

ICS 45.060

TB

**RAILWAY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

TB/T 3541.3-2018

Disk brakes for rolling stock. Part 3: Composite brake pads

机车车辆盘形制动 第3部分：合成闸片

(English Translation)

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References

1 Scope

1 Scope

This Part of TB/T 3541 specifies the terms and definitions, technical requirements, inspection methods, inspection rules, marking, packaging, transportation and storage of composite brake pads for locomotives and rolling stock (hereinafter referred to as brake pads).

This Part applies to composite brake pads for rolling stocks, which have a maximum operating speed of no more than 200 km/h and an axle weight of no more than 21 t, or a maximum operating speed of no more than 120 km/h and an axle weight of no more than 30 t (hereinafter referred to as rolling stock brake pads); it also applies to the composite brake pads for railway vehicles, which have a maximum operating speed of no more than 160 km/h and an axle weight of no more than 18 t (hereinafter referred to as railway vehicle brake pads).

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) is

applicable to this standard.

GB/T 1033.1 Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (GB/T 1033.1-2008, ISO 1183-1:2004, IDT) GB/T 1041 Plastics - Determination of compressive properties (GB/T 1041-2008, ISO 604:2002, IDT) GB/T 1043.1 Plastics - Determination of Charpy impact properties - Part 1: Non-instrumented impact test (GB/T 1043.1- 2008, ISO 179-1:2000, IDT) GB/T 2918 Plastics - Standard atmospheres for conditioning and testing (GB/T 2918-1998, ISO 291:1997, IDT) GB/T 3398.1 Plastics - Determination of hardness - Part 1: Ball indentation method (GB/T 3398.1-2008, ISO 2039-1:2001, IDT)

3 Terms and definitions

The following terms and definitions apply to this document.

Instantaneous friction coefficient μ_k Function of speed, which is the ratio of the braking force to the applied force on brake pad at each moment of the braking process.

Average friction coefficient μ_{is} Function of the initial braking speed, which is the integral of the instantaneous friction coefficient over the braking distance S_e , see formula (1).

4.2 Appearance

4.2.1

The steel back shall not have cracks or other defects that may cause the brake pad to break during use.

4.2.2

The friction surface shall be flat. The friction body shall not have inclusions, cracks, blistering, bulging, delamination, looseness, warping and other defects.

4.2.3

The friction body and the steel back shall be firmly bonded.

4.3 Usage requirements

Under normal use conditions, the following requirements shall be met.

4.4 Physical and mechanical properties of friction body

The physical and mechanical properties of the brake pad's friction body shall comply with the provisions of Table 1.

4.5.1 Average friction coefficient during the running-in period

The average friction coefficient's reference value during the running-in period is the average value of the average friction coefficients of the last five parking brakes, during the running-in period. Starting from the 11th brake until 30% of the total number of brakes during the running-in period, the average friction coefficient of each brake shall not exceed $\pm 30\%$ of the average friction coefficient's reference value during the running-in period. The average friction coefficient of each brake thereafter shall not exceed $\pm 15\%$ of the average friction coefficient's reference value during the running-in period.

4.5.2 Instantaneous friction coefficient of one parking brake condition

4.5.2.1

The instantaneous friction coefficient of the rolling stock brake pad and the railway vehicle brake pad, in the normal temperature dry state and the one parking brake condition, shall comply with the provisions of Figure B.1 and Figure B.3 in Appendix B, respectively.

5.1 Appearance

Visually inspect the appearance of the brake pad.

5.2 Geometric dimensions

Use the special inspection gauge and vernier caliper, which has a graduation value of 0.02 mm shown in Appendix C, for inspection.

5.3.1 Preparation of specimens

5.3.1.3

Avoid overheating of the specimen when preparing the specimen.

5.3.2.1 Measure the density of the friction material of the brake pad by the immersion

method specified in GB/T 1033.1.

5.3.3 Hardness

5.3.3.1

For materials with a nominal hardness less than 30 HRX, the ball indentation hardness shall be tested by the method specified in GB/T 3398.1; the test load shall be

49 N.

5.4 Braking friction and wear performance

5.4.1

The braking friction and wear performance test shall be carried out on a 1.1 braking power test bench, according to the procedure specified in Appendix D.

5.4.2

The brake pads used for the test shall be unused real objects; the reduced-scale specimens shall not be used for the test.

5.4.3

The test under humidification conditions shall be carried out using a water spray device.

5.5 Hazardous substances

5.5.1

The content of asbestos in the brake pads shall be tested according to the method specified in GB/T 23263-2009.

5.5.2

The content of lead and zinc in the brake pads shall be tested according to the method specified in GB 5085.3-2007.

6.1 Inspection classification and inspection items

The brake pad inspection is divided into exit-factory inspection and type inspection.

The inspection items are shown in Table 3.

6.2.1 Appearance inspection

The appearance of the brake pads leaving the factory shall be inspected piece by piece.

6.2.2 Geometric dimension inspection

6.2.2.1

The geometric dimensions shall be randomly sampled and inspected batch by batch.

6.2.3.1 Physical and mechanical properties shall be randomly sampled for inspection

batch by batch.

6.2.3.2 For brake pads of the same material and specification, each heat treatment furnace shall be considered as an inspection batch; no less than 2 pieces shall be randomly