
**Vozila za talni transport - Energijska učinkovitost - Preskusne metode - 2. del:
Vozila za talni transport z upravljavcem in lastnim pogonom, vlačilci in vozila za
prevoz bremen**

Energy efficiency of Industrial trucks - Test methods - Part 2 : Operator controlled self-propelled trucks, towing tractors and burden-carrier trucks

Energieeffizienz von Flurförderzeugen - Testmethoden - Teil 2: Bedienergeführte selbstangetriebene Flurförderzeuge, Schlepper und Lastentransportfahrzeuge

Efficacité énergétique des chariots de manutention - Méthodes d'essai - Partie 2 : Chariots automoteurs commandés par l'opérateur, tracteurs et chariots transporteurs de charge

Ta slovenski standard je istoveten z: EN 16796-2:2016

ICS:

27.015	Energijska učinkovitost. Ohranjanje energije na splošno	Energy efficiency. Energy conservation in general
53.060	Industrijski tovornjaki	Industrial trucks

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EUROPEAN STANDARD

EN 16796-2

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November 2016

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English Version

Energy efficiency of Industrial trucks - Test methods - Part 2: Operator controlled self-propelled trucks, towing tractors and burden-carrier trucks

Efficacité énergétique des chariots de manutention -
Méthodes d'essai - Partie 2 : Chariots automoteurs
commandés par l'opérateur, tracteurs et chariots
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Energieeffizienz von Flurförderzeuge, - Testmethoden -
Teil 2: Bedienergeführte selbstangetriebene
Flurförderzeuge, Schlepper und
Lastentransportfahrzeuge

This European Standard was approved by CEN on 13 August 2016.

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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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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European foreword

This document (EN 16796-2:2016) has been prepared by Technical Committee CEN/TC 150 “Industrial Trucks - Safety”, the secretariat of which is held by BSI.

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 May 2017, and conflicting national standards shall be withdrawn at the latest May 2017.

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.

EN 16796 consists of the following parts, under the general title *Energy efficiency of Industrial trucks — Test methods*:

- *Part 1: General;*
- *Part 2: Operator controlled self-propelled trucks, towing tractors and burden-carrier trucks;*
- *Part 3: Container handling lift trucks.*

The following parts are under preparation:

- *Part 4: Rough-terrain trucks;*
- *Part 5: Trucks with elevating operator position and trucks specifically designed to travel with elevated loads.*

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

EN 16796-2:2016 (E)**1 Scope**

This European Standard specifies the method of energy consumption measurement for the following types of industrial trucks as defined in ISO 5053-1:

- counterbalance lift truck;
- articulated counterbalance lift truck;
- lorry-mounted truck;
- reach truck (with retractable mast or fork arm carriage);
- straddle truck;
- pallet-stacking truck,
- pallet truck;
- platform and stillage truck;
- pallet truck end controlled;
- order-picking truck;
- centre-controlled order-picking truck;
- towing, pushing tractor and burden carrier;
- towing and stacking tractor;
- side-loading truck (one side only);
- lateral-stacking truck (both sides);
- lateral-stacking truck (three sides);
- non-stacking low-lift straddle carrier;
- multi-directional lift truck.

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This part is intended to be used in conjunction with EN 16796-1.

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.

EN 16796-1:2016, *Energy efficiency of Industrial trucks — Test methods — Part 1: General*

EN ISO 3691-1:2015, *Industrial trucks - Safety requirements and verification - Part 1: Self-propelled industrial trucks, other than driverless trucks, variable-reach trucks and burden-carrier trucks (ISO 3691-1:2011, including Cor 1:2013)*

ISO 5053-1, *Industrial trucks — Terminology and classification — Part 1: Types of industrial trucks*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5053-1 and EN 16796-1 apply.

4 Test conditions

The test conditions are given in EN 16796-1:2016, Clause 4.

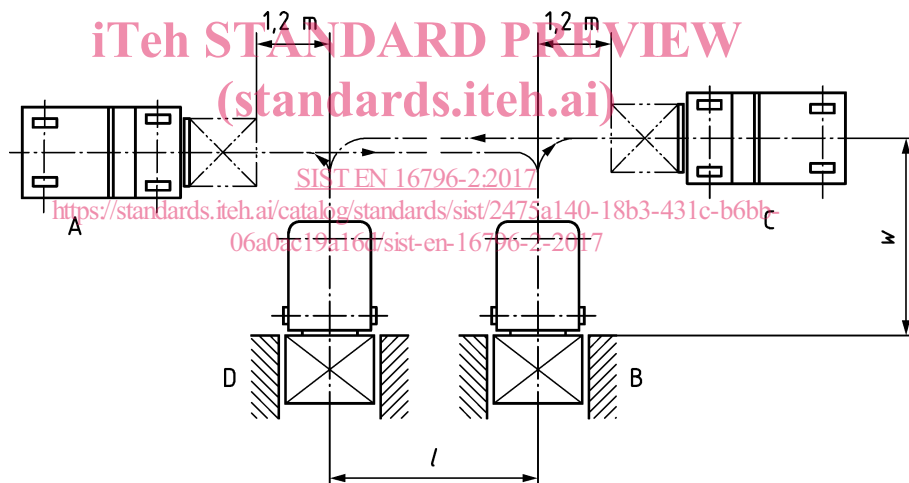
5 Measurement procedure

5.1 General

EN 16796-1 applies together with the following sub-clauses that are describing specific information for the respective truck type.

5.2 Test layout

Figure 1 shows the general test layout to perform the consumption test-cycle for self-propelled trucks within the scope of this standard. Figure 2 shows the cycle for towing tractors and burden carriers.



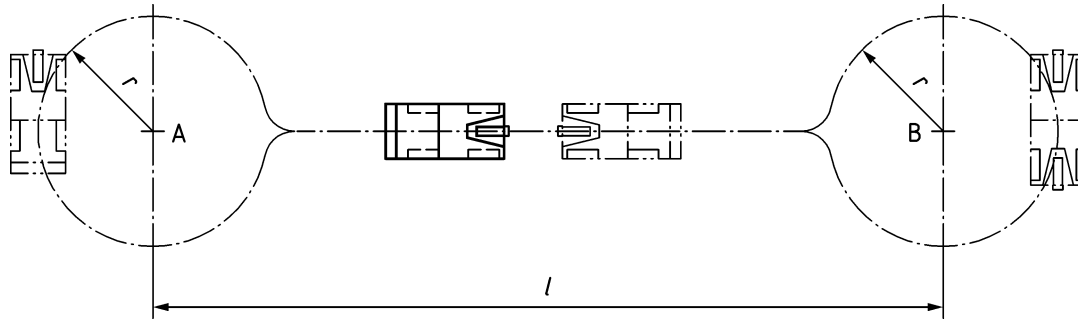
Key

w distance between the longitudinal centre plane of the truck and the simulated leading edge of the rack

l distance

Figure 1 — Cycle for energy consumption test of self-propelled trucks

EN 16796-2:2016 (E)

**Key**

- r minimum turning radius
 A,B midpoint r
 l distance

Figure 2 — Cycle for energy consumption test of towing tractors and burden carriers

5.3 Operating requirements and sequence for counterbalance lift trucks and comparable truck designs

For counterbalance trucks, lorry-mounted trucks, multi-directional forklift trucks and articulated counterbalance lift trucks the cycle shall be performed according to Figure 1 and Table 1 and shall start at position “A”.

While travelling the load shall be at a lift height defined by the manufacturer, typically 300 mm. The mast or the fork carriage shall be tilted to the maximum backwards tilt.

Simultaneous operation is not permissible, travelling is not permitted while lift/lowering, or tilt operations.

The test duration shall be 1 h and the speed shall be adapted to reach the number of cycles per hour as defined in Table 1.

At position “B” and “D”, the load shall be lifted and lowered without depositing the load.

The sequence of the cycle shall be carried out with the following actions:

- start at position “A”,
- travel in forward direction to position “B” by turning through 90°,
- return the backward tilt to the vertical position,
- lift the load with the lift as specified in Table 1,
- lower to the lift height for travelling (300 mm),
- tilt back to maximum,
- drive backwards to position “C”,
- drive forward to position “D”,
- repeat the procedure as on position “B”,
- drive backwards to position “A”,

— end of cycle.

Table 1 — Test specification for counterbalanced trucks

Rated capacity Q, rated voltage U and type	$Q \leq 5 \text{ t}$ and $U \leq 36 \text{ V}$ (electric)	$Q \leq 5 \text{ t}$ (all other)	$Q = 5 \text{ t}^a$	$5 \text{ t} < Q \leq 10 \text{ t}$	$10 \text{ t} < Q \leq 18 \text{ t}$	$Q > 18 \text{ t}$
Test load	0,7 Q	0,7 Q	0,7 Q	0,7 Q	0,7 Q	0,7 Q
No. of cycles [1/h]	45	60	60 or 45 ^a	45	40	25
Distance l [m]	30	30	30	30	50	100
Distance w [m]	3	3	3 or 4 ^a	4	5	8
Lift at B and D [m]	2	2	2	2	3	3

^a The truck manufacturer may decide to test according to the test for trucks with $Q \leq 5 \text{ t}$ or $Q > 5 \text{ t}$. For this capacity the selected No. of cycles and distance w shall be documented and published.

5.4 Operating requirements for other types of self-propelled trucks

5.4.1 General

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For other truck types within the scope of this standard the cycle shall be performed according to Figure 1 and Table 2.

NOTE For types of trucks not covered by this standard or other parts of the standard series one of the specific measurement procedures can be chosen and used as a guideline.

At position “B” and “D”, the load shall be lifted and lowered without depositing the load.

The test duration shall be 1 h and the speed shall be adapted to reach the number of cycles per hour as defined in Table 2.

Simultaneous operation is not permissible, travelling is not permitted while lift/lowering, reach or tilt operations.

While travelling the load shall be at a lift height defined by the manufacturer, typically 300 mm.