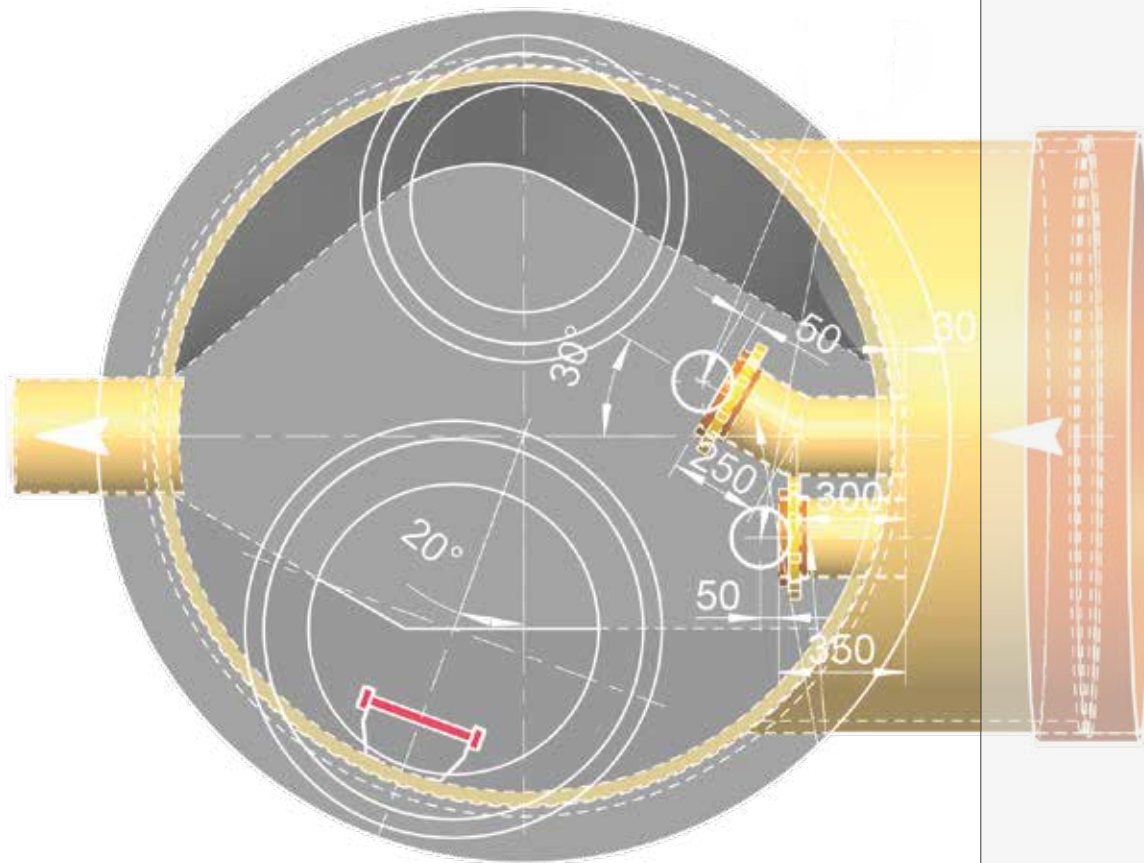


FLOWTITE GRP MANHOLES INSTALLATION MANUAL



TECHNICAL DOCUMENTATION

04-16 | EN | V1

0 CONTENTS

1	Introduction	03
1.1	Foreword	03
1.2	Safety	03
1.3	Material	03
2	Shipping, Handling and Storage	04
2.1	Inspection	04
2.2	Weight	04
2.3	Unloading and Handling	05
2.4	Site Storage	06
2.5	Raising of laying manholes	07
3	Installation of Manholes	07
3.1	Standard Trench	07
3.2	Foundation	08
3.3	Setting Manholes	08
3.4	Manhole Connections	09
3.5	Backfilling	09
3.6	Installing Cover Plates	10
4	Control and Maintenance	11
4.1	Cleaning	11
4.2	Repairs	11

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.

Table 2.1 | Title block with manhole weight

Vers. Nr.		Änderung Content of change		Datum Date		Seitend. / von Chang. by	
Datum Date of issue		Erstellt durch Created by		Genehmigt durch Approved by		Sondertransport Special Transport	
01.10.2015		G. Moritz		T. Hoffmann		JA <input type="checkbox"/> NE <input type="checkbox"/> (X)	
Maßstab Scale		Einheit Measurement unit		Masse Mass		Bemrk. / Hinweis Remarks note (in the title block)	
1:20		mm		1600 kg		Bitte nach 38-39 3843 Aufgabenlösungen nach 38-39 3843	
Technische Ref. Technical ref.		Material Material		Sprachcode Language			
W. Schmann				D/2/N			
Projektname / Projektname Berlin, Unter den Linden		Index Index		Titel / Title Pump Manhole PW009 DN1000 GRP		Werk: Shop:	
Auftraggeber / Customer name / ref. Musterbau GmbH		SC-Nummer / Scale number		AMIANTT AMIANTT AMIANTT		Zeichnungsnummer / Drawing number	
45678						34567-0042113-F	
AB-Nummer / Order number		34567		Zeichnungsnummer / Drawing number		Werk: Shop:	
						A.5 1/1	
Dateiname der Zeichnung / Name of drawing 4.2113-201-PW09.dwg		Dateiname der Zeichnung / Name of drawing 4.2113-201-PW09.dwg		Zeichnungsnummer / Drawing number 34567-0042113-F		Werk: Shop:	
						A.5 1/1	
				Zeichnungsnummer / Drawing number 34567-0042113-F		Werk: Shop:	
						A.5 1/1	
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						A.5 1/1	
				Zeichnungsnummer / Drawing number 34567-0042113-F		Werk: Shop:	
						A.5 1/1	

Table 2.2 | Delivery note with manhole weight

AMIANTT
Amiantt GmbH
Am Futhloch 19
64729 Grossenbich

Tel.: 03431 71820
Fax: 03431 70234

0000028340

Customer Address:		Delivery Address:		DELIVERY NOTE 901669 Page: 1/2	
CCI Leidingpijpen B.V.		54017		Our Order No.: 899503149-4 Delivery Date: 03-05-15	
Polderlaan 27		Jubille Drive		Final Purchase Order No.: 000-Annulch-DE1010	
NL-4730 AA Klundert		Cerenberndstraat		Year bet: Eric Bollar Our Project: 002/11	
Year VBT ID No.: N.00001000801		S. 2985 Hain		Our Ref.: Anja Donner Sales Rep.: 205	
		Belgium			
		Sua Huidgegevens +32 497527061			
		Tel.:			
		Fax:			
Delivery Terms: Carrier near: gald to Flinn, Belgium		As Per Incoterms 2010		Delivery Method: By Truck	
Item	Product Code	Product Description		Year Net Weight (kg)	Quantity
800010	Project 800211 BE Hain	F5MRLOG-0900KR10220A023- Manhole EN0800h2300PN 1.3W 1000design according to released Ziv. 37784-0175-V1 design according to released Ziv. 37784-0175-V1 Manhole 0173 acc. to drawing Scale No.: M0100124		1.600,00	1,0 Pcs
800015	F5MR LIMP-C09HC0800G03- Concrete cover plateEN 1309 x 200design according to released Ziv. 37784-0175-V1 design according to released Ziv. 37784-0175-V1 Scale No.: U01500109			480,00	1,0 Pcs
800010	F5MRLOG-0900KR1010A023- Manhole EN0800h1900PN 1.3W 1000design according to released Ziv. 37784-0174-V1 design according to released Ziv. 37784-0174-V1			1.600,00	1,0 Pcs
Goods properly loaded		Goods properly accepted		Goods properly accepted	
Logistics:		Shipper:		Customer:	
				Continues on the next page	
Geschäftskvater: Rick Oufte FRB 10922 Ammanon Chemie		USP ID: DE 18005 120 Street No. 2361050500			
Betreiber: M&M-GmbH Stone Leasing Service Tel: 1431 831.32.1 480 941 01		Bank: C248 40020101 140 1101 000, Leiter F. C. K. A. C. B. I.			
Betreiber: Stone Leasing - Europa, Markt 11 809 32711, B. 2 200 333 82		IBAN: C248 40020101 140 1101 000, Leiter F. C. K. A. C. B. I.			

2.3 Unloading and Handling

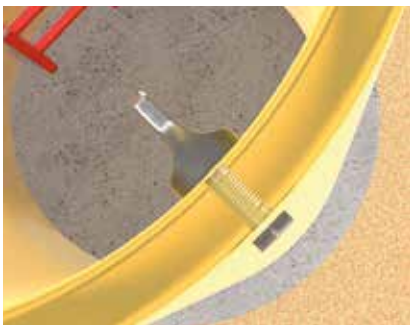
The unloading of the manholes is carried out by the customer and where necessary it should be controlled using guide ropes. The manholes must neither fall nor collide. Only approved lifting equipment and slings are to be used and when using steel chains or ropes only the factory installed lifting points. 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.

Load Class	Maximum Weight kg	Maximum DN of Manhole	Bore Diameter mm	Sling 3 x
I	≤ 6.500	≤ 1.500	24	Ring Nut VRM-M24
II	≤ 9.000	≤ 2.400	30	Ring Nut VRM-M30
III	≤ 21.500	---	42	Ring Nut VLBG 10t M24

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*).



Pic. 2.1 | Attached ring-eye

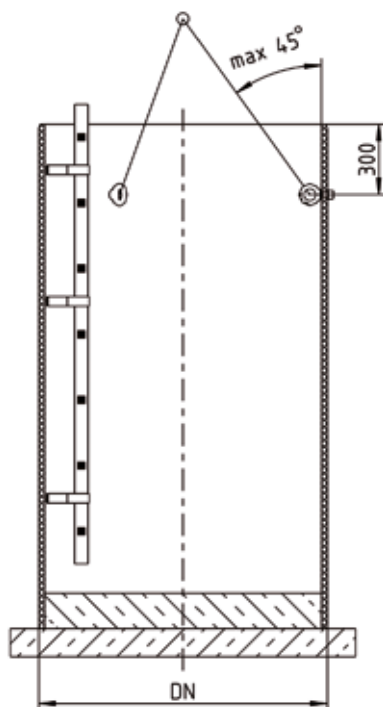
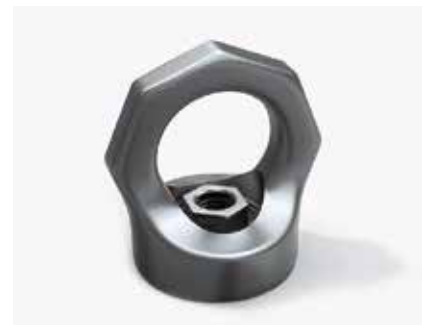


Fig. 2.4 | Lifting of manholes, vertical lifting angle 45° or less



Pic. 2.2 | Ring-eye



Pic. 2.3 | Manhole shaft, suspended

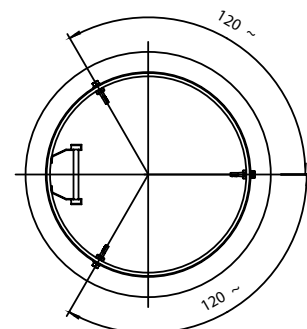


Fig. 2.5 | Lifting with 3 attachment points, 120° angle in between

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.



Pic. 2.6 | Lifting a horizontal manhole with two straps

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!



Pic. 2.7 | Lifting an end piece with two straps

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.

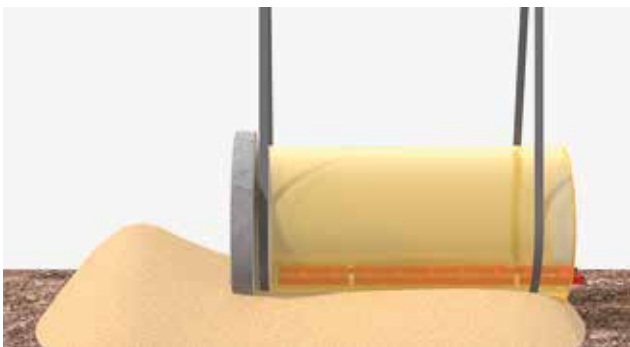


Pic. 2.8 | Storing horizontal manholes

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!



Pic. 2.9 | Raising on mineral support



Pic. 2.10 | Raising using suspension gear

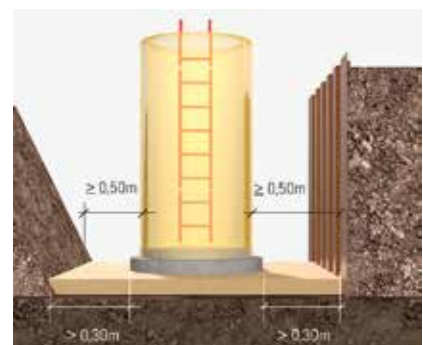
INSTALLATION OF MANHOLES 3

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.



Pic. 3.1 | Minimum width for the working area

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 $45 \text{ MN} / \text{m}^2$. 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° and 45° (*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.

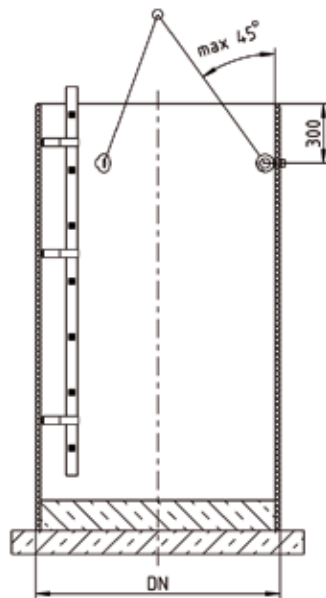


Fig. 3.2 | Manhole, attached

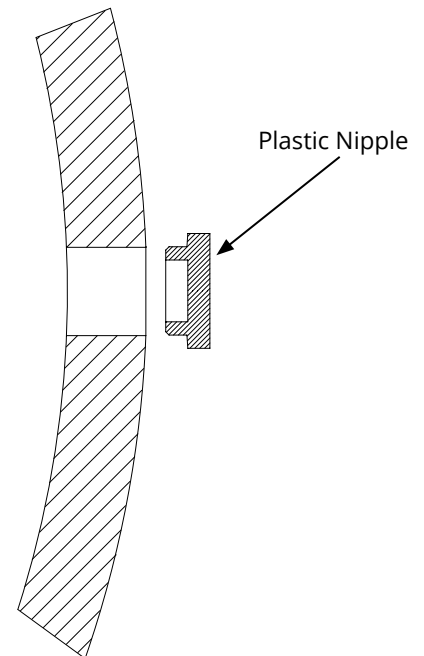
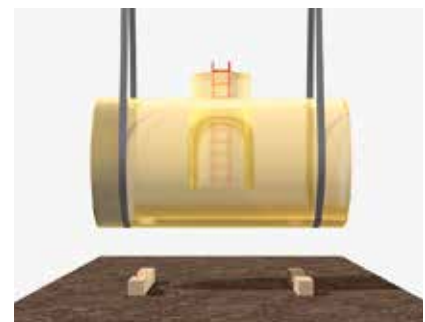


Fig. 3.3 | Plastic Nipple or similar for closing of lifting points

Tangential Manholes

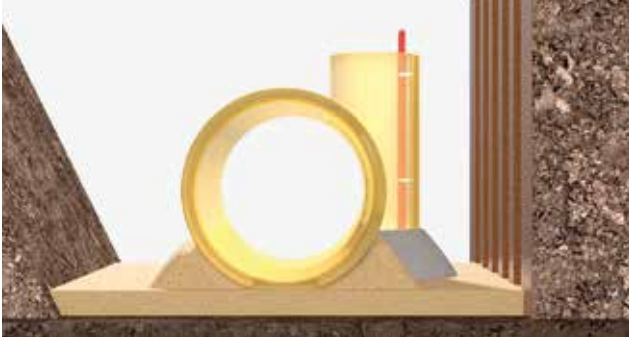
Lift and move tangential manholes and end pieces with straps attached at two holding points. Steel ropes or chains are not permitted. For end pieces with reinforced concrete end walls, one anchorage point is to be positioned as close as possible to the reinforced concrete end wall (*Pic. 3.4*).

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.



Pic. 3.4 | Lifting an end piece with two straps

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*).



Pic. 3.5 | Concrete filling below the step



Pic. 3.6 | Concrete filling below the step

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*)



Pic. 3.7 | Installing the entry extension



Pic. 3.8 | Installing the entry extension

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 ($\leq 5\%$) 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

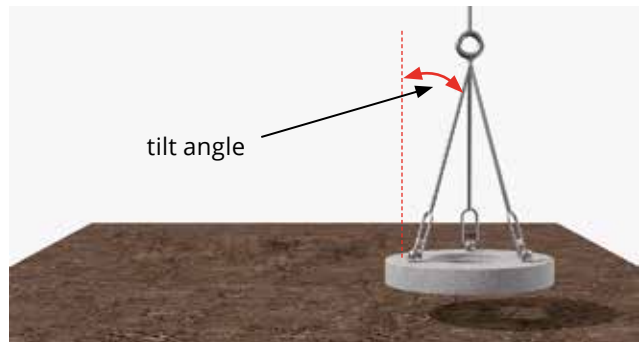
3.6 Installing Cover Plates

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.



Pic. 3.9 | Uni-head lifter



Pic. 3.10 | Lifting the reinforced concrete cover plate

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)

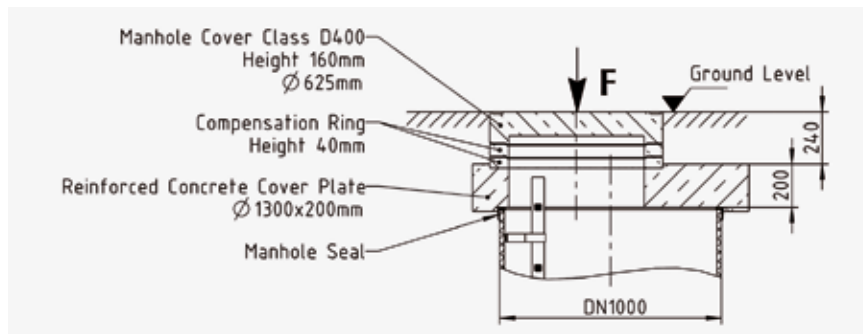


Fig. 3.11 | Cover plate with shift protection

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).

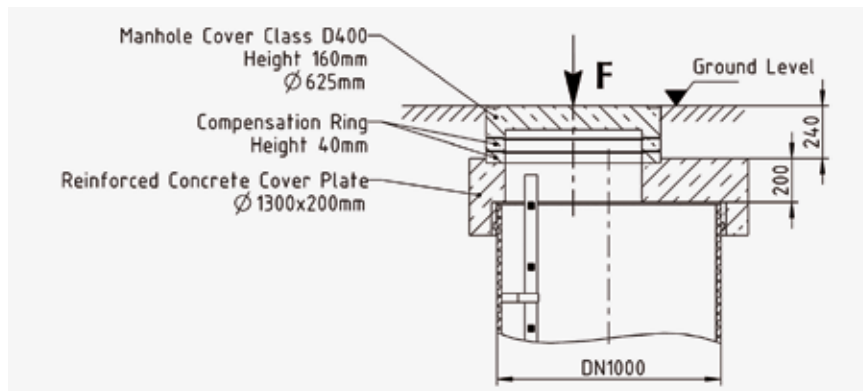


Fig. 3.12 | Cover plates with half coupling without load distribution ring

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.

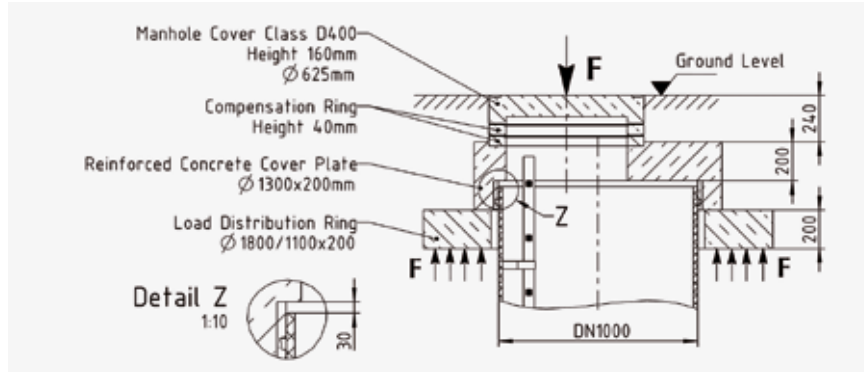


Fig. 3.13 | Cover plate with half coupling and load distribution ring

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.

TECHNICAL DOCUMENTATION

The Flowtite technology is owned and licensed worldwide by Amiblu.
Find more information and contact details at www.amiblu.com.

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