SLOVENSKI STANDARD
oSIST prEN 1755:2026

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Vozila za talni transport - Varnostne zahteve in preverjanje - Dodatne zahteve za delovanje v potencialno eksplozivnih atmosferah

Industrial trucks - Safety requirements and verification - Supplementary requirements for operation in potentially explosive atmospheres

Flurförderzeuge - Sicherheitsanforderungen und Verifizierung - Zusätzliche Anforderungen für den Einsatz in explosionsgefährdeten Bereichen

Chariots de manutention - Prescriptions de sécurité et vérification - Prescriptions supplémentaires pour le fonctionnement en atmosphères explosibles

Ta slovenski standard je istoveten z: **prEN 1755**

ICS:

13.230	Varstvo pred eksplozijo	Explosion protection
53.060	Industrijski tovornjaki	Industrial trucks

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EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

Industrial trucks - Safety requirements and verification - Supplementary requirements for operation in potentially explosive atmospheres

Chariots de manutention - Prescriptions de sécurité et vérification - Prescriptions supplémentaires pour le fonctionnement en atmosphères explosibles

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

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 1755:2026) 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.

This document will supersede EN 1755:2024.

In comparison with the previous edition, the following technical changes have been made:

— removal of normative references to CLC/TR 60079-32-1:2018 and IEC TS 60079-46:2017 from the normative references;

— Re-designation of Annex A as informative;

— Normative references have been updated.

An overview of significant changes is also given in Table F.1.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

Introduction

This document is a type-C standard as stated in EN ISO 12100:2010.

This document is of relevance, in particular, for the following stakeholder groups representing the market players with regard to machinery safety:

— machine manufacturers (small, medium and large enterprises);

— health and safety bodies (regulators, accident prevention organizations, market surveillance, etc.).

Others can be affected by the level of machinery safety achieved with the means of the document by the above-mentioned stakeholder groups:

— machine users/employers (small, medium and large enterprises);

— machine users/employees (e.g. trade unions, organizations for people with special needs);

— service providers, e.g. for maintenance (small, medium and large enterprises);

— consumers (in case of machinery intended for use by consumers).

The above-mentioned stakeholder groups have been given the possibility to participate in the drafting process of this document.

The machines concerned and the extent to which hazards, hazardous situations or hazardous events are covered are indicated in the scope of this document.

When requirements of this type-C standard are different from those which are stated in type-A or type-B standards, the requirements of this type-C standard take precedence over the requirements of the other standards for machines that have been designed and built according to the requirements of this type-C standard.

This document covers specific safety requirements where industrial trucks will operate in potentially explosive atmospheres that are not covered exhaustively by:

— EN 1459-1:2025 and EN 1459-2:2015+A1:2018;

— ISO 24134:2006;

— EN ISO 3691-1:2015[1];

— EN ISO 3691-2:2023;

— EN ISO 3691-3:2016[2];

— EN ISO 3691-4:2023;

— EN ISO 3691-5:2015[3];

— EN ISO 3691-6:2021.

1 As impacted by EN ISO 3691-1:2015/AC:2016 and EN ISO 3691-1:2015/A1:2020.
2 As impacted by EN ISO 3691-3:2016/A1:2023.
3 As impacted by EN ISO 3691-5:2015/AC:2016 and EN ISO 3691-5:2015/A1:2020.

Assessment of hazards

The product needs to be designed in such a way that it is fit for its purpose or function and can be adjusted and maintained without putting persons at risk when used under the conditions foreseen by the manufacturer.

In order to properly design a product and to cover all specific safety requirements, the manufacturer needs to identify the hazards that apply to their product and carry out a risk assessment. The manufacturer then needs to design and construct the product taking this assessment into account.

The aim of this procedure is to eliminate the risk of accidents throughout the foreseeable lifetime of the machinery, including the phases of assembling and dismantling where risks of accidents can also arise from foreseeable abnormal situations.

In selecting the most appropriate methods, the manufacturer needs to apply the following principles, in the order given here:

a) eliminate or reduce risks as far as possible by design (inherently safe machinery design and construction);

b) take the necessary protective measures in relation to risks that cannot be eliminated by design;

c) inform users of any shortcoming of the protective measures adopted;

d) indicate whether any particular training is required;

e) specify any need to provide personal protection equipment;

f) refer to the appropriate user's document for proper operating instructions.

Industrial trucks need to be designed to prevent foreseeable misuse wherever possible, if such would engender risk. In other cases, the manufacturer's instructions need to draw the user's attention to ways shown by experience in which the machinery ought not to be used.

This document does not repeat all the technical rules which are state-of-the-art, and which are applicable to the material used to construct the industrial truck. Refer to EN ISO 12100:2010.

1 Scope

This document is applicable to self-propelled and pedestrian propelled manual and semi-manual industrial trucks as defined in ISO 5053-1:2020 including their load handling devices and attachments (hereafter referred to as trucks) intended for use in potentially explosive atmospheres.

NOTE 1 Attachments mounted on the load carrier or on fork arms which are removable by the user are not considered to be a part of the truck.

This document specifies supplementary technical requirements for the prevention of the ignition of an explosive atmosphere of flammable gases, vapours, mists or dusts by industrial trucks of equipment group II and equipment category 2G, 3G, 2D or 3D.

NOTE 2 The relationship between an equipment category (hereafter referred to as category) and the corresponding zone (area classification) is shown in informative Annex B.

This document does not apply to:

— trucks of equipment group I;

— trucks of equipment group II, equipment category 1;

— trucks intended for use in potentially explosive atmospheres with hybrid mixtures;

— protective systems.

This document does not apply to trucks intended for use in potentially explosive atmospheres of carbon disulfide (CS_2), carbon monoxide (CO) and/or ethylene oxide (C_2H_4O) due to the special properties of these gases.

Technical requirements relating to lithium-ion batteries and fuel cells as energy sources are not given in this document due to their specific hazards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 1175:2025, *Safety of industrial trucks — Electrical/electronic requirements*

EN 1834-1:2000, *Reciprocating internal combustion engines — Safety requirements for design and construction of engines for use in potentially explosive atmospheres — Part 1: Group II engines for use in flammable gas and vapour atmospheres*

EN 1834-3:2000, *Reciprocating internal combustion engines — Safety requirements for design and construction of engines for use in potentially explosive atmospheres — Part 3: Group II engines for use in flammable dust atmospheres*

EN 14986:2024[4], *Design of fans working in potentially explosive atmospheres*

EN 50271:2018, *Electrical apparatus for the detection and measurement of combustible gases, toxic gases or oxygen — Requirements and tests for apparatus using software and/or digital technologies*

[4] As impacted by EN 14986:2024/prA1:2025.

EN IEC 60079-14:2025, *Explosive atmospheres — Part 14: Electrical installations design, selection and installation of equipment, including initial inspection (IEC 60079-14:2024)*

EN 60079-29-1:2016[5], *Explosive atmospheres — Part 29-1: Gas detectors — Performance requirements of detectors for flammable gases (IEC 60079-29-1:2016)*

EN 60079-29-2:2015, *Explosive atmospheres — Part 29-2: Gas detectors — Selection, installation, use and maintenance of detectors for flammable gases and oxygen (IEC 60079-29-2:2015)*

EN 60079-29-3:2014, *Explosive atmospheres — Part 29-3: Gas detectors — Guidance on functional safety of fixed gas detection systems (IEC 60079-29-3:2014)*

EN IEC 60384-14:2023, *Fixed capacitors for use in electronic equipment — Part 14: Sectional specification — Fixed capacitors for electromagnetic interference suppression and connection to the supply mains (IEC 60384-14:2023)*

EN 60529:1991[6], *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 60695-11-10:2013[7], *Fire hazard testing — Part 11-10: Test flames — 50 W horizontal and vertical flame test methods (IEC 60695-11-10:2013)*

EN 61508-6:2010, *Functional safety of electrical/electronic/programmable electronic safety-related systems — Part 6: Guidelines on the application of IEC 61508-2 and IEC 61508-3 (IEC 61508-6:2010)*

EN IEC 60079-0:2018[8], *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017)*

EN IEC 60079-15:2019[9], *Explosive atmospheres — Part 15: Equipment protection by type of protection "n" (IEC 60079-15:2017)*

EN IEC 62061:2021[10], *Safety of machinery — Functional safety of safety-related control systems (IEC 62061:2021)*

EN ISO 284:2025, *Conveyor belts — Electrical conductivity — Specification and test method (ISO 284:2025)*

EN ISO 3691-1:2015[11], *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)*

EN ISO 13849-1:2023, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2023)*

EN ISO 80079-36:2016[12], *Explosive atmospheres — Part 36: Non-electrical equipment for explosive atmospheres — Basic method and requirements (ISO 80079-36:2016)*

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5 As impacted by EN 60079-29-1:2016/A1:2022 and EN 60079-29-1:2016/A11:2022.
6 As impacted by EN 60529:1991/corrigendum May 1993, EN 60529:1991/A1:2000, EN 60529:1991/A2:2013, EN 60529:1991/AC:2016-12 and EN 60529:1991/A2:2013/AC:2019-02.
7 As impacted by EN 60695-11-10:2013/AC:2014.
8 As impacted by EN IEC 60079-0:2018/AC:2020-02, EN IEC 60079-0:2018/A11:2024.
9 As impacted by EN IEC 60079-15:2019/A11:2026.
10 As impacted by EN IEC 62061:2021/A1:2024.
11 As impacted by EN ISO 3691-1:2015/AC:2016 and EN ISO 3691-1:2015/A1:2020.
12 As impacted by EN ISO 80079-36:2016/AC:2019.

EN ISO 80079-37:2016, *Explosive atmospheres — Part 37: Non-electrical equipment for explosive atmospheres — Non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k"' (ISO 80079-37:2016)*

ISO 1813:2025, *Belt drives — Electrical conductivity of antistatic belts: Characteristics and test methods*

ISO 9563:2015, *Belt drives — Electrical conductivity of antistatic endless synchronous belts — Characteristics and test methods*

ISO 7000:2019, *Graphical symbols for use on equipment — Registered symbols*

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org

3.1
explosive atmosphere
mixture with air, under atmospheric conditions, of flammable substances in the form of gases, vapours, mists or dusts in which, after ignition has occurred, combustion spreads to the entire unburned mixture

[SOURCE: EN 13237:2024, A.1]

3.2
potentially explosive atmosphere

atmosphere which could become explosive due to local and operational conditions

[SOURCE: EN 13237:2024, A.1]

3.3
hybrid mixture
mixture of flammable substances in different physical states with air

[SOURCE: EN 13237:2024, 3.60]

3.4
auto ignition temperature
lowest temperature (of a surface) at which under specified test conditions an ignition of a flammable gas or flammable vapour in mixture with air or air/inert gas occurs

[SOURCE: EN 13237:2024, 3.61.2]

3.5
minimum ignition temperature of a dust cloud
lowest temperature of a hot surface on which the most ignitable mixture of the dust with air is ignited under specified test conditions

[SOURCE: EN 13237:2024, 3.38]

3.6
minimum ignition temperature of a dust layer
lowest temperature of a hot surface at which ignition occurs in a dust layer under specified test conditions

[SOURCE: EN 13237:2024, 3.38]

3.7
service temperature
maximum or minimum temperature reached at specific points of the equipment when the equipment is operating at rated conditions, including ambient temperature and any external sources of heating or cooling

Note 1 to entry: Each equipment may reach different service temperatures in different parts.

Note 2 to entry: This definition applies to both electrical and non-electrical equipment and components.

[SOURCE: EN IEC 60079-0:2018, 3.79]

3.8
maximum surface temperature
highest temperature that can be attained in service under the most adverse operating conditions (but within the recognised tolerance) by any part or surface of equipment, protective system or component which can produce an ignition of the surrounding explosive atmosphere

Note 1 to entry: The maximum surface temperature is marked on the equipment and includes safety margins depending on the EPL of the equipment.

Note 2 to entry: The surface temperature which is relevant can be internal or external depending upon the type of ignition protection concerned.

Note 3 to entry: For Ex Equipment in an explosive dust atmospheres, this temperature occurs on the external surface of the enclosure and may include a defined dust layer condition.

[SOURCE: EN 13237:2024, 3.73]

3.9
wheel
circular structure able to rotate on an axle, either directly or with the use of bearing(s), with the external part in contact with the ground

[SOURCE: ISO 22877:2004, 1.1.1]

3.10
castor
assembly comprising a housing, one or more wheels, an axle and, if required, accessories

[SOURCE: ISO 22877:2004, 3.1]

3.11
tyre
outer part of a wheel, produced from different material from the wheel centre

[SOURCE: ISO 22877:2004, 1.1.6]

3.12
service brake
brake system allowing the operator or control system of a driverless truck to control, directly or indirectly, the speed of the truck or to bring the truck to a halt

EXAMPLE The brake can be electrical, hydraulic or mechanical or a combination of the three.

[SOURCE: ISO 6292:2020, 3.9, modified- “braking system” replaced with “brake”, addition of an example and control system of driverless truck]

3.13
restricted breathing enclosure “nR”
enclosure that is designed to restrict the entry of gases, vapours and mists

[SOURCE: EN IEC 60079-15:2019, 3.3]

3.14
safety function
function to be implemented by a safety device, which is intended to achieve or maintain a safe state for the equipment under control (EUC), in respect of ignition hazards

Note 1 to entry: See EN 50495 for the definitions of “safety device”, “safe state” and “equipment under control”.

[SOURCE: EN 50495:2010, 3.7, modified, addition of Note 1 to entry]

3.15
safety shutdown
shutdown of a truck or a piece of equipment activated by a safety function to prevent potential ignition sources from becoming effective

3.16
normal operation
operation of equipment conforming to its design specification and used within the limits specified by the manufacturer

Note 1 to entry: Failures (such as a breakdown of pump seals, flange gaskets or releases of substances caused by accidents) which involve repair or shut -down are not considered to be part of normal operation.

Note 2 to entry: Minor releases of flammable material may be part of normal operation. For example, releases of substances from seals which rely on wetting by the fluid which is being pumped are considered to be minor releases.

[SOURCE: EN ISO 80079-36:2016, 3.2]

3.17
malfunction
situation where equipment or components do not perform their intended function

[SOURCE: EN ISO 80079-36:2016, 3.3.1, modified- “with respect to explosion protection” deleted]

3.18
expected malfunction
disturbance or equipment malfunction which normally occur in practice

[SOURCE: EN ISO 80079-36:2016, 3.3.2]

3.19
rare malfunction
type of malfunction which may happen only in rare instances

[SOURCE: EN ISO 80079-36:2016, 3.3.3]

3.20
earthing strap
strap made of conductive or dissipative material strong enough to withstand mechanical and chemical influences and installed to achieve potential equalization between truck chassis and the floor/ground

3.21
controlled stop
condition in which the truck is in a safe stationary state

3.22
highly efficient electrostatic charge generating mechanism
process that generates a higher rate of electrostatic charge than simple operations

Note 1 to entry: For more information, see EN ISO 80079-36:2016, 6.7.3.

EXAMPLE 1 Rubbing, cleaning with a dry cloth, raising from a seat, walking, wiping of clothes are examples of simple operations

EXAMPLE 2 The flow of insulating liquids or powders, high voltage spray charging, running of transmission belts are examples of highly efficient electrostatic charge generating mechanisms

4 Safety requirements and/or protective measures

4.1 General

Trucks for use in potentially explosive atmospheres shall comply with the additional requirements given in 4.1 up to and including 4.11.

Trucks of Group II shall be subdivided according to the explosive gas atmosphere for which they are intended:

Group II subdivisions:

a) IIA;

b) IIB;

c) IIB + H_2;

d) IIB + C_2H_2;

e) IIB + H_2 + C_2H_2.

NOTE 1 Trucks marked IIB are also suitable for IIA applications.

NOTE 2 Trucks marked IIB+H_2, IIB+C_2H_2 or IIB+H_2+C_2H_2 are also suitable for IIA or IIB applications.

NOTE 3 Trucks equipped with a gas detection system are specifically marked in accordance with 6.3.3 g).

NOTE 4 H_2 is the chemical formula for hydrogen and C_2H_2 for acetylene.

Trucks of Group III shall be subdivided according to the explosive dust atmosphere for which they are intended:

Group III subdivisions:

1) IIIA: combustible flyings;

2) IIIB: non-conductive dusts;

3) IIIC: conductive dusts.

The following climatic conditions shall apply:

— maximum ambient temperature, unless otherwise specified and marked: +40 °C;

— lowest ambient temperature, unless otherwise specified and marked: −20 °C;

— altitude: up to 2 000 m.

NOTE 5 According to EN ISO 3691-1:2015, the lowest ambient temperature for trucks intended for use in normal indoor conditions is +5 °C.

NOTE 6 Further information can be found in EN IEC 60079-0:2018, 4.3.

Equipment shall be selected taking into consideration any service temperatures measured during the temperature tests described in 5.1.

4.2 Hot surfaces

4.2.1 General

For category 3G and 2G trucks the maximum surface temperature of any part of the truck shall not exceed the temperature class or maximum surface temperature specified on the truck marking plate.

For category 3D and 2D trucks the maximum surface temperature of any part of the truck which can come into contact with dust clouds or dust layers shall not exceed the maximum surface temperature specified on the truck marking plate.

Maximum surface temperatures shall be determined in accordance with 5.1.

Reduction of surface temperatures by means of thermal insulation is not permitted.

NOTE 1 The relationship between the maximum surface temperature of the equipment and the minimum ignition temperature of dust layers and dust clouds is given in EN 1127-1:2019, 6.4.2 and EN IEC 60079-14:2025, 7.3.9.3.

NOTE 2 The possible insulation effects of a dust layer on the surface temperatures are taken into account by the safety margin to the minimum ignition temperature of a dust layer specified in EN 1127-1:2019, 6.4.2 and EN IEC 60079-14:2025, 7.3.9.3.

4.2.2 Temperature monitoring

Surface temperatures may be limited by the use of a temperature monitoring and control system which provides a safety shutdown in accordance with 4.3 if limiting values are exceeded.

For both category 3 and category 2 trucks, the electrical temperature monitoring and control system shall fulfil the performance level PLr = c in accordance with EN ISO 13849-1:2023 or SIL 1 in accordance with EN IEC 62061:2021.