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PREFABRICATED WASTEWATER TREATMENT PLANTS FOR AT LEAST 51 UP TO 500 PT

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Contents

1	Scope of the EAD	4
1.1	Description of the construction product	4
1.2	Information on the intended use(s) of the construction product	4
1.2.1	Intended use(s).....	4
1.2.2	Working life/Durability.....	4
2	Essential characteristics and relevant assessment methods and criteria	6
2.1	Essential characteristics of the product	6
2.2	Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product	6
2.2.1	Reaction to fire	6
2.2.2	Treatment efficiency	7
2.2.3	Watertightness.....	7
2.2.4	Load bearing capacity	7
2.2.5	Power consumption	7
2.2.6	Durability.....	7
3	Assessment and verification of constancy of performance	9
3.1	System(s) of assessment and verification of constancy of performance to be applied	9
3.2	Tasks of the manufacturer	9
3.3	Tasks of the notified body	9
4	Reference documents	11

1 SCOPE OF THE EAD

1.1 Description of the construction product

The EAD applies to the prefabricated wastewater treatment plants for at least 51 up to 500 PT (population total) made of polyethylene (PE) or made of the laminate of the glass fiber reinforced polyester resin (GRP).

The product is not fully covered by the following harmonised technical specification: EN 12566-3:2005+A2:2013¹. The prefabricated wastewater treatment plants for at least 51 up to 500 PT are not in the scope of this standard. In addition the assessment method of the wastewater power consumption differs from the standard.

Prefabricated wastewater treatment plants are prefabricated products or kits of site assembled domestic wastewater treatment plants for at least 51 up to 500 PT. In the case of kits they consist of the following components:

- tanks made of GRP or PE,
- technical equipment.

The settling tank according to EN 12566-1 can be an element of the plant. The settling tank is not covered by this EAD.

Optionally tanks are made with thermal insulation provided by PUR foam.

Concerning product packaging, transport, storage, maintenance, replacement and repair it is the responsibility of the manufacturer to undertake the appropriate measures and to advise his clients on the transport, storage, maintenance, replacement and repair of the product as he considers necessary.

It is assumed that the product will be installed according to the manufacturer's instructions or (in absence of such instructions) according to the usual practice of the building professionals.

Relevant manufacturer's stipulations having influence on the performance of the product covered by this European Assessment Document shall be considered for the determination of the performance and detailed in the ETA.

1.2 Information on the intended use(s) of the construction product

1.2.1 Intended use(s)

Prefabricated wastewater treatment plants are intended to be used for population of at least 51 up to 500 inhabitants. Products are used for treatment of domestic wastewater. Domestic wastewater does not include rainwater. Prefabricated wastewater treatment plants are installed outside buildings, fully or partially buried in the ground. They can be subjected to pedestrian loads.

1.2.2 Working life/Durability

The assessment methods included or referred to in this EAD have been written based on the manufacturer's request to take into account a working life of the prefabricated wastewater treatment plants for at least 51 up to 500 PT for the intended use of 10 years when installed in the works. These provisions are based upon the current state of the art and the available knowledge and experience.

¹ All undated references to standards or to EADs in this EAD are to be understood as references to the dated versions listed in chapter 4.

When assessing the product, the intended use as foreseen by the manufacturer shall be taken into account. The real working life may be, in normal use conditions, considerably longer without major degradation affecting the basic requirements for works².

The indications given as to the working life of the construction product cannot be interpreted as a guarantee neither given by the product manufacturer or his representative nor by EOTA when drafting this EAD nor by the Technical Assessment Body issuing an ETA based on this EAD, but are regarded only as a means for expressing the expected economically reasonable working life of the product.

² The real working life of a product incorporated in a specific works depends on the environmental conditions to which that works is subject, as well as on the particular conditions of the design, execution, use and maintenance of that works. Therefore, it cannot be excluded that in certain cases the real working life of the product may also be shorter than referred to above.

2 ESSENTIAL CHARACTERISTICS AND RELEVANT ASSESSMENT METHODS AND CRITERIA

2.1 Essential characteristics of the product

Table 2.1 shows how the performance of the prefabricated wastewater treatment plants for at least 51 up to 500 PT is assessed in relation to the essential characteristics.

Table 2.1 Essential characteristics of the product and methods and criteria for assessing the performance of the product in relation to those essential characteristics

No	Essential characteristic	Assessment method	Type of expression of product performance
Basic Works Requirement 2: Safety in case of fire			
1	Reaction to fire	2.2.1	Class
Basic Works Requirement 3: Hygiene, health and the environment			
2	Treatment efficiency	2.2.2	Level
3	Watertightness	2.2.3	Description
Basic Works Requirement 4: Safety and accessibility in use			
4	Load bearing capacity	2.2.4	Level
Basic Works Requirement 6: Energy, economy and heat retention			
5	Power consumption	2.2.5	Level
Aspects of durability linked with the Basic Works Requirements			
6	Durability	2.2.6	Description

2.2 Methods and criteria for assessing the performance of the product in relation to essential characteristics of the product

This chapter is intended to provide instructions for TABs. Therefore, the use of wordings such as “shall be stated in the ETA” or “it has to be given in the ETA” shall be understood only as such instructions for TABs on how results of assessments shall be presented in the ETA. Such wordings do not impose any obligations for the manufacturer and the TAB shall not carry out the assessment of the performance in relation to a given essential characteristic when the manufacturer does not wish to declare this performance in the Declaration of Performance.

2.2.1 Reaction to fire

The prefabricated wastewater treatment plants shall be tested according to the test method(s) referred to in EN 13501-1 and relevant for the corresponding reaction to fire class. The product shall be classified according to the Commission Delegated Regulation (EU) 2016/364. The reaction to fire class shall be stated in the ETA.

2.2.2 Treatment efficiency

The treatment efficiency of prefabricated wastewater treatment plants shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.3 and Annex B). If the prefabricated wastewater treatment plant used for 51 up to 500 PT is of the same range with smaller wastewater treatment plant (up to 50 PT) in terms of technological principle and the smaller representative of the range is consistent with the EN 12566-3:2005+A2:2013 – the test report from the smaller plant of the same range is sufficient for the assessment of the treatment efficiency for wastewater treatment plant used for 51 up to 500PT.

The treatment efficiency, expressed as a ratio of treatment effectiveness of COD (chemical oxygen demand), BOD₅ or BOD₇ (biochemical oxygen demand at 5 or 7 days), SS (suspended solids), P (total phosphorus), KN (nitrogen) according to EN 12566-3:2005+A2:2013 (clause 6.3 and Annex B), shall be stated in the ETA.

2.2.3 Watertightness

The watertightness of prefabricated wastewater treatment plants shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.4 and Annex A, method A.2).

The watertightness, expressed as “pass” or “fail” according to EN 12566-3:2005+A2:2013, shall be stated in the ETA.

2.2.4 Load bearing capacity

The load bearing capacity of prefabricated wastewater treatment plants shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.2 and Annex C).

The load bearing capacity, expressed as maximum allowed height of backfill and possibility to install the plant in dry or wet site (maximum height of the water table) according to EN 12566-3:2005+A2:2013, shall be stated in the ETA.

2.2.5 Power consumption

The power consumption shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.7) or shall be calculated on the basis of the rated power and time setting of electric devices installed in prefabricated wastewater treatment plant, according to the formula given below (these two methods are equivalent).

$$P_C = \sum_{n=1}^n (P_n \times t_n)$$

where:

P_C – power consumption per day [kWh/d],

P_n – rated power of electric device n [kW],

t_n – time setting of electric device n (number of hours per day when the device is working), $0 < t_n \leq 24$ [h/d],

n – number of electric devices installed in wastewater treatment plant.

The power consumption value (in kWh/d) and the assessment method shall be stated in the ETA.

2.2.6 Durability

The durability of the prefabricated wastewater treatment plants is defined by characteristics given in 2.2.6.1 ÷ 2.2.6.2 for plants made of laminate of the glass fiber reinforced polyester resin (GRP) and 2.2.6.3 ÷ 2.2.6.7 for plants made of polyethylene (PE).

The durability, expressed as “pass” or “fail” according to EN 12566-3:2005+A2:2013 (clause 6.5), shall be stated in the ETA.

2.2.6.1 Creep factor α

The creep factor α shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.6), EN ISO 14125 (method A) and EN ISO 899-2. The creep factor α shall be $\geq 0,3$.

2.2.6.2 Ageing factor β

The ageing factor β shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.6) and EN ISO 14125 (method A). The ageing factor β shall be $\geq 0,3$.

2.2.6.3 Density

The density shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.5) and EN ISO 1183-1. The density shall be:

- $\geq 930 \text{ kg/m}^3$ in case of products manufactured by rotational moulding or by extrusion,
- $\geq 940 \text{ kg/m}^3$ in case of products manufactured by blow moulding.

2.2.6.4 Melt mass-flow rate (MFR)

The melt mass-flow rate (MFR) shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.5) and EN ISO 1133-1. The melt mass-flow rate (MFR) shall be:

- $(4,0 \pm 3,0 \text{ g})/10 \text{ min}$ in case of products manufactured by rotational moulding,
- $2,0 \text{ g}/10 \text{ min} \leq \text{MFR} \leq 12,0 \text{ g}/10 \text{ min}$ in case of products manufactured by blow moulding,
- $0,15 \text{ g}/10 \text{ min} \leq \text{MFR} \leq 1,0 \text{ g}/10 \text{ min}$ in case of products manufactured by extrusion.

2.2.6.5 Tensile stress at yield

The tensile stress at yield shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.5) and EN ISO 527-2. The tensile stress at yield shall be:

- $\geq 14 \text{ MPa}$ in case of products manufactured by rotational moulding,
- $\geq 19 \text{ MPa}$ in case of products manufactured by blow moulding,
- $\geq 21 \text{ MPa}$ in case of products manufactured by rotational extrusion.

2.2.6.6 Tensile strain at yield

The tensile strain at yield shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.5) and EN ISO 527-2. The tensile strain at yield shall be $\leq 25\%$ (in case of products manufactured by rotational moulding, blow moulding or extrusion).

2.2.6.7 Tensile strain at break

The tensile strain at break shall be determined in accordance with EN 12566-3:2005+A2:2013 (clause 6.5.5) and EN ISO 527-2. The tensile strain at break shall be:

- $\geq 80 \%$ in case of products manufactured by rotational moulding,
- $\geq 200\%$ in case of products manufactured by blow moulding or extrusion.

3 ASSESSMENT AND VERIFICATION OF CONSTANCY OF PERFORMANCE

3.1 System(s) of assessment and verification of constancy of performance to be applied

For the products covered by this EAD the applicable European legal act is: Decision 1997/464/EC as amended by 2004/663/EC.

The AVCP system is: 3.

For uses subject to regulations on reaction to fire the applicable AVCP systems are: 1, 3 or 4.

3.2 Tasks of the manufacturer

The cornerstones of the actions to be undertaken by the manufacturer of the product in the procedure of assessment and verification of constancy of performance are laid down in Table 3.1.

Table 3.1 Control plan for the manufacturer; cornerstones

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Raw materials	Checking of delivery documentation	Compliance with required materials	100%	Every batch of raw material
2	Reaction to fire	2.2.1	According to Control Plan	1	First delivery of raw materials and components
3	Deviation of dimensions of prefabricated parts	Measurement using universal devices	Compliance with documentation, 10% deviation is allowed	100%, diameter and height	Each product
4	Watertightness	2.2.3	2.2.3	1	1/500 units or minimum 1/month
5	Verification of the completeness of the plant	Visual inspection	Compliance with documentation	100%	Each product

3.3 Tasks of the notified body

The intervention of the notified body for reaction to fire under AVCP system 1 is only necessary for the prefabricated wastewater treatment plants for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).

In this case the cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.2.

Table 3.2 Control plan for the notified body in case of AVCP 1 for reaction to fire; cornerstones

No	Subject/type of control <i>(product, raw/constituent material, component - indicating characteristic concerned)</i>	Test or control method <i>(refer to 2.2 or 3.4)</i>	Criteria, if any	Minimum number of samples	Minimum frequency of control
Initial inspection of the manufacturing plant and of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire <i>(for system 1 only)</i>					
1	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 are fulfilled for reaction to fire, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material).	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	As defined in the control plan	As defined in the control plan	When starting the production or a new line
Continuous surveillance, assessment and evaluation of factory production control carried out by the manufacturer regarding the constancy of performance related to reaction to fire <i>(for system 1 only)</i>					
2	Where the intervention of the Notified Body is necessary only because the conditions for the applicability of system 1 in the Decisions regarding reaction to fire are fulfilled, the notified body will consider especially the clearly identifiable stage in the production process which results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)	Verification of the controls carried out by the manufacturer as described in the control plan agreed between the TAB and the manufacturer with reference to the raw materials, to the process and to the product as indicated in Table 3.1	As defined in the control plan	As defined in the control plan	Annually

4 REFERENCE DOCUMENTS

EN ISO 527-2:2012	Plastics. Determination of tensile properties. Test conditions for moulding and extrusion plastics
EN ISO 899-2:2003	Plastics. Determination of creep behaviour. Part 2: Flexural creep by three-point loading
EN ISO 1183-1:2013	Plastics. Methods for determining the density of non-cellular plastics. Part 1: Immersion method, liquid pycnometer method and titration method
EN ISO 1133-1:2011	Plastics. Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics. Standard method
EN 12566-1:2000	Small wastewater treatment systems for up to 50 PT. Prefabricated septic tanks
EN 12566-3:2005 +A2:2013	Small wastewater treatment systems for up to 50 PT. Part 3: Packaged and/or site assembled domestic wastewater treatment plants
EN 13501-1:2018	Fire classification of construction products and building elements. Part 1: Classification using data from reaction to fire tests
EN ISO 14125:1998	Fibre-reinforced plastic composites. Determination of flexural properties