

Installation Instructions for Polycarbonate Manholes



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1 General information

These instructions are supplied with the equipment.



Caution!

Any person involved in the installation, operation and repair of the product must first read, understand, and follow these instructions. We accept no liability for damage and operational malfunctions caused by failure to comply with these instructions.

In the interest of further development, we reserve the right to change individual assemblies and accessories as considered necessary for enhanced safety and performance improvements, while preserving the main features.

The copyright to these instructions remains with Langmatz GmbH.

2 Safety information

“Polycarbonate manholes” are designed for stationary use underground as - cable draw manholes,

- telecommunication distribution points/fibre distribution points,
- energy distribution systems,
- systems to accommodate electronic components.

When the manhole is used for electronic components, it is not suitable for use in potentially explosive atmospheres.

The product complies with the state-of-the-art technology at the time of printing and is delivered in an operationally safe condition. Unauthorised modifications, particularly to safety-related parts, are prohibited.

Langmatz GmbH warns against the misuse of the product. Only allow qualified electricians/optical fibre specialists to work on electrical or electronic fixtures.

The operator is responsible for installing, operating and maintaining the fixtures.

The operator is responsible for the following:

- Preventing danger to the life and limb of users and third parties.
- Ensuring operational safety.
- Preventing downtime and environmental impact caused by incorrect handling.
- Ensuring that protective clothing is worn when working with or on the product.



Use of a damaged product is prohibited. Please contact the hotline (see section 14).



Caution!

Comply with applicable occupational safety and environmental protection regulations during installation, operation, maintenance, and repair.

3 Product description

Since Langmatz polycarbonate manholes come in a wide variety of sizes and versions, these instructions are based on one product by way of example: manhole – clear dimension (CD) 400 x 800 mm / 750 mm high.

3.1 Dimensions

(Product example, CD 400 x 800 mm)

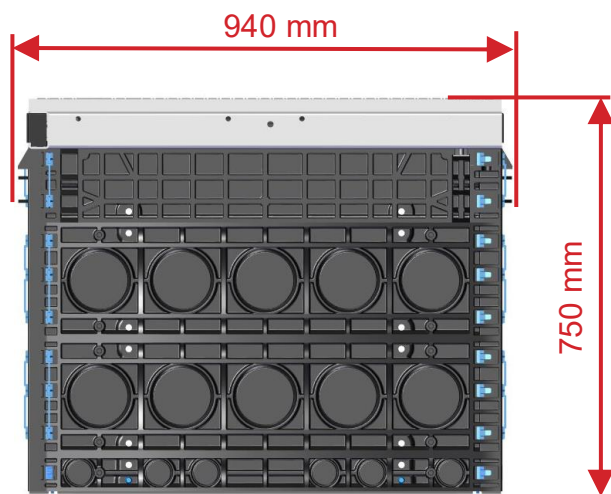


Fig. 1

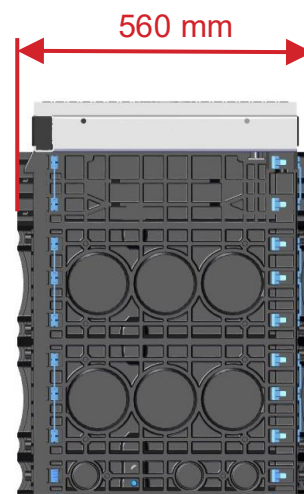


Fig. 2

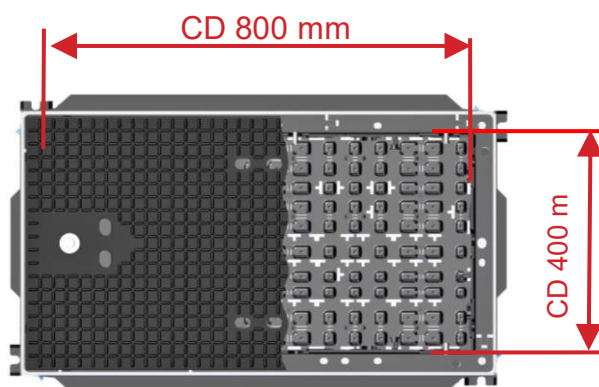


Fig. 3

3.2 Technical data – Single frame for wall installation

Dimensions L x W x H:	940 x 560 x 750 mm
Total weight:	Approx. 135 kg
Frame component/base plate material:	Polycarbonate (PC)/polypropylene (PP)
Steel frame material:	Hot-dip galvanised steel
Manhole cover versions:	Cast steel: D400/B125 Concrete-lined: D400/B125 Paveable: D400/B125 Chequered stud plate: A15
Manhole closure versions:	Locking mechanism/screw connection

4 Scope of delivery

(Product example, CD 400 x 800 mm/750 mm high)



Fig. 4

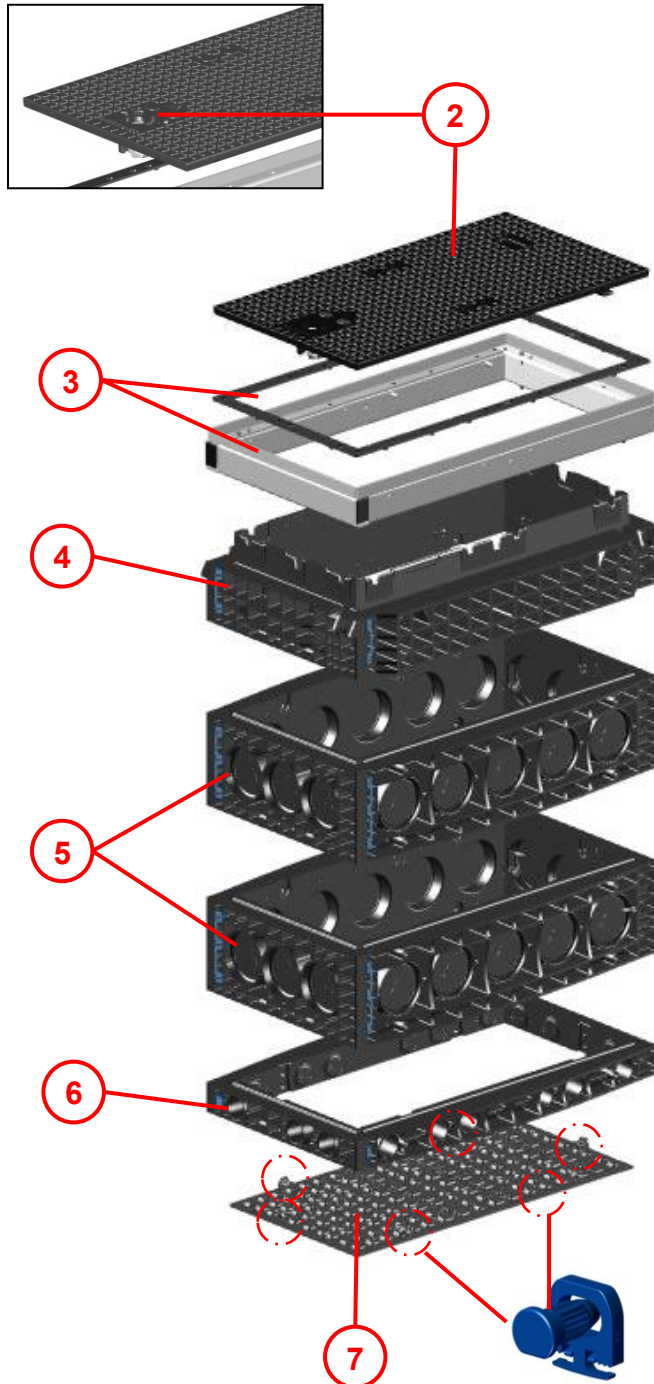


Fig. 5

The complete manhole consists of:

- Item 1** 18x dual fixing dowels
(number depends on the design).
- Item 2** 1x manhole cover
- cast steel
- with locking mechanism
(depending on the design).
- Item 3** 1x steel frame with
damping pad
(elastomer).
- Item 4** 1x top frame H=140 mm.
- Item 5** 2x frame components
H=220 mm
(number depends on the design).
- Item 6** 1x frame component H=70 mm.
- Item 7** 1x base plate
with dowel clips fitted
(number depends on the design).

4.1 Required tools (not included)



Fig. 6

- 1 Key with lifting hook
(type depends on locking mechanism design. Available to order from Langmatz).
- 2 Hammer
- 3 AF 5 hexagon screwdriver

The following tools are needed to open the cover depending on the locking mechanism of the manhole cover:

Hexagonal head	Hexagonal socket head	LIC-LOCK	COLT / TELENET / OTC
AF 24	AF 14	Special tool	

5 Foundation pit base

5.1 General

The manhole must be installed by a specialist company.

Assess the ground conditions before preparing a load-bearing foundation pit base.

- For manholes with an overall height less than 680 mm, the highest groundwater level must be at least 1,200 mm below ground level.
- The manhole must be installed in “non-cohesive” to “cohesive” mixed soils.
- Group G1 to G3 soil types as per ATV-DVWK-A (German Association for Water, Waste Water and Waste) 127, and/or soil groups GE, GW, GI, SE, SW, SI, GU, GT, SU, ST, GU*, GT*, SU*, ST*, UL and UM as per DIN 18196.



Caution!

- **Direct installation under the roadway is not recommended.**
- **Reason:**
 - **More difficult access with moving traffic**
 - **Higher noise development**
- **If the manhole is installed in the roadway, Langmatz recommends the use of “concreted” manhole covers.**

Observe ZTV A-StB 12 (Supplementary Technical Contract Conditions and Guidelines for the Construction of Asphalt Roads) for the construction of the road surface!

5.2 Preparing the foundation pit base

When preparing the foundation pit, comply with the following documentation from the Gütegemeinschaft Leitungstiefbau e.V. (Underground Cable Line Construction Quality Association):

“Procedural instructions for working in underground cable line construction”.

Ensure that the position and depth of the foundation pit base matches the installation situation.

The upper edge of the manhole cover must lie completely flush with the surrounding ground level, and must not project.

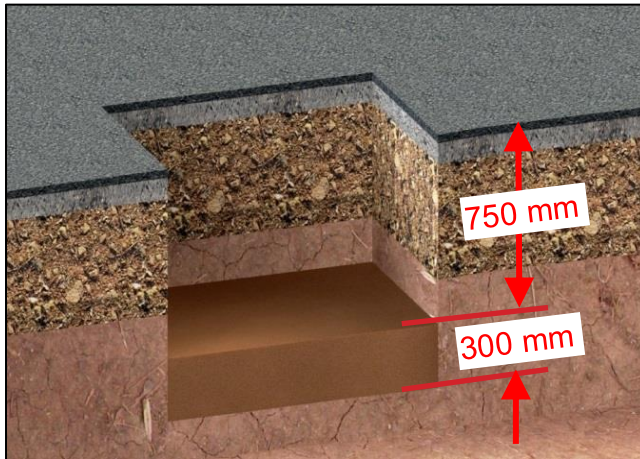


Fig. 7

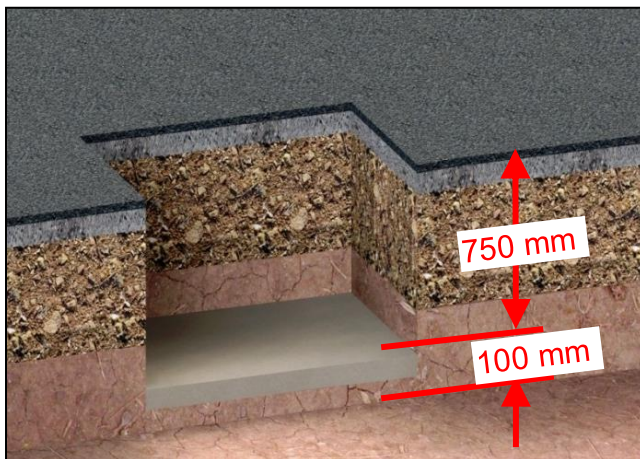


Fig. 8

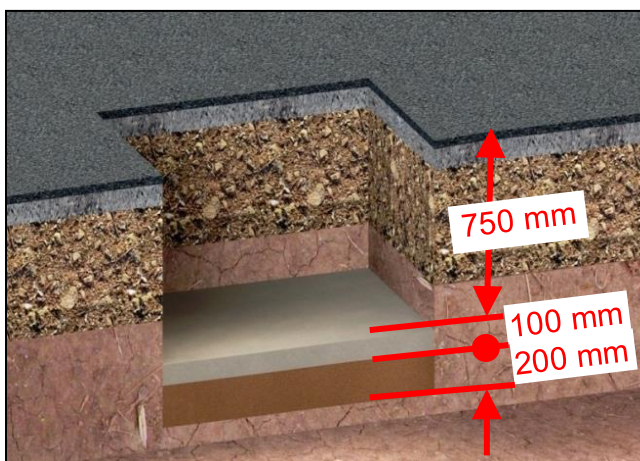


Fig. 9

Situation “A”

For pedestrian areas:

- Use an underfill/bottom layer at least 300 mm thick.
- The underfill/bottom layer must consist of “non-cohesive” to “cohesive” mixed soil (group G1 soil type as per ATV-DVWK-A127).
- Layer and compact the underfill/bottom layer to $D_{Pr} \geq 98\%$.

Situation “B”

For vehicle traffic areas:

- Compact the pit base according to the requirements.
- For group G1/G2 soil types as per ATV-DVWK-A 127 (soil groups GE, GW, GI, SE, SW, SI, GU, GT, SU, ST as per DIN 18196):
- Use a concrete load-bearing layer at least 100 mm thick (tamped concrete, strength class $\geq C8/10$).

Situation C

For vehicle traffic areas:

- For group G3 soil types as per ATV-DVWK-A 127 (soil groups GU*, GT*, SU*, ST*, UL, UM as per DIN 18196):
- For group G1 soil types, use an underfill as per ATV-DVWK-A 127. Minimum thickness 200 mm. The underfill must be layered and compacted to $D_{Pr} \geq 98\%$.
- Use a concrete load-bearing layer at least 100 mm thick (tamped concrete, strength class $\geq C8/10$).

6 Manhole installation

6.1 Constructing the base

6.1.1 Installing the complete manhole

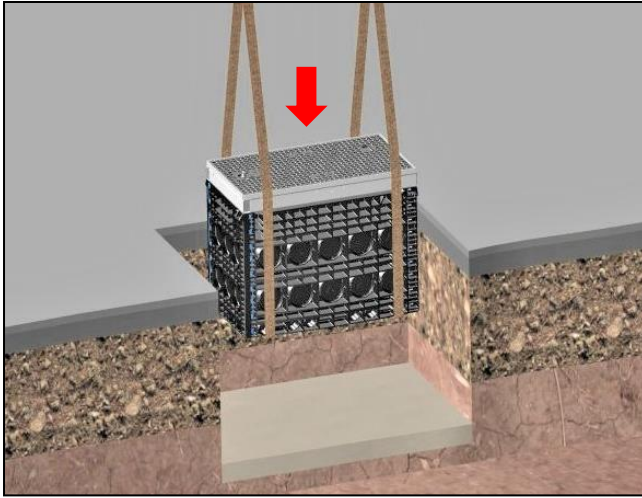


Fig. 10

- Place the complete manhole on the foundation pit base, or construct the manhole body depending on how it is supplied (see 6.1.3)



Warning:

- When inserting the manhole, place slings or similar around the entire structure.
- If the manhole tips or drops, it may cause injury.
- Where manholes are factory-fitted with crane lugs, these must be used.

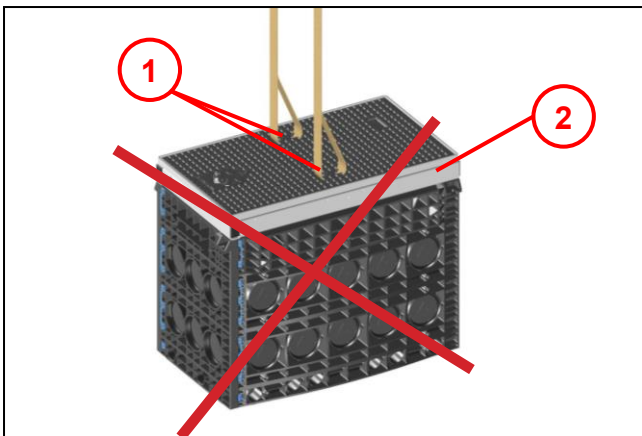


Fig. 11



Warning:

- Do not use the lifting openings in the manhole cover (1) to lift the manhole itself.
- The manhole cover (e.g. cast) could rip out, damaging the steel frame (2).

6.1.2 Opening the manhole cover

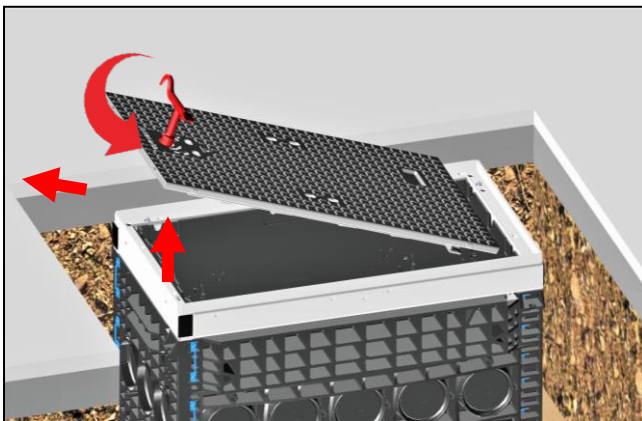


Fig. 12

- Use the appropriate key to open the manhole cover, turning the lock catch to the “OPEN” position (90° anticlockwise).
- With a suitable tool, lift the manhole cover and pull it out sideways.

6.1.3 Installing single manhole parts

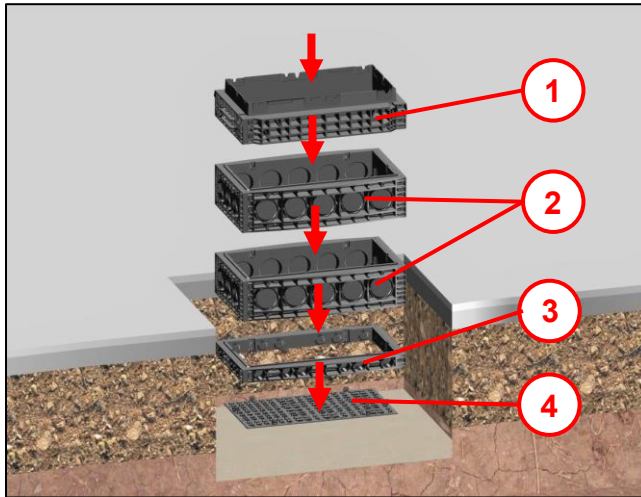


Fig. 13

- Place the base plate **(4)** on the foundation pit base.
- Place the H=70 mm frame component **(3)** on the base plate.
- Place the H=220 mm frame components **(2)** on top of each other (number based on design).
- Finally, place the top frame **(1)** on top of the frame structure.

6.1.4 Connecting the individual parts of the manhole

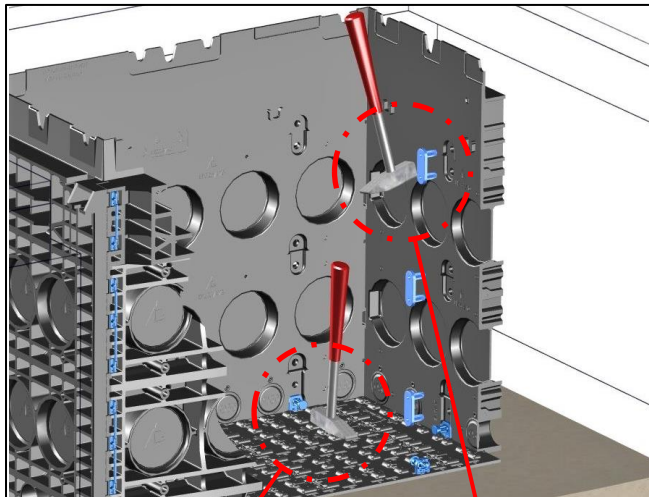
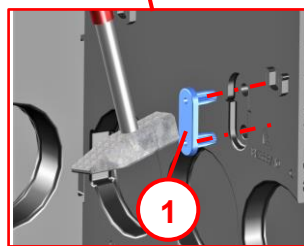
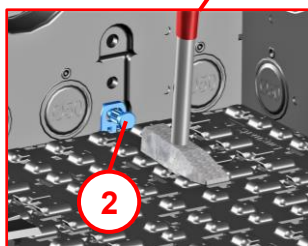


Fig. 14

- To connect the frame components, drive in the enclosed dual fixing dowel mounting plugs **(1)** from the inside.
- To connect the base plate to the frame component, use the enclosed dowel clips with moulded fixing dowel mounting plug **(2)**.
- Drive the fixing dowel mounting plug into the hole in the frame component.
- When modifying the manhole structure, drive the fixing dowel mounting plugs through from the outside to the inside of the manhole using a suitable tool.



If the fixing dowel mounting plugs show no sign of damage at this point, they can be reused without any loss of functionality.

6.1.5 Installing the steel frame

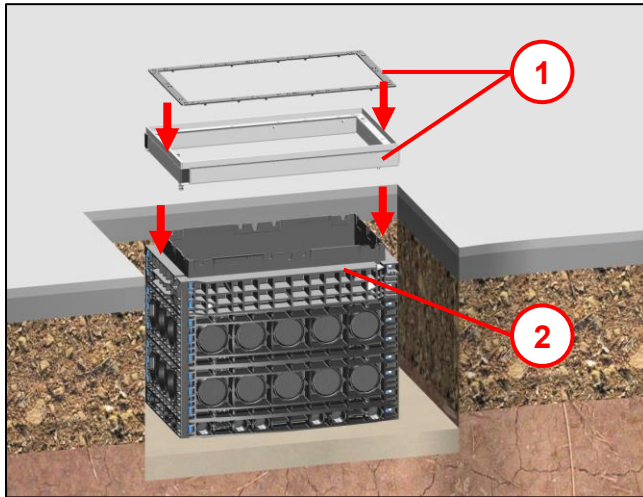


Fig. 15

- Once all the frame components have been connected, place the steel frame and (elastomer) damping pad (1) onto the top frame (2).

6.1.6 Optional frame anchor from steel frame to top frame

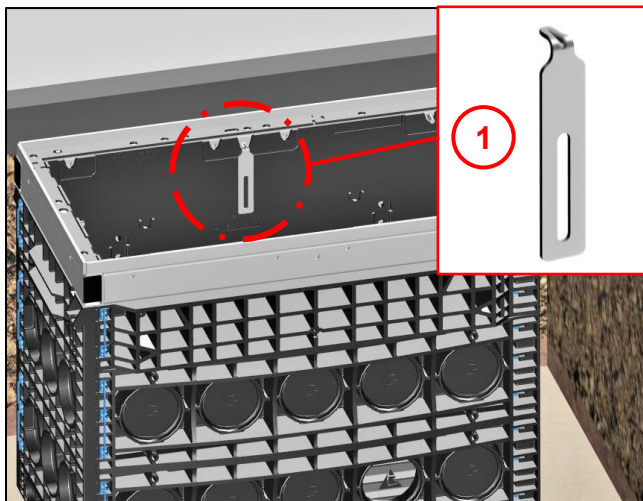


Fig. 16

A frame anchor can optionally be installed to connect the steel frame to the plastic frame.
(Not included with standard delivery. Please order separately).

- Install the frame anchor (1) in accordance with the installation instructions provided.

6.2 Manhole structure for new routes

6.2.1 Removing the predetermined breaking point for Ø110 mm/Ø50 mm cable ducts

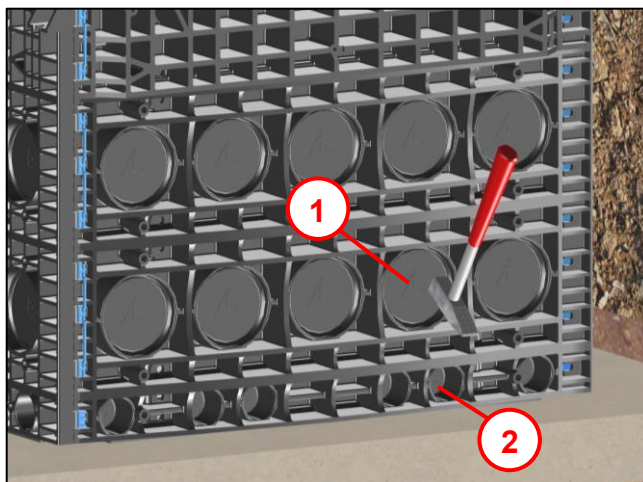


Fig. 17

- Determine the required number of cable ducts and their position.
- Use a hammer to knock out the relevant Ø110 mm (1) or Ø50 mm (2) predetermined breaking points.
- Use a suitable tool to remove any swarf or burrs produced.

6.2.2 Installing the stepped grommets/protective pipe seals

(Example is shown with cables and conduits)

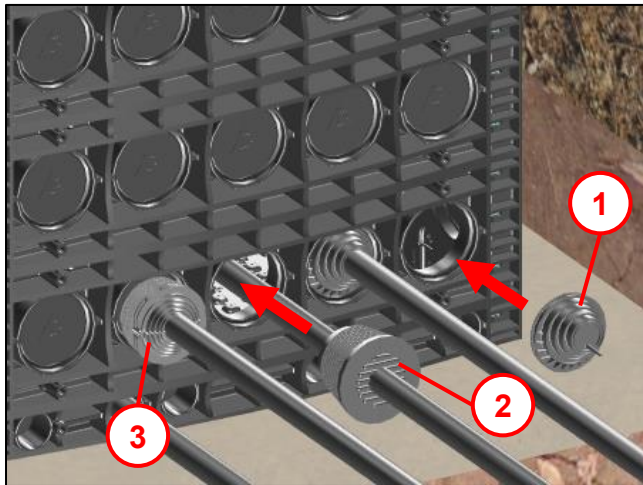


Fig. 18

We recommend the use of a protective pipe seal Ø110/Ø50 mm **(2)**, sealing plugs Ø110 **(3)** or stepped grommets **(1)** to prevent the manhole from silting up when laying grounding cables and pipes with a defined diameter.

Note!

Not included with standard delivery. Please order separately.

- Using a suitable tool, open up the required pipe diameter at the predetermined breaking point.
- Insert the stepped grommet, protective pipe seal or sealing plug from outside into the opening (Ø110 mm) in the manhole as shown (note the direction of installation!)

6.2.3 Installing micro-duct pipes

(Illustrative example)

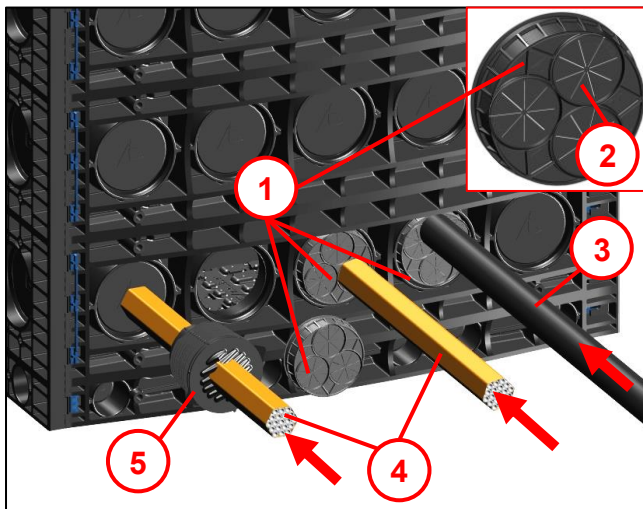



Fig. 19

The micro-duct pipe adapter **(1)** is not included with standard delivery and must be ordered separately.

- Insert the micro-duct pipe adapter from outside into the open cable duct until the circumferential groove clicks into the opening over the circumferential edge (not the direction of installation!).
- Guide the micro-duct pipe bundle **(4)** (max. Ø 46 mm) into the manhole either through the slotted openings **(2)** in the micro-duct pipe adapter or protect it with a protective pipe seal **(5)** to prevent it from silting up.

Note!

Grip the slotted openings **(2)** of pipes with max. Ø 50 mm **(3)** at the marked tab  and remove.

6.3 Optional manhole structure for existing routes

6.3.1 Installing an overbuild frame for existing Ø50 mm pipes

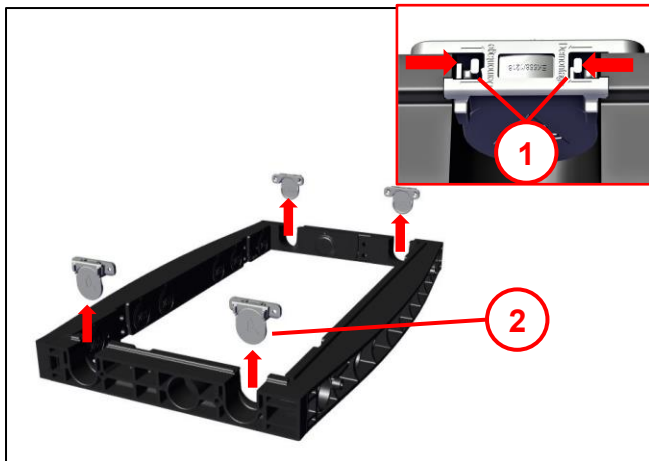


Fig. 20

- The pre-mounted adapters (2) are removed by pressing together the two snap lugs (1).

6.3.2 Inserting existing pipes

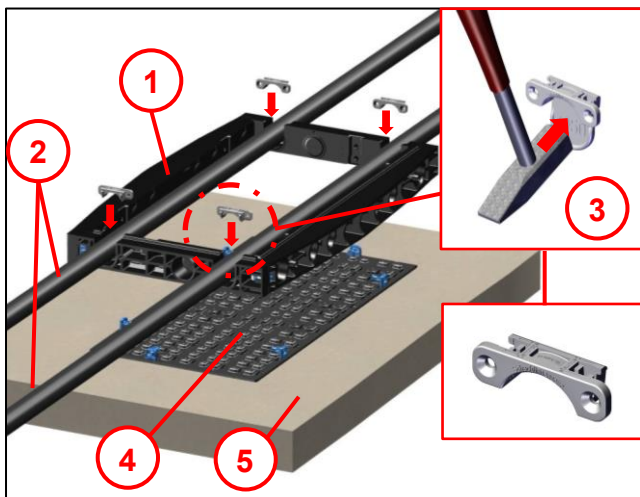


Fig. 21

- Place the base plate (4) on the foundation pit base (5).
- Place the overbuild frame (H=70 mm) (1) on the base plate (4) and connect with dowel clips (see section 6.1.4).
- Note!** Create a foundation pit base if there is not already one on site (see section 0).
- Put the existing Ø50 mm pipes (2) into the recesses.
- Knock out the predetermined breaking point on the adapters (3).
- Place the adapters over the pipes and press them into the recesses until they engage.
- For further assembly of the frame components, see sections 6.1.3 to 6.1.6.

6.3.3 Installing an overbuild frame for existing Ø110 mm pipes

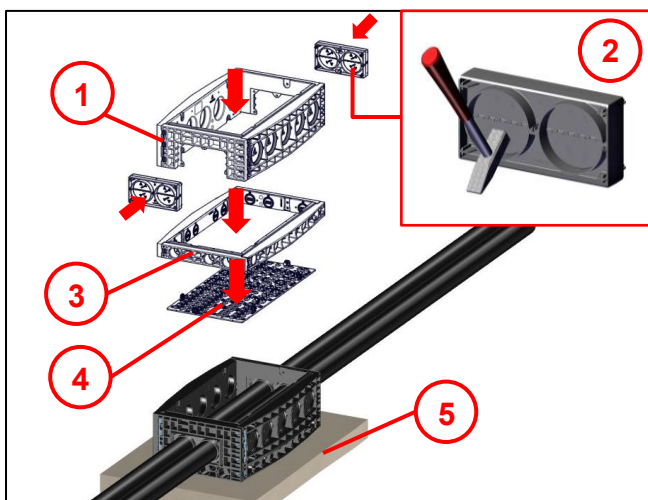


Fig. 22

- Place the base plate (4) on the foundation pit base (5).
- Put the frame component (H=70 mm) (3) on the base plate.
- Place the overbuild frame (H=220 mm) (1) on the frame component (H=70 mm) (3).
- Knock out the predetermined breaking points on the adapter plates (2) and insert them over the existing pipes in the frame.
- Note!** Create a foundation pit base if there is not already one on site (see section 0).
- For further assembly of the frame components, see sections 6.1.3 to 6.1.6.

6.4 Backfilling the foundation pit up to the lower edge of the top layer

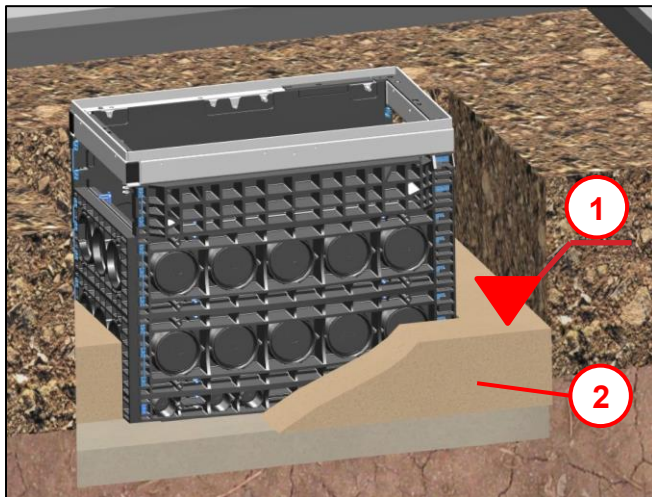


Fig. 23

- Backfill the foundation pit in layers using material suitable for compacting **(2)** in accordance with ZTV E-StB 09 up to the lower edge of the top layer **(1)**.

6.5 Inserting the manhole cover

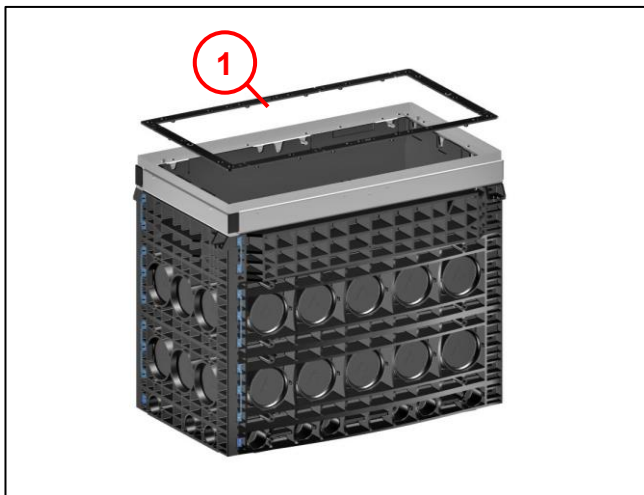


Fig. 24

The following must be observed to ensure proper assembly of any manhole cover:

- The damping pad **(1)** must be complete.
- The damping pad may not be damaged.
- The damping pad must be cleaned before the manhole cover is inserted to ensure that the manhole cover fits as well as possible.

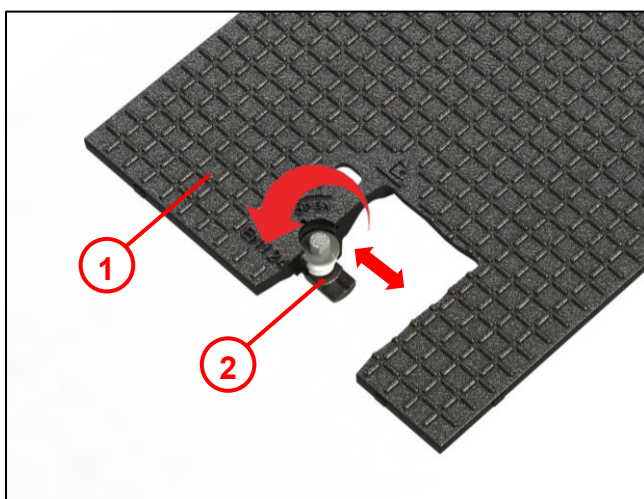


Fig. 25

- Before inserting the manhole cover **(1)**, turn the lock catch **(2)** to the "OPEN" position (90° anticlockwise).

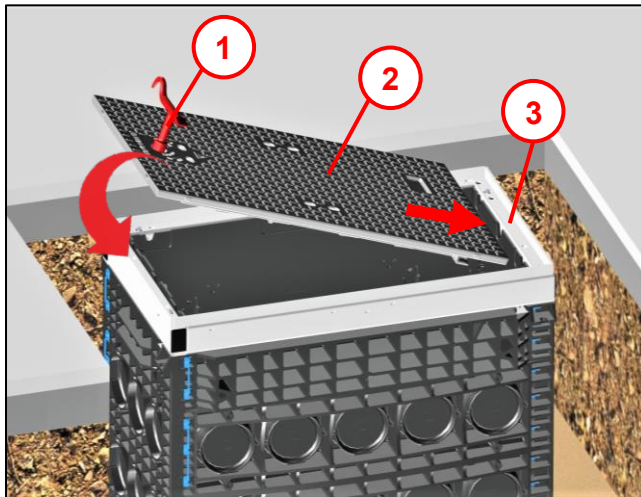


Fig. 26

- Use a suitable lifting tool (1) to lift the manhole cover (2) and place it on the steel frame (3).
- Note the next step in Fig. 27 for exactly how to place the cover!

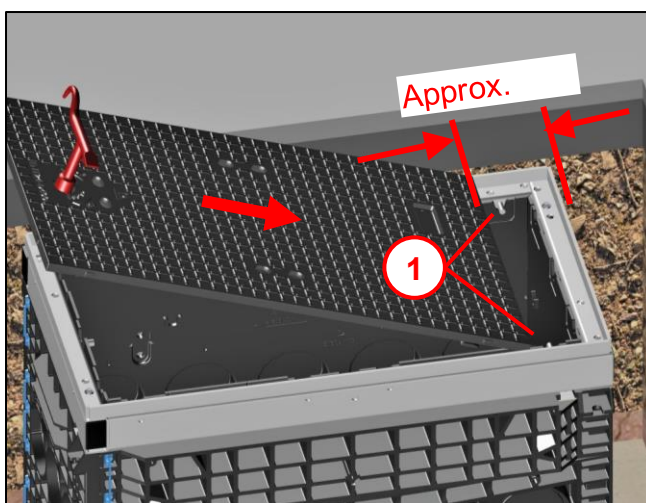


Fig. 27

- Place the manhole cover obliquely approx. 100 mm from the steel frame and slide it until it engages with the retaining bolts on each side (1).

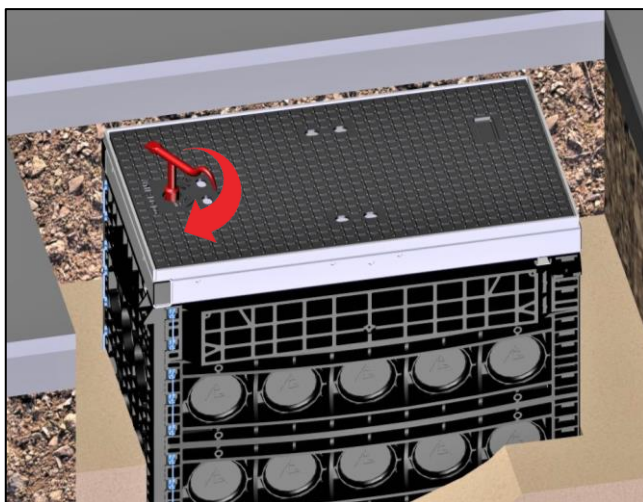


Fig. 28

- To lock the manhole cover, turn the lock catch to the "CLOSED" position (90° clockwise).
- The cover is locked when the retaining bolts audibly click into place.

6.6 Constructing the top layer

(Example shows vehicle traffic areas)

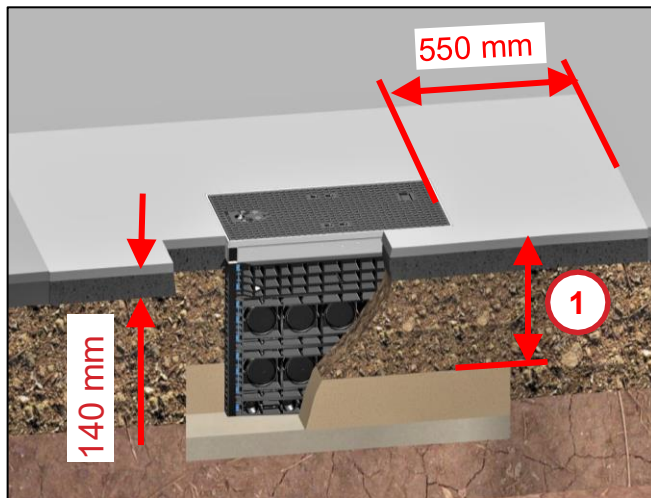


Fig. 29

- Construct the top layer **(1)** in accordance with ZTV A-StB 12 (and/or Guidelines for the standardisation of traffic area top layers RStO 2012).
- At the surface of the top layer, allow a strip of concrete or poured asphalt at least 550 mm wide and 140 mm thick (asphalt base layer of at least load class 0.3 according to RStO 2012).

The manhole assembly without height adjustment is completed.

7 Optional: manhole installation with height adjustment

7.1 When using casting mortar (similar to AzKm)

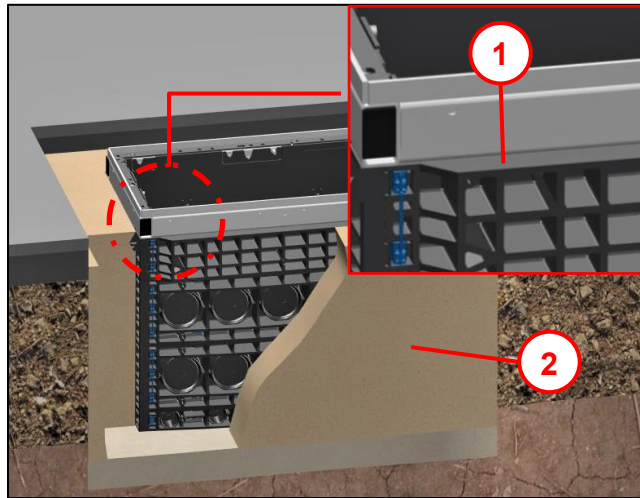


Fig. 30

- Backfill the foundation pit in layers using material suitable for compacting (2) in accordance with ZTV A-StB 12 (and/or ZTV E-StB 09) up to the **contact surface of the top frame (1)**.

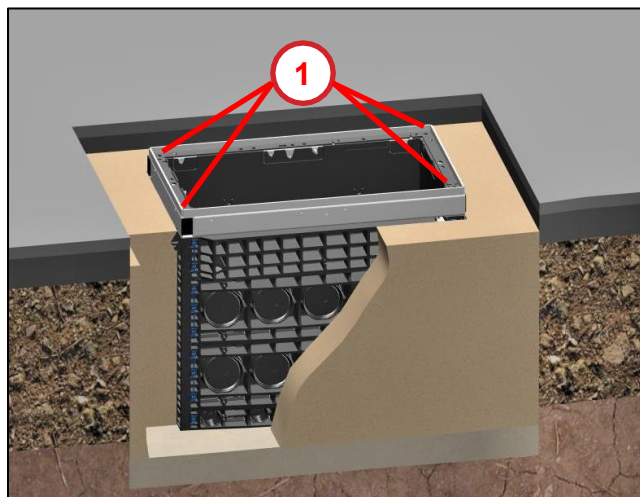


Fig. 31

- The set screws with AF5 hexagon socket for height adjustment (1) are attached to all four corners.

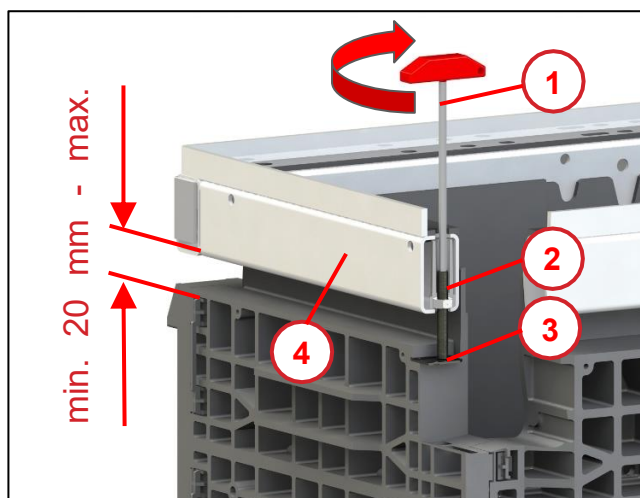


Fig. 32

- Turn the AF5 hexagon screwdriver (1) clockwise at all four height adjustment points to lift the steel frame (4) and adjust it to the intended manhole cover height.
Note!
 - The ideal adjustment range is at least 20 mm to maximum 50 mm.
 - Ensure that the set screw (2) is always in contact with the support plate (3).

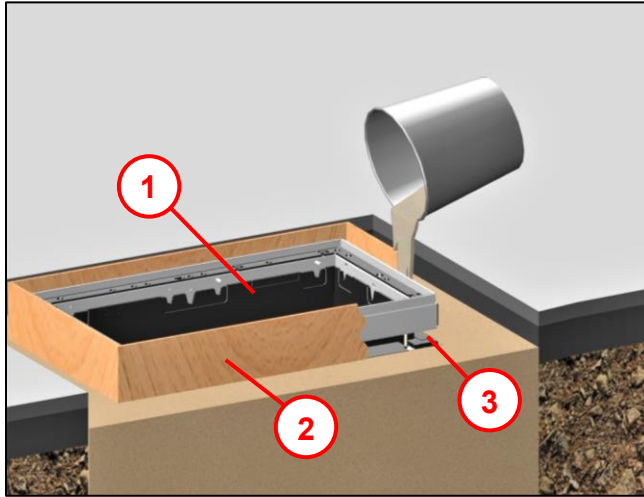


Fig. 33

- Prepare a suitable formwork frame on site (2) to fill in the gap between the top frame and steel frame (3) to prevent the casting mortar from flowing away.
- Inside, an existing shuttering wall on the top frame (1) prevents the penetration of casting mortar.
- Backfill according to DIN 18555
- Compressive strength $>35 \text{ N/mm}^2$ after 28 days.

Note!

Do not use foam to fill in the gap! It does not meet load capacity requirements!

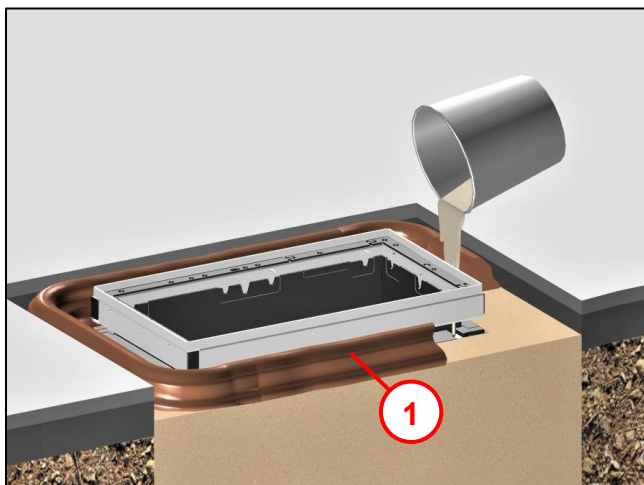


Fig. 34

- Alternatively, form a suitable earth wall (1) to prevent the casting mortar from flowing away.

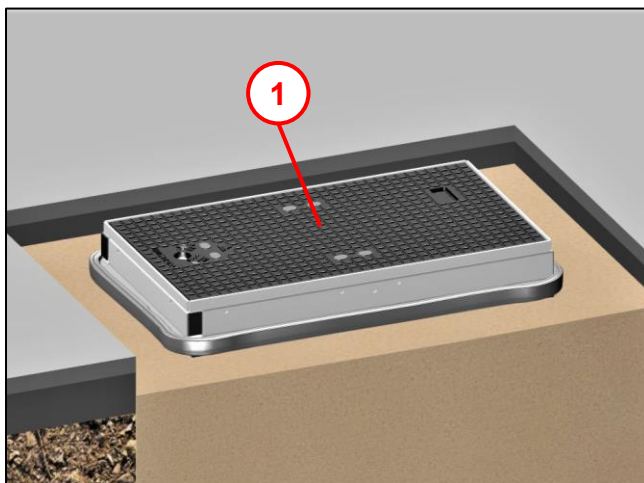


Fig. 35

- Replace and lock the manhole cover (1). (See section 6.5).

Note!

Only load the manhole after the casting mortar used reaches the rigidity specified by the manufacturer!

- Construct the top layer in accordance with ZTV A-StB 12 (see section 6.6).

7.2 When using dry mortar (similar to Kombina 35 S)

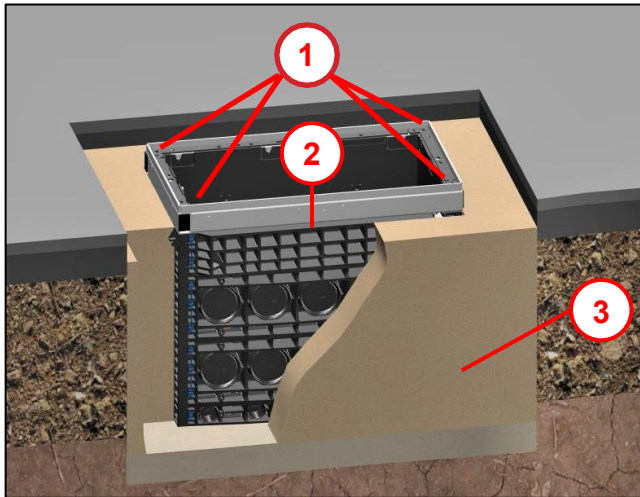


Fig. 36

- Backfill the foundation pit in layers using material suitable for compacting **(3)** in accordance with ZTV A-StB 12 (and/or ZTV E-StB 09) up to the **contact surface of the top frame (2)** (see also Fig. 30 **Fehler! Verweisquelle konnte nicht gefunden werden.**).
- The set screws with AF5 hexagon socket for height adjustment **(1)** are attached to all four corners.

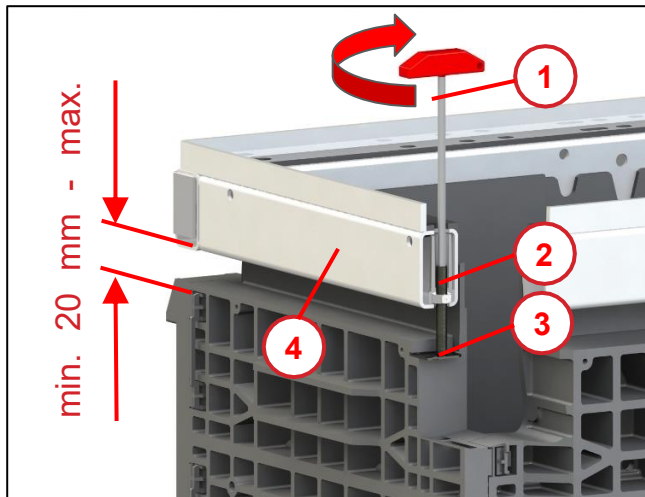


Fig. 37

- Turn the AF5 hexagon screwdriver **(1)** clockwise at all four height adjustment points to lift the steel frame **(4)** and adjust it to the intended manhole cover height.

Note!

- The ideal adjustment range is at least 20 mm to maximum 50 mm.
- Ensure that the set screw **(2)** is always in contact with the support plate **(3)**.

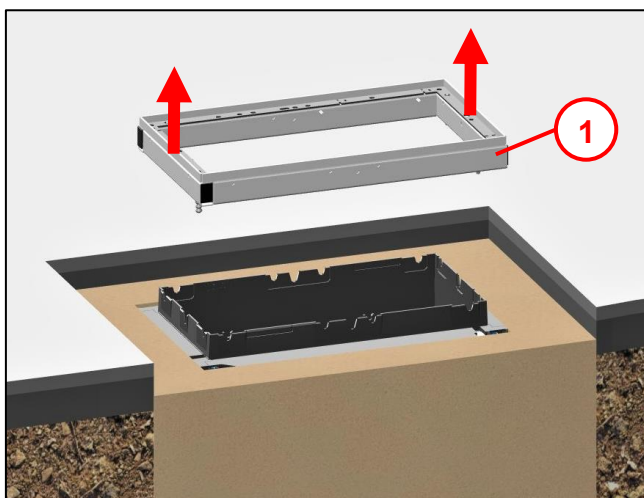


Fig. 38

- Once the height has been adjusted, remove the steel frame **(1)** and set it aside next to the manhole.

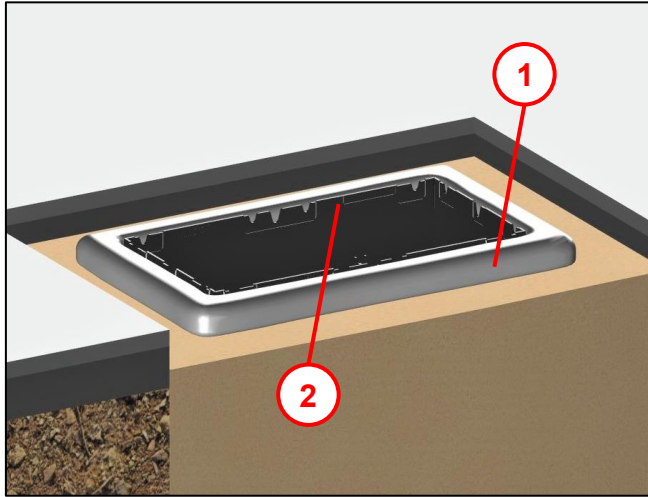


Fig. 39

- Use dimensionally stable dry mortar (1) to fill in the gap between the top frame and the steel frame.
- Inside, an existing shuttering wall on the top frame (2) prevents dry mortar penetration.
- Backfill according to DIN 18555
- Compressive strength $>35 \text{ N/mm}^2$ after 28 days.

Note!

Dry mortar

Do not use foam to fill in the gap! It does not meet load capacity requirements!

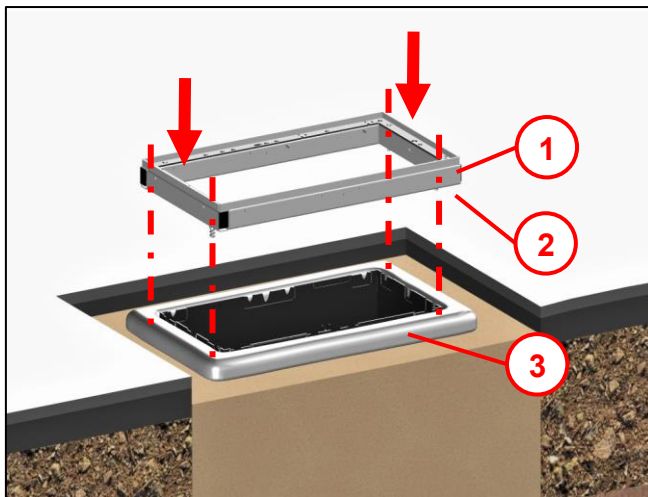


Fig. 40

- Place the steel frame (1) back on the manhole.
- Note!**
Push the set screws (2) from the earlier height adjustment through the dry mortar (3) while it is still soft, until they are back in contact with the support plate (see Fig. 37 item 3).

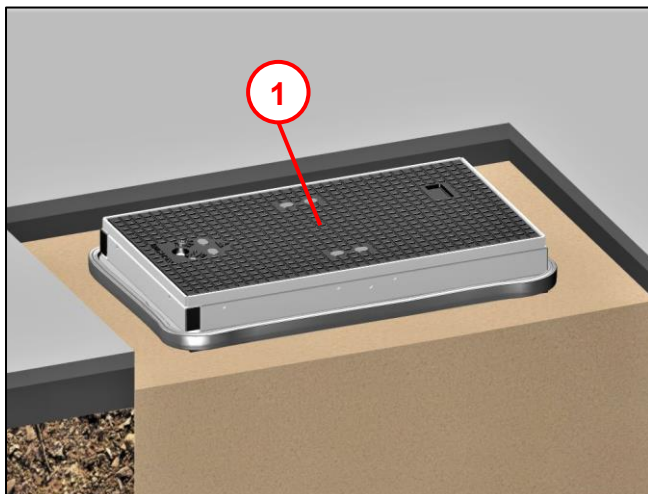


Fig. 41

- Replace and lock the manhole cover (1). (See section 6.5).
- Note!**
Only load the manhole after the casting mortar used reaches the rigidity specified by the manufacturer!
- Construct the top layer in accordance with ZTV A-StB 12 (see section 6.6).

8 2-piece manhole cover

8.1 Opening the manhole cover

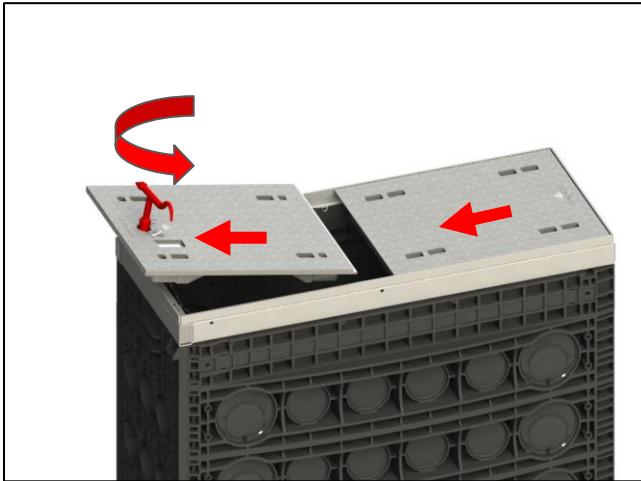


Fig. 42

- Use the appropriate key to open the manhole cover, turning the lock catch to the “OPEN” position (90° anticlockwise).
- With a suitable tool, lift the manhole cover and pull it out sideways.
- Using a suitable tool, pull the second manhole cover sideways out of the four retaining bolts and lift it up.

8.2 Inserting and closing the manhole cover

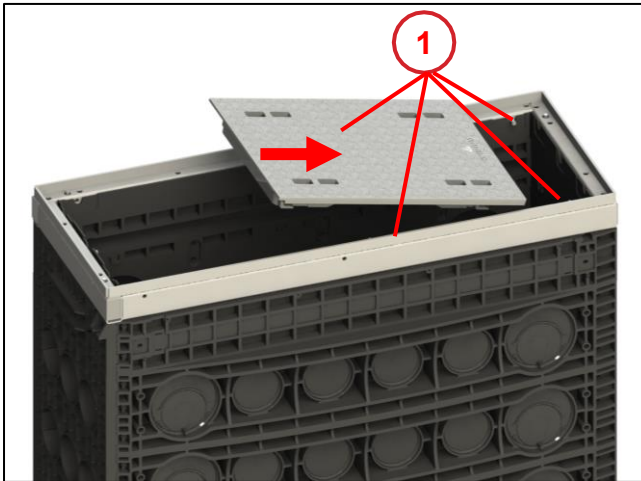


Fig. 43

- To close the manhole cover, first position it without the lock catch.
- Set the manhole cover down obliquely and slide it under the retaining bolts (1).

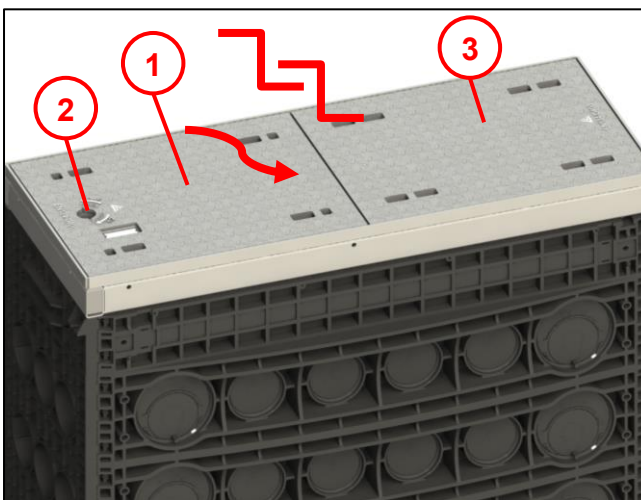


Fig. 44

Note!

Before inserting the second manhole cover (1), turn the lock catch (2) to the “OPEN” position (90° anticlockwise).

- Set down the manhole cover with the lock catch (1) positioned obliquely and slide it under the manhole cover (3) already in place (overlap/underlap).
- The lock catch (2) must be on the outside of the manhole.
- Turn the catch to the “CLOSED” position (90° clockwise). The cover is locked when the retaining bolts audibly click into place.

8.3 Inserting and removing 2-piece concrete-lined manhole cover

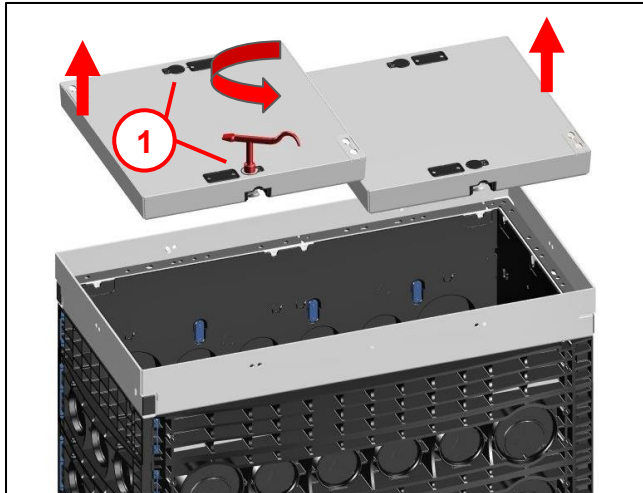


Fig. 45

- Each manhole cover has two lock catches **(1)**.
- Turn the lock catch to the “OPEN” position (90° anticlockwise) to open the manhole cover.
- Lift out the manhole cover using a suitable tool.

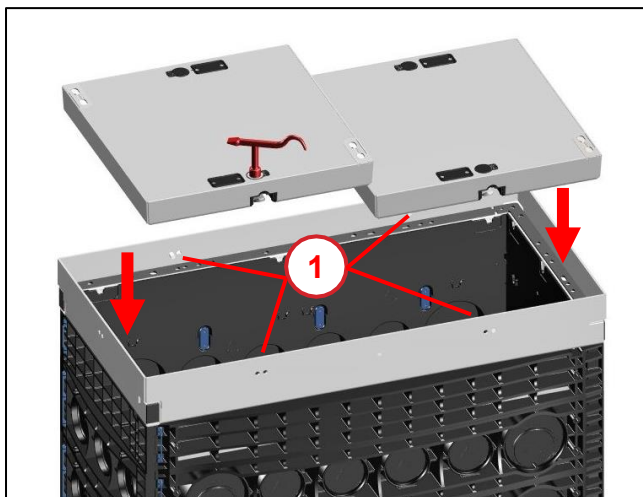


Fig. 46

- To close the cover, turn the lock catches to the “OPEN” position.
 - Use a suitable tool to lift the manhole covers and place them in the steel frame.
 - No particular order needs to be followed.
 - Turn the catch to the “CLOSED” position (90° clockwise).
 - The cover is locked when the retaining bolts **(1)** audibly click into place.
- Note!** see section 6.5

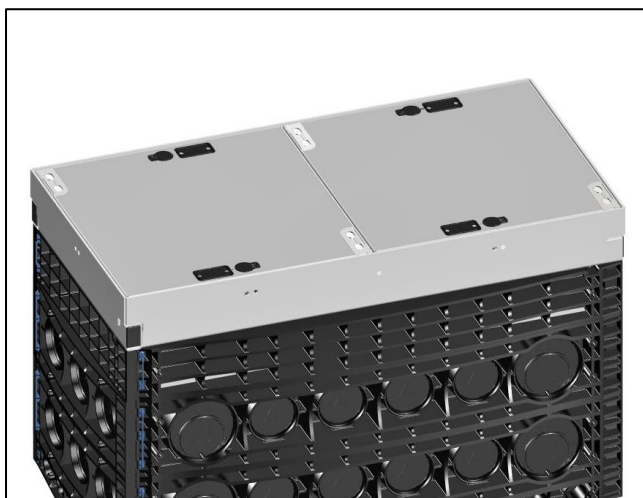


Fig. 47

- Installation of the 2-piece concrete-lined manhole cover is now complete.

9 Handling paveable manhole covers

9.1 Preparation of the available concrete filling

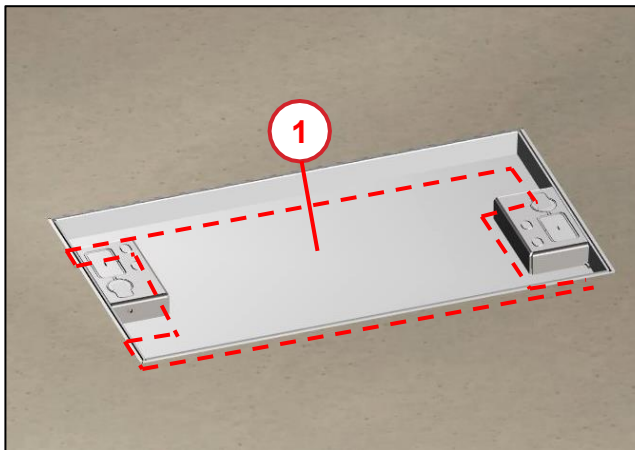


Fig. 48

- Preparation of the concrete filling (1) provided ex-works.
- Make sure that the surface of the concrete filling is level, free of dirt or shrinking components.

For example, if there are potentially shrinking cement-lime layers, then work the surface with a diamond grinding wheel to ensure that it is rough and sufficiently load-bearing.

9.2 Preparation for paving

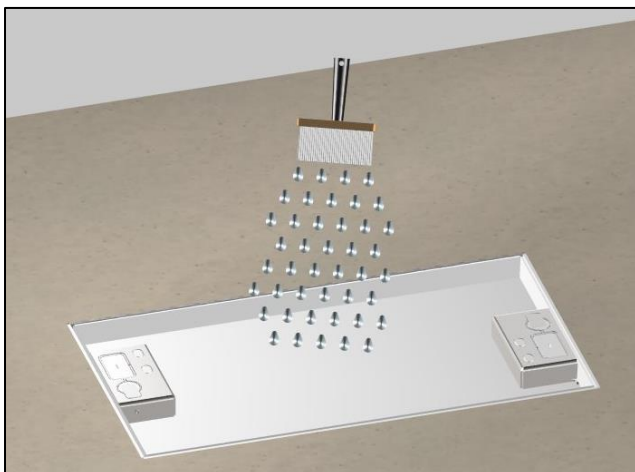


Fig. 49

- First wet the surface with water before laying the paving stones.
- Make sure that the base surface is damp before applying the adhesive mortar.

9.3 Laying the mortar bed

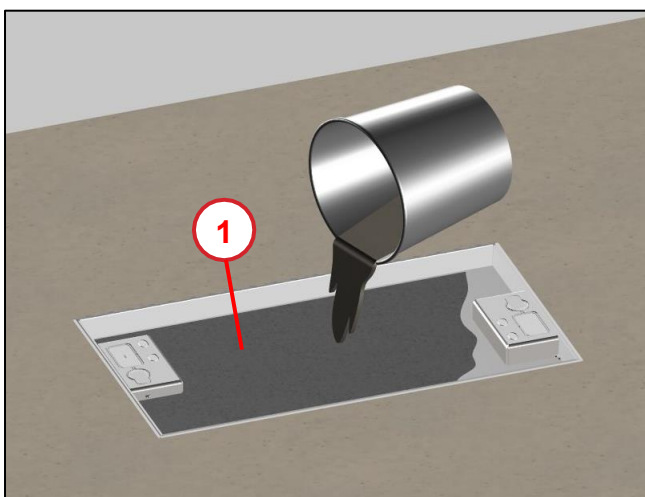


Fig. 50

- Use *PCI Carrament Grey* or similar to professionally bond the concrete slabs or natural stone paving stones.

The thickness of the adhesive layer required can be found in the corresponding data sheet.

9.4 Paving and grouting

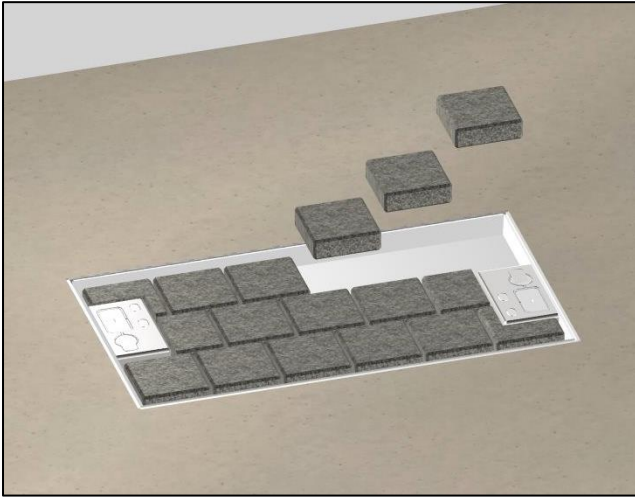


Fig. 51

- Tap in the paving stones before the base has fully dried.

Note!

Grout after allowing to harden for 6 hours.

Use *PCI Pavifix CEM Rapid* or similar to grout the stones.

The surface thus prepared is fully load-bearing after approx. 48 hours (at +23 °C and 50% air humidity).

10 Maintenance

Measures	Intervals	Remarks
Check, clean and replace any missing hole plugs before opening the manhole cover and locking mechanism.	With each use.	Only open and close the locking mechanism with the operating key supplied for this purpose. Use appropriate lifting equipment to lift off the cover.
Clean the damping pad for the manhole cover.	Vehicle traffic areas: Once per year Pedestrian areas: As required	Replace if damaged.
Clean the damping pad for the manhole cover.	With each use.	Sweep clean with a brush.
For screwed variants:		
Treat the locking screws in the manhole cover with anti-seize paste before screwing them in. Only tighten with a suitable tool (see section 0). Recommended tightening torque = 46 Nm.	After each use.	Screw in the locking screws by hand only! Anti-seize paste is available from Langmatz (for information see section 14 – Contacts).

11 Material defects

Langmatz GmbH accepts liability for material defects in the product as per Section 434 BGB (German Civil Code) for 24 months, starting from the date on the purchase receipt.

Within the scope of liability, all parts that become damaged due to manufacturing faults or material defects will be replaced or repaired free of charge.

The purchaser must report any deficiency complaints immediately in writing.

Claims by the purchaser for damages due to material defects or for whatever legal reason will not be accepted.

Any damage or failure caused by the following are also excluded from liability

- Incorrect use,
- Natural wear and tear
- Intervention by third parties.

We accept no liability for damage caused by force majeure or transport.

Repairs due to a complaint about a defect do not extend the warranty period for the replaced parts or for the product.

12 Quality management

The Langmatz GmbH quality management system is certified to DIN EN ISO 9001.

13 Disclaimer/Warranty

The information in this technical document is presented appropriately and correctly in compliance with the technical regulations, and to the best of our knowledge. However, this does not confer any guarantee of particular characteristics. In this context, the operator of the Langmatz GmbH products is expressly obliged to decide, based on their own judgement, whether the products are suitable and appropriate for the application or use being considered. The product liability accepted by Langmatz GmbH relates exclusively to our conditions of sale, delivery, and payment. Langmatz GmbH accepts no liability on the basis of random, indirect and resultant consequential damage, or of any damage attributable to any use of the product other than its intended purpose as described.

14 Contact

Langmatz GmbH
Am Gschwend 10
82467 Garmisch-Partenkirchen, Germany

Our hotline: +49 88 21 920 – 137
Phone: +49 88 21 920 – 0
Email: info@langmatz.de
www.langmatz.de

