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Performance Requirements and Bench Test Methods for Air Brake Caliper Assemble of Automobile

汽车用气压制动卡钳总成性能要求及台架试验方法

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard was proposed by the Ministry of Industry and Information Technology.

This standard shall be under the jurisdiction of National Technical Committee of Auto Standardization (SAC/TC 114)..

Drafting organizations of this Standard: China Automotive Engineering Research Institute Co., Ltd., China Automotive Technology & Research Center, Wuhan Yuanfeng Autoparts Co., Ltd., Zhejiang Vie Science and Technology Co., Ltd., WABCO China Co. Ltd., and Longzhong Holdings Group Co., Ltd..

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Performance Requirements and Bench Test Methods for Air Brake Caliper Assemble of Automobile

1 Scope

This Standard specifies the performance requirements and bench test methods for air brake caliper assemble of automobile.

This Standard is applicable to the air brake caliper assemble (excluding the brake chamber) with compressed air as the working medium.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this standard.

GB/T 5620-2002 Road Vehicles - Braking of Automotive Vehicles and their Trailers - Vocabulary

GB/T 2829 Sampling Procedures and Tables for Periodic Inspection by Attributes (Apply to Inspection of Process Stability)

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

QC/T 316 Bench Test Methods of Fatigue Strength for Automobile Service Brake

3 Terms and Definitions

The following terms and definitions defined in GB/T 5620-2002 are applicable to this document.

3.1 Starting pressure

The inputted air pressure of brake chamber, when the pad assemble of the air brake caliper assemble begins to move.

3.2 Dragging torque

d) Caliper sliding resistance shall be no more than 100N;

e) Self-adjustment function of brake clearance shall meet the requirements in Clause 4.4.

4.8 Temperature Durability

During the temperature durability test period, the sample shall have no obvious catching phenomenon. After test, various performance indicators shall meet the following requirements:

a) Sample caliper and exposed non-metallic parts shall have no obvious surface cracks, and deformation influencing the function;

b) Starting pressure shall be no more than 45kPa;

c) Caliper sliding resistance shall be no more than 100N;

d) Self-adjustment function of brake clearance shall meet the requirements of Clause 4.4.

4.9 Salt spray corrosion

After the air brae caliper assemble undertakes the 72h salt spray corrosion test, within any 100cm^2 range of sample external surface shall generate no corrosive substances with diameter greater than 2mm; total corrosive area shall be no more than 5cm^2; sample's starting pressure shall be no more than 45kPa; and the caliper sliding resistance shall be no more than 100N.

5 Test Related Requirements

5.1 Test equipment requirements

5.1.1 Test bench for dragging torque

Test bench shall be mounted with brake disk spindle, the speed of which can be adjusted arbitrarily within the range of 0~50r/min, system detection error of the torque shall not exceed ±1.0% of the full scale, the resolution shall be no less than 0.1N·m.

5.1.2 High and low temperature test chamber

The error between the actual and design temperature of the test chamber shall not exceed ±2°C; test chamber shall have the channel to connect the air pipe, and shall take the heat & moisture insulated sealing measures; and there shall be sufficient space within the test chamber for installation sample and test fixture.

5.1.3 Salt spray test chamber

6.2 Caliper rigidity

6.2.1 Horizontally install the air brake caliper assemble on the test stand, see Figure 1.

6.2.2 Measurement point for deformation amount of caliper shall be selected to the flat rather than the uneven sample surface, located in the center line of the inner push rod of the caliper, and close to the outer ends of the sample. If it can't be measured when located in the center line of the push rod, then other representative positions paralleling to the center line of push rod can be selected.

6.2.3 On the installation point conforming to Clause 6.2.2, through installing dial indicator or micro displacement sensor, measure the total deformation amount of sample caliper in the center line direction of push rod.

6.2.4 Conduct 5 times brakes with rated working pressure, pressure retention time shall be no less than 5s, while interval between two brakes shall be 2s~3s.

6.2.5 Pour into compressed air into the inlet of brae chamber, the pressure slowly raises from zero to the rated working pressure; maintain for 5s, then record the total deformation amount of sample caliper in the center line direction of push rod.

Note: as for double-push-rod or multiple-push-rod specimen, it can measure at the same time the total deformation amount in the different center line direction of push rod; take the maximum one as the total deformation amount of such sample caliper in the center line direction of push rod.

6.3 Caliper sliding resistance

6.3.1 Horizontally mount the air brake caliper assemble on the test stand, see Figure 1. Eliminate the effect of gravity on the measurement; brake disk is the simulation brae disk (i.e. steel plate with the same thickness as the brake disk).

6.3.2 Conduct 10 times brakes with rated working pressure, during each brake, pressure retention time shall be no less than 5s; while the interval between two brakes shall be 2s~3s.

6.3.3 After the last brake is released, remove the simulation brake disk; so that floating parts of the caliper move along the two center line directions of push rod; measure the force value of caliper's floating parts moving along the two center line directions of push rod; take the maximum value as caliper sliding resistance.

Note: as for the air brake caliper assemble of fixed caliper, it shall not conduct such item.

6.4 Self-adjustment function of brake clearance

6.4.1 Air brae caliper assemble simulates the actual vehicle state (brake chamber is

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