SLOVENSKI STANDARD
SIST EN 12255-14:2023

01-september-2023

Nadomešča:
SIST EN 12255-14:2004

Čistilne naprave za odpadno vodo - 14. del: Dezinfekcija

Wastewater treatment plants - Part 14: Disinfection

Kläranlagen - Teil 14: Desinfektion

Stations d'épuration - Partie 14 : Désinfection

Ta slovenski standard je istoveten z: **EN 12255-14:2023**

ICS:

13.060.30	Odpadna voda	Sewage water

SIST EN 12255-14:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12255-14

July 2023

ICS 13.060.30

Supersedes EN 12255-14:2003

English Version

Wastewater treatment plants - Part 14: Disinfection

Stations d'épuration - Partie 14: Désinfection

Kläranlagen - Teil 14: Desinfektion

This European Standard was approved by CEN on 28 May 2023.

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 CEN-CENELEC 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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

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

Ref. No. EN 12255-14:2023 E

Contents

Page

European foreword

This document (EN 12255-14:2023) has been prepared by Technical Committee CEN/TC 165 “Wastewater 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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

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 12255-14:2003.

It is the 14th 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 construction principles*
- *Part 2: 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*
- *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*

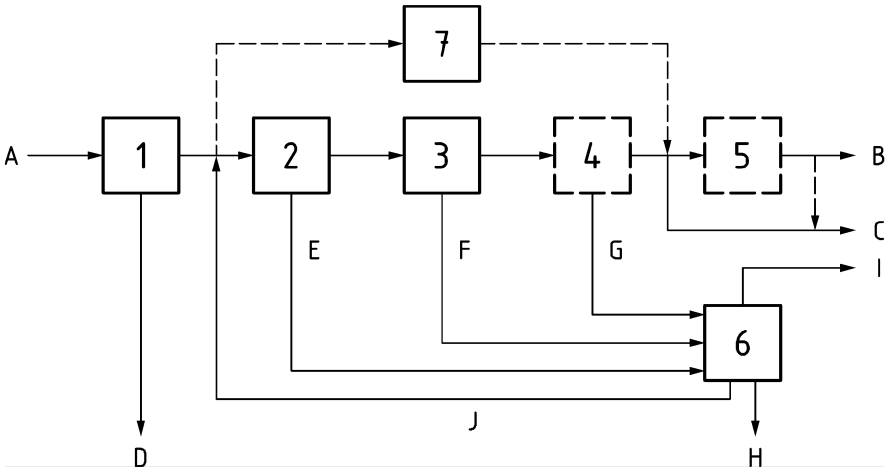
NOTE Part 2 is under preparation.

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	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	stabilized sludge
I	digester gas
J	returned water from dewatering

Figure 1 — Schematic diagram of wastewater treatment plants

Detailed information additional to that contained in this document can be obtained by referring to the Bibliography.

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 and the EN 16932 series:

— *Part 1: General requirements;*

— *Part 2: Positive pressure systems;*

— *Part 3: Vacuum systems.*

1 Scope

This document specifies design principles and performance requirements for disinfection of effluents (excluding sludge) at wastewater treatment plants serving more than 50 PT.

NOTE Sludge disinfection is described in EN 12255-8.

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 12255-1, *Wastewater treatment plants - Part 1: General construction principles*

EN 12255-5, *Wastewater treatment plants - Part 5: Lagooning processes*

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

EN 12255-12, *Wastewater treatment plants - Part 12: Control and automation*

EN 12255-15, *Wastewater treatment plants - Part 15: Measurement of the oxygen transfer in clean water in aeration tanks of activated sludge plants*

EN 16323, *Glossary of wastewater engineering terms*

ISO 15727, *UV-C devices — Measurement of the output of a UV-C lamp*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12255-1, 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
residual concentration
concentration of a substance in the final effluent of a treatment stage

3.2
UV dose
product of UV irradiance and specific exposure time along the pathway of an infinitesimal small water volume

Note 1 to entry: UV dose is expressed in millijoules per square centimetre (mJ/cm^2).

3.3
UV intensity
quotient of the energy of the UV radiation received on the surface of an infinitesimal small area divided by the size of the area

Note 1 to entry: The unit of UV intensity is W/m^2, measured in accordance with ISO 15727.

3.4
UV-reactor
closed vessel or an open channel section with an assembly of UV-lamps irradiating the water passing through

3.5
bioassay
measurement of the concentration or potency of a substance by its effect on living cells or tissues

[SOURCE: EN 16323:2014, 2.3.5.4, modified to remove limitations]

3.6
specific ozone demand
required dissolved ozone concentration in the wastewater to achieve a level of disinfection

Note 1 to entry: The unit of specific ozone demand is typically g O_3/m^3 or g O_3/l.

3.7
ozone destructor
device for destruction of residual ozone that has not been consumed in the ozonation process and is accumulated in the gaseous form in an off-gas stream

Note 1 to entry: The destruction takes place in gas-phase by converting ozone (O_3) into oxygen (O_2).

3.8
chlorinator
equipment for dosing chlorine into water

Note 1 to entry: Includes *in situ* generation.

3.9
contact tank
tank for providing the required retention time for certain reactions to take place

3.10
contact time
required retention time at a certain concentration for a specific reaction to occur

3.11
membrane
semipermeable material used as filter media in membrane filtration processes

Note 1 to entry: Membranes normally are flat sheets, tubes or hollow fibres composed of a thin semipermeable layer on a structural material.

3.12
permeate (*noun*)
liquid or gas that diffuses through a permeable membrane

[SOURCE: ISO 3857-4:2012, 2.54]

3.13
concentrate (*noun*)
fluids enriched with substances not passing the membranes in membrane filtration processes

3.14
membrane flux
amount of permeate produced per unit area of membrane surface per unit time

3.15
transmembrane pressure
mean pressure exerted across the semipermeable membrane

[SOURCE: ISO 8637-3:2018, 3.7]

3.16
cross flow filtration
filtration with a significant flow parallel to the membrane surface

Note 1 to entry: This is intended to prevent substances from accumulating on the surface of the membrane.

[SOURCE: EN 16323:2014, 2.3.3.5]

3.17
perpendicular mixing
mixing perpendicular to flow direction

3.18
feed-gas
gas or gas mixture which is supplied to the ozone generation system

3.19
normal cubic metre
<gas> cubic metre of gas, usually dry, referenced to 1 atmosphere (101,325 kPa) and 0 °C
[SOURCE: ISO 20675:2018, 3.41]

Note 1 to entry: The unit is expressed m^3_n. In other documents the unit Nm^3 is sometimes used.

4 Symbols and abbreviations

AOX	halogenated organic compounds
BOD_5	biochemical oxygen demand in 5 days (expressed as milligrams of oxygen needed to break down the organic matter contained in a litre of water over five days (mg/l))
COD	chemical oxygen demand
CT	product of concentration and contact time
LOX	liquid oxygen
NOx	nitrogen oxides
PAA	peracetic acid
PE	polyethylene
PTFE	polytetrafluoroethylene
PVC	polyvinyl chloride
Q	wastewater flow rate

RH	relative humidity, (expressed as a percentage of present state of absolute humidity relative to a maximum humidity given the same temperature)
SS	suspended solids, (expressed as milligrams of small solids contained in a litre of water (mg/l))
P_{tot}	concentrations of total phosphorus compounds expressed in milligrams of phosphorous in a litre of water (mg/l)
T	contact time
THM	trihalomethanes
t_R	retention time
UV	ultraviolet, electromagnetic radiation with wavelength 100 nm to 400 nm
V	active contact volume

5 Design requirements

5.1 General

Disinfection processes are used to improve the microbiological quality of effluents, if required, e.g. because of sensitive uses of the receiving waters downstream. A disinfection of effluents from wastewater treatment plants can reduce public health risks by preventing contamination by human pathogens in:

- waters used for bathing and other recreational activities involving immersion;
- shellfisheries;
- treated wastewater to be used for irrigation or as process water or other compatible uses;
- sources used for potable water supply.

Disinfection of effluents from wastewater treatment can be attained by two possible mechanisms:

- inactivation of microorganisms rendering microorganisms incapable of reproduction;
- removing the microorganisms from an effluent (e.g. by filtration) but not necessarily inactivating them.

Although other methods exist, the processes most commonly used for disinfecting wastewater by inactivating microorganisms are:

- ultraviolet (UV)-radiation;
- chlorination;
- ozonation;
- peracetic acid.

The processes most commonly used for disinfecting wastewater by removing respectively reducing microorganisms are:

- membrane filtration;
- effluent maturation ponds;