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Metal packaging

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Steel strapping for packaging

WDstage

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This document was prepared by Technical Committee ISO/TC 122, *Packaging*

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Steel strapping for packaging

1 Scope

This document specifies the classification, dimensions, shape, mass, technical requirements, inspection rules and testing methods, packaging, marking and inspection certificate of the steel strapping for packaging.

This document is applicable to steel strapping packaging in the field of metallic material, glass, light industrial products and logistics, etc.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 31-0, *Quantities and units-part 0: General principles*

ISO 404, *Steel and steel products — General technical delivery requirements*

ISO 6892-1, *Metallic materials — tensile testing — Part 1:Method of test at room temperature*

ISO 7799, *Metallic materials — sheet and strip 3mm thick or less — reverse bend test*

ISO 9227, *Corrosion tests in artificial atmospheres — salt spray tests*

ISO10474, *Steel products — Inspection documents*

ISO 21067-1, *Packaging — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1

packaging

product to be used for the containment, protection, handling, delivery, storage, transport and presentation of goods, from raw materials to processed goods, from the producer to the user or consumer, including processor, assembler or other intermediary

[SOURCE:ISO 21067-1:2016,2.1.1]

3.2

steel strapping

strip of metal material, which is made from carbon steel or alloy steel through heat treatment process and used in bundling, reinforcing and connection for manufacture industries goods and shipment process by manual or automatic machine

4 Classification

4.1 The classification of steel strapping in accordance with tensile strength shall be as follows:

—Regular tensile strength

—High tensile strength

—Super high tensile strength

4.2 The classification of steel strapping in accordance with surface finish shall be as follows:

—Bright

—Blue and waxed

—Painted and waxed

—Galvanized

Note: the definition see Annex A

4.3 The classification of steel strapping in accordance with wound type shall be as follows:

—Ribbon

—Oscillated

Note: the definition see Annex A

5 Ordering information

To adequately specify the requirements in this international standard, enquiries and orders shall include the following information:

a) a reference to this International Standard (i.e. ISO 24259)

b) surface finished (see 4.2)

c) wound type (see 4.3)

d) steel strapping dimensions and tolerances (see 6.1 and 6.2)

e) coil dimensions(inside diameter, maximum outside diameter and weight)

f) packaging (see 9)

g) quantity required

h) application

i) special requirements.

6 Dimensions, shape and tolerances

6.1 The nominal thickness and width of steel strapping shall be in accordance with Table 1. When agreed between the manufacturer and the purchaser, and indicated in the contract, other dimensions may be supplied.

Table1 Width and thickness

in millimetre

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

6.2 The dimension tolerances of steel strapping shall be in accordance with Table 2.

Table 2 Dimension tolerances

in millimetre

Dimensions	Tolerances
Thickness	±0.035
Width	±0.13

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

Table 3 Shape tolerances

Shape	Specimen length 2000 mm (per 2000 mm length)
	≤
Camber	6 mm
Curl(flatness)	24 mm
Twist	18°

6.4 Single coil less than 500 kg shall be no welded joints. Single coil more than 500kg is allowed to be of one welded joint, the thickness of welded joint shall not exceed 120% the nominal thickness, the tensile strength of welded joint shall be not less than 75% the minimum specified tensile strength.

6.5 Coil inside diameter is 406mm and the tolerance shall be ±2 mm. When agreed between the manufacturer and the purchaser, and indicated in the contract, other dimensions may be supplied.

6.6 Coil size, weight and number of coils per pallet shall be subject of agreement between the manufacture and customer.

7 Technical requirements

7.1 Mechanical properties

7.1.1 The requirements for steel strapping mechanical properties shall be in accordance with Table 4.

Table 4 Mechanical properties of steel strapping

Classification	**Tensile strength,** R_m MPa min	**Elongation after fracture,** A	
		Nominal thickness, mm	% min
Regular tensile strength	830	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	8
	880	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	8
High tensile strength	930	0.4 to 0.6	2
		0.7	4
		0.8 to 1.2	8
	980	0.7	8
		0.8 to 1.2	10
Super high tensile strength	1150	1.0 to 1.2	8
	1250		6
	1350		6
NOTE 1MPa=1N/mm²			

7.1.2 Steel strapping bend test method shall be in accordance with ISO 9227. The steel strapping bend property see Annex B.

7.2 Coating

7.2.1 The thickness of painted and galvanized coating on each side shall not be less than 3μm.

7.2.2 The painted coating color of steel strapping is normally supplied black. When agreed between the manufacturer and the purchaser, and indicated in the contract, other painted coating colors may be supplied.

7.3 Surface quality

7.3.1 The painted and galvanized coating shall be uniform and complete, free of flake, crack and uncoated area. Slight runs and scratches are permitted.

7.3.2 The surface of steel strapping shall be smooth and free of rust. Slight grooves, salient points, lengthway scratches not exceed half of thickness tolerance are permitted.

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

7.3.4 The steel strapping may be supplied with defects since they are not easily detected and removed due to continuous production process. The total length of the defects parts shall be not exceed 4% of the total length of the coil.

7.4 Neutral salt spray (NSS) test

The neutral salt spray test of galvanized steel strapping shall be free of red rusty spot within 24 hours, testing method shall be in accordance with ISO 9227.

8 Inspection and Testing

8.1 The inspection of appearance shall be carried out by visual examination. The inspection of steel strapping thickness shall be carried out by outside micrometer and the inspection of steel strapping width shall be carried out by vernier calipers. The specimen length is not less than 100mm. The thickness and width is measured at 3 spots on each test piece and the mean value of 3 test results is calculated as the thickness or width of the steel strapping.

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

8.3 The inspection of coating thickness shall be carried out with appropriate measuring equipment. The test shall be carried out at equal interval point more than 3mm from each side edge of the strapping and the specimen length is not less than 100mm. The coating thickness shall be measured at 3 spots(more than 3mm from the strapping edges) on each side of the test piece and the mean value of 6 test results is calculated as the steel strapping coating thickness.

8.4 The specimen of tensile test shall be original rectangular section shape. The original gauge length, *Lo*=30 mm, shall be marked by means of fine marks or scribed lines. The distance between gauge length marks on the break sample shall be carried out with accurate scale.

8.5 The steel strapping shall be accepted in test unit. Each test unit consists of a maximum of 30 tons strapping of the same grade, cold-rolled process, heating treatment process, dimension and finish. In case of strip, a coil weighing more than 30 tons shall be regarded as one test unit.

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

Table 5 The test items, number of test piece, sampling method and test method per lot

NO.	Test items	Number of test pieces	Sampling method	Test method
1	Tensile test		at random parts of	ISO 6892.1

2	Dimensions, shape	1 per test unit	steel strapping in same unit	7.1 and Annex A
3	appearance			Visual examination
4	Thickness of painted and galvanized			Suitable instruments

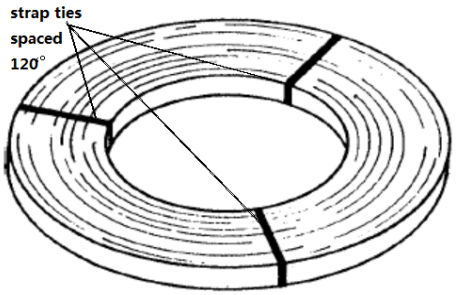
8.7 The re-testing and acceptance rules shall be in accordance with ISO404.

9 Packaging

9.1 Packaging of strapping coil (unit packed)

9.1.1 Coil straps

Each coil shall be wrapped with equally spaced steel tie straps not less than 16 by 0.5mm. The three strap ties in ribbon wound coil shall be spaced 120° apart (see Figure 1) while the four strap ties in oscillated wound coil shall be spaced 90° apart (see Figure 2).



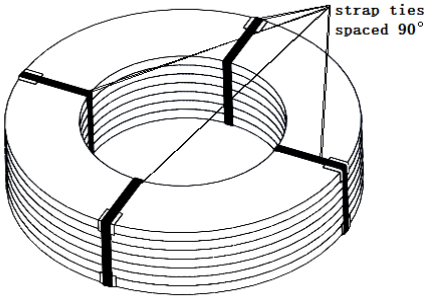


Figure 1— Tie of ribbon wound strapping coil **Figure 2— Tie of oscillated wound strapping coil**

9.1.2 Coil wrapping

Each coil or multiple of coils shall be spiral-wrapped with paper by means of a coil-wrapping machine. Wrapping paper material shall have excellent toughness and corrosion resistance. The wrapping process shall be continuous and complete. Each wrap shall overlap each preceding layer of wrap at least 50%. Coil wrapping shall be accomplished in a neat and compact unit pack manner.

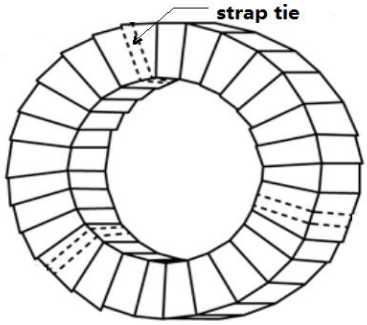


Figure 3—Strapping coil wrapping

9.2 Coils pile packed

9.2.1 Bare packaging (see Figure4)