



# SLOVENSKI STANDARD

## SIST EN 12053:2002

01-maj-2002

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### Varnost vozil za talni transport - Preskusne metode za merjenje emisije hrupa

Safety of industrial trucks - Test methods for measuring noise emissions

Sicherheit von Flurförderzeugen - Verfahren für die Messung der Geräuschemission

Sécurité des chariots de manutention - Méthodes d'essai pour le mesurage des émissions de bruit

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Ta slovenski standard je istoveten z: **EN 12053:2001**

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#### ICS:

17.140.30	Emisija hrupa transportnih sredstev	Noise emitted by means of transport
53.060	Industrijski tovornjaki	Industrial trucks

**SIST EN 12053:2002**

**en**

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ICS 17.140.30; 53.060

English version

## Safety of industrial trucks - Test methods for measuring noise emissions

Sécurité des chariots de manutention - Méthodes d'essai  
pour le mesurage des émissions de bruit

Sicherheit von Flurförderzeugen - Verfahren für die  
Messung der Geräuschemission

This European Standard was approved by CEN on 19 February 2001.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

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## Foreword

This European Standard 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 December 2001, and conflicting national standards shall be withdrawn at the latest by December 2001.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this standard.

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

This European Standard is one of a series of European Standards for the safety of industrial trucks.

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- |                |   |
|----------------|---|
| EN 1175-1:1998 | Safety of Industrial trucks - Electrical requirements - Part 1: General requirements for battery-powered trucks   |
| EN 1175-2:1998 | Safety of Industrial trucks - Electrical requirements - Part 2: General requirements of internal combustion engine powered trucks   |
| EN 1175-3:1998 | Safety of Industrial trucks - Electrical requirements - Part 3: Specific requirements for electrical power transmission systems of internal combustion engine powered trucks  |
| EN 1459:1998   | Safety of Industrial trucks - Self propelled variable reach trucks  |
| EN 1525:1997   | Safety of Industrial trucks - Driverless industrial trucks and their systems  |
| EN 1526:1997   | Safety of Industrial trucks - Additional requirements for automated functions for industrial trucks   |
| EN 1551:2000   | Safety of Industrial trucks - Self propelled trucks over 10 000kg capacity  |
| EN 1726-1:1998 | Safety of industrial trucks - Self propelled trucks up to and including 10 000kg capacity and industrial tractors with a drawbar pull up to and including 20 000N Part 1: General requirements  |
| EN 1726-2:2000 | Safety of Industrial trucks - Self propelled trucks up to and including 10 000kg capacity and industrial tractors - with a drawbar pull up to and including 20 000N Part 2: Additional requirements for trucks with elevating operator position and/or trucks especially designed to travel with elevated loads |
| EN 1755:2000   | Safety of Industrial trucks - Operation in potentially explosive atmospheres; Use in flammable gas, vapour, mist and dust   |

EN 1757-1: 2001 Safety of Industrial trucks - Pedestrian propelled trucks - Part 1: Stacker trucks

EN 1757-2:2001 Safety of Industrial trucks - Pedestrian propelled trucks - Part 2: Pallet trucks

prEN 1757-3:1997 Safety of Industrial trucks - Pedestrian propelled trucks - Part 3: Platform trucks

prEN 1757-4:1997 Safety of Industrial trucks - Pedestrian propelled trucks - Part 4: Scissor lift pallet trucks

EN 12895:2000 Safety of Industrial trucks - Electromagnetic compatibility

EN 12053:2001 Safety of Industrial trucks - Test methods for measuring noise emissions

prEN 13059:1997 Safety of Industrial trucks - Test methods for measuring vibration

prEN ISO 13564:1996 Safety of Industrial trucks - Test methods for measuring visibility from self propelled trucks  
(ISO/DIS 13564:1996)

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## Introduction

This European Standard is a type C standard as defined in EN 292-1. This standard has been prepared to be a harmonized standard to provide one means of conforming to the essential safety requirements of the Machinery Directive and associated EFTA regulations.

The extent to which hazards are covered is indicated in the scope of this standard. In addition, industrial trucks should comply as appropriate with EN 292-1 for hazards which are not covered by this standard.

General standards for the determination of the noise emissions at the operator's position and of the sound power levels of machines already exist. However and because of specific applications these existing standards cannot be applied directly to industrial trucks. Therefore it was necessary to prepare this standard. The basic standards EN ISO 3744 : 1995 and EN ISO 11201 : 1995 have been taken into account.

A further aim of this European standard is, despite the variety of industrial trucks, to obtain representative and comparable information on the noise emissions of this category of equipment. It should be possible to determine and verify this information. This requires definition of conditions of operation and typical time proportions.

The IDLE condition of the industrial truck is included because it is representative of those conditions in which the industrial truck has low noise emission, for instance, when lowering, tilting, load handling, slow manoeuvring as well as waiting between tasks.

The determination of sound power levels with the commonly used enveloping measurement surface method, with six or more microphone positions in the DRIVE condition, is only possible with considerable technical difficulty. The proposed method with four microphone positions has been shown, following extensive comparisons, to produce final results that deviated only minimally in numerous comparisons, so that the intended purpose was achieved.

The test results, however, are not applicable to the determination of exposure to noise at the operator's position in accordance with EU Directive 86/188/EEC.

## 1 Scope

This noise measurement standard gives methods for determining the sound pressure level at the operator's position and the sound power level of industrial and rough terrain trucks.

This European standard is a type test applicable to all industrial trucks listed in table A1.

The test results obtained in accordance with this standard are also applicable to the evaluation of the hazard generated by noise from industrial trucks.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

prEN 292-1:2000 Safety of machinery - Basic concepts - General principles for design Part 1: Basic terminology, methodology (identical with ISO/DIS 12100-1:2000)

EN 1459:1998 Safety of industrial trucks - Self propelled variable reach trucks.

EN 1525:1997 Safety of industrial trucks - Driverless industrial trucks and their systems

EN 1551:2000	Safety of industrial trucks - Self propelled trucks over 10 000 kg capacity
EN 1726-1:1998	Safety of industrial trucks - Self propelled trucks up to and including 10 000 kg capacity and industrial tractors with a drawbar pull up to and including 20 000 N - Part 1: General requirements
EN 1726-2:2000	Safety of Industrial trucks - Self propelled trucks up to and including 10 000 kg capacity and industrial tractors with a drawbar pull up to and including 20 000 N Part 2: Additional requirements for trucks with elevating operator position and/or trucks especially designed to travel with elevated load
EN 1757-1:2001	Safety of industrial trucks - Pedestrian propelled trucks - Part 1: Stacker trucks
EN 1757-2:2001	Safety of industrial trucks - Pedestrian propelled trucks - Part 2: Pallet trucks
prEN 1757-3:1997	Safety of Industrial trucks - Pedestrian propelled trucks - Part 3: Platform trucks
prEN 1757-4:1997	Safety of Industrial trucks - Pedestrian propelled trucks - Part 4: Scissor lift pallet trucks
EN ISO 3744:1995	Acoustics - Determination of sound power levels of noise sources using sound pressure - Engineering method in an essentially free field over a reflecting plane (ISO 3744:1994)
EN ISO 4871:1996	Acoustics - Declaration and verification of noise emission values of machinery and equipment (ISO 4871:1996)
EN ISO 11201:1995	Acoustics - Noise emitted by machinery and equipment - Measurement of emission sound pressure levels at a work station and at other specified positions - Engineering method in an essentially free field over a reflecting plane (ISO 11201:1995)
ISO 5053:1987	Powered industrial trucks -Terminology.

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### 3 Terms and definitions

[SIST EN 12053:2002](#)

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For the purpose of this standard, the definitions given in EN ISO 3744:1995, EN ISO 4871:1995 and EN ISO 11201:1995 apply together with the following.

#### 3.1 A-weighted emission sound pressure level at the operator's position for the operational

cycle  $L_{pAZ}$

The average sound pressure level at the operator's position in an operational cycle is determined from the values of different conditions of operation in accordance with the equation;

$$L_{pAZ} = 10 \lg \left[ 1/(a+b+c) \times (a \times 10^{0,1L_{pa}} + b \times 10^{0,1L_{pb}} + c \times 10^{0,1L_{pc}}) \right] \text{ dB}$$

where:

$a$  is the time proportion factor - LIFTING

$b$  is the time proportion factor - IDLING

$c$  is the time proportion factor - DRIVING

$L_{pa}$  is the sound pressure level at the operator's position during LIFTING

$L_{pb}$  is the sound pressure level at the operator's position during IDLING

$L_{pc}$  is the sound pressure level at the operator's position during DRIVING

NOTE The A-weighted emission sound pressure level at the operators position,  $L_{pAZ}$ , corresponds to the equivalent continuous A-weighted sound pressure level given in 1.7.4f of EU directive 98/37.



### 3.2 A-weighted sound power level in an operational cycle $L_{WAZ}$

The average sound power level in an operational cycle is determined from the values of different operating conditions in accordance with the equation;

$$L_{WAZ} = 10 \lg [1/(a+b+c) \times (a \times 10^{0,1L_{WAa}} + b \times 10^{0,1L_{WAb}} + c \times 10^{0,1L_{WAc}})] \text{ dB}$$

where:

- a is the time proportion factor - LIFTING
- b is the time proportion factor - IDLING
- c is the time proportion factor - DRIVING
- $L_{WAa}$  is the sound power level during LIFTING
- $L_{WAb}$  is the sound power level during IDLING
- $L_{WAc}$  is the sound power level during DRIVING

### 3.3 Forwards operation

Direction of travel of a truck in accordance with the relevant European Standard in the series „Safety of Industrial Trucks“.

### 3.4 Industrial and rough terrain truck families

A group of trucks in which those components that cause noise emission are similar, e.g. internal combustion engine, exhaust equipment.

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### 3.5 Idling

[SIST EN 12053:2002](https://standards.iteh.ai/catalog/standards/sist/4b4f954e-18b5-431e-b7a1-6cb86a00ae64/sist-en-12053-2002)  
<https://standards.iteh.ai/catalog/standards/sist/4b4f954e-18b5-431e-b7a1-6cb86a00ae64/sist-en-12053-2002>

Operating condition of the industrial truck ready for use. Ancillaries which can be turned on in this operating condition are, e.g. driving unit for the power assisted steering, the engine cooling fan and the ventilation fan for the cabin or air conditioning system shall be turned on. Driving units that can operate at different speeds shall use the operating speed specified in the relevant clause of this standard. When using an IC-engine as the driving unit, the engine shall run at the low idle speed specified by the truck manufacturer.

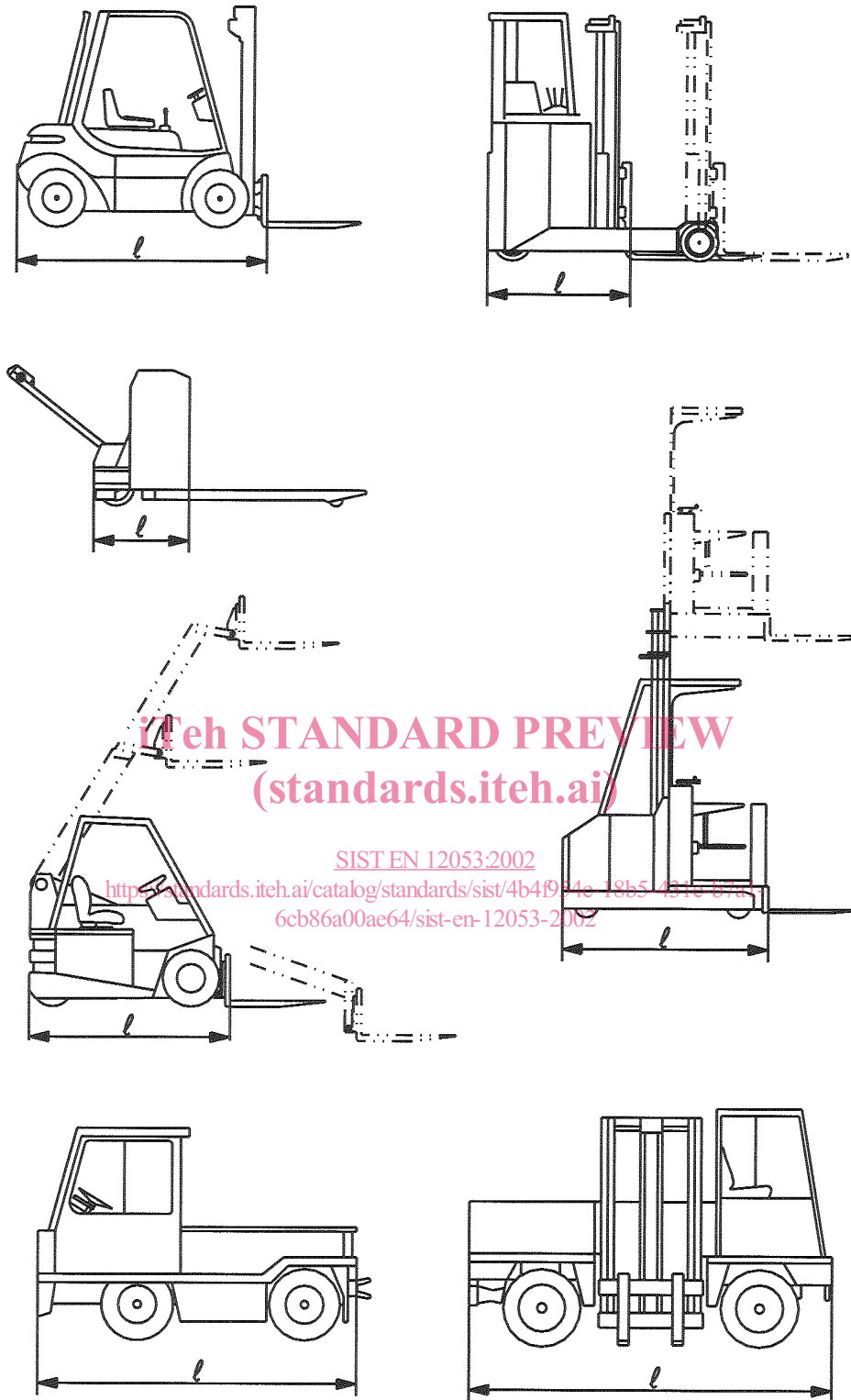


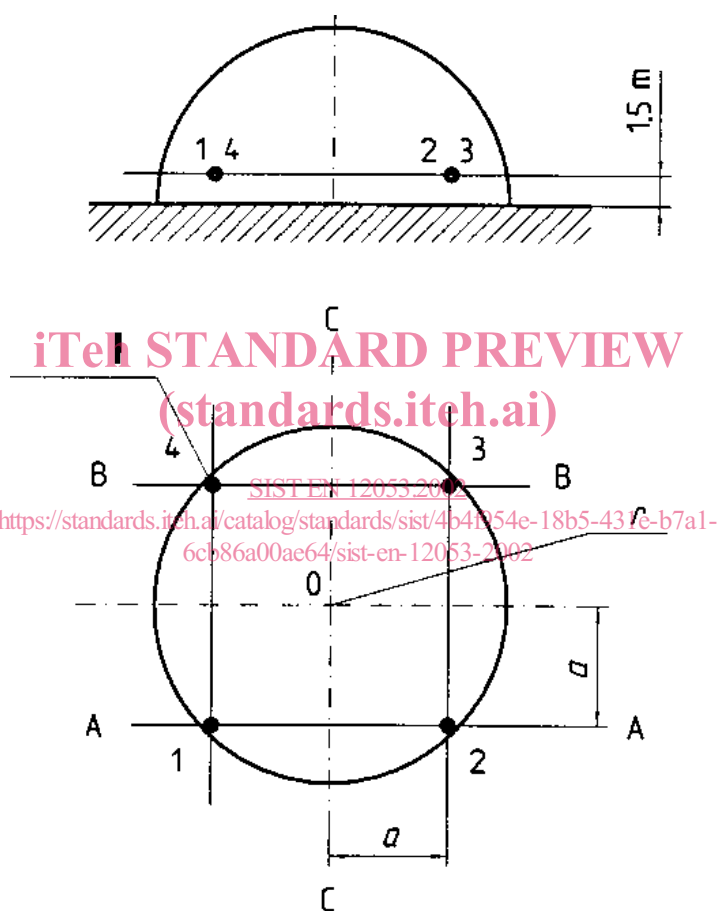
Figure 1 - Examples for the determination of truck length ( $l$ )

## 4 Installation and equipment

### 4.1 Test environment

For the test site, test environment and measurement conditions, the requirements of EN ISO 11201:1995 and EN ISO 3744:1995 shall be fulfilled.

The test site shall consist of a track C-C with sections A-O-B in accordance with figure 2. The overall length of the track shall be such that the DRIVE condition can be carried out safely.



#### Key

I Microphone position  
r = radius of hemisphere  
a = 0,75 r

Figure 2 - Test site