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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

Abwasserhebeanlagen für die Gebäude- und Grundstücksentwässerung - Bau- und Prüfgrundsätze - Teil 4: Rückflussverhinderer für fäkalienfreies und fäkalienhaltiges Abwasser
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Stations de relevage d'effluents pour les bâtiments et terrains - Principes de construction et d'essai - Partie 4: Dispositif anti-retour pour eaux résiduaires contenant des matières fécales et exemptes de matières fécales

Ta slovenski standard je istoveten z: EN 12050-4:2000

ICS:

91.140.80 Drenažni sistemi Drainage systems

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English version

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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 national standard body.

This part of this European Standard for wastewater lifting plants for buildings and sites was prepared by Task Group 4 "Wastewater lifting plants" of Working Group WG 21 "Drainage systems within buildings" of CEN Technical Committee TC 165 "Wastewater engineering".

This is the fourth part 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 non-return valves used in conjunction with faecal and faecal-free wastewater lifting plants. This part of the standard contains general requirements, basic construction and testing principles together with information on materials and conformity evaluation.

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 applies (including amendments).

EN 1085:1997

Wastewater treatment – Vocabulary

prEN 12050-1:2000

Wastewater lifting plants for buildings and sites – Principles of construction and testing – Part 1: Lifting plants for wastewater containing faecal matter

EN 12050-2:2000

Wastewater lifting plants for buildings and sites – Principles of construction and testing – Part 2: Lifting plants for faecal-free wastewater

EN 12050-3:2000

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

EN 12639:2000

Liquid pumps and pump units - Noise test code 20 Grade 2 and grade 3 of accuracy

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3 Terms and definitions

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

3.1

non-return valve

part of a wastewater lifting plant that prevents backflow of wastewater from the discharge pipework

3.2

backwash device

part of the non-return valve which allows draining of the discharge pipework and venting of the pumping device

3.3

initial testing (type testing) of non-return valves

testing to demonstrate that a non-return valve conforms to this standard

4 Requirements

Non-return valves shall automatically prevent wastewater flowing back from the discharge pipework when the pumping operation stops. Non-return valves shall open automatically during pumping.

Connections to the discharge pipework shall resist longitudinal forces. They shall be capable of withstanding the maximum pump pressure of the wastewater lifting plant without leakage.

5 Principles of construction

5.1 Connections

Non-return valves which are not an integral part of a wastewater lifting plant shall have connections complying with relevant pipework standards.

5.2 Solids passage

The free solids passage of a non-return valve shall be at least 80 % of the internal diameter of the discharge pipework minus 4 mm ie:

$$D_s = 0,8 \times D_i - 4 \text{ mm}$$

where:

D_s is the solids passage, in millimetres

D_i is the internal diameter of the discharge pipework, in millimetres

5.3 Design requirements

Non-return valves shall ensure that solids present in wastewater, particularly fibrous materials, cannot be retained.

5.4 Cleaning opening

For non-return valves of $DN \geq 80$, intended for use with faecal lifting plants, the inside of the non-return valve shall be accessible via an opening with a gas and watertight cover. For non-return valves of $DN < 80$ a cleaning opening is not necessary.

6 Materials

Materials used shall be adequate to meet the demands of installation, operation, shall comply with the requirements given in clause 5 and shall not release dangerous substances. Examples of suitable materials for the construction of non-return valves 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.

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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).

8 Testing

8.1 General requirements

Testing shall be carried out on a valve that complies with the shape, dimensions and materials given in the testing documentation. The test shall demonstrate compliance with the construction principles given in clause 5. If the closure device consists of a ball, its diameter and mass shall be checked.

8.2 Functional testing

8.2.1 General requirements

If the application of the non-return valves is not specified, valves shall be tested in accordance with both 8.2.2 and 8.2.3. The test has to be performed with the valves to be tested in the designated position.

8.2.2 Faecal-free wastewater

The operation of non-return valves shall be tested as part of a lifting plant for faecal-free wastewater, carried out in accordance with 8.4 of EN 12050-2:2000. After testing, the non-return valves shall be examined to ensure that they remain able to operate.

8.2.3 Wastewater containing faecal matter

The operation of non-return valves shall be tested as part of a faecal lifting plant, carried out in accordance with 8.5 of prEN 12050-1:2000 or 8.4.2 of EN 12050-3:2000. The pieces of test material shall pass through the non-return valve. After the test the non-return valve shall be opened and checked that no test material has settled.

8.2.4 Leakage

Non-return valves shall be subjected to a back pressure of 0,2 bar for 10 minutes using clean water. During this period no more water shall pass through the valve than specified in table 1.

Table 1 - Relationship between valve size and maximum leakage

Valve Size	Maximum leakage during the test time of 10 minutes litre
DN < 32	0,5
32 ≤ DN ≤ 100	1
DN > 100	3

8.2.5 Pressure testing

Non-return valves shall withstand a test pressure of at least 6 bar, when open and when closed. For non-return valves which are integral with the plant, the test pressure shall be 1,5 times the maximum pump pressure of the plant. There shall be no visible leakage from the valve over the test duration of 10 minutes.

8.2.6 Testing of backwash devices SIST EN 12050-4:2001

If a backwash device is fitted, a check shall be made to ensure that it can be opened against a counter pressure of 1 bar.

9 Conformity evaluation

9.1 General

To demonstrate conformity with this standard the products shall be subjected to the following evaluation procedures:

- initial testing of the products (type testing) according to clause 8 and Annex A of this standard;
- factory production control to be carried out by the manufacturer (internal conformity evaluation) according to 9.3 of this standard.

If third party control is carried out other than required in Annex Z, due to national requirements for example, this should be carried out in accordance with Annex C (informative).

9.2 Initial testing of the products (type testing)

The type tests in accordance with clause 8 and Annex A of this standard shall be carried out on first application of this standard in order to demonstrate compliance with the requirements of this standard. Where these characteristics have been determined by the components supplier, it need not to be retested by the lifting plant manufacturer. Tests previously performed in accordance with the provisions of the standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc) may be taken into account.

Whenever a change occurs in the design, the raw material, components, supplier of the components or the production process, which would change significantly one or more of the stated characteristics, the type tests shall be repeated for the appropriate characteristic(s).

9.3 Factory production control (FPC) carried out by the manufacturer (internal conformity evaluation)

The FPC shall be carried out according to table 2.

The manufacturer shall establish, document and maintain an FPC system to ensure that the products, placed on the market, conform with the stated performance characteristics. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of results to control raw and other incoming materials or components, the production process and the product, and shall be sufficiently detailed to ensure that the conformity of the product is apparent.

An FPC system conforming with the requirements of EN ISO 9001 and/or EN ISO 9002 and made specific to the requirements of this standard, is considered to satisfy the above requirements.

The manufacturer shall have the following available:

- an organisation chart with information on the person responsible for the conformity evaluation system;
- trained personnel;
- the required production equipment;
- the required test equipment.

The manufacturer shall provide written procedures for the following:

- control of the test reports;
- control of defective products, storage, handling and marking;
- the handling of customer complaints;
- the calibration and checking of measuring and test equipment.

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Table 2 - Internal production control carried out by the manufacturer

No	Properties	Frequency	Requirement as per clause
1	Principles of construction Marking Visual examination to determine that the device is complete, able to function and free from defects	per product	5 and 10
2	Dimensions	one part per production day and type *)	5.2
3	Materials Use of the materials in accordance with the initial type test	one part per production day and type *)	6 and 7
4	Hydraulic values	one part per production day and type *)	8

*) The frequency and extent of sampling depends on the production program, the scale of production and the manufacturing process in each factory. At least one part per production day and type shall, however, be checked. Where these characteristics have been determined by the components supplier they need not be retested by the lifting plant supplier.

9.4 Non-conforming products

All non-conforming products shall be separately stored and excluded from delivery, and instructions shall be given for further handling, storage and marking.

If during the factory production control non-conforming products are detected the manufacturer shall investigate the cause of the defect and take appropriate corrective actions e. g. stop the production related to the failure(s) and/or quarantine the defective product.

Only after a thorough examination and correction of the fault and a subsequent successful final inspection shall the evaluating personnel make a decision on recommencing production.

10 Marking

Non-return valves complying with this standard which are not permanently installed in a wastewater lifting plant shall be marked in a permanent and legible manner with the manufacturer's symbol¹⁾ and "EN 12050-4".

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¹⁾ The manufacturer is the person under whose name the product is sold.