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Guidance for the implementation of environmental aspects in product standards and system standards in the field of wastewater engineering

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National foreword

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Guidance for the implementation of environmental aspects in product standards and system standards in the field of wastewater engineering

Lignes directrices pour la mise en oeuvre des aspects environnementaux dans les normes produits et les normes systèmes du domaine de l'assainissement

Anleitung zur Umsetzung von Umweltaspekten in Produkt- und Systemnormen im Bereich Abwassertechnik

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European foreword

This document (CEN/TR 16928:2016) has been prepared by Technical Committee CEN/TC 165 "Wastewater Engineering", the secretariat of which is held by DIN.

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1 Scope

This document applies for the implementation of environmental aspects in product standards and system standards in the field of wastewater engineering. It provides a structure on how to identify and consider environmental aspects and potential environmental impacts of products and systems in the field of wastewater engineering throughout their life cycle.

NOTE Standards that are produced make environmental declarations voluntary where there are no national regulations. This is carried out by including for "No Performance Declared".

This Technical Report gives guidance on how this life cycle should be considered in accordance with EN 15804.

The stages of Life Cycle Assessment (LCA) are given in Annex A.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 15804, *Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products*

CEN Guide 4:2008, *Guide for addressing environmental issues in product standards*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN Guide 4:2008 and the following apply.

3.1
life cycle
consecutive and interlinked stages of a product system, from raw material acquisition or generation of natural resources to final disposal

Note 1 to entry: The term "product system" is defined and further explained in ISO 14040.

[SOURCE: ISO 14050:2009, definition 7.1]

4 General guidance

4.1 Provisions dealing with the introduction of environmental aspects into European Standards

European Standards concerning products and systems in the field of wastewater engineering currently exist without any direct reference for the user to environmental awareness and the possible environmental aspects and potential impacts. This does not necessarily lead to products and systems in the field of wastewater engineering which are less environmentally friendly, because the user has other incentives when considering environmental aspects, such as installation considerations, legal requirements etc. However, the inclusion of environmental provisions encourages the consideration of environmental aspects in cases where such incentives do not exist.

In many cases, it is sufficient to include the necessary provisions when revising European Standards dealing with products and systems in the field of wastewater engineering by the inclusion of a new

Clause or Subclause where the relevant environmental aspects are formulated or by reference to this Technical Report.

In standardization, environmental impacts should be considered together with other factors, such as:

a) local circumstances (see EN 752);

b) system objectives, functional requirements and performance indicators (see EN 752);

c) system design and installation;

d) product characteristics and production processes;

e) operation and maintenance;

f) total cost of ownership/life cycle costing;

g) quality;

h) legal constraints and regulatory requirements.

In order to determine how the product environmental aspects should be identified in wastewater standards, it is necessary to understand how the product interacts with the system and the environment during its life cycle. Environmental aspects are connected to impacts through a cause and effect relationship.

Examples of environmental aspects to consider include:

— emissions to air;

— discharges to water and soil;

— use of raw materials;

— energy and water consumption;

— land use.

Examples of environmental impacts that can be positively or negatively influenced by provisions in standards can include:

— climate change (through the emission of greenhouse gases);

— air pollution (through uncontrolled/untreated or accidental emissions of particulates and toxic gases to air); and

— depletion of non-renewable resources (consumption of fossil fuels, minerals).

NOTE Additional examples are given in EN 15804.

All environmental aspects outlined in this Clause also apply to services.

As a result of this consideration, substantial energy and CO_2 reduction and resource optimization can be possible without compromising the fitness for purpose and longevity of the pipe systems.

4.2 Life Cycle Assessment (LCA)

Any inclusion of environmental aspects into product and system standards should consider the life cycle of the product or system. As such, all stages of the life cycle of the relevant product or system should be considered, including:

a) acquisition stage:

1) raw materials and energy;

2) premanufactured materials and components;

b) product stage:

1) production from raw material;

2) transport;

3) manufacturing of final products;

c) construction and installation process stage:

1) transport of the products and laying to build a system;

d) use stage:

1) collection and transportation of wastewater;

2) operation and maintenance of the system;

e) end-of-life (including recycling).

Guidance on Life Cycle Assessment (LCA) is given in e.g. EN 15804, EN 15978 and EN ISO 14044, with special regard to recycling issues (see also Annex A). European Standards should specify requirements for re-use.

4.3 Assessment of environmental impacts in standards

For the design of products and systems in the field of wastewater engineering, e.g. EN 752, EN 12056 (all parts), EN 12255 (all parts), EN 12566 (all parts) and the guidance given in ISO/TR 14062 should be considered.

In accordance with CEN Guide 4, additional environmental aspects, specific for the relevant design and product life cycle, should be identified by the applicable screening procedures as defined in EN 15804.

Assessment of the environmental impacts should be in accordance with construction product standards.

An environmental checklist should be completed, updated as appropriate and attached to draft standards during all stages of the development of a standard. The matrix provided in Table B.1, is particularly suitable to standards. In some cases, e.g. for services, or to accommodate regional or sector specific issues, other tools or another form of checklist can be more appropriate. For example, the life cycle stages can be modified to better reflect the typical steps of providing services. In other cases, where one product is described by a whole series of standards covering the whole life cycle, it can be more appropriate to complete the checklist not for each single standard, but for the whole series.

The purpose of the environmental checklist is to explain whether the proposal covers relevant product environmental aspects and, if so, how they are dealt with in the European Standard. The European Standard is published without the environmental checklist.

5 Overview of environmental aspects in wastewater standards

5.1 General

Environmental aspects should be considered for cases where requirements are specified for systems and products and in the field of wastewater engineering. These aspects can be addressed in the standards for:

— systems for drains and sewers outside buildings;

— systems for drains and sewers inside buildings;

— wastewater treatment plants (< 50 PT);

— wastewater treatment plants (> 50 PT);

— reuse of water.

For the most part, the main potential environmental impacts of products and systems are related to the energy consumption and the associated emissions in the operating stage. The energy consumption of a system depends e.g. on its head losses for pressure pipes, leakages, energy need of pumping systems.

Increasing the lifetime of the products reduces the environmental impacts, because more frequent rehabilitation (repair /renovation/replacement) means additional extraction of energy resources, emissions and waste. Trenchless applications can reduce environmental impact of installation. Other examples of beneficial environmental aspects are:

a) the avoidance of unnecessary material should be a general requirement for the design of the products;

b) reduction in traffic resulting in avoidance of traffic jams and delays and reduction in CO_2 emissions;

c) high mechanical performance, i.e. the robustness of products and systems allow energy saving from the reduced mechanisation required during installation. Similarly, the need for imported material for bed and surround is avoided/minimised, with the subsequent savings associated with the unnecessary use of natural resources and transportation costs;

d) recovery of energy.

e) Environmental impacts are related to the inputs that are used and consumed, the processes employed and the outputs that are generated at all stages of the life cycle including options for the dismantling, decommissioning or demolition of wastewater systems.

5.2 Inputs

5.2.1 General

Inputs include the use of resources that can be natural materials (e.g. minerals, water, gas, oil, coal, wood), those from the industrial environment (e.g. recycled materials, co-products, intermediate products, energy), or from land use.

For practical reasons, these different resources can be broadly categorized into “materials”, “water”, “energy” and “land use”.

5.2.2 Materials

Material inputs play an important role in all stages of the life cycle, from raw material extraction to final disposal. They can produce a variety of environmental impacts. These impacts can include depletion of resources, detrimental land use, and environmental or human exposure to hazardous materials.

Material inputs also contribute to the generation of waste, emissions to air and discharges to soil and water. European (e.g. REACH) and national regulations shall be taken into account.

5.2.3 Water

The scarcity of water, especially of fresh water from surface or underground sources, is critical in many regions. The efficient use and re-use of water in the different stages of the life cycle needs to be considered, where pertinent. In addition, the availability of water where it is needed requires the use of energy to transport it. The preservation of natural habitats and biodiversity is also important in lakes and rivers. Water pollution can destroy the natural water flora and fauna.

NOTE Nitrate and phosphorus pollution (e.g. because of over-fertilization in landlocked countries) can produce eutrophication in water bodies, which endangers organisms in the affected area.

5.2.4 Energy

Energy inputs are required at most stages of the life cycle. Energy sources typically include fossil fuels, nuclear fuels, recovered waste, and hydroelectric, geothermal, biomass, solar and wind energy. Each energy source has its own set of environmental impacts.

5.2.5 Land

Taking land into use can lead to a decrease in biodiversity and can affect the soil quality, which takes a long time to rebuild itself. Even if efforts are made to replant the spoiled area, the natural balance and flow of the ecosystem can take a prolonged period, or can never return to a normal level.

5.3 Outputs

5.3.1 General

Outputs generated during the life cycle generally comprise intermediates and co-products, emissions to air, discharges to water and soil, waste materials and other releases. European and national regulations shall be taken into account.

5.3.2 Emissions to air

Emissions to air comprise releases of gases, vapours or particulate matter to the air. Releases (e.g. dust and toxic, corrosive, flammable, explosive, acidic or odorous substances) can adversely affect flora, fauna and human beings. In addition, acidic rain can cause damage to sites of architectural and archaeological value. They can contribute to other environmental impacts, such as climate change, depletion of stratospheric ozone or formation of photochemical smog. Air emissions include releases from controlled as well as uncontrolled releases.

NOTE 1 Uncontrolled releases can be leaks, vaporization or those arising from accidents.

NOTE 2 Climate change is caused e.g. by greenhouse gases. The greenhouse gases that contribute most to climate change are carbon dioxide, methane, nitrous oxide, sulfur hexafluoride, hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

5.3.3 Discharges to water

Discharges to water comprise the discharge of substances either to a drain, a sewer or a watercourse. The discharge of nutrients and toxic, pathogenic, corrosive, radioactive, persistent, accumulating or oxygen depleting substances can give rise to adverse environmental impacts, including various pollution effects on aquatic ecosystems and deterioration of water quality. Discharges to water include controlled as well as uncontrolled sources, treated as well as untreated discharges, and discharges from normal operations as well as accidental discharges.

NOTE Uncontrolled releases can be leaks or those arising from accidents.

5.3.4 Discharges to soil

All discharges and disposals to soil, as well as soil applications, should be considered for their potential environmental impact. As well as hazardous materials, this includes non-hazardous materials, depending on their concentration and use. Their potential impacts should be considered in relation to soil and groundwater quality. Discharges to soil include controlled as well as uncontrolled sources, treated as well as untreated discharges and discharges from normal operation as well as accidental discharges.

NOTE Uncontrolled releases can be leaks or those arising from accidents.

5.3.5 Waste

Waste materials and products can be classified in the following broad categories:

— those which are sent to final disposal, e.g. incineration without energy recovery or land filling;

— those which are collected after use and can be suitable for recovery including recycling;

— those which arise within a production process and are not subject to further processing or use before collection.

The existence of regional or national regulations can have a bearing on the subsequent treatment of waste products and materials.

5.3.6 Intermediate and co-products

Other outputs should be considered, e.g. recovered energy from waste (high heat value waste), recycled materials, by-products and recycled water.

5.3.7 Other releases

Other releases include noise and vibration, radiation and heat.

5.4 Other relevant issues

5.4.1 Energy savings

For the most part, the main potential environmental impacts of systems and products for water application are related to the energy consumption and the associated emissions in the operating stage. The energy consumption of a pipe system depends on its leakages and head losses (for pressure pipes). Each head loss reduction leads to energy savings on the whole life cycle of the pressure pipe systems and consequently, significant consideration should be paid to the head losses of the water mains.

5.4.2 Recycling

Recycling usually consists of different steps, namely e.g. excavation from the trench, transportation, or shredding.

The recycled material advantages can be:

a) reduction in mining;

b) reduction in emissions;

c) conservation of natural resources;

d) reduction in landfill usage.

5.4.3 Construction and operational stages

During these stages, in- and exfiltration in the network causes problems such as water or soil pollution and/or unnecessary sewerage treatment.

The exfiltration of wastewater can directly lead to environmental damage such as (see EN 752):

a) soil and groundwater pollution (i.e. rivers, lakes, sea);

b) pollution of ground water.

Similarly, a broken sewer or a leaking joint allows the ingress of groundwater leading to:

a) increased treatment costs;

b) ingress of soil;

c) lower groundwater levels;

d) potential damage to adjacent structures (i.e. buildings, roads, other underground services).

5.5 Trenchless applications

5.5.1 General

Trenchless applications include repair, renovation and replacement as well as new installations. These techniques are e.g. lining, horizontal directional drilling, pipe bursting, press pull, and pipe-jacking (see EN 15885). Such installations can result in reducing environmental impacts.

5.5.2 Environmental advantages

Environmental advantages of trenchless applications can include:

a) elimination of pipe damage;

b) reduction in environmental damage;

c) reduction in hazardous operational conditions;

d) reduction in road construction waste;

e) reduction in installation time;

f) minimal excavated material and associated transportation savings;

g) reduction in pipeline removals;

h) minimization of any relevant ground water pumping;

i) avoidance of imported backfill material;

j) reduction in noise;

k) reduction in damage to adjacent structures/services;

l) possibility of installation regardless of weather conditions.

Annex A
(informative)

Stage of Life Assessment (LCA)

The stages of Life Cycle Assessment (LCA) are given in Figure A.1 (see EN 15978).

The different stages given in Figure A.1 are also applicable to systems in the field of wastewater engineering.

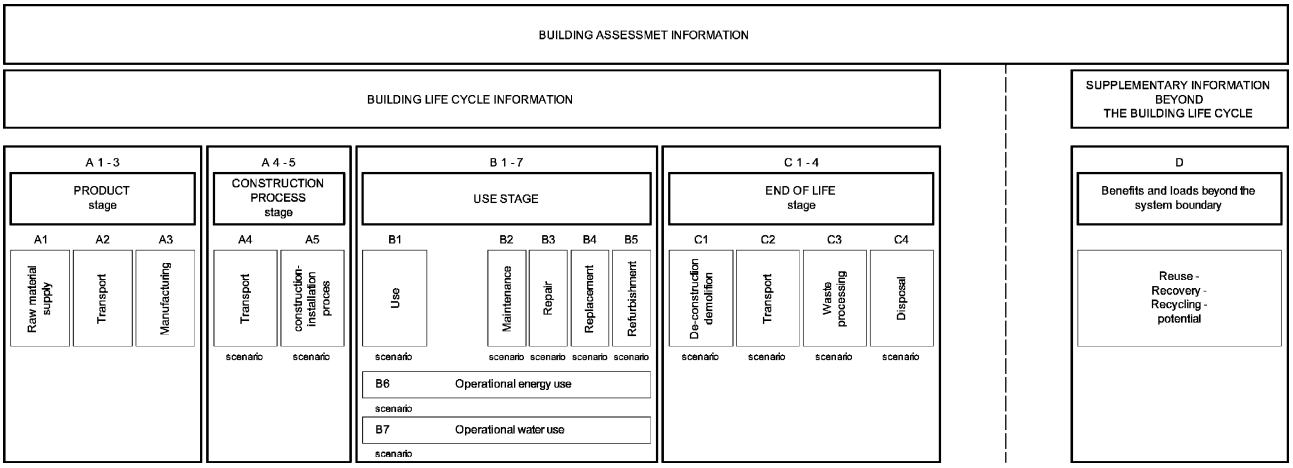

Figure A.1 — Stages of life cycle

Annex B
(informative)

Environmental checklist

This checklist is a tool for drafting standards in the field of wastewater engineering.

The purpose of the environmental checklist is to explain whether the proposal covers relevant product environmental aspects and, if so, how they are dealt with in the draft. The standard will be published without the environmental checklist.

The following information should be given on the checklist:

— document number (if available);

— title of standard;

— technical committee (TC)/subcommittee (SC)/working group (WG) number;

— work item number (if available);

— version of the environmental checklist; and

— date of last modification of the environmental checklist.

The matrix should be completed as indicated below, encouraging the involvement of the TC members.

a) Identify each relevant environmental aspect.

b) Fill in each box with “yes”, if there is a significant environmental aspect, or “no”, if there is no significant environmental aspect or if the box is not relevant.

c) For each box with a “yes”, identify whether this environmental aspect can be addressed in the standard. Mark these boxes with three asterisks (***).

d) Write the numbers of the clauses in the standard where the environmental aspects are addressed, in the appropriate boxes.

e) Use a separate box (“Comments”) to provide any additional information. A short description of each environmental aspect (boxes marked with “yes”) and how they are addressed (or why they are not) can be given here. Furthermore, environmentally related comments on the draft standard and the TC reply to these comments can be included here.

f) When assessing various environmental aspects during the life cycle of a product, it needs to be borne in mind that environmental burden should not be shifted from one life cycle stage to another, or from one medium to another.

Table B.1 — Environmental checklist

Document number (if available):			Title of standard:					TC/SC/WG number:			
Work item number (if available):			Version of the environmental checklist:					Date of last modification of the environmental checklist:			
Environmental issue	Stage of the life cycle										All stages
	Acquisition		Production		Use			End of life			
	Raw materials and energy	Pre-manufactured materials and components	Production	Packaging	Use	Maintenance and repair	Use of additional products	Reuse/material and energy recovery	Incineration without energy recovery	Final disposal	Transportation
Inputs											
Materials											
Water											
Energy											
Land											
Outputs											
Emissions to air											
Discharges to water											
Discharges to soil											
Waste											
Noise, vibration, radiation, heat											
Other relevant aspects											
Risk to the environment from accidents or unintended use											
Customer information											
Comments:											

NOTE 1 The stage of packaging refers to the primary packaging of the manufactured product. Secondary or tertiary packaging for transportation, occurring at some or all stages of the life cycle, is included in the stage of transportation.

NOTE 2 Transportation can be dealt with as being a part of all stages (see checklist) or as a separate sub-stage. To accommodate specific issues relating to product transportation and packaging, new columns can be included and/or comments can be added.

Bibliography

[1] EN 752, *Drain and sewer systems outside buildings*

[2] EN 12056 (all parts), *Gravity drainage systems inside buildings*

[3] EN 12255 (all parts), *Wastewater treatment plants*

[4] EN 12566, *Small wastewater treatment systems for up to 50 PT*

[5] EN 15978, *Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method*

[6] EN ISO 14044, *Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044)*

[7] ISO 14050:2009, *Environmental management — Vocabulary*

[8] ISO/TR 14062, *Environmental management — Integrating environmental aspects into product design and development*

[9] CEN/TR 15855, *Construction products - Assessment of release of dangerous substances - Barriers to trade*

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