SLOVENSKI STANDARD
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Čistilne naprave za odpadno vodo - 1. del: Splošna načela gradnje

Wastewater treatment plants - Part 1: General construction principles

Kläranlagen - Teil 1: Allgemeine Baugrundsätze

Stations d'épuration - Partie 1 : Principes généraux de conception et de construction

Ta slovenski standard je istoveten z: **prEN 12255-1**

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13.060.30	Odpadna voda	Sewage water

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English Version

Wastewater treatment plants - Part 1: General construction principles

Stations d'épuration - Partie 1: Principes généraux de construction

Kläranlagen - Teil 1: Allgemeine Baugrundsätze

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 165.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 12255-1:2023) has been prepared by Technical Committee CEN/TC 165 “Waste water engineering”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12255-1:2002.

The main changes compared to the previous edition are listed below:

a) update of title and scope to incorporate design;

b) comprehensive revision and additions in all sections;

c) adaptation to the current state of the art;

d) updating of the Normative references;

e) editorial revision.

This is the first part 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 design and construction principles*

— *Part 2*[1]*: Storm management systems*

— *Part 3: Preliminary treatment*

— *Part 4: Primary treatment*

— *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*

[1] Part 2 is under preparation.

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

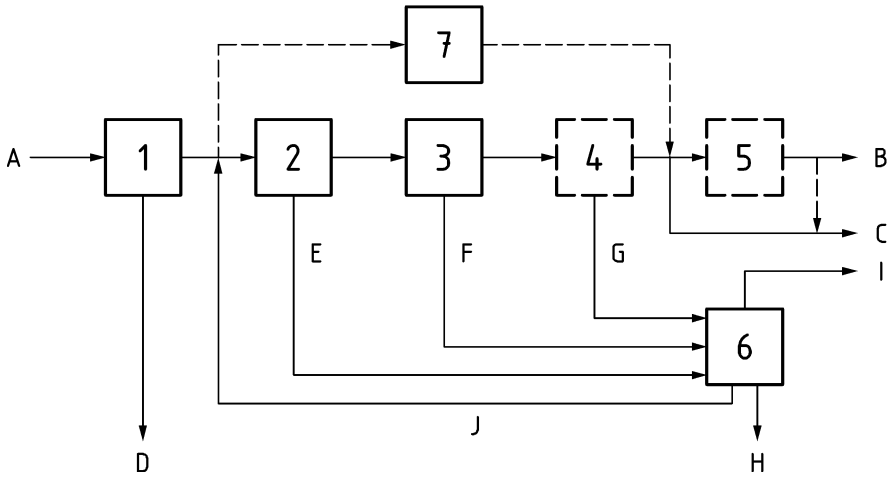
— *Part 14: Disinfection*

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

— *Part 16: Physical (mechanical) filtration*

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 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 digested 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* 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 the basic design and construction requirements for wastewater treatment plants for over 50 PT.

NOTE 1 Requirements for structures which are not specific for wastewater treatment plants are not within the scope of this document. Other ENs can apply.

NOTE 2 Equipment which is not solely used in wastewater treatment plants is subject to the applicable product standards. However, specific requirements for such equipment when used in wastewater treatment plants are included in this part.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 9001:2015, *Quality management systems - Requirements (ISO 9001:2015)*

EN 809, *Pumps and pump units for liquids - Common safety requirements*

EN 10088-2, *Stainless steels - Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes*

EN 12255-9, *Wastewater treatment plants - Part 9: Odour control and ventilation*

EN 12255-10, *Wastewater treatment plants - Part 10: Safety principles*

EN 12255-13, *Wastewater treatment plants - Part 13: Chemical treatment - Treatment of wastewater by precipitation/flocculation*

EN 16323, *Glossary of wastewater engineering terms*

EN 60529, *Degrees of protection provided by enclosures (IP Code)*

EN 60034-1, *Rotating electrical machines - Part 1: Rating and performance*

EN 16932 (all parts), *Drain and sewer systems outside buildings - Pumping systems*

EN ISO 14122-2:2016, *Safety of machinery - Permanent means of access to machinery - Part 2: Working platforms and walkways (ISO 14122-2:2016)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16323 and the following apply.

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

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

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

3.1
structure
construction intended to fulfil a function

[SOURCE: EN 16323:2014, definition 2.1.6.11]

3.2
equipment
any component which is installed in, mounted on, attached to, or operated on structures, in the performance of their intended function

3.3
unit
any structure including any related equipment which is used as a process stage and which can be isolated from other parallel, upstream or downstream structures

Note 1 to entry: Examples for a unit are: a grit chamber, a clarifier, an aeration tank, a thickener, a digester.

3.4
assembly
mechanical equipment that can be removed and replaced as a whole

Note 1 to entry: Examples for an assembly are a pump, a compressor, a gas engine, an aerator.

3.5
wastewater treatment plant
facility for the physical, biological and/or chemical treatment of wastewater

[SOURCE: EN 16323:2014, definition 2.3.9.18]

3.6
tracks
those parts of a structure on which wheels run

3.7
design mechanical load
Y_N
effective average load in continuous operation under full loading

Note 1 to entry: It is greater than or equal to the value of the operating loading which, for example, fluctuates as a function of the given load.

[SOURCE: EN 16323:2014, definition 2.3.10.8]

3.8
continuous load bearing capacity
Y_C
load bearing capacity in continuous operation under full load

3.9
maximum loading
Y_{max}
peak loading which is taken as the switch-off value

Note 1 to entry: E.g. value to which overload circuit breakers are adjusted.

3.10
maximum load bearing capacity
Y_B
highest possible load bearing capacity limited to short-term load peaks, such as occur on switching on and off

Note 1 to entry: In addition, alarm loadings Y_S, lying between the design loading Y_N and the switch-off loading Y_{max}, can be agreed as required, Y_N and Y_{max} being stated by the equipment supplier.

3.11
utilisation factor
K_A
parameter for the effects on drive units etc., intrinsic to their operation

Note 1 to entry: Usually K_A includes, either directly or indirectly, information on the loading, running time and temperature and is an overall value of the relationship between load bearing capacity and loading.

3.12
design service life
operating time until break-down of a machinery element stressed due to wear under design mechanical load which is reached by a certain percentage of the elements tested

Note 1 to entry: As an example, the percentage for rolling bearings is 90 %.

Note 2 to entry: The design service life is different from both the warranty time and an average service life of use, as used for cost efficiency calculations.

Note 3 to entry: The design service life is different from the cyclic design life (see 3.19).

Note 4 to entry: The design service life is often expressed as the mean time between failures.

3.13
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: 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 1990:2023, modified to provide consistency with the terminology in EN 16323:2014]

3.14
expected service life
anticipated usage time of the plant, unit or equipment

Note 1 to entry: The horizon of cost calculations shall be based on the expected design service life. It shall include investment and repeated investment and operational costs during the design service life. Such calculations shall include expected price increases as well as expected interest rates. Such cost calculations can be compared as current worth values or annuities.

3.15
design horizon
length of time (or a date) in the future for which the use of the facility can be reasonably anticipated to be required

Note 1 to entry: The design Horizon is usually equal to (or a multiple of) the Design Working Life. E.g. a design Horizon of 60 years may be chosen for assets made up of predominantly civil structures.

3.16
mode of operation
condition or manner in which a unit can operate or function

Note 1 to entry: Examples of condition include. frequency of starts, temperatures, etc.

3.17
degree of protection
condition related to the effects on motors and other electrical equipment intrinsic to their operating environment

Note 1 to entry: E.g. environmental conditions can include effects of water or dust.

3.18
relevant authority
organization with appropriate statutory powers of control

[SOURCE: EN 16323:2014, definition 2.1.3.10]

3.19
cyclic design life
period of time to be applied in computational verifications for alternating or threshold loads (e.g. in fatique verifications)

Note 1 to entry: The cyclic design life is different from the warranty time, the design service life (see 3.12) and an expected service life (see 3.15).

4 Symbols and abbreviations

MCC Motor Control Centre