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## Instructions for installation and maintenance of Graf Herkules tank 1600 litres

**GRAF – Herkules tank  
for overground and  
underground installation:**

**Order No.: 200200**



English

**It is imperative to observe the items described in these instructions. In case of non-observance any warranty claims expire. You will receive separate installation instructions contained in the transportation packaging for all additional items purchased with GRAF.**

**Missing instructions have to be requested immediately.**

**It is imperative to check the tanks for possible damages before installing them into the excavation pit.**

**The installation has to be conducted by a qualified company.**

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## 1. General notes

### 1.1 Safety

The relevant accident prevention regulations according to BGV C22 have to be observed when conducting any works. Especially when inspecting tanks a second person is required for safety reasons.

Furthermore, the relevant regulations and standards have to be observed during installation, assembly, maintenance, repair, etc. You will find information about this in the related sections of these instructions.

The installation of the system respectively of individual system components has to be conducted by qualified professionals.

During all works on the system respectively on system components the overall system has to be decommissioned and secured against unintentional restart at all times.

The tank cover has to be closed at all times, except when conducting works on the tank, otherwise there is a very high risk of accident. Only original GRAF covers or covers approved by the company GRAF in writing are to be used.

The company GRAF offers a comprehensive portfolio of accessories that are aligned with each other and can be developed into complete systems. Using deviating accessories can lead to impairments of the functionality of the system and thus to the liability for damages resulting thereof expiring.

### 1.2 Identification obligation

All lines and tapping points of process water have to be labelled with the words “**No drinking water**” in writing or visually (DIN 1988 part 2, section 3.3.2.) in order to avoid an accidental connection to the drinking water network even after years. Even when there are correct labels, irritations are possible, e.g. through children. That is why all tapping points of process water have to be installed with **child-proof** valves.

## 2. Installation / assembly conditions

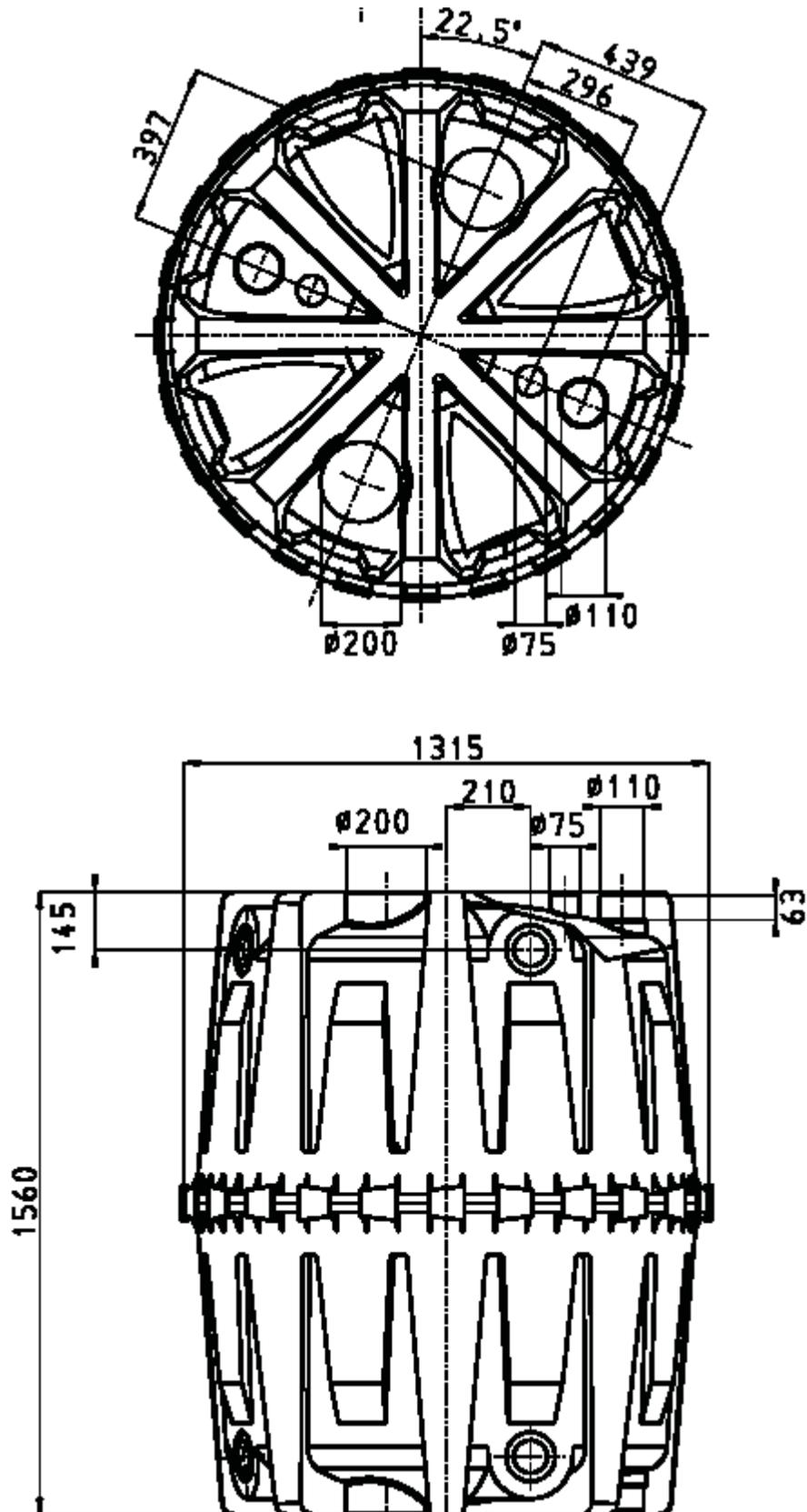
### 2.1 Overground assembly

- the tanks have to be installed on firm and level ground without sharp stones and without incline
- please observe the weight of the filled tank during assembly (1,650kg)
- in case of risk of frost, the tanks have to be emptied completely
- when installing the tanks in closed rooms there has to be a floor drain
- children need supervision when lingering near the tanks

### 2.2 Underground installation

- by using the supporting tube (item number: 322025) the tank may be installed under ground (max height above ground 100cm)
- the tank head (item number: 202033) has to be installed for possible revision works
- in case of ground water and hillside situation special installation provision have to be observed
- the tanks must only be installed in non-accessible green areas
- Along with the earth load no additional loads must affect the tank in any case, the distance to the accessible areas has to be at least 2.6m.

### 3. Technical data



## 4. Transport and storage

### 4.1 Transport

Only companies having appropriate means of transport and correspondingly trained personnel may transport the tanks. During transport the tanks have to be secured against shifting and falling down. If the tanks are secured during transport by means of load straps, it has to be ensured that the tanks remain undamaged. Clamping or lifting the tanks using steel ropes or chains is inadmissible.

Strains caused by impacts have to be avoided in any case. The tanks must not be rolled or pulled over the ground in any case.

### 4.2 Storage

If the tanks have to be stored intermediately, they have to be stored on appropriate, level ground without sharp objects. During storage damages due to environmental effects or external effects have to be avoided. Unauthorised persons have to be kept away from the tanks.

## 5. Installation tank

### 5.1 Test installation

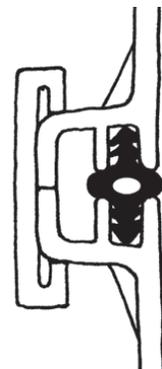
Before installing the tank finally it should be assembled tentatively in order to determine the following connections:

- empty conduit connection
- supply line
- overflow line

After having opened the connections, all boring respectively sawing chips have to be removed from the tank.

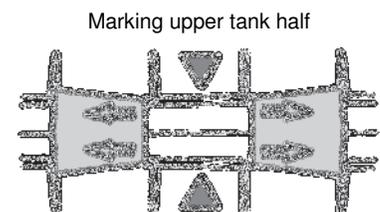
### 5.2 Installation tank

The tank consists of two half shells that are identical in construction. In order to install the tank, one of the shells is put on level ground with the closed side pointing downwards. Afterwards, the profile gasket is pushed into the circumferential inner groove with the corrugated side astringent. Before adding the second half shell, the gasket and the groove of the upper half shell have to be rubbed with the soft soap supplied in a slathering manner. When adding the second half shell (the half shells fit in one position only – observe arrow marking) it has to be paid attention to the gasket not slipping from the groove. If the tank is to be installed under ground, the **GRAF support tube** (item number: 322025) has to be placed in the centre of the lower shell before adding the second half shell.



In order to connect the shells, the quick connectors are attached in an alternating manner to the left and to the right. For this, every second connector is pre-adjusted manually in the first step and afterwards attached using a hammer and a wooden support. In order to facilitate the installation, the connectors should be greased on the inner edges. The connectors engage in their final position.

Afterwards, all remaining connectors are attached as described.



Marking lower tank half

## 6. Overground and underground installation

### 6.1 Overground installation

When installing the tank above ground it has to be paid attention to the tank being emptied completely in case of risk of frost. Furthermore, the tank has to be installed on firm and level ground without sharp objects. The overall weight of the filled tank (1,650kg) has to be observed when installing the tank. The tank should be installed in a shady environment. If the tank is installed in closed rooms, it has to be paid attention to a floor drain being designed. The tank must not be pressurised, i.e. the overflow installed (on the side of the tank) has to have the same diameter as the supply. It is imperative to provide sufficient ventilation.

### 6.2 Underground installation

#### 6.2.1 Foundation soil

Before conducting the installation the following items have to be clarified:

- the technical suitability of the soil according to DIN 18196
- maximum occurring levels of ground water respectively seeping ability of the soil
- occurring types of strain, e.g. live loads

In order to determine the soil physical conditions, a soil expert opinion should be requested from the local building authorities.

#### 6.2.2 Excavation pit

In order to provide for sufficient room to work, the footprint of the excavation pit has to exceed the dimensions of the tank by 50cm on each side, the distance to existing buildings has to be at least 50cm.

The batter has to be designed in accordance with DIN 4124. The foundation soil has to be horizontally and level and has to provide for sufficient load-bearing capacity.

The pit has to be so deep that the maximum height above ground (1 m) above the tank is not exceeded. In order to be able to use the system all year, the tank and the water-bearing components have to be installed in an area free of frost. Normally, the frost-free depth is at approx. 80 cm. You will receive more detailed information regarding this item with the responsible authority.

A layer of compressed rounded gravel (granulation 8/16 according to DIN 4226 – 1, thickness approx. 15-20 cm) is used as substructure. In case of soil not able to take loads a reinforced lean concrete slab with a thickness of approx. 10cm has to be designed.

#### 6.2.3 Ground water and cohesive soils (impervious to water)

Installing the tanks in areas with ground water is admissible, if a sufficiently stable geogrid - to be provided by the customer - (tensile force at least 50kN/m<sup>2</sup> in longitudinal and cross direction) with dimensions of 2.5 x 2.5m is installed and anchored above the tank as safety measure against upwelling.

**Height of vertical cover in case of ground water and cohesionless soils (permeable to water) (installation with safety measure against upwelling):**

<b>Immersion depth of the tank into the ground water</b>	≤ 65cm	80cm	100cm	120cm	160cm
<b>Required height above ground</b>	≥ 40cm	50cm	70cm	80cm	90cm

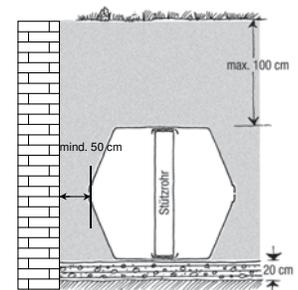
If there is the risk of exceeding the maximum admissible level of ground water, a sufficiently dimensioned drainage line has to be routed in any case.

**In case of cohesive soils (impervious to water), e.g. silt, a minimum height of the vertical cover of 90cm incl. safety measure against upwelling and a sufficiently dimensioned drainage line are mandatory.**

## 6. Overground and underground installation

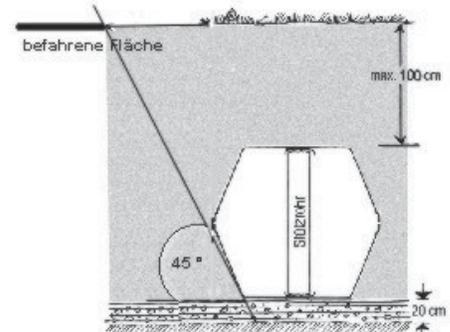
### 6.2.4 Hillside situation, slope, etc.

When installing the tank in direct vicinity (<5m) to a hillside, mound or slope, a statically calculated support wall has to be constructed in order to accept the soil pressure. The wall has to exceed the dimensions of the tank in all directions by at least 50cm and has to have a minimum distance from the tank of 50cm.



### 6.2.5 Installation next to accessible areas

When installing the tanks near accessible areas, it has to be provided that occurring strains by vehicles are not transferred to the tanks. The angle of the fictitious connection line between outer edge of the thoroughfare area and lower edge of the tank must be  $45^\circ$  at the most, i.e. the minimum distance to the accessible area is 2.6m.



### 6.2.6 Connection several tanks

Two or more tanks are connected using the mounting areas situated on the bottom of the tanks via GRAF expansion kit (item number: 322008) and plastic tubes used for underground installation (to be provided by the customer). The recesses have to be drilled using the GRAF special bit drill (item number: 332001) in the corresponding size. It has to be paid attention to the distance between the tanks not falling below 80cm. The plastic tubes used for underground installation have to extend into the tanks at least 20cm. If more than two tanks are connected, a connection on the upper side for ventilation purposes has to be made along with the connection on the lower side.

### 6.2.7 Insertion and backfilling

The tanks have to be introduced into the prepared excavation pit without impacts using appropriate equipment (see also item 3 - Transport and storage)

In order to avoid deformations, the tank is filled with water up to 1/3 of its volume **before** starting to backfill the tank coating. Afterwards, the coating (rounded gravel max. granulation 8/16 according to DIN 4226-1) is backfilled and compressed layer-wise in steps of maximum 30cm until reaching 1/3 of the height. Then, the tank is filled with water up to 2/3 of its volume and backfilled and compressed with layers of 30cm again until reaching 2/3 of the height, etc. The individual layers have to be compressed properly (hand rammer). Damaging the tank during compacting is to be avoided. Mechanical compression machines must not be used in any case. The coating has to have a width of at least 50cm.

### 6.2.8 Routing the connections

All supply and overflow lines have to be routed with an incline of at least 1%. The lines are connected to pre-drilled recesses on the tank or to mould ports to be opened. If the tank overflow is connected to the public duct system, it has to be protected against backwater according to DIN 1986 for mixed ducts via a lifting system or when it is connected to a pure rain water duct via a backwater gate.

If the tanks are installed in a module system of more than 2 tanks, the supply line has to be installed on the first and last tank. In this case the withdrawal is implemented in the middle tank. The first and the last tank have to be equipped with an overflow as well.

All suction respectively pressure and control lines have to be routed through an empty conduit that has to be routed as straight as possible and with an incline, but without bending. Required bends have to be implemented with  $30^\circ$  moulded parts. The empty conduit has to be as short as possible. **Important:** The empty conduit has to be connected to a recess **above** the max water level.

In order to create ventilation for the tank, a DN 100 plastic tube for underground installation has to be connected to the free recess and routed in an ascending manner (discharge end point item number 202004). Connection to ventilation systems of other buildings is inadmissible.

## 7. Installation tank head DN 200

The tank head has to be put on one of the moulded and opened ports DN 200 with sleeve. It can be shortened from above, but must not be extended in any case. The supplied telescope 220 with removable cover forms the end with the surface. Concrete shafts or similar must not be used by any means, but only the GRAF tank head DN 200 (item number 202033).



## 8. Service and maintenance

The system as a whole has to be checked for leaks, cleanliness, and stability at least every three months.

The system as a whole should be maintained every 5 years. In doing so, all system components have to be cleaned and checked for functionality. Maintenance works should be conducted as follows:

- empty tank completely
- remove immovable residua using a pressure washer through the tank head
- remove all contaminations from the tank
- check all installation parts for proper seat