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European Assessment Document for

Rotationally moulded bunded storage tank made of polyethylene

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 No (EU) 305/2011 as a basis for the preparation and issuing of European Technical Assessments (ETA).

Contents

1 SCOPE OF THE EAD

1.1 Description of the construction product

This EAD covers rotationally moulded bunded storage tanks made of polyethylene (linear low density, PE-LLD) (in the following referred to as rotationally moulded tanks) with a secondary containment (see figure 1.1.1). The rotationally moulded tank can be reinforced, e.g., with steel straps. The assessment methods as covered by this EAD are applicable to rotationally moulded tanks within the following boundaries:

a) Storage capacities up to 2500 litres
b) Installation indoor and outdoor in non-seismic and non-flooding areas
c) Operating temperature limited to ≤ 40 °C.
d) Non-pressurized storage
e) Above ground storage

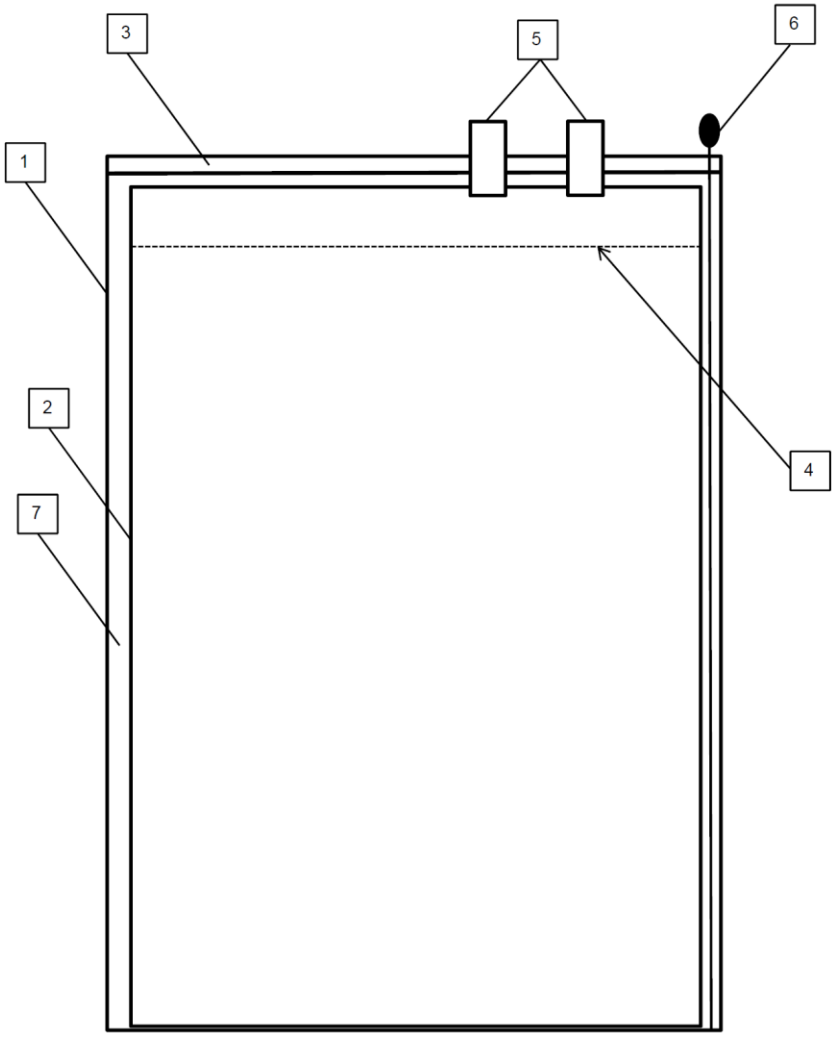

Figure 1.1.1: Rotationally moulded inner tank with a rotationally moulded secondary containment – general scheme (For the wall thicknesses see 2.2.12)

1 Secondary containment
2 Storage tank (inner tank)
3 Lid
4 Filling height
5 Other tank equipment: overfill protection device, vents, openings, filling pipe, mountings, etc.
6 Leak detection device
7 Interspace between storage tank and secondary containment (interstitial spaces)

The product is not fully covered by the following harmonised technical specification: EN 13341[1]. Deviating from EN 13341 the rotationally moulded tanks have additional surrounding external tanks (secondary containments) and are intended to be used for other/more liquids. The inner tank and the secondary containment are made of the same material.

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)

This EAD covers the following intended uses:

The storage of

- aqueous urea solution (AUS 32) according to ISO 22241-1,
- heating oil,
- diesel fuels according to EN 590 with the admixtures of biogenous fuels,
- used and non-used lubricants,
- antifreeze mixture and emulsion for cooling drilling machines

at atmospheric pressure.

The rotationally moulded tanks are intended to be used with a maximum filling level of 95 % of the volume up to the top of the inner tank. The rotationally moulded tanks are intended to be installed both indoor and outdoor in non-seismic and non-flooding areas and used under an operating temperature of not more than 40 °C. An installation in rooms used for the stay of people or animals is not intended.

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 rotationally moulded tanks for the intended use of 25 years when installed in the works (provided that the rotationally moulded tanks are subject to appropriate installation (see 1.1)). 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[2].

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.

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

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.

1.3 Specific terms used in this EAD

1.3.1 Storage tank

Prefabricated containments for liquids (inner tank).

1.3.2 Secondary Containment

Container which is designed to enclose an inner tank and prevent leakage entering the environment.

1.3.3 Rotationally moulded tank

Factory assembled combination of static thermoplastic inner tank with its specific secondary containment.

1.3.4 Raw material

Thermoplastic material before processing.

1.3.5 Reinforcement

Constitutive element of a tank which contributes to its mechanical stability.

1.3.6 Overfill prevention device

A device which automatically stops the filling at a pre-defined liquid level in the storage tanks.

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 rotationally moulded tank 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
Basic Works Requirement 1: Mechanical resistance and stability			
1	Density (raw material)	2.2.2	Level
2	Melt flow rate (material)	2.2.3	Level
3	Tensile strength (material)	2.2.4	Level
4	Elongation (material)	2.2.5	Level
5	Chemical resistance against the storage liquid (material) - Change in mass - Change in tensile strength - Change in elongation	 2.2.6.1 2.2.6.2 2.2.6.3	 Level Level Level
6	Resistance to weathering	2.2.7	Level
7	Impact resistance (inner tank)	2.2.8	Description
8	Deformation	2.2.9	Description, Level
9	Pressure resistance (inner tank)	2.2.10	Description
10	Wall thickness (inner tank and secondary containment)	2.2.12	Level
11	Mass (inner tank and secondary containment)	2.2.13	Level
12	Capacity	2.2.14	Level
13	Visual appearance (inner tank and secondary containment)	2.2.15	Description
Basic Works Requirement 2: Safety in case of fire			
14	Reaction to fire	2.2.16	Class
15	Resistance against heat effects	2.2.17	Description
Basic Works Requirement 3: Hygiene, health and the environment			
16	Leak tightness (inner tank)	2.2.11	Description
17	Content, emission and/or release of dangerous substances	2.2.18	Level, 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 Tank connections for filling, extraction, ventilation and overfill prevention sensor

The assessment methods given in this EAD are based on the assumption that the tank is equipped on its top with connections for the filling, extraction, ventilation and level measurement devices. The configuration of such devices shall be indicated in the ETA by technical descriptions and drawings.

2.2.2 Density (raw material)

The density of the raw material shall be measured in accordance with EN ISO 1183-1, method B, and stated in the ETA.

The method in accordance with EN ISO 17855-2 shall be used to anneal the specimen.

According to EN 13341, table 1, the density (arithmetic mean value from all tested samples) shall not be less than 934 kg/m^3.

2.2.3 Melt flow rate (material)

The melt flow rate of the raw material and of a section taken from any location on the rotationally moulded tank shall be measured in accordance with EN ISO 1133-1 (test method A) and stated in the ETA.

According to EN 13341, table 1, the melt flow rate (arithmetic mean value from all tested samples) shall be less than 4,0 ± 3,0 g/10 min at 190 °C, 21,6 kg. Maximum increase of the melt flow rate of the rotationally moulded tank shall not be greater than 20 % (see EN 13341, table 1) of the value determined on the raw material.

2.2.4 Tensile strength (material)

Use a moulding press and a mould in accordance with EN ISO 293. The mould thickness shall be appropriate to obtain a final thickness of the compression-moulded specimen of (3 ± 0,2) mm.
Cut a square plate from the rotationally moulded tank wall of a mass calculated to fill 105 % of the volume of the cavity of the mould. The compression-moulded specimens shall be prepared using the conditions specified in Table 2 of EN ISO 17855-2, except for the moulded temperature to be applied which shall be 200 °C, to obtain a final thickness of (3 ± 0,2) mm.

The tensile strength test shall be carried out in accordance with EN ISO 527-2 at a testing speed of 100 mm/min, using Type 1BA test pieces, prepared by machining plates prepared as described above.
The tensile strength in megapascal [MPa] (arithmetic mean value from all tested samples) shall be given in the ETA. According to EN 13341, table 1, the tensile strength at yield shall not be less than 15 MPa.

2.2.5 Elongation (material)

The elongation at yield in percent [%] test shall be carried out in accordance with EN ISO 527-2 at a testing speed of 100 mm/min, using Type 1BA test pieces, prepared by machining plates and as described in 2.2.4. For the determination of elongation at break after artificial weathering the type 1BA test pieces shall be prepared by machining plates and as described in 2.2.4 after the exposure of those plates to artificial weathering.

The elongation at yield in percent [%] (arithmetic mean value from all tested samples) shall be given in the ETA. According to EN 13341, table 1, the elongation at yield shall not be more than 25 % and the elongation at break shall not be less than 200%.

2.2.6 Chemical resistance against the storage liquid (material)

2.2.6.1 Change in mass

The increase in mass in percent [%] shall be determined by immersing minimum 3 pressed specimens of 50 mm x 50 mm x 1 mm in the liquid intended to be stored in the rotationally moulded tank (see 1.2.1) until it reaches equilibrium at 40 °C, (equilibrium point is reached when the change in mass after a one-week interval is less than 0,5 %). The change in mass in percent [%] shall be determined (arithmetic mean value from all tested samples) in accordance with EN ISO 175 and shall be given in the ETA, together with the information about the test liquid used. The pressed specimens shall be prepared using the conditions specified in Table 2 of EN ISO 17855-2.
According to EN 13341, table 1, the mass alteration shall be less than 10 %.

2.2.6.2 Change in tensile strength

The change in tensile strength at yield in percent [%] shall be measured by repeating the test according to 2.2.4 on minimum 3 specimens taken from the inner tank wall immersed in the liquid intended to be stored in the rotationally moulded tank (see 1.2.1) at 40 °C until it reaches equilibrium, (equilibrium point is reached when the change in mass after a one-week interval is less than 0,5 %). The change in tensile strength in percent [%] together with the information about the test liquid used shall be given in the ETA.
The change in tensile strength at yield (arithmetic mean value from all tested samples) shall not exceed 20 % (see EN 13341, table 1) of that measured in 2.2.4.

2.2.6.3 Change in elongation

The change in elongation at yield in percent [%] shall be measured by repeating the test according to 2.2.5 on minimum 3 specimens taken from the inner tank wall immersed in the liquid intended to be stored in the rotationally moulded tank (see 1.2.1) at 40 °C until it reaches equilibrium, (equilibrium point is reached when the change in mass after a one-week interval is less than 0,5 %).
Change in elongation at yield in percent [%] (arithmetic mean value from all tested samples) shall be given in the ETA together with the information about the test liquid used. It shall not exceed 150 % (see EN 13341, table 1) of that measured in 2.2.5.

2.2.7 Resistance to weathering (material)

A 3 ± 0,2 mm plaque shall be prepared in accordance with the conditions specified in Table 2 of EN ISO 17855-2, using moulding press as specified in EN ISO 293, from a square specimen cut from the secondary containment wall. Five tensile samples shall be cut from this plaque and tensile tested at a testing speed of 100 mm/min, using Type 1BA of EN ISO 527-2, and the elongation to break shall be measured on these un-aged samples. A section of at least 140 x 100mm shall be cut from the 3 mm thick plaque and placed into the weatherometer and shall be exposed to UV radiation in accordance with EN ISO 4892-1 and EN ISO 4892-2 employing the following conditions:

- xenon arc lamp;
- black standard temperature: 65 °C;
- relative humidity: 65 %;

- spray cycle: (duration of spray:18 min and dry interval between spraying: 102 min);
- for external installations exposure to global radiant shall be 34 GJ/m_2 (corresponding to a radiant exposure of 2,3 GJ/m2 for the band from 300 nm to 400 nm);
- for internal installations exposure to global radiant shall be 3,4 GJ/m_2 (corresponding to a radiant exposure of 0,23 GJ/m2 for the band from 300 nm to 400 nm).

After aging in the weatherometer under the above-mentioned radiant exposure [GJ/m^2] tensile samples, Type 1BA of EN ISO 527-2, are cut from the section and tested at 100 mm/min. The elongation at break (arithmetic mean value from all tested samples) is obtained and compared with unweathered samples. The elongation at break in percent [%] (arithmetic mean value from all tested samples) of the weathered sample shall be given in the ETA. It shall be ≥ 50% (see EN 13341, table 1) of the unweathered sample.

2.2.8 Impact resistance (inner tank)

The assessment shall be done according to EN 13341, clause B.5.

The inner tank shall remain leak tight. In the ETA it shall be stated whether the test has been passed successfully.

2.2.9 Deformation

The rotationally moulded tank shall be conditioned for 48 h at (23± 2)°C and 50 ± 5% relative humidity.
The deformation test shall be carried out on a rotationally moulded tank assembled with the lightest secondary containment from the samples.

The rotationally moulded tank shall be set up under normal assembled conditions and shall be placed on a flat surface with reference to a measurement grid so as to be able to determine its length and width. Water used for the test shall be at a temperature of (15 ± 5) °C. The filling rate shall be 150 ± 40 liters per min. The rotationally moulded tank shall be stabilized by filling it with 30 cm of water. The initial length (l_i), and height (h_i) shall be determined and the width (w_i) of the inner tank shall be measured in at least three cross-sections where the deformation, due to the hydrostatic pressure, is most critical.
The inner tank shall be filled 95 % of brimful capacity. The inner tank shall be pierced in such manner that the liquid levels into the tank and the secondary containment could counterbalance each other.
NOTE: If any doubt, it is preferable to pierce the tank in the area of the bottom (angle of the bottom).

The length and width of the secondary containment shall be measured at the same locations after 5, 18 and 27 days. From day 28 the volume variation shall be measured. The secondary containment is stabilized when the volume variation measured for 2 successive days is not greater than 0,015 % per day.

After stabilization or after a maximum of 42 days, the length (l_d) and width (w_d) shall be measured.

The elongation at the surface in percent [%] (the highest measured value) shall be given in the ETA; reference shall be made to the fact that EN 13341, table 5, requests for the tanks covered by this standard that the elongation at the surface shall not exceed 1,5 % after 1000 h. Furthermore, it shall be stated in the ETA whether the tank remained leak tight.

2.2.10 Pressure Resistance (inner tank)

The pressure resistance test shall be carried out on the second lightest inner tank from the samples. The tank shall be filled with water at (15 ± 5) °C. The opening shall be closed with reinforced or metal caps. The tanks shall be tested with their reinforcements. The tank shall be tested with five times the pressure resulting from the hydrostatic pressure based on the height of the tank. The test pressure shall be measured at the base of the tank. After the tank is filled the pressure shall be increased using a filling rate of 10 l/min up to the test pressure and shall

be held at this pressure for 5 min. During the pressure increase the condition of the reinforcements shall be observed up to twice the hydrostatic pressure.

According to EN 13341, table 5, the tank shall remain leak tight. It shall be stated in the ETA whether the test has been passed successfully.

2.2.11 Leak tightness (inner tank)

The inner tank (minimum one per each tank size) shall be subjected to a pneumatic pressure of 30 kPa for at least 15 s or 10 kPa for at least 60 s. The results of both test set-ups are equivalent.

According to EN 13341, table 5, the tank shall remain leak tight. It shall be stated in the ETA whether the test has been passed successfully.

2.2.12 Wall thickness (inner tank and secondary containment)

The wall thickness shall be determined rounded to the nearest 0,1 mm using ultrasonic wall thickness measurement equipment calibrated in accordance with the instructions of the manufacturer of the ultrasonic measuring device. A reference test piece of similar thickness, manufactured by the same process and from the same raw material as the tank shall be used for measurement.

According to EN 13341, table 5, the minimum wall thickness of the inner tank and secondary containment shall be as follows:

For maximum filling capacity	**Minimum wall thickness**
≥ 400 l < 1000 l	3,3 mm
≥ 1000 l < 1500 l	3,5 mm
≥ 1500 l < 2000 l	3,9 mm
≥ 2000 l < 2500 l	4,1 mm
= 2500 l	4,3 mm

2.2.13 Mass (inner tank and secondary containment)

The mass in kilogram [kg] of the rotationally moulded tank (three per each tank size) shall be measured with all moulded-in inserts, without reinforcements and accessories to an accuracy of ± 0,5 %. The mass of the lightest of the three tanks shall be given in the ETA.

2.2.14 Capacity

The rotationally moulded inner tank shall be conditioned at (20 ± 5) °C for 48 h and then be filled to the point of overflow at a rate of 150 l/min ± 40 l/min with water at (15 ± 5) °C.

After 10 min the tank shall be filled again to overflow and the brimful capacity shall be measured with an accuracy of ± 1 %.

According to EN 13341, table 5, the maximum filling capacity in liter [l] shall be presented in the ETA.

2.2.15 Visual appearance (inner tank and secondary containment)

Visual inspection shall be conducted on the internal and external surfaces of each secondary container and the external surfaces of each inner tank with a light source with a minimum light intensity of 350 Lux. Where the secondary containment has been supplied fitted with inner tank and or support frames, these shall be removed for inspection.

According to EN 13341, table 5, the water leak tightness area of the internal and external surface of the secondary containment and the external surfaces of the inner tank shall be free from all visible defects such as cracks or pinholes (for example blisters or malformed sections which could lead to holing or fracture of the tank). The ETA shall indicate whether any such visible defects have been detected or not.

2.2.16 Reaction to fire

The rotationally moulded tank shall be tested, using the test method(s) relevant for the corresponding reaction to fire class according to EN 13501-1. The rotationally moulded tank shall be classified according to Commission Delegated Regulation (EU) 2016/364 in connection with EN 13501-1.

The following conditions and parameters shall be taken into account when preparing test specimens of the tank material and conducting the tests:

a) The necessary tests according to EN ISO 11925-2 shall be performed with edge exposure as well as with surface exposure on specimens as follows:
   1 flat boards made from the material of inner tank and secondary containment or cut sections from inner tank or secondary containment, mounted in a free-hanging test position without any substrate behind,
   2 flat boards made from the material of inner tank and secondary containment or cut sections from inner tank or secondary containment, mounted on a standard calcium-silicate board according to EN 13238, if tests fail with a specimen configuration according to "1)"
b) The necessary tests according to EN 13823 (SBI) shall be performed on specimens as follows:
   - flat boards made from the material of inner tank and secondary containment or cut sections from inner tank or secondary containment, which are placed side by side with closed butt joints
     - one time on a sub-construction made of vertically positioned linear metal profiles (Z- or I-profiles are recommended) and mounted in a free-standing test position (80 mm distance to the backing board of the SBI test rig) and,
     - one time directly mounted on a standard calcium-silicate board according to EN 13238.

     Each of the flat boards or the cut section shall be mechanically fixed to the profiles of the sub-construction as well as to the standard calcium silicate substrate with four small metal nails or screws (one fixing mean in each corner of the boards).
   - at least one orientation test with both of the above-mentioned specimen configurations and then at least two further tests with the more critical configuration to obtain the necessary number of test results needed for classification purposes.

Relevant product parameters to be considered in the tests are:

- Variations of a product family (as defined by a combination of certain raw materials and certain type of production process),[3]
- highest and lowest thickness, if relevant,

highest and lowest density, if relevant. The results of tests considering the aforementioned parameters in fully are valid for:

- all variations of the defined product family,
- the tested thickness or the whole range between those thickness values tested,
- the tested density or the whole range between those density values tested.

3 If the manufacturer provides sufficient information (e.g., on the basis of the composition of the products in question) this can allow the TAB to determine which material or material variants should be submitted to testing in order to reduce the number of tests.

The reaction to fire class obtained for the tank material shall be stated in the ETA together with those conditions (see parameters above) for which the classification is valid.

2.2.17 Resistance against heat effects

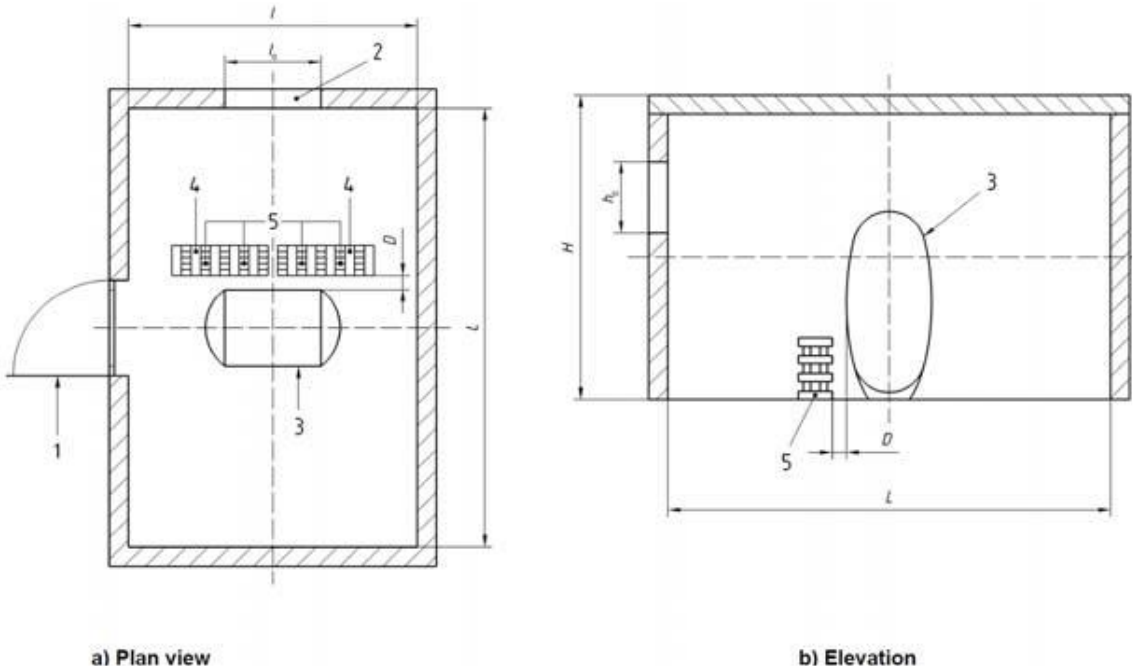
Principle
A rotationally moulded tank is installed in a ventilated room and submitted to heat effects due to burning of stacks of spruce set close by. The rotationally moulded tank is filled partially with water. The behaviour of the rotationally moulded tank is observed during a time period.

Test room

Testing shall be carried out in a test room (see Figure 2.2.17.1) with internal dimensions as follows:

- Length (L): (3,50 ± 0,25) m
- Width (l): (2,5 ± 0,25) m
- Height (W): (2,5 ± 0,25) m

The maximum volume of the test room shall be (22 ± 2) m^3.
The air feeding of the room shall be obtained by means of a window opening made in one of the walls constituting the room width, which dimensions are (0,80 ± 0,05) m x (0,50 ± 0,05) m.



a) Plan view b) Elevation

Key			
L	length of the testing room	1	entrance door
I	width of the testing room	2	opening
H	height of the testing room	3	rotationally moulded tank
D	distance between the stacks and the combined tank	4	stacks of spruce
h_o	height of opening	5	ignition area
l_o	width of opening		

Figure 2.2.17.1 - Installation for determination of performance against heat effects

Burning material
Burning material shall be composed by two stacks conditioned spruce (cross-section 4 cm x 4 cm). Each stack of spruce shall be prepared in such manner that the ratio wood/air is 1/1 and the dimensions of each stack are 1 m long, 48 cm high and 25 cm broad.

Test specimen
For a series of rotationally moulded tanks the test specimen shall be one rotationally moulded tank produced by the same mould design. The test shall be performed on the largest rotationally moulded tank.

Procedure
The rotationally moulded tank shall be installed in the middle of the room parallel to the window opening (see Figure 2.2.17.1) and shall be filled with water up to 50 % of its maximum filling capacity.

Between the rotationally moulded tank and the window opening at a distance of 10 cm from the secondary containment wall the two stacks of conditioned spruce shall be arranged in the longitudinal axis. The ignition shall be made by four soft fibre strips soaked with 10 ml kerosene set at two opposite sides of each wood stack. During testing, the temperatures in the testing room shall be measured and recorded.
The combustion is stopped 30 min after the ignition.

In the ETA a description of the damage after 30 minutes shall be given.

2.2.18 Content, emission and/or release of dangerous substances

The performance of the product regarding the emissions and/or release and, where appropriate, the content of dangerous substances shall be assessed on the basis of the information provided by the manufacturer[4] after identifying the release scenarios taking into account the intended use(s) of the product and the Member States where the manufacturer intends his product to be made available on the market.

The identified intended release scenario for this product and intended use with respect to dangerous substances are:

S/W2: Product with indirect contact to soil, ground- and surface water

For the intended use covered by the release scenario S/W2 the performance of the product concerning leachable substances shall be assessed. A leaching test with subsequent eluate analysis shall take place, each in triplicate. Leaching tests of the sheet-like product shall be conducted in accordance with CEN/TS 16637-2:2014. The leachant shall be pH-neutral demineralised water and the ratio of liquid volume to surface area shall be 25 ± 5 l/m².

The edges of the test pieces shall not be sealed. The cut edges of the sheet-like product exposed to the eluent shall be included in the calculation as a leachable area.
The eluates taken after 6 hours / 1 day / 2 days and 6 hours / 4 days / 9 days / 16 days / 36 days / 64 days shall be analysed for all environmentally relevant parameters, presumably at least the following:

4 The manufacturer may be asked to provide to the TAB the REACH related information which he shall accompany the DoP with (cf. Article 6(5) of Regulation (EU) No 305/2011).
The manufacturer is not obliged to:
- provide the chemical constitution and composition of the product (or of constituents of the product) to the TAB, or
- provide a written declaration to the TAB stating whether the product (or constituents of the product) contain(s) substances which are classified as dangerous according to Directive 67/548/EEC and Regulation (EC) No 1272/2008 and listed in the "Indicative list on dangerous substances" of the SGDS, taking into account the installation conditions of the construction product and the release scenarios resulting from there.

Any information provided by the manufacturer regarding the chemical composition of the products is not to be distributed to EOTA, to other TABs or beyond.

- TOC in accordance with EN 1484,
- pH-value in accordance with EN ISO 10523,
- electrical conductivity in accordance with EN 27888.

In eluates of "6 hours" and "36 days", the following biological tests shall be conducted:

- Acute toxicity test with Daphnia magna Straus in accordance with EN ISO 6341,
- Toxicity test with algae in accordance with EN ISO 8692,
- Luminescent bacteria test in accordance with EN ISO 11348-1, EN ISO 11348-2 or EN ISO 11348-3,
- For each biological test, the ecotoxic effects in accordance with the respective test method for dilution ratios 1:2, 1:4, 1:6, 1:8 and 1:16 shall be determined.

If the parameter TOC is higher than 10 mg/l, the following biological tests shall be conducted with the eluates of "6 hours" and "36 days" eluates:

- Biological degradation in accordance with OECD Test Guideline 301, parts A, B or E.

Determined toxicity in biological tests shall be expressed in the ETA as the dilution ratios, where no toxicity (in accordance with the respective test methods) is observed. Maximum determined biological degradability shall be expressed as "…% within …hours/days". In addition, the respective test methods for analysis shall be specified in the ETA.

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 Decision 1999/472/EC, as amended by Commission Decision 2001/596/EC.

The system is 1.

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.

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
Factory production control (FPC) [including testing of samples taken at the factory in accordance with a prescribed test plan]					
1	Initial material	According to EN 10204	Inspection certificate 3.1	Control plan	On each new delivery
2	Density (raw material)	According to EN 10204	Inspection certificate 3.1, not less than 934 kg/m^3	Control plan	On each new delivery
3	Melt flow rate (raw material)	According to EN 10204	Inspection certificate 3.1, less than 4,0 ± 3,0 g/10 min at 190 °, 21,6 kg	Control plan	On each new delivery
4	Melt flow rate	2.2.3	not greater than 20 % of the value determined on the raw material	3	Once every working week on a program that covers all machines; every new batch
5	Mass	2.2.13	Control plan	Control plan	Every inner tank and secondary containment
6	Wall thickness	2.2.12	Control plan	Control plan	Every inner tank and secondary containment at its critical points as identified by the manufacturer
7	Visual appearance	2.2.15	free from all visible defects such as, cracks, pinholes, blisters or malformed sections	Control plan	Every inner tank and secondary containment
8	Leak tightness	2.2.11	leak tight	Control plan	Every inner tank and secondary containment
9	Reaction to fire	indirect tests; see lines 2, 4 and 6 of this table	see lines 2, 4 and 6 of this table	see lines 2, 4 and 6 of this table	see lines 2, 4 and 6 of this table
		direct test: see 2.2.16	according to control plan	according to the test method	Once per 5 years

3.3 Tasks of the notified body

The cornerstones of the actions to be undertaken by the notified body of the product in the procedure of assessment and verification of constancy of performance 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
Initial inspection of the manufacturing plant and of factory production control					
1	Notified Body will ascertain that the factory production control with the staff and equipment are suitable to ensure a continuous and orderly manufacturing of the product.	Verification of the complete FPC as described in the control plan agreed between the TAB and the manufacturer	According to Control plan	According to Control plan	When staring the production or a new line
Continuous surveillance, assessment and evaluation of factory production control					
2	The Notified Body will ascertain that the system of factory production control and the specified manufacturing process are maintained taking account of the control plan.	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 3.2.1	According to Control plan	According to Control plan	1/year

4 REFERENCE DOCUMENTS

[1] EN 13341:2005+A1:2011	Static thermoplastic tanks for above ground storage of domestic heating oils, kerosene and diesel fuels - Blow moulded and rotationally moulded polyethylene tanks and rotationally moulded tanks made of anionically polymerized polyamide 6 - Requirements and test methods
[2] ISO 22241-1:2019	Diesel engines — NOx reduction agent AUS 32 — Part 1: Quality requirements
[3] EN 590:2022	Automotive fuels - Diesel - Requirements and test methods
[4] EN ISO 17855-1:2014	Plastics - Polyethylene (PE) moulding and extrusion materials - Part 1: Designation system and basis for specifications (ISO 17855-1:2014)
[5] EN ISO 17855-2: 2016	Plastics - Polyethylene (PE) moulding and extrusion materials - Part 2: Preparation of test specimens and determination of properties (ISO 17855-2:2016)
[6] EN ISO 1183-1:2019	Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1:2019, corrected version 2019-05)
[7] EN ISO 1133-1:2022	Plastics - Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics - Part 1: Standard method (ISO 1133-1:2022)
[8] EN ISO 293:2023	Plastics - Compression moulding of test specimens of thermoplastic materials (ISO 293:2023)
[9] EN ISO 527-2:2012	Plastics - Determination of tensile properties - Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2:2012)
[10] EN ISO 175:2010	Plastics - Methods of test for the determination of the effects of immersion in liquid chemicals (ISO 175:2010)
[11] EN ISO 4892-1:2016	Plastics - Methods of exposure to laboratory light sources - Part 1: General guidance (ISO 4892-1:2016)
[12] EN ISO 4892-2:2013+A1:2021	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013+Amd 1:2021)
[13] EN 13501-1:2018	Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests
[14] EN 13238:2010	Reaction to fire tests for building products - Conditioning procedures and general rules for selection of substrates
[15] 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
[16] 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)
[17] CEN/TS 16637-2:2014	Construction products - Assessment of release of dangerous substances - Part 2: Horizontal dynamic surface leaching test
[18] EN 1484:1997	Water analysis - Guidelines for the determination of total organic carbon (TOC) and dissolved organic carbon (DOC)

[19] EN ISO 10523:2012	Water quality - Determination of pH (ISO 10523:2008)
[20] EN 27888:1993	Water quality; determination of electrical conductivity (ISO 7888:1985)
[21] EN ISO 6341:2012	Water quality - Determination of the inhibition of the mobility of Daphnia magna Straus (Cladocera, Crustacea) - Acute toxicity test (ISO 6341:2012)
[22] EN ISO 8692:2012	Water quality - Fresh water algal growth inhibition test with unicellular green algae (ISO 8692:2012)
[23] EN ISO 11348-1:2008 + AMD 1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 1: Method using freshly prepared bacteria (ISO 11348-1:2007+Amd 1:2018)
[24] EN ISO 11348-2:2008 + AMD 1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 2: Method using liquid-dried bacteria ((ISO 11348-2:2007+Amd 1:2018)
[25] EN ISO 11348-3:2008 + AMD 1:2018	Water quality - Determination of the inhibitory effect of water samples on the light emission of Vibrio fischeri (Luminescent bacteria test) - Part 3: Method using freeze-dried bacteria (ISO 11348-3:2007+Amd 1:2018)
[26] EN 10204:2004	Metallic products - Types of inspection documents
[27] OECD (1992), Test No. 301	Ready Biodegradability, OECD Guidelines for the Test of Chemicals, Section 3, OECD Publishing, Paris