

Pallets for materials handling - Flat pallets - Part 2:  
Performance requirements and selection of tests (ISO  
8611-2:2021)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 8611-2:2022 sisaldab Euroopa standardi EN ISO 8611-2:2022 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 8611-2:2022 consists of the English text of the European standard EN ISO 8611-2:2022.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.01.2022.	Date of Availability of the European standard is 12.01.2022.
Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 55.180.20

**Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele**

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autoriõiguse kaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

**The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation**

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about standards copyright protection, please contact the Estonian Centre for Standardisation and Accreditation: Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

English Version

**Pallets for materials handling - Flat pallets - Part 2:  
Performance requirements and selection of tests (ISO  
8611-2:2021)**

Palettes pour la manutention - Palettes plates - Partie  
2: Exigences de performance et sélection des essais  
(ISO 8611-2:2021)

Paletten für den Gütertransport - Flachpaletten - Teil 2:  
Leistungsanforderungen und Auswahl von Prüfungen  
(ISO 8611-2:2021)

This European Standard was approved by CEN on 5 January 2022.

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-CENELEC 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-CENELEC Management Centre has the same status as the official versions.

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



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

This document (EN ISO 8611-2:2022) has been prepared by Technical Committee ISO/TC 51 "Pallets for unit load method of materials handling" in collaboration with 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 July 2022, and conflicting national standards shall be withdrawn at the latest by July 2022.

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

This document supersedes EN ISO 8611-2:2012.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Endorsement notice

The text of ISO 8611-2:2021 has been approved by CEN as EN ISO 8611-2:2022 without any modification.

# Contents

Page

Foreword.....	iv
Introduction.....	v
<b>1 Scope.....</b>	<b>1</b>
<b>2 Normative references.....</b>	<b>1</b>
<b>3 Terms and definitions.....</b>	<b>1</b>
<b>4 Test conditions.....</b>	<b>2</b>
4.1 General.....	2
4.2 Wooden pallets.....	3
4.3 Metal pallets.....	3
4.4 Plastic pallets.....	3
4.5 Paper pallets.....	3
4.6 Wood-based composite pallets.....	3
<b>5 Number of replicates.....</b>	<b>4</b>
<b>6 Performance requirements.....</b>	<b>4</b>
<b>7 Selection of the tests.....</b>	<b>7</b>
7.1 Intended use.....	7
7.2 Handling of goods with racking and stacking.....	8
7.3 Handling of goods with stacking without racking.....	8
7.4 Handling of goods without racking or stacking.....	8
7.5 Special applications.....	8
7.5.1 General.....	8
7.5.2 Automatic handling or conveyors.....	9
7.5.3 Lifting with slings.....	9
7.5.4 Resistance to impact.....	9
7.5.5 Friction tests.....	9
<b>8 Test load — Nominal load.....</b>	<b>9</b>
8.1 Strength tests.....	9
8.2 Ultimate load, $U$ .....	9
8.3 Stiffness tests.....	9
8.4 Nominal load.....	9
<b>9 Duration for static stiffness tests.....</b>	<b>10</b>
<b>10 Number of impacts for dynamic tests.....</b>	<b>10</b>
<b>11 Test report.....</b>	<b>10</b>
<b>Annex A (informative) Plots of typical force versus deformation from pallet testsshowing the deformation of ultimate load, <math>U</math>.....</b>	<b>11</b>
<b>Bibliography.....</b>	<b>13</b>

## 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](http://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](http://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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 51, *Pallets for unit load method of materials handling*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 261, *Packaging*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 8611-2:2011), which has been technically revised.

The main changes compared to the previous edition are as follows:

- Separate performance/deflection limits for the internal and external spans were specified for test 2a and 2b.
- It was clarified that test 5 applies for both twin track conveyors and narrow span beam racking.
- It was clarified in [Table 2](#), that test 4a,b should be conducted for a pallet without racking or stacking but only on the top deck.
- The determination of nominal load was clarified in [Table 3](#).

A list of all parts in the ISO 8611 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

The forces to which pallets are exposed during use vary significantly. The test procedures described in ISO 8611-1 are approximate simulations of pallet use. These tests help the pallet designer to establish an initial acceptable balance between the cost and the performance of a pallet design. It is intended that all results of tests performed using this protocol be confirmed and verified using field trials before publication of performance or the commercial implementation of a new pallet design.

The nominal load, determined according to this test protocol, does not represent a payload and cannot be verified using field trials. The nominal load is a minimum payload level for use in determining maximum working load according to the procedures in ISO 8611-3. The maximum working load can be verified for a specified payload and intended use, using field trials. It is intended that the publication of the maximum working load include a description of the payload and the intended modes of use of the pallet.

It is essential to exercise care when comparing the results of tests with historic experience using existing pallet designs. User expectations of pallet performance vary. Some require greater and some accept lower levels of performance. Users are accepting different levels of risk when using pallets. Because of the varied performance expectations of pallet users, it is possible that the results of tests do not always reflect the user's perception of pallet performance in use.

It is possible that the nominal load does not reflect users' perception of pallet performance because the nominal load does not represent a payload. It is intended that maximum working loads be used to compare with the historic performance of existing pallet designs.

Regarding the use of the ISO 8611 series,

- ISO 8611-1 describes the test methods,
- this document describes the performance requirements and selection of tests, and
- ISO 8611-3 describes tests for determining maximum working loads for known payloads.

ISO 8611-1 and this document are required for determining nominal load. The nominal load is the lowest safe load value for the specified support conditions, independent of the type of load (excluding concentrated loads).

ISO 8611-1, this document and ISO 8611-3 are required for determining maximum working loads for known payloads.

The nominal load for the intended use is established by the selection of tests in ISO 8611-1 and the performance requirement is established from criteria in this document.

The following three types of intended use with specified support conditions are specified:

- handling of loaded pallets with racking and stacking;
- handling of loaded pallets without racking;
- handling of loaded pallets without racking or stacking.

To determine the maximum working load through testing given in ISO 8611-3, the deflection under the known payload cannot exceed the limiting deflection (see ISO 8611-3:2011, 4.2, 4.3 and 4.4) established in ISO 8611-1 and this document. The maximum working load is the greatest payload that a pallet can be permitted to carry in a specific loading and support condition.

Guidance is given in ISO 8611-3:2011, Annex A as to the general effect on performance of different load types and stabilization methods. These can only give guidance as to the likely result from tests with the known payload.

Other tests for durability evaluation are specified in ISO 8611-1.

# Pallets for materials handling — Flat pallets —

## Part 2:

## Performance requirements and selection of tests

### 1 Scope

This document specifies the performance requirements to establish nominal loads for new flat pallets.

It also specifies the tests required for new flat pallets in various handling environments and the performance requirements for tests with payloads. This document does not apply to pallets with a fixed superstructure or a rigid, self-supporting container that can be mechanically attached to the pallet and which contributes to the strength of the pallet.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 8611-1:2021, *Pallets for materials handling — Flat pallets — Part 1: Test methods*

ISO 8611-3, *Pallets for materials handling — Flat pallets — Part 3: Maximum working loads*

### 3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **breaking of one component**

fracture of a structural element which significantly affects the strength, *stiffness* (3.9) or functionality of a pallet

#### 3.2

##### **concentrated load**

load concentrated over an area of less than 50 % of the pallet top deck

#### 3.3

##### **maximum working load**

greatest *payload* (3.5) that a pallet is permitted to carry in a specific loading and support condition

Note 1 to entry: This varies according to the type, distribution, arrangement and means of stabilization of the load and the system of support, and can be lower or higher than the *nominal load* (3.4) (see, for example, [Clauses 4](#) and [6](#) and see also ISO 8611-3).