
Vozila za zbiranje odpadkov in pripadajoči iztresalniki - Splošne in varnostne zahteve - 3. del: Vozila za zbiranje odpadkov z nakladanjem spredaj

Refuse collection vehicles and their associated lifting devices - General requirements and safety requirements - Part 3: Front loaded refuse collection vehicles

Abfallsammelfahrzeuge und die dazugehörigen Schüttungen - Allgemeine Anforderungen und Sicherheitsanforderungen - Teil 3: Frontlader

Véhicules de collecte de déchets et leurs lève-conteneurs associés - Exigences générales et exigences de sécurité - Partie 3 : Véhicules de collecte de déchets à chargement frontal

<https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-pr-en-1501-3-2020>

Ta slovenski standard je istoveten z: prEN 1501-3

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

oSIST prEN 1501-3:2018

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[ksIST FprEN 1501-3:2020](https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020)

<https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1501-3

February 2018

ICS 43.160

Will supersede EN 1501-3:2008

English Version

Refuse collection vehicles and their associated lifting devices - General requirements and safety requirements - Part 3: Front loaded refuse collection vehicles

Véhicules de collecte de déchets et leurs lève-conteneurs associés - Exigences générales et exigences de sécurité - Partie 3 : Véhicules de collecte de déchets à chargement frontal

Abfallsammelfahrzeuge und die dazugehörigen Schüttungen - Allgemeine Anforderungen und Sicherheitsanforderungen - Teil 3: Frontlader

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 183.

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.

This draft European Standard was established by CEN 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

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.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	8
4 List of significant hazards	14
5 General safety requirements and protective measures.....	18
5.1 General.....	18
5.2 Danger zones	18
5.2.1 General.....	18
5.2.2 Verification.....	20
5.3 Compaction mechanism.....	20
5.3.1 Interaction between bodywork and compaction mechanism	20
5.3.2 Rear of the cab protection.....	20
5.3.3 Hopper — Capacity of the hopper and dimensions	21
5.3.4 Additional equipment.....	21
5.3.5 Guards	21
5.3.6 Front loaded RCV with rotation drum body.....	21
5.3.7 Controls for the compaction mechanism.....	21
5.4 Discharge system	22
5.4.1 Controls for discharge system.....	22
5.4.2 Operation conditions for the discharge door.....	22
5.4.3 Laterally hinged discharge door.....	23
5.4.4 Operation conditions for emptying the body.....	23
5.5 Requirements for refuse container lifting device(s) and interfaces	23
5.6 Top door(s) (if present).....	23
5.6.1 Opening and closing of the top door.....	23
5.6.2 Top door warning	23
5.7 Hydraulic, pneumatic and electric powered systems	23
5.7.1 Hydraulic systems.....	23
5.7.2 Pneumatic systems.....	24
5.7.3 Electric powered systems	24
5.8 Interchangeable body system.....	24
5.9 Operating symbols.....	24
5.10 Riding on front loaded RCV by operator(s) — Riding in the cab	26
5.11 Monitoring and warning — Requirement for field of vision	26
5.12 Control systems	27
5.12.1 General requirements for safety circuits	27
5.12.2 Emergency stopping devices.....	27
5.12.3 Control devices.....	28
5.13 Electrical components	30
5.13.1 General.....	30
5.13.2 Electromagnetic compatibility (EMC).....	30
5.13.3 Remote controls.....	31
5.13.4 Safety related interlocks.....	31

5.13.5	Two-hand operating controls.....	31
5.13.6	Overload protection.....	32
5.13.7	Energy interruption.....	32
5.13.8	Position sensors.....	32
5.13.9	Terminals and wire connections.....	32
5.14	Requirements for maintenance.....	32
5.14.1	Unexpected start-up.....	32
5.14.2	Raised discharge door or tilting body.....	32
5.14.3	Access and inspection door(s).....	33
5.14.4	Access to the roof.....	33
5.15	Stability and driving security.....	33
5.15.1	General.....	33
5.15.2	Stability in discharging mode.....	33
5.15.3	Lateral stability.....	34
5.15.4	Minimum front axle mass.....	34
5.16	Others.....	34
5.16.1	Exhaust pipe.....	34
5.16.2	Ventilation of the body.....	34
5.17	Noise control.....	34
6	Information for use.....	35
6.1	General.....	35
6.1.1	Introduction.....	35
6.1.2	Operator's manual.....	35
6.2	Maintenance.....	36
6.3	Spare parts list.....	37
6.4	Data sheet.....	37
6.5	Marking.....	37
7	Verification.....	37
Annex A (normative)	Components of the vehicle.....	39
Annex B (normative)	Examples of data sheet.....	41
Annex C (informative)	Basic scenarios of different danger zones.....	43
Annex D (normative)	Warning signals.....	47
Annex ZA (informative)	Relationship between this European Standard and the Essential Requirements of EU Directive 2006/42/EC.....	48
Bibliography	49

prEN 1501-3:2018 (E)**European foreword**

This document (prEN 1501-3:2018) has been prepared by Technical Committee CEN/TC 183 “Waste management”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1501-3:2008.

This document 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 document.

The EN 1501 series consists of the following parts:

- *Refuse collection vehicles — General requirements and safety requirements — Part 1: Rear loaded refuse collection vehicles;*
- *Refuse collection vehicles — General requirements and safety requirements — Part 2: Side loaded refuse collection vehicles;*
- *Refuse collection vehicles and their associated lifting devices — General requirements and safety requirements — Part 3: Front loaded refuse collection vehicles (this part);*
- *Refuse collection vehicles and their associated lifting devices — General requirements and safety requirements — Part 4: Noise test code for refuse collection vehicles;*
- *Refuse collection vehicles — General requirements and safety requirements — Part 5: Lifting devices for refuse collection vehicles.*

It will be enforced at the same time as prEN 1501-5:2018 and applied whenever the rear loaded RCV is fitted with a lifting device.

Combinations of a front loaded refuse collection vehicle according to this standard with rear and/or side loading capability will comply with the corresponding clauses of prEN 1501-1, prEN 1501-2 and prEN 1501-5.

Introduction

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

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

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.

While producing this standard it was assumed that:

- wherever national road regulations interfere those regulations would be met.
- the guidelines issued by the chassis-cab manufacturer have been taken into account;
- that based on measurements on different types of RCVs hand-arm vibrations are in general lower than $2,5 \text{ m/s}^2$;
- that based on measurements on different types of RCVs whole-body vibrations are lower than $0,5 \text{ m/s}^2$;
- 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;
- components are kept in good repair and working order, so that the required characteristics remain despite wear; <https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020>
- harmful materials, such as asbestos, are not used as part of the front loaded RCV;
- only persons who have been appropriately trained will operate the front loaded RCV.

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

prEN 1501-3:2018 (E)**1 Scope**

This document applies to front loaded refuse collection vehicle (RCV), as defined in 3.2 with closed system defined in 3.13.

This document deals with all significant hazards, hazardous situations and events relevant to the front 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 front loaded RCV so as to ensure that it is fitted for its function and can be operated adjusted and maintained during its entire lifetime. It is not applicable to the end of life of the front loaded RCV.

prEN 1501-3 describes and defines the safety requirements of front loaded RCV excluding the interface with the lifting device(s) and excluding the lifting device itself and excluding loader cranes, which could be mounted on the RCV.

Safety requirements for the lifting device(s), loader cranes and their interface to the RCV are defined in prEN 1501-5.

Safety requirements for loader cranes are defined in EN 12999. Additional requirements to loader cranes installed as a loading device for handling containers for refuse or recyclable material on RCVs are defined in prEN 1501-5.

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 $-25\text{ }^{\circ}\text{C}$ 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 349, *Safety of machinery — Minimum gaps to avoid crushing of parts of the human body*

- EN 547-1, *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, *Safety of machinery — Human body measurements — Part 2: Principles for determining the dimensions required for access openings*
- EN 574, *Safety of machinery — Two-hand control devices — Functional aspects — Principles for design*
- EN 894-1, *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, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 2: Displays*
- EN 894-3, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 3: Control actuators*
- EN 894-4, *Safety of machinery — Ergonomics requirements for the design of displays and control actuators — Part 4: Location and arrangement of displays and control actuators*
- EN 1037, *Safety of machinery — Prevention of unexpected start-up*
- 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*
- prEN 1501-5:2018, *Refuse collection vehicles — General requirements and safety requirements — Part 5: Lifting devices for refuse collection vehicles*
- EN 60204-1:2006, *Safety of machinery — Electrical equipment of machines — Part 1: General requirements (IEC 60204 1:2005, modified)*
- EN 60529, *Degrees of protection provided by enclosures (IP Code) (IEC 60529)*
- EN 61310-1, *Safety of machinery — Indication, marking and actuation — Part 1: Requirements for visual, acoustic and tactile signals (IEC 61310-1)*
- EN ISO 374-1, *Protective gloves against dangerous chemicals and micro-organisms — Part 1: Terminology and performance requirements for chemical risks (ISO 374-1)*
- EN ISO 4413, *Hydraulic fluid power — General rules and safety requirements for systems and their components (ISO 4413)*
- EN ISO 2867, *Earth-moving machinery — Access systems (ISO 2867)*
- EN ISO 7731, *Ergonomics — Danger signals for public and work areas — Auditory danger signals (ISO 7731)*
- EN ISO 12100:2010, *Safety of machinery — General principles for design — Risk assessment and risk reduction (ISO 12100:2010)*
- EN ISO 13732-1, *Ergonomics of the thermal environment — Methods for the assessment of human responses to contact with surfaces — Part 1: Hot surfaces (ISO 13732-1)*

prEN 1501-3:2018 (E)

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

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

EN ISO 13857:2008, *Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs (ISO 13857:2008)*

EN ISO 14119:2013, *Safety of machinery — Interlocking devices associated with guards — Principles for design and selection (ISO 14119:2013)*

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

EN ISO 14122-2, *Safety of machinery — Permanent means of access to machinery — Part 2: Working platforms and walkways (ISO 14122-2)*

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

ISO 7000 [online database], *Graphical symbols for use on equipment*

UN/ECE R-10, *Regulation No. 10 — Uniform provisions concerning the approval of vehicles with regard to electromagnetic compatibility*

UN/ECE R-65, *Regulation No. 65 — Uniform provisions concerning the approval of special warning lamps for power-driven vehicles and their trailers*

STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020>

3 Terms and definitions

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

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

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

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: It consists of a chassis-cab onto which a bodywork is mounted.

[SOURCE: prEN 1501-1:2018, 3.1]

3.2**front loaded RCV**

RCV into which the refuse or recyclable materials are loaded from the front

Note 1 to entry: In front loaded RCVs refuse is transferred manually or mechanically from the front over the rave 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 front loaded RCV. To discharge, either the body is tilted, rotated or an ejection device is used. The trajectory of the refuse container is over the top of the cab or the front axle, regardless where the refuse container is picked up.

3.3**cab**

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

[SOURCE: prEN 1501-1:2018, 3.3]

3.4**bodywork**

assembly of all components fitted on the chassis-cab of the RCV including 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.

[SOURCE: prEN 1501-1:2018, 3.4]

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 2 in Figure A.1 and Figure A.2.

[SOURCE: prEN 1501-1:2018, 3.5 — modified, Note 3 to entry added]

3.6**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 or recyclable materials.

[SOURCE: prEN 1501-1:2018, 3.8]

3.7**hopper**

part of the bodywork into which the refuse is loaded either manually or mechanically

[SOURCE: prEN 1501-1:2018, 3.9]

prEN 1501-3:2018 (E)**3.8****capacity of the hopper**

volume of non-compacted refuse the hopper contains up, 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 V1 in Figure B.1.

[SOURCE: prEN 1501-1:2018, 3.10 — modified, Note 1 to entry added]

3.9**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.

[SOURCE: prEN 1501-1:2018, 3.14]

3.10**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.

[SOURCE: prEN 1501-1:2018, 3.15]

3.11**automatic mode**

mechanism achieving a sequence of movements by a pulse start command

[SOURCE: prEN 1501-1:2018, 3.16]

3.12**closed system**

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

[SOURCE: prEN 1501-1:2018, 3.18.2]

3.13**cab shield**

plate fitted to the front of the hopper for protection of the cab and the space between the cab and the bodywork from falling objects

3.14**compaction mechanism**

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

[SOURCE: prEN 1501-1:2018, 3.17]

3.15**discharge system**

mechanism and movement for emptying the body

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

[SOURCE: prEN 1501-1:2018, 3.19]

3.15.1**ejection plate**

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

[SOURCE: prEN 1501-1:2018, 3.19.1]

3.15.2**rotating drum**

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

[SOURCE: prEN 1501-1:2018, 3.19.2]

3.15.3**tipping**

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

[SOURCE: prEN 1501-1:2018, 3.19.3]

<https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020>

3.16**designated refuse container**

refuse container compatible with the lifting device

[SOURCE: prEN 1501-5:2018, 3.15]

3.17**lifting device**

mechanism fitted onto the RCV for loading refuse into its body

[SOURCE: prEN 1501-5:2018, 3.2]

3.18**danger zone**

zone within and/or around machinery in which a person may be exposed to a potential risk to his health or safety

Note 1 to entry: See Annex C.

[SOURCE: prEN 1501-1:2018, 3.24]

3.19**interlocking guard**

guard associated with an interlocking device so that, together with the control system of the machine, the following functions are performed:

prEN 1501-3:2018 (E)

- the hazardous machine functions “covered” by the guard cannot operate until the guard is closed;
- if the guard is opened while hazardous machine functions are operating, a stop command is given, and
- when the guard is closed, the hazardous machine functions “covered” by the guard can operate (the closure of the guards does not by itself start the hazardous machine functions)

Note 1 to entry: EN ISO 14119 gives detailed provisions.

[SOURCE: EN ISO 12100:2010, 3.27.4]

3.20**operator**

person trained to operate the RCV

[SOURCE: prEN 1501-1:2018, 3.25]

3.21**working station**

location where the RCV is operated during normal use

Note 1 to entry: Inspection, cleaning and maintenance are excluded.

[SOURCE: prEN 1501-5:2018, 3.25]

3.22**travel movement**

unrestricted motorized movement of the RCV

[SOURCE: prEN 1501-1:2018, 3.28]

3.23**access door**

door in the bodywork for maintenance purpose

[SOURCE: prEN 1501-1:2018, 3.36]

3.24**hopper lid**

powered flap for loading refuse and covering the hopper

3.25**transport position**

designated position of the equipment during travel movement and all elements of the vehicle are in a position as defined by the manufacturer

[SOURCE: prEN 1501-1:2018, 3.31]

iTech STANDARD PREVIEW
(standards.iteh.ai)

kSIST FprEN 1501-3:2020
<https://standards.iteh.ai/catalog/standards/sist/453e6049-e436-4b3f-b34d-57d24cf49d92/ksist-fpren-1501-3-2020>

3.26**discharge system**

mechanism and movement for emptying the body

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

[SOURCE: prEN 1501-1:2018, 3.19]

3.27**visible area**

directly and/or indirectly by the operator from his working station, either in or outside of the cab

[SOURCE: prEN 1501-5:2018, 3.26]

3.28**hold-to-run control device**

control device which initiates and maintains machine functions only as long as the manual control (actuator) is actuated

[SOURCE: EN ISO 12100:2010, 3.28.3]

3.29**interface**

connections between two parts and/or systems of the RCV

[SOURCE: prEN 1501-1:2018, 3.23]

3.30**interface with the lifting device(s)**

provisions for power supply, controls and mechanical devices to ensure safe connections between the bodywork and its lifting device(s)

[SOURCE: prEN 1501-1:2018, 3.23.1]

3.31**operation position**

designated position of body, discharge door, hopper and other equipment for the purpose

Note 1 to entry: Other Equipment means lifting devices including clamps, arms or footboards.

[SOURCE: prEN 1501-1:2018, 3.32]

3.32**refuse container lifting device**

mechanism fitted onto an RCV for emptying designated refuse containers

Note 1 to entry: Refuse container lifting devices other than specified in EN 12999.

[SOURCE: prEN 1501-5:2018, 3.2.1]