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

TB/T 1941-2013

**Tarpaulin for railway wagons
(English Translation)**

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1 Scope

This Standard specifies the technical requirements, production, test methods, inspection rules, marks, folding and packaging as well as storage of tarpaulin for railway wagons (including railway tarpaulin and self-contained tarpaulin, hereinafter referred to as the tarpaulin).

This Standard is applicable to the design, production, management and testing of the tarpaulin.

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 2423.16-2008, Environmental testing - Part 2. Test methods - Test J and guidance. Mold growth (IEC 60068-2-10.2005, IDT)

GB/T 3917.4-2009, Textiles - Tear properties of fabrics - Part 4.

Determination of tear force of tongue-shaped test specimens (Double tear test) (ISO 13937-4.2000, IDT)

GB/T 8834-2006, Ropes - Determination of certain physical and mechanical properties (ISO 2307.1990, IDT)

GB 15193.3-2003, Acute toxicity test

GB/T 19978, Geotextiles and geotextile-related products - Determination of the puncture resistance

HG/T 3053-1999, Rubber or plastics coated fabrics Determination of flexibility - Flat loop method [eqv ISO 5979.1982(1987)]

3.1.1 Base fabric

Eye ring material is stainless steel. The shape shall be flat and smooth. See

Table 1 for specifications. The eye ring is close to the edging rope and is firmly mounted on the same plane of the tarpaulin. Large triangle cloth is sewn at the corners of the four corners of the tarpaulin. Small triangle cloth is sewn at the eye circles at both ends of the tarpaulin.

4.5 Elastic waist-rope production

Make elastic waist-rope according to Figure 5. The braided sleeve of the elastic part and the middle part of the main rope are made by weaving method. Both ends of the main rope are made by twisting. Braided rope sleeve and rubber rod are closely stuck. The tethers at both ends of the rubber rod are respectively extended from the braided sleeve and are connected with the main rope by a horseshoe buckle. Horseshoe buckle is not less than 5 buckles. Elastic waist-rope is overall without disconnection. The stretchability of the elastic part of the braided rope sleeve shall ensure that the rubber rod is stretched by 300 mm after being stretched by the braided sheath.

4.6 Rope docking

The end rope and the angle rope shall be firmly inserted after passing through the eye socket. The butt joints shall be firmly connected, and the joints shall not exceed 2. The buckles at all docks shall not be less than 8 buckles.

4.7 Rope head treatment

The rope head is wound 5 cycles with ramie or polyester thread, and then stitched with 4 stitches. The end of the rope is thermally bonded and not loose.

4.8 Connection of pressure rope, elastic waist-rope and tarpaulin

Press the rope through the eye ring and the pressure rope cloth, knotting outside the eye circle. The elastic waist-rope is connected to the tarpaulin through the eye ring and the stringing cloth. After one end of the waist-rope is worn out from the eye ring, the rope head is back again, passing between the elastic waist-rope and the tarpaulin, and making a slip knot. After the other end is worn out from the eye circle, make a dead knot back. The position of adjacent two elastic waist-rope's slip knot, dead knot shall stagger. After the elastic waist-rope passes through the eye ring and the rope, the elastic part shall be naturally relaxed.

5.1 Test environment conditions

The test shall be carried out at a temperature of $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$, a relative humidity

Along with the tarpaulin width direction, take 5 points from left, center, right positions to measure. Take the average of five measured data as the measurement result, to the nearest of 0.001 mm.

5.5 Measurement of coated fabric mass

Along with the tarpaulin width direction, from left, center and right, extract 3 pieces of 100 mm x 100 mm specimens. Weigh five-level analytical balance to weigh, to the nearest of 0.1 g. Take the arithmetic mean of 3 measurements multiplied by 100, it shall be the mass of per square meter.

5.6 Measurement of breaking tensile force and breaking elongation of

coated fabric

Cut 5 pieces of 250 mm x 50 mm specimens along the length and width of the tarpaulin. Mark a gauge length of 100 mm in the middle of each block. The specimen is clamped to the test machine fixture with a 200 mm pitch and stretched at 200 mm/min. Record the maximum load and the length of the line when the specimen is pulled off. Take the experimental average of 5 tests as the test result, to the nearest of 1 N.

5.7 Measurement of coated fabric tear resistance

Cut 5 pieces of 220 mm x 150 mm specimens along the length and width of the tarpaulin (shall not be sampled within 150 mm from the edge of the fabric). The starting point of the tear at the time of sampling is 15 mm from the reinforcing wire. Every two specimens shall not contain yarns of the same length or width.

Use the method for calculation by electronic device according to 10.2 of GB/T

3917.4-2009. The value is calculated as 2 highs and 2 lows. Tensile at a speed of 100 mm/min $\pm$ 10 mm/min, the sensitivity of the test machine is 10%. Take the arithmetic mean of 5 tests as test result, to the nearest of 1 N. Each value shall contain 2 peaks of reinforcing wire. If only one peak of reinforcing wire is included, it shall be invalid.

5.8 Measurement of coated fabric softness

Cut 3 pieces of 600 mm x 100 mm specimens along the length and width of the tarpaulin. Conduct the test according to the flat ring method in HG/T 3053-1999.

Measure the date of two points for each specimen. Calculate the arithmetic mean as the test result respectively, to the nearest of 1 mm.

5.9 Measurement of waterproof performance

5.9.1

Coated fabric. cut 3 pieces of 200 mm x 200 mm specimens in the left, center and right directions of the specimen along the width of the tarpaulin. Use water pressure meter to test. Place the specimen on the lower platen, cover the top cover and press it tightly. The water level gauge is at zero. Then, when it is

5.13 Measurement of water extraction properties of coated fabric

Cut 3 pieces of coated fabric specimens of 500 mm x 500 mm and 1 piece of specimen with weld along the width of the tarpaulin. Soak in a container at room temperature. Change water every 24 h. Take out after 144 h. Bake at $100^{\circ}\text{C} \pm$

2°C for 60 min. Then, the specimens for waterproof performance, flame retardant performance and cold resistance tests shall be respectively cut.

Perform waterproofing and flame retardancy tests according to the provisions of 5.9 and 5.11. Conduct cold resistance test at -10°C according to the method specified in 5.10.

5.14 Measurement of mold resistance of coated fabric

According to the method specified in GB/T 2423.16-2008.

5.15 Coated fabric toxicity test

According to the method specified in GB 15193.3-2003.

5.16 Measurement of weld peeling force

Cut 3 pieces of 200 mm x 40 mm specimens along the weld direction. Strip the weld at 50 mm at one end of the specimen. The two peeled pieces are respectively placed on the fixture of the testing machine. Strip at a tensile speed of $200 \text{ mm/min} \pm 50 \text{ mm/min}$. The effective strip length of the specimen is at least 70 mm. Calculate the arithmetic mean of each specimen. Take the arithmetic mean of 3 specimens as the result of the test, to the nearest of 1 N.

5.17 Measurement of stringing cloth tensile strength

Take a specimen with a stringing cloth for testing. Apply force at $200 \text{ mm/min} \pm$

50 mm/min . Record the maximum tensile force when the stringing cloth is broken. The minimum of the three specimens is the result of this test, to the nearest of 1 N.