INTERNATIONAL STANDARD

ISO 18334

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

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

Reference number
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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

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

Introduction

Efficient international transportation of products depends on both pallet strength and functionality, or fit, to the material handling systems. Existing International Standards address issues of strength and some issues regarding functionality of pallets. However, major issues related to the minimum material quality and manufacturing and repair workmanship are not addressed in current International Standards. These factors may significantly impact the efficiency of international unit load material 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 will include recommended criteria for pallet component placement accuracy, fastening schedules, and fastener placement accuracy.

There are four related International Standards:

— ISO 15629,

— ISO 18333,

— ISO 18334,

— ISO 18613.

Pallets for materials handling — Quality of assembly of new, wooden, flat 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, fastener schedules and fastener placement, the clinching of fasteners, and guidelines for the placement of component characteristics which limit their affect on pallet performance.

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

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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 Manufacture

4.1 Sound or intergrown knots

Fasteners may be driven through sound knots.

4.2 Unsound knots and holes

Fasteners should be compensated when associated with unsound knots or holes. Unsound knots or holes should not be permitted in the outer edge of end boards, nor on the exposed ends of stringers or blocks.

4.3 Wane (without bark)

Wane, without bark, is permitted 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 using an additional fastener and driven flush.

4.4 Splits and shakes

A fastener should be placed on both sides of splits and shakes which extend the full thickness of the top and bottom end deckboards and butted bottom deckboards in perimeter-based block pallets (not applicable to nail splits).

4.5 Resin pockets

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

5 Assembly

5.1 Wooden-component placement

5.1.1 All lead deckboards should be within $\left(^{+3}_{-6}\right)$ mm of their specified location.

5.1.2 Other wooden components should be within $\pm$ 6 mm of their specified location, except that bottom boards should not extend into the stringer notch.

5.1.3 Unless otherwise specified, lead deckboards and ends of deckboards should be flush with the stringer. All allowable deviations under 5.1 are limited by the overall pallet-size criteria in 5.2.

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.

5.2 Pallet-size deviation

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

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

5.3 Squareness

Squareness should be as specified in ISO 6780.

5.4 Fastenings (mechanical fasteners)

5.4.1 Fastening schedules

5.4.1.1 Nails and staples

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

Table 1 — Minimum number of driven fasteners

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

[a] Not less 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 (2) fasteners.

5.4.1.2 Bolts, wood screws and lag bolts

When bolts, wood screws or lag bolts are used, at least two per corner connection 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 (EMC) during the use of the pallet.

5.4.2 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 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, simultaneously contribute 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.

5.4.3 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.

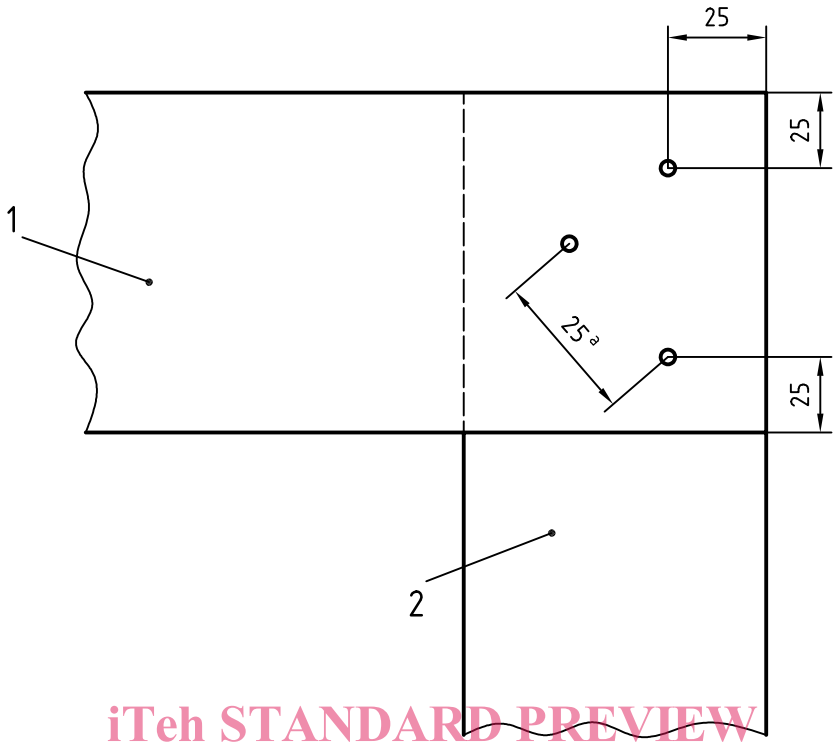
5.4.4 Fastener-caused splits

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 be permitted, 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.

5.4.5 Protruding fasteners

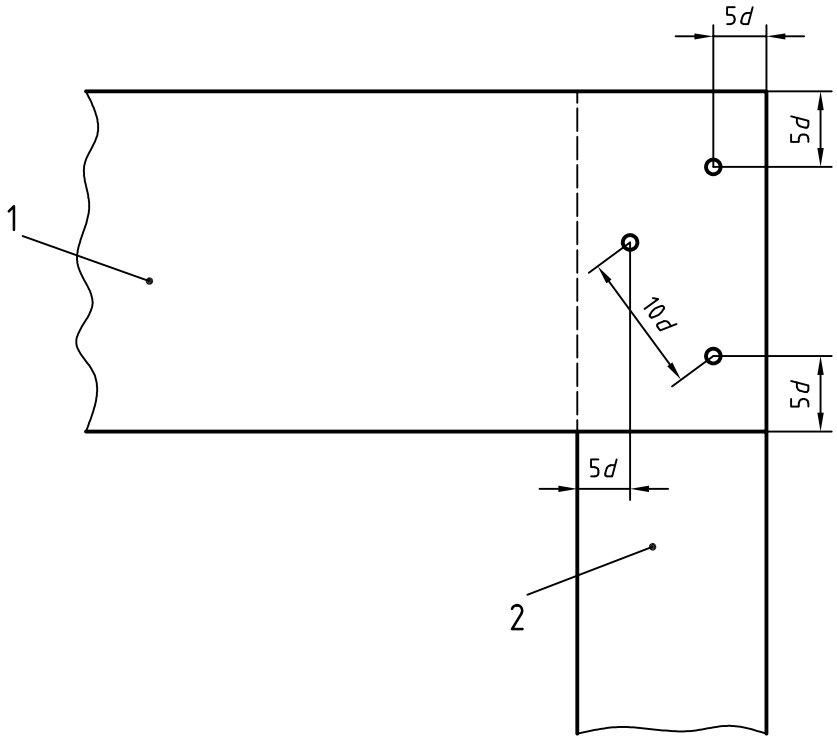
Nail heads, staple crowns, bolt heads, nuts and screw heads should be flush or below the deck surfaces. Countersinking fastener heads and protruding fastener points should not significantly affect pallet performance. No protruding fastener points should be permitted on the exposed face of outside stringers or blocks or in lead deckboard areas. Provided they do not significantly affect pallet performance, 2 % of protruding fasteners (rounded to the nearest whole number) on unexposed surfaces are permitted. 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

Figure 1 — Fastener placement



b) Example of nail spacing for stringer-type pallets

Key

1 Deckboard

2 Stringer

d is the nail wire diameter

[a] Recommended minimum spacing.

Figure 1 — Fastener placement (*continued*)