



SLOVENSKI STANDARD SIST EN 12050-3:2001

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Wastewater lifting plants for buildings and sites - Principles of construction and testing -
Part 3: Lifting plants for wastewater containing faecal matter for limited applications

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

Stations de relevage d'effluents pour les bâtiments et terrains -Principes de construction
et d'essai - Partie 3: Stations de relevage a application limitée pour effluents contenant
des
matieres fécales

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ICS:

91.140.80 Drenažni sistemi Drainage systems

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ICS 91.140.80

English version

Wastewater lifting plants for buildings and sites - Principles of construction and testing - Part 3: Lifting plants for wastewater containing faecal matter for limited applications

Stations de relevage d'effluents pour les bâtiments et terrains - Principes de construction et d'essai - Partie 3: Stations de relevage à application limitée pour effluents contenant des matières fécales

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

This European Standard was approved by CEN on 1 December 2000.

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 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 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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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 165 "Wastewater engineering", the secretariat of which is held by DIN.

This is the third of a total of four parts of the standard series EN 12050 with the following titles:

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

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 June 2001, and conflicting national standards shall be withdrawn at the latest by September 2002.

This European Standard 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 Z, which is an integral part of this standard.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Annex A is normative. The annexes B, C and Z are informative.

1 Scope

This part of this European Standard applies to lifting plants for wastewater containing faecal matter for limited applications used for draining a single WC according to EN 33 or EN 37 to which it is directly connected and located below flood level. Plants for limited applications are those where the number of users is small, where there is another WC available above flood level, and the plants serve no more than one wash-hand basin, one shower and one bidet provided they pass the tests described in clause 8 and they are installed in accordance with EN 12056-1 and no other sanitary appliance is directly or indirectly connected. In addition, limited application means that the plant is located in the same room as the WC and any other appliance served by it.¹⁾ This part of this standard contains general requirements, basic construction and testing principles, together with information on materials and conformity evaluation. Construction and testing requirements for non-return valves used in faecal lifting plants for limited applications are given in EN 12050-4.

2 Normative references

This European Standard incorporates by dated or undated reference provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to apply (including amendments).

EN 33

Pedestal W.C. pan with close coupled cistern – Connecting dimensions

EN 37

Pedestal W.C. pan with independent water supply – Connecting dimensions

EN 1085:1997

Wastewater treatment – Vocabulary

EN 12050-4

Wastewater lifting plants for buildings and sites – Principles of construction and testing – Part 4: Non-return valves for faecal-free wastewater and wastewater containing faecal matter

EN 12056-1

Gravity drainage systems inside buildings – Part 1: General and performance requirements

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.

EN 12056-4

Gravity drainage systems inside buildings – Part 4: Wastewater lifting plants, layout and calculation

EN 12639 : 2000

Liquid pumps and pump units - Noise test code - Grade 2 and grade 3 of accuracy

EN 60529

Degrees of protection provided by enclosures (IP code) (IEC 60529: 1989)

ISO 9906

Rotodynamic pumps - Hydraulic performance acceptance tests - Grades 1 and 2

3 Terms and definitions

For the purposes of this standard, the definitions given in EN 1085 : 1997 and the following apply:

3.1

faecal lifting plant for limited applications

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

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

3.2

container of faecal lifting plant for limited applications

integral part of a faecal lifting plant for limited applications and contains the pump, its controls and the priming volume of wastewater

NOTE The container of a faecal lifting plant for limited applications is not considered to be a collection tank according to prEN 12050-1: 2000.

3.3

pumping device of faecal lifting plant for limited applications

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

3.4

initial testing (type testing)

testing to demonstrate that a plant conforms to all requirements of this standard

3.5

priming volume

volume of liquid required for proper operation of the pumping device

4 Requirements

4.1 Control equipment

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

4.2 Electrical equipment

The electrical equipment of the plant shall comply with the appropriate valid IEC-Standard. Even where the electrical equipment of the plant is located in a well ventilated space and not liable to flooding it shall comply with at least Protection Type IP 44 according to EN 60529.

4.3 Container

The container shall be closed, watertight and odourtight.

4.4 Manufacturer's statement

The manufacturer shall state the hydraulic performance characteristics (head and flow) according to grade 2 of ISO 9906 together with the maximum power consumption and maximum current consumption.

5 Construction principles

5.1 Pumping of solids

The faecal 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 does not accumulate.

5.2 Pipe connections

The dimensions of inlet, discharge and ventilating connections shall permit the use of standard pipe sizes. Connections shall be flexible and shall withstand the maximum pump pressure without leaking. The WC inlet connection shall facilitate connection of a WC according to EN 33 or EN 37.²⁾ Wastewater flows shall be unimpeded, in accordance with EN 12056-1.

The minimum diameter of additional connections shall be DN 40. Additional connections shall ensure that wastewater containing faecal matter cannot contaminate or significantly displace the trap seal of a sanitary appliance. The minimum outlet levels and minimum distances of additional sanitary appliances shall be specified in the installation instructions.

5.3 Ventilation

The container shall be adequately ventilated. Ventilation into a room shall be odour-free.

5.4 Minimum flow velocity

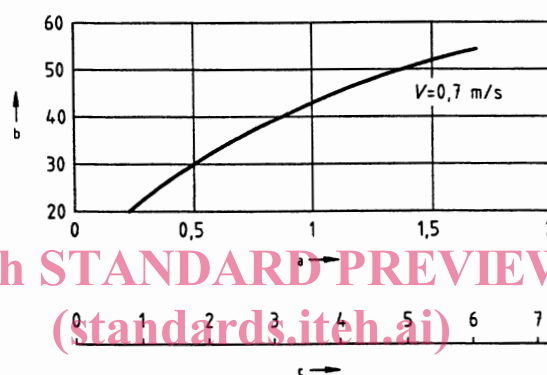
The flow velocity in the discharge pipework shall be at least 0,7 m/s at the duty point. The duty point shall be calculated according to EN 12056-4. The minimum flow rate shall be calculated in accordance with equation (1)

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

Where:

- v the minimum flow velocity in the discharge pipework = 0,7 m/s;
- d_i the pipe internal diameter in mm;
- Q_{\min} the minimum flow rate in l/s.

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



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Key

- a) Flow rate Q in l/s b) Pipe internal diameter d_i in mm c) Flow rate Q in m³/h

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

²⁾ These requirements do not apply to faecal lifting plants for limited applications which are integrated into a WC.

5.5 Minimum passage of the plant

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

5.6 Minimum size of discharge pipework

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

5.7 Fixing devices

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

6 Materials

Materials used shall be adequate to meet the demands of installation and operation, shall comply with the requirements of this standard and shall not release dangerous substances. Examples of suitable materials for the construction of faecal lifting plants for limited applications are given in Annex B (informative). For materials where corrosion protection is necessary, such materials shall conform to the relevant corrosion protection requirements in force in the place of use of the plant.

7 Testing documentation and samples to be tested

For the initial testing the following documentation shall be provided:

- drawings, including information on materials used;
- operating and maintenance instructions (acceptable in manuscript form).

The initial testing shall be carried out on the wastewater lifting plant with the lowest rated performance from each series.

8 Testing

8.1 General

Testing shall be carried out on a plant that complies with the shape, dimensions and materials given in the testing documentation. The test shall demonstrate compliance with the requirements of this standard. The water temperature during the test shall not exceed 35 °C.

8.2 Test conditions

The hydraulic and electrical characteristics stated by the manufacturer shall be confirmed, hydraulic characteristics according to ISO 9906 grade 2, and shall comply with this standard. Before commencing testing, the pumping device shall be run continuously for at least 1 minute. Testing of hydraulic and electrical characteristics shall be carried out over a period of 5 to 10 minutes. Based on the hydraulic characteristics determined by testing, compliance with the minimum flow velocity given in 5.4 shall be checked.

8.3 Testing for leaks

Water and odour tightness testing shall be carried out in a water-pressure test unit. During this test the plant full of water shall withstand an overpressure of $(8 \pm 0,5)$ kPa ($(0,080 \pm 0,005)$ bar) for 15 minutes without any visible leakage.

8.4 Lifting effectiveness of the faecal lifting plant for limited applications

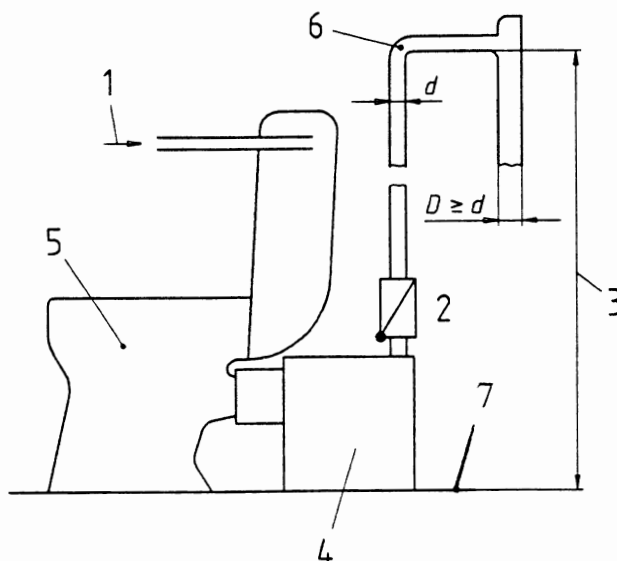
8.4.1 Pumping of solids

The lifting effectiveness of faecal lifting plants for limited applications shall be tested by using the arrangement shown in Figure 2. For macerating units, the discharge pipe of the test arrangement shall have an internal diameter d of 20 mm; for non-macerating units d shall be 25 mm; except where a larger diameter is required by the manufacturer.

Faecal lifting plants for limited applications integrated into the WC shall be connected directly to the discharge pipe of diameter d .

Materials used in the test shall be:

- sheets of double layered toilet paper
- sheets of moistened toilet paper of fleece quality (size 195 mm × 100 mm)
- sanitary tampon



Key

- | | | | |
|---|--------------------------------------|---|----------------|
| 1 | Water supply | 5 | WC |
| 2 | Non-return valve | 6 | Discharge pipe |
| 3 | Head (as stated by the manufacturer) | 7 | Base level |
| 4 | Lifting plant | | |

Figure 2 - Testing Arrangement

8.4.2 Test procedure

A faecal lifting plant for limited applications together with its non-return valve shall be connected to a WC with a 9 litre flush. The suction and pumping effectiveness shall be tested by flushing the WC ten times, adding the test material as follows:

- | | |
|----------------|--|
| flush 1) | 12 sheets of double layer toilet paper |
| flush 2) | 12 sheets of double layer toilet paper |
| flush 3) | 4 sheets of moistened toilet paper of fleece quality |
| flush 4) | 1 sanitary tampon of normal size |
| flush 5) | 12 sheets of double layer toilet paper |
| flush 6) | 12 sheets of double layer toilet paper |
| flush 7) | 4 sheets of moistened toilet paper of fleece quality |
| flush 8 to 10) | water flushes without addition of test materials |

During the test the water level in the container shall not rise more than 180 mm above the base level.

8.4.3 Completion of test

After testing as described in 8.4.2, there shall be no test material deposited except in negligible amounts. Amounts less than 20 % of the total dry weight of materials added are regarded as negligible.