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Energijska učinkovitost vozil za talni transport - Preskusne metode - 1. del:
Splošno

Energy efficiency of industrial trucks - Test methods - Part 1 : General

Energieeffizienz von Flurförderzeugen - Testmethoden - Teil 1: Generelles

Efficacité énergétique des chariots de manutention - Méthodes d'essai - Partie 1 :
Généralités

Ta slovenski standard je istoveten z: prEN 16796-1

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**Energy efficiency of industrial trucks - Test methods - Part 1 :
General**

Efficacité énergétique des chariots de manutention -
Méthodes d'essai - Partie 1 : Généralités

Energieeffizienz von Flurförderzeugen - Testmethoden -
Teil 1: Generelles

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 150.

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

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Foreword

This document (prEN 16796-1:2014) has been prepared by Technical Committee CEN/TC 150 “Industrial trucks - Safety”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

prEN 16796-1 consists of the following parts, under the general title Energy efficiency of Industrial trucks — Testing methods:

- Part 1: General
- Part 2: Operator controlled self-propelled trucks, towing tractors and burden-carrier trucks
- Part 3: Container-handling lift trucks
- Part 4: Rough terrain trucks
- Part 5: Trucks with elevating operator position and trucks specifically designed to travel with elevated loads

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Introduction

This standard has been prepared to be a harmonized standard, which will provide one means of conforming to the Essential Requirements of the New Approach Ecodesign Directive 2009/125/EC (ErP) and corresponding Commission Regulations, where related, to the products under the scope of this standard.

The content of this document is of relevance for the following stakeholder groups:

- Machine manufacturers (small, medium and large enterprises);
- market surveillance authorities;
- machine users (small, medium and large enterprises);
- service providers, e.g. for consulting activities.

The aforementioned stakeholder groups have been given the option to participate at the drafting process of this document. The machineries concerned are indicated in the Scope of this document.

The standard contains the definition of operation cycles as defined in the VDI 2198 guideline. This guideline is accepted by all major truck manufacturers to measure the energy consumption of electric industrial trucks and internal combustion industrial trucks. The guideline has been in place since 1996 and it is used broadly, therefore this approach allows the evaluation of the energy efficiency of trucks by comparison.

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prEN 16796-1:2014 (E)**1 Scope**

The prEN 16796 series deals with the energy efficiency of self-propelled industrial trucks (hereafter referred to as trucks), as defined in ISO/FDIS 5053-1. This part of the prEN 16796 specifies basic test criteria and requirements to measure the energy consumption for trucks during operation, hereafter referred to as trucks. For electrical trucks, the efficiency of the battery and the battery charger is included.

It does not establish requirements for the energy efficiency during construction, recycling and removal.

This European Standard is applicable to the following truck types according ISO/FDIS 5053-1, and special conditions:

- Counterbalanced lift truck
- Articulated counterbalance lift truck
- Truck trailer mounted
- Reach truck (with retractable mast or fork arm carriage)
- Straddle truck
- Pallet-stacking truck and double stacker
- Pallet truck
- Platform truck
- Fixed height load-carrying truck (fixed platform truck)
- Platform and stillage truck
- End controlled pallet truck
- Order picking truck
- Centre controlled order picking truck
- Towing, pushing tractors and burden carrier
- Towing and stacking tractor
- Side-loading truck (one side only)
- Rough terrain truck
- Rough terrain variable reach truck
- Slewing rough terrain variable reach truck
- Variable reach container handler
- Counterbalanced container handler
- Lateral stacking truck (both sides)
- Lateral stacking truck (three sides)

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- Non-stacking low-lift straddle carrier
- Multi-directional forklift

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 589, *Automotive fuels - LPG - Requirements and test methods*

EN 590, *Automotive fuels - Diesel - Requirements and test methods*

EN 60254-1, *Lead acid traction batteries - Part 1: General requirements and methods of tests*

EN ISO 3691-1, *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)*

prEN ISO 3691-2, *Industrial trucks - Safety requirements and verification - Part 2: Self-propelled variable-reach trucks (ISO/DIS 3691-2:2014)*

EN ISO 3691-6, *Industrial trucks - Safety requirements and verification - Part 6: Burden and personnel carriers (ISO 3691-6:2013)*

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

ISO 15500-1, *Road vehicles - Compressed natural gas (CNG) fuel system components - Part 1: General requirements and definitions*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 battery

electrical power source consisting of battery cells, connectors of cells, battery controller (if applicable, e.g. controller for Li-Ion batteries) and battery enclosure that is ready to use in an industrial truck

3.2

battery state of charge

measured capacity of a battery, expressed in Ampere-hours (Ah). It may also be expressed as a percentage of the battery/s maximum rated Ah capacity

3.3

carbon dioxide equivalent (CDE)

quantity that describes, for a given mixture and amount of greenhouse gas, the amount of CO₂ that would have the same global warming potential (GWP)

3.4

charge factor

factor of the energy delivered to the battery by charger (Ah) divided by the capacity stored in the battery (Ah)

Note 1 to entry: Typically the charge factor for lead acid batteries is in the range of 1,02 to 1,25

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3.5**cycle time**

amount of time it takes a machine to perform a repetitive segment of an operation, typically measured as the time it takes a machine to return to the same position

3.6**electric-motor-generator system**

device permanently located on the machine that can convert mechanical energy into electrical energy (e.g., to recharge a battery) and/or electrical energy into mechanical energy (e.g. to propel the vehicle)

3.7**hybrid truck**

truck that uses two or more energy sources destined to move the truck [identical to ISO/FDIS 5053-1]

3.8**power battery factor (PBF)**

factor that gives the ratio between the battery capacity and the electrical power taken from the battery

3.9**synthetic discharge cycle**

typical battery discharge profile that mirrors the actual energy consumption of electric trucks during a test cycle

4 Test conditions

The following test conditions ensure that the measurement of power consumption is performed in a similar and comparable way.

4.1 Test equipment**4.1.1 Test area**

The test area shall be a flat, smooth area with a hard, clean, and dry surface made of concrete, asphalt or an equivalent. The test course shall have no more than 2% slope in any direction of travel.

4.1.2 Test track

For specific information for a different truck type see the respective part of the prEN 16796 series.

4.1.3 Test load and/or towing capacity

Unless it is otherwise stated in the specific part of the prEN 16796 series, the test load shall be equal to the rated load of the truck, as defined in the applicable part of EN ISO 3691.

Tractors shall tow with a force according to the rated drawbar pull as defined in EN ISO 3691-1, Annex A.3.

The burden-carrier shall be laden with the maximum load, as defined in EN ISO 3691-6.

4.2 Truck conditions

The truck to be tested shall be in new condition. A run-in time of up to 100h is permissible, and shall be documented.

The truck to be tested shall be in a safe and functional state. All equipment attached shall be in accordance to the specification of the manufacturer of the truck.