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European Assessment Document for

# Retrofit kits for small wastewater treatment plants



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This European Assessment Document (EAD) has been developed taking into account up-to-date technical and scientific knowledge at the time of issue and is published in accordance with the relevant provisions of Regulation (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

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## 1 SCOPE OF THE EAD

### 1.1 Description of the construction product

Retrofit kits for small wastewater treatment plants as covered by this EAD are prefabricated and manufacturer assembled technical equipment for the retroactive installation in existing sewage works which are buried into the ground to retrofit them to small wastewater treatment plants of one range.

In any case, the retrofit kits consist of components for biological treatment of domestic wastewater and, where applicable, advanced treatment. These components are

- Two or more pumps,
- Two or more pipes with sealings,
- One or more aerator(s),
- One compressor,
- One control unit and
- Mounting parts.

This EAD does not cover any additional optional components. The internal components which are in contact with wastewater are made from materials which comply with EN 12566-3<sup>1</sup>, clauses 6.5.2 to 6.5.7.

The product is not fully covered by the harmonised European standard EN 12566-3. As this EAD covers retrofit kits and not complete small wastewater treatment plants, no tank respectively tanks are part of the product and not all essential characteristics as indicated in the harmonised standard are relevant for the retrofit kits. This is related to load-bearing capacity and watertightness. As the product is installed in an existing sewage work, it has no direct contact to soil and/or groundwater or indoor air. Thus, "content and/or emission of dangerous substances" is not relevant for the product subject to this EAD, neither regarding the environmental nor hygiene and health aspects.

The product performance as assessed by the treatment efficiency test does only apply if dimension and geometry of the tanks which shall be retrofitted conform to the tank used for this test. The transfer to other dimensions and geometries is technically not possible and requires a specific test setup for the treatment efficiency test. The assessment methods given in this EAD are not based on any conditions regarding the load-bearing capacity of the tanks to be retrofitted.

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, e.g., with regard to the intended end use conditions, 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 as long as the details of the assessment methods as laid down in this EAD are respected.

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

#### 1.2.1 Intended use(s)

The retrofit kits for small wastewater treatment plants are intended to be used for the retroactive installation in existing sewage works outside buildings to retrofit them to small wastewater treatment plants (including

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<sup>1</sup> All undated references to standards in this EAD are to be understood as references to the dated versions listed in chapter 4.

guest houses and businesses) used for populations up to 50 inhabitants. These retrofitted small wastewater treatment plants are designed for the treatment of domestic wastewater. Domestic wastewater does not include rainwater.

The performance of the treatment efficiency of the retrofit kits in use can only be achieved when installed in suitable tank(s) of sewage works and when operation and maintenance of the small wastewater treatment plants fits to the manufacturer's product installation information (MPII).

### **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 retrofit kits for small wastewater treatment plants 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.

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 works<sup>2</sup>.

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.

## **1.3 Specific terms used in this EAD**

All specific terms can be found in EN 12566-3 and EN 16323.

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<sup>2</sup> 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 2.1.1 shows how the performance of the retrofit kit for small wastewater treatment plants itself or after installation into suitable tanks as expressed in chapter 1.2 is assessed in relation to the essential characteristics.

**Table 2.1.1 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
<b>Basic Works Requirement 2: Safety in case of fire</b>			
1	Reaction to fire	2.2.1	Class
<b>Basic Works Requirement 3: Hygiene, health and the environment</b>			
2	Treatment efficiency	2.2.2	Level
3	Treatment capacity	2.2.3	Level
<b>Basic Works Requirement 4: Safety and accessibility in use</b>			
4	Accessibility	2.2.4	Description
<b>Aspects of durability</b>			
5	Durability	2.2.5	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.

If for any components covered by harmonised standards or European Technical Assessments the manufacturer of the component has included the performance regarding the relevant characteristic in the Declaration of Performance, retesting of that component for issuing the ETA under the current EAD is not required.

The product performance as assessed by the treatment efficiency test does only apply if dimension and geometry of the tanks which shall be retrofitted conform to the tank used for this test. The transfer to other dimensions and geometries is technically not possible and requires a specific test setup for the treatment efficiency test. The assessment methods given in this EAD are not based on any conditions regarding the load-bearing capacity of the tanks to be retrofitted.

### 2.2.1 Reaction to fire

Reaction to fire of the whole kit shall be assessed by considering the reaction to fire of the most relevant components (pipes, sealings, mounting parts), in order to be classified in accordance with Commission Delegated Regulation (EU) 2016/364. For that, the assessment of the whole kit shall be based on the worst class of any relevant component obtained from CWFT Decisions or from results of the relevant tests method(s) in accordance with EN 13501-1 as prescribed below.

The following options for the assessment of the components shall apply:

- a) Components made of metal or metal alloys without coatings or with inorganic coatings are considered to satisfy the requirements for performance class A1 of the characteristic reaction to fire in accordance with the Commission Decision 96/603/EC, as amended by Commission Decisions 2000/605/EC and 2003/424/EC, without the need for testing on the basis of them fulfilling the conditions set out in that Decision and its intended use being covered by that Decision.
- b) Components used as fixing means (not falling under option "a") are considered as small components without the need for testing, because their contribution to fire can be seen as negligible due to their very small dimensions.
- c) The performance of pipes and sealings shall be tested using the test method(s) for the corresponding reaction to fire classes in accordance with EN 13501-1. The components shall be classified in accordance with Commission Delegated Regulation (EU) 2016/364 in connection with EN 13501-1.

The aerator is considered as component which cannot contribute to fire because it is installed inside the wastewater treatment plant and is completely covered by wastewater during the use. Therefore, there is no need for testing and classification of its reaction to fire performance.

Pumps, compressors and control unit are considered as components of the drive system of the kit which are already covered by other regulations and are installed separately from the wastewater treatment plant in a metal enclosure or a separate room. Therefore, these components do not need to be tested and classified in accordance with EN 13501-1.

For option "c)", the necessary tests in accordance with EN ISO 11925-2 shall be performed with edge exposure as well as with surface exposure on specimens as follows:

- a) pipes (if the outer diameter is equal to or lower than 60 mm) or cut sections of pipes in lengthwise direction, mounted in a free-hanging test position without any substrate behind,
- b) stripes of sealing, mounted in a joint between angles (or similar) made of material as used for producing the pipes or made from representative standard substrate boards in accordance with EN 13238 (cf. EAD 350141-00-1106, Annex A.2).

Furthermore, for SBI tests in accordance with EN 13823 within the frame of option "c", the provisions of EAD 280009-00-0802, Method B, as described in Annex C.3 of that EAD, shall apply for pipes and the provisions of EAD 350141-00-1106, Annex A.1, shall apply for sealings.

The following parameters shall be considered for both components when preparing the test specimens and executing the tests:

- variations of a product family (as defined by a combination of certain raw materials and certain type of production process),
- lowest content of inorganic fillers, if relevant,
- highest and lowest thickness / pipe wall thickness, if relevant,
- highest and lowest density, if relevant,
- lowest and highest / highest testable outer diameter of the pipes for tests in accordance with EN 13823, each in combination with the corresponding highest and lowest pipe wall thickness, if relevant.

In addition, the greatest width of the sealing shall be considered for testing purposes in tests in accordance with EN ISO 11925-2.

The results of tests considering the aforementioned parameters in fully are valid for:

- all variations of the defined product family,
- with higher content of inorganic fillers,
- the tested thickness / pipe wall thickness or the whole range between those thickness / pipe wall thickness values tested,
- the tested density or the whole range between those density values tested,
- the same or any lower width of the sealing.
- any outer diameter of pipes, if the pipes have only been tested in accordance with EN ISO 11925-2, or
- if tested in accordance with EN 13823 (SBI), the tested outer diameter of pipes or the whole range between those outer diameters of pipes tested and also for outer diameters up to 250 mm, if pipes with an outer diameter of 180 mm have been tested in this test method.

The worst class assessed for the different components is decisive for the entire kit and shall be stated in the ETA together with the conditions for which the classification is valid.

### 2.2.2 Treatment efficiency

#### Purpose of the assessment

The performance of those parameters shall be assessed which are decisive for the treatment efficiency of the retrofit kit for small wastewater treatment plants when installed in tank(s). These parameters are indicated in this clause in the paragraph "Expression of results".

The standard configurations for the existing wastewater treatment plants depend on the total population and equivalents as follows:

- 4-12 PT: circular tank of three chambers, inner diameter = 2,3 m, height (bottom of the tank to bottom edge of the outlet) = 3,04 m,
- 12-24 PT: circular tank of three chambers, inner diameter = 3,0 m, height (bottom of the tank to bottom edge of the outlet) = 3,53 m,
- 24-40 PT: two circular tanks, inner diameter of the first tank = 3,0 m, inner diameter of the second tank = 2,0 m, each height (bottom of the tank to bottom edge of the outlet) = 3,18 m,
- 40-50 PT: three circular tanks, inner diameter of the first tank = 3,0 m, inner diameter of the second tank = 3,0 m, inner diameter of the third tank = 2,5 m, each height (bottom of the tank to bottom edge of the outlet) = 2,65 m.

Thus, in case no further information are given by the manufacturer in that respect with regard to the intended use of the retrofit kit for small wastewater treatment plants, one or more of these standard configurations is/are used to assess the performance of the product. A deviation of the standard configuration is possible if the deviated configuration is considered in the test setup and additional sizing data are given by the manufacturer.

The used configuration shall be given in the ETA.



### Assessment method

For the assessment the test procedure described in EN 12566-3, Annex B, shall be used. The test shall be carried out at a retrofit kit installed in a tank. The tank size and geometry shall consider the smallest and hydraulically most demanding tank as identified by the TAB.

### Expression of results

The results of the test shall be expressed as minimum value, maximum value and average for the efficiency ratios for BOD<sub>5</sub>, COD, suspended solids and for the effluent parameters BOD<sub>5</sub>, COD, suspended solids, nitrogen parameters, total phosphorus and, where applicable, faecal coliforms. This is the case when advanced treatment applies.

## **2.2.3 Treatment capacity**

### Purpose of the assessment

The treatment capacity of the retrofit kits of the small wastewater treatment plants expressed as nominal hydraulic daily flow and the nominal organic load shall be assessed.

### Assessment method

For the assessment the manufacturer shall state the nominal hydraulic daily flow and the nominal organic load as described in EN 12566-3, clause 5.

### Expression of results

The nominal hydraulic daily flow shall be expressed in cubic meters per day and the nominal organic load shall be expressed in kg of BOD<sub>5</sub> (or BOD<sub>7</sub>) per day.

## **2.2.4 Accessibility**

### Purpose of the assessment

The accessibility after installation of the retrofit kits of the small wastewater treatment plants for maintenance and operational safety shall be assessed.

### Assessment method

The conditions which allow for an assessment of whether appropriate accessibility is ensured are given in EN 12566-3, clause 6.1.3.

### Expression of results

It shall be stated in the ETA whether accessibility to ensure maintenance and operational safety is given.

## **2.2.5 Durability**

### Purpose of the assessment

The performance of the retrofit kits for small wastewater treatment plants regarding their durable functioning shall be assessed.

### Assessment method

For all internal components of the retrofit kits for small wastewater treatment plants it shall be assessed whether they are made from materials which comply with EN 12566-3, clauses 6.5.2 to 6.5.7.

### Expression of results

It shall be stated in the ETA whether the durability of the materials in wastewater environment is given.

### **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 Commission Delegated Decision (EU) 2015/1959.

The applicable AVCP system is 3 for any use except for uses subject to regulations on reaction to fire.

For uses subject to regulations on reaction to fire the applicable AVCP systems regarding reaction to fire are 1, or 3, or 4 depending on the conditions defined in the said Decision.

### 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 3.2.1.

For kits: The manufacturer (regarding the components he buys from the market with DoP) shall take into account the Declaration of Performance issued by the manufacturer of that component. No retesting is necessary.

**Table 3.2.1 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
<b>Factory production control (FPC)</b> [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Completeness of the retrofit kit, internal components	Quality control of the retrofit kit production, checklist (according to control plan)	According to control plan	every retrofit kit	every retrofit kit
2	Dimensions of the air lift pumps	Quality control of the retrofit kit production, checklist (according to control plan)	According to control plan	every retrofit kit	every retrofit kit
3	Additional components such as sampling device, hose, aerator, electrical pumps	Quality control, checklist (according to control plan)	According to control plan	every retrofit kit	every retrofit kit
4	Completeness of the components of the control unit such as control device, compressor, air distributor, hose connector, accessories	Factory production control, checklist (according to control plan)	According to control plan	every control unit	every control unit
5	Function test of the control box	Quality control of the production, checklist (according to control plan)	Faultless function	every control box	every control unit
6	Reaction to fire of pipes and sealings	2.2.1	According to control plan	1 or 2 depending on the class and the test methods – see control plan	Once per five years or Once per two years in case of class C or higher

### 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 products/materials 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). The cornerstones of the tasks to be undertaken by the notified body under AVCP system 1 are laid down in Table 3.3.1.

**Table 3.3.1 Control plan for the notified body; cornerstones**

No	Subject/type of control	Test or control method	Criteria, if any	Minimum number of samples	Minimum frequency of control
<b>Initial inspection of the manufacturing plant and of factory production control</b>					
1	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, or after modification of the production process
<b>Continuous surveillance, assessment and evaluation of factory production control</b>					
2	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 products as indicated in Table 3.2.1	As defined in the control plan	As defined in the control plan	Once per two years

## 4 REFERENCE DOCUMENTS

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 16323:2014	Glossary of wastewater engineering terms
EN 13238:2010	Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates
EN 13501-1:2018	Fire classification of construction products and building elements – Part 1: Classification using data from reaction to fire tests
EN 13823:2020+A1:2022	Reaction to fire tests for building products – Building products excluding floorings exposed to the thermal attack by a single burning item
EN ISO 11925-2:2020	Reaction to fire tests - Ignitability of products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925 2:2020)
EAD 280009-00-0802	Plastics piping kits for the transport system of hot and cold water, made of PE-RT
EAD 350141-00-1106	Fire stopping and fire sealing products – linear joints and gap seals