BRITISH STANDARD

BS EN
12056-5:2000

Gravity drainage systems inside buildings —

Part 5: Installation and testing, instructions for operation, maintenance and use

The European Standard EN 12056-5:2000 has the status of a British Standard

ICS 91.140.80

National foreword

This British Standard is the official English language version of EN 12056-5:2000.

The UK participation in its preparation was entrusted by Technical Committee B/505, Wastewater engineering, to Subcommittee B/505/21, Roof drainage and sanitary pipework, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 19 and a back cover.

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

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English version

Gravity drainage systems inside buildings - Part 5: Installation and testing, instructions for operation, maintenance and use

Réseaux d'évacuation gravitaire à l'intérieur des bâtiments - Partie 5: Mise en œuvre, essai, instructions de service, d'exploitation et d'entretien

Schwerkraftentwässerungsanlagen innerhalb von Gebäuden - Teil 5: Installation und Prüfung, Anleitung für Betrieb, Wartung und Gebrauch

This European Standard was approved by CEN on 27 October 1999.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12056-5:2000 E

Foreword

This European Standard 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 December 2000, and conflicting national standards shall be withdrawn at the latest by June 2001.

This part is the fifth in a series relating to the fundamental requirements of gravity drainage systems inside buildings. There will be five parts, as follows: Gravity drainage systems inside buildings:

Part 1: General and performance requirements

Part 2: Sanitary pipework - Layout and calculation

Part 3: Roof drainage - Layout and calculation

Part 4: Waste water lifting plants - Layout and calculation

Part 5: Installation and testing, instructions for operation, maintenance and use

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.

1 Scope

This European Standard applies to waste water drainage systems which operate under gravity. It is applicable for drainage systems inside dwellings, commercial, institutional and industrial buildings.

Differences in plumbing within Europe have led to a variety of systems being developed. Some of the major systems in use are described but this standard has not attempted to detail the intricacies of each system. Detailed information additional to that contained in this standard may be obtained by referring to the technical documents listed in Annex A.

This fifth part of the standard sets out the principles, which should be followed when installing and maintaining waste water and rainwater gravity drainage systems. It deals with fixing, support, containment of thermal movement, protection and accessibility of the system.

All drawings in this standard are given as examples and are not intended to exclude any other system configuration.

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.

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

EN 12056-2: Gravity drainage systems inside buildings
Part 2: Sanitary pipework - Layout and calculation

EN 12056-3: Gravity drainage systems inside buildings
Part 3: Roof drainage - Layout and calculation

EN 12056-4: Gravity drainage systems inside buildings
Part 4: Waste water lifting plants - Layout and calculation

3 Definitions

For the purposes of this European Standard, the following definitions apply:

3.1 General

3.1.1 waste water
water which is contaminated by use and all water discharging into the drainage system; e.g. domestic and trade effluent, condensate water and also rainwater when discharged in a waste water drainage system

3.1.2 domestic waste water
water which is contaminated by use and normally discharged from WC, shower, bath, bidet, wash basin, sink, floor gully

3.1.3 trade effluent
water after industrial use and processes contaminated / polluted water including cooling water

3.1.4 grey water
waste water not containing faecal matter or urine

3.1.5 black water
waste water containing faecal matter

3.1.6 rainwater
water resulting from natural precipitation that has not been deliberately contaminated

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

3.1.8 drainage system
a system composed of drainage equipment, and other components collecting waste water and discharging by means of gravity. Effluent lifting plant may be part of a gravity drainage system.

3.1.9 combined system
a drainage system for both rain and waste water in a single pipe

3.1.10 separate system
a drainage system for draining rain and waste water separately by dedicated pipework

3.2 Pipes and fittings

3.2.1 sanitary pipework
arrangement of discharge pipework, with or without ventilating pipes, connected to a drainage system
Note: For the purposes of this standard “pipework” include pipes and fittings.

3.2.2 nominal diameter (DN*)*
numerical designation of size which is a convenient round number approximately equal to the diameter in mm

3.2.3 internal diameter (d_i)
mean internal diameter of the pipe barrel at any cross section

3.2.4 external diameter(d_a)
mean external diameter of the pipe barrel at any cross section

3.2.5 minimum internal diameter ($d_{i\,min}$)
smallest internal diameter allowed with maximum tolerance

3.2.6 branch discharge pipe
pipe connecting sanitary appliances to a discharge stack or drain

3.2.7 square entry
equal branch junction that is more than 45°, or has a centre line radius less than the internal pipe diameter

3.2.8 swept entry
equal branch junction that is at 45° or less, or has a centre line radius not less than the internal pipe diameter

3.2.9 connection bend
first fitting in direction of flow after trap outlet

3.2.10 discharge stack
main (generally vertical) pipe, conveying discharges from sanitary appliances

3.2.11 stack offset
non vertical part of a discharge stack

3.2.12 drain
near horizontal pipe suspended within a building or buried in the ground to which stacks or ground floor appliances are connected

3.2.13 filling degree
proportion of water depth (h) to the inside diameter (d_i)

3.3 Ventilating pipework and fittings

3.3.1 ventilating pipe
pipe provided to limit the pressure fluctuations within the discharge pipe system

3.3.2 branch ventilating pipe
ventilating pipe connected to a branch discharge pipe

3.3.3 stack vent
extension of a vertical discharge pipe above the highest branch discharge pipe connection that terminates in an end, open to the atmosphere

3.3.4 ventilating stack
main vertical ventilating pipe, connected to a discharge stack, to limit pressure fluctuations within the discharge stack

3.3.5 air admittance valve
valve that allows air to enter the system but not to escape in order to limit pressure fluctuations within the sanitary pipework

3.4 Appliances

3.4.1 domestic sanitary appliances
fixed appliances supplied with water and used for cleaning or washing. For example: bath, shower, wash basin, bidet, WC, urinal, sink, dishwasher, washing machine

3.4.2 non-domestic sanitary appliances

special sanitary appliances used in commercial kitchens, laundries, laboratories, hospitals, hotels, swimming-pools etc.

3.4.3 floor gully

discharge fitting intended to receive water from floors either through apertures in a grating or from pipes connected to the body of the gully. A gully may include a trap.

3.4.4 trap

device that prevents the passage of foul air by means of water seal

3.4.5 depth of water seal (*H*)

the depth of water which would have to be removed from a fully charged trap before gases and odours at atmospheric pressure could pass through the trap shown as *H* in Figure 2

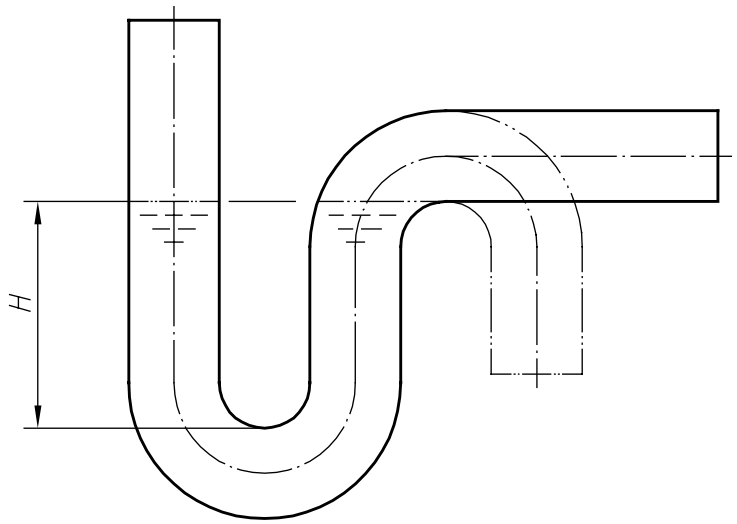

Figure 1 — Water depth in trap

3.5 Calculation

3.5.1 discharge unit (DU)
the average discharge rate of a sanitary appliance expressed in litres per second (l/s)

3.5.2 frequency factor (*K*)
variable to take account of the frequency of use of sanitary appliances (dimensionless)

3.5.3 waste water flow rate (Q_{ww})
total design flow rate from sanitary appliances in a drainage system or in a part of a drainage system in litres per second (l/s)

3.5.4 continuous flow rate (Q_c)
flow rate of all continuous flows e.g. cooling water etc. in litres per second (l/s)

3.5.5 pumped water flow rate(Q_p)
discharge rate of waste water pumps in litres per second (l/s)

3.5.6 total flow rate (Q_{tot})
the total flow rate is the sum of the waste water flow rate (Q_{ww}) and continuous flow rate (Q_c) and pumped water flow rate (Q_p), in litres per second (l/s)

3.5.7 hydraulic capacity(Q_{max})
maximum flow rate of water permitted in a branch, stack or drain in litres per second (l/s)

3.5.8 air flow rate (Q_a)
minimum flow rate of air through a ventilating pipe or air admittance valve, measured at 250 Pascal (Pa) pressure drop, in litres per second (l/s)

4 Storage and transport

Components for wastewater discharge systems shall be handled carefully and be protected against dirt and damage when stored and transported. They shall be stored according to the manufacturers' instructions.

5 General requirements

5.1 General

The installation of a wastewater discharge system is divided into the installation of wastewater pipework and the connection of the sanitary appliances. It is essential that the pipework once installed is not disturbed by subsequent construction work or following trades. This requires close co-operation and co-ordination of designer and the installing trades.

5.2 Waste water discharge pipework

Wastewater discharge pipework shall to be installed according to the design and calculation requirements of EN 12056-2. The design route of the pipework shall be followed.

5.3 Gradient

Wastewater discharge pipes shall be installed to the designed gradient and drain completely except where installations are designed to run full bore to discharge rainwater in syphonic systems (see EN 12056-3) and the pressure pipework of waste water lifting plants (see EN 12056-4).

5.4 Sanitary appliance

Throughout the building process checks shall be made to ensure that the connection points of the waste water pipework to sanitary appliances and their water supply points are correctly sited.

5.5 Safety precautions

Information on the location of gas, water supply, electrical power supply, and other services shall be made available in order to ensure that the wastewater installation can proceed and be used safely.

5.6 Stability of sanitary pipework

Sanitary pipework is not part of the load bearing structure. There shall be no unauthorized attachments to the drainage system. Pipework shall be supported. The loads that will be exerted by the sanitary appliances and drainage system in operation shall be taken into account when designing the support system.

6 Installation of waste water pipes

6.1 Fixing

The waste water pipe shall be safely and securely fixed to the structure. Fixings appropriate to the pipe material and the supporting structure shall be installed in accordance with the manufacturer's recommendations.

6.2 Jointing

The jointing of wastewater discharge pipes and fittings shall be made water and gas tight according to the manufacturers' instructions using specified sealing techniques.

6.3 Fixing and supporting

Pipelines with joints, which allow longitudinal movement, shall be fixed and/or supported in such a way as to ensure that during service the joint cannot become unintentionally disconnected. Reaction forces shall be considered.

6.4 Changes of directions and branch pipe connections

Any change of direction in pipelines or branch pipe connections shall be made using fittings.

6.5 Connection of pipes of different materials and sizes

The connection of pipes of different materials and/or sizes shall only be made with purpose made fittings.

6.6 Thermal movement

Thermal movement shall be considered. The pipe manufacturers' instructions shall be followed.

6.7 Installation in concrete or other fills

If wastewater discharge pipelines are installed in concrete or other fill, the manufacturers' instructions shall be followed. Pipelines and pipe joints shall be protected against ingress of the surrounding fill material and be restrained from displacement due to flotation.

7 Installation of sanitary appliances

7.1 Fixing

Sanitary appliances shall be safely and securely fixed to the structure, using fixings and techniques recommended by the manufacturer.

7.2 Connection

The sanitary appliance shall be connected to the wastewater discharge pipe by using the manufacturer's recommended fitting. If necessary the connecting fitting shall be supported.

8 Fire protection

Where pipes penetrate a fire rated element (ceiling, wall or floor), the construction of the penetration seal shall have the same fire resistance as the penetrated element or be appropriate to the building's design requirement. Details of penetration seals for fire rated elements are found in the manufacturer’s instructions.

9 Sound insulation

Waste water discharge pipes and sanitary appliances shall be installed in such a way that sound transmission is within the limits set by national and local regulations and practice.

10 Instructions for operation, maintenance and use

A document giving instructions for operation, maintenance and use of the wastewater discharge system and sanitary appliances shall be prepared and made available for the building owner or occupier.

11 Testing

Both tightness tests and performance tests may be required by local practice or as a contractual requirement.

Annex A (informative)

A.1 National and local regulations and practice

The following documents contain details which should be considered within the framework of this standard. This list was correct at the time of publication of this standard but should not be considered to be exhaustive. Users of this standard should check for the latest applicable documents.

Austria

ÖNORM B 2501 "Entwässerungsanlagen für Gebäude und Grundstücke; Bestimmungen für Planung und Ausführung"

ÖNORM B 2506-1 "Regenwasser-Sickeranlagen für Abläufe von Dachflächen und befestigten Flächen – Teil 1: Anwendung, hydraulische Bemessung, Bau und Betrieb"

ÖWAV Regelblatt 5 "Richtlinien für die hydraulische Berechnung von Abwasserkanälen"

ÖWAV Regelblatt 11 " Richtlinien für die abwassertechnische Berechnung von Schmutz-, Regen- und Mischwasserkanälen"

Belgium

According to the Royal Decree of 24.06.1988 on the municipalities, drainage installations inside buildings are of the competence of the municipalities. Drainage systems have thus to comply with the municipal regulations.

Denmark

Bygningsreglement BR 1995. Udgivet af By- og Boligministeriet.
Danish Building Regulation BR 1995. Published by the National Building and Housing Agency.
available from Schultz Information
Herstedvang 10
DK-2620 Albertslund
Telephone: + 45 43 63 23 00
Telefax: + 45 43 63 19 69

DS 432:1994 Norm for afløbsinstallationer.
DS 432:1994 Code of Practice for sanitary drainage - Waste water installations.

DS 432:1995/Ret.1 Norm for afløbsinstallationer.
DS 432:1995/Corr.1 Code of Practice for sanitary drainage - Waste water installations.

France

Règlement sanitaire départemental, titre III "Locaux d'habitation et assimilés" (circulaire du 9 août 1978 modifiée par les circulaires des 26 avril 1982, 20 janvier 1983, 18 mai 1984, 31 juillet 1995, 22 mai 1997).

Germany

National regulations require drainage system I to be used.
For EN 12056-1 refer to DIN 1986-1 and -2, DIN EN 1610 and DIN 18381.
For EN 12056-2 refer to DIN 1986-1 and -2, DIN EN 1610 and DIN 18381.
For EN 12056-3 refer to DIN 1986-1 and -2, DIN EN 1610 and DIN 18381.
For EN 12056-4 refer to DIN 1986-1 and -2 and DIN EN 12050-1 to -4.
For EN 12056-5 refer to DIN 1986-1 and -2 and DIN EN 1610 and DIN 18381.

Ireland

National Regulations: Building Regulations 1997 Technical Guidance Document H Drainage and Waste Water Disposal.

Local Regulations: Local Authorities have different requirements concerning the use of types of drainage systems, and the use of air admittance valves. Drainage System No 1 is the accepted method of gravity drainage inside buildings in Ireland.

Italy

LEGGE m.319 (Legge Merli) 10-05-76
Norme per la tutela delle acque dall'inquinamento coordinate con le modifiche ed integrazioni apportate dalla Legge 8/10/1976 n.690, dalla Legge 24/12/1979, n.650, dalla Legge 23/4/1981, n.153. G.U. n.48 del 21/2/1977

Decreto Legge n. 544, 10-08-76
Proroga dei termini di cui agli articoli 15, 17 e 18 della Legge 319 (Legge Merli) del 10/5/1976, recante G.U. n.211 dell'11/8/1976

Delibera MINISTERO LL.PP. COMITATO MINISTRI TUTELA ACQUE, 4-02-77
Criteri, metodoligie e norme tecniche generali di cui all'Art. 2 lettera b), d), e) della legge 319 (Legge Merli) del 10/5/1976, recante norme per la tutela delle acque dall'inquinamento

Decreto Legge n.467, 24-09-79
Proroga dei termini ed integrazioni delle Leggi 171 del 16/4/1973 e 319 (Legge Merli) del 10/5/1976, in materia di tutela delle acque dallo inquinamento, G.U. n.263 del 25/9/1979

LEGGE n.650, 24-12-79
Integrazioni e modifiche delle Leggi n.171 del 16/4/1973 e n.319 del 10/5/1976 (Legge Merli) in materia di tutela delle acque dall'inquinamento, G.U. n.352 del 29/12/1979

Decreto Legge n.620, 4-11-81
Provvedimento urgenti in materia di tutela delle acque dallo inquinamento, G.U. n.303 del 4/11/1981

LEGGE n.62, 5-03-82
Conversione in legge, con modificazioni, del D.L. 30/12/1981 n. 801 concernente provvedimenti urgenti in materia di tutela delle acque dallo inquinamento, G.U. n.63 del 5/3/1982

Circolare n.3035/SI/AC del MINISTERO DELL'AMBIENTE, 27-07-87
Indagine sugli impianti di depurazione delle acque reflue, G.U. n.183 del 7/8/1987

Decreto Legislativo n.132, 27-01-92
Attuazione della direttiva CEE n.80/68 concernente la protezione delle acque sotterranee dall'inquinamento provocato da alcune sostanze pericolose, Suppl. Ord. n.24 alla G.U. n.41 del 19/2/1992

Decreto n.309 del PRESIDENTE DELLA REPUBBLICA, 27-07-87
Regolamento per l'organizzazione del Servizio per la tutela delle acque, la disciplina dei rifiuti, il risanamento del suolo e la prevenzione dell'inquinamento di natura fisica e del Servizio per l'inquinamento acustico, atmosferico e per le industrie a rischo del Ministero dell'ambiente, G.U. n.136 dell'11/6/1992

Decreto Legge n.454, 15-11-93
Modifica alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.268 del 15/11/1993

Decreto Legge n.31, 14-01-94
Modifica alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.13 del 18/1/1994

Decreto Legge n.177, 17-03-94
Modifiche alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.64 del 18/3/1994

Decreto Legge n.292, 16-05-94
Modifiche alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.114 del 18/5/1994

Decreto Legge n.449, 15-07-94
Modifiche alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, nonché riorganizzazione degli organi collegiali del Ministero dell'Ambiente, G.U. n.166 del 18/7/1994

Decreto Legge n.537, 17-09-94
Modifiche alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.218 del 17/9/1994

Decreto Legge n.629, 16-11-94
Modifica alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.269 del 17/11/1994

Decreto Legge n.9, 16-01-95
Modifica alla disciplina degli scarichi delle pubbliche fognature e degli insediamenti civili che non recapitano in pubbliche fognature, G.U. n.12 del 16/1/1995

LEGGE n.135, 23-05-97
Conversione in Legge, con modificazioni, del Decreto Legge 25 marzo 1997, n.67, recante disposizioni urgenti per favorire l'occupazione, G.U. n.119 del 24/5/1997

Netherlands

NEN 3215 Binnenriolering in woningen en woongebouwen -
Eisen en bepalingsmethoden
Sewerage inside dwellings - Requirements and determination methods

NTR 3216 Binnenriolering - Richtlijn voor ontwerp en uitvoering
Sewerage inside dwellings - Guideline for design and installation

Sweden

Boverkets Byggregler BBR 94
Swedish Building Regulations 94 with mandatory provisions and general advisory notes

Boverkets Författningssamling BFS 1993:57, kapitel 6: Hygien, hälsa och miljö
Code of Statutes 1993:57 of the Swedish National Board of Housing, Building and Planning, chapter 6: Hygiene, Health and Environment

VA-handboken 10- Vatten och avlopp (Svensk Byggtjänst)
Water Supply and Sewer System Handbook 10 (Svensk Byggtjänst)

Switzerland

1. National regulations require drainage system I to be used.
2. The permission of air admittance valves is subject to local bodies.
3. Swiss standard SN 592000 is applicable for all layout rules which are not contained in EN 12056 Parts 1 to 5.

United Kingdom

1. Building Regulations 1991; Approved Document H
   available from Department of the Environment, Transport and the Regions (DETR)
   HMSO Publications Centre
   PO Box 276
   London
   SW8 5DT
   Great Britain
   Telephone: + 44 171 873 9090
   Telefax: + 44 171 873 8200

2. Technical Standards for Compliance with the Building Standards (Scotland) Regulations 1990; Part M: Drainage and sanitary facilities.
   available from Scottish Office (SO)
   New St Andrew's House
   Edinburgh
   EH1 3TG
   Great Britain
   Telephone: + 44 131 244 4553

3. The Building Regulations (Northern Ireland) 1994; Technical booklet N: Drainage.
   available from Department of the Environment for Northern Ireland (DON)
   c/o HMSO Bookshops
   16 Arthur Street
   Belfast
   BT1 4GD
   Great Britain
   Telephone: + 44 1232 238451
   Telefax: + 44 1232 235401

4. National annexes to BS EN 12056-2

5. National annexes to BS EN 12056-3

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W4 4AL