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Wastewater lifting plants for buildings and sites - Part 3: Lifting plants for limited applications

Abwasserhebeanlagen für die Gebäude- und Grundstücksentwässerung - Teil 3: Abwasserhebeanlagen zur begrenzten Verwendung

Stations de relevage d'effluents pour les bâtiments et terrains - Partie 3: Stations de relevage à application limitée pour effluents

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Abwasserhebeanlagen für die Gebäude- und Grundstücksentwässerung - Teil 3: Hebeanlagen zur begrenzten Verwendung

This European Standard was approved by CEN on 17 January 2015.

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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EN 12050-3:2015 (E)**Foreword**

This document (EN 12050-3:2015) has been prepared by Technical Committee CEN/TC 165 “Wastewater 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of an identical text or by endorsement, at the latest by September 2015 and conflicting national standards shall be withdrawn at the latest by December 2016.

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 12050-3:2000.

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 the Regulation (EU) No. 305/2011.

For relationship with EU Regulation, see informative Annex ZA, which is an integral part of this document.

EN 12050 “*Wastewater lifting plants for buildings and sites*” consists of the following parts:

- Part 1: *Lifting plants for wastewater containing faecal matter*
- Part 2: *Lifting plants for faecal-free wastewater*
- Part 3: *Lifting plants for limited applications*
- Part 4: *Non-return valves for faecal-free wastewater and wastewater containing faecal matter*

The main changes with respect to the previous edition are listed below:

- a) Title was shortened and scope changed to apply for lifting plants for limited applications for domestic non-commercial wastewater containing or not containing faecal matter;
- b) reaction to fire added;
- c) paragraph title “Evaluation of conformity” changed to “Assessment and verification of constancy of performance – AVCP” and updated in accordance with “Implementation of the Construction Products Regulation (CPR) in harmonized standards”;
- d) Annex ZA updated in accordance with “Implementation of the Construction Products Regulation (CPR) in harmonized standards” (adoption of the Regulation EU No. 305/2011);
- e) editorially revised.

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard applies to lifting plants for limited applications for domestic non-commercial wastewater containing or not containing faecal matter and located below flood level.

NOTE Limited application means that the number of users is small and the plant is located in the same room as the sanitary appliance(s) served by it¹⁾ which are installed in accordance with EN 12056-1 and the layout and calculation are in accordance with EN 12056-4.

This European Standard applies to lifting plants for limited applications designed for wastewater containing faecal matter, where there is another WC available above flood level, and the plants serve no more than a single WC to which it is directly connected (at a distance of max. 0,5 m) and one hand washbasin, one shower and one bidet provided no other sanitary appliance is directly or indirectly connected.

This European Standard also applies to lifting plants for limited applications designed for faecal free wastewater, where a maximum of one hand washbasin or kitchen sink plus one further appliance such as a bathtub or a washing machine or a shower or a dish washer or an urinal are connected. No other sanitary appliance shall be directly or indirectly connected.

This European Standard contains general requirements, basic construction and testing principles, together with information on materials.

Construction and testing requirements for non-return valves used in wastewater lifting plants for limited applications are given in EN 12050-4.

This European Standard does not apply for lifting plants for limited applications for wastewater containing faecal matter where WC flushing is carried out by pressure flush valve.

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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 33, *WC pans and WC suites — Connecting dimensions*

EN 997, *WC pans and WC suites with integral trap*

EN 12056-1, *Gravity drainage systems inside buildings — Part 1: General and performance requirements*

EN 12056-4, *Gravity drainage systems inside buildings — Part 4: Wastewater lifting plants — Layout and calculation*

EN 13501-1, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item*

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

¹⁾ The installation of a faecal lifting plant for limited applications above flood level is normally not allowed but limited to exceptional cases described in EN 12056-1; lifting plants above flood level are not subject to this standard.

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

EN ISO 20361, *Liquid pumps and pump units — Noise test code — Grades 2 and 3 of accuracy (ISO 20361)*

3 Terms, definitions, symbols and abbreviations**3.1 Terms and definitions**

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

3.1.1**lifting plant for limited applications**

device for the automatic lifting of wastewater which may or may not contain faecal matter to a height above flood level from sanitary appliances connected to it and located in the same room

Note 1 to entry A non-return valve according to EN 12050-4 is a component of the plant.

3.1.2**flood level**

maximum level to which waste water can rise within a drainage system

[SOURCE: EN 12056-1:2000, 3.1.7]

3.1.3**tank of lifting plant for limited applications**

integral part of a lifting plant for limited applications, containing the pump and its controls and the liquid volume required by the pump installation to fulfil its function

Note 1 to entry The tank of a lifting plant for limited applications is not considered to be a collection tank according to EN 12050-1.

3.1.4**pumping device of lifting plant for limited applications**

component of a lifting plant for limited applications which pumps wastewater to a height above flood level

3.1.5**maximum pump operating pressure**

maximum hydrostatic pressure that the pumping device is capable to create

3.1.6**ball passage**

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

3.2 Symbols and abbreviations**3.2.1 Symbols**

d_i pipe internal diameter, in mm

Q flow rate, in l/s

H discharge head, in m

v flow velocity, in m/s

3.2.2 Abbreviations

AVCP	assessment and verification of constancy of performance
DN	nominal diameter
CWT	classified without testing
CWFT	classified without further testing
SBI	single burn item
DoP	declaration of performance
FPC	factory production control

4 Material and product characteristics

4.1 Materials

Materials used shall be adequate to meet the demands of installation and operation. Materials shall comply with the requirements of this standard and shall not release dangerous substances (see 4.10). Examples of suitable materials for the construction of wastewater lifting plants are given in Annex A (informative).

For tanks only corrosion resistant materials or materials with a corrosion resistant protective coating shall be used.

4.2 Mechanical resistance

The structural stability of tanks shall be shown to be adequate for the place of installation. When tested according to 5.3.1 the tank shall be tight and shall not show any deformation influencing subsequent function of the lifting plant.

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4.3 Watertightness

Lifting plants for limited applications, except their inlet, outlet and vent openings, shall be closed and watertight when tested according to 5.3.1.

4.4 Odourtightness

Lifting plants for limited applications for wastewater containing faecal matter shall be odourtight when tested according to 5.3.2.

4.5 Lifting effectiveness

4.5.1 General

The lifting plant for limited applications shall be capable of pumping domestic wastewater including all the solid matter it usually contains, as defined in EN 12056-1. It shall be designed in such a way that solid matter generally does not accumulate.

Lifting plants for limited applications for wastewater containing faecal matter with macerators are generally not suitable for handling wastewater with abrasive solids (e.g. sand).

Lifting plants for limited applications for faecal free wastewater shall be capable of pumping wastewater which can contain sand particles and other solids up to 2 mm size.

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When tested in accordance with 5.4 for lifting plants for limited application for wastewater containing faecal matter or 5.5 for lifting plants for faecal free wastewater, the plant shall not show damages which could affect the operation of the plant.

4.5.2 Pipe connections

The dimensions of inlet, discharge and ventilating connections shall permit the use of standardised pipes. Connections shall be flexible and leak-tight. The discharge pipe connection shall withstand a pressure that is 1,5 times the maximum pump operating pressure without leaking. The WC inlet connection shall facilitate connection of a WC according to EN 997 and EN 33. Wastewater flows shall be unimpeded, in accordance with EN 12056-1. The connected pipes shall be able to drain freely.

The minimum diameter of additional connections shall be according to Table 1.

Table 1 — Minimum connection diameter

Appliance	System I	System II	System III	System IV
Hand washbasin kitchen sink, bidet	40 DN	30 DN	30 DN	30 DN
Shower, urinal	50 DN	40 DN	40 DN	40 DN
Bathtub	50 DN	50 DN	40 DN	50 DN
Dishwasher, washing machine	50 DN	50 DN	40 DN	40 DN

NOTE Adapted from EN 12056-2:2000. (standards.iteh.ai)

Additional connections shall ensure that wastewater containing faecal matter cannot contaminate or significantly displace the trap seal of a sanitary appliance.

If wastewater inflow is below the maximum water level in the tank, a device can be provided to prevent backflow into the wastewater pipe. In accordance with manufacturer's specifications access to this device shall be possible for maintenance purposes. This shall be limited to exceptional cases. The preferred solution shall allow self-draining and unrestricted inflow into the tank without any interruption as required by EN 12056-1:2000, 4.2 and EN 12056-4:2000, 5.2.

4.5.3 Ventilation

The container shall be adequately ventilated. Ventilation of lifting plants for limited applications for wastewater containing faecal matter into a room shall be odour-free.

4.5.4 Minimum flow velocity

When tested in accordance with 5.2, the minimum flow velocity in the discharge pipework shall be at least 0,7 m/s at a manometric pressure of 30 kPa (0,3 bar).

The minimum flow rate shall be calculated in accordance with Formula (1).

$$Q_{\min} = v \times \frac{\pi}{4} \times 10^{-3} \times d_i^2 \quad (1)$$

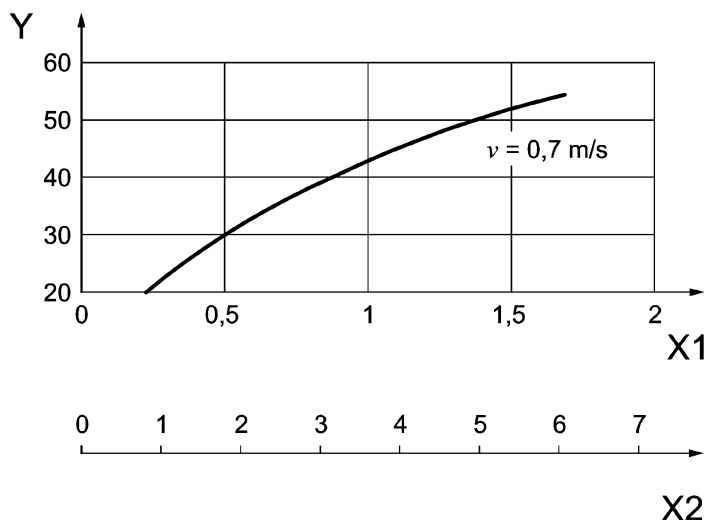
Where:

v is the minimum flow velocity in the discharge pipework = 0,7 m/s;

d_i is the pipe internal diameter in mm;

Q_{\min} is the minimum flow rate in l/s.

For convenience, Figure 1 shows the relationship between flow and internal diameter d_i of the discharge pipe. The pumping device shall be able to deal with this flow.



Key

Y pipe internal diameter d_i in mm

X1 flow rate Q in l/s

X2 flow rate Q in m³/h

Figure 1 — Relationship between flow and pipe internal diameter of the discharge pipe

4.5.5 Minimum free ball passage of the lifting plant

The ball passage in faecal lifting plants for limited applications between the WC inlet to the plant and the suction opening of the pumping device or of the macerator shall be at least 25 mm. The ball passage for faecal-free wastewater for lifting plants for limited applications between inlet connections and the suction opening of the pumping device shall be a minimum of 10 mm.

4.5.6 Minimum size of discharge pipework

Discharge connections, discharge pipework and non-return valves for lifting plants for limited applications shall have a minimum internal diameter of 20 mm; for non-macerating faecal lifting plants for limited applications, the minimum internal diameter shall be 25 mm.

4.6 Control equipment

Lifting plants for limited applications shall be fitted with control equipment for automatic operation.

4.7 Electrical equipment

The electrical equipment of the plant shall comply with at least protection type IP 44 to EN 60529.

EN 12050-3:2015 (E)**4.8 Fixing devices**

Lifting plants for limited applications shall be designed to prevent rotation or floatation.

4.9 Reaction to fire**4.9.1 General**

Where use of a plant is subject to national regulatory requirements on reaction to fire, its reaction to fire performance shall be considered as that of its components (i.e. material approach) and shall be declared as one of the following classes, according to EN 13501-1:

- a) Class A1, without the need for testing (CWT), when meeting the requirements, specified in 4.9.2, or otherwise;
- b) Class A1 to E, defined according to the results of testing the plant's constituent material(s), according to the standard(s) referred to in EN 13501-1, as specified in 4.9.3 of this standard.

4.9.2 Plants classified as Class A1 without the need for testing

The reaction to fire performance of a plant shall be declared as Class A1²⁾ without the need for testing, provided that:

- a) each of the plant's constituent materials contains not more than 1% of homogeneously distributed organic material, by mass or volume (whichever is the most onerous); and
- b) any external coating, if applied over the surface area of the plant, is made of inorganic material(s), which is/are also classified as Class A1.

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4.9.3 Plants classified according to test results**4.9.3.1 Principle**

For the purpose of the reaction to fire performance of the plant each of its constituent materials, including those in surface coating of the plant, if any, shall be classified according to EN 13501-1 and only the lowest class of such materials shall be declared. The class of an individual constituent material shall be obtained as the result of the test method(s), relevant to this class, and as specified in the standards referred to in EN 13501-1.

NOTE A constituent material of the plant is considered as one which may have a significant effect on the reaction to fire performance of such a plant. According to the definitions given in EN 13501-1, this may be in the case of:

- a homogeneous plant, its material, or
- a non-homogeneous plant, its substantial component (i.e. a material that constitutes a significant part of such plant). A layer with a mass per unit area $\geq 1,0 \text{ kg/m}^2$ or a thickness $\geq 1,0 \text{ mm}$ is considered to be a substantial component.

Test specimens used for the test methods applicable for this classification shall be prepared according to EN 13501-1 and to the relevant standards referred therein.

²⁾ See Decision of the Commission 96/603/EC of 1996-10-04 (see OJEU L 267 of 1996-10-19), as twice amended by 2000/605/EC of 2000-09-26 (see OJEU L 258 of 2000-10-12) and by 2003/424/EC of 2003-06-06 (see OJEU L 144 of 2003-06-12).

In addition, with regard to the SBI test according to EN 13823, when applied, the test specimen shall be prepared and mounted as specified in 4.9.3.2.

4.9.3.2 Sizes and mounting of the test specimen

The test specimen of each constituent material shall be in accordance with EN 13823 in a flat-sheet form of the following sizes:

- short wing: $(495 \pm 5) \text{ mm} \times (1\,500 \pm 5) \text{ mm}$;
- long wing: $(1\,000 \pm 5) \text{ mm} \times (1\,500 \pm 5) \text{ mm}$.

4.10 Noise level

The manufacturer shall declare the A-weighted emission sound pressure level (to be measured at 1 m distance from the plant). Measurements shall be performed according to EN ISO 20361. The pump shall operate in best efficiency point during this measurement.

If an A-weighted emission sound pressure level is above 80 dB, the sound power level shall be determined according to EN ISO 20361 and shall be declared.

Where the manufacturer declares that the A-weighted emission sound pressure level is equal to 70 dB, although it might be smaller, the manufacturer may state “70 dB(A)”.

If the manufacturer declares a lower value of the sound pressure level than 70 dB(A) the plant shall be measured according to EN ISO 20361 and the corresponding test result shall be declared.

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4.11 Durability

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4.11.1 General <https://standards.iteh.ai/catalog/standards/sist/b57f848e-2578-4f57-a370-26413ab0f9c3/sist-en-12050-3-2015>

Lifting plants for limited applications for wastewater containing or not containing faecal matter are products of known and stable performance for defined end use applications with respect to their established durability for which experience has been accumulated over a long period of time. Durability is ensured by meeting the requirements of this standard, which represent the state of the art.

For new materials the manufacturer shall take appropriate measures to verify that the lifting plant made of the new material is in accordance with the performance characteristics required by this standard.

4.11.2 Durability of watertightness and odourtightness

Durability of watertightness and odourtightness is ensured by meeting the requirements according to 4.3 and 4.4, when tested in accordance with 5.3.

4.11.3 Durability of lifting effectiveness

Durability of lifting effectiveness is ensured by meeting the requirements for

- pumping of solids according to 4.5.1, when tested in accordance with 5.4 and 5.5,
- the pipe connections according to 4.5.2 and 4.5.6 when tested in accordance with 5.3,
- ventilation according to 4.5.3, when tested according to 5.4 and 5.5,
- minimum flow velocity according to 4.5.4 when tested in accordance with 5.2,