

Steel strip for packaging

1 Scope

This standard specifies the classification and designation, order information, dimensions, shape, mass, technical requirements, inspection and testing, packaging, marking and inspection certificate of the steel strip for packaging

This standard is applicable to steel strip for packaging in metallic material, glass, light industrial products and logistics (hereinafter referred as strapping) .

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 228.1 *Metallic materials—Tensile testing—Part 1: Method of test at room temperature*

GB/T 235 *Metallic materials—Sheet and strip—Reverse bend test*

GB/T 247 *General rule of package, mark and certification for steel plates (sheets) and strips*

GB/T 8170 *Rules of rounding off for numerical values & expression and judgement of limiting values*

GB/T 10125 *Corrosion tests in artificial atmospheres—Salt spray tests*

GB/T 17505 *Steel and steel products—General technical delivery requirements*

3 Classification and designation

3.1 Designation

Designation of strapping shall be indicated with the value of specified minimum tensile strength and the initial capital letter of Chinese phonetic alphabet “Kun Dai” .

Example: 830KD.

830 — the value of specified minimum tensile strength, in MPa;

KD — the initial capital letter of Chinese phonetic alphabet “Kun Dai”

3.2 Classification

3.2.1 Classified according to tensile strength:

- a) Regular duty: 830 KD、880 KD;
- b) High strength: 930 KD、980 KD;
- c) Super high strength: 1150KD、1250KD、1350KD。

3.2.2 Classified according to surface finish:

- a) Blue treated: the strapping surface is protected by oxidation and waxed film.
- b) Painted: the strapping surface is protected by painting and waxed film.
- c) Galvanized: the strapping surface is protected by zinc (zinc alloy) and waxed film.

3.2.3 Classified according to wound type

- a) Ribbon Wound (hereinafter referred as ribbon): a wound type that the strapping is wound

around a fixed center point.

b) Oscillated (hereinafter referred as oscillated): a wound type that the strapping is wound around a center point which oscillates on a axis with certain distance.

4 Order information

The contract or order covered by this standard shall include the following information:

- a) grade;
- b) the number of this standard;
- c) dimensions;
- d) surface finish;
- e) inner diameter and maximum outer diameter;
- f) wound type;
- g) mass (coil weight and order quantity);
- h) packaging type;
- i) other special requirements.

5 Dimensions, shape, mass

5.1 The nominal thickness and nominal width of strapping shall be in accordance with Table 1. However, the strapping in other dimensions may be supplied under the agreement between the manufacturer and purchaser

Table 1 Width and thickness of strapping unit in mm

Nominal thickness	Nominal width					
	12.7	16	19	25.4 (25)	31.75 (32)	40
0.4	√	√				
0.5	√	√	√			
0.6	√	√	√			
0.7			√			
0.8			√	√	√	
0.9			√	√	√	√
1.0			√	√	√	√
1.2					√	√

Note: √ indicates dimensions regularly supplied .

5.2 The thickness tolerances of strapping shall be in accordance with Table 2.

Table 2 Thickness tolerances unit in mm

Nominal thickness	Thickness tolerances
0.4	±0.030
0.5~1.2	±0.035

5.3 The width tolerances of strapping shall be ±0.13mm.

5.4 The shape tolerance of strapping shall be in accordance with Table 3.

Table 3 Shape tolerances

Shape	Test piece length 2000mm no more than
Camber	6mm
Curl	24mm
Twist	18°

5.5 Single coil with mass less than 500 kg shall have no joint; Single coil with mass no less than 500 kg may have one joint, the thickness of weld shall not exceed 120% of the nominal thickness, the tensile strength of weld shall be not less than 80% of the specified minimum tensile strength.

5.6 The inner diameter of strapping is 406 mm and the tolerance shall be ± 2 mm. Strapping in other inner diameter may be supplied under the agreement between the manufacturer and purchaser

6 Technical requirements

6.1 Mechanical properties and processing properties

6.1.1 Mechanical properties of strapping shall be in accordance with Table 4.

6.1.2 For bend property of strapping, see Annex A. Test method shall be in accordance with GB/T 235.

Table 4 Mechanical properties

Grade	Tensile strength R_m , MPa No less than	Elongation after fracture A_{50mm} , %	
		Nominal thickness, mm	No less than
830KD	830	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	10
880KD	880	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	10
930KD	930	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	10
980KD	980	0.7	9
		0.8 to 1.2	12
1150KD ^a	1150	0.7 to 1.2	8
1250KD ^a	1250	0.7 to 1.2	6
1350KD ^a	1350	0.7 to 1.2	6

^a For grade 1150KD, 1250KD, 1350KD, the elongation after fracture is determined with the proportional test piece and with the coefficient of proportionality $k=5.65$.

6.2 Painted or galvanized coating

6.2.1 The thickness of painted coating on each side shall be not less than $3\mu\text{m}$. The coating shall be uniform, continuous and free of uncoated areas. Slight runs and scratches are permitted. The painting color is determined under the agreement between the manufacturer and purchaser

6.2.2 The thickness of galvanized coating on each side should be not less than 3 μm .

6.2.3 The galvanized coating shall be uniform , complete and free of flake, crack and uncoated area.

6.3 Salt spray test

During salt spray test, galvanized strapping shall be free of red rusty spot within 24 hours. Test method shall be in accordance with GB/T 10125. If the manufacturer can guarantee the corrosion resistance, salt spray test may be omitted.

6.4 Surface quality

6.4.1 The surface of strapping shall be smooth. Slight pit, convex, longitudinal scratch with length no less than half of thickness tolerance are permitted. The surface of strapping shall be free of rust.

6.4.2 The edge of strapping shall be free of burrs, slivers and unwell-cutting.

6.4.3 The strapping may be supplied with defects since partial defects are not easily detected and removed due to continuous production process. The total length of the defect parts shall be not more than 4% of the total length of the coil.

7 Inspection and Testing

7.1 The strapping color and surface quality shall be inspected by visual examinations. The strapping thickness shall be measured with outside micrometer and the width shall be measured with vernier calipers . The test piece length is not less than 100 mm. The thickness and width is measured respectively at 3 spots of each test piece and the average value of 3 test results is calculated as the thickness or width of strapping .

7.2 The test method of camber, curl and twist shall be in accordance with Annex B.

7.3 The coating thickness of painted strapping and galvanized strapping shall be measured by using instruments with suitable precision . The measured spots shall be at equal interval and not less than 3mm from each side edge of the strapping , and the measured length is not less than 100mm. The thickness is usually measured at 3 spots on each side of the test piece and the average value of 6 results is calculated as the coating thickness.

7.4 The test piece of tensile test shall be original rectangular section with gauge length $L_0=30\text{mm}$, the elongation after fracture shall be measured by the inside claws of vernier caliper.

7.5 The test item, number of test piece, sampling method and test method shall be in accordance with Table 5.

Table 5 The test item, number of test piece, sampling method and test method

NO.	Test item	Number of test piece	Sampling method	Test method
1	tensile test	1per test unit	Sampling at random parts of strapping in same test unit.	GB/T 228.1
2	Dimensions, shape	each test unit		7.1 and Annex B
3	surface quality	each test unit		visual examination
4	Thickness of painted and galvanized	each test unit		suitable instruments

	coating			
--	---------	--	--	--

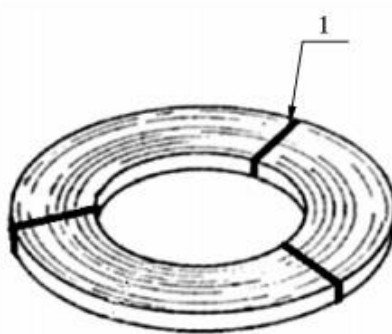
7.6 The strapping shall be accepted in test unit. Each test unit consists of a maximum of 30 tons strapping of the same grade, rolling process, heat treatment, dimension and surface finish. The strapping produced by hot rolled strip with mass more than 30 tons shall be regarded as one test unit.

7.7 The re-testing and acceptance rules shall be in accordance with GB/T 17505.

8 Packaging

8.1 Packaging of strapping coil

8.1.1 Packaging of ribbon wound coil. The coil shall be wrapped with three 16mm-wide or 19mm-wide straps spaced 120° apart (see Figure 1).

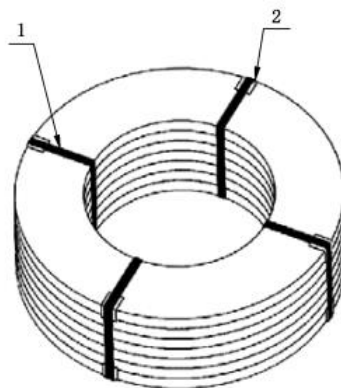


Note

1 16mm-wide or 19mm-wide straps

Figure 1 Packaging of ribbon wound coil

8.1.2 Packaging of oscillated wound coil. The coil shall be wrapped with four 16mm-wide or 19mm-wide straps spaced 90° apart, with corner protectors putting between strap ties and coil (see Figure 2).



Note

1 16mm-wide or 19mm-wide straps

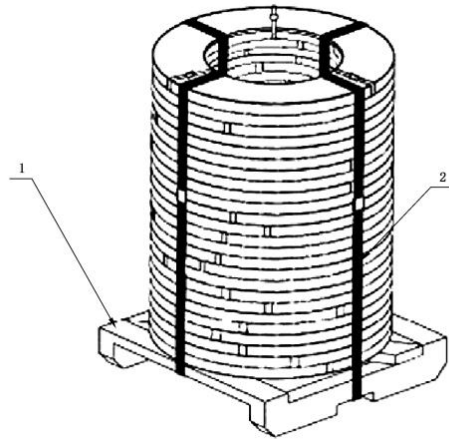
2 corner protector

Figure2 Packaging of oscillated wound coil

8.2 Pile packaging

8.2.1 Bare packaging (see Figure3).

Packaging materials: wooden pallet, four strap ties.



Note

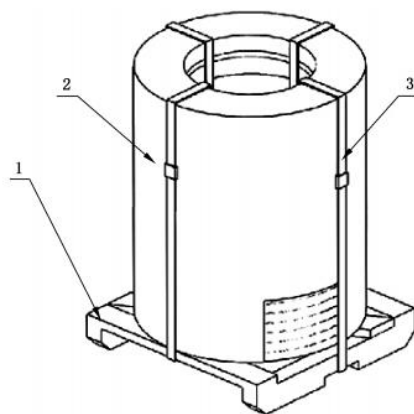
1 wooden pallet

2 outside strap ties

Figure 3 Pile bare packaging

8.2.2 Regular packaging(see Figure 4)

Packaging materials: wooden pallet, VCI paper, six strap ties (two strap ties inside VCI paper and four strap ties outside).



Note

1 wooden pallet

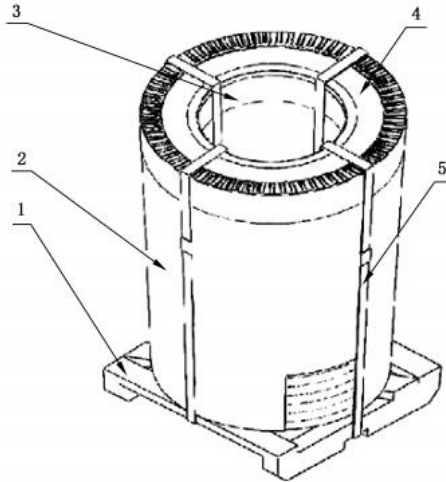
2 VCI paper

3 inner and outside strap ties

Figure 4 Pile regular packaging

8.2.3 Lean packaging(see Figure 5)

Packaging materials: wooden pallet, outside VCI paper, anti-rust plastic film, steel circle(inner and outside), desiccants, six strap ties(two strap ties inside VCI paper and four strap ties outside).



Note

- 1 wooden pallet
- 2 VCI paper
- 3 inner steel circle
- 4 outside steel circle
- 5 inner and outside strap ties

Figure 5 Waterproof packaging

9 Marking

9.1 The marking shall be visible, firm, clear, normative and non-fading.

9.2 The marking shall include manufacturer's name or trademark, standard number, grade, specification and weight.

9.3 The marking shall be stuck or hang on the finished strapping and include all information.

10 Transportation

10.1 Collision shall be avoided during transportation.

10.2 Strapping shall be waterproof and moisture-proof during transportation.

10.3 Strapping shall be kept in warehouse when transited in a railway station or in a pier.

11 Inspection certificate

The inspection certificate of strapping shall be in accordance with GB/T 247.

12 Rules of rounding off for numerical value

The test results of mechanical properties shall adopt rounded value comparison method. Rules of rounding off shall be in accordance with GB/T 8170.

Annex A
(informative)

Bend test for strapping

For bend test of the strapping, see Table A.1.

Table A.1 Bend Test for Strapping

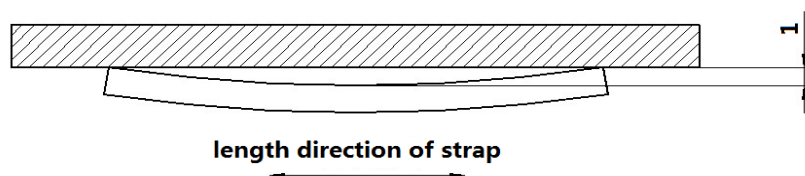
Nominal thickness mm	Minimum number of bends r=3mm
0.4	12
0.5	8
0.6	6
0.7	5
0.8	5
0.9	5
1.0	4
1.2	3
Note: r indicates the bend radius.	

Annex B (normative)

Definition and measurement of strapping shape

B.1 Camber

Camber is the greatest deviation of a side edge from a straight line, the measurement being taken on the concave side with a straight edge as shown in Figure B.1.



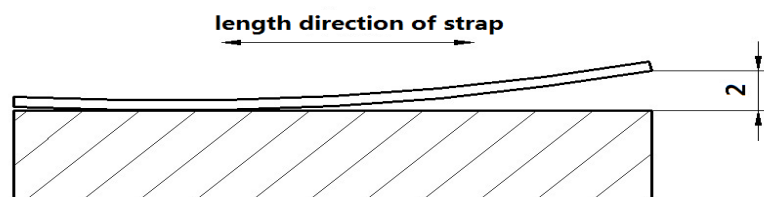
Note

1—camber

Figure B.1 measurement of camber

B.2 Curl

Place the strapping specimen on the platform naturally, except its own weight, without any other pressure on it, measure the maximum distance between its downward surface and platform's surface (see Figure A.2).



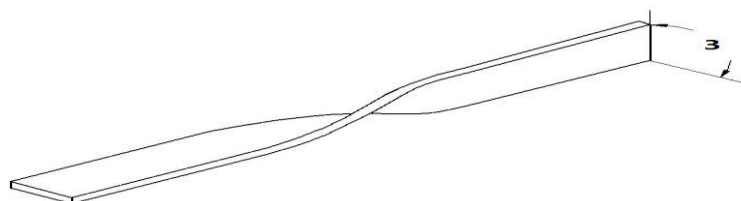
Note

2—curl

Figure A.2 measurement of curl

A.3 Twist

Place the strapping test piece on the platform naturally. Do not apply any other pressure on it except its own weight and measure the maximum dip angle formed by its downward surface and platform's surface (see Figure A.3).



Note

3—twist

Figure A.3 measurement of twist