INTERNATIONAL STANDARD

ISO 18334

Second edition
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Pallets for materials handling — Quality of assembly of new wooden pallets

Palettes pour la manutention et le transport des marchandises — Qualité d'assemblage des palettes neuves en bois

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18334 was prepared by Technical Committee ISO/TC 51, *Pallets for unit load method of materials handling*.

This second edition cancels and replaces the first edition (ISO 18334:2003), which has been technically revised to include reference to ISPM 15 and other national or international phytosanitation regulations and, in 6.1.1, to make the tolerances less restrictive for manual unit-load materials-handling systems.

Introduction

Efficient international transportation of products depends on both pallet strength and functionality, or fit, to the materials-handling systems. Existing International Standards address issues of strength and some issues regarding functionality of pallets. However, major issues related to minimum material quality and manufacturing and repair workmanship are not addressed in current International Standards. These factors can significantly impact the efficiency of international unit-load materials-handling practices.

The purpose of this International Standard is to establish internationally recognized minimum acceptable quality levels for the assembly of new wood pallets. This includes recommended criteria for pallet component placement accuracy, fastening schedules and fastener placement accuracy.

There are three other related International Standards:

— ISO 15629, *Pallets for materials handling — Quality of fasteners for assembly of new and repair of used, flat, wooden pallets*

— ISO 18333, *Pallets for materials handling — Quality of new wooden components for flat pallets*

— ISO 18613, *Repair of wooden flat pallets*

Pallets for materials handling — Quality of assembly of new wooden pallets

1 Scope

This International Standard gives guidance on the minimum quality criteria concerning the assembly of new wooden pallets. This includes component placement accuracy, fastening schedules and fastener placement, the clinching of fasteners, and guidelines for the placement of components, the characteristics of which impact pallet performance.

NOTE Attention is drawn to the document ISPM 15 and other relevant national and international phytosanitation regulations.

This International Standard does not address safety problems, if any, associated with pallet assembly.

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.

ISO 445, *Pallets for materials handling — Vocabulary*

ISO 18333, *Pallets for materials handling — Quality of new wooden components for flat pallets*

EN 844-3, *Round and sawn timber — Terminology — Part 3: General terms relating to sawn timber*

EN 844-9, *Round and sawn timber — Terminology — Part 9: Terms relating to features of sawn timber*

EN 844-12, *Round and sawn timber — Terminology — Part 12: Additional terms and general index*

3 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in ISO 445, ISO 18333, EN 844-3, EN 844-9 and EN 844-12 apply.

4 General requirement

The provisions in Clauses 5 and 6 regarding the quality of materials and construction shall be taken into consideration in the design of pallets.

5 Manufacture

5.1 Sound or intergrown knots

Fasteners may be driven through sound knots.

5.2 Unsound knots and holes

Fasteners should be compensated when associated with unsound knots or holes. Unsound knots or holes should neither be present on the outer edge of end boards nor on the exposed ends of stringers or blocks.

5.3 Wane

Wane may occur on any component within the limits specified in ISO 18333 provided it is not located on the outer edge of lead deckboards or on the exposed sides of stringers or blocks. Wane may appear on the surface or edge of other components. Not more than one-third (33 %) of the components in a pallet should contain wane. Any fastener associated with maximum wane should be compensated by using an additional fastener driven flush.

5.4 Splits and shakes

A fastener should be placed on both sides of splits and shakes that extend the full thickness of top and bottom end deckboards and butted bottom deckboards in perimeter-based block pallets.

This is not applicable to nail splits.

5.5 Resin pockets

Resin pockets should not appear on the outside surfaces of pallet decks.

6 Assembly

6.1 Wooden-component placement

NOTE All tolerances allowed under 6.1 are subject to the overall pallet-size criteria given in 6.2.

6.1.1 For use in automatic materials-handling systems, all lead deckboards should be within $^{+3}_{-6}$ mm of their specified location. For manual unit-load materials-handling systems, lead deckboards should be within ± 6 mm of their specified location.

6.1.2 Other wooden components should be within ± 6 mm of their specified location except that bottom boards should not extend into the stringer notch.

6.1.3 Unless otherwise specified, lead deckboards and ends of deckboards should be flush with the stringer.

Maximum placement deviation should be limited to one-third of the components in any pallet. All similar components should be placed parallel unless otherwise specified.

6.2 Pallet-size deviation

Pallet-size deviation should be limited as described in ISO 6780.

The pallets should be flat on their top and bottom surfaces with a maximum deviation of 6 mm from the corner-to-corner straight line.

6.3 Squareness

Squareness should be as described in ISO 6780.

6.4 Fastenings (mechanical fasteners)

6.4.1 Fastening schedules

6.4.1.1 Nails and staples

For nails and staples, the minimum recommended number of driven fasteners per pallet component is given in Table 1.

Table 1 — Minimum number of driven fasteners

Element	Width mm	Minimum number[a] of fasteners per connection
Deckboard	⩽ 130	2
	131 to 175	3
	176 to 200	4
Corner block	—	3[b]
Interior block	—	2

[a] No fewer than one nail or staple per 5 000 mm^2 of block-fastening surface is recommended.

[b] Corner blocks with less than 10 000 mm^2 of block-fastening surface should be connected with at least two fasteners.

6.4.1.2 Bolts, wood screws and lag bolts

When bolts, wood screws or lag bolts are used, at least two per corner connections and at least one at all other connections are recommended. It is recommended that bolts be retightened at the time the connected components reach equilibrium moisture content during the use of the pallet.

6.4.2 Fastener placement

Fasteners should be placed in such a way as to minimize splitting of the connected components. Fasteners should be no closer than 25 mm from the edge of deckboards and a spacing of 25 mm is recommended. The distance between the nail and the end of the deckboard should not be less than 25 mm; see Figure 1 a).

For stringer-type pallets, the distance between the fastener and the periphery of the deckboard should be not less than five times the diameter of the nail shank and the distance between fasteners should be not less than 10 times the diameter of the nail shank; see Figure 1 b).

Staple crowns should not be parallel to the grain of the deck components. A combination of the various fastener types in a single connection should be avoided if they do not interact effectively, that is contribute simultaneously to the stiffness and strength, or both, of the connection. For example, bolts in oversized holes and driven fasteners represent a poor combination and cannot be expected to work in unison. They should not be placed in the same connection or different connections of an assembly.

6.4.3 Clinching points of driven fasteners

Clinched fasteners should be at least 6 mm longer than the sum of the thicknesses of the components being fastened and driven in such a manner as to prevent buckling of the fastener under the crown or head.

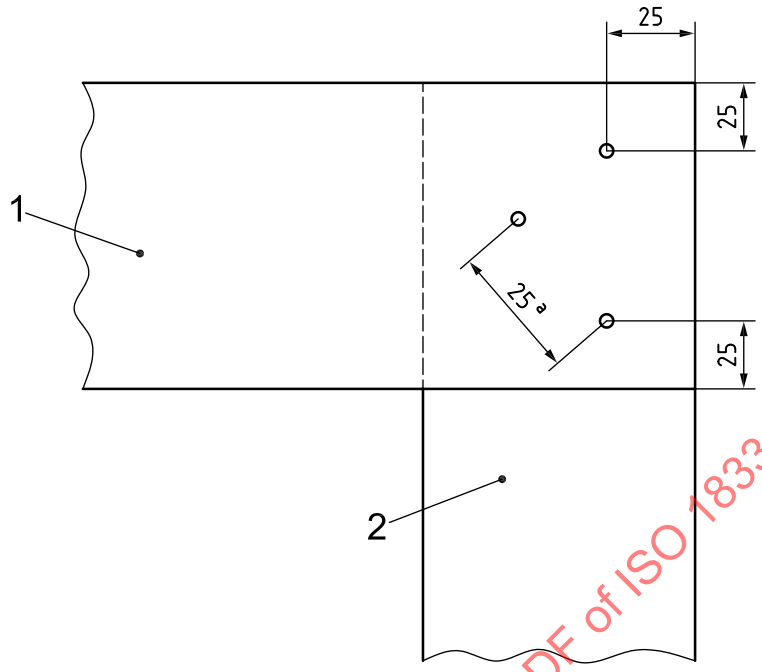
6.4.4 Fastener-caused splits

Open splits with visible fastener shanks or legs should be limited. Not more than one open split with a visible fastener shank or leg per connection should occur and not more than one-third of the components per pallet should contain open splits with visible fastener shanks or legs at the completion of manufacture.

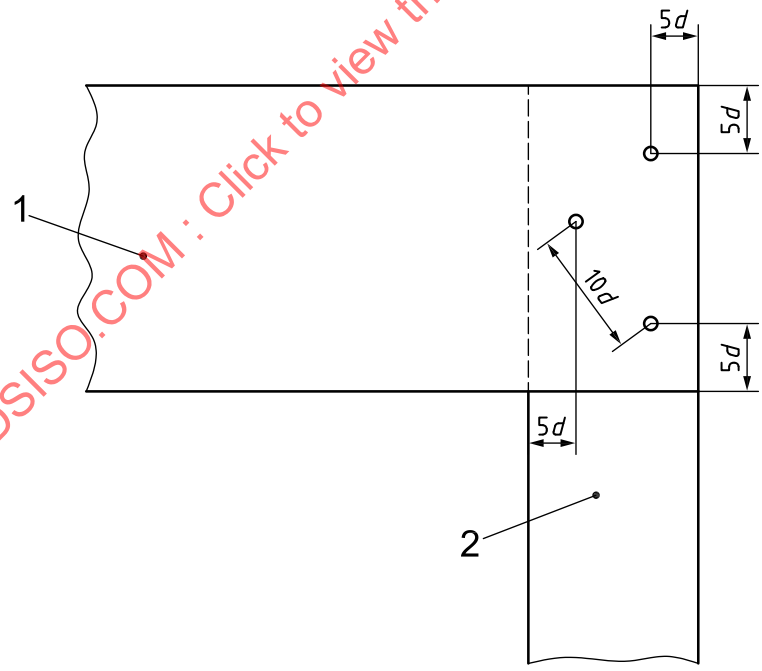
6.4.5 Protruding fasteners

Nail heads, staple crowns, bolt heads, nuts, and screw heads should be flush or below deck surfaces. Countersinking fastener heads and protruding fastener points should not significantly affect pallet performance. There should be no protruding fastener points on the exposed face of outside stringers or blocks or in lead deckboard areas. Provided they do not significantly affect pallet performance, a maximum of 2 % of protruding fasteners (rounded to the nearest whole number) may occur on unexposed surfaces. Fastener points should not protrude when using non-clinched fasteners to attach deckboards to stringerboards in block class pallets.

Dimensions in millimetres



a) Example of nail spacing for block-type pallets



Key

1 deckboard
2 stringer
d nail wire diameter

a Recommended minimum spacing.

b) Example of nail spacing for stringer-type pallets

Figure 1 — Diagram of fastener placement