SLOVENSKI STANDARD
SIST EN 12895:2002

01-maj-2002

Vozila za talni transport - Elektromagnetna združljivost

Industrial trucks - Electromagnetic compatibility

Flurförderzeuge - Elektromagnetische Verträglichkeit

Chariots de manutention - Compatibilité électromagnétique

Ta slovenski standard je istoveten z: **EN 12895:2000**

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general
53.060	Industrijski tovornjaki	Industrial trucks

SIST EN 12895:2002 **en**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 12895

July 2000

ICS 33.100; 53.060

English version

Industrial trucks - Electromagnetic compatibility

Chariots de manutention - Compatibilité électromagnétique

Flurförderzeuge - Elektromagnetische Verträglichkeit

This European Standard was approved by CEN on 18 June 2000.

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 Central Secretariat 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 Central Secretariat 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.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12895:2000 E

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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of an identical text or by endorsement, at the latest by January 2001, and conflicting national standards shall be withdrawn at the latest by January 2001.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.

This European Standard is one of a series of European Standards for Industrial trucks :

EN 1175-1	Safety of industrial trucks - Electrical requirements - Part l: General requirements for battery powered trucks
EN 1175-2	Safety of industrial trucks - Electrical requirements - Part 2: General requirements of internal combustion engine powered trucks
EN 1175-3	Safety of industrial trucks - Electrical requirements - Part 3: Specific requirements for the electric power transmission systems of internal combustion engine powered trucks
EN 1459	Safety of industrial trucks - Self-propelled variable reach trucks
EN 1525	Safety of industrial trucks - Driverless trucks and their systems
EN 1526	Safety of industrial trucks - Additional requirements for automated functions on trucks
EN 1551	Safety of industrial trucks - Self propelled trucks over l0 000 kg capacity
EN 1726-1	Safety of industrial trucks - Self propelled trucks up to and including l0 000 kg capacity and industrial tractors with a drawbar pull up to and including 20 000 N - Part l: General requirements
prEN 1726-2:1995	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 trucks specifically designed to travel with elevated loads
EN 1755	Safety of industrial trucks - Operation in potentially explosive atmospheres - Use in flammable gas,vapour, mist and dust
prEN 1757-1:1994	Safety of machinery - Industrial trucks - Pedestrian controlled manual and semi-manual trucks - Part l: Stacker trucks
prEN 1757-2:1994	Safety of machinery - Industrial trucks - Pedestrian controlled manual and semi-manual trucks - Part 2: Pallet-trucks with lift height up to 300 mm
prEN 1757-3:1997	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks - Part 3: Platform trucks
prEN 1757-4:1997	Safety of industrial trucks - Pedestrian controlled manual and semi-manual trucks - Part 4: Scissor lift pallet-trucks

prEN 12053:1995	Safety of industrial trucks – Test methods for measuring noise emissions
prEN ISO 13564:1996	Test method for measuring visibility from self-propelled trucks (ISO/DIS 13564:1996)
prEN 13059:1997	Safety of industrial trucks - Test methods for measuring vibration

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.

Introduction

With the use of more electronic devices in areas where industrial trucks operate, there is a need to ensure that industrial trucks are provided with adequate immunity to external electromagnetic fields. As more industrial trucks are fitted with electrical and electronic devices, there is a need to ensure that emission of electromagnetic fields from the trucks meets acceptable limits.

High frequency electrical disturbances emerge during the normal operation of many parts of the industrial trucks and systems. They are generated within a large frequency range with different electrical characteristics.

Electrostatic discharges are relevant to industrial trucks

This standard provides test methods and acceptance criteria which are correct for industrial trucks considering the specific characteristics and the operating parameters of this machinery; therefore the tests have been modified to reflect the construction of the industrial trucks.

This standard is not intended to be used within the scope of the 'Machinery Directive'.

Two approaches are described to achieve compliance:
- complete truck tests;
- electrical/electronic systems with the components in the same configuration as in the truck.

In some situations trucks may be foreseen to be used in environments where the level of electro-magnetic disturbances are likely to exceed the test levels required by this standard. In these situations, levels and/or frequencies outside the specified test parameters will need to be applied. In addition many areas are not homogeneous for their EMC classification; for example, hospitals and airports have areas with different levels of classifications, for the areas outside the generic standard definitions special rules may be applicable.

1 Scope

This standard applies to industrial trucks regardless of the power source (called only trucks) as defined in ISO 5053, variable reach trucks and their electrical/electronic systems when used in Residential, Commercial, Light Industry and Industrial Environment (see EN 50081-1:1992 and EN 61000-6-2:1999).

This standard defines :
- the requirements and the limit values for electromagnetic emission and immunity ;
- the procedure and criteria for testing trucks and their electrical/electronic systems.

This standard does not cover:
- trucks intended for use outside the electromagnetic environments specified above;
- trucks intended for use on public highway with maximum speed exceeding 25 km/h;
- driverless industrial trucks and their systems;

- interaction between systems on the trucks;

- interference to on-board radio equipment;
- equipment connected to AC-mains which is only used when the truck is not being operated (e.g. on board charger)

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).

EN 50081-1:1992	Electromagnetic compatibility - Generic emission standard - Part 1: Residential, commercial and light industry
EN 61000-6-2:1999	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environment (IEC 61000-6-2:1999)
EN 55022	Information Technology Equipment - Radio Disturbance Characteristics - Limits and methods of measurement (CISPR22:1997, modified)
EN 61000-4-2	Electromagnetic compatibility (EMC) - Part 4 : Testing and measurement techniques – Section 2 : Electrostatic discharge immunity test - Basic EMC publication (IEC 61000-4-2:1995)
EN 61000-4-3	Electromagnetic compatibility (EMC) - Part 4 : Testing and measurement techniques - Section 3 : Radiated , radio-frequency, electromagnetic field immunity test (IEC 61000-4-3:1995, modified)

3 Terms and definitions

For the purposes of this standard, the following terms and definitions apply:

3.1
test sample
truck and/or electrical/electronic system for subjecting to type test accordingly to this standard.This sample can represent similar versions of trucks and / or systems with the same design concepts, concerning:

- the truck ;
- the electrical/electronic control system;
- the electrical machines (motors, generators);
- the system configuration, but with maximum cable and harness lengths

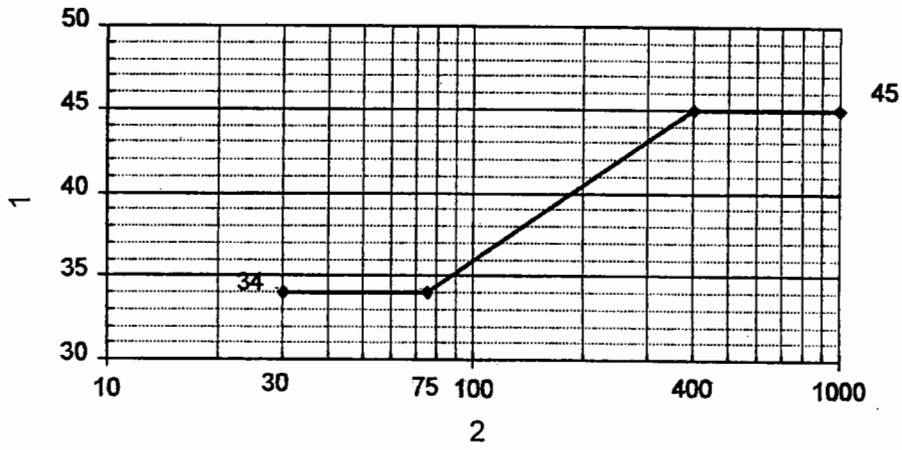
3.2
electrical/electronic system
electrical / electronic component(s) or set of components intended to be part of a machine together with any associated electrical connections and wiring which performs one or more specialized functions and operates on its own (also referred to as system).

4 Requirements

4.1 Emission

For trucks/systems the following limit values are valid at 10 m distance with an antenna height of 3 m (see Figure 1)

30 to 75 MHz	34 dB µV/m
75 to 400 MHz	34 to 45 dB µV/m increasing with the frequency
400 to 1000 MHz	45 dB µV/m



Key
1 Electric field (dB µV/m)
2 Frequency (MHz)

Figure 1 - Maximum limits of electromagnetic emissions.

When the tests are to be conducted at a distance which differs from 10 m , the equivalent antenna height and emission levels shall be used.

For trucks which can be connected to the AC-mains network , in addition to the above the limits stated in Table 1 of EN 50081-1:1992 apply.

The method of measurement shall be "quasi peak."

NOTE If the field strength measurement at 10 m cannot be made because of high ambient noise levels or for other reasons, measurement of equipment's under test may be made at a closer distance, for example 3 m. An inverse proportionality factor of 20dB per decade should be used to normalise the measured data to the specified distance for determining compliance.
Care should be taken in the measurement of large equipment at 3 m at frequencies near 30 Mhz, due to near field effects.

4.2 Immunity

For trucks / systems the following limit values are valid :

Table 1 - Immunity - Enclosure port

	Environmental phenomena	Test specifications	Units	Basic standard
1.1	Frequency Electromagnetic field Amplitude modulated	27 - 1000 * 10 80	MHz V/m (unmodulated,rms) % AM (1 kHz)	EN 61000-4-3
1.2	Frequency Electromagnetic field Pulse modulated	900 ± 5 10 50 200	MHz V/m (unmodulated,rms) % duty cycle Hz repetition frequency	EN 61000-4-3
1.3	Electrostatic discharge	4 Contact 8 Air discharge	kV (charge voltage)	EN 61000-4-2
* The frequency range has been extended to cover low frequency coupling to the harness.				

For trucks / systems which can be connected to the AC-mains network, in addition to the above the limits stated in Table 5 of EN 61000-6-2:1999 apply .

NOTE In practice, in the range 27 MHz to 80 MHz it may be difficult to reach uniformity of the field over the whole area where the truck/system is placed; it should be ensured however that all the critical parts are at least submitted to a field of 10 V/m.

5 Tests

5.1 General

The compliance with the limit values shall be proved. The tests here below are simplified tests without load, as tests for all the possible working conditions are not practical for technical and economic reasons.
Testing shall be conducted in accordance with 5.2, 5.3 and 5.4.
One of the following approaches shall be taken to achieve compliance:

- complete truck test,
  this test shall be carried out on a single test sample (type test) ;
- system test ,
  the system may be tested separated from the truck, it is essential that the installation of the system to the truck uses the same components and harness physically and electrically similar to those tested.

The test sample / system shall be in an operating condition. For the tests it may be necessary to change the normal operating condition. If test sample / systems are designed to operate with different nominal voltages, they shall be tested in the worst case condition.
The test sample / system shall be representative of the series production.

Complete systems e.g. internal combustion engine and additional electric equipment may be used without the need of additional tests if they are certified with the limits of this standard. If the installation differs significantly from the installation instructions of the systems manufacturer, the truck / test sample shall be tested.
All test results, the test procedure and the mode of operation during the test shall be recorded accurately in the test report.