SVENSK STANDARD
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Avlopp – Avloppssystem utomhus – Pumpsystem – Del 2: Trycksatta avloppssystem

Drain and sewer systems outside buildings – Pumping systems – Part 2: Positive pressure systems

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Europastandarden EN 16932-2:2018 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 16932-2:2018.

Denna standard ersätter SS-EN 1671, utgåva 1.

The European Standard EN 16932-2:2018 has the status of a Swedish Standard. This document contains the official version of EN 16932-2:2018.

This standard supersedes the Swedish Standard SS-EN 1671, edition 1.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Avloppsteknik, SIS/TK 198/AG 03.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16932-2

April 2018

ICS 93.030

Supersedes EN 1091:1996, EN 1671:1997

English Version

Drain and sewer systems outside buildings - Pumping systems - Part 2: Positive pressure systems

Réseaux d'évacuation et d'assainissement à l'extérieur des bâtiments - Systèmes de pompage - Partie 2: Systèmes sous pression

Entwässerungssysteme außerhalb von Gebäuden - Pumpsysteme - Teil 2: Druckentwässerungssysteme

This European Standard was approved by CEN on 22 January 2018.

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.

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.

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

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European foreword

This document (EN 16932-2:2018) has been prepared by Technical Committee CEN/TC 165 “Waste water engineering”, 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 October 2018, and conflicting national standards shall be withdrawn at the latest by October 2018.

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

Together with EN 16932-1:2018 and EN 16932-3:2018, this document supersedes EN 1091:1996 and EN 1671:1997.

EN 16932, *Drain and sewer systems outside buildings — Pumping systems*, contains the following parts:

— *Part 1: General requirements*;

— *Part 2: Positive pressure systems*;

— *Part 3: Vacuum systems*.

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, 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 the United Kingdom.

1 Scope

This European Standard specifies requirements for design, construction and acceptance testing of wastewater pumping systems in drain and sewer systems outside the buildings they are intended to serve. It includes pumping systems in drain and sewer systems that operate essentially under gravity as well as systems using either positive pressure or partial vacuum.

This document is applicable to positive pressure systems.

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 1610:2015, *Construction and testing of drains and sewers*

EN 12050-1:2015, *Wastewater lifting plants for buildings and sites — Part 1: Lifting plants for wastewater containing faecal matter*

EN 12050-2, *Wastewater lifting plants for buildings and sites — Part 2: Lifting plants for faecal-free wastewater*

EN 12050-3, *Wastewater lifting plants for buildings and sites — Part 3: Lifting plants for limited applications*

EN 12050-4, *Wastewater lifting plants for buildings and sites — Part 4: Non-return valves for faecal-free wastewater and wastewater containing faecal matter*

EN 16323:2014, *Glossary of wastewater engineering terms*

EN 16932-1:2018, *Drain and sewer systems outside buildings — Pumping systems — Part 1: General requirements*

EN 16933-2:2017, *Drain and sewer systems outside buildings — Design — Part 2: Hydraulic design*

EN ISO 9906:2012, *Rotodynamic pumps — Hydraulic performance acceptance tests — Grades 1, 2 and 3 (ISO 9906:2012)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16323, in EN 16932-1 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

Note 1 to entry: Certain key definitions from EN 16323:2014 have been repeated below for clarity. The following additional terms used in this document are defined in EN 16323:

aerobic;

anaerobic;

maintenance;

pumping station;

collection tank;
combined system;
confined space;
drain;
dry weather flow;
extraneous flow;
gradient;
infiltration;
relevant authority;
retention period;
rising main;
septic wastewater;
sewer;
sewer system;
wastewater treatment plant.

Note 2 to entry: The following terms used in this part of this standard are defined in EN 16932-1:2018:

collection chamber;
duty point;
forwarding pump;
level sensor;
lift station;
profile;
pump;
pump unit
pumping system;
vacuum station.

3.1
ball passage
passage where a ball with a defined diameter can pass through without deformation

[SOURCE: EN 12050-1:2015, 3.1.9]

3.2
foul wastewater
wastewater comprising domestic wastewater and/or industrial wastewater

[SOURCE: EN 16323:2014, 2.1.2.6]

3.3
net positive suction head
NPSH
amount of the absolute value of the total head above the head equivalent to the vapour pressure of the liquid at the particular temperature, with reference to the NPSH-datum plane

[SOURCE: EN ISO 17769-1:2012, 2.2.2.1]

3.4
NPSH datum plane
horizontal plane through the centre of the circle described by the external points of the entrance edges of the impeller blades, in the first stage in the case of multi-stage pumps

[SOURCE: EN ISO 17769-1:2012, 2.2.2.1]

3.5
surface water
water from precipitation, which has not seeped into the ground and is discharged to the drain or sewer system directly from the ground or from exterior building surfaces

[SOURCE: EN 16323:2014, 2.1.1.3]

3.6
wastewater
water composed of any combination of water discharged from domestic, industrial or commercial premises, surface run-off and accidentally any sewer infiltration water

[SOURCE: EN 16323:2014, 2.3.10.65]

4 Symbols and units

a	wave speed of pressure transients, in metres per second [m/s]
D	internal diameter of the pipe (bore), in metres [m]
D_{i}	internal diameter of the pipe (bore) in section i, in metres [m]
E_{P}	elastic modulus of the pipe material, in Newtons per square metre [$\mathrm{N/m^2}$]
E_{W}	elastic modulus of wastewater, in Newtons per square metre [$\mathrm{N/m^2}$]
f	maximum permitted frequency of pump starts per hour [1/h]
g	acceleration due to gravity, in metres per second squared [$\mathrm{m/s^2}$]
H_S	total head of the system, in metres [m]
H_{p}	total head at the pump unit, in metres [m]
H_{A}	required pump head in an air flushed rising main, or a rising main where air or gas accumulation can occur, in metres [m]
h_{f}	local head loss in the bends, valves and other fittings, in metres [m]
h_{l}	head loss, in metres [m]
h_{p}	head loss due to friction in the pipe, in metres [m]
$h_{\mathrm{z,rm}}$	level difference between the end of the rising main and pump unit(s), in metres [m]
$\Sigma h_{\mathrm{A,i}}$	sum of the level differences of all downsloping sections in the rising main which can be filled with air or gas, (i.e. the level differences between all their high and subsequent low points), in metres [m]
h_{z}	hydrostatic head, in metres [m]
Σk_{p}	sum of the local head loss coefficients in bends, valves and other fittings in the pipeline (dimensionless) [-]
$\Sigma k_{\mathrm{p,i}}$	sum of the local head loss coefficients in bends, valves and other fittings in section i, dimensionless [-]
L	length of the pipeline, in metres [m]
L_{i}	length of section i of the rising main, in metres [m]
L_{t}	length of the pipeline before or after a closing device, in metres [m]
$\Sigma L_{\mathrm{A,i}}$	sum of the lengths of the downsloping sections in section i, which can be filled with air, in metres [m]