SLOVENSKI STANDARD
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Vozila za zbiranje odpadkov in pripadajoči iztresalniki - Splošne in varnostne zahteve - 2. del: Vozila za zbiranje odpadkov z nakladanjem s strani

Refuse collection vehicles and associated lifting devices - General requirements and safety requirements - Part 2: Side loaded refuse collection vehicles

Abfallsammelfahrzeuge und die dazugehörigen Schüttungen - Allgemeine Anforderungen und Sicherheitsanforderungen - Teil 2: Seitenlader

Bennes de collecte des déchets et leurs lève-conteneurs associés - Exigences générales et exigences de sécurité - Partie 2: Bennes à chargement latéral

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Refuse collection vehicles and associated lifting devices - General requirements and safety requirements - Part 2: Side loaded refuse collection vehicles

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This European Standard was approved by CEN on 25 March 2005 and includes Amendment 1 approved by CEN on 10 October 2009.

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Foreword

This document (EN 1501-2:2005+A1:2009) has been prepared by Technical Committee CEN/TC 183 “Waste management”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2010, and conflicting national standards shall be withdrawn at the latest by May 2010.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document includes Amendment 1, approved by CEN on 2009-10-10.

This document supersedes EN 1501-2:2005.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] ⟨A1⟩.

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).

[A1] For relationship with EU Directive(s), see informative Annexes ZA and ZB, which are integral parts of this document. ⟨A1]

The minimum essential criteria are considered to be of primary importance in providing safe, serviceable, economical, and practical side loaded refuse collection vehicles.

This European Standard is the second one of the series of co-ordinated standards of EN 1501 about “Refuse collection vehicles and their associated lifting devices” comprising the following parts:

— Part 1: Rear-end loaded refuse collection vehicles

— Part 2: Side loaded refuse collection vehicles

— Part 3: Front loaded refuse collection vehicles

— Part 4: Noise measurement protocol for refuse collection vehicles

— Part 5: Lifting devices for refuse collection vehicles (in preparation)

— Part 6: Electromagnetic compatibility (EMC) (in preparation)

— Amendment EN 1501-1/A1: Footboards

This European Standard is the second one of a series of standards dealing with specification, design, safety and testing of side loaded refuse collection vehicles (side loaded RCVs) and associated lifting devices.

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

Introduction

This European Standard is a type C standard as stated in EN ISO 12100-1.

The machinery concerned and the extent to which hazards, hazardous situations and events are covered are indicated in the scope of this European Standard.

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

The series of standards should be read in conjunction with the documents developed by CEN/TC 183/WG 1 for mobile waste containers (series of standards EN 840), for stationary waste containers (series of standards EN 12574) and for selective collection containers emptied by the top (Type B of EN 13071) that are compatible with the lifting devices specified in these standards.

While producing this European Standard it was assumed that:

— only persons who have been appropriately trained will operate the side loaded RCV;

— components without specific requirements are designed in accordance with the usual engineering practice and calculation codes, including all failure modes, of sound mechanical and electrical construction and made of materials with adequate strength and of suitable quality;

— harmful materials, such as asbestos, are not used as part of the machine;

— components are kept in good repair and working order, so that the required characteristics remain despite wear within the specified limits as stated in the maintenance manual;

— by design of the load bearing elements, a safe operation of the machine is assured for loading ranging from zero to 100 % of the rated capacities and during the tests;

— the equipment shall be designed for operation with an ambient temperature between -10 °C and +40 °C;

— negotiation occurs between the manufacturer and the user concerning the specific uses and places of use of the machinery;

— the locations for use of the side loaded RCV are safe (e.g. tarmac road).

The standard is designed for careful consideration by designers, manufacturers, suppliers and users of side loaded RCVs.

1 Scope

This European Standard specifies the technical requirements to minimise the hazards listed in Clause 5 which can arise during the operation and the maintenance of side loaded refuse collection vehicles (side loaded RCVs) used for the collection, transportation and unloading of solid wastes and as intended by the manufacturer or his authorised representative.

This European Standard deals with:

— side loaded refuse collection vehicles as defined in Clauses 3 and 4;

— lifting devices for side loaded refuse collection vehicles.

Examples for basic types of side loaded refuse collection vehicles are given in Annex B.

This European Standard does not establish the additional requirements for:

— design and equipment of the chassis, considered as meeting all road traffic requirements;

— operation in severe conditions (e.g. extreme environmental conditions such as: temperatures below –10 °C and above +40 °C, corrosive environment, tropical environment);

— operation subject to special rules (e.g. potentially explosive atmospheres, contaminating environments);

— static electricity problems;

— transportation of passengers, lifting of persons;

— loading by crane;

— loading by a satellite vehicle;

— containers other than those manufactured according to EN 840, EN 12574 and EN 13071;

— handling of loads the nature of which could lead to dangerous situations (e.g. hot wastes, acids and bases, radioactive materials, especially fragile loads, explosives);

— hazards occurring during construction, transportation, commissioning, decommissioning;

— hazards occurring in relation to traffic on public roads;

— wind velocity in excess of 75 km/h;

— direct contact with foodstuffs;

— hazards due to the noise of the side loaded RCV.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 294:1992, *Safety of machinery — Safety distances to prevent danger zones being reached by the upper limbs*

EN 349:1993, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

EN 418:1992, *Safety of machinery — Emergency stop equipment, functional aspects — Principles for design*

EN 457:1992, *Safety of machinery — Auditory danger signals — General requirements, design and testing (ISO 7731:1986, modified)*

EN 563:1994, *Safety of machinery — Temperatures of touchable surfaces — Ergonomics data to establish temperature limit value for hot surfaces*

EN 574:1996, *Safety of machinery — Two-hand control devices — Functional aspects — Principles for design*

EN 894-1:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 1: General principles for human interactions with displays and control actuators*

EN 894-2:1997, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*

EN 894-3:2000, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*

EN 953:1997, *Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards*

EN 954-1:1996, *Safety of machinery — Safety related parts of control systems — Part 1: General principles for design*

EN 982:1996, *Safety of machinery — Safety requirements for fluid power systems and their components — Hydraulics*

EN 1037:1995, *Safety of machinery — Prevention of unexpected start-up*

EN 1050:1996, *Safety of machinery — Principles for risk assessment*

EN 1088:1995, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection*

〉A1〈 EN 1501-4:2007, *Refuse collection vehicles and their associated lifting devices – General requirements and safety requirements — Part 4: Noise test code for refuse collection vehicles* 〉A1〈

EN 60204-1:1997, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (ISO 60204-1:1997)*

EN 60529:1991, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989)*

EN ISO 12100-1:2003, *Safety of machinery — Basic concepts, general principles for design — Part 1: Basic terminology, methodology (ISO 12100-1:2003)*

EN ISO 12100-2:2003, *Safety of machinery — Basic concepts, general principles for design — Part 2: Technical principles (ISO 12100-2:2003)*

ISO 7000:2004, *Graphical symbols for use on equipment — Index and synopsis*

IEC 60417-DB:2002, *Graphical symbols for use and equipment — Index, survey and compilation of single sheets*

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN ISO 12100:2003 and the following apply.

3.1
refuse collection vehicle (RCV)
vehicle intended for the collection and transportation of waste or recyclable materials based on loading via containers or by hand. It consists of a chassis with cab onto which the bodywork is mounted. The bodywork includes an integrated or interchangeable body. The bodywork also includes either a compaction mechanism or a lifting device or both

3.2
side loaded RCV
RCV into which the waste or recyclable materials are loaded from the sides

3.2.1
general
in side loaded RCVs waste is transferred manually or mechanically over the rave rail into a hopper. A compaction mechanism, if fitted, then transfers and compacts the waste from the hopper into a fixed or interchangeable body of the side loaded RCV. To discharge, either the body is tilted, rotated or an ejection device is used

3.2.2
types of side loaded RCVs
side loaded RCVs in the scope of this European Standard are classified into ten types (see Tables B.1 and B.2). These ten types are the following:

3.2.2.1
type 1
type 1 has an automatically controlled lifting device with extending arm commanded from the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.2
type 2
type 2 has a semi-automatically controlled lifting device with extending arm commanded from the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.3
type 3
type 3 has a manually controlled lifting device with extending arm commanded from the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.4
type 4
type 4 has an automatically controlled lifting device without extending arm commanded from outside of the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.5
type 5
type 5 has a semi-automatically controlled lifting device without extending arm commanded from outside of the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.6
type 6
type 6 has a manually controlled lifting device without extending arm commanded from outside of the cab and a compaction mechanism. This mechanism is automatic, semi-automatic or manual

3.2.2.7
type 7
type 7 has a manually controlled lifting device with an integrated container commanded from the cab or the outside. If present, the compaction mechanism is automatic, semi-automatic or manual

3.2.2.8
type 8
type 8 has an extending arm as a part of the lifting device. This extending arm is mounted between the bodywork and the cab and is commanded either automatically, semi-automatically or manually from the cab or from outside. If present, the compaction mechanism is automatic, semi-automatic or manual

3.2.2.9
type 9
type 9 has no lifting device (handloading only) and has a compaction mechanism, which is either automatic, semi-automatic or manual

3.2.2.10
type 10
type 10 has a lifting device but no compaction mechanism

3.2.2.11
combinations of these basic types are possible. Combination of a side loaded RCV with a rear loaded RCV complies with the corresponding clauses of both prEN 1501-2 and EN 1501-1

3.3
cab

enclosure mounted on the chassis in front of the bodywork where the driver controls the vehicle

3.4
body
part of the bodywork in which the collected waste is stored, it may be fixed or interchangeable or rotate as part of the compaction mechanism

3.5
capacity of the side loaded RCV
capacity of the internal volume available for waste, measured in cubic metres rounded off to one decimal place (V3 and V4 in Table B.3)

3.6
discharge door
part of the bodywork, hinged to the body, which needs to be opened to discharge the waste or recyclable materials

3.7
hopper
part of the bodywork into which the waste is loaded via containers or by hand. If the side loaded RCV has no compaction mechanism, the body is the hopper

3.8
capacity of the hopper
volume of non-compacted waste the hopper contains without taking into account the edge of the guide flap, measured in cubic metres rounded off to one decimal.place, when the compaction mechanism is in its fully retracted position (V1 and V2 in Table B.3)

3.9
rave rail
loading edge of the hopper (if no guide flap) or of the guide flap (see Figure A.2)

3.10
guide flap
removable or foldable extension to the rave rail

3.11
compaction mechanism
mechanism used to compact and transfer the waste from the hopper into the body

3.12
discharge system
device to empty the body

3.12.1
ejection plate system
system which allows the emptying of the body by moving an ejection plate (nominally occupying the inner cross section area of the body) from the front to the rear,after opening the discharge door

3.12.2
rotation drum system
discharge of the rotation drum is done by inversion of the rotation after opening the discharge door

3.12.3
discharge by tipping
system to empty the body by tilting the body to the rear after opening the discharge door

3.13
designated waste container
range or types of receptacles for storing waste prior to the collection by a side loaded RCV and which are compatible with the lifting device of the side loaded RCV

3.14
lifting device
mechanism located on either side of the side loaded RCV which empties waste containers into the hopper and puts them back on the ground. This mechanism may also include an integrated receptacle for waste

3.15
functional space (envelope)
functional space covered by the movements of the lifting device (including the waste containers) as specified by the manufacturer (see Figure A.1b)

3.16
extending arm
moving part of the lifting device to provide more horizontal reach to pick up the designated waste container(s)

3.17
clamp
mechanism which holds the waste container(s) by application of jaws. When these jaws overlap, it is called an overlapping clamp

3.18
rest position
location of lifting device and/or extending arm within the dimensions of the side loaded RCV, e.g. for the purpose of travel movement

3.19
hand loading
operation covering the loading of waste into the hopper of the side loaded RCV directly by hand

3.20
waste container emptying cycle
number of sequences to hold, pick up, lift and tilt the waste containers and put them back on the ground

3.21
visible area
area resulting from the design, visible by the operative from his working station, either in or outside of the cab. For types 1-2-3-7-8-10 of Annex B (in cab control; see Figure A.1b) and for types 4-5-6-9 of Annex B (on ground control; see Figure A.1c)

3.22
operative
operator in charge of the operation of the side loaded RCV

3.23
mono-operative side loaded RCV
when the whole sequence of movements of the waste container emptying cycle can be achieved only through the actuation of the controls located in the cab

3.24
working station
location outside of the functional space where the operative operates the machine during normal use. Inspection, cleaning and maintenance are excluded

3.25
hold-to-run control device
control device by which the operating function is only carried out as long as the control is activated according to 2.31 of EN 1070:1998. The operation stops automatically when the control is released

3.26
travel movement
motorised movement over 6 km/h of the side loaded RCV

3.27
positioning movement
motorised movement not exceeding 6km/h of the side loaded RCV

4 Modes and controls of side loaded RCVs

(Travel and positioning movements not included)

4.1 Operating modes

Movements of the mechanically moved parts of the side loaded RCV:

4.1.1 Manual: the mechanism achieves each movement within the waste container emptying cycle or the compaction cycle by a specific separate command.

4.1.2 Semi-automatic: the mechanism achieves each sequence of movements (two or more movements in one sequence) within the waste container emptying cycle or the compaction cycle by a specific command.

4.1.3 Automatic: the mechanism achieves all sequences of the waste container emptying cycle or the compaction cycle by one command without any other action.

4.2 Compaction operating modes and controls

4.2.1 Closed and open systems

4.2.1.1 Closed system

When the rave rail is 1 600 mm or more above the level on which the side loaded RCV is standing, and any shear trap is at least 850 mm away from the rave rail (see Figure A.2).

4.2.1.2 Open system

When the rave rail does not meet the above mentioned measurement of a closed system.

NOTE This approach is not related to the Annex IV of the machinery directive.

4.2.2 Compaction modes

Each side loaded RCV may be fitted with one or more of the following compaction operating modes:

4.2.2.1 Automatic compaction

Automatic compaction mechanisms are activated by an impulse command, e.g. by a start control device or by the emptying of a container into the hopper:

— continuous cycle is one that continually cycles until stopped by an independent action ("AUTO");

— single cycle is one that cycles once with a start impulse or the emptying and then stops without any other action ("SINGLE");

— multi cycle is one that cycles by a start impulse or emptying for a given number of times and then stops without any other action ("MULTI").

For single and/or multi cycles the start impulse may be generated by means of the start command of the lifting device.

4.2.2.2 Semi-automatic compaction

Semi-automatic compaction can either be a controlled cycle or an intermittent cycle as follows:

The controlled cycle is activated by one single hold-to-run control, e.g. button or lever, from the start until all shear traps have been passed. Thereafter, the cycle will be completed automatically, even if the button or lever is released ("CTRL").

The intermittent cycle works automatically without any other action and is interrupted at least 500 mm before the first shear trap. A hold-to-run control is required to run the compaction mechanism for that part of the cycle where a shear trap is created up to the end of the cycle ("SEMI").

4.2.2.3 Manual compaction

The compaction mechanism is commanded and controlled by the operative by means of a hold-to-run control, e.g. button or lever, for each movement ("MAN").

4.2.2.4 Selection of mode/compaction

A selection of mode is when a compaction operating mode can be changed to or from any of the modes mentioned under 4.2.2.1 to 4.2.2.3 ("SELECT").

4.3 Discharge system operating modes and controls

Each side loaded RCV may be designed for one or more of the following discharge operating mode(s), as described in 4.3.2 and 4.3.3:

4.3.1 Automatic discharge mode

The automatic discharge door opening and closing modes are forbidden.

4.3.2 Semi-automatic discharge mode

The discharge door automatically achieves each sequence of movement of the discharge cycle except for the final closure (at least 500 mm before closed position) by a command using a hold-to-run control device.

4.3.3 Manual discharge mode

The discharge door achieves each sequence of movement within the discharge cycle by a specific separate command.

4.4 Lifting device operating modes and controls

Each side loaded RCV may be designed for one or more of the following lifting device operating modes, as described in 4.4.1 to 4.4.3:

4.4.1 Manual lifting mode

The lifting device achieves each movement within the emptying cycle by a specific command using a hold-to-run control device.

4.4.2 Semi-automatic lifting mode

The lifting device achieves each sequence of movements (two or more movements in the sequence) of the emptying cycle by a command using a hold-to-run or impulse control device.

4.4.3 Automatic lifting mode

The lifting device achieves all the sequences of the emptying cycle by one command.

4.4.4 Selection of mode/lifting device

A selection of mode is when a lifting operating mode can be changed to or from any of the modes mentioned under 4.4.1 to 4.4.3 ("SELECT").

5 List of significant hazards

This clause contains all the significant hazards, risk areas and hazardous situations and events as far as they are dealt with in this European Standard, identified by risk assessment as significant for this type of machinery and which require action to eliminate or reduce the risk.