

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by Technical Committee B/505, Wastewater engineering, to Subcommittee B/505/22, Drainage systems outside buildings, upon which the following bodies were represented:

- Association of Consulting Engineers
- British Plastics Federation
- Clay Pipe Development Association Ltd.
- Concrete Pipe Association
- Department of the Environment
- Department of the Environment (Property and Buildings Directorate)
- Fibre Cement Manufacturers' Association
- Institute of British Foundrymen
- Institution of Civil Engineers
- Institution of Water and Environmental Management
- METCOM
- Water Services Association of England and Wales

The following bodies were also represented in the drafting of the standard through panels:

- Association of Building Engineers
- British Pump Manufacturers' Association
- Institute of Building Control
- Institute of Plumbing

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National foreword

This Part of BS EN 752 has been prepared by Subcommittee B/505/22 and is the English language version of EN 752-2 : 1996 *Drain and sewer systems outside buildings — Part 2: Performance requirements*, published by the European Committee for Standardization (CEN).

This Part was published as a result of international discussion and agreement in which the UK took an active part. It will be followed in due course by Parts 3 to 7, as listed in the foreword.

The British Standards BS 8005 and BS 8301 are valid for reference at the time of publication of this Part, but they will be replaced by national annexes showing UK practice published with the other relevant Parts of BS EN 752. When all seven Parts of BS EN 752 are published, BS 8005 and BS 8301 will be withdrawn in their entirety.

Cross-reference

Publication referred to	Corresponding British Standard
EN 752-1 : 1996	BS EN 752 <i>Drain and sewer systems outside buildings</i> Part 1 : 1996 <i>Generalities and definitions</i>

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 14, an inside back cover and a back cover.

EUROPEAN STANDARD

EN 752-2

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 1996

ICS 13.060.30

Descriptors: Sanitation, water removal, buildings, exterior, specifications, performance evaluation, verification

English version

Drain and sewer systems outside buildings — Part 2: Performance requirements

Réseaux d'évacuation et d'assainissement à
l'extérieur des bâtiments
Partie 2: Prescriptions de performances

Entwässerungssysteme außerhalb von
Gebäuden —
Teil 2: Anforderungen

This European Standard was approved by CEN on 1996-06-17. 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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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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

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Ref. No. EN 752-2 : 1996 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 Part is the second in a series relating to the functional requirements of drain and sewer systems outside buildings that operate essentially under gravity. There will be seven Parts, as follows: *Drain and sewer systems outside buildings* —

- Part 1. *General and definitions*
- Part 2. *Performance requirements*
- Part 3. *Planning*
- Part 4. *Hydraulic design and environmental considerations*
- Part 5. *Rehabilitation*
- Part 6. *Pumping installations*
- Part 7. *Maintenance and operations*

In drafting this Part of this European Standard account has been taken of other available draft standards, in particular prEN 476 *General requirements for components used in discharge pipes, drains and sewers for gravity systems*.

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 January 1997, and conflicting national standards shall be withdrawn at the latest by January 1997.

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

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1 Scope

This European Standard is applicable to drain and sewer systems, which operate essentially under gravity, from the point where the sewage leaves a building or roof drainage system, or enters a road gully, to the point where it is discharged into a treatment works or receiving water.

Drains and sewers below buildings are included provided that they do not form part of the drainage system of the building.

This Part sets out the performance requirements to be taken into account when planning, designing, installing and operating drain and sewer systems that operate essentially under gravity.

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 752-1 *Drain and sewer systems outside buildings — Part 1: Generalities and definitions*

3 Definitions

For the purposes of this standard, the definitions given in EN 752-1 apply.

4 Sources of additional information

This standard sets out the essential requirements for good practice in various engineering activities relating to the planning, design and operation of drain and sewer systems. For supplementary detail and guidance reference should be made to national documents until such time as fully comprehensive European Standards are available.

The documents listed in annex A contain details which may be used in the framework of this Part, given approval by the relevant authority.

5 General

Performance requirements cover the drain and sewer systems, together with combined sewer overflows, pumping installations and the receiving sewage treatment works, including the effects of their discharges on receiving waters. Performance requirements shall be considered in respect of the whole system to ensure that additions or modifications to the system do not result in failure to meet the target standards.

Performance requirements shall be established which, whilst taking into account total costs and indirect costs, ensure that drain and sewer systems convey and discharge their contents without causing unacceptable environmental nuisance, risk to public health, or risk to personnel working therein.

6 Basic performance requirements

The basic performance requirements to which drain and sewer systems shall operate are that:

- a) the pipework operates without blocking;
- b) the flooding frequencies shall be limited to prescribed values;
- c) public health and life shall be safeguarded;
- d) the sewer surcharge frequencies should be limited to prescribed values;
- e) the health and safety of operator personnel shall be safeguarded;
- f) receiving waters shall be protected from pollution within prescribed limits;
- g) drains and sewers shall not endanger existing adjacent structures and utility services;
- h) the required design life and structural integrity shall be achieved;
- i) drains and sewers shall be watertight in accordance with testing requirements;
- j) odour nuisance and toxicity do not arise;
- k) appropriate access shall be provided for maintenance purposes.

The impact of drain and sewer systems on the receiving waters shall meet the requirements of the relevant authority. Other environmental requirements specified by the relevant authority shall also be met.

In setting hydraulic design performance criteria for surface water and combined sewers, allowance shall be made for the design methods that are likely to be used. In all cases the scale of the consequences of flooding should be taken into account.

For smaller schemes a relatively simple, but safe, approach is recommended, though use of simulation models is not excluded. Sewers are usually designed to run full, without surcharge, for relatively frequent storms in the knowledge that this provides protection against flooding from much larger storms. For these schemes the 'design storm frequency' criteria in table 1 should be used in the absence of any specified by the relevant authority. The designer shall use rainfall intensity and duration figures applicable to that particular area.

Design storm frequency ¹⁾ (1 in 'n' years)	Location	Design flooding frequency (1 in 'n' years)
1 in 1	Rural areas	1 in 10
1 in 2	Residential areas	1 in 20
1 in 2 1 in 5	City centres/ industrial/ commercial areas: – with flooding check; – without flooding check	1 in 30
1 in 10	Underground railway/ underpasses	1 in 50

¹⁾ For those design storms no surcharge shall occur.

For smaller schemes to be designed using a simulation model and for larger schemes, particularly where damage or public health risks are significant, it is recommended that the level of flooding protection be directly assessed. The sewer system may be initially designed, as above, to give no surcharge with an appropriate 'design storm frequency'. A sewer flow simulation model should then be used to check the level of flood protection against the 'design flooding frequency' and the design adjusted where the required flooding protection is not achieved. There will be cases, however, where adjustments are appropriate to avoid unnecessary over-design. Any requirements from the relevant authority shall be followed, but in their absence the design flooding frequency values given in table 1 should be used.

These approaches should be applied when an existing system is being considered for upgrading.

7 Performance testing

It is necessary to test and assess the performance of the drain and sewer systems during construction, at the completion of the construction stage and also during the operational life of the system.

Examples of tests and assessments are:

- a) water test;
- b) air test;
- c) infiltration test;
- d) visual inspection;
- e) CCTV (closed circuit television) inspection;
- f) dry weather flow assessment;
- g) monitoring of inputs to the system;
- h) monitoring effluent quality, quantity and frequency at point of discharge to receiving water;
- i) monitoring within the system for toxic and/or explosive gas mixtures;
- j) monitoring of discharge from system to treatment works.

The tests to be undertaken to determine the performance being achieved by the drain or sewer system will depend on whether it is a new system or an existing system being tested.

8 Performance assessment and documentation

In order to assess the performance of a drain and sewer system, it is necessary to review all available relevant data. Examples are records of:

- a) flooding incidents;
- b) pipe blockage incidents;
- c) sewer collapse incidents;
- d) disease, injury or fatal incidents to operators;
- e) disease, injury or fatal incidents to members of the public;
- f) sewer damage incidents;
- g) compliance with discharge consents into and out of the system;
- h) CCTV survey and visual inspection data;
- i) sewage-related odour complaint incidents;
- j) hydraulic performance analysis;
- k) performance of mechanical/electrical equipment;
- l) results of testing and monitoring;
- m) performance and condition of flow control structures;
- n) sewer surcharge incidents.

If the desired performance is not being achieved, remedial action is required according to the priority allocated.

To be able to undertake performance assessment it is necessary to have available as-constructed drawings to provide essential basic information.

The relevant authorities will be the source of many of the records listed above. All appropriate records are to be retained.

Annex A (informative)**Sources of additional information**

The titles of the documents are translated for information. Only those documents where the title is marked with an asterisk (*) are available in the language of the title.

A.1 Austria**A.1.1 Austrian Standards (ÖNORM)**

No.	Title
B 2500	<i>Abwassertechnik, Entstehung und Entsorgung von Abwasser; Begriffsbestimmungen und Zeichen*</i> <i>Wastewater management: formation and disposal of wastewater; definitions and symbols</i>
B 2501	<i>Entwässerungsanlagen für Gebäude und Grundstücke; Bestimmungen für Planung und Ausführung*</i> <i>Sewer systems for buildings and premises; rules for planning and installation</i>
B 2503	<i>Ortskanalanlagen (Straßenkanäle); Richtlinien der Ausführung*</i> <i>Sewer system; code of building practice</i>
B2504	<i>Schächte für Entwässerungsanlagen*</i> <i>Manhole shafts for sewerage</i>
B 5012	
Teil 1	<i>Statische Berechnungen erdverlegter Rohrleitungen im Siedlungs- und Industriebau, Grundlagen*</i> <i>Static calculation of buried pipelines for water supply and sewerage: principles</i>
Part 1	
B 5012	
Teil 2	<i>Statische Berechnungen erdverlegter Rohrleitungen im Siedlungs- und Industriebau, Lastannahmen, rechnerische Nachweise*</i> <i>Static calculation of buried pipelines as parts of water and sewerage conduits for housing and industry; assumptions of charge, calculating certificates</i>
Part 2	
B 5013	
Teil 1	<i>Oberflächenschutz mit organischen Schutzmaterialien im Siedlungswasserbau; Abschätzung der Korrosionswahrscheinlichkeit und Schutz von unlegierten und niedertegierten Eisenwerkstoffen*</i> <i>Corrosion protection by organic coatings for water and wastewater engineering in residential areas, assessment of corrosion probability and protection of unalloyed and low-alloyed ferrous materials</i>
Part 1	
B 5013	
Teil 2	<i>Oberflächenschutz mit organischen Schutzmaterialien im Siedlungswasserbau; Abschätzung der Korrosionswahrscheinlichkeit und Schutz von zementgebundenen Werkstoffen*</i> <i>Corrosion protection by organic coatings for water and wastewater engineering in residential areas, assessment of corrosion probability and protection of cement-bound materials</i>
Part 2	
B5016	<i>Überprüfung von Erdarbeiten für Rohrleitungen des Siedlungs- und Industriebauwes; Verdichtungsgrade*</i> <i>Examination of earthworks for pipelines of water and sewage conduits for housing and industry — Degrees of compaction</i>

A.1.2 Austrian Water and Waste Management Association — Rules of Practice (ÖWAV — Österreichischer Wasser- und Abfallwirtschaftsverband — Regelblätter)

No.	Title
Regelblatt 5	<i>Richtlinien für die hydraulische Berechnung von Abwasserkanälen*</i>
Rule 5	<i>Guidelines for the hydraulic calculation of sewerage pipelines</i>
Regelblatt 9	<i>Richtlinien für die Anwendung der Entwässerungsverfahren*</i>
Rule 9	<i>Guidelines for the use of sewerage systems</i>
Regelblatt 11	<i>Richtlinien für die abwassertechnische Berechnung von Schmutz-, Regen- und Mischwasserkanälen*</i>
Rule 11	<i>Guidelines for technical calculation of foul water, stormwater and combined systems</i>
Regelblatt 19	<i>Richtlinien für die Bemessung und Gestaltung von Regenentlastungen in Mischwasserkanälen*</i>
Rule 19	<i>Guidelines for the design of stormwater overflows in combined systems</i>
Regelblatt 21	<i>Kanalkataster*</i>
Rule 21	<i>Documentation of sewerage systems</i>
Regelblatt 22	<i>Kanalwartung und Kanalerneuerung*</i>
Rule 22	<i>Maintenance and renewal of sewerage systems</i>

A.1.3 Other guidelines

No	Title
ZL.57.030/3-V-6/84	<i>Technische Richtlinien für die Errichtung, Erweiterung und Verbesserung von mit Mitteln des Wasserwirtschaftsfonds geförderten Wasserversorgungs- und Abwasserbeseitigungsanlagen (Technische Richtlinien des Wasserwirtschaftsfonds). Bundesministerium für Umwelt, Jugend und Familie*</i> <i>Technical guidelines for the construction, extension and improvement of water supply and wastewater systems financially supported by the Water Management Fund (Technical Guidelines of the Water Management Fund). Federal Ministry for Environment, Youth and Family</i>

A.2 Denmark**A.2.1 Danish Standards Association (DS)**

No.	Title
DS 421	<i>Norm for taette fleksible samlinger i ledninger af beton mv. *</i> <i>Code of practice for flexible watertight joints for pipelines of concrete, etc.</i>
DS 430	<i>Norm for laegning af fleksible ledninger af plast i jord*</i> <i>Code of practice for the laying of underground flexible pipelines of plastic</i>
DS 432	<i>Norm for afløbsinstallationer*</i> <i>Code of practice for sanitary drainage/wastewater installations</i>
DS 436	<i>Norm for draening af bygvaerker*</i> <i>Code of practice for the groundwater drainage of buildings</i>
DS 437	<i>Norm for laegning af stive ledninger af beton mv i jord*</i> <i>Code of practice for the laying of underground rigid pipelines of concrete, etc.</i>
DS 440	<i>Norm for mindre afløbsanlaeg med nedsivning*</i> <i>Code of practice for smaller drainage disposal systems for percolation into the ground</i>
DS 455	<i>Norm for taethed af afløbssystemer i jord*</i> <i>Code of practice for impenetrability of underground sewer systems</i>

A.2.2 Nordic Committee on Building Regulations

No.	Title
NKB publ. No. 48	<i>Retningslinier for bestemmelser vedrørende vand- og afløbsinstallationer*</i>
NKB publ. No. 48E	<i>Guidelines for building regulations for water supply and drainage systems*</i>

A.2.3 The Danish Water Pollution Committee

No.	Title
Skrift nr. 18	<i>Maksimalafstrømninger og bassinvoluminer fra historiske regnserier*</i>
Guide No. 18	<i>Urban storm water runoff and storage tanks calculated with series of historical rain events</i>
Skrift nr. 21	<i>Recipientbelastning fra overløbssystemer*</i>
Guide No. 21	<i>Calculation of combined sewer overflow on receiving waters</i>
Skrift nr. 22	<i>Forurening af vandløb fra overløbsbygværker*</i>
Guide No. 22	<i>The impact of combined sewer overflows on small streams</i>
Skrift nr. 24	<i>Standardiserede data for afløbssystemer*</i>
Guide No. 24	<i>Standardized data for sewer systems</i>
ISBN 87-254-15-8	<i>Huskelist for fornyelse af afløbssystemer*</i>
	<i>Check list for preparation of sewer rehabilitation plans</i>

A.2.4 The Danish Environmental Protection Agency

No.	Title
SPVF nr. 6	<i>Kvalitetsstyring af afløbsprojekter*</i>
	<i>Quality control of sewer projects</i>
SPVF nr. 13	<i>Udarbejdelse af fornyelsesplaner for afløbssystemer*</i>
	<i>Preparation of Projects for the Renovation of Sewer Systems</i>
SPVF nr. 22	<i>Renovering af afløbssystemer; Belastning af PEH-rør ved dynamisk rørsproengning.*</i>
	<i>Renovation of sewer systems: HDPE pipes: stress by dynamic pipe cracking</i>
SPVF nr. 33	<i>Fornyelse af afløbssystemer; Behov og økonomi*</i>
	<i>Rehabilitation of sewer systems; Needs and finance</i>
SPVF nr. 48	<i>Uvedkommende vand i afløbssystemer*</i>
	<i>Intruding water in sewer systems</i>
Projekt nr. 137	<i>Regulering af forurening fra afløbssystemer under regn*</i>
Project No. 137	<i>Control of Pollution from Sewer Systems during rain</i>

A.2.5 Building regulations

No.	Title
BR 1995	<i>Bygningsreglementet — Udgivet af Bygge- og Boligstyrelsen *</i>
	<i>Danish building regulation — Published by the National Building and Housing Agency</i>

A.3 Finland

A.3.1 Nordic Committee on Building Regulations

No.	Title
NKB publ. No. 48	(Not available in Finnish language)
NKB publ. No. 48E	<i>Guidelines for building regulations for water supply and drainage systems*</i>

A.3.2 Ministry of the Environment

No.	Title
ISBN 951-37-1134-X	<i>Kiinteistöjen vesi- ja viemärilaitteistot*</i> <i>Water supply and drainage installations for buildings and recommendations</i>

A.4 France

No.	Title
	<i>Instruction technique relative aux réseaux d'assainissement des agglomérations*</i> (1977):
	Chapitre 1 <i>Conception générale</i>
	Chapitre 2 <i>Calcul des débits d'eaux pluviales</i>
	Chapitre 3 <i>Calcul des débits d'eaux usées</i>
	Chapitre 4 <i>Calcul des sections des ouvrages</i>
	Chapitre 5 <i>Condition d'établissement des réseaux</i>
	Chapitre 6 <i>Ouvrages annexes</i>
	Chapitre 7 <i>Bassins de retenue d'eaux pluviales</i>
	<i>Technical Directive for Urban Drain and Sewer Systems:</i>
	Chapter 1 <i>General design data</i>
	Chapter 2 <i>Calculation of rainwater flow rates</i>
	Chapter 3 <i>Calculation of wastewater flow rates</i>
	Chapter 4 <i>Dimensioning of pipe diameters</i>
	Chapter 5 <i>Conditions for installation of systems</i>
	Chapter 6 <i>Ancillary works</i>
	Chapter 7 <i>Detention tanks for rainwater.</i>
Fascicule 70	<i>Cahier des clauses techniques générales applicables aux marchés publics de travaux (ouvrages d'assainissement): *</i>
	Chapitre 1 <i>Dispositions générales</i>
	Chapitre 2 <i>Nature et qualité des matériaux</i>
	Chapitre 3 <i>Règles de conception et de calcul des ouvrages</i>
	Chapitre 4 <i>Prestations préalables</i>
	Chapitre 5 <i>Exécution des travaux</i>
	Chapitre 6 <i>Conditions de réception.</i>
Book No. 70	<i>General technical requirements for public contracts dealing with installation of wastewater systems</i>
	Chapter 1 <i>General requirements</i>
	Chapter 2 <i>Type and quality requirements for materials</i>
	Chapter 3 <i>Design requirements including structural design</i>
	Chapter 4 <i>Preliminary work</i>
	Chapter 5 <i>Installation</i>
	Chapter 6 <i>Commissioning requirements</i>

A.5 Germany

No.	Title
ATV-Merkblatt M 101	<i>Planung von Entwässerungsanlagen, Neubau-, Sanierungs- und Erneuerungsmaßnahmen*</i> <i>Planning of drain and sewer systems, new construction, rehabilitation and replacement*</i>
ATV-Arbeitsblatt A 1050	<i>Hinweise für die Wahl des Entwässerungsverfahrens (Mischverfahren/Trennverfahren)*</i> <i>Notes for the selection of the drainage system (combined system/separate system)*</i>
ATV-Arbeitsblatt A 117	<i>Richtlinien für die Bemessung, die Gestaltung und den Betrieb von Regenrückhaltebecken*</i> <i>Standard for the dimensioning, design and operation of stormwater holding tanks*</i>
ATV-Arbeitsblatt A 118	<i>Richtlinien für die hydraulische Berechnung von Schmutz-, Regen- und Mischwasserkanülen*</i> <i>Standard for the hydraulic calculation of wastewater, stormwater and combined wastewater sewers*</i>
ATV-Arbeitsblatt A 119	<i>Grundsätze für die Berechnung von Entwässerungsnetzen mit elektronischen Datenverarbeitungsanlagen*</i> <i>Rules for the calculation of sewer systems by data processing*</i>
ATV-Arbeitsblatt A 128	<i>Richtlinien für die Bemessung und Gestaltung von Regenentlastungsanlagen in Mischwasserkanülen*</i> <i>Standard for the dimensioning and design of overflow structures in combined sewers*</i>
ATV-Arbeitsblatt A140	<i>Regeln für den Kanalbetrieb, Teil 1: Kanalnetz*</i> <i>Rules for the operation of sewers, Part 1: the sewer network*</i>
DIN 1986	<i>Entwässerungsanlagen für Gebäude und Grundstücke*</i> <i>Drainage systems on private ground</i>
DIN 4045	<i>Abwassertechnik –Begriffe*</i> <i>Wastewater Engineering –Definitions</i>

A.6 Ireland

A.6.1 British Standards

No.	Title
BS 6100 : Section 2.7	<i>Building and civil engineering terms. Part 2 Civil engineering. Section 2.7 Public health –Environmental engineering*</i>
BS 8000 : Part 14	<i>Workmanship on building sites. Part 14 Code of practice for below ground drainage*</i>
BS 8005 : Part 0	<i>Sewerage: Introduction and guide to data sources and documentation*</i>
BS 8005 : Part 1	<i>Sewerage: Guide to new sewerage construction*</i>
BS 8005 : Part 2	<i>Sewerage: Guide to pumping stations and pumping mains*</i>
BS 8005 : Part 3	<i>Sewerage: Guide to planning and construction of sewers in tunnel*</i>
BS 8005 : Part 4	<i>Sewerage: Guide to design and construction of outfalls*</i>
BS 8005 : Part 5	<i>Sewerage: Guide to rehabilitation of sewers*</i>
BS 8301	<i>Code of practice for building drainage*</i>

A.6.2 Building Regulations

No.	Title
	Building Regulations 1991 — Department of Environment. Available from Government Publications Office, Molesworth Street, Dublin 2*

A.7 Italy

No.	Title
UNI 9183	<i>Edilizia. Sistemi di scario delle acque usate. Criteri di progettazione, collaudo e gestione*</i> <i>Building — Plumbing design criteria — Drainage system</i>
UNI 9184	<i>Edilizia. Sistemi di scario delle acque meteoriche. Criteri di progettazione, collaudo e gestione*</i> <i>Building — Plumbing design criteria — Storm water system</i>
UNI ISO 7336	<i>Condotte di amianto-cemento. Direttive per il calcolo idraulico*</i> <i>Asbestos cement pipelines — Guidelines for hydraulic calculation</i>

A.8 Netherlands

No.	Title
NPR 3218	<i>Buitenriolering onder vrij verval — Aanleg en onderhoud *</i> <i>Drainage and sewerage gravity systems outside buildings — Installation and maintenance</i>
NEN 3219	<i>(Draft) Buitenriolering — Aanduiding op tekeningen *</i> <i>Drainage and sewerage gravity systems outside buildings — Symbols for drawings</i>
NEN 3220	<i>Buitenriolering — Beheer*</i> <i>Drainage and sewerage outside buildings — Management</i>
NEN 3221	<i>Buitenriolering onder over- en onderdruk — Ontwerp-criteria, aanleg en onderhoud*</i> <i>Drainage and sewerage partial vacuum and over-pressure systems outside buildings — Design requirements, installation and maintenance</i>
NEN 3300	<i>(Draft) Buitenriolering — Benamingen *</i> <i>(Draft) Drainage and sewerage outside buildings — Terminology</i>
NPR 3398	<i>Buitenriolering — Inspectie en toestandbeoordeling van riolen*</i> <i>Sewerage systems outside buildings — Inspection and condition assessment of sewers</i>
NEN 3399	<i>Buitenriolering — Classificatiesysteem bij visuele inspectie van riolen*</i> <i>Sewerage systems outside buildings — Classification system for visual inspection of sewers</i>
NPR 7061	<i>Aanleg van rioolpersleidingen van ongeplastificeerd PVC*</i> <i>Installation of buried unplasticized PVC sewer pipelines under pressure</i>

A.9 PORTUGAL**A.9.1 Portugese Regulations**

No.	Title
Porara No. 11 338	<i>Regulamento Geral de Canalizações de Esgoto. Ministério das Obras Públicas e Transportes, Lisboa, Imprensa Nacional — Casa da Moeda.</i> <i>Projecto de Regulamento Geral de Distribuição de Água e de Drenagem de Águas Residuais. Conselho Superior de Obras Públicas, Lisboa.*</i> <i>General Regulations for Sewers. Ministry of Public Works and Transportation, Lisbon, Imprensa Nacional — Casa da Moeda.</i> <i>Project of General Regulation of Water Distribution and Wastewater Drainage. Superior Committee of Public Works, Lisbon.</i>

A.9.2 Portugese Standards

No.	Title
NP-893	<i>Redes de Esgotos, Construção e Conservação *</i> <i>Sewerage systems, Building and maintenance</i>
NP-894	<i>Redes de Esgotos, Verificação de estanquidade*</i> <i>Sewerage systems, Watertightness tests</i>
NP-881	<i>Redes de Esgotos, Câmaras de visita. Características *</i> <i>Sewerage systems, Manholes. Characteristics</i>
NP-882	<i>Redes de Esgotos. Elementos pré-fabricados para câmara de visita.</i> <i>Características e recepção *</i> <i>Sewerage Systems, Prefabricated elements for manholes. Characteristics and reception</i>
NP-883	<i>Redes de Esgotos, Degraus das câmaras, Características e montagem*</i> <i>Sewerage Systems, Steps of manholes, Characteristics and assemblage</i>
NP-676	<i>Redes de Esgotos. Sarjetas, Tipos, características e condições de emprego.*</i> <i>Sewerage systems, Storm water inlets, Types, characteristics and using conditions</i>
NP-677	<i>Redes de Esgotos. Sarjetas. Ensaios de permeabilidade*</i> <i>Sewerage Systems. Storm water inlets. Water tightness tests</i>

A.10 Spain

No.	Title
NTE-ISA/1973	<i>Norma tecnológica de la edificación. Instalaciones de salubridad alcantarillado*</i> <i>Technical standard for building sanitary sewage systems</i>
Orden Ministerial de 1986-09-15	<i>Pliego de prescripciones técnicas generales para tuberías de saneamiento de poblaciones*</i> <i>General technical specifications for public sewerage piping</i>

A.11 Sweden

A.11.1 Nordic Committee on Building Regulations

No.	Title
NKB publ. No. 48	<i>(Not available in Swedish language)</i>
NKB publ. No. 48E	<i>Guidelines for Building Regulations for Water Supply and Drainage Systems *</i>

A.11.2 The Swedish Water and Waste Water Works Association, VAV

No.	Title
VAV P28	<i>Anvisningar för beräkning av allmänna avloppsledningar*</i> <i>Rules for the hydraulic dimensioning of sewer systems</i>
VAV P31	<i>Utjämningsmagasin i avloppsnät*</i> <i>Rules for the hydraulic dimensioning and design of storm water retention tanks</i>
VAV P39	<i>Skötsel och underhåll av va-nät *</i> <i>Rules for the operation and maintenance of the water and sewerage networks</i>
VAV P45	<i>Brunnar i avloppssystem*</i> <i>Manhole shafts and inspection chambers in sewerage networks, functional requirements</i>
VAV P46	<i>Lokalt omhändertagande av dagvatten - LOD*</i> <i>Guidelines for infiltration and percolation of storm water</i>
VAV P47	<i>Avloppspumpinstallationer. Dimensionering, utformning och drift*</i> <i>Guidelines for pumping stations. Planning and operation</i>
VAV P49	<i>Källaröversvämningar. Ansvar — Åtgärder — Ersättning*</i> <i>Flooded basements. Responsibilities — Actions — Compensation</i>
VAV P50	<i>Anvisningar för provning i fält av avloppsledningar för sjfölyfall*</i> <i>Code of practice for testing underground gravity sewer systems</i>
VAV P59	<i>Inre inspektion av avloppsledningar, Del 1 och 2, Handbok och upphandlingsanvisningar*</i> <i>Code of practice for interior inspection of sewers. Part 1 and 2. Handbook</i>
VAV P60	<i>Inre inspektion av avloppsledningar. Del 3. Dokumentation med fotomanual*</i> <i>Code of practice for interior inspection of sewers. Part 3. Documentation and photo manual</i>
VAV P65	<i>Nederbördsdata vid dimensionering och analys av avloppssystem*</i> <i>Precipitation data for hydraulic dimensioning and analysis of sewer systems</i>
VAV P66	<i>Renovering av avloppsledningar*</i> <i>Rehabilitation of sewers</i>
VAV P68	<i>PRIVA II. Åtgärdsplanering för kommunala va-ledningsnät*</i> <i>Upgrading of water and sewerage systems, general guidelines for planning</i>

A.12 Switzerland

No.	Title
SN 533190	<i>Kanalisationen*</i> <i>Canalisations*</i> <i>Canalizzazioni*</i> <i>Sewer Systems</i>
SN 592000	<i>Liegenschaftsentwässerung*</i> <i>Evacuation des eaux des bien-fonds*</i> <i>Smaltimento delle acque dei fondi*</i> <i>Drainage systems inside and outside buildings</i>
SN 531205	<i>Verlegung von unterirdischen Leitungen*</i> <i>Pose de conduites souterraines*</i> <i>Construction of pipelines</i>
VSA-Richtlinie	<i>Genereller Entwässerungsplan (GEP)*</i> <i>Plan général d'évacuation des eaux (PGEE) *</i> <i>Piano generale di smaltimento delle acque (PGS)*</i> <i>The Integrated Urban Drainage Master Plan</i>
VSA-Richtlinie	<i>Unterhalt von Kanalisationen*</i> <i>Entretien des canalisations*</i> <i>Manutenzione delle canalizzazioni*</i> <i>Maintenance and Operation of Sewer Systems</i>

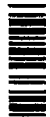
A.13 United Kingdom

A.13.1 British Standards

No.	Title
BS 6100 : Section 2.7	<i>Building and civil engineering terms: Part 2: Civil engineering. Section 2.7 Public health, environmental engineering*</i>
BS 8000 : Part 14	<i>Workmanship on building sites. Part 14: Code of practice for below ground drainage*</i>
BS 8005 : Part 0	<i>Sewerage: Introduction and guide to data sources and documentation*</i>
BS 8005 : Part 1	<i>Sewerage: Guide to new sewerage construction*</i>
BS 8005 : Part 2	<i>Sewerage: Guide to pumping stations and pumping mains*</i>
BS 8005 : Part 3	<i>Sewerage: Guide to planning and construction of sewers in tunnel*</i>
BS 8005 : Part 4	<i>Sewerage: Guide to design and construction of outfalls *</i>
BS 8005 : Part 5	<i>Sewerage: Guide to rehabilitation of sewers*</i>
BS 8301	<i>Code of practice for building drainage*</i>

List of references

See national foreword.



S

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