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Air brake - Performance requirements and bench test methods of external automatic brake adjuster

气压制动器 外置式间隙自动调节装置技术要求及台架试验方法

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1 Scope

This Standard specifies the terms and definitions, technical requirements, test related requirements and bench test methods for external automatic brake adjuster of car and trailer air drum brakes.

This Standard is applicable to external automatic brake adjuster of car and trailer air drum brakes (hereinafter referred to as “automatic brake adjuster”).

2 Normative references

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

GB/T 175, *General purpose Portland cement*

GB/T 5620, *Road vehicles - Braking of automotive vehicles and their trailers - Vocabulary*

QC/T 32-2006, *Test methods of air cleaners for automobiles*

3 Terms and definitions

The terms and definitions defined in GB/T 5620 as well as the followings apply to this Standard.

3.1 rate torque, T_e

the maximum working torque value of the worm gear rotating by the brake chamber pushing rod under the rated working pressure and the rated working pressure

NOTE: The unit of rated torque is N•m.

150 mm arm length), and zeroing the measuring device. Then apply the same test torque in the opposite direction to 6.2.2, while recording the displacement of the displacement measuring device.

6.2.4 Rotate the worm shaft to turn the worm gear 72°±3°, then repeat at this position 6.2.2 and 6.2.3.

6.2.5 Repeat 6.2.4 for a total of 3 times.

6.3 High-low temperature test

6.3.1 Immerse the automatic brake adjuster in a closed tank and apply a constant pressure of (21±5) kPa inside the tank.

6.3.2 Remove the automatic brake adjuster from the water after 24h (do not dry). Immediately install it on the test fixture as follows:

a) install and adjust the automatic brake adjuster according to the product technical documentation requirements;

b) when the automatic brake adjuster is in the brake release state, the residual torque it receives shall be (22.5 ±11.5) N•m;

c) when the torque applied by the automatic brake adjuster is 200 N•m, the brake chamber push rod stroke shall be greater than the upper limit of the maximum brake interval of the automatic brake adjuster.

6.3.3 Place the automatic brake adjuster and test fixture at least for 16 h in an environmental chamber at an ambient temperature of (-40±2)°C.

6.3.4 At the end of the installation, the automatic brake adjuster is still subjected to 3 braking tests with a test torque of 200 N•m under this ambient temperature condition. Observe and record the operation of the automatic brake adjuster and the brake chamber push rod stroke for each brake.

6.3.5 Adjust the automatic brake adjuster to the initial state before the low temperature test. The sample and test fixture are then allowed to stand for at least 16h in an environmental chamber at an ambient temperature of (80±3)°C.

6.3.6 At the end of the placement, the automatic brake adjuster is still subjected to 100 braking tests with a test torque of 200 N•m under this ambient temperature condition. Observe and record the operation of the automatic brake adjuster and the stroke of the air chamber pusher during each braking.

6.4 Corrosion resistance

6.4.1 Install the automatic brake adjuster on the test fixture in the salt bath according to the technical documentation requirements of the product.

6.5.7 After the test, adjust the torque according to 6.1.

6.6 Dust test

6.6.1 The automatic brake adjuster sample is mounted on the test fixture in the dust chamber with a cavity size of approximately 900mm × 900mm × 900mm as required by the product technical documentation. The distance between the surface of the sample and the chamber shall not be less than 150mm.

6.6.2 Perform 100 brake tests at a test torque of $0.2T_e$ or until the chamber push stroke is stable.

6.6.3 Perform braking at a test torque of $0.2T_e$, and the displacement at the arm length of 150 mm shall be recorded as the initial stroke.

6.6.4 Spread 4.5 kg of cement in accordance with GB 175 evenly on the bottom of the box.

6.6.5 Carry out 5000 brake tests according to the test torque of $0.2T_e$, and the working time of each brake shall be the same as 6.4.8.

6.6.6 During the test, in order to simulate the brake lining wear, the brake gap shall be increased every 160 times of brake tests are performed, so that the angle of the automatic brake adjuster is increased by 0.5°.

6.6.7 During the test, the cement is stirred once with compressed air or blower every 15 minutes. Each stirring time is 2s, and the cement dust shall be filled into the dust box when stirring.

6.6.8 During the test, if the working stroke measured at the arm length of 150 mm from the center of the worm gear of the automatic adjustment device exceeds the initial stroke by 6.2 mm, the automatic adjustment mechanism of the gap is considered to be invalid, and the test shall be terminated.

6.6.9 After the test is finished, repeat the adjustment torque according to 6.1.

6.7 Durability test

6.7.1 Gear pair integrity

6.7.1.1 Install the automatic brake adjuster on the test bench according to the product technical documentation requirements.

6.7.1.2 Adjust the angle between the brake chamber push rod and the arm of the automatic brake adjuster, so that when the test load reaches the rated torque, the brake chamber push rod and the arm of the automatic brake adjuster are in a vertical state, that is, the angle between the push rod and the arm is 90°±3°.

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