SLOVENSKI STANDARD
SIST EN 12255-9:2002

01-december-2002

Ļistilne naprave za odpadno vodo ï 9. del: Kontrola vonja in prezraļevanje

Wastewater treatment plants - Part 9: Odour control and ventilation

Kläranlagen - Teil 9: Geruchsminderung und Belüftung

Stations d'épuration - Partie 9: Maîtrise des odeurs et ventilation

Ta slovenski standard je istoveten z: **EN 12255-9:2002**

ICS:

13.060.30 Odpadna voda Sewage water

SIST EN 12255-9:2002 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12255-9

January 2002

ICS 13.060.30

English version

Wastewater treatment plants - Part 9: Odour control and ventilation

Stations d'épuration - Partie 9: Maîtrise des odeurs et ventilation

Kläranlagen - Teil 9: Geruchsminderung und Belüftung

This European Standard was approved by CEN on 20 December 2001.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Ref. No. EN 12255-9:2002 E

Contents

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by July 2002, and conflicting national standards shall be withdrawn at the latest by December 2002.

It is the ninth part prepared by the Working Groups CEN/TC 165/WG 42 and 43 relating to the general requirements and processes for treatment plants for a total number of inhabitants and population equivalents (PT) over 50. The parts of the series are as follows:

— Part 1: General construction principles

— Part 3: Preliminary treatment

— Part 4: Primary settlement

— Part 5: Lagooning processes

— Part 6: Activated sludge processes

— 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[1)]

NOTE For requirements on pumping installations at wastewater treatment plants, provided initially as part 2 "Pumping installations for wastewater treatment plants", see EN 752-6 "Drain and sewer systems outside buildings — Part 6: Pumping installations".

The parts EN 12255-1, EN 12255-3 to EN 12255-8 and EN 12255-10 and EN 12255-11 were implemented together as a European package (Resolution BT 152/1998).

[1)] In preparation.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies design principles and performance requirements for odour control and associated ventilation for wastewater treatment plants.

The primary application is for wastewater treatment plants designed for the treatment of domestic and municipal wastewater for over 50 PT.

Differences in wastewater treatment throughout Europe have led to a variety of systems being developed. This standard gives fundamental information about the systems; this standard has not attempted to specify all available systems.

Detailed information additional to that contained in this standard may be obtained by referring to the Bibliography.

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 (including amendments).

EN 752-4, *Drain and sewer systems outside buildings — Part 4: Hydraulic design and environmental considerations.*

EN 1085, *Wastewater treatment — Vocabulary.*

prEN 13725, *Air quality — Determination of the odour concentration by dynamic olfactometry.*

ISO 5492:1997, *Sensory analysis — Vocabulary*.

3 Terms and definitions

For the purposes of this European Standard, the terms and definitions given in EN 1085 and the following apply.

3.1
olfactometry
measurement of the response of assessors to olfactory stimuli (see ISO 5492). Definition according to prEN 13725

3.2
odour concentration
the number of European Odour Units in a cubic metre of gas at standard conditions. The odour concentration has the symbol c_{od} and the unit ou_E/m^3 (see prEN 13725)

NOTE The value of the odour concentration is the dilution factor that is necessary to reach the detection threshold. At the detection threshold, the odour concentration of the mixture is 1 ou_E/m^3 by definition.

EXAMPLE If a sample has to be diluted by a factor of 300 to reach the detection threshold, the odour concentration of the sample is c_{OD} = 300 ou_E/m^3.

3.3
odorant flow rate; odour emission rate
the odorant flow rate q_{od} is the quantity of odorous substances passing through a defined area per unit time. It is the product of the odour concentration c_{od}, the outlet velocity v and the outlet area A or the product of the odour concentration c_{od} and the pertinent volume flow rate $\dot{V}$. Its unit is ou_E/h, ou_E/min or ou_E/s (see prEN 13725)

NOTE Diffuse sources such as unaerated wastewater or sludge surfaces, do not have a defined waste air flow, although they can emit odorants. In these cases, a special sampling procedure is necessary which is discussed in prEN 13725 (see annex A).

Odorant flow rates can be used in an analogous fashion to mass flow rates when modelling the impact from a source. All odour sources will have an odorant flow rate, even where no air flow rate is easily identifiable.

4 Design principles

4.1 General

Given the nature of wastewater it is not possible to guarantee that a wastewater treatment plant will be totally odour free. A well-designed plant minimises the potential for odour problems.

The potential for odour generation shall be considered at the earliest stages in the design of wastewater treatment works. The likelihood of odour emission, its impact and ease of treatment shall be considered in all aspects of design, especially:

a) Minimise the septicity of the raw wastewater by considering the sewerage system.

b) Process selection – e.g. if septic wastewater is anticipated, possibilities to minimise odour are for example:

— minimise the retention time of the sludge in the primary settlement tank;

— having no primary settlement (thus avoiding a major source of odour) and applying extended aeration;

— select a covered process.

c) By locating the major sources of odour, wherever possible, away from the most sensitive locations surrounding the plant. For planning the direction and speed of winds local to the installation shall be taken into account.

NOTE Situations with light wind or no wind and stable atmospheric conditions are most unfavourable for the dispersion of odours. Thus, if these situations happen very often, then the local wind direction during these situations is relevant instead of the generally prevailing wind direction.

d) By considering the location of unit processes relative to each other it may be possible to use a single abatement process to treat more than one source of odour or to use the odorous air from one process as process or combustion air in an adjacent process. Any decision to treat odorous air will require a process to be covered and ventilated with the vented air ducted to treatment. Covering, venting and treatment shall be designed as an integrated package.

Where treatment plants are not covered or housed in buildings and the effect of odour is difficult to quantify prior to commissioning designs should allow for covering and/or ventilation at a later date.

When tanks or processes are covered careful consideration is required of:

a) explosion risk;

b) corrosion prevention;

c) health and safety of operators;

d) access for maintenance.

4.2 Sources and nature of odours

Odour is generated during the conveyance and treatment of wastewater due to the degradation of organic matter by micro-organisms under anaerobic conditions. Industrial wastewater can also contain characteristic odorous constituents. The onset of septicity can be accelerated by elevated temperatures, high BOD concentration and presence of reducing chemicals. The range of odorous constituents is very wide and includes:

— hydrogen sulphide;

— ammonia;

— organic sulphur compounds;

— thiols (e.g. mercaptans);

— amines;

— indole and skatole;

— volatile fatty acids;

— other organic compounds.

The conditions that give rise to odours occur most typically in:

— unfavourable conditions in the sewage systems (e.g. long retention times, poor maintenance, industrial discharges);

— long pressure mains;

— some high rate treatment processes;

— anaerobic lagoons;

— sludge storage and treatment processes.

Odours can be present or form in the sewer system or in the treatment plant. Once formed, odours tend to travel with the flow through the treatment process to be transferred to the atmosphere at points of turbulence or where there is a large air-water interface. Levels of odour can be increased by the recycling of liquors within a treatment process, particularly when recycling those produced by the thickening or dewatering of sludge.

NOTE EN 752-4 gives guidance on minimising septicity in drain and sewer systems.

Particular problems can however be found at:

a) inlet works: strong odours in the incoming flow lead to high levels of release at inlet works;

b) primary settlement tanks: if they receive a highly odorous flow or if excessive sludge is allowed to accumulate in the tank, generating septicity;

c) secondary treatment if it is highly loaded or receives a highly odorous feed;

d) sites for the transfer, storage and treatment of sludges, especially of non-stabilised sludges;

e) leaks or emissions of biogas from anaerobic digestion and the first point of discharge of digested sludge.