shall be as specified in GB/T 10587.

5.1.5 Vibration test apparatus shall have sweep frequency function.

5.2 Test conditions

Unless specified otherwise, all tests shall be carried out under the following conditions:

a) the environmental temperature shall be 20°C ± 2°C;

b) the relative humidity shall not be greater than 95%;

c) the environmental atmospheric pressure shall not be lower than 98 kPa;

d) the motor working voltage shall be rated voltage;

e) the test volume shall be decided in accordance with vacuum tank equipped in vehicles or as agreed on by the supplier and the purchaser.

5.3 Test items and sample requirements

The corresponding relationships between test samples and test items are preferably selected based on Table 2, based on different test objectives.

6.2.2.1 Installation of sample and connection of relevant pipes and circuits are as specified in 6.1.2.1.

6.2.2.2 Start electric vacuum pump after achieving the environmental temperature specified; carry out durability test under the test conditions specified in Table 3, altogether 10 cycles of test.

6.2.3 Carry out basic performance retest at normal temperature after test; dismantle sample if necessary; record the damages of sample.

6.3 Vibration durability

6.3.1 Mount test sample on vibration test bench through fixture in accordance with the actual installation condition on a vehicle; connect relevant pipes and circuits as specified in product specifications.

6.3.2 Start vibration test bench to carry out sweep frequency test at 33.3 Hz ~ 66.7 Hz along the vertical direction at the acceleration of 43 m/s^2; the sweep frequency cycle is 15 min and the test duration 40 h. Meanwhile, electric vacuum pump operates under the normal-temperature durability test conditions specified in Table 3.

6.3.3 Carry out basic performance retest at normal temperature in accordance with 6.1.2.1 after test; dismantle sample if necessary; record the damages of sample.

6.4 Corrosion resistance

Place sample into salt spray test chamber after sealing the evacuation opening of sample; carry out continuous salt spray test for 144 h (96 h for galvanized parts) in accordance with the requirements for neutral salt spray test specified in GB/T 10125-1997. Use clean water of temperature not higher than 40°C for washing to remove the salt deposit on the sample surface after test; then blow air for drying within 2 min; examine and record the corrosion of the surface protective layer.

6.5 Liquid consumption

6.5.1 At the filling opening of electric vacuum pump liquid reservoir, use an adapter to connect with a graduated measuring container. The minimum resolution of the container is preferably 1 mL. Add liquid medium specified in product specifications to electric vacuum pump through measuring container. The amount added shall ensure the measurement of liquid consumption; meanwhile, it shall not influence the normal operation of electric vacuum pump. When the two are contradictory, an alternative method shall be used for test.

6.5.2 Mount sample on test bench as specified in 6.1.2.1.

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