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1.1 Foreword

This document is a technical documentation on the handling and belowground installation of GRP manholes supplied by Amiantit. It describes only the standard procedures.

Special situations are to be clarified separately with the supplier. Furthermore, the generally accepted rules of technology, applicable laws, safety, environmental or other regulations or local regulations or specifications and instructions of the owner and / or planning engineer and the building contractors must be observed.

In case of doubt, any conflicting information in these instructions must be clarified in advance with the supplier and the design engineer.

1.2 Safety

The information contained in this document regarding installation, operation and maintenance is to be strictly observed and read carefully before starting installation. These instructions must always be available at the construction site.

All legal requirements and local health and safety regulations must be observed. When dealing with electricity, the requirements of the local electricity supplier must be followed.

Changes to the GRP product or GRP module may only be made after consultation with the supplier. Only original spare parts and accessories approved by the manufacturer may be used. The use of any other parts will void all claims for warranty and damages.

The pictures in this manual are only examples and may differ from the actual design of the manhole supplied.

As with almost all manholes made from petroleum chemicals, manholes made of glass fibre reinforced plastic (GRP) are flammable under certain circumstances and therefore should not be used near intensive heat sources or open flames. During installation, the manhole must not be subjected to any welding sparks, cutting flames or other heat, flame or electrical sources, especially when manufacturing reinforced compounds or carrying out repairs or modifications to the manhole with volatile chemicals on site.

When working in trenches, the trench walls must be stiffened, laid up, braced, sloped or otherwise supported according to regulations to protect individuals. Furthermore, it must be ensured that objects cannot fall into the trench or that the trench cannot collapse from the positioning or movement of adjacent machinery or equipment while someone is in the trench. Excavated material must be stored at a safe distance from the edge of the trench. The proximity and the amount of the earth masses must not endanger the stability of the excavation. The relevant recognised technical rules and applicable standards such as EN 1610 and accident prevention regulations for working in excavations and open trenches are to be observed.

1.3 Material

GRP manholes are made of glass fibre reinforced unsaturated polyester resin (UP-GF) in accordance with EN 15383, manhole pipe according to EN 14364 for underground drainage and have a continuous glass fibre reinforcement in the circumferential direction with highly corrosion-resistant ECR glass inert filler without calcium carbonate. They include a liner with glass fibre fleece and glass fibre reinforcement for expected higher chemical pollution of municipal wastewater.

PH resistance of PH 1 - 10

Suitable for use in H2S hazardous areas.
2 SHIPPING, HANDLING AND STORAGE

2.1 Inspection

The manholes are to be checked for transport damage on delivery. The check is to include:

- Total check of the load for integrity. If the load has shifted, each manhole must be checked thoroughly for damage.
- Contents must be checked according to the bill of lading. Any transport damage or loss must be signed for on the freight bill by representatives of the transport company. Damages must be claimed against the shipping company in accordance with its procedural requirements.
- In case of defects / damages, separate the affected manholes and contact the supplier. Do not use damaged or defective manholes!
- Unless otherwise agreed in writing, the transfer of risk is free on site, before unloading.

2.2 Weight

The approximate weight of the manholes in kg can be found in the title block of each manhole drawing (Table 2.1) and on the delivery note (Table 2.2). Upon request, the supplier shall also notify the expected, exact maximum weight of the delivery parts.
2.3 Unloading and Handling

The unloading of the manholes is carried out by the customer and where necessary it should be controlled using guide ropes. The manholes must neither fall nor collide. Only approved lifting equipment and slings are to be used and when using steel chains or ropes only the factory installed lifting points. When unloading without using the attachment points, textile belts or lifting equipment should be used. Hoists are not included.

Manholes - vertically transported

For upright structures, three pre-assembled ring-eyes allow suitable suspension gear to be attached. The ring-eyes corresponding to the respective manhole are presented in the following table. The factory installed anchorage points are designed for the slings listed in the following table. Alternatives are acceptable if they are suitable for the given bore diameter / manhole wall thickness.

<table>
<thead>
<tr>
<th>Load Class</th>
<th>Maximum Weight kg</th>
<th>Maximum DN of Manhole</th>
<th>Bore Diameter mm</th>
<th>Sling 3 x</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>( \leq 6.500 )</td>
<td>( \leq 1.500 )</td>
<td>24</td>
<td>Ring Nut VRM-M24</td>
</tr>
<tr>
<td>II</td>
<td>( \leq 9.000 )</td>
<td>( \leq 2.400 )</td>
<td>30</td>
<td>Ring Nut VRM-M30</td>
</tr>
<tr>
<td>III</td>
<td>( \leq 21.500 )</td>
<td>---</td>
<td>42</td>
<td>Ring Nut VLBG 10t M24</td>
</tr>
</tbody>
</table>

For fitting the manhole, the ring-eyes are to be mounted on the inside of the shaft (Pic. 2.1). The ring-eye is always to be attached perpendicular to the shaft axis. The tilt angle of the suspension gear to the vertical must be between 0 ° and 45 ° (Pic. 2.2, 2.3, 2.4, 2.5).
2 SHIPPING, HANDLING AND STORAGE

Manholes - horizontally transported

Horizontal manholes are to be unloaded using lifting straps. Steel ropes or chains are not permitted. For safety, horizontal manholes must be lifted with two holding points (Pic. 2.6). One anchorage point is to be fitted as close to the heavy base slab / buoyancy control position as possible to prevent tipping. For very long manholes, trusses or 2 parallel hoists are to be used.

Tangential Manholes and End Pieces

For lifting tangential manholes and end pieces (horizontal manholes), use lifting straps. Steel ropes or chains are not permitted. For safety, horizontal manholes must be lifted with two holding points (Pic. 2.7).

For end pieces with reinforced concrete end walls, one anchorage point is to be positioned as close as possible to the reinforced concrete end wall. Depending on the design, the use of a guide rope on the tangential entry is recommended.

Lifting tangential manholes with a rope or chain that is pulled through from one end of the main pipe to the other is not permitted due to the significant risk of damage!

2.4 Site Storage

The storage surface must be sound and as flat as possible, without stones or other solid foreign bodies.

Upright manholes should be stored standing on their shaft bottom. Horizontal manholes are to be fixed on the wooden supports used for transport. Lateral pipes, sumps and other attachments should not be laid on the ground or otherwise damaged (Pic. 2.8).

Horizontal manholes must always be secured against rolling. Horizontal manholes with one-sided reinforced concrete end walls or reinforced concrete base plates should be secured against tipping.
2.5 Raising of laying manholes

With horizontal manholes, suitable suspension gear is attached to the ring-eye mounted inside the shaft in order to raise the shaft. To prevent damage to the manhole, a sufficient cushion of mineral material is to be placed under the base of the shaft (Pic. 2.9, 2.10).

Always make sure that the shaft does not turn suddenly while it is being raised, as this can lead to the eyelets being torn out. Never tighten balanced suspension ropes abruptly. Then move the manhole using the already fixed suspension gear. Depending on center of mass, the manhole may begin to turn. Single robes or chains should not be tightened. The manhole should be able to rotate easily at the loose material. Prevent hard deposits!

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3.1 Standard Trench

The execution of the trench must be carried out in accordance with the applicable accident prevention regulations and standards for the execution of and work in trenches and excavations. If necessary, the given structural requirements must also be observed.

The minimum dimensions of the trench must allow the risk-free installation of the manhole as well as the professional backfilling and compaction of the trench (Pic. 3.1).

The specifications of EN 1610 concerning the allowable slope angle and the shoring works must be adhered to.
3 INSTALLATION OF MANHOLES

3.2 Foundation

To avoid differential settling of manholes and pipelines, the foundations and the bedding of vertical manholes must be carried out in the same way as for the connected pipeline. The trench bottom must have a deformation modulus $E_{V2}$ of at least 45 MN / m². On non-load bearing ground, appropriate measures should be taken to improve the stability.

The specifications of EN 1610 as well as the supplier’s installation instructions concerning the bedding and the bedding material should be observed.

Tangential manholes and end pieces follow the installation routine of GRP pipes. Details can be found in the Flowtite installation manual for buried pipes. Please ask your local dealer for availability.

3.3 Setting Manholes

Upright Manholes

Suitable suspension gear must be secured to the ring-eyes fitted in the interior of the shaft. The manhole should then be lifted and set into the prepared trench. The tilt angle of the suspension gear to the vertical must be between $0^\circ$ and $45^\circ$ (Pic. 3.2).

When moving, pipe supports and other fittings must not be damaged. After moving the manhole, the ring-eyes are to be removed and the mounting holes closed by hammering in the supplied plastic caps inside and out (Pic. 3.3).

Raise the manhole smoothly! Sudden pulls may result in damaged ring eyes.

Tangential Manholes

Lift and move tangential manholes and end pieces with straps attached at two holding points. Steel ropes or chains are not permitted. For end pieces with reinforced concrete end walls, one anchorage point is to be positioned as close as possible to the reinforced concrete end wall (Pic. 3.4).

When setting the manhole in the trench, pipe supports, sumps and other fittings should not be damaged. After being set into the trench, the manhole is to be aligned, secured against shifting and attached to the pipeline to be connected.
For tangential manholes with a step at the bottom dome end, the pipe zone below the step must be filled with concrete to avoid any subsequent settlement (Pic. 3.5, 3.6).

When facing direct traffic load, a rotation around the pipe axis or a settlement of the manhole cover away from road level might appear. In such cases a concrete encasement is recommended for stability reasons. Please contact your local supplier for further information.

For transport reasons, the entry dome to the main pipe for tangential manholes with large main pipe diameters or large base depths is kept as short as possible. However, a separate extension for the entry dome is delivered and must be installed after setting the manhole (Pic. 3.7, 3.8)

### 3.4 Manhole Connections

Connections to manholes are generally to be carried out in an articulated manner. This is usually done by incorporating joint pieces between manhole and pipeline. Please consult the pipeline installation instructions from your supplier.

Pipes connected to the manhole should be installed as specified by the supplier. GRP pipes should be always connected with rocker pipes as described in the separately available Flowtite installation manual for buried pipes. Please contact your local supplier for further information.

### 3.5 Backfilling

The working area around manhole constructions is filled in the same manner as the pipe trench itself. The backfill material is usually crushed stone or gravel with no significant proportion (≤5%) of fine grain. The backfill material is to be added in 100 – 300 mm layers and compacted. The requirements of EN 1610 as well as the pipe laying instructions of the pipe supplier are to be observed.
3 INSTALLATION OF MANHOLES

3.6 Installing Cover Plates

Where supplied, reinforced concrete cover plates are delivered with three uni-heads and separately enclosed uni-head lifters for hooking. Attach all three supplied uni-head lifters to the cover plate and attach with suitable suspension gear. Do not exceed the permissible tilt angle of 60 ° to the perpendicular for the suspension gear! Dismantle the uni-head lifters again after installing the cover plate.

![Uni-head lifter](Pic. 3.9)

Cover Plates with Shift Protection

With cover plates with shift protection, mount the supplied manhole seal on the shaft pipe before putting on the cover plate.

Then place the cover plate directly onto the GRP shaft (Fig. 3.11).

![Cover plate with shift protection](Fig. 3.11)

Cover Plates with Half Coupling Without Load Distribution Ring

With cover plates with half coupling without load distribution ring, fill the working space to 9 cm below the top of the manhole pipe.

Then place the cover plate on the manhole pipe and lower to the backfill material (Fig. 3.12).

![Cover plates with half coupling without load distribution ring](Fig. 3.12)
Cover Plates with Half Coupling and Load Distribution Ring for Tangential Manholes

With cover plates with half coupling and load distribution ring, fill the working space to 9 cm + the thickness of the load distribution ring below the upper edge of the manhole pipe. Then lay the load distribution ring on the backfill material.

Then place the cover plate on the manhole pipe and lower down to the load distribution ring.

Ensure that there is at least 3 cm gap between the top of the manhole pipe and the rubber stopper of the cover plate coupling to compensate for any possible settlement (Fig. 3.13).

Constructions with Balancing Rings and Manhole Cover

The subsequent assembly with spacer rings and manhole cover is not included and must be provided on site.

4.1 Cleaning

GRP manholes are generally maintenance-free. Possible cleaning work before entering the manhole can be carried out using commercially available high-pressure cleaners (max. 70 bar, fan nozzle) without the addition of abrasives. The minimum distance of the nozzle from the shaft surface is 50 cm. The use of plastic brushes is also permitted. Mechanical cleaning methods with steel wire brushes are not permitted!

4.2 Repairs

Manholes with minor damage can usually be repaired on-site quickly and easily by a professional.

Our trained technicians check whether a repair is necessary, possible or practical. Never try to repair a damaged GRP manhole by yourself without first consulting the supplier so as not to jeopardise any existing warranty claims.
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