
Pallets for materials handling — Repair of flat wooden pallets

*Palettes pour la manutention et le transport des marchandises —
Réparation des palettes plates en bois*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information \(standards.iteh.ai\)](http://Foreword - Supplementary information (standards.iteh.ai))

The committee responsible for this document is ISO/TC 51, *Pallets for unit load method of materials handling*.

This second edition cancels and replaces the first edition (ISO 18613:2003), which has been technically revised.

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Introduction

Mandatory requirements for recycling of packaging materials has led to an expansion of reuse, repair and recycling of wooden pallets. This International Standard is intended to assist this process, in that, through its implementation, the safety and longevity of repaired pallets will be maximised. This International Standard also refers particularly to new pallet standards and prescriptive pallet specifications in wide use.

There is no requirement in this International Standard for pallet repairers to undertake tests, since, if guidance given in this International Standard is followed and systematic repair and inspection systems are used, then a successful repair is assumed to follow.

There are four 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 18334, *Pallets for materials handling — Quality of assembly of new wooden pallets*
- ISO 18613, *Pallets for materials handling — Repair of flat wooden pallets*

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Pallets for materials handling — Repair of flat wooden pallets

1 Scope

This International Standard specifies the maximum defects and damage allowed before a flat wooden pallet shall be repaired, and defines the minimum repair criteria that shall be used.

This International Standard is applicable to wooden flat pallets repaired with wood based components.

NOTE The maximum allowed defects and damage for pallets are described in this International Standard and the [Annexes A to D](#) show examples of defects and damage which make the widely used pallets unacceptable for use. For other pallet types similar criteria should be set up. The repair criteria for pool and rental pallets are controlled by their respective controlling operators/owners, and may be subject to a licence.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 15629, *Pallets for materials handling — Quality of fasteners for assembly of new and repair of used, flat, wooden pallets*

EN 1087-1:1994, *Particleboards — Determination of moisture resistance — Boil test*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 445 (some of which are repeated below for convenience) and the following apply.

3.1

board

top deck board, bottom deck board, or stringer board

3.2

deckboard

individual member of a top or bottom deck

3.3

bottom deck board

individual member of bottom deck

3.4

stringerboard

horizontal member linking the blocks and deckboards

3.5

stringer or bearer

continuous longitudinal member underneath the top deck or between the top and bottom decks, which provides space for the entry of fork-lift forks and pallet-truck fingers

4 Defects and damage criteria

4.1 Overriding criterion

The overriding criterion for an unacceptable pallet is if its condition is such that it cannot be regarded as safe and that handling the pallet might be dangerous for persons or goods (as illustrated in [Annexes A to D](#)).

4.2 Nail joint strength

Nail joint strength is particularly important for the performance of pallets.

4.3 Inspection

Inspection of a pallet shall take place before any handling, whether loaded or empty.

4.4 General conditions identifying an unacceptable pallet

The general conditions which make a pallet unacceptable for use are as follows.

- a) One deckboard missing or broken, either obliquely or across.
- b) Either one block, stringer (bearer) or stringerboard missing or broken.
- c) Missing wood on deckboards to such an extent that on one deckboard, two or more nail shanks are visible, or on more than two deckboards, one or more nail shanks are visible, or missing wood of more than 1/4 of the width of the board for 1/4 length. Missing wood on a deckboard between the blocks of more than 1/4 of the width of the deckboard.
- d) Splits on deckboards of more than 1/2 of the width or the length of the deckboard, which cannot be securely nailed.
- e) Wings on pallets may only have missing wood from inner deckboard ends for a maximum of 1/3 of projecting wing length.
- f) Missing wood on blocks, stringers (bearers) or stringerboards, if more than one nail shank is visible at any one joint.
- g) Depending on use, dirty or contaminated pallet. If any doubt exists as to the nature of the contamination, care shall be taken in its identification and subsequent disposal.
- h) Older pallets with a combination of minor damage or loose joints and with a poor appearance may have a combination of issues and be unacceptable when viewed as a whole.
- i) Pallets with bad workmanship. Pallets with materials or components that have been previously incorrectly applied.
- j) Components affected by decay which could affect their mechanical properties.
- k) Full width splits of any length in stringer (bearer) notches.

NOTE Attention is also drawn to publication UIC-Leaflet 435-4 (2010) 'Repair of EUR flat pallets and EUR box pallets'.

5 Repair

5.1 General

Components with unacceptable defects or damage shall be removed and replaced by new or re-used components of one piece.

5.1.1 Blocks of particleboard

If blocks of particleboard are used they shall conform to EN 1087-1. The density of the particle board shall be more than 580 kg per cubic metre.

5.1.2 Bottom deckboards

Bottom deckboards and the corners of the pallet shall be chamfered, if required.

5.1.3 Nail heads

Nail heads shall be countersunk so that the top of the head of the nail cannot be snagged above the surface.

5.2 Repair of pallets of known specification

Replacement components shall be from new or re-used materials. They shall be in accordance with the relevant specifications of the pallet and its repair requirements in the relevant standards. Re-used components shall conform to all the requirements of the new pallet component specifications. No missing wood or splits are allowed in these re-used components. The nails used and the final assembled pallet shall meet the requirements of the specifications for that pallet.

NOTE Repair requirements may differ from the new pallet specification. Details as agreed by contract.

Pallets which are unacceptable for use, shall be repaired or disposed of, and marking requirements met as defined in [5.4](#).

5.3 Repair of pallets of unknown specification

If the specification is not known or no specification exists, the replacement components shall have the same dimensions and quality as the removed components. Replacement components may be from new or re-used materials. Components shall meet the conditions given in [5.3.3](#). Too many nail holes may weaken the component.

5.3.1 Dimensional tolerances

The general maximum permitted tolerances from basic dimensions for pallets of unknown specifications shall be as in [Table 1](#).

Table 1 — General maximum permitted tolerances from basic dimensions for pallets of unknown specifications

Component	Tolerance
Length	+ 8 / – 8 mm
Width	+ 8 / – 8 mm
Overall height	+ 10/ – 10 mm
Diagonal difference	+ 10/ – 10 mm
Flatness	Within 10 mm
Block twist	No overhang
Top gaps	Max 65 mm
Lead board position from edge	+ 0 / – 5 mm
Inner deckboard position from centre line	+ 2,5 / – 2,5 mm
Stringerboard position from centre line	+ 2,5 / – 2,5 mm
Stringer (bearer) position from centre line	+ 5 / – 5 mm
Butted joints	Max 5 mm
Nail counter-sinking from the surface	– 1 / – 5 mm
NOTE The pallets should be flat on their top and bottom surfaces to within 6 mm maximum deviation from the corner-to-corner straight line. Other accuracy requirements may be specified. Annex G shows one example of high accuracy requirements.	

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5.3.2 Assembly

5.3.2.1 General

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For assembly, the following fasteners having the physical characteristics described in ISO 15629, Annex A shall be used. The specification of the nails shall meet the requirements of the pallets concerned.

5.3.2.2 Boards - blocks or stringers (bearers)

Twisted square wire, helically threaded, annular threaded nail (the length of the nail depends on the depth of the assembly). The nail penetration shall be at least 35 mm into the block or stringer (bearer).

5.3.2.3 Deckboards - stringerboards

Twisted square wire, helically threaded, annular threaded nail (the length of the nail depends on the combined thickness of the stringerboards and deckboards). If the nail is not clinched, the nail shall not penetrate the underside of the stringer board. If the nail is clinched the clinch shall be 10 mm. Plain nails may also be used if the nail is clinched.

5.3.2.4 Positioning and number of nails used in assembly

The number of nails per joint and the correct positioning shall repeat the pattern of the original pallet. Nails shall be positioned no closer than 15 mm from either the end or the edge of a board.

5.3.2.5 Repair of notched stringers (bearers)

Full width splits in notched stringers (bearers) of partial four-way pallets shall be repaired using metal plates according to [Annex E](#).

5.3.3 Components

Components shall have maximum tolerances as shown on [Table 2](#).

Table 2 — Maximum tolerances for components

Component	Maximum tolerance
Thickness of stringerboards and deckboards	+ 2 / - 2 mm
Width of deckboards	+ 10 / - 10 mm
Length of stringerboards and deckboards	+ 5 / - 10 mm
Height of blocks or stringers (bearers)	+ 2 / - 2 mm
Length or width of blocks or stringers (bearers)	+ 5 / - 5 mm

5.4 Marking

The marking of repaired pallets shall be as defined by the competent authority and may be identified for example, by a pool mark or identification nail (or fastener).

Reference should be made to ISPM 15 for phytosanitary marking.

5.5 Final inspection of repaired pallets

The overall size accuracy of the pallet and the minimum dimensions of the openings shall be met and all joints shall be fixed with the relevant number of nails. The repaired pallets are required to conform to the physical requirements of the intended use. The inspection of pallets of known specification is controlled by the competent authority.

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6 Recycling - disposal (standards.iteh.ai)

Pallets which cannot be repaired for reuse in line with these specifications shall be discarded.

NOTE 1 After removing the markings, some pallets may be used as limited use pallets.

NOTE 2 Components of good condition can be used as replacement components.

NOTE 3 Other methods for disposal include grinding, composting and burning.