



SLOVENSKI STANDARD

oSIST prEN 17451:2020

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Vgrajene naprave za gašenje - Avtomatski sprinklerski sistemi - Projektiranje, montaža, vgradnja in preverjanje črpalk

Fixed firefighting systems - Automatic sprinkler systems - Design, assembly, installation and commissioning of pump sets

Ortsfeste Brandbekämpfungsanlagen - Automatische Sprinkleranlagen - Projektierung, Zusammenstellung, Montage und Inbetriebnahme von Pumpenaggregaten

Installations fixes de lutte contre l'incendie - Systèmes d'extinction automatique de type sprinkleur - Conception, assemblage, installation et mise en service des groupes motopompes

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13.220.10 Gašenje požara Fire-fighting

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Fixed firefighting systems - Automatic sprinkler systems - Design, assembly, installation and commissioning of pump sets

Installations fixes de lutte contre l'incendie - Systèmes
d'extinction automatique de type sprinkleur -
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Ortsfeste Brandbekämpfungsanlagen - Automatische
Sprinkleranlagen - Projektierung, Zusammenstellung,
Montage und Inbetriebnahme von Pumpenaggregaten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 191.

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COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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European foreword

This document (prEN 17451:2019) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

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Introduction

This document covers:

- the design and assembly of the pump set in accordance to the requirements of EN 12845, EN 16925 and CEN/TS 14816;
- identification of essential pump set components;
- the performance characteristics for components used within a pump set;
- performance testing requirements for diesel and electric driven pump sets;
- commissioning and handover site testing;
- performance handover documentation;
- servicing and maintenance handover documentation.

Figure 1 identifies the typical pump set components covered by this standard.

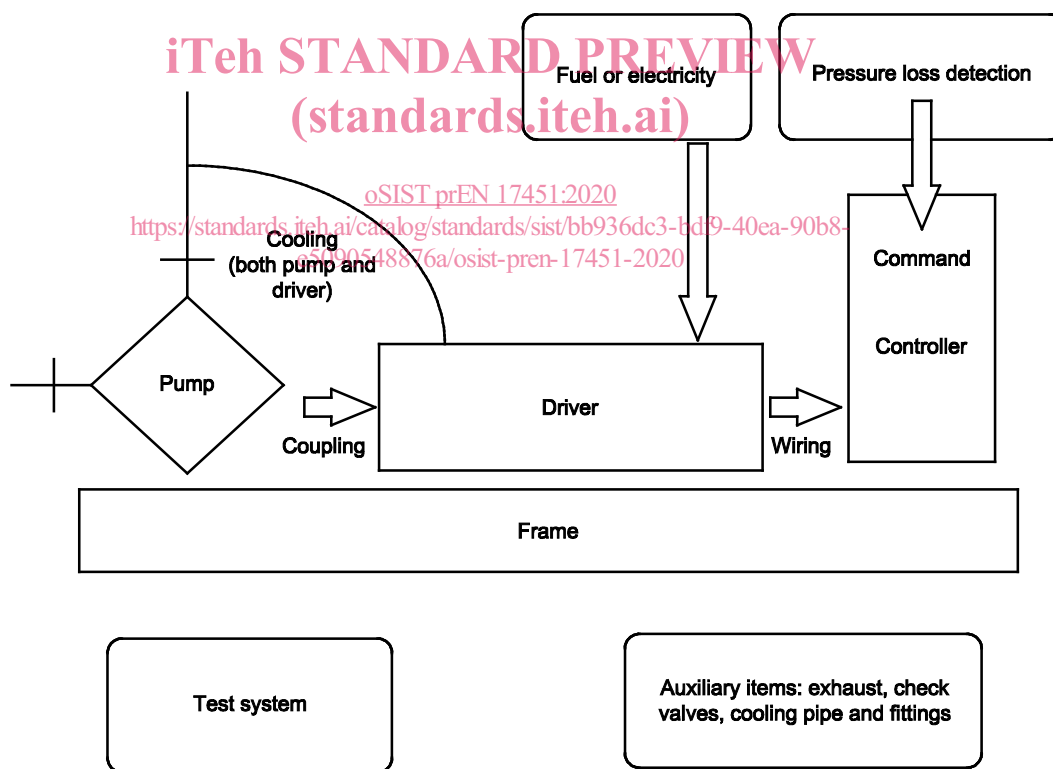


Figure 1 — Example of a typical pump set assembly for a diesel driven unit

The performance requirements for the pump set will be by reference to the relevant European component standards, where available, and for those key components such as pumps, drivers, couplings, baseplates and controllers. Where suitable component standards do not exist, this document sets the performance requirements for the pump set.

prEN 17451:2019 (E)**1 Scope**

This document specifies the assembly of components to produce a pump set which meet the performance requirements and characteristics for specified water supplies in accordance with the design, assembly, installation and commissioning of the main fire diesel and electric pump sets used in fixed firefighting systems conforming to EN 12845, CEN/TS 14816 and EN 16925.

This document is also applicable to fire-fighting pump sets for firefighting hydrants and hose reels where included in the fixed firefighting water supply specification.

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.

CEN/TS 14816, *Fixed firefighting systems — Water spray systems — Design, installation and maintenance*

EN 12845, *Fixed firefighting systems — Automatic sprinkler systems — Design, installation and maintenance*

EN 16925, *Fixed firefighting systems — Automatic residential sprinkler systems — Design, installation and maintenance*

EN 50342-1, *Lead-acid starter batteries — Part 1: General requirements and methods of test*

EN 50342-2, *Lead-acid starter batteries — Part 2: Dimensions of batteries and marking of terminals*

EN 590, *Automotive fuels — Diesel — Requirements and test methods*

<https://standards.iteh.ai/catalog/standards/sist/bb936dc3-bd19-40ea-90b8-5001dd857c02>

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

EN 60529:1991/A1:2000, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989/A1:1999)*

EN 60529:1991/A2:2013, *Degrees of protection provided by enclosures (IP code) (IEC 60529:1989/A2:2013)*

EN 60623, *Secondary cells and batteries containing alkaline or other non-acid electrolytes — Vented nickel-cadmium prismatic rechargeable single cells (IEC 60623)*

EN IEC 60947-4-1:2019, *Low-voltage switchgear and controlgear — Part 4-1: Contactors and motor-starters — Electromechanical contactors and motor-starters (IEC 60947-4-1:2018)*

IEC 60034-1, *Rotating electrical machines — Part 1: Rating and performance*

ISO 3046-1, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

prEN 12259-12:2017, *Fixed firefighting systems — Components for sprinkler and water spray systems — Part 12: Pumps*

3 Terms, definitions, symbols and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12845, EN 16925, CEN/TS 14816 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>

3.1.1

assembly

design, production and testing of the pump

3.1.2

installation

mounting and commissioning of the pump set in accordance with the pump set manufacturer's installation manual and procedures

3.1.3

maintenance

work performed to keep pump sets operable including repairs where required

3.1.4

pump set

assembly which is intended to supply water to automatic sprinkler or water spray systems, comprising at least a pump, driver or motor controller unit, partial wiring loom, drive coupling, mounting frame, baseplate and where required fuel tank

3.1.5

installer

installer of the fire pump set in accordance with the manufacturer's installation manual and procedures

3.1.6

pump set assembler

entity responsible for the design and build of the pump set

3.1.7

flexible fire pump couplings and flexible connecting drive shafts

integrated unit which provides power transmission from diesel engines or electric motors to fire pumps that supply water to fire protection systems

3.1.8

all elastomeric coupling

plastic coupling

coupling that relies solely on an elastomeric material for power transmission

3.1.9

driver service factor

design margin specified by driver manufacturers to account for higher torque demand conditions than normal but which can be encountered under certain extreme operating conditions

prEN 17451:2019 (E)**3.1.10****coupling safety factor****SFk**

safety margin specified by coupling manufacturers to address uncertainties in design

3.1.11**back pull-out type pump**

centrifugal pump design type which allows the rotating assembly to be pulled out of the pump casing without having to remove the pump casing from the piping

3.1.12**Biodiesel**

vegetable oil or animal fat-based FAME diesel fuel

NOTE to entry 1: Biodiesel can have 100 % FAME content or blended with petroleum derived diesel fuel in any proportions.

NOTE to entry 2: See 4.6.

3.2 Symbols and abbreviated terms

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

L ₁₀ basic life rating	time by which ten percent of a population of a product will have failed (see ISO 281)
ECM	electronic fuel management control
EMC	electromagnetic compatibility
EMF	electromagnetic fields
FAME	fatty acid methyl ether
FLA	full load amperes
FLC	full load current
IFN	numerical value of the fuel stop power taken as the maximum IFN value in accordance to ISO 3046-1 for the driver, expressed in kilowatt
LRC	locked rotor current
NPSH	net positive suction head
NPSHr	net positive suction head required
Pdm	power distribution module
SFk	coupling safety factor
VFD	variable frequency drive

4 Performance of pump set**4.1 General design principles**

The design details covered in this clause address the general principles which shall be considered for all pump set designs covered by this document. The design of pump set shall be based on the following information provided to the pump set assembler:

- flow and corresponding head including details of the safety margin applied for the unfavourable area, in line with the requirements of EN 12845, CEN/TS 14816 or EN 16925 (e.g. at least 10 % or a maximum of 0,5 bar higher than that required in the case of EN 16925 or at least 0,5 bar higher than that required in the case of EN 12845 and CEN/TS 14816);
- flow for favourable area maximum possible demand flow;
- maximum possible suction pressure at pump suction flange;
- available NPSH at low water level in water storage tank at pump suction flange at the maximum possible demand flow including 1 m safety margin;
- duration of operation for fuel tank sizing;
- driver type (electric or diesel);
- applicable fixed firefighting system design specification: EN 12845, CEN/TS 14816 or EN 16925;
- hazard class against which the fixed firefighting system is designed as given in EN 12845, CEN/TS 14816 or EN 16925 e.g. LH, OH, HHP or HHS in the case of EN 12845;
- water quality (potable, sea or filtered) description as defined in EN 12845.

The pump set shall be designed to ensure a reliable and stable supply of water at the specified volume flow and pressure over the operating range and duration in accordance with EN 12845, CEN/TS 14816 or EN 16925.

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4.2 Components

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4.2.1 Connections <https://standards.iteh.ai/catalog/standards/sist/bb936dc3-bdf9-40ea-90b8-e5090548876a/osist-pren-17451-2020>

All service interface connection requirements (including electrical, hydraulic and pneumatic) shall be provided as part of the installation instructions to enable the correct installation of the pump set on-site. The connections shall be easily accessible and located in accordance with EN 12845, CEN/TS 14816 or EN 16925.

4.2.2 Pumps

Pumps, shall be in accordance with prEN 12259-12:2017 and shall be driven either by electric motors or diesel engines, capable of providing at least the power required to comply with the following:

- a) for pumps with non-overloading power characteristic curves, the maximum power required at the peak of the power curve;
- b) for EN 12845 applications, for pumps with rising power characteristic curves, the maximum power for any conditions of pump load, from zero flow to a flow corresponding to a pump NPSH required equal to 16 m;
- c) for EN 16925 applications, for pumps with rising power characteristic curves, the maximum power for any conditions of pump load, from zero flow to the maximum flow on the pump curve.

The pump shall conform to the performance characteristics specified by prEN 12259-12:2017.

Table 1 — Summary of typical prEN 12259-12:2017 pump designs

Type	Pump design
1	End suction long coupled
2	End suction closed coupled
3	Axial horizontal split case
4	Multistage inline pumps
5	Single stage inline pumps
6	Ring section pumps
7	Vertical turbine pumps
8	Submersible motor pumps
9	Multistage multi-outlet pumps

End suction pumps shall be of the “back pull-out” type. Pipes shall be supported independently of the pump.

4.3 Pump set activation **iTeh STANDARD PREVIEW**

The activation of the pump set shall arise from an externally supplied signal in accordance with the relevant standard EN 12845, CEN/TS 14816 or EN 16925.

4.4 Cooling and by-pass flow oSIST prEN 17451:2020

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Arrangements such as by-pass flows shall be made to ensure a continuous flow of water through the pump sufficient to prevent overheating when it is operating against a closed valve. The by-pass system can also be required to maintain the operational temperature of the diesel drivers. Any additional flow requirements shall also be considered.

Water to cool the pump (in the closed valve condition) shall be taken from the sprinkler system water supply.

The by-pass system shall not be supplied as a component of the pump set.

NOTE As it can be formed as part of the wider system pipework installation in a manner similar to the supply of electrical cabling etc.

prEN 12259-12:2017 specifies the minimum by-pass flow for the compliant pump.

The by-pass flow shall be taken into account in the fixed firefighting system hydraulic calculation and pump selection. This additional flow shall be provided in addition to the fixed firefighting system flow figures.

The pump set assembler shall specify the required parameters for the cooling circuit and flow.

4.5 Fuel tank design

The fuel tank capacity shall be sufficient to enable the engine to run on full load for the required period of duty. Minimum values, taken from EN 12845 as follows:

- 3 h for LH;