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**Pallets for materials handling —  
Flat pallets —**

**Part 3:  
Maximum working loads**

*Palettes pour la manutention — Palettes plates —*

*Partie 3: Charges maximales en service*

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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 8611-3 was prepared by Technical Committee ISO/TC 51, *Pallets for unit load method of materials handling*.

This first edition of ISO 8611-3 cancels and replaces ISO/TS 8611-3:2005, which has been technically revised.

ISO 8611 consists of the following parts, under the general title *Pallets for materials handling — Flat pallets*:

- *Part 1: Test methods* <https://standards.iteh.ai/catalog/standards/sist/f4601bb2-ddfb-4193-bd67-3a645f230c88/iso-8611-3-2011>
- *Part 2: Performance requirements and selection of tests*
- *Part 3: Maximum working loads*

## 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 this part of ISO 8611. 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, the results of tests might not always reflect the user's perception of pallet performance in use.

The nominal load might 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,
- ISO 8611-2 describes the performance requirements and selection of tests, and
- this part of ISO 8611 describes tests for determining maximum working loads for known payloads.

ISO 8611-1 and ISO 8611-2 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, ISO 8611-2 and this part of ISO 8611 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 ISO 8611-2.

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

- 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 by testing in this part of ISO 8611, the deflection under the known payload cannot exceed the limiting deflection (see 4.2, 4.3 and 4.4) established in ISO 8611-1 and ISO 8611-2. The maximum working load is the greatest payload that a pallet can be permitted to carry in a specific loading and support condition.

## ISO 8611-3:2011(E)

Guidance is given in 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.

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# Pallets for materials handling — Flat pallets —

## Part 3: Maximum working loads

### 1 Scope

This part of ISO 8611 specifies the determination of maximum working load for new flat pallets with known payloads in different handling environments.

It is not intended to 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 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 8611-3:2011  
<https://standards.iteh.ai/catalog/standards/sist/f4601bb2-ddfb-4193-bd67-d164523e885a/iso-445-2008>

ISO 8611-1, *Pallets for materials handling — Flat pallets — Part 1: Test methods* ISO 8611-3:2011

ISO 8611-2, *Pallets for materials handling — Flat pallets — Part 2: Performance requirements and selection of tests* ISO 8611-3:2011

### 3 Terms and definitions

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

#### 3.1

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

fracture of a structural element which significantly affects the strength, stiffness or functionality of a pallet

#### 3.2

##### **concentrated load**

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

[ISO 445:2008, definition 2.3]

#### 3.3

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

greatest payload that a pallet is permitted to carry in a specific loading and support condition

NOTE 1 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 (see ISO 8611-2 and this part of ISO 8611).

NOTE 2 Adapted from ISO 445:2008, definition 2.7.

**3.4**  
**nominal load**  
*R*  
lowest safe load value for the specified support conditions, independent of the type of load (excluding concentrated loads)

NOTE 1 “Specified support conditions” refers to the range of conditions of use in 7.1 of ISO 8611-2:2011.

NOTE 2 Nominal load does not represent an actual payload on a pallet in use. The nominal load is used for comparing the performance of different pallets.

NOTE 3 Adapted from ISO 445:2008, definition 2.2.

**3.5**  
**payload**  
*Q*  
load carried by the pallet in use

[ISO 445:2008, definition 2.8]

NOTE This can be above, identical to or below the nominal load.

**3.6**  
**platen**  
solid, rigid surface on a test machine used for applying a load to test a sample pallet

**3.7**  
**racking**  
storage of unit loads in drive-in or beam racks with free, unsupported spans

[ISO 445:2008, definition A.3.1]

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**3.8**  
**safety factor**  
ratio of the ultimate load to the nominal load

NOTE In ISO 8611 (all parts), this ratio is at least 2,0.

**3.9**  
**solid load**  
single, compact, rigid, homogeneous load, supported by all the blocks and/or stringers (bearers) of the pallet

NOTE Adapted from ISO 445:2008, definition 2.6.

**3.10**  
**stacking**  
placing of pallets with unit loads one upon the other without recourse to intermediate shelves or racking

NOTE Adapted from ISO 445:2008, definition A.2.1.

**3.11**  
**stiffness**  
relative deformation of a pallet or component under load

NOTE High stiffness means small displacement, deflection or deformation for a given load.

**3.12**  
**test load**  
*P*  
load applicators, the load board or load box and the applied load itself



**3.13****ultimate load***U*

load at which compression, displacement or deflection is no longer contained, resulting in the destruction of the specimen or breaking of one component, or when displacement, deformation or deflection becomes excessive

NOTE See Table 1 of ISO 8611-2:2011.

**3.14****uniformly distributed bonded load**

load spread evenly across the full surface of the pallet top deck, where the pattern of each single layer changes, so that the packages are interlocked

**3.15****uniformly distributed unbonded load**

load spread evenly across the full surface of the pallet top deck where the packages are not interlocked, bound or connected

**4 Determination of maximum working load with known payloads****4.1 General**

Conditions of intended use are given in Table 1.

**Table 1 — Conditions of intended use**

Handling activity	Racking and stacking	Stacking without racking	Without racking or stacking	Special situation	
				Conveyor	Sling
Racking	1b <sup>a</sup> or 7b <sup>b</sup>				
Forklift	2b <sup>c</sup>	2b <sup>c</sup>	2b <sup>c</sup>		
Stacking	4b <sup>d</sup>	4b <sup>d</sup>			
Twin track conveyors	5b <sup>e</sup>			5b <sup>e</sup>	
Sling under wings					6 <sup>f</sup>
<p><sup>a</sup> Bending — Bending stiffness test.</p> <p><sup>b</sup> Airbag bending — Bending stiffness test.</p> <p><sup>c</sup> Forklifting — Bending stiffness test.</p> <p><sup>d</sup> Stacking — Deck stiffness test.</p> <p><sup>e</sup> Bottom deck bending — Bending stiffness test.</p> <p><sup>f</sup> Wing pallet bending — Bending stiffness test.</p>					

The test load in tests 1b, 2b, 4b, 5b and 6b shall be the payload. The test load in test 7b shall be the airbag.

The maximum working load shall be determined by the appropriate tests as given in 4.2 to 4.4.

Test the pallet in the direction of its intended use. If the pallet is only going to be supported in one direction, then test in that direction. If the pallet is going to be supported in both directions in a rack, or on forks, the weaker direction may be determined and used for determining the maximum working load.

In order to establish the weakest pallet support direction relative to pallet length or width, whenever conducting tests 1b, 2b and 7b, test one pallet across the length of the pallet and then a second pallet across the width of the pallet. There is no requirement for further tests on the stronger dimension unless the result is within 15 % of the weaker.