



# **INSTALLATION MANUAL OF UNDERGROUND TANKS**

INSTALLATION • USE • MAINTENANCE • WARRANTY

## Contents

### Dear customer,

Thank you for choosing a high-quality tank from Eccua.

Eccua's underground tanks are made of durable glass reinforced plastic (GRP) which is delivered as a whole and fully ready for use.

GRP tanks are made of fiberglass using the winding method. The tank set includes:

- a tank,
- anchor straps for the tank and
- a service well.

Eccua tanks comply with standard EVS-EN 976-1:2000 of the European Union.

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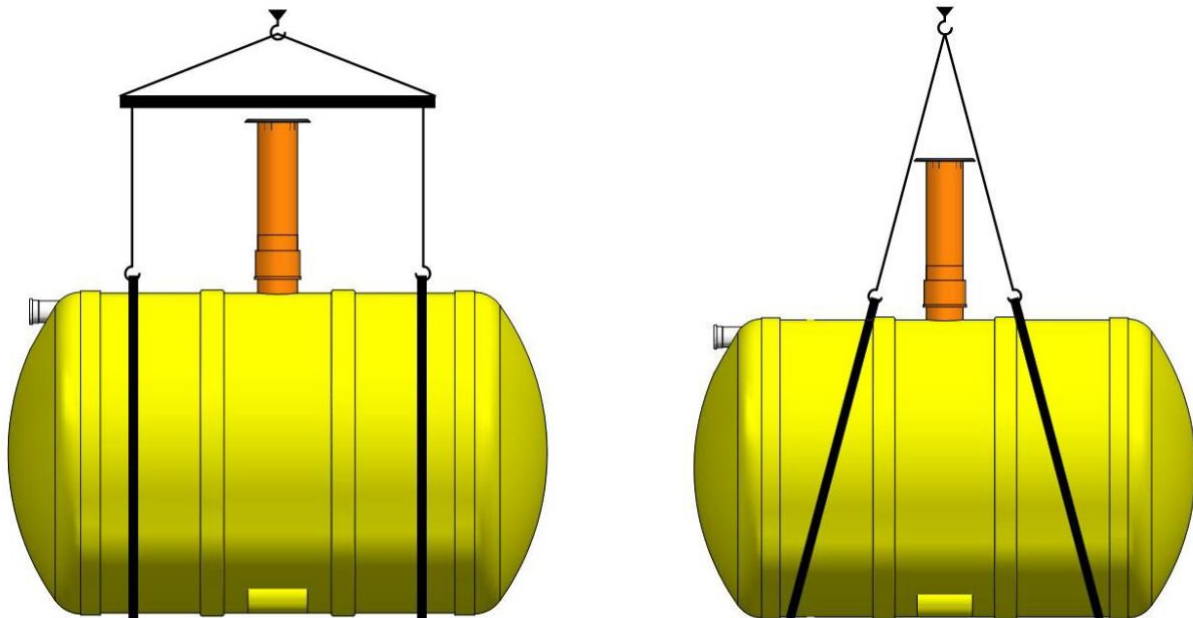
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## TRANSPORT

GRP tanks are made of fiberglass using the winding method. Tanks must be transported carefully and they must be secured in order to avoid damage to the product. The tanks must not come into contact with sharp objects as it can cause product defects. It is important to avoid mechanical damage as it can damage the casing of the tank.

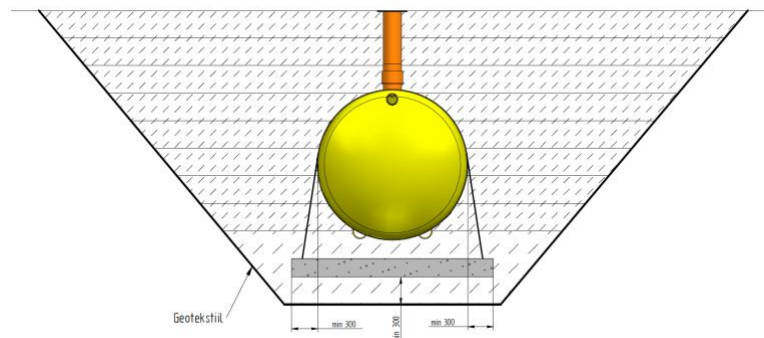
Durable lifting straps must be used to lift the tank as shown in the figure below. There must be at least two lifting points. Steel wire ropes or chains must not be used around the tank. It must be lifted and installed into the bed of the hole in the correct position and at the required level.



**Anchor straps must be made of nylon or other non-metallic material which can withstand the upward thrust of the surrounding environment that is caused by groundwater. Excessive strain to the straps must be avoided to prevent damage to the product.**

## INSTALLATION

To install the tank, an excavation with dimensions that allow for appropriate back-filling of the excavation and compacting of the soil must be excavated. Before the back-filling is added, the excavation must be lined with geotextile. The profile of a suitable geotextile shall be at least Class 2.



The best filling material is gravel or crushed stone. The material must be clean, sorted and fall freely and must not contain ice, snow, clay, organic material or excessively large and heavy objects, including stones, which can damage the tank. Minimal bulk density is 1500 kg/m<sup>3</sup>.

Only 3% of **gravel** can pass through a filter with holes of 2-4 mm. The material must be rounded gravel similar to peas with a fraction of 4-20.

**Crushed stone** fragments must have a fraction of 4-20 and only up to 3% of it may pass through a filter with holes of 2.4 mm.

**Sand** or excavated **natural soil** are not recommended as back-fill materials. Using sand and natural soil does not guarantee that the back-fill material is not washed away over time. In the case of filling material being washed away from around the tank, the even support of the soil lessens and the tank can start to deform at that place. If sand must be used, the excavation must be lined with geotextile fabric which sand cannot pass through prior to placing the sub-base. Geotextile is used to prevent blending of backfill (sand) with soft soil.

### **Excavation dimensions**

In the case of stable ground, the dimensions of the excavation must be at least 450 mm larger than dimensions of the tank on all sides. In the case of unstable ground, the excavation must be larger than the tank by at least ½ of the diameter of the tank on all sides.

### **Several tanks in one excavation**

When installing several tanks into one excavation, a space of at least 450 mm must be left between the tanks.

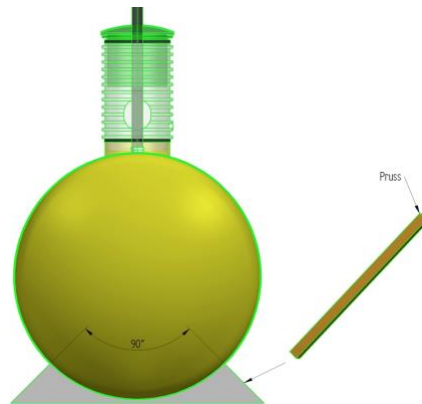
### **Excavation of sublayer**

A back-fill layer of at least 200 mm must be placed onto the bottom of the excavation or on top of the concrete slab and compacted with a soil compactor to at least 95% of the natural soil density (to achieve that, the soil should be compacted with a 200 kg compactor at least five times). The tank must then be placed on the sublayer and anchored, if necessary.

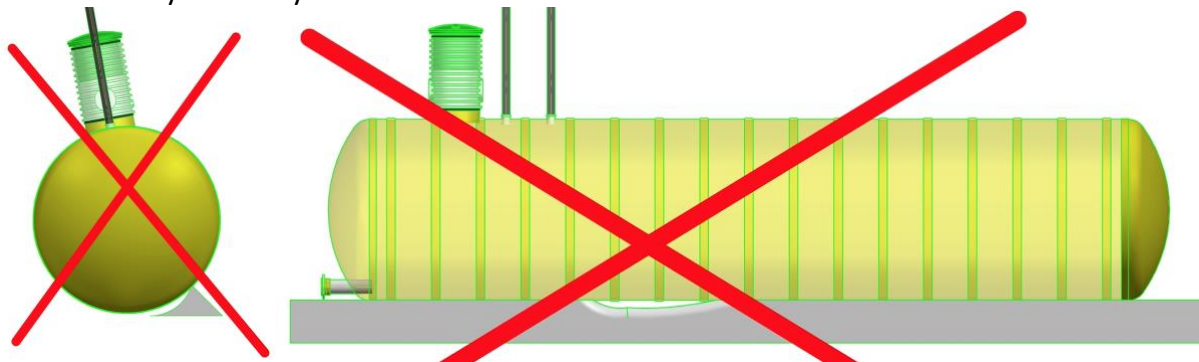
### **Filling for the bottom of the tank**

The tank, placed on a properly compacted and levelled layer, must be anchored if necessary (see

Anchoring). Filling the bottom quarter of the tank is the most critical to achieve good installation. Use only gravel with the appropriate characteristics described above for the filling. Use a beam for compacting which allows the gravel to be properly stamped to the bottom and side of the tank (see figure). Compaction should be carried out layer by layer until 90% density of the natural soil is reached.



Examples of incorrect installation (see figures). If the wrong filling material and/or inadequate technique is used, the soil under the tank may sink or be washed away by water, and the tank will be affected by unevenly distributed soil forces.



## ANCHORING

The purpose of anchoring is to ensure the fixed position of the tank underground and prevent it rising above ground due to upward thrust caused by groundwater.

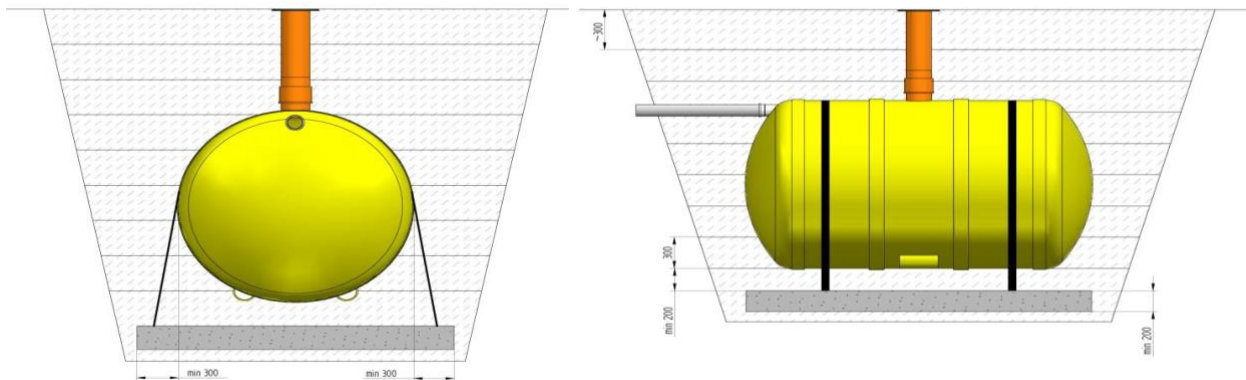
The tank must be anchored using concrete baseplates or blocks or brooches. Anchoring points must be at the places indicated on the tank by the producer and there must be at least two lifting points. Anchor straps must be made of nylon or other non-metallic material which can withstand the upward thrust of the surrounding environment that is caused by groundwater. Excessive strain to the straps must be avoided to prevent damage to the product.

### Concrete baseplate

If a concrete baseplate is required, it must comprise reinforced concrete which is at least 200 mm thick and installed evenly onto a 50 mm thick gravel base. The baseplate must extend at least 500 mm from the sides of the tank and be at least as long as the full length of the tank. Tanks with outlet pipes at the bottom part (e.g. firewater tanks) require longer concrete baseplates which extend at least 1.5 m from the end with pipework.

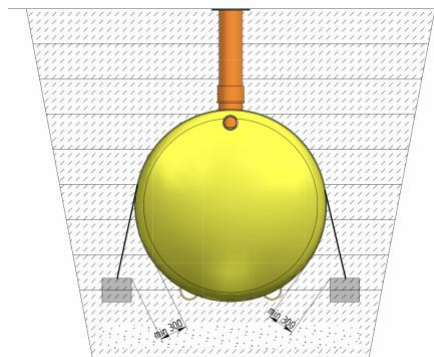
Anchoring points in the concrete plate must be constructed of steel rods with a diameter of at least 10 mm which must be hot-dip galvanised and covered with a protective coating or protected from corrosion in another suitable way.

As an alternative, the anchor straps can be placed under the base or through it opposite the anchoring points; in this case, the straps are positioned vertically.

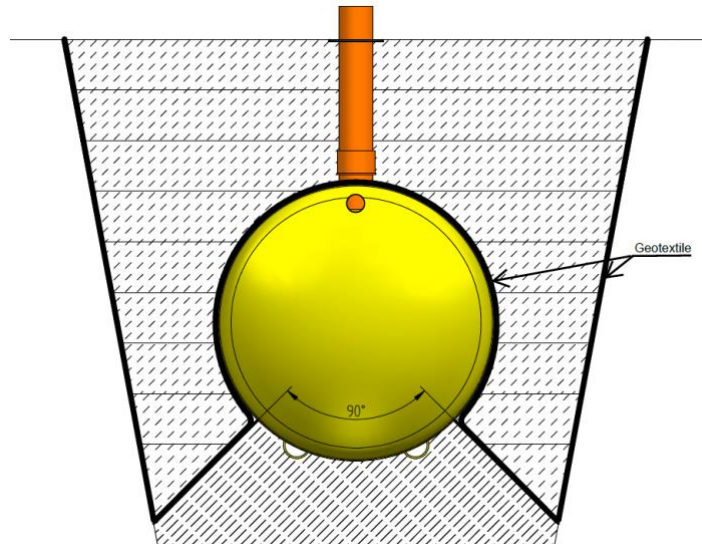


**If the excavation fills with water during installation, the excavation must be emptied of water using a pump.**

The **blocks** must be made of concrete. They must be big enough to prevent the tank from lifting up after the excavation is filled. Each block must have at least two anchoring points and the total number of these points on the blocks must be equal to the number of fixing points on the tank. The blocks must be placed in such a way that they extend further than the diameter of the tank.



**Geotextile fabric** for anchoring, it is also possible to use geotextile fabric, which is used to line the tank and trench after the first quarter of the compaction work has been performed, see Blueprint. The length of the fabric must be enough to line the entire trench. If the fabric needs to be continued lengthwise, it must not be used. In this case, you need to take the next roll of fabric and cut a piece of suitable length from it. After lining with fabric, continue installing the backfill according to the instructions.



The idea of anchoring with a geotextile fabric is that the fabric holds the backfill as a monolithic weight in relation to the tank and does not allow the groundwater pressure to rise the tank.

### **Filling the excavation**

A 400 mm layer of water must be poured into the tank when starting the back-fill process. An additional 300 mm layer of water must be added to the tank before each following layer. The tank must be surrounded with back-fill by adding back-fill layers of at least 300 mm until it reaches the inlet pipe and compacted with a soil compactor to at least 95% of the natural soil density (to achieve that, the soil should be compacted with a 200 kg compactor at least five times). Gaps in back-fill must be avoided. The back-fill must be installed very carefully up to the first third of the tank (distance between the legs, lower sides, bases for ends and pipe connections).

**Sand should be avoided as back-fill material.**

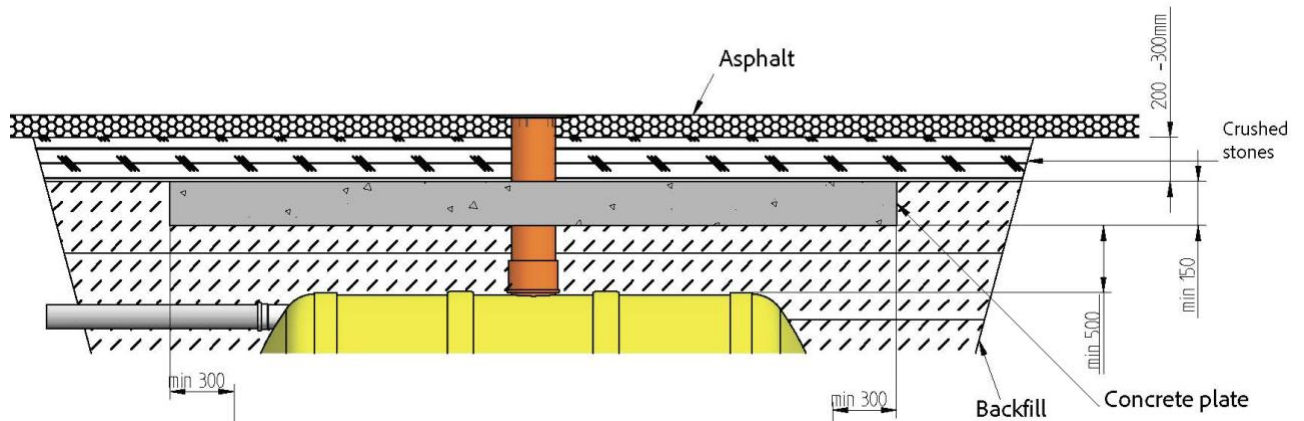
### **INSTALLING TANKS IN TRAFFIC AREAS**

The filling that covers tanks installed under traffic areas must be at least 500 mm thick. A min 150 mm thick reinforced concrete load-spreading plate must be placed above it. There must be a minimum 200 mm thick layer of crushed stone between the load-levelling plate and the asphalt. The plate must extend at least 300 mm beyond the edges of the tank in all directions.

Using the correct backfill material and installation instructions, the load-levelling plate can also perform the functions of a tank anchor plate, in which case the well would no longer require additional anchoring.

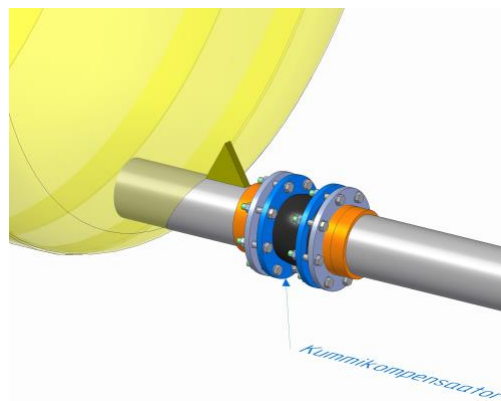


**A load-spreading plate must also be used on all tanks in non-traffic areas if the height of the service well is more than 2500 mm.**



## BOTTOM PART PIPE INSTALLATION

For tanks whose pipes are connected to the lower part of the tank, e.g. firewater tanks, additional conditions must be monitored. It often appears after installation that the tank and the pipe line connected to it which were at the same level when they were installed have become displaced over time because of pure baselayer. The break caused by the shift forms at the point where the tank and the pipe are connected. In order to avoid breaking the connection between the tank and the pipe, a rubber compensator (see picture below) must be placed between the pipe line and the pipe connected to the tank.

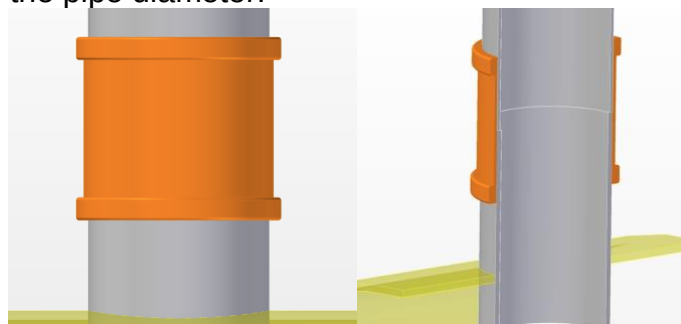


Another option is to extend the anchoring plate under the tank until it extends at least 1.5 m beyond the end of the tank from where the pipes exit.

## INSTALLING SERVICE WELL

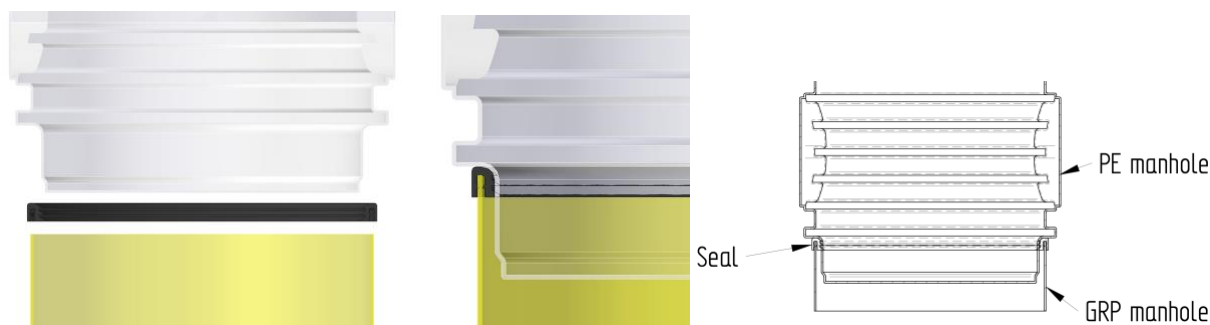
Service wells and air ventilation pipes will be installed on to the pipe outlets that are specially laminated onto the top of the tank by the producer.

Service wells with a diameter from DN100 to DN500 are installed using a pipe socket with a sealing suitable for the pipe diameter.



Service wells DN600 and DN800 will be installed on to the pipe outlets using a sealing profile included in the set. The pipe and the sealing profile must be cleaned before installing the profile onto the outlet pipe. The sealing must be pressed around the edges of the outlet pipe all the way and in its entirety. To make installation easier, the edge of the pipe can be

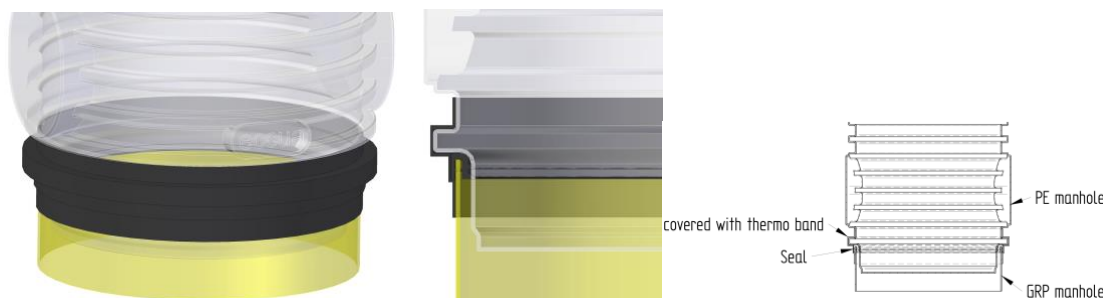
lubricated with liquid soap (lubricants made from petroleum products corrode the rubber profile and should not be used). Then the service well lubricated with liquid soap should be pressed steadily into the sealing profile.



**The sealing profiles used for service wells DN600 and DN800 do not guarantee 100% air-tightness in conditions where the level of groundwater surrounding the tank is higher than the top of the tank.**

In such cases, thermo shrinking tape with a width of 150 mm, for example, should be wrapped around the connection of the outlet pipe and the service well and shrunk using a heat gun. The tape should first be heated at the overlapping part and when the ends have become glued together. The rest of the tape should be heated until it is tight around the connection of the service well.

Thermo shrinking tape is not included in the tank set.



## WARRANTY

Tanks sold by Eccua have a warranty for both private and business customers. Eccua accepts responsibility for eliminating equipment malfunctions under the following conditions.

- The tank installation checklist has been filled out in the course of installation and it has been signed by the constructor who carried out the installation and the customer or their representative.
- The malfunction is caused by a fault in the design of the tank or the material or the improper processing of it.
- Eccua is notified of the malfunction during the warranty period.
- The product has been used in accordance with the installation, service and maintenance instructions in this manual and the product has been used only in the prescribed way.
- If excavating is required to identify a malfunction, it must be done in the presence of a representative of the producer.
- Only genuine Eccua spare parts and accessories are used.

Malfunctions which are caused by inadequate maintenance, incorrect installation, improper repairs or expected wear will not be covered by warranty.

## European Union standards

Eccua's horizontal tanks comply with standard EVS-EN 976-1:2000 of the European Union.

Eccua's above-ground tanks are produced in accordance with standards EVS-EN 13121-1:2003; EVS-EN 13121-2:2003 and EVS-EN 13121-3:2008 of the European Union.

## TANK INSTALLATION CHECKLIST

Eccua recommends filling in the checklist below during the installation of the tank to achieve better installation quality and compliance with warranty conditions.

Read the installation manual and complete this checklist during the installation process.

If the checklist has been filled out, hand one copy to the customer, one to the producer and one to the site supervisor.

|                           |       |
|---------------------------|-------|
| Site owner:               | Date: |
| Site address:             |       |
| Installation company:     |       |
| Installation supervision: |       |

Producer name: Eccua Pro OÜ    Product no.: \_\_\_\_\_    Date of production: \_\_\_\_\_

Material of the tank:    ☐ fiberglass GRP    ☐ PE plastic

### PRE-INSTALLATION INSPECTION

INSPECTOR:

- 1) Visual inspection:                      no signs of holes, cracks, scratches and inadequate lamination. \_\_\_\_\_
- 2) Testing leak-tightness (if suspected):                      No decrease in water level in ..... min. \_\_\_\_\_
- 3) Back-fill material:                      Crushed stone, fraction size from ..... to ..... mm  
Gravel, fraction size from ..... to ..... mm \_\_\_\_\_  
Other material: .....
- 4) Excavation size:                      Dimensions of the hole comply with the requirements in the installation manual \_\_\_\_\_
- 5) Excavation conditions:                      1. Dry excavation. The expected fluctuations of groundwater level do not reach the tank and there is no risk of flooding in the area. \_\_\_\_\_  
2. Wet excavation. Groundwater may reach the tank or there is danger of flooding in the area. \_\_\_\_\_
- 6) Traffic load:                      1. There is traffic load on the site of the tank (installation according to the requirements for traffic load). \_\_\_\_\_  
2. There is no traffic on the site of the tank (installation according to normal conditions). \_\_\_\_\_

### DURING INSTALLATION

INSPECTOR:

- 1) Sublayer:                      The back-fill of the excavation is even and minimally ..... mm above the natural bottom of the excavation or concrete plate. \_\_\_\_\_
- 2) Free space around tank walls:                      The tank is installed with the correct amount of free space between the excavation walls and adjacent tanks. \_\_\_\_\_
- 3) Anchoring:                      Anchoring is done according to the manual and using the materials given in it. \_\_\_\_\_
- 4) Back-fill:                      The back-fill material is installed in dense layers of ..... mm around the tank according to the installation manual requirements and taking into account \_\_\_\_\_ the requirements for back-fill materials.
- 5) Filling the tank during installation:                      During the installation, the tank was filled with water up to \_\_\_\_\_

the maximum installation depth in accordance to the manual

\_\_\_\_\_

## INSTALLATION TESTING

TESTER:

1) Installation depth of the tank: The final installation depth of the tank complies with the maximum installation depth of the product \_\_\_\_\_

2) Internal check: (if the tank has an entrance)  
 1) Checking back-fill quality (especially for the first third) using a wooden hammer, \_\_\_\_\_ tapping the wall of the tank and listening for gaps.  
 2) Absence of defects (cracks, holes, separated layers) and physical damage during a visual \_\_\_\_\_ check.

3) Leak test: Measuring the change in water level during ..... min \_\_\_\_\_

4) Deformation test: Inner vertical diameter of the tank  
 - inner vertical diameter before back-fill D1 = ..... mm  
 - inner vertical diameter after back-fill D2 = ..... mm  
 Calculation for vertical diameter change  $D2 - D1 = \dots\dots\dots$  mm.

## NOTES

1. Measuring the change of horizontal diameter

2.

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Place and time

Supervision

Client: \_\_\_\_\_

Producer: \_\_\_\_\_

Supervision: \_\_\_\_\_

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