BRITISH STANDARD

BS EN 13698-2:2009

Pallet production specification

Part 2: Construction specification for 1000 mm x 1200 mm flat wooden pallets

ICS 55.180.20

BSI British Standards

National foreword

This British Standard is the UK implementation of EN 13698-2:2009. It supersedes BS EN 13698-2:2003 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PKW/0/-/11, Wood.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2009

ISBN 978 0 580 59693 3

Amendments/corrigenda issued since publication

Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 13698-2

June 2009

ICS 55.180.20

Supersedes EN 13698-2:2003

English Version

Pallet production specification - Part 2: Construction specification for 1000 mm x 1200 mm flat wooden pallets

Spécification de produit pour les palettes - Partie 2 : Spécification de fabrication des palettes plates en bois, de dimensions 1000 mm x 1200 mm

Produktspezifikation für Paletten - Teil 2: Herstellung von 1 000 mm x 1 200 mm-Flachpaletten aus Holz

This European Standard was approved by CEN on 27 May 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword

This document (EN 13698-2:2009) has been prepared by Technical Committee CEN/TC 261 “Packaging”, the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2009, and conflicting national standards shall be withdrawn at the latest by December 2009.

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

This document supersedes EN 13698-2:2003.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Tests on the perimeter base pallet and over 30 years of experience with the skid pallet in through transit of goods, have demonstrated that these designs of pallet comply with the relevant dimensional requirements and appropriate tests specified in certain standards. This certifies that the quality of the pallet is suitable for normal purposes as regards the physical stresses involved in distribution and handling.

1 Scope

This European Standard specifies the manufacturing characteristics of flat re-usable wooden 1000 mm × 1200 mm, double deck, non-reversible, 4-way entry, 9 block skid and perimeter base pallets suitable for transport, storage, handling or exchange use. It also gives some requirements for manufacture and marking and addresses the issue of safety.

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.

EN 717-1, *Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method*

EN 1087-1, *Particleboards – Determination of moisture resistance – Part 1: Boil test*

EN 1310:1997, *Round and sawn timber – Method of measurement of features*

EN 12246:1999, *Quality classification of timber used in pallets and packaging*

EN 13183-1, *Moisture content of a piece of sawn timber – Part 1: Determination by oven dry method*

EN 13183-2, *Moisture content of a piece of sawn timber – Part 2: Estimation by electrical resistance method*

EN 13382, *Flat pallets for materials handling – Principal dimensions*

EN ISO 445:1998, *Pallets for materials handling – Vocabulary (ISO 445:1996)*

EN ISO 8611-1:2004, *Pallets for materials handling – Flat pallets – Part 1: Test methods for flat pallets (ISO 8611-1:2004)*

ISO 3133, *Wood – Determination of ultimate strength in static bending*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 445:1998 and the following apply.

3.1
stacking
placing of pallets with unit loads, one upon the other, without recourse to intermediate shelves or racking

3.2
nominal load
reference load capacity, in kilograms, assuming an uniformly distributed load

3.3
safe working load
maximum load capacity, in kilograms, in a defined loading situation

3.4
concentrated load
load concentrated over an area between 30 % and 85 % of the pallet deck

3.5
uniformly distributed load
load spread evenly across the full surface of the pallet deck

3.6
solid load
single, compact, rigid, homogeneous load, covering approximately the complete surface of the pallet

4 Pallet types

4.1 Type 1

Re-useable wooden flat pallet, double deck, non-reversible, 4-way entry, skid pallet.

4.2 Type 2

Re-useable wooden flat pallet, double deck, non-reversible, 4-way entry, perimeter base pallet.

5 Nominal and safe working loads

The nominal load of pallets conforming to this standard will be established by tests conducted under the review of EN ISO 8611. Annex E gives general information on safe working loads under different loading conditions.

6 Construction

6.1 Materials

6.1.1 Timber species

Timber species are given in Annex A.

6.1.2 Timber quality grade

The timber quality grade shall conform to A.2.

6.1.3 Moisture content

Moisture content shall be determined in accordance with EN 13183-1 or EN 13183-2.

At the time of delivery the moisture content of the component parts of the pallets shall not exceed 22 %.

The reference moisture content shall be 20 %.

NOTE Dimensions at other moisture levels may be calculated using the correction factors given in Annex B.

6.1.4 Particle board

High density, moisture resistant particle board conforming to A.3 is permitted for blocks.

6.1.5 Fasteners

Pallets shall be assembled with fasteners conforming to A.4.

6.2 Design and manufacture

6.2.1 Component parts

6.2.1.1 Type 1: Skid pallet 1000 mm × 1200 mm

Component parts of the skid pallet 1000 mm × 1200 mm shall conform to Table 1 and Figure 1.

Table 1 — Component parts for the skid pallet 1000 mm × 1200 mm

Part [a]	Component [a]	Number of components	Dimensions at 20% moisture content mm		
			Length	Width [b]	Thickness [b]
1	top deck lead board	2	1200 ± 3	$145\ ^{+7}_{-3}$	$22\ ^{+2}_{0}$
2	intermediate top deck board	4	1200 ± 3	100 ± 3	$22\ ^{+2}_{0}$
3	central top deck board	1	1200 ± 3	$145\ ^{+7}_{-3}$	$22\ ^{+2}_{0}$
4	stringer board	3	1000 ± 3	$145\ ^{+7}_{-3}$	$25\ ^{+2}_{0}$
5	bottom deck board	3	1200 ± 3	$145\ ^{+7}_{-3}$	$22\ ^{+2}_{0}$
6	block	9	$145\ ^{+7}_{-3}$	$145\ ^{+7}_{-3}$	$78\ ^{+1}_{-3}$
7	nail	27	See A.4.		
8	nail	27			
9	nail or staples	36			

[a] See Figure 1.
[b] See Annex B.

6.2.1.2 Type 2: Perimeter base pallet 1000 mm × 1200 mm

Component parts of the perimeter base pallet shall conform to Table 2 and Figure 2.

Table 2 — Component parts of perimeter base pallet 1000 mm × 1200 mm

Part [a]	Component [a]	Number of components	Dimensions at 20 % moisture content mm		
			Length	Width [b]	Thickness [b]
1	top deck lead and central top deck board	3	1200 ± 3	120 ± 3	$22\ ^{+2}_{0}$
2	Intermediate top deck board	2	1200 ± 3	120 ± 3	$22\ ^{+2}_{0}$
3	Intermediate top deck board	2	1200 ± 3	100 ± 3	$22\ ^{+2}_{0}$
4	stringer board	3	1000 ± 3	$145\ ^{+5}_{-3}$	$22\ ^{+2}_{0}$
5	bottom length deck board	3	1000 ± 3	120 ± 3	$22\ ^{+2}_{0}$
6	bottom width deck board	2	1000 ± 3	100 ± 3	$22\ ^{+2}_{0}$
7	block	9	$145\ ^{+5}_{-3}$	120 ± 3	98 ± 2
8	square twisted or annular ring rolled nail	27	See A.4.		
9	square twisted or annular ring rolled nail	39			
10	plain shank nail	36			

a See Figure 2.
b See Annex B.

6.2.2 Boards and blocks

All boards and natural timber blocks shall be of one piece.

The outer surfaces of the top and bottom decks shall be unplanned.

The wood fibres of the outer skid blocks shall be parallel to the longitudinal axis of the pallet.

Blocks shall be of natural timber or particle board (see 6.1.4).

6.2.3 Pallet assembly and fastener positions

6.2.3.1 General

All fasteners shall be driven in vertically, at a minimum of 20 mm from the edges of the boards, and, for particle board blocks, a minimum of 20 mm from the centre hole if present. Fasteners shall not be inserted parallel to the wood grain (which may split the board or block) and shall be spaced as far apart as possible. Nail heads shall not protrude above the surface of the board (this also applies after drying the pallet) or be sunk below the board surface by more than 3 mm. Fasteners shall not pierce the sides of blocks.

No splits resulting from nailing shall be visible on the blocks or boards after assembly.

6.2.3.2 Assembly deck board: block

For each block, a minimum of three nails shall be used on both the top and bottom surfaces.

The bottom deck length board of the perimeter base pallet shall be fixed to the outer blocks with two nails.

6.2.3.3 Assembly top deck board: stringer board

A minimum of three fasteners shall be used for fixing each intermediate top deck board to a stringer board.

Any fastener protruding below the stringer board shall be bent back.

NOTE A staple is considered to be a single fastener.

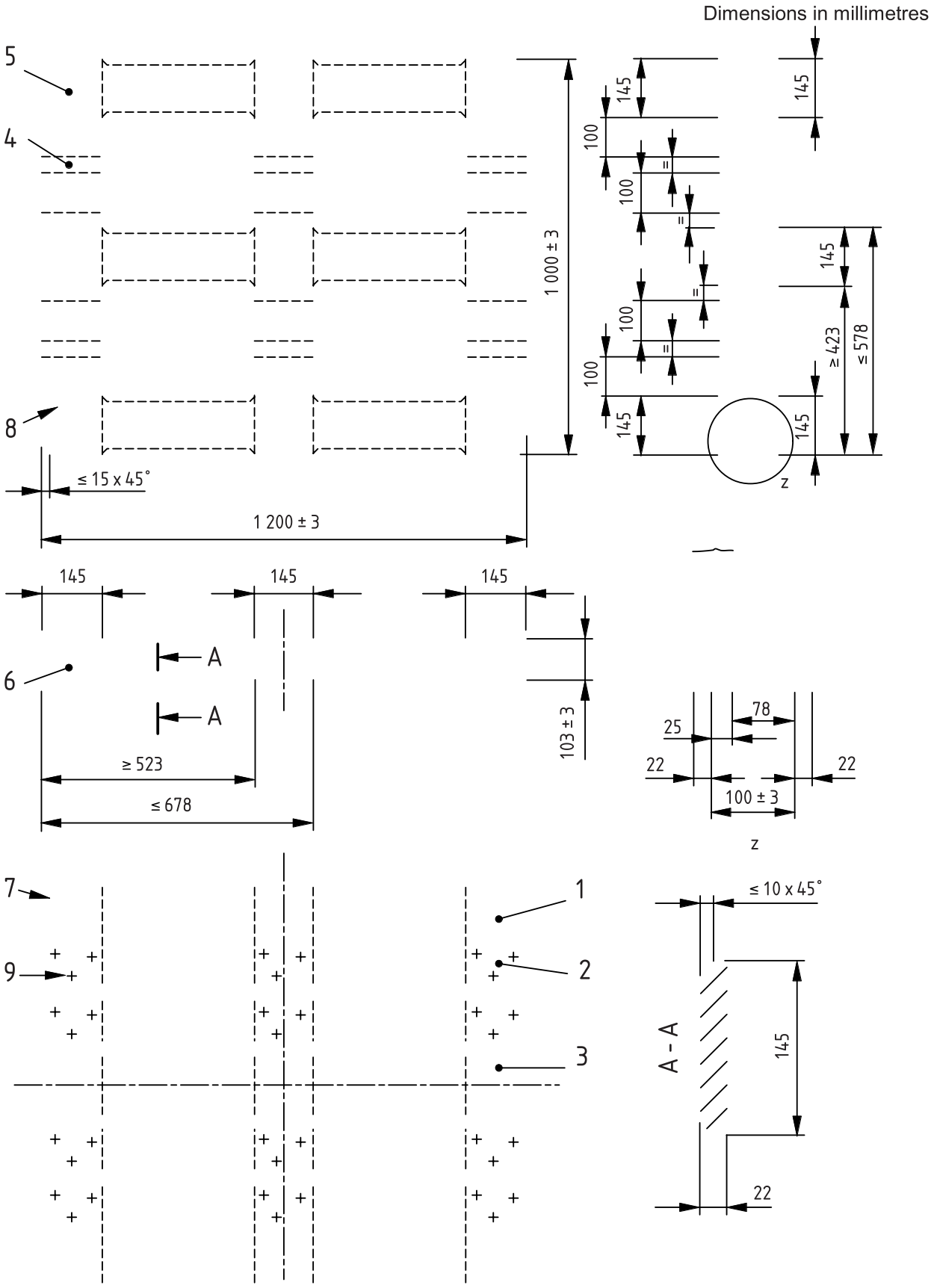
6.3 General assembly details

General assembly details of the pallets, including dimensions and tolerances, shall conform to Table 3 and to Figure 1 for skid pallet and to Figure 2 for perimeter base pallet. The chamfering of the bottom deck boards shall be on all bottom deck boards. All dimensions shall be in conformity with EN 13382.

Table 3 — General assembly – Overall tolerances in millimetres

Dimension	Tolerance
Length	1200 ± 3
Width	1000 ± 3
Height of skid pallet	$147\ ^{+7}_{0}$
Height of perimeter base pallet	$164\ ^{+8}_{-2}$

NOTE Height tolerances are the sum of the tolerances of the individual components.

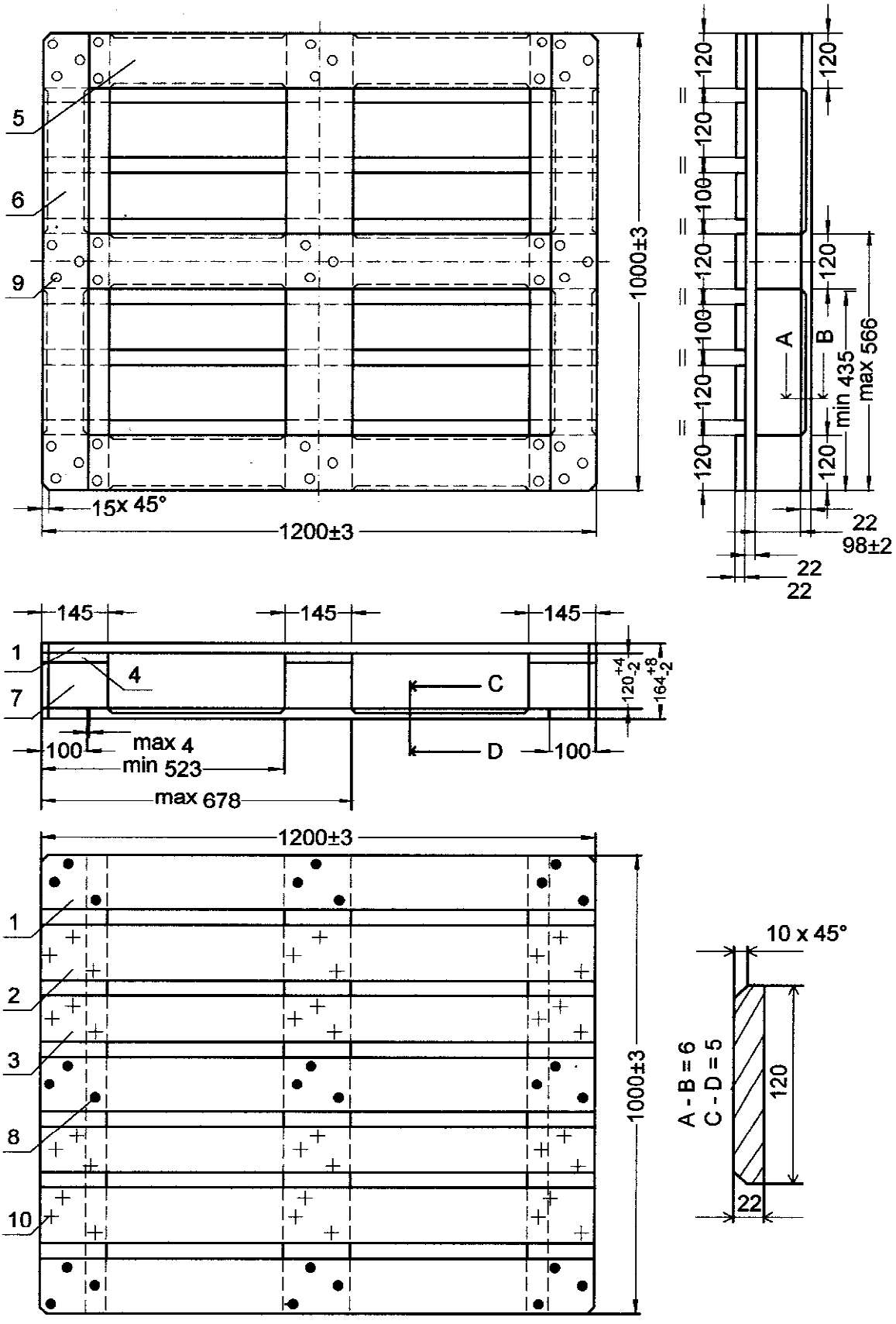


Key

See Table 1.

Figure 1 — General assembly details, skid pallet

Dimensions in millimetres



Key

See Table 2.

Figure 2 — General assembly, perimeter base pallet

6.4 Assembly strength

6.4.1 Diagonal rigidity

Test for diagonal rigidity in accordance with EN ISO 8611-1:2004 (Test No 10) on three pallets with six corner drops on each pallet (same corner throughout). The drop height shall be 1 m.

After the test, the pallets shall not be distorted by more than 3 % of the initial value (measured as the mean distortion for all three pallets).

6.4.2 Separation force

The joints of the pallet shall be tested using the joint separation test in accordance with Annex C. The arithmetic mean of the recorded separation force, and at least 75 % of all recordings, shall be equal to or higher than the following:

a) block/stringer board/top deck board: 5,5 kN;

b) block/bottom deck board: 5,5 kN;

c) stringer board/intermediate top deck board: 3,0 kN.

7 Inspections and marking

Before delivery, pallets shall be inspected for quality.

Pallets in conformity with this standard shall be marked on the outer side of the centre block with the number of this European Standard, the mark of the country and of the manufacturer.

NOTE 1 Pallets used in pooling or exchange systems may be marked in accordance with the guidelines defined at the pooling or exchange system.

NOTE 2 Pallets manufactured in conformity with this standard may be required to comply with National Authority marking requirements.

NOTE 3 Plant Health recommendations are constantly under review and pallets may need to be marked accordingly.

Annex A
(normative)

Materials

A.1 Timber

A.1.1 General

Pallets shall be constructed from the timber species listed in Table A.1 and in A.1.2.

Table A.1 — European grown wood

Softwood (conifer)	Hardwood (deciduous)
Douglas	Acacia
Pine	Alder
Fir	Ash
Larch	Beech
Spruce	Birch
	Chestnut
	Elm
	Maple
	Oak
	Plane
	Poplar

A.1.2 Other timber species

If other timber species are taken into consideration for manufacturing pallets in conformity with this standard, these species shall have an ultimate strength in static bending of at least 42 N/mm², tested on small clear samples with a moisture content of 20 %, in accordance with ISO 3133, and the pallets manufactured from these species shall be tested according to EN ISO 8611-1:2004 (bending test) before starting the production.

A.2 Timber quality grade

The quality of sawn timber for pallet components (except stringer boards) shall conform to Table A.2. The quality of sawn timber for stringer boards shall conform to Tables A.2 and A.3. Timber containing bark shall not be used.

Table A.2 — Quality of sawn timber in pallets

Criterion	Requirement (EN 12246:1999, Class P1)
Knots:	On both faces, knots shall be measured in accordance with 4.1.2 of EN 1310:1997. Knots shall be disregarded on the edges. Knots less than 10 mm shall be disregarded. Knot clusters shall be considered as individual knots.
– intergrown, partially intergrown, dead	Shall be ≤ 33 % of the width of the piece.
– loose	Shall be ≤ 20 mm.
– unsound	Shall be ≤ 20 mm.
– branched	Permitted.
Exposed pith	Permitted on one face.
Boxed heart	Permitted.
Shakes:	Shakes shall be taken into account on the ends, faces and edges. Shakes shall be measured in accordance with EN 1310.
– surface shake	Permitted except at points of nailing.
– split (in boards)	One split permitted ≤ width of the board.
– split (in bearers and blocks)	Not permitted.
Resin pocket	Permitted on one face only.
Bark pocket	Not permitted.
Blue stain [a]	
Biological degradations (except blue stain)	Not permitted.
Active insect infestation	Not permitted.
Insect holes (non active)	Up to 5 holes of diameter ≤ 3 mm permitted.
Wane (without bark)	Wane shall be measured in accordance with clause 4 of EN 1310:1997. Permitted up to ≤ 25 % of the piece length. up to 33% of the thickness and allowed both sides of one face if ≤ 10 mm from each side.
[a] See Annex D.	

Table A.3 — Quality of sawn timber for stringer boards

Criterion	Requirement
Knots– intergrown, partially intergrown, dead	≤ 25 % of piece width.
Wane	Not permitted.
Slope of grain	≤ 5 %.

A.3 Particle board

Particle board shall only be used for blocks. The material shall conform to Figure A.1 and the following:

a) depending on the manufacturing process, blocks shall be rectangular or provided with chamfered edges of 15 mm × 45° and with or without a central hole; the diameter of any hole shall not exceed 35 mm for blocks 145 mm × 120 mm or 40 mm for blocks 145 mm × 145 mm;

b) the mean weight per unit volume shall be ≥ 580 kg/m^3;

c) the moisture content shall be between 7 % and 13 %;

d) the material shall give a formaldehyde emission of < 0,1 ml per cubic metre of air, when determined in accordance with EN 717-1;

e) the efficiency of the bonding process shall be determined by the following tests:

1) size variation test, after 24 h immersion in water at 20 °C, measured on 10 test pieces:

i) the length and width shall not increase by more than 2 %;

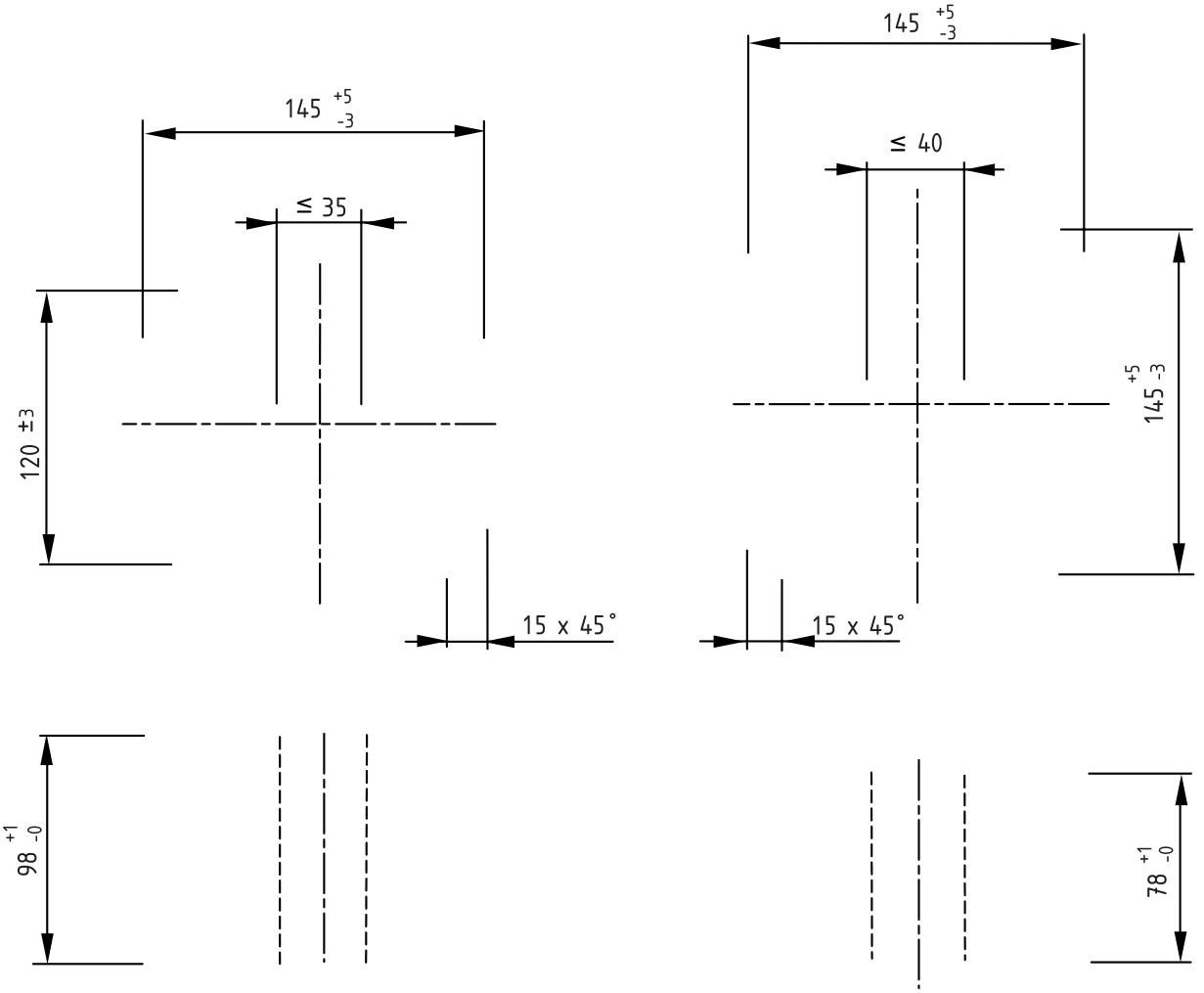
ii) the height shall not vary by more than 4,5 %, except that one of the ten blocks may vary between 4,5 % and 5,5 %;

2) tests for retention of material strength, absence of splits, loss of cohesion after test cycle, and determination of bond quality, in accordance with EN 1087-1 involving:

i) a 2-h immersion in water at 100° C under ambient pressure,

ii) 2 h in the oven at 65° C (± 3° C).

Dimensions in millimetres



NOTE The examples in this diagram are shown with both hole and chamfer. Blocks are not required to have either.

Figure A.1— Particle board blocks

A.4 Fasteners

A.4.1 Nails for block/stringer board/top deck board assemblies

Nails for block/stringer board/top deck board assemblies shall conform to Table A.4.

Table A.4— Nails for block/stringer board/top deck board assemblies

Property	Specification
Minimum length	88 mm [a]
Dimension of nail head	min 8,4 mm (diameter) or min 55 mm^2
Ratio of head diameter to shank diameter	≥ 2
Nail shank type	spiral rolled, annular ring rolled, square twisted, indented shank
Minimum tensile strength [b]	700 N/mm^2
Nail point type	Diamond or chisel point

[a] This value is valid for a standard nominal dimension of (90 ± 2) mm.

[b] See EN 10002-1.

A.4.2 Nails for block/bottom deck board assemblies

Nails for block/bottom deck board assemblies shall conform to Table A.5.

Table A.5— Fasteners for block/bottom deck board assemblies

Property	Specification
Minimum length	68 mm [a]
Dimension of nail head	min 8,4 mm (diameter) or min 55 mm^2
Ratio of nail head diameter to shank diameter	≥ 2
Nail shank type	spiral rolled, annular ring rolled, square twisted, indented shank
Minimum tensile strength [b]	650 N/mm^2
Nail point type	diamond or chisel point

[a] This value is valid for a standard nominal dimension of (70 ± 2) mm.

[b] See EN 10002-1.

A.4.3 Fasteners for stringer board/top deck board assemblies

Fasteners for stringer board/top deck board assemblies shall conform to Tables A.6, A.7 or A.8 as appropriate.

Table A.6 — Nails bent back on the lower surface of the stringer board

Property	Specification
Minimum length	50 mm [a]
Dimension of nail head	min 5,5 mm (diameter) or min 24 mm^2
Ratio of nail head diameter to shank diameter	≥ 2
Nail shank type	plain, spiral rolled, annular ring rolled, square twisted, indented shank
Minimum tensile strength [b]	800 N/mm^2
Nail point type	diamond or diamond offset
[a] This value is valid for standard nominal dimensions of (55 $^{+2}_{-5}$) mm and (60 ± 2) mm. [b] See EN 10002-1.	

Table A.7 — Nails that do not pierce the stringer board

Property	Specification
Length	min 36 mm , max 41 mm [a]
Dimension of nail head	min 5,5 mm (diameter) or min 24 mm^2
Ratio of nail head diameter to shank diameter	≥ 2
Nail shank type	spiral rolled, annular ring rolled, square twisted, indented shank
Minimum tensile strength [b]	600 N/mm2
Nail point type	diamond or chisel point
[a] This value is valid for a standard nominal dimension of (38 $^{+3}_{-2}$) mm. [b] See EN 10002-1.	

Table A.8 Staples bent back on the lower surface of the stringer board

Property	Specification
Length	min 53 mm
Width (inside)	min 14 mm
Thickness of wire	min 2,2 mm
Shank type	Plain
Tensile strength	760 N/mm^2
Point type	diamond offset

Annex B
(informative)

Wood shrinkage – Comparative wood shrinkage/expansion rates

At the saw milling stage, it is necessary to consider the machining allowances taking into account the moisture content, consequent shrinkage of the wood, and dressing, smoothing or planing operations.

Table B.1 gives comparative wood shrinkage/expansion rates, valid for all species, for determination of dimensions at alternative moisture contents to 20 %.

Table B.1 — Minimum dimensions in relation to moisture content

Moisture content	Minimum actual dimension of nominal width and thickness [a]							
	(22 $^{+2}_{0}$) mm (nominal)	(25 $^{+2}_{0}$) mm (nominal)	(78 $^{+1}_{0}$) mm (nominal)	(98 ±2) mm (nominal)	(100 ±3) mm (nominal)	(100 $^{+3}_{0}$) mm (nominal)	(120 ±3) mm (nominal)	(145 $^{+5}_{-3}$) mm (nominal)
%	mm	mm	mm	mm	mm	mm	mm	mm
30	22.5	25,5	80,0	98,5	99,5	102,5	119,5	145,5
29	22,5	25,5	80,0	98,0	99,0	102,0	119,5	145,0
28	22,5	25,5	79,5	98,0	99,0	102,0	119,0	145,0
27	22,5	25,5	79,5	97,5	98,5	101,5	119.0	144,5
26	22,5	25,5	79,0	97,5	98,5	101,5	118,5	144,0
25	22,5	25,5	79,0	97,0	98,0	101,0	118,5	144,0
24	22,0	25,0	79,0	97,0	98,0	101,0	118,0	143,5
23	22,0	25,0	78,5	96,5	97,5	100,5	118,0	143,0
22	**22,0**	**25,0**	**78,5**	**96,5**	**97,5**	**100,5**	**117,5**	**142,5**
21	22,0	25,0	78,0	96,0	97,0	100,0	117,5	142,5
20	**22,0**	**25,0**	**78,0**	**96,0**	**97,0**	**100,0**	**117.0**	**142,0**
19	22,0	25,0	78,0	96,0	97,0	100,0	116,5	141,5
18	22,0	25,0	77,5	95,5	96,5	99,5	116,5	141,5
17	22,0	25,0	77,5	95,5	96,5	99,5	116,0	141,0
16	22,0	25,0	77,0	95,0	96,0	99,0	116,0	140,5
15	21,5	24,5	77,0	95,0	96,0	99,0	115,5	140,0
14	21,5	24,5	77,0	94,5	95,5	98,5	115,0	140,0
13	21,5	24,5	76,5	94,5	95,5	98,5	115,0	139,5
12	21,5	24,5	76,5	94,0	95,0	98,0	114,5	139,0

[a] The thickness and the width of a piece of timber increase by 0,25 % for every 1 % of moisture content from 20 % up to 30 %, and decrease by 0,25 % for every 1 % of moisture content. below 20 %. The above values are typical, regardless of the species (see EN 1313-1 and EN 1313-2).

Annex C
(normative)

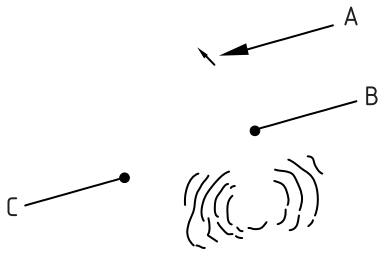
Joint separation test

C.1 Test apparatus

The test apparatus shall conform to Figure C.1. Two stirrups shall be prepared, with stirrup B attached to a pallet block (or stringer board), and stirrup C pressing on to an adjoining board.

A gauge shall be positioned to measure the force (at A) required to separate the block and board.

The accuracy of the measuring gauge shall be at least 4 % of the nominal separation force.



Key

A Force indicator
B Stirrup
C Stirrup

Figure C.1 — Joint separation test apparatus

C.2 Test pieces

Cut test pieces conforming to Figure C.2 from workable pallets.

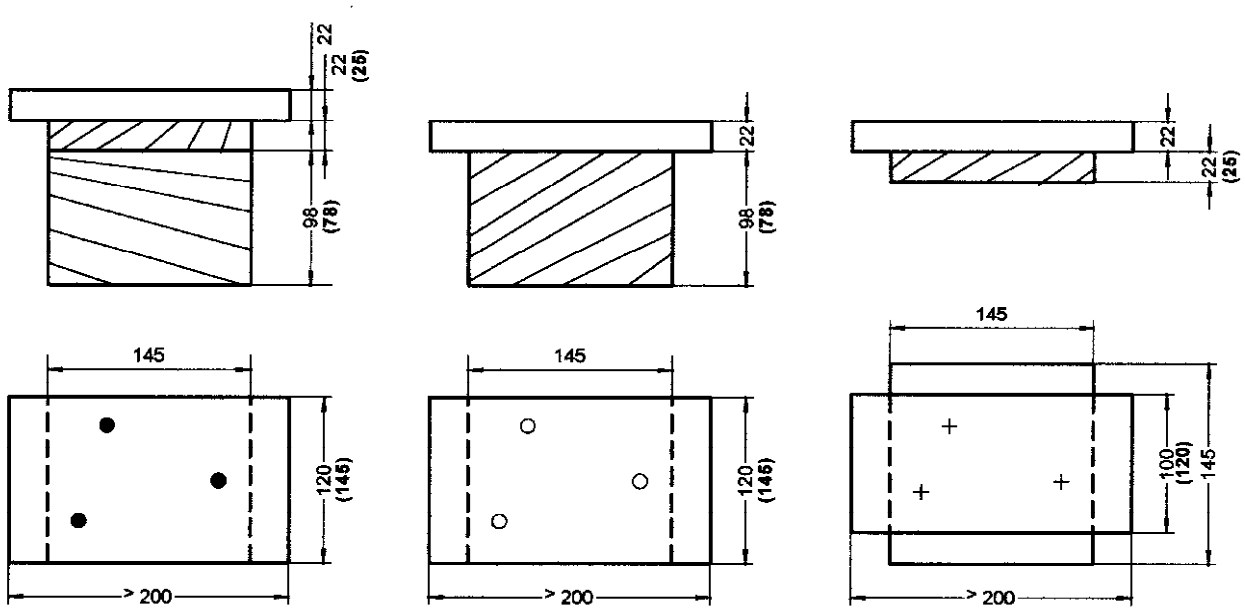
NOTE The moisture content of the wood should be (20 ± 2) %.

For each type of assembly, wood and fastener, perform the following tests:

a) a new fasteners test (20 test pieces);

b) production control tests (10 test pieces; at the start of production, if changing the type of wood or fasteners, or changing production methods).

Dimensions in millimetres



Block/stringerboard/top deckboard	block/bottom deckboard	Intermediate top deckboard/stringerboard

Figure C.2 — Test pieces

C.3 Procedure

Apply a separating force across the block and board slowly and smoothly, and measure the resulting tear strength.

C.4 Test results

The test pieces shall conform to 6.4.2.

C.5 Report

The test report shall contain:

a) the type, dimensions, and material of the fasteners, with tolerances and drawings;

b) the wood species used for the blocks and boards;

c) the moisture content of each test piece;

d) the separation force of each test piece;

e) the mean separation force for each assembly.

Annex D
(normative)

Preservatives – General policy

Mechanical properties are not affected by blue stain. Stain can be avoided by kiln drying or other means.

If some species have to be protected in view to avoid blue stain, products used have to be in respect of the requirements of the directive BIOCIDES (98-8-CE). The directive has taken into account (Clause 3) human and animal health and environmental risks. This directive is therefore in line with one of the first considerations fixed in the Directive 94/62 CE concerning packaging and packaging waste.

Annex E
(informative)

Safe working load under different loading conditions – General policy

Pallets conforming to this standard should have safe working loads as described in Table E.1 for skid pallets and in Table E.2 for perimeter base pallets.

Table E.1 — Safe working loads of skid pallets in racking condition

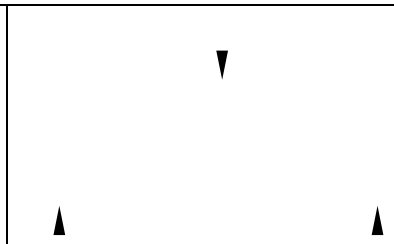
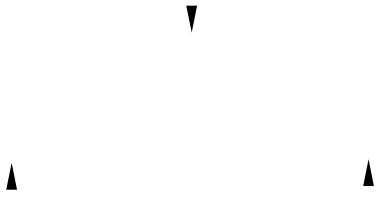
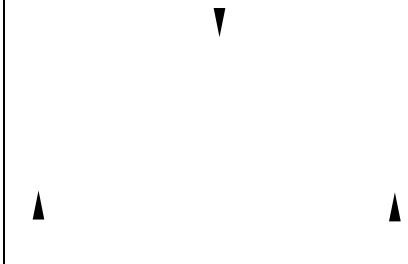
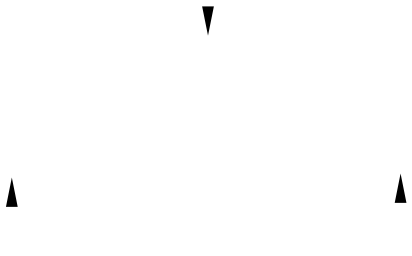
		
Concentrated load	*)	*)
Uniformly distributed load	*)	*)
Uniformly distributed bonded load	*)	*)
solid load	*)	*)

Table E.2 — Safe working loads of perimeter base pallets in racking condition

		
Concentrated load	*)	*)
Uniformly distributed load	*)	*)
Uniformly distributed bonded load	*)	*)
Solid load	*)	*)

*) Values will be inserted after the completion of studies for the future EN ISO 8611-2 and EN ISO 8611-3.

Bibliography

[1] EN 1313-1, *Round and sawn timber – Permitted deviations and preferred sizes – Part 1: Softwood sawn timber*

[2] EN 1313-2, *Round and sawn timber – Permitted deviations and preferred sizes – Part 2: Hardwood sawn timber*

[3] EN 10002-1, *Metallic materials – Tensile testing – Part 1: Method of test at ambient temperature*

[4] EN ISO 12777-3, *Methods of test for pallet joints – Part 3: Determination of strength of pallet joints (ISO 12777-3:2002)*

[5] ISO/TS 8611-2, *Pallets for materials handling – Flat pallets – Part 2: Performance requirements and selection of tests*

[6] ISO/TS 8611-3, *Pallets for materials handling – Flat pallets – Part 3: Maximum working load*

[7] Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market

[8] Directive 94/62/CE of the European Parliament and of the Council of 20 December 1994 on packaging and packaging waste

This page has been intentionally left blank

BSI - British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001 Email: orders@bsigroup.com You may also buy directly using a debit/credit card from the BSI Shop on the Website http://www.bsigroup.com/shop

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact Information Centre. Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048 Email: info@bsigroup.com

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001 Email: membership@bsigroup.com

Information regarding online access to British Standards via British Standards Online can be found at http://www.bsigroup.com/BSOL

Further information about BSI is available on the BSI website at http://www.bsigroup.com.

Copyright

BSI Group
Headquarters 389
Chiswick High Road,
London, W4 4AL, UK
Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/
standards