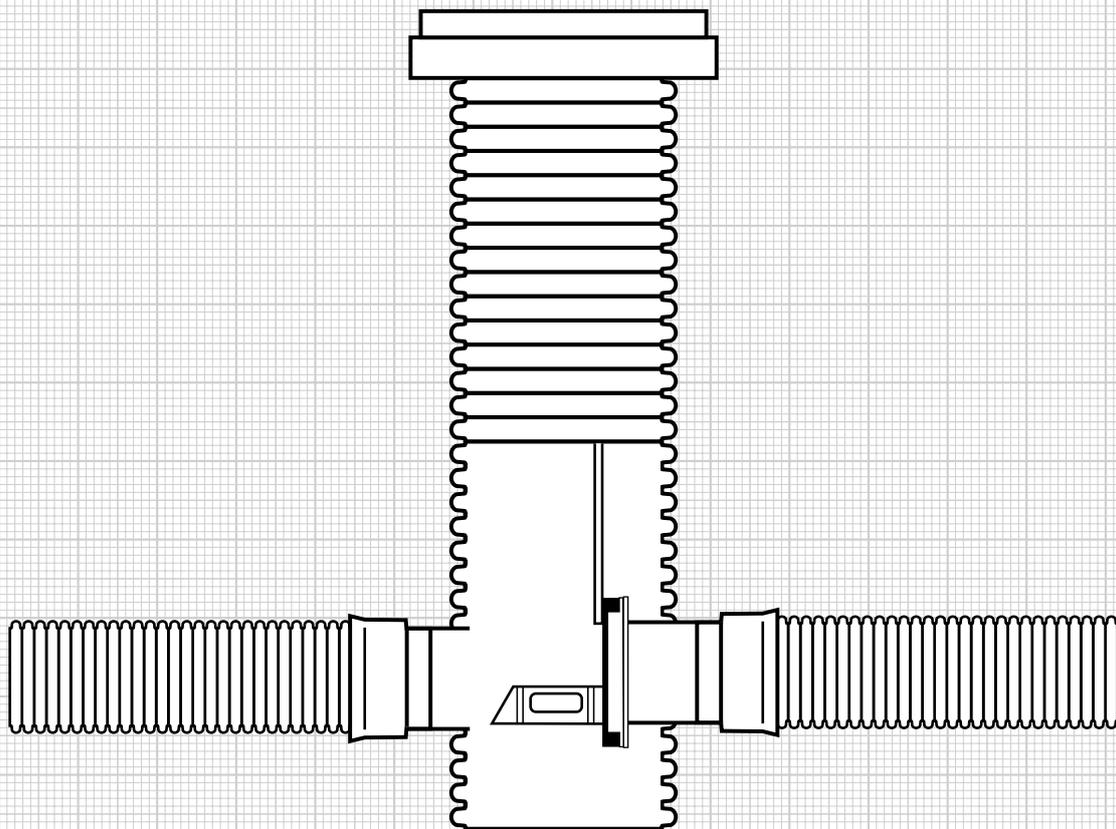


Installation manual

# AquaLimit tube



Throttle shaft with integrated tube throttle for smaller discharge values

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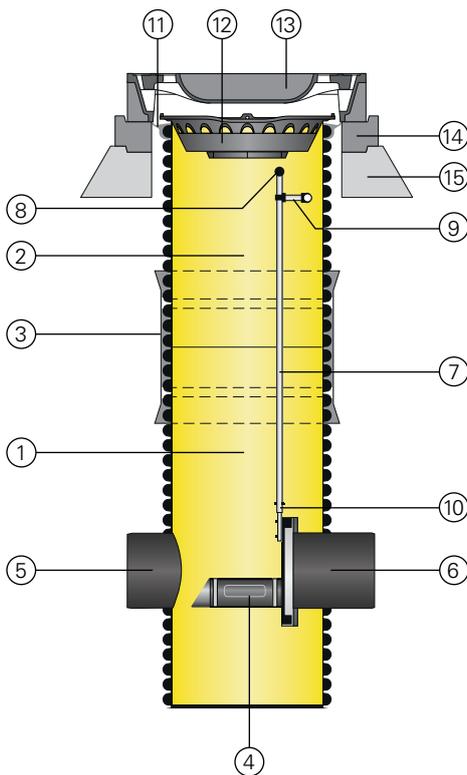
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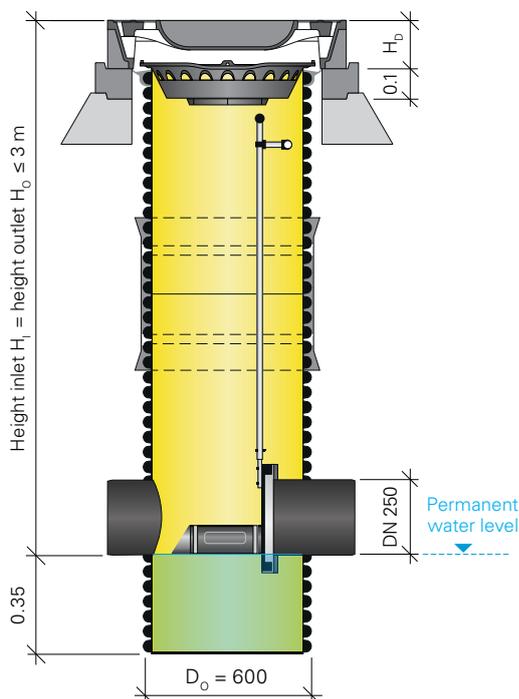
## 2 Shaft design / function

AquaLimit tube is a plastic throttle shaft  $D_o$  600 with integrated tube throttle. Tube throttles work without auxiliary energy and operate according to the so-called Bernoulli effect. This effect basically states the following: an increase in the speed of a fluid occurs simultaneously with a decrease in pressure. Rising water leads to a higher flow velocity in the throttle, which creates underpressure (pull). This causes the rubber membrane to contract and reduces the throttle cross-section. Thus, less water can flow through the throttle. This allows the realisation of very small discharge values and/or an almost constant throttle curve.

Compared to the orifice, a tube throttle generates a relatively constant discharge, irrespective of the water level in the storage/infiltration system/basin. This ensures that the storage/infiltration system empties within the shortest possible time and is available again for the next rainfall.



- ① AquaLimit tube base shaft
- ② Extension pipe (optionally – depending on total height)
- ③ Coupling incl. 2 x sealing rings (optionally – depending on total height)
- ④ Tube throttle
- ⑤ Inlet DN 250
- ⑥ Outlet DN 250 incl. stainless steel base plate
- ⑦ Lifting bar
- ⑧ Lifting bar handle
- ⑨ Lifting bar fixture
- ⑩ Connection of lifting bar with tube throttle
- ⑪ DOM sealing ring (optional accessory)
- ⑫ Sediment trap, large (optional accessory)
- ⑬ Shaft cover CW 610 (to be supplied on site)
- ⑭ Concrete support ring  $h=100$  mm (to be supplied on site)
- ⑮ Bearing without stationary loads (to be supplied on site)



- Plastic shaft  $D_o$  600
- Material PP
- Black outside, yellow inside
- Incl. tube throttle
- Inlet and outlet diameter DN 250 KG
- Throttle outlet range of up to 1-10 l/s depending on the head.

### NB

**AquaLimit tube is manufactured and dimensioned according to each project's needs. The throttle outlet range depends on the planned head in the basin. AquaLimit tube can realise discharge volumes between 1 l/s and 10 l/s depending on the head.**

### 3 Transport and construction site storage

The tube throttle, the lifting bar with handle and the assembly material are delivered together with the appropriate AquaLimit tube plastic shaft. The shaft components are delivered packaged. Use appropriate means for unloading and construction site transport. Avoid damage during unloading and storage.

AquaLimit tube can be stored outside. The storage period outside should, however, not exceed one year. Protect the material from direct sunlight, e.g., by storing in the shade or covering it appropriately. Store the components such that they are not damaged and that they are protected from getting dirty. Store the components on sleepers on plain ground.

Check the components for defects before installation. The impact strength of the material decreases in sub-zero temperatures. Damaged components must not be installed! The relevant safety provisions of the building industry apply.

#### ATTENTION

**Check all components for completeness and intactness upon delivery.**

**Damaged parts must NOT be installed.**

**Do NOT throw components, they include breakable parts!**

#### NB

**The tube throttle is marked with a project-specific type plate.**

### 4 Excavating pit and creating bearing



Create the excavation pit according to the planning specifications. The provisions of DIN 18300 "Earthworks" (*Erdarbeiten*) and DIN 4124 "Excavations and trenches" (*Baugruben und Gräben*) apply. When installing the shaft, comply with DIN EN 1610 "Construction and testing of drains and sewers" (*Verlegung von Abwasserleitungen*). Create and compact a planar shaft bearing with 10 cm to 15 cm of stoneless, compactable material.

#### ATTENTION

**Create AquaLimit tube bearing heights exactly according to planning specifications.**

### 5 Installing the base shaft

Place the base shaft, initially without throttle, on the prepared planum at the appropriate height and secure against shifting.

Connect the supply pipe and drainage pipe according to planning specifications. Make sure no backfill material enters the shaft **by using on-site protective cover.**

### 6 Embedding pipes

DIN EN 1610 forms the basis for the entire installation. Create embedding and side filling with stoneless, compactable material. Compact material by hand.

## 7 Installing the extension pipe

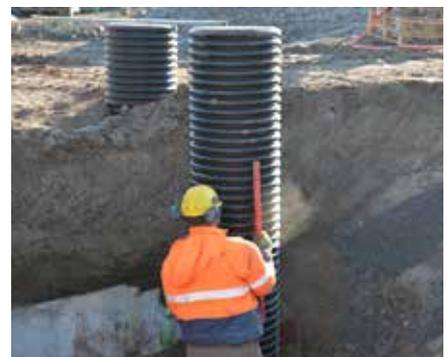
The shafts can be seen better during the construction period if the extension pipes protrude from the planum. The extension pipes feature a cover in order to prevent backfill material from entering the system. This cover is neither accessible nor resistant to static loads.

Place the extension pipe with the coupling and both sealing rings onto the base shaft. To do so, mount the profile sealing rings into the respective second corrugation trough. Now, apply a sufficient amount of FRÄNKISCHE lubricant to the sealing rings and the inside of the coupling (do not use oils and greases).

Afterwards, insert the coupling into the base shaft up to the limit stop. Then, insert the extension pipe into the coupling up to the limit stop. Finally, check the vertical alignment of the extension pipe.

### ATTENTION

**The included temporary construction site cover is neither accessible nor resistant to static loads.**



## 8 Tests before backfilling

Before backfilling the excavation pit, check the system for proper assembly. The following tests must be performed in particular:

- Height of the shaft according to design specifications
- Exact alignment of the shaft
- Check for damage, foreign objects or coarse contamination

### ATTENTION

**We recommend having the system approved by site management before backfilling.**

## 9 Backfilling excavation pit

- Backfill the excavation pit according to design specifications
- Compact material layer by layer
- Adhere to the provisions of DIN EN 1610
- Make sure that the extension pipe is not shifted during compacting.

### ATTENTION

**Do not remove included protective covers from shafts during backfilling!**

**Align the extension pipe upright. Adhere to the provisions of DIN EN 1610.**

## 10 Cutting the extension pipe



If necessary, extension pipes can be cut to length in the middle of corrugation troughs using a fine-toothed saw or a pipe cutter.

Remove edges and irregularities on the cutting surfaces with a grater, file or another suitable tool.

## 11 Installing the fixture for the lifting bar



Mark a distance of 25 cm from the upper edge of the extension pipe.

### Required tools

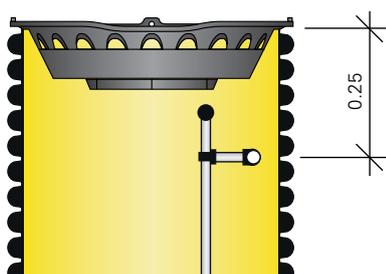
- Ruler
- Pen / chalk
- Slotted screwdriver



Position the fixture for the lifting bar vertically and centrally over the stainless steel base plate and screw directly into the shaft wall, no primary drilling required.

### Required components

- Fixture
- Screws

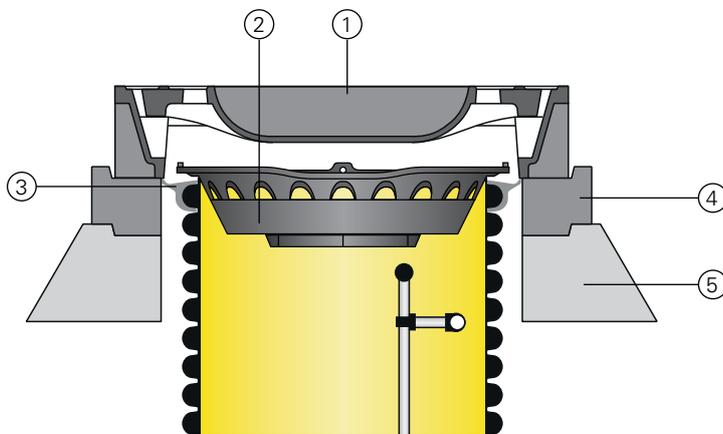


### ATTENTION

The distance of 25 cm to the top edge (sediment trap) must be observed by all means.

## 12 Installing shaft covers

As soon as the road superstructure is being prepared, the bearing for the shaft covers must be created. Common standard 625 mm covers according to DIN EN 124 with ventilation openings are used. Shaft covers and concrete support rings are not included in the scope of delivery of FRÄNKISCHE and must be supplied on site. Put a support ring  $h = 100$  mm according to DIN 4034 under the shaft cover on an appropriate bearing. The shaft cover can be placed on a 10-mm-thick mortar joint to avoid stationary loads between equalisation ring and shaft cover. Create the bearing from insitu concrete C 16/20. Avoid interlocking of the bearing with the corrugations of the extension pipe by any means (use casing aid!). Vertical loads may only be transferred to the load-bearing underground.



### ATTENTION

**Shaft covers and concrete support rings are not included in the scope of delivery of FRÄNKISCHE Rohrwerke and must be supplied on site.**



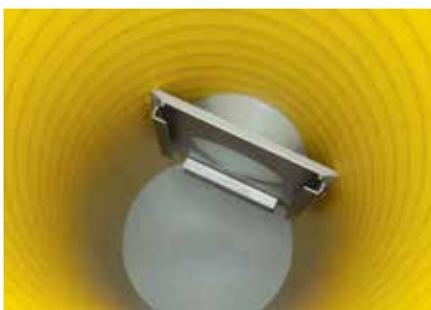
- ① Shaft cover (to be supplied on site)
- ② Sediment trap  $D_o$  600
- ③ DOM sealing ring
- ④ Support ring (to be supplied on site)
- ⑤ Bearing (to be supplied on site)

The gap between the support ring and the outside shaft wall can be closed using a DOM sealing ring. This guarantees a tight connection. Mount the sealing ring onto the last corrugation of the extension pipe. Place a sediment trap  $D_o$  600 on the extension pipe.



DOM sealing ring

## 13 Cleaning the shaft



Now it must be checked whether the guides and the lower stop edge of the stainless steel base plate in the shaft are free of contamination; if not, clean/hose it down with water (hose or watering can).

### ATTENTION

**We recommend illuminating the bottom of the shaft using an explosion-protected illuminant.**

## 14 Installing the tube throttle and lifting bar

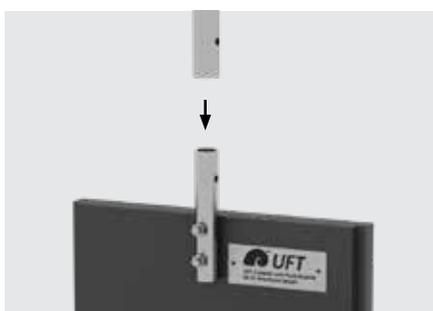
### 14.1 Installing the lifting bar



The tube throttle can be installed in only a few steps. First, install the handle in the last hole of the lifting bar (observe the side of the bar).

#### Required tools

- Slotted screwdriver
- Flat wrench (wrench width 13)



Now, slide the lifting bar over the pin of the board ...



... and secure using the screw and M8 nut.



### 14.2 Inserting the tube throttle into the slot



Afterwards, insert the tube throttle with the lifting bar into the shaft and insert the board into the guides of the stainless steel base plate. Make sure to insert the board down to the lowest stop edge of the stainless steel base plate.

## 14 Installing the tube throttle and lifting bar (continued)

### 14.3 Securing the lifting bar



Next, engage the lifting bar into the fixture using the connector.

#### Required components

- Connector



### 14.4 Cutting the lifting bar



Cut the lifting bar to an application-appropriate length.

Mark/shorten the lifting bar such that the installation of the handle can be ensured and the lifting bar does not protrude more than 11 cm over the fixture.

#### Required tools

- Pen / chalk
- Saw and/or angle grinder
- Appropriate tools for deburring



Remove the lifting bar with the handle and the throttle from the shaft. Disassemble the handle. Cut the lifting bar at the marked position (use a saw or angle grinder), remove edges. Reassemble the handle and insert the component into the shaft.

## 15 Safety instructions

### ATTENTION

Staff responsible for installation, assembly, operation, maintenance and repair must have appropriate qualifications required for this kind of work. The builder is responsible for organising in detail authority, responsibility and supervision of staff.

The operational safety of the system components supplied is only guaranteed in case of proper installation and correct use. Technical threshold values must not be exceeded.

Observe the accident prevention regulations and relevant standards and directives for installation, fitting, operation, maintenance and repair!

#### These are inter alia (in extracts):

- Accident prevention regulations
  - Construction work BGV C22 (*Bauarbeiten BGV C22*)
  - Technical wastewater systems GUV-V C5 (*Abwassertechnische Anlagen GUV-V C5*)
- Safety regulations for working in enclosed spaces of technical wastewater systems GUV-R 126 (*Sicherheitsregeln für Arbeiten in umschlossenen Räumen von abwassertechnischen Anlagen GUV-R 126*)
- Handling biological working materials in technical wastewater systems GUV-R 145 (*Umgang mit biologischen Arbeitsstoffen in abwassertechnischen Anlagen GUV-R 145*)
- Directives for working in tanks and narrow spaces BGR 117 (*Richtlinien für Arbeiten in Behältern und engen Räumen BGR 117*)
- Standards
  - Excavations and trenches - Slopes, planking and strutting, breadths of working spaces DIN 4124 (*Baugruben und Gräben-Böschungen, Verbau, Arbeitsraumbreiten*)
  - Construction and testing of drains and sewers DIN EN 1610 (*Verlegung und Prüfung von Abwasserleitungen und -kanälen*)
- Tool for safety and health protection in technical wastewater systems

### WARNING

- Hazards from gases and vapours such as risk of suffocation, risk of poisoning and risk of explosion
- Risk of falling
- Risk of drowning
- Germ pollution and wastewater with sewage
- High physical and psychological stress during work in deep, narrow and dark spaces
- And others

### DANGER

Non-compliance with the operating manual may result in considerable property damage, injury or death.

### CAUTION

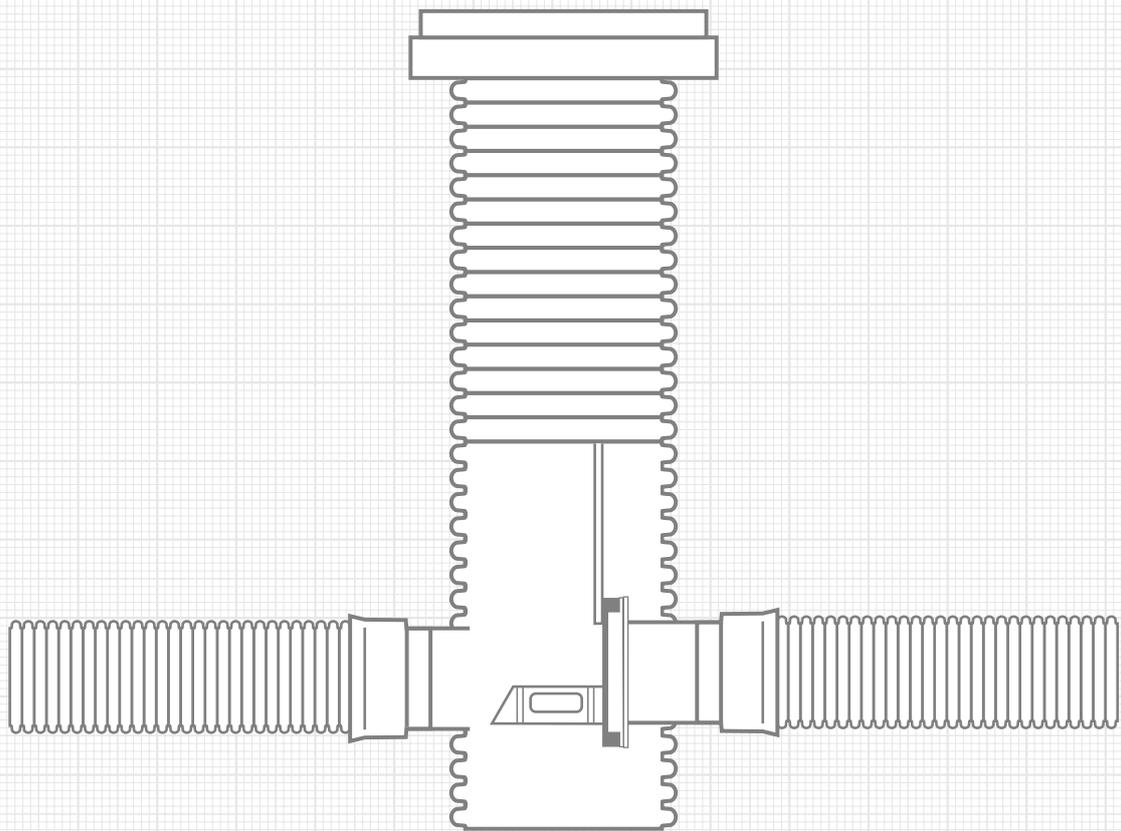
The system is part of an entire network. During installation, maintenance, service and repair work on one component, always consider the entire system. Avoid work during rain.

Changes or modifications to the system may only be carried out with the agreement of the manufacturer. For safety reasons, use original spare parts and accessories approved by the manufacturer. The use of other parts voids the liability for any consequences arising therefrom.

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