



# SLOVENSKI STANDARD

## SIST EN 1846-3:2013

01-november-2013

Nadomešča:

SIST EN 1846-3:2003+A1:2009

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**Gasilska in reševalna vozila - 3. del: Trajno vgrajena oprema - Varnost in zahteve za obnašanje v uporabi**

Firefighting and rescue service vehicles - Part 3: Permanently installed equipment - Safety and performance

Feuerwehrfahrzeuge - Teil 3: Fest eingebaute Ausrüstung - Sicherheits- und Leistungsanforderungen

Véhicules des services de secours et de lutte contre l'incendie - Partie 3: Equipements installés à demeure - Sécurité et performances

**Ta slovenski standard je istoveten z: EN 1846-3:2013**

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13.220.10	Gašenje požara	Fire-fighting
43.160	Vozila za posebne namene	Special purpose vehicles

**SIST EN 1846-3:2013**

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EUROPEAN STANDARD

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NORME EUROPÉENNE

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English Version

## Firefighting and rescue service vehicles - Part 3: Permanently installed equipment - Safety and performance

Véhicules des services de secours et de lutte contre l'incendie - Partie 3: Equipements installés à demeure - Sécurité et performances

Feuerwehrfahrzeuge - Teil 3: Fest eingebaute Ausrüstung - Sicherheits- und Leistungsanforderungen

This European Standard was approved by CEN on 22 May 2013.

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## Foreword

This document (EN 1846-3:2013) has been prepared by Technical Committee CEN/TC 192 "Fire and Rescue Service Equipment", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2014, and conflicting national standards shall be withdrawn at the latest by January 2014.

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 supersedes EN 1846-3:2002+A1:2008.

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.

EN 1846, *Firefighting and rescue service vehicles*, is composed of three parts:

- *Part 1: Nomenclature and designation*;
- *Part 2: Common requirements — Safety and performance*;
- *Part 3: Permanently installed equipment — Safety and performance* (the present document).

### Significant changes:

The significant changes with respect to the previous edition EN 1846-3:2002+A1:2008 are listed below:

- a) demountable systems using a hydraulic hook arm are integrated in the standard;
- b) Clause 2: updated;
- c) Clause 3:
  - 1) 3.1.1 "specified rate(s) of the water installation,  $Q_1$ " and 3.1.2 "specified outlet pressure(s) of the water installation,  $p_{a1}$ " replaced with new 3.1.1 "classification of the water installation";
  - 2) 3.1.4 "specified height of the water installation,  $d$ " deleted;
  - 3) 3.1.10 "hosereel system": new wording;
  - 4) 3.6 "equipment gantry" replaced with "bracket assembly";
  - 5) new definitions: 3.7 "demountable" and 3.8 "hold-to-run control device";
- d) Clause 4: updated;
- e) Clause 5: verification placed directly after the requirements;
  - 1) 5.2.1: new numbered sub-entries dealing with oil hydraulic components;
  - 2) 5.2.2.3: addition of requirements regarding the installation of the final supply and delivery connection(s);

**EN 1846-3:2013 (E)**

- 3) 5.2.3.1: reference to prEN 16327:2011 added;
- 4) 5.2.6 and 5.3.6: addition of requirements for demountable systems using a hydraulic hook arm;
- 5) 5.3.2: amended to take into account all type of pumps and/or water installation;
- 6) 5.3.2.7: Figure 3 amended with new dimensions;
- 7) 5.3.4: text amended taking into account EN 15767-1;
- f) Annex A: new informative annex "Symbols and abbreviated terms";
- g) Annex B: new normative annex "Theoretical stability calculation";
- h) Annex C: new normative annex "Rated capacity of the tank".

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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## Introduction

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

This document should be used with EN 1846-2 which also deals with some optional specific permanently installed equipment used by firefighters.

The equipment concerned and the extent to which hazards, hazardous situations and 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.

This document also deals with the performance requirements which apply to the equipment as defined in the scope.

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**EN 1846-3:2013 (E)****1 Scope**

**1.1** This part of this European Standard specifies the minimum requirements for safety and performance of some optional specific permanently installed equipment on firefighting and rescue service vehicles, operated by trained persons, as designated in EN 1846-1 and specified in EN 1846-2.

NOTE Categories and mass classes of the firefighting and rescue service vehicles are given in EN 1846-1.

The permanently installed equipment covered by this Part of this European Standard is given below:

- water installation;
- liquid additive installation;
- monitor;
- equipment gantries;
- demountable systems using a hydraulic hook arm.

This part of this European Standard should be read in conjunction with any national regulations in force for vehicles using the public roads and with any EU Directives and associated EFTA regulations in force relevant to vehicles and their equipment.

For the purposes of this European Standard, the normal ambient temperature range is - 15 °C to + 35 °C.

For equipment to be used at temperature outside this temperature range, the particular temperature range should be specified by the user and the manufacturer should determine by a risk assessment any need for additional precautions.

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**1.2** This European Standard does not deal with the following types of fire-fighting or rescue vehicles or equipment:

- all control systems outside of the cabin related to hook arm system;
- vehicles designed exclusively for carrying personnel;
- vehicles with a gross laden mass not exceeding 3 t;
- boats;
- aircraft;
- railway vehicles;
- ambulances (see EN 1789);
- provisions for removable equipment driven by PTO;
- airport vehicles in the scope of the recommendations of the International Civil Aviation Organisation (ICAO).

**1.3** This part of this European Standard deals with the technical requirements to minimise the hazards listed in Clause 4 which can arise during operational use, routine checking and maintenance of firefighting and rescue service vehicles.

It does not cover the hazards generated by:



- non-permanently installed equipment i.e. portable equipment carried on the vehicle;
- use in potentially explosive atmospheres;
- commissioning and decommissioning;
- noise (as permanently installed equipment cannot be operated separately from the vehicle, this hazard is covered in Part 2);
- electromagnetic compatibility.

Additional measures not dealt with in this European Standard may be necessary for specific use (e.g. fire in natural environment, flooding, etc.).

**1.4** This document is not applicable to the equipment which is manufactured before its date of publication by CEN.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 659, *Protective gloves for firefighters*

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

EN 1028-1:2002+A1:2008, *Fire-fighting pumps — Fire-fighting centrifugal pumps with primer — Part 1: Classification — General and safety requirements*

EN 1028-2, *Fire-fighting pumps — Fire-fighting centrifugal pumps with primer — Part 2: Verification of general and safety requirements*

EN 1846-1, *Firefighting and rescue service vehicles — Part 1: Nomenclature and designation*

EN 1846-2:2009+A1:2013, *Firefighting and rescue service vehicles — Part 2: Common requirements — Safety and performance*

EN 1947, *Fire-fighting hoses — Semi-rigid delivery hoses and hose assemblies for pumps and vehicles*

EN 14710-1:2005+A2:2008, *Fire-fighting pumps — Fire-fighting centrifugal pumps without primer — Part 1: Classification, general and safety requirements*

EN 15767-1, *Portable equipment for projecting extinguishing agents supplied by fire fighting pumps — Portable monitors — Part 1: General requirements for portable monitor assemblies*

prEN 16327:2011, *Fire-fighting — Positive pressure foam proportioning systems (PPFPS) and compressed air foam systems (CAFS)*

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

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

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EN ISO 13849-1:2008, *Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design (ISO 13849-1:2006)*

EN ISO 13849-2:2008, *Safety of machinery — Safety-related parts of control systems — Part 2: Validation (ISO 13849-2:2003)*

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

**3 Terms and definitions**

For the purposes of this document, the terms and definitions given in EN 1846-1, EN 1846-2:2009+A1:2013 and the following apply.

NOTE The list of the symbols and abbreviated terms used in the standard is given in Annex A.

**3.1 water installation**

combination of components for the collection, storage and delivery of water and/or water-additive mixture at varying pressures and delivery rates

**3.1.1 classification of the water installation**

combination of the delivery rate  $Q_1$  specified at pressure  $p_{a1}$  and at specified height  $d$

**3.1.2 height**

$d$

difference of level between the standing surface of the vehicle and the water surface at the time of a pumping appliance suction operation

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**3.1.3 standing surface of the vehicle**

surface on which the vehicle wheels are resting when it is operating

**3.1.4 standing surface of the operator**

surface on which the operator stands

**3.1.5 installed water pump**

pump permanently installed on a vehicle and driven by the motive power of the vehicle, or a pump complete with drive motor

**3.1.6 installed water tank**

container for storage of water for fire service purposes

**3.1.7 supply and delivery connections for water**

inlet and outlet devices for joining hoses to the pipework installation

**3.1.8 pipework installation for water**

system linking the installed water pump(s), the installed water tank(s) and the supply and delivery connections

**3.1.9 operating and control instruments for water**

controls and gauges necessary to operate and monitor the water installation system

**3.1.10****hosereel system**

fixed hose storage system on a rotating drum for semi-rigid hose(s) permanently connected to the pipework installation

**3.1.11****wheeled hosereel**

hosereel designed for the storage, the transport and the deployment of layflat hose

**3.2****liquid additive**

addition to water to enhance firefighting capabilities e.g. foam concentrate, fire retardant

Note 1 to entry: In this document, the term "additive" means "liquid additive".

**3.2.1****additive installation**

combination of components for the collection, storage and delivery of additive at varying pressures and delivery rates before mixing with water

**3.2.2****installed additive pump**

pump permanently installed on a vehicle and driven by the motive power of the vehicle, or a pump complete with drive motor

**3.2.3****installed additive tank**

container for storage of additive for fire service purposes

**3.2.4****supply and delivery connections for additive**

inlet and outlet devices for joining hoses to the additive installation

**3.2.5****pipework installation for additive**

system linking the installed additive pump(s), the additive installed tank(s) and the supply and delivery connections

**3.2.6****operating and control instruments for additive**

controls and gauges necessary to operate and monitor the additive installation system

**3.3****rated capacity of a tank**

capacity of liquid contained in a tank that could be used by the corresponding pump(s)

**3.4****mixing system**

system to mix the additive (including foam concentrate) with water (and sometimes air) to produce the required firefighting media

Note 1 to entry: The mixing system is part of the water and/or additive installation.

**3.5****monitor**

device for projection of extinguishing agents

**3.6****bracket assembly**

mechanical system(s), manually or power driven, to assist with the loading, unloading and storage of equipment

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## EN 1846-3:2013 (E)

**3.7**  
**demountable**

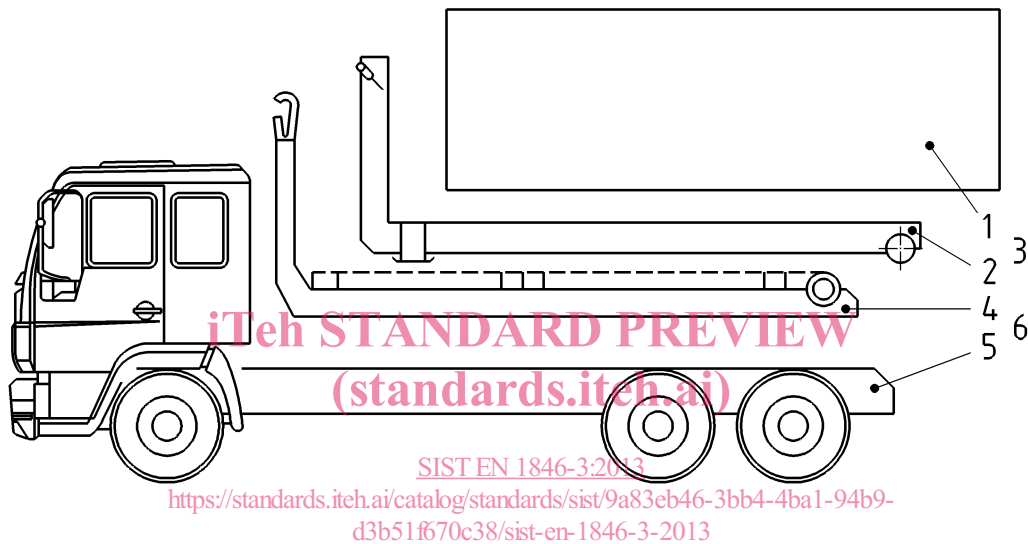
specially designed frame with superstructure that can be easily mounted on, removed from and transported by a suitable vehicle with a hydraulic hook arm system

Note 1 to entry: See Figure 1.

**3.8**  
**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]


**Key**

- 1 super structure of demountable
- 2 frame of demountable
- 3 demountable (1 + 2)
- 4 hook arm system
- 5 chassis
- 6 vehicle with hook arm system (4 + 5)

**Figure 1 — Vehicle with a hook arm system and demountable**

#### 4 List of significant hazards

The significant hazards relevant to permanently installed equipment which are dealt with in this European Standard are given in Tables 1 to 5.

Table 1 — List of significant hazards for water installation (1 of 2)

Hazard (see EN ISO 12100:2010)	Situation/area	References to Part 2 of this standard or other standards	Clause/subclause reference in this Part of this standard (in addition to Part 2 when dealt with in it)
<b>Mechanical hazards</b>			
Due to accumulation of energy inside the machinery caused, for example, by liquids and gases under pressure	Variation of pressure for firefighters at the end of the branchpipe	/	5.2.2
Entanglement by a powered system	Exposed power take off (PTO) transmissions	<ul style="list-style-type: none"> <li>5.1.1.5 of EN 1846-2:2009+A1:2013</li> <li>EN 953</li> </ul>	/
	Powered rewind hose reel(s)	/	5.2.2.6
Rupture or piercing of the water installation	Exposed parts of the installation	/	5.2.2
Ejection of coupling	Supply and delivery location	/	5.2.2.1 / 5.2.2.3
<b>Thermal hazards</b>			
Resulting in burns by contact with the pump or by projection of hot water from the pump	Exposed parts of the pump, pipework and delivery connections	<ul style="list-style-type: none"> <li>5.2.3 of EN 1028-1:2002+A1:2008</li> <li>5.2.3 of EN 14710-1:2005+A2:2008</li> </ul>	/
<b>Material/substance hazards</b>			
Inhalation of exhaust gases	Bad location of the exhaust	<ul style="list-style-type: none"> <li>5.1.1.1 of EN 1846-2:2009+A1:2013</li> </ul>	/

Table 1 (2 of 2)

Hazard (see EN ISO 12100:2010)	Situation/area	References to Part 2 of this standard or other standards	Clause/subclause reference in this Part of this standard (in addition to Part 2 when dealt with in it)
<b>Ergonomics hazards</b>			
Inadequate local lighting	At the operating position	<ul style="list-style-type: none"> <li>5.1.3.3 and 5.1.4.4 of EN 1846-2:2009+A1:2013</li> </ul>	/
Mental overload and underload, stress	No logical relationship between the command and the expected operation at the operating position	<ul style="list-style-type: none"> <li>5.1.2.5 of EN 1846-2:2009+A1:2013</li> </ul>	5.2.2.4; 5.2.2.5
Human error, human behaviour		<ul style="list-style-type: none"> <li>3<sup>rd</sup> dash of 6.2.8 of EN ISO 12100:2010</li> </ul>	
Inadequate design, location or identification of manual controls	At the operating position	<ul style="list-style-type: none"> <li>5.1.4.4 and 6.4 of EN 1846-2:2009+A1:2013</li> <li>3<sup>rd</sup> dash of 6.2.8 of EN ISO 12100:2010</li> </ul>	/
Confusion between different signals	At the operating position	<ul style="list-style-type: none"> <li>5.1.4.3 and 6.4 of EN 1846-2:2009+A1:2013</li> </ul>	/
<b>Impossibility of stopping the machine in the best possible conditions</b>	At the operating position	/	5.2.1
<b>Relating to the travelling function</b>			
Excessive oscillations when moving	Overturning of vehicle. Loss of lateral stability during braking	<ul style="list-style-type: none"> <li>5.1.1.2 and 5.1.1.3 of EN 1846-2:2009+A1:2013</li> </ul>	5.2.2.2

Table 2 — List of significant hazards for additive installation (1 of 2)

Hazard (see EN ISO 12100:2010)	Situation/area	References to Part 2 of this standard or other standards	Clause/subclause reference in this Part of this standard (in addition to Part 2 when dealt with in it)
<b>Mechanical hazards</b>			
Entanglement by a powered system (if pump)	Exposed PTO/transmissions	<ul style="list-style-type: none"> <li>5.1.1.5 of EN 1846-2:2009+A1:2013</li> <li>EN 953</li> </ul>	/

Table 2 — List of significant hazards for additive installation (2 of 2)

Hazard (see EN ISO 12100:2010)	Situation/area	References to Part 2 of this standard or other standards	Clause/subclause reference in this Part of this standard (in addition to Part 2 when dealt with in it)
Rupture or piercing of the additive installation	Exposed parts of the additive installation	/	5.2.3.1
Ejection of coupling	Supply and delivery location	/	5.2.3.4
<b>Material/substance hazards</b>			
Contact with or inhalation of harmful additive	Point of contact with additive	/	6.1 6.2
Inhalation of exhaust gases	Bad location of the exhaust	<ul style="list-style-type: none"> <li>5.1.1.1 of EN 1846-2:2009+A1:2013</li> </ul>	/
<b>Ergonomics hazards</b>			
Inadequate local lighting	At the operating position	<ul style="list-style-type: none"> <li>5.1.3.3 and 5.1.4.4 of EN 1846-2:2009+A1:2013</li> </ul>	/
Mental overload and underload, stress	No logical relationship between the command and the expected operation at the operating position	<ul style="list-style-type: none"> <li>5.1.4.5 of EN 1846-2:2009+A1:2013</li> <li>3<sup>rd</sup> dash of 6.2.8 of EN ISO 12100:2010</li> </ul>	5.2.3.5
Human error, human behaviour			
Inadequate design, location or identification of manual controls	At the operating position	<ul style="list-style-type: none"> <li>5.1.4.4 and 6.4 of EN 1846-2:2009+A1:2013</li> <li>3<sup>rd</sup> dash of 6.2.8 of EN ISO 12100:2010</li> </ul>	/
Confusion between different signals	At the operating position	<ul style="list-style-type: none"> <li>5.1.4.3 and 6.4 of EN 1846-2:2009+A1:2013</li> </ul>	/
<b>Impossibility of stopping the machine in the best possible conditions</b>	At the operating position	/	5.2.1
<b>Relating to the travelling function</b>			
Excessive oscillations when moving	Overturning of the vehicle. Loss of lateral stability during braking	<ul style="list-style-type: none"> <li>5.1.1.2 and 5.1.1.3 of EN 1846-2:2009+A1:2013</li> </ul>	5.2.3.2