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Čistilne naprave za odpadno vodo - 11. del: Zahtevani splošni podatki

Wastewater treatment plants - Part 11: General data required

Kläranlagen - Teil 11: Erforderliche allgemeine Angaben

Stations d'épuration - Partie 11 : Informations générales exigées

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13.060.30	Odpadna voda	Sewage water

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Wastewater treatment plants - Part 11: General data required

Stations d'épuration - Partie 11 : Informations générales exigées

Kläranlagen - Teil 11: Erforderliche allgemeine Angaben

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 12255-11:2023) 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of an identical text or by endorsement, at the latest by August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12255-11:2001.

This is the eleventh part of the EN 12255 series prepared by Working Group CEN/TC 165/WG 40, relating to the general requirements and processes for treatment plants for a total number of inhabitants and population equivalents (PT) over 50.

The EN 12255 series with the generic title “Wastewater treatment plants” consists of the following parts:

— *Part 1: General construction principles*

— *Part 2: Storm management systems*

— *Part 3: Preliminary treatment*

— *Part 4: Primary settlement*

— *Part 5: Lagooning processes*

— *Part 6: Activated sludge process*

— *Part 7: Biological fixed-film reactors*

— *Part 8: Sludge treatment and storage*

— *Part 9: Odour control and ventilation*

— *Part 10: Safety principles*

— *Part 11: General data required*

— *Part 12: Control and automation*

— *Part 13: Chemical treatment - Treatment of wastewater by precipitation/flocculation*

— *Part 14: Disinfection*

— *Part 15: Measurement of the oxygen transfer in clean water in aeration tanks of activated sludge plants*

— *Part 16: Physical (mechanical) filtration*

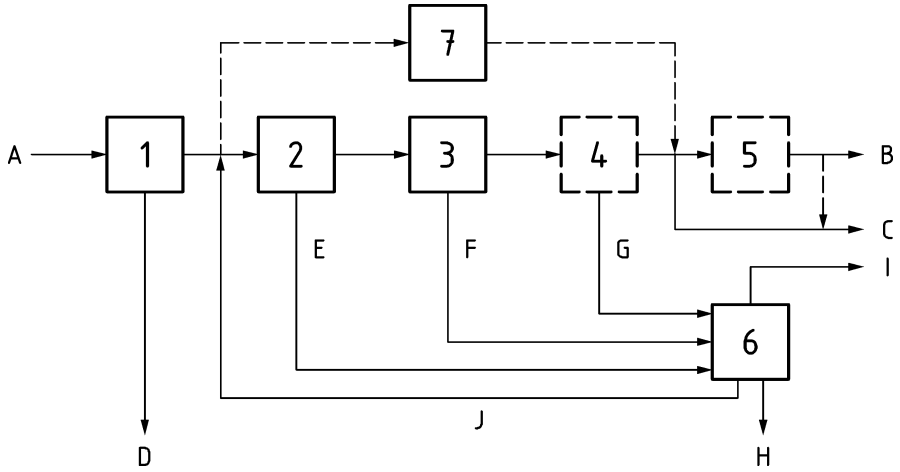
NOTE Part 2 is under preparation.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Differences in wastewater treatment throughout Europe have led to a variety of systems being developed. This document gives fundamental information about the systems; this document has not attempted to specify all available systems. A generic arrangement of wastewater treatment plants is illustrated below in Figure 1.



Key

1 preliminary treatment
2 primary treatment
3 secondary treatment
4 tertiary treatment
5 additional treatment (e.g. disinfection or removal of micropollutants)
6 sludge treatment
7 lagoons (as an alternative)
A raw wastewater
B effluent for re-use (e.g. irrigation)
C discharged effluent
D screenings and grit
E primary sludge
F secondary sludge
G tertiary sludge
H stabilised sludge
I digester gas
J returned water from dewatering

Figure 1 — Schematic diagram of wastewater treatment plants

The primary application is for wastewater treatment plants designed for the treatment of domestic and municipal wastewater.

NOTE For requirements on pumping installations at wastewater treatment plants, see EN 752, *Drain and sewer systems outside buildings — Sewer system management* and the EN 16932 series, *Drain and sewer systems outside buildings — Pumping systems:*

— *Part 1: General requirements*;

— *Part 2: Positive pressure systems*;

— *Part 3: Vacuum systems*.

1 Scope

This document specifies data which is necessary for the planning, design, bidding, performance guarantees, construction, start-up and compliance testing of a wastewater treatment plant or parts of it. This document gives fundamental information about the practices; this document has not attempted to specify all available practices.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
relevant plant
new wastewater treatment plant; rebuild, upgrade or extension of an existing wastewater treatment plant or a part of a new or extended wastewater treatment plant (e.g. sludge handling facilities)

3.2
client
municipality, city or other organization which intends to build a wastewater treatment plant or parts thereof, or its representative

[SOURCE: EN 12255-1:2002, 3.6]

3.3
functional tender
tender document that contains the design flows and loads, a description of the site where the relevant plant is to be erected, the relevant discharge limits and any additional requirements

3.4
sectional tender
separate tender documents prepared for different sections of work that may be constructed by different entities

Note 1 to entry: Examples of sections of work can include: earth work, concrete work, mechanical equipment, electrical installations, buildings, etc.

3.5
consulting engineer
independent engineer or engineering company commissioned by the client designing a wastewater treatment plant or parts of it and/or supervising the construction

Note 1 to entry: The consulting engineer may assist the client with any work preparing all or part of the tender documents. The consulting engineer supervises the construction and checks the time schedule and costs. The consulting engineer has knowledge and experience in planning, design and operational aspects of wastewater treatment plants. In some countries, a special certification may be required.

3.6
turn-key contractor
builder who agrees to complete a facility so that it is ready for use when delivered to the other contracting party

Note 1 to entry: The turn-key contractor is typically a company which has knowledge and experience in planning, design, construction and operational aspects of wastewater treatment plants.

3.7
design working life
assumed period for which a structure or part of it is to be used for its intended purpose with anticipated repair and maintenance but without renovation or replacement being necessary

Note 1 to entry: The "Design Working Life" can often be significantly longer than "design life" and is of critical importance when calculating the longer-term resilience of drainage infrastructure, to, for example, climate change impacts.

[SOURCE: EN 1990:2002, 1.5.2.8, modified to provide consistency with the terminology in EN 16323]

4 Symbols and abbreviations

COD	chemical oxygen demand
BOD_5	biochemical oxygen demand in 5 days
TKN	total Kjeldahl nitrogen
NH_4-N	ammonium-nitrogen
NO_3-N	nitrate-nitrogen
COD/N	ratio of COD and nitrogen
COD/P	ratio of COD and phosphorus

5 Requirements

5.1 Contract strategy

The client may decide whether a functional tender or a sectional tender shall be prepared. The client may commission a consulting engineer to carry out one or more of the following:

— establish the design loads and data as described in 5.2;

— prepare the tender documents for a functional tender;

— design the plant and estimate the costs and prepare the tender documents for the sectional tender;

— inspect the construction in case of functional tendering;

— supervise and coordinate the construction in case of sectional tendering;

— evaluate the bids on the tenders and to propose which contractor or contractors (in case of sectional tendering) should be commissioned.

5.2 Provision of loading data

5.2.1 General

Where applicable the following basic data either measured or estimated shall be provided by the client or his representative, e.g. consulting engineer.

5.2.2 Sewerage system

The data on the sewerage system should include:

— areas served by combined and/or separate sewers;

— proportions of flows and loads from separate and/or combined sewer systems in dry weather conditions;

— storage capacity for storm water within the sewerage system and details of flow control systems;

— potential to control and balance flows and loads within the sewerage system;

— infiltration flows in dry weather conditions and their seasonal fluctuations (where appropriate);

— septic and corrosive components of the wastewater.

Dry weather conditions and fluctuations in storm water flow will be impacted by climate change. Local interpretation of average and worst-case climate change scenarios over the design working life of the sewerage system should be assessed to determine their potential impact.

5.2.3 Population served

The data on the population served shall include:

— current population connected to the sewerage system;

— population connected at start-up of the plant;

— population connected at design working life of the principal components and the design horizon for the plant;

— seasonal variations of population (e.g. holiday periods);

— weekly variations of population (e.g. movement of commuting population).

5.2.4 Significant trades and industries

A list of trades and industries which discharge significant loads to the sewerage system should include the following flows and loads, e.g.:

COD, BOD_5, TKN, NH_4-N, NO_3-N, total phosphorus, total suspended solids, organic suspended solids, salinity and alkalinity; shown as current, start-up, and design target data for:

— hourly peak (m^3/h, kg/h);

— daily peak and daily average (m^3/d, kg/d);

— weekly peak day (m^3/d, kg/d);

— maximum weekly average (m^3/d, kg/d);

— annual average (m^3/a, kg/a);

— 85 %-percentile (m^3/a, kg/a).

In addition, for trades and industries with seasonal fluctuations the periods of high and low loads shall be included preferably as an annual diagram. The client shall specify dischargers who handle hazardous, toxic or inhibitory material and identify which precautions are necessary to prevent that hazardous, toxic or inhibitory materials being discharged. Organic discharges with low biodegradability should be specified.

5.2.5 Data from existing wastewater treatment plants

The loading data and the operational results of the existing wastewater treatment plants contain valuable information. As a minimum, the following data for at least the previous year shall be provided in the specifications:

— annual wastewater flow (m^3/a) proportions treated physically, chemically and biologically;

— average quantity (m^3/d) and composition of sludge with % solids, and % volatile solids content and heavy metals;

— annual quantity of screenings, grit and floatables;

— 15-min-peak quantity of raw screenings (assumed medium raw density 1 Mg/m^3);

— average volume of liquor from sludge treatment (m^3/d) and organic and nutrient content;

— average quantity of digester gas (m^3/d);

— electrical energy produced from digester gas (kWh/a);

— electrical energy consumed (kWh/a);

— probability plots and diagrams showing the following over a year wastewater flows (m^3/d):

  — the daily loads of COD, BOD_5, TKN, NH_4-N, NO_3-N, total phosphorus, total suspended solids, organic suspended solids;

  — salinity and alkalinity;

  — seasonal temperature of the wastewater or biological reactor temperatures over a year;

  — diurnal fluctuation of the wastewater flow at dry weather conditions;

  — peak flow at storm water conditions (m^3/h or l/s);

  — amount and loads of wastes other than wastewater being delivered to the plant (e.g. night soil); and

  — performance of the treatment plant.

If data are not available, the client and contractor shall agree on values.