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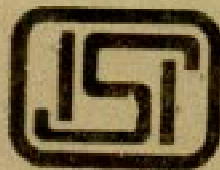
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IS : 8725 - 1978

Indian Standard
SPECIFICATION FOR
WIREBOUND WOODEN BOXES

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SPECIFICATION FOR WIREBOUND WOODEN BOXES

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Indian Standard

SPECIFICATION FOR WIREBOUND WOODEN BOXES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 February 1978, after the draft finalized by the Wood and Wood Products Containers Sectional Committee had been approved by the Marine, Cargo Movement and Packaging Division Council.

0.2 In an attempt to reduce the lumber requirements of wooden containers and to facilitate ease of assembling of prefabricated sections, wirebound wooden containers were developed. Wirebound containers are primarily used when a substantial volume of the same size container is required. Large appliances and industrial products, such as transformers, water pumps, are packaged in these types of containers. The degree of prefabrication obtainable with these containers usually provides economy through simplified packaging techniques.

0.3 Very thin lumber is used to make wirebound wooden boxes and wires around the girth of the container are stapled to wood at frequent intervals. Wood cleats are sometimes placed at the ends and sometimes in between. These cleats are mitred and may also be tenoned so that when assembled they lock together.

0.4 In the preparation of this standard, assistance has been derived from the following publications:

JIS Z 1407-1960 Wirebound containers. Japanese Industrial Standards Committee.

BS 1133 : Section 8 : 1950 Packaging Code, Section 8 Wooden containers. British Standards Institution.

Fed Spec PPP-B-585b Boxes, wood, wirebound. General Service Administration, USA.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers the requirements for wirebound wooden boxes for loads not exceeding 250 kg.

2. TERMINOLOGY

2.1 For the purpose of this standard, the following definitions in addition to those given in IS : 707-1976* and IS : 6703-1972† shall apply.

2.1.1 *Liner* — Liners are thin boards which prevent the end board from splitting and the fastenings from pulling through the end boards. Shearing of end boards is also prevented.

2.1.2 *Mat* — That part of the box consisting of the sides, top and bottom which are connected together by the binding wires, that is, knocked-down wirebound box exclusive of the ends.

2.1.3 *Nomenclature* — The nomenclature of various parts of wirebound wooden boxes shall be as shown in Fig. 1.

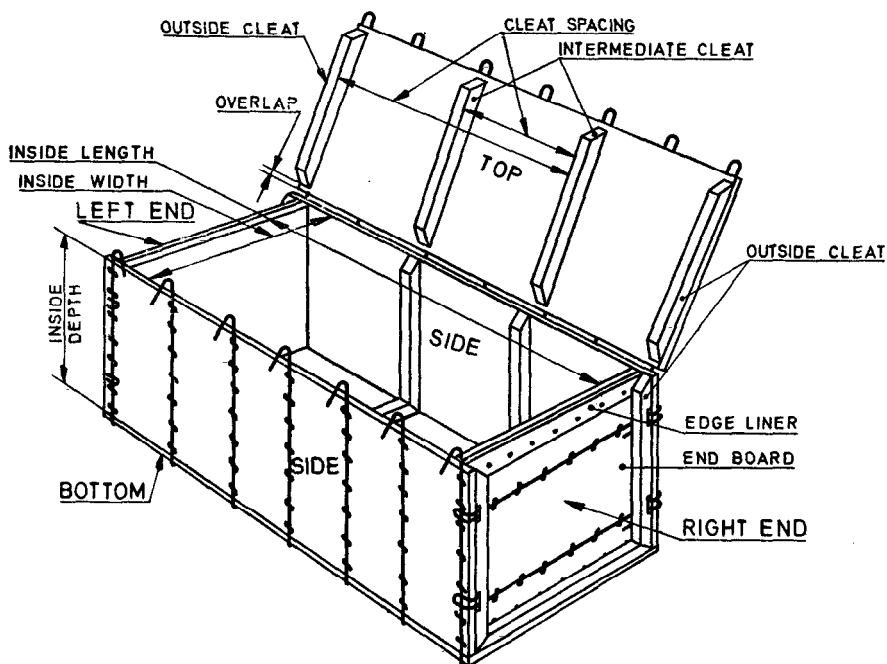


FIG. 1 NOMENCLATURE

*Glossary of terms applicable to timber technology and utilization (second revision).

†Glossary of wooden packaging terms.

3. MATERIALS

3.1 Wood — The most suitable species of timber for these types of boxes shall be from Groups I, II and III of IS : 6662-1972*, and shall be sliced, sawn or peeled wood.

3.1.1 Moisture Content — The timber used for the manufacture of the wirebound wooden boxes shall be seasoned to a moisture content between 10 to 15 percent.

3.1.2 Decay — Each piece of timber used shall be sound and free from decay.

3.1.3 — The timber used shall not have any of the objectionable knots.

3.1.4 Grain Divergence — The divergence of grain shall not exceed 1 in 10 in cleats and battens, and 1 in 8 in sawn or veneered face boards.

3.2 Nails — Plane head nails of suitable length conforming to IS : 723-1972† shall be used for the assembly of the boxes wherever necessary.

3.3 Wire

3.3.1 Binding Wire — Wire used for binding shall be of mild steel conforming to IS : 280-1972‡.

3.3.2 Stapling Wire — Wire for stapling shall be of mild steel drawn wire of the following dimensions:

- a) Staples of end binding wire 1.6 mm, and
- b) Staples of intermediate wires 1.2 mm.

4. TYPES

4.1 Wirebound wooden boxes shall be constructed, conforming to any of the styles shown in Fig. 2 to 5.

4.1.1 Style A — This box shall be made with a twist wire closure with nailed-in ends. Such a box is low in cost and is readily adaptable to every type of shipment. It is pilfer-proof since it cannot be opened without destroying the closures (*see* Fig. 2).

4.1.2 Style B — This box has a Rock Fastener loop closure with nailed-in ends. This provides faster closing than the twist wire closure (Style A). It is safer in handling and assembly since no wire ends are exposed. Also such boxes can be opened for inspection and easily reclosed for shipping. For reusable containers Rock Fastener closures generally permit safe opening and closing operations (*see* Fig. 3).

*Specification for timber species suitable for wooden packaging.

†Specification for steel countersunk head wire nails (*first revision*).

‡Specification for mild steel wire for general engineering purposes (*second revision*).

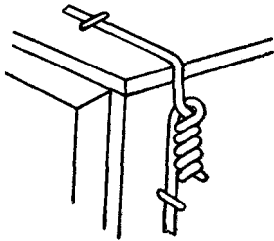


FIG. 2 STYLE A

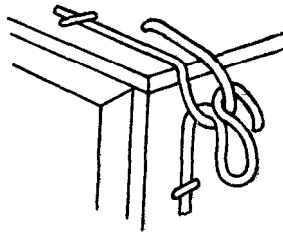


FIG. 3 STYLE B

4.1.3 Style C — This container shall have a twisted looped wire closure with nail-in ends. The advantages of this style are similar to Style B (see Fig. 4).

4.1.4 Style D — This type of box shall be bound on all sides with Rock Fastener loop closures and nail-less wired ends. It provides preassembled ends which need not be stapled or nailed to the cleats of the box blank. It offers the fastest assembly of all wirebound wooden boxes (see Fig. 5).

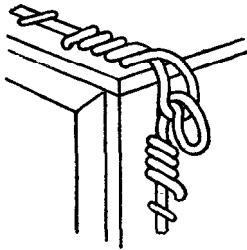


FIG. 4 STYLE C

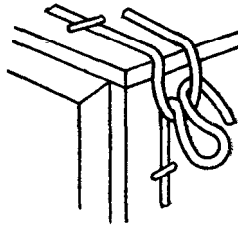


FIG. 5 STYLE D

5. CONSTRUCTION

5.1 Planks — The planks used shall conform to IS : 6662-1972* and the thickness shall be as given in Table 1, depending on the load type (see Appendix A).

5.1.1 The width of the plank shall be not less than 80 mm.

5.1.2 The adjacent edge of the plank shall be cut true and, at the time of manufacture, shall be in close contact.

5.2 Cleats — Only timbers of Groups I and II of IS : 6662-1972* shall be used for making cleats.

*Specification for timber species suitable for wooden packaging.

TABLE 1 MINIMUM THICKNESS OF PLANKS

(Clause 5.1)

MASS OF CONTENTS	GROUP I WOOD			GROUP II WOOD			GROUP III WOOD		
	Easy Load	Average Load	Difficult Load	Easy Load	Average Load	Difficult Load	Easy Load	Average Load	Difficult Load
1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
kg	mm	mm	mm	mm	mm	mm	mm	mm	mm
Up to 35	3.5	3.5	4.0	3.5	4.0	5.0	5.0	6.5	8.0
Above 35 up to 55	3.5	4.0	5.0	4.0	5.0	5.0	6.5	8.0	9.5
.. 55 .. , 80	4.0	5.0	5.0	5.0	5.0	6.5	8.0	9.5	11.0
.. 80 .. , 100	5.0	5.0	6.5	5.0	5.0	6.5	9.5	11.0	—
.. 100 .. , 150	5.0	6.5	8.0	6.5	6.5	8.0	—	—	—
.. 150 .. , 250	6.5	6.5	8.0	8.0	8.0	9.5	—	—	—

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5.2.1 *Size of Cleats*

5.2.1.1 *Edge cleats* — The edge cleats for all types of boxes shall have the following dimensions:

<i>Load</i>	<i>Width × Thickness (Min)</i>
kg	mm
Up to 40	20 × 20
Above 40 up to 150	20 × 22
Above 150 up to 250	30 × 30

5.2.1.2 *Intermediate cleats* — Boxes for Types II and III loads having cleat-spacing greater than given in Table 2 shall be reinforced with one or more rows of intermediate cleats. The size of intermediate cleats may be chosen depending upon the design of the box.

5.2.2 *Cleat Spacing* — The maximum distance between adjacent rows of cleats shall be as given in Table 2.

5.2.3 The ends of the cleats shall be mitred, mortised and tenoned or stepped.

5.3 **Wires** — Each girth wire shall be continuous around the girth of the box. As far as practicable all girth wires shall be uniformly spaced except that when rows of intermediate cleats are used, a girth wire shall be placed over each row of cleats.

5.3.1 The wires shall be stapled to the outside face of the end but may be stapled to the inside face if it is more practicable.

5.3.2 The number and the diameter of wires used shall conform to Table 3.

5.3.3 Each end of the girth wire shall be fastened in a way depending upon the style of box used.

5.4 **Ends of Boxes** — The ends are composed of end boards to which liners, battens or both may be attached.

5.4.1 *Styles A, B and C Boxes* — These types of boxes are made with plain ends or battened ends. The battens are used as reinforcement of the end and may be applied in many different ways as given in Fig. 6. Plain ends (without battens) shall be used only when made of plywood. If rotary cut or resawn lumber is used, liners are stapled to the inner face at the edges of the end boards with the grain of the liner perpendicular to the grain of the end boards. Figure 7 shows three types of liner ends.

TABLE 2 MAXIMUM DISTANCE BETWEEN ADJACENT ROWS OF CLEATS

(Clauses 5.2.1.2 and 5.2.2)

THICKNESS OF PLANK	TYPE II LOAD			TYPE III LOAD		
	Group I Wood	Group II Wood	Group III Wood	Group I Wood	Group II Wood	Group III Wood
(1)	(2)	(3)	(4)	(5)	(6)	(7)
mm	mm	mm	mm	mm	mm	mm
3.5	800	—	—	—	—	—
4.0	900	800	—	600	—	—
5.0	1 000	900	—	700	600	—
6.5	1 100	1 000	—	800	700	—
8.0	1 200	1 200	800	900	800	—
9.5	1 200	1 200	900	1 000	900	600
11.0	1 200	1 200	1 000	1 000	1 000	700

TABLE 3 MINIMUM NUMBER AND DIAMETER OF GIRTH WIRES

(Clause 5.3.2)

MASS OF CONTENTS	INSIDE LENGTH OF BOX IN mm											
	Up to 200		Above 200 Up to 400		Above 400 Up to 575		Above 575 Up to 750		Above 750 Up to 900		Above 900 Up to 1 050	
	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size	No.	Size
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Up to 35	2	1·8	3	1·8	4	1·8	5	1·8	6	1·8	7	1·8
Above 35 up to 55	2	2·24	3	2·24	4	2·0	5	1·8	6	1·8	7	1·8
„ 55 „ „ 80	—	—	4	2·24	5	2·24	5	2·24	6	2·24	7	2·24
„ 80 „ „ 100	—	—	4	2·5	4	2·5	5	2·5	6	2·24	7	2·24
„ 100 „ „ 150	—	—	4	2·5	5	2·5	5	2·5	6	2·5	7	2·5
„ 150 „ „ 250	—	—	4	2·5	6	2·5	6	2·5	6	2·5	7	2·5

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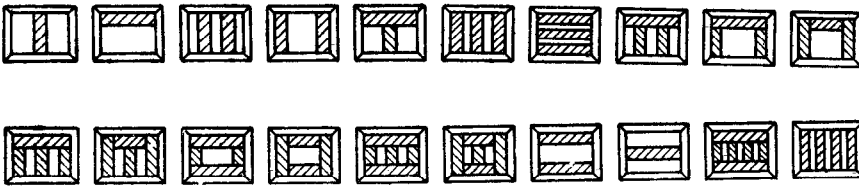


FIG. 6 TYPICAL BATTERED ENDS FOR STYLES A, B AND C
WIREBOUND BOXES

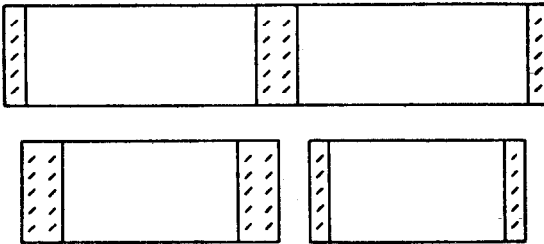


FIG. 7 TYPICAL LINED ENDS FOR STYLES A, B AND C
WIREBOUND BOXES

5.4.2 Style D Boxes — Liners or battens or both may be used. All wires shall be stapled to the unreinforced area of the end boards. Typical ends are shown in Fig. 8.

5.5 Battens — The battens shall be attached to the outside face of the end boards and may be positioned in horizontal, vertical or horizontal and vertical positions.

5.5.1 Battens shall be not less than 35 mm in width. Battens shall have the same thickness as the cleats on the boxes.

5.6 Liners — The grain of liner shall be at right angles to the grain of end boards. Liners may be stapled to either the outside or inside face of the end board.

5.6.1 The liners shall have a width not less than 30 mm. The thickness of the liner shall be not less than the thickness of the end board except that the thickness of the liner shall be not more than 6 mm.

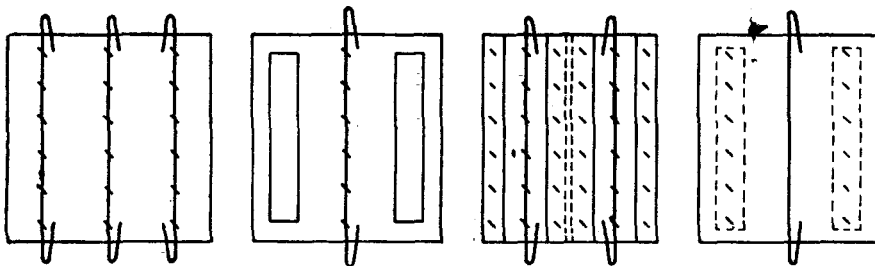


FIG. 8 TYPICAL LINERED AND BATTENED ENDS FOR STYLE D WIREBOUND BOXES

5.6.2 Each edge and intermediate liner shall be fastened to the end board by staples. Liners less than 30 mm wide shall have different row of staples and those above shall have tow rows of staples.

5.7 Staples — Staples used on the end binding wires shall be driven home astride the wires through the boards and into the cleats and shall be anchored in the cleats.

5.7.1 Staples used in intermediate wires shall be driven astride the wires through the boards and shall be firmly clinched.

6. WORKMANSHIP AND FINISH

6.1 The boards, battens, liners, etc, shall be of even thickness, rectangular section, trimmed square at the end, and reasonably smooth.

6.2 The nails shall be well clinched and the clinching shall be along the grain of the timber.

7. PRESERVATIVE TREATMENT

7.1 Mats and ends shall be given a preservative treatment as necessary and as agreed to between the purchaser and the manufacturer. The treatment shall in general conform to IS : 401-1967*.

8. DELIVERY

8.1 Unless otherwise specified by the purchaser the boxes shall be delivered in the form of shooks. They shall be tied in reasonable bundles capable of being handled by one man.

*Code of practice for preservation of timber (*second revision*).

9. MARKING

9.1 Unless otherwise specified, each assembled case or a bundle of mats and ends shall be legibly and indelibly marked or stapled with the following information:

- a) Manufacturer's name or initials or trade-mark, if any;
- b) Year of manufacture; and
- c) The number and size.

A P P E N D I X A

(Clause 5.1)

TYPES OF LOADS

A-1. FACTORS

A-1.1 The prime factor influencing proper wooden container design is the physical attributes of the load. This includes the weight, size, fragility, shape and capacity for supporting the container. For the purpose of classifying the contents which may be packed in the wooden container, three types of load categories have been defined. These are 'easy load', 'average load' and 'difficult load'.

A-2. EASY LOAD

A-2.1 Easy load consists of contents having low or moderate density and filling the inside of the container completely. The contents also consist of articles of sufficient strength to withstand the forces encountered in handling and transportation, and are of such shape as to fully contact all faces of the shipping container. Such items as boxed articles, chests or kits of tools, and wooden cabinets are examples of this type of load.

A-3. AVERAGE LOAD

A-3.1 Average load consists of items which are moderately dense and which require a reasonable amount of protection. Items of this type may either be packed directly into the outer container or in an intermediate package which aids in supporting the faces of the outer container. The items themselves or their packages shall provide a moderate amount of support for all faces of the shipping container in order to be classified as an average load. In this group fall items in metal cans, bottles individually cushioned, hardware and numerous other items which are first packed in individual cartons.

A-4. DIFFICULT LOAD

A-4.1 Difficult load consists of items which are highly concentrated or require a high degree of protection. Items in this category furnish no support to the faces of the packing box but rather, in many instances, tend to apply concentrated forces to the container's surfaces. Bolts, nuts and other dense items which are free to shift or flow, as well as delicate instruments, machined parts, valves and fittings, machine assemblies and accessories which have to be held in place by bracing and bolting heavy wrenches which exert highly concentrated forces on two opposite faces of the packing box and others which do not completely fill the packing box fall into this class.