



SLOVENSKI STANDARD SIST EN 1501-1:2021

01-junij-2021

Nadomešča:

SIST EN 1501-1:2011+A1:2015

Vozila za zbiranje odpadkov - Splošne in varnostne zahteve - 1. del: Vozila za zbiranje odpadkov z nakladanjem zadaj

Refuse collection vehicles - General requirements and safety requirements - Part 1: Rear loaded refuse collection vehicles

Abfallsammelfahrzeuge - Allgemeine Anforderungen und Sicherheitsanforderungen - Teil 1: Hecklader

Véhicules de collecte de déchets - Exigences générales et exigences de sécurité - Partie 1 : Véhicules de collecte de déchets à chargement arrière

<https://standards.iteh.ai/catalog/standards/sist/d5d240a0-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

Ta slovenski standard je istoveten z: EN 1501-1:2021

ICS:

13.030.40	Naprave in oprema za odstranjevanje in obdelavo odpadkov	Installations and equipment for waste disposal and treatment
43.160	Vozila za posebne namene	Special purpose vehicles

SIST EN 1501-1:2021

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 1501-1:2021

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

EUROPEAN STANDARD

EN 1501-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2021

ICS 43.160

Supersedes EN 1501-1:2011+A1:2015

English Version

Refuse collection vehicles - General requirements and safety requirements - Part 1: Rear loaded refuse collection vehicles

Véhicules de collecte de déchets - Exigences générales et exigences de sécurité - Partie 1 : Véhicules de collecte de déchets à chargement arrière

Abfallsammelfahrzeuge - Allgemeine Anforderungen und Sicherheitsanforderungen - Teil 1: Hecklader

This European Standard was approved by CEN on 15 February 2021.

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 CEN-CENELEC Management Centre or to any CEN member.

iTeh STANDARD PREVIEW

(standards.itih.eu)

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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

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

Contents

	Page
European foreword.....	4
Introduction	6
1 Scope.....	8
2 Normative references.....	9
3 Terms and definitions	11
4 List of significant hazards	17
5 Safety requirements and protective measures	21
5.1 General.....	21
5.2 Danger Zones.....	21
5.2.1 General.....	21
5.2.2 Verification.....	23
5.3 Compaction mechanism.....	23
5.3.1 General.....	23
5.3.2 Interaction between bodywork and compaction mechanism	23
5.3.3 Hopper	23
5.3.4 Relationship between the compaction mechanism and the rake rail.....	24
5.3.5 Guide flap	24
5.3.6 Additional equipment(s).....	24
5.3.7 Guards.....	24
5.3.8 Electro-sensitive protective equipment (ESPE).....	24
5.3.9 Controls for the compaction mechanism.....	25
5.4 Discharge system	25
5.4.1 Controls for discharge system	25
5.4.2 Operation conditions for the tailgate or discharge door.....	26
5.4.3 Operation conditions for emptying the body and the tailgate.....	26
5.4.4 Hinged adaptation frame	27
5.5 Requirements for the refuse container lifting device(s)	27
5.6 Position of the refuse container lifting device in relation to the compaction mechanism.....	27
5.7 Satellite vehicle.....	27
5.8 Hydraulic, pneumatic and electric systems.....	27
5.8.1 Hydraulic system.....	27
5.8.2 Pneumatic system	27
5.8.3 Electric system	28
5.9 Operating symbols.....	28
5.10 Riding on rear loaded RCV by operator(s).....	30
5.10.1 General.....	30
5.10.2 Cab	30
5.10.3 Footboard(s) and handles.....	31
5.11 Control systems	34
5.11.1 General requirements for safety circuits	34
5.11.2 Emergency stop devices.....	34
5.11.3 Control devices.....	35
5.12 Monitoring and warning.....	37
5.12.1 Closed circuit television system.....	37
5.12.2 Communication.....	37

5.12.3 Warnings.....	37
5.13 Electrical components.....	39
5.13.1 General	39
5.13.2 Protective interlocks.....	39
5.13.3 Two-hand operating controls.....	39
5.13.4 Overload protection.....	39
5.13.5 Energy interruption.....	39
5.13.6 Position sensors	39
5.13.7 Terminals and wire connections.....	39
5.13.8 Electric cables and wiring harness.....	39
5.13.9 Working lights	40
5.14 Requirements for maintenance.....	40
5.14.1 Unexpected start-up	40
5.14.2 Raised tailgate or discharge door or tilting body	40
5.14.3 Access and inspection door(s)	40
5.14.4 Cleaning.....	40
5.15 Stability and driving security.....	40
5.15.1 General	40
5.15.2 Stability in container lifting mode.....	41
5.15.3 Stability in discharging mode.....	41
5.15.4 Lateral stability	41
5.15.5 Minimum front axle mass	41
5.16 Exhaust pipe	41
5.17 Ventilation of the body.....	41
5.18 Vibration.....	41
5.18.1 Hand-arm vibration.....	41
5.18.2 Whole-body vibration.....	41
5.18.3 Uncertainty of vibration measurements.....	42
5.19 Noise control	42
6 Verification	43
7 Information for use.....	43
7.1 Instruction handbook	43
7.2 Maintenance	45
7.3 Spare parts list.....	46
7.4 Data sheet.....	46
7.5 Marking	46
Annex A (normative) Description of interfaces and systems	47
Annex B (normative) Open and closed systems - Footboard(s).....	50
Annex C (normative) Basic scenarios of different danger zones.....	60
Annex D (informative) Volumes	70
Annex E (informative) Illuminated areas	71
Annex ZA (informative) Relationship between this European Standard and the essential requirements of EU Directive 2006/42/EC aimed to be covered	72
Bibliography	77

EN 1501-1:2021 (E)**European foreword**

This document (EN 1501-1:2021) 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 September 2021 and conflicting national standards shall be withdrawn at the latest by March 2022.

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

This document supersedes EN 1501-1:2011+A1:2015.

This document has been prepared under a standardization request 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 document.

The main changes compared to the previous edition are listed below:

- TECH STANDARD PREVIEW
- (standard(s) in draft)
- document has been completely revised and partially restructured;
 - European foreword and Introduction have been updated;
 - Clause 1, Scope, has been slightly revised and clarified;
 - Clause 2, Normative references, have been updated;
 - in Clause 3 new terms and definitions have been added and others revised;
 - Table 1 has been updated;
 - Table 2 “Basic scenarios and applicable danger zones” and a completely new Annex C with multiple figures of danger zones has been added;
 - previous Annex C “Technical file” has been deleted;
 - requirements on footboards and handles (5.10.3), reversing (5.10.3.4.3), remote controls (5.11.3.5), monitoring and warning (5.12), stability (5.15), noise control (5.19) and many more have been revised or added;
 - new Annex E “Illuminated areas” has been added;
 - Annex ZA has been updated.

EN 1501 consists of the following parts under the general title *Refuse collection vehicles — General requirements and safety requirements*:

- *Part 1: Rear loaded refuse collection vehicles (this part)*;

- *Part 2: Side loaded refuse collection vehicles;*
- *Part 3: Front loaded refuse collection vehicles;*
- *Part 4: Noise test code for refuse collection vehicles;*
- *Part 5: Lifting devices for refuse collection vehicles.*

This document will be enforced at the same time as EN 1501-5:2021 and applied whenever the RCV is fitted with a lifting device.

For combinations of a rear loaded refuse collection vehicle with side and/or front loading capability the corresponding clauses of EN 1501-2:2021, EN 1501-3:2021 and EN 1501-5:2021 apply.

This document has been prepared under a standardization request 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 document.

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, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

SIST EN 1501-1:2021

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

EN 1501-1:2021 (E)**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 organisations, 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, organisations 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 at the drafting process of this document.

The machinery 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 is intended for careful consideration by designers, manufacturers, suppliers and users of rear loaded RCVs.

This document should be read in conjunction with EN 1501-5:2021 developed for lifting devices which are compatible with the refuse collection vehicle specified in this document.

While producing this document it was assumed that:

- for RCV the requirements of road traffic regulations apply. Where road traffic regulations are in conflict with the provisions of this standard, the road regulations have priority;
- due to the European regulations on the approval of vehicles for use on public roads, the requirements of UN/ECE R10:2019 for an RCV with regard to EMC applies. Therefore, EMC is not further considered in this standard;
- the guidelines issued by the chassis manufacturer have been taken into account;
- chassis related safety items are handled by the chassis manufacturer according to their state of the art and in compliance with the public road regulations;
- the guidelines of the lifting device manufacturer have been taken into account;
- based on measurements of different types of RCV hand-arm vibrations are in general lower than 2,5 m/s²;

- based on measurements on different types of RCV whole body vibrations are in general lower than 0,5 m/s²;
- 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 of adequate strength and of suitable quality;
- components are kept in good repair and working order, so that the required characteristics remain despite wear and tear;
- harmful materials, such as asbestos, are not used as part of the rear loaded RCV;
- only persons who have been appropriately trained will operate the rear loaded RCV.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 1501-1:2021](https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021)

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

EN 1501-1:2021 (E)**1 Scope**

This document applies to rear loaded refuse collection vehicles (RCV), as defined in 3.2.

This document deals with all significant hazards, hazardous situations and events relevant to the rear loaded RCV, when it is used as intended and under conditions of misuse which are reasonably foreseeable by the manufacturer, throughout its foreseeable lifetime, as defined in Clause 4.

This document is applicable to the design and construction of the rear loaded RCV so as to ensure that it is fit for its intended function and can be operated, cleaned (including unblocking), adjusted and maintained during its entire lifetime. It is not applicable to the end of life of the rear loaded RCV.

This document describes and defines the safety requirements of rear loaded RCVs excluding the interface tailgate/discharge door with the lifting device(s) and the lifting device(s) itself and excluding loader cranes, which could be mounted on the RCV.

Safety requirements for the lifting device(s) and the interface with the tailgate/discharge door are defined in EN 1501-5:2021.

Safety requirements for loader cranes are defined in EN 12999:2020. Additional specific requirements to loader cranes installed on RCVs are defined in EN 1501-5:2021.

This document also applies to compactors, operated on a truck for collecting purposes.

This document is not applicable to:

- operation in severe conditions, e.g. extreme environmental conditions such as:
 - below $-20\text{ }^{\circ}\text{C}$ and above $+40\text{ }^{\circ}\text{C}$ temperatures;
 - tropical environment;
 - wind velocity in excess of 75 km/h ;
- contaminating environment;
- corrosive environment;
- operation in potentially explosive atmospheres;
- handling of loads the nature of which could lead to dangerous situations (e.g. hot refuses, acids and bases, radioactive materials, contaminated refuse, especially fragile loads, explosives);
- operation on ships.

This document is not applicable to machinery which is manufactured before the date of publication of this document by CEN.

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 547-1:1996+A1:2008, *Safety of machinery - Human body measurements - Part 1: Principles for determining the dimensions required for openings for whole body access into machinery*

EN 547-2:1996+A1:2008, *Safety of machinery - Human body measurements - Part 2: Principles for determining the dimensions required for access openings*

EN 894-1:1997+A1:2008, *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+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 2: Displays*

EN 894-3:2000+A1:2008, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 3: Control actuators*

EN 894-4:2010, *Safety of machinery - Ergonomics requirements for the design of displays and control actuators - Part 4: Location and arrangement of displays and control actuators*

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*

EN 1501-5:2021, *Refuse collection vehicles - General requirements and safety requirements - Part 5: Lifting devices for refuse collection vehicles*
<https://standards.sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

EN 60204-1:2018, *Safety of machinery - Electrical equipment of machines - Part 1: General requirements (IEC 60204-1:2016, modified)*

EN 60529:1991¹⁾, *Degrees of protection provided by enclosures (IP Code) (IEC 60529:1989)*

EN 61310-1:2008, *Safety of machinery - Indication, marking and actuation - Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1:2007)*

EN 61496-1:2013, *Safety of machinery - Electro-sensitive protective equipment - Part 1: General requirements and tests (IEC 61496-1:2012)*

EN ISO 374-1:2016²⁾, *Protective gloves against dangerous chemicals and micro-organisms - Part 1: Terminology and performance requirements for chemical risks (ISO 374-1:2016)*

EN ISO 4413:2010, *Hydraulic fluid power - General rules and safety requirements for systems and their components (ISO 4413:2010)*

EN ISO 4414:2010, *Pneumatic fluid power - General rules and safety requirements for systems and their components (ISO 4414:2010)*

1) As impacted by EN 60529:1991/A1:2000 and EN 60529:1991/A2:2013.

2) As impacted by EN ISO 374-1:2016/A1:2018.

EN 1501-1:2021 (E)

EN ISO 7731:2008, *Ergonomics - Danger signals for public and work areas - Auditory danger signals (ISO 7731:2003)*

EN ISO 12100:2010, *Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)*

EN ISO 13732-1:2008, *Ergonomics of the thermal environment - Methods for the assessment of human responses to contact with surfaces - Part 1: Hot surfaces (ISO 13732-1:2006)*

EN ISO 13849-1:2015, *Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design (ISO 13849-1:2015)*

EN ISO 13849-2:2012, *Safety of machinery - Safety-related parts of control systems - Part 2: Validation (ISO 13849-2:2012)*

EN ISO 13850:2015, *Safety of machinery - Emergency stop function - Principles for design (ISO 13850:2015)*

EN ISO 13854:2019, *Safety of machinery - Minimum gaps to avoid crushing of parts of the human body (ISO 13854:2017)*

EN ISO 13855:2010, *Safety of machinery - Positioning of safeguards with respect to the approach speeds of parts of the human body (ISO 13855:2010)*

EN ISO 13857:2019, *Safety of machinery - Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2019)*

EN ISO 14118:2018, *Safety of machinery - Prevention of unexpected start-up (ISO 14118:2017)*

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816->

EN ISO 14120:2015, *Safety of machinery - Guards - General requirements for the design and construction of fixed and movable guards (ISO 14120:2015)*

IEC 60417:2002, [online database], *Graphical symbols for use on equipment*

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

iTeh STANDARD PREVIEW

(standards.iteh.ai)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 12100:2010 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

3.1

refuse collection vehicle

RCV

vehicle used for the collection and transportation of refuse (e.g. household refuse, bulky refuse, recyclable materials) based on loading via refuse containers or by hand

Note 1 to entry: Most of the time it consists of a chassis or rigid chassis onto which a bodywork is mounted. Sometimes it can also be a truck and trailer combination.

Note 2 to entry: A RCV is a special purpose vehicle according to 2007/46/EC Annex II, Part A, 5.8.

3.2

rear loaded RCV

RCV, in which refuse is loaded into the body from the rear

Note 1 to entry: In rear loaded RCVs refuse is transferred manually or mechanically from the rear rake rail into a hopper. A compaction mechanism, if fitted, then transfers and compacts the refuse from the hopper into a fixed or interchangeable body of the rear loaded RCV. To discharge, either the body is tilted, rotated or an ejection device is used.

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

3.3

cab

enclosure mounted on the chassis in front of the bodywork where the operator drives and controls the RCV and where other potential operator(s) can sit

3.4

bodywork

assembly of all components fitted on the chassis of the RCV which includes the body itself

Note 1 to entry: The bodywork can be fixed or interchangeable. The bodywork also includes either a compaction mechanism, a lifting device or (a) footboard(s) or any combination of the three.

3.5

body

part of the bodywork in which the collected refuse is transported

Note 1 to entry: It may be fixed or interchangeable or rotate as part of the compaction mechanism.

Note 2 to entry: To discharge the collected refuse, the body is either tilted or rotated or an ejection system is used.

Note 3 to entry: See 3 in Figure A.1 and 1 in Figure A.2.

EN 1501-1:2021 (E)**3.6****discharge mode**

sequence of operations to empty the RCV

3.7**tailgate**

rear part of the bodywork connected to the body incorporating a compaction mechanism

Note 1 to entry: It is designed to be opened to discharge the collected refuse from the body

3.8**discharge door**

part of the bodywork, connected to the body without compaction mechanism

Note 1 to entry: It is designed to be opened to discharge the collected refuse.

3.9**hopper**

part of the bodywork where waste is emptied manually or charged mechanically

3.10**capacity of the hopper**

volume of non-compacted refuse the hopper contains, measured in cubic metres rounded off to one decimal place, when the compaction mechanism is in its fully retracted position

Note 1 to entry: See V_2 in Figure D.1.

(standards.iteh.ai)

Note 2 to entry: The additional volume created by the guide flap is V_3 of Figure D.1.

<https://standards.iteh.ai/catalog/standards/sist/d3d246a6-82ae-41f8-9816-73163ac479fd/sist-en-1501-1-2021>

3.11**loading edge**

perimeter of the loading opening

Note 1 to entry: See Figure A.2 and Figures B.1, B.2 and B.3.

3.12**rave rail**

lowest fixed limit of the loading edge or nearest edge in relation to the position of the operator

Note 1 to entry: See Figures B.1, B.2 and B.3.

3.13**guide flap**

removable or foldable extension to the rave rail

Note 1 to entry: See Figure A.2 and Figure B.2.

3.14**manual mode**

mechanism achieving either each movement or each sequence of movements by a hold-to-run command

Note 1 to entry: Each sequence of movements means two or more movements in one sequence.

3.15**semi-automatic mode**

mechanism achieving either each movement or each sequence of movements by a manual pulse start command

Note 1 to entry: A sequence of movements means two or more movements in one sequence.

3.16**automatic mode**

mechanism achieving a sequence of movements by a pulse start command

3.17**compaction mechanism**

mechanism used to compact and/or transfer refuse from the hopper into the body

Note 1 to entry: See for example Figures A.2 and A.3.

3.18**open and closed systems**

distinct configurations of the compaction mechanism in relation to its accessibility for the operator

3.18.1**open system**

configuration where the operator can reach the hazardous area of the compaction mechanism from the level on which the operator is standing

Note 1 to entry: See Figures B.1 and B.2 ground or footboard(s) when fitted.

3.18.2**closed system**

configuration where the operator cannot reach the hazardous area of the compaction mechanism from the level on which the operator is standing

Note 1 to entry: See Figures B.2 and B.3 ground or footboard(s) when fitted.

3.19**discharge system**

mechanism and movement for emptying the body

EXAMPLE Ejection plate, rotating drum, tipping system, walking floor.

3.19.1**ejection plate**

means of emptying the body by moving the ejection device to the rear after opening the tailgate or the discharge door if needed

3.19.2**rotating drum**

means of emptying of the body by rotation of the drum after opening the tailgate or the discharge door if needed