

02.05 Installation instructions for RAUSIKKO Box SX



02.05.01 General

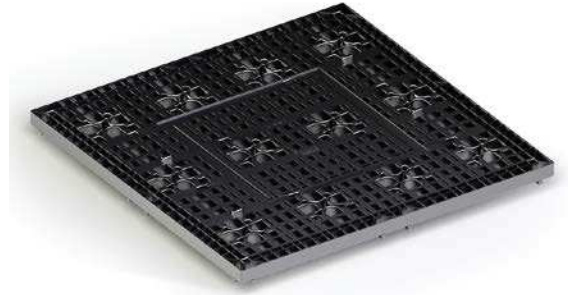
The RAUSIKKO Box is used for building rainwater management systems. Detailed information on products can be found in our price list for rainwater management (print no. 838350).

The following basic modules of the RAUSIKKO Box ensure optimal, project-related assembly of such systems:

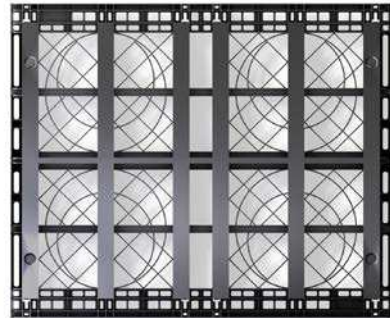
1 Overview of system components RAUSIKKO Box SX



Base element SX



Cover grille 8.3 SX



Side grille 8.6 SX



Side grille 8.3 SX



RAUSIKKO SX connection adapter

2 System structure

Percolation systems are covered with a RAUMAT water-permeable geotextile. Detailed information on RAUMAT is available in the section "Laying geotextile filters" on page 48.

Systems designed for storage/retention are covered sandwich-style with geotextile, then a plastic liner sheet, then more geotextile.

The RAUSIKKO Boxes can be arranged one after another, next to each other and on top of each other. For vertical construction, there is an option to combine boxes with construction height 660 mm (type 8.6, for whole layers) and boxes with construction height 360 mm (type 8.3 for half layers).

To ensure effective system cleaning and uniform water distribution, we recommend arranging the RAUSIKKO Boxes SC with an integrated cleaning and distribution channel as laid out in section "02.04 Installation instructions for RAUSIKKO Boxes SC/S/HC/H" on page 35 ff.

For better inner cohesion of a gravel trench, you can construct the RAUSIKKO Box SX in a wall structure. More information on this can be found in the chapter "4 Setup in a wall structure" on page 51 .

There are further suitable solutions for chamber and pipe connections and for ventilation . The relevant installation information can be found in the sections "Connections and chambers" on page 52 and "02.07 RAUSIKKO Ventilation plate" on page 56.

The systems for rainwater purification can be found in the chapters "05 RAUSIKKO SediClean and Filter-Clean" on page <?>, "06 RAUSIKKO HydroClean" on page <?> and "07 RAUSIKKO HydroMaxx" on page <?>.



RAUSIKKO Boxes 8.6 SC with RAUSIKKO Boxes 8.6 SX



RAUSIKKO Boxes 8.3 SC with RAUSIKKO Boxes 8.3 SX

02.05.02 Installation conditions

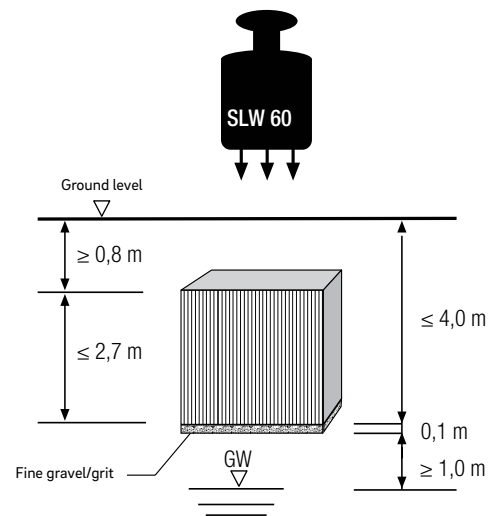


When using RAUSIKKO Boxes in a gravel trench or reservoir system which is accessible to vehicles, (generally*) a minimum covering of 0.8 m and a maximum installation depth of 4.0 m must be observed.

- The height of the gravel trench or reservoir system must not exceed 2.7 m.
- The ground underneath the boxes must have sufficient load bearing capacity. If necessary, corresponding measures to increase the load bearing capacity are to be taken.
- The systems should not be installed where there is permanent or occasionally occurring ground, stratum or impounded water. In the case of percolation systems, the relevant recommendations of work sheet DWA-A 138 are to be considered. According to this, the distance from the highest average groundwater level should be at least 1.0 m.
- Under the conditions described above and taking into account the following installation guidelines, the ground surface on top of and next to the boxes may be loaded with a maximum traffic load corresponding to SLW 60 in accordance with DIN 1072 (heavy goods vehicles with a total weight of 60 t and a wheel load of 100 kN or a compensating distribution load of 33.3 kN/m²).
- These conditions are also to be maintained throughout the whole construction period. The construction site is to be organised accordingly.
- In particular it is to be ensured that no cranes, silos, containers, construction or excavated materials, which could lead to a larger single or surface load than described above, are placed above the gravel trench or reservoir system.

Installation conditions which deviate from this – in particular deeper installation depths – require an individual assessment and are to be clarified with the REHAU Applications Engineering Department. Approval of these alternative installation conditions is ultimately given by the company commissioned with the installation and/or the construction supervisor or planner.

Standard conditions*):



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For installation under classified road surfaces, observe the guidelines' specifications for standardising the roadbed (issue 2012).

*1) Native soil of soil types G1 to G3 according to DWA work sheet A 127 (friable and non-cohesive soils and also cohesive mixed soils and silts)

02.05.03 Transport and storage

The RAUSIKKO Boxes are supplied stacked and strapped onto palettes.



Danger due to lack of stability

The stack can be unloaded using a forklift or wheel loader. Unloading must be carried out with care. The stack must not be knocked over or dropped.

For safety reasons, we recommend transporting the palettes to the construction site one at a time.



Transporting a palette with base elements

The RAUSIKKO Boxes can be stored outside. They are to be placed on level, solid ground. The stack height must not exceed 2 pallets.

The maximum permissible open-air storage time is one year. Damaged boxes may no longer be used.



The boxes are to be stored in such a way that they are protected from direct sunlight (stored in the shade or covered with a light geotextile fabric). In the latter case, ensure that no heat builds up underneath the cover.

Sub-surface installation should only take place once the boxes have cooled to ambient temperature.

02.05.04 Preparing excavation pits and bedding

The applicable legislation on accident prevention during excavation and also the applicable standards for digging excavation pits and trenches are to be observed.

- The length of the trench equates to the length of the gravel trench plus working area.
- The trench depth of a box-gravel trench or a reservoir equates to the height of the gravel trench plus the top fill height and the height of the grit or fine gravel bed (around 0.1 m, see below).
- The trench depth of a ditch-gravel trench (with a box-gravel trench underneath the ditch) equates to the depth of the ditch plus the depth of the gravel trench (according to design) and also the thickness of the top soil layer (normally 0.3 m) and the fine gravel bed (around 0.1 m, see below).
- The base of the trench must be free of stones, smooth and completely flat. The load bearing capacity and permeability of the base must be at least equal to the grown ground. If necessary suitable measures are to be taken (soil replacement, re-compacting, etc.).



Excavation pit after preparation



On the base, an approx. 10 cm thick grit bed (e.g. grain of 2/8 mm) must be built. The bed is to be laid thinly and evenly using suitable equipment (planer or similar). Laying the gravel layer is to be carried out with great care.

02.05.05 Laying geotextile filters

In the case of percolation systems, the box-gravel trench is completely covered with the RAUMATE Non-woven separator and geotextile filter (min. 150 g/ m²) in order to prevent the permeation of fine soil particles. The geotextile should be laid perpendicular to the length of the trench.



RAUMAT Geotextile filter

Meaning:
Length of geotextile channels =
 $2 \times \text{height} + 2 \times \text{width} +$
0.5 m overlap.

The lengthways overlap and the overlap on the front ends should also be approx. 0.5 m.

Fasten both ends of the geotextile temporarily to the edges of the trench, the trench walls or the trench sheeting.

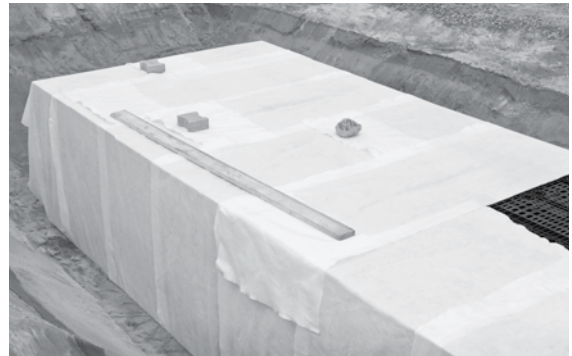


Excavation pit with laid-out geotextile channel

Where there are pipe penetrations, cut the geotextile fabric cross-wise.

Once the boxes have been installed and all chamber connections have been fitted, remove the RAUMAT Non-woven separator and geotextile filter from the edges of the trench and lay it across the RAUSIKKO Boxes with a 0.5 m overlap at the edge of the geotextile. Ensure that the geotextile fabric lies tightly against the boxes and no earth gets between the RAUSIKKO Boxes and the geotextile fabric.

Cover the front of the gravel trench with a pre-cut the size of the surface area of the front end plus an approx. 0.5 m wide overlap.



RAUSIKKO Box with geotextile filter

If the boxes are only going to be used to store or retain rainwater (for example, as quench water cisterns), cover the boxes with a liner sheet instead of a geotextile filter, so that they are watertight. The liner sheet is to be protected against mechanical damage on both sides with a protective membrane of at least 400 g/ m².

Particular attention must be paid to the alignment of corners and the connections.

The plastic liner sheet must be heat-sealed by a qualified company certified in accordance with WHG (Federal Water Act) and DVS (German Welding Society) guidelines. The geomembranes must not get damaged during heat-sealing.

02.05.06 Assembling boxes



Before assembling the boxes or box systems, a non-woven separator and geotextile filter (for percolation systems) or a liner sheet (for rainwater storage or retention) must be laid in the excavation pit; see section "Laying geotextile filters" on page 48.



No additional connection elements are required for assembling the RAUSIKKO Box SX. The components connect to each other with their integrated latching elements.



Plugs and receiving hole on the base elements

1 RAUSIKKO Box 8.6 SX

1. To assemble a RAUSIKKO Box 8.6 SX, position the supporting columns of two base elements on top of each other in such a way that the plugs of one base element are inserted into the receiving holes of the other base element (see fig.).
2. Apply pressure from above to make the base elements latch into each other.



Assembling a Box 8.6 SX



Box 8.6 SX after assembly

2 RAUSIKKO Box 8.6 SX Side grille



Place side grilles only on the outer edge of the gravel trench.

The side boundaries of a gravel trench construction are closed with side grilles.

1. To install these, attach a side grille to a Box 8.6 SX (see fig.) and the insert the plugs of the side grille into the receiving holes on the base element.
2. Apply pressure from the side to make the side grille latch into the base element.



Installation of a side grille on a Box 8.6 SX



Box 8.6 SX with side grille installed

3 RAUSIKKO Box 8.3 SX

1. To assemble a RAUSIKKO Box 8.3 SX, position the plugs and receiving holes of a cover grille above the support columns of a base element in such a way that the components line up (see fig.).
2. Apply pressure from above to make the cover grille latch into the base element.



Assembling a Box 8.3 SX



Assembled Box 8.3 SX

4 RAUSIKKO Box 8.3 SX Side grille

Close off the borders of the gravel trench with side grilles.

1. To install these, attach a side grille to a Box 8.3 SX (see fig. below) and position the side grille plugs in the receivers on the base element.
2. Apply side pressure to make the side grille latch in.



Installation of a side grille on a Box 8.3 SX



Box 8.3 SX with side grille installed



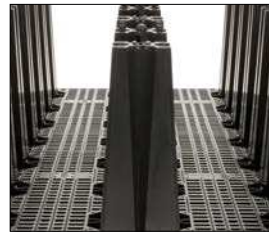
To make sure the pieces latch smoothly, when installing the side grille, ensure that the geotextile does not get clamped between the base element and the side grille.

02.05.07 Installing boxes

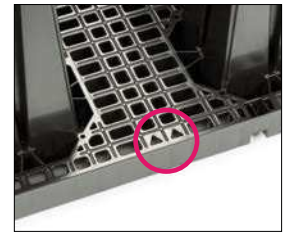
The structure and dimensions of the systems are available in the design and planning documents, in particular, the width, length and height of the gravel trench and also the number of layers and alignment of the modules.

1 Inspection channel and direction marking

The base elements are put together in such a way that they have a continuous inspection channel (see fig.).



Inspection channel



Direction markings of the inspection channel



When assembling multiple conjoined base elements to form a row, all marking arrows must point in one direction.

2 Multi-layer setup

When assembling multi-layer box systems, the block elements are fixed on top of each other using integrated push-fit socket connections.

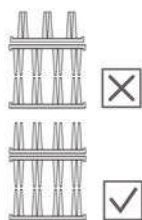


Push-fit sockets on the top and bottom of the SX Boxes

When you place two SX base elements on top of each other, the push-fit sockets of one fit into the hollow chambers of the other. When doing this, make sure that the orientation of the box pillars on each box is the same (see fig.).



Placing RAUSIKKO base elements on top of each other



Orientation of the channels in a multi-layer structure

3 Multi-layer setup with RAUSIKKO Box SC

When you position a base element SX onto a RAUSIKKO Box SC, the push-fit sockets fit into the hollow chambers.



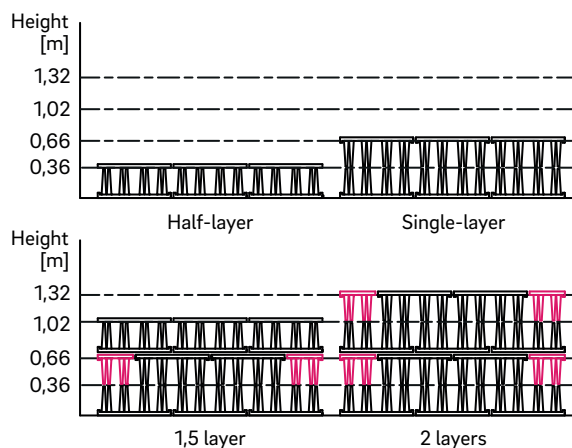
RAUSIKKO Box SX on Box SC



Push-fit socket of a RAUSIKKO Box SC

4 Setup in a wall structure

For systems with a total height of 1 m or more, it is recommended to set up all modules in a staggered pattern within in wall structure.



Recommended installation of RAUSIKKO Boxes SX

For the wall structure, one base element should be cut at the cutting mark in each row of boxes.



Cutting the base element along the cutting guide



Divided base element for the wall structure



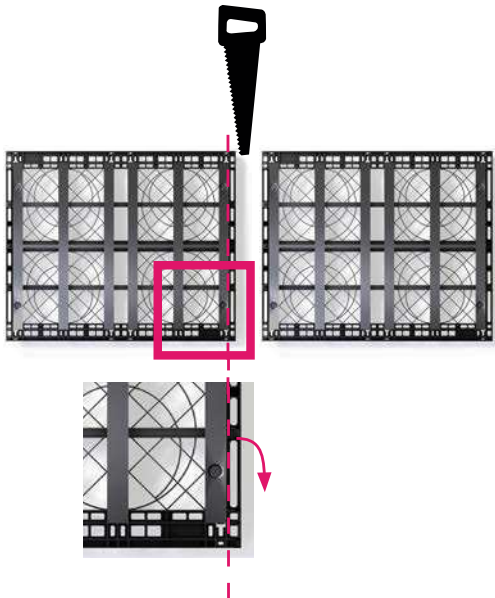
First stages of gravel trench construction with a cleaning channel in the wall structure

5 Inside corners



Inside corner of a percolation/retention system made from RAUSIKKO Boxes 8.6 SX

The edge of one of the two neighbouring side grilles (type 8.6 or 8.3) in the inside corners of a percolation or retention system is to be trimmed with a fine-toothed saw as follows:



Trimming an 8.6 SX side grille along the outer spacer block

02.05.08 Connections and chambers

Connect the pipes

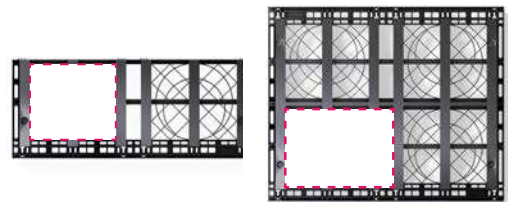
For a direct connection of smooth-walled sewer pipes (e.g. AWADUKT PP) to a RAUSIKKO Box SX, the corresponding RAUSIKKO connection adapter DN 160, DN 200 and DN 250 as well as a connection adapter DN 315–500 are available.



RAUSIKKO SX Connection adapter

The connection adapters DN 160, DN 200 and DN 250 are mounted as follows:

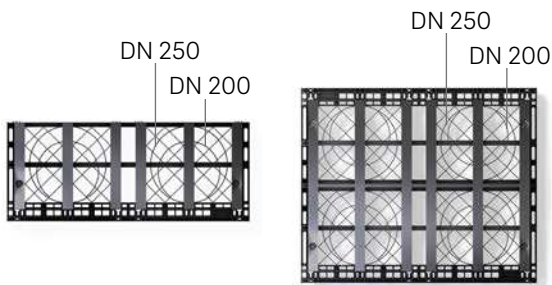
1. Saw out the relevant side grille with a fine-toothed saw (e.g. jigsaw) along the cutting guides dotted in red at the bottom.



2. Position the adapter in the centre of the sawed-out area and fasten to the side grille with 4 wood screws (not included in the delivery contents).
3. Clip the side grille onto the RAUSIKKO Box SX.

For connecting pipes with a nominal diameter of DN 315 or higher, the connection adapter DN 315–DN 500 and the C3 chamber can be used (see section "02.06 RAUSIKKO Connection adapter DN 315–500" on page 55).

The 8.3 SX and 8.6 SX side grilles can be cut to size for lateral connections. For this purpose, the side grilles are fitted with a sawing matrix for the connection of KG pipes DN 200 to DN 250.



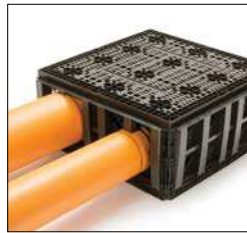
Side grille 8.3 SX

Side grille 8.6 SX

1. Cut the corresponding sawing matrix out of the side grille using a fine-toothed saw. The grille structure must not be damaged in doing so.
2. If needed, deburr the cutting area.
3. Insert the KG pipe spigot. The insertion depth of the pipe may be at most 5 cm in relation to the exterior surface of the box.



Cut-out side grille



RAUSIKKO Box 8.3 SX with opened side grille and KG pipes inserted

Section "02.01.03 Connection options for RAUSIKKO Box SX" on page 27 gives an overview of the connection options.

Chambers

- The REHAU AWASCHACHT, RAUSIKKO C3 System chamber and/or RAUSIKKO SX Chamber are used as inlet, inspection or cleaning chambers. Details on how to install the chamber systems AWASCHACHT, C3 and SX can be found in the chapter "08 RAUSIKKO Chambers" on page <?>.
- RAUSIKKO throttle chambers DN 600 or DN 1000 are used to prevent backflow.

Details on how to install RAUSIKKO throttle chambers can be found in the corresponding installation instructions; see chapter "08 RAUSIKKO Chambers" on page <?> ff.



RAUSIKKO C3 System chamber



SX chamber built into a single-layer RAUSIKKO Box SX percolation/retention system

02.05.09 Filling the excavation pit



Compacting the work area

- The working area next to the gravel trench or rain-water tank is to be filled with non-cohesive, stone-free soil which can be compacted (sand or gravel, soil group G1 according to DWA work sheet A 127) in 0.3 m-thick layers. The filler base should be compacted in layers with a light to medium-weight vibration plate with a maximum compaction force of 3 t. The Proctor density and permeability of the filler must be at least equal to that of the existing ground.



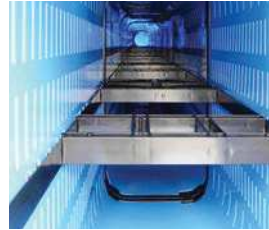
These machines can only be driven over a sufficiently compacted layer of ground comprising G1 material with a thickness of at least 0.5 m.

Only the vibration plates (no vibro-tampers!) described above may be used to compact the ground in the first filler layer.

- Above a compacted covering height of 0.3 m, compaction may also be done with heavy vibration plates (maximum compaction force of 6 t).
- Before spreading the ground for the coverage, the boxes should be topped with a 0.1 m-thick sand levelling layer.
- The ground is then spread on top of the boxes in layers by way of front filling and using a light digger or wheel loader with a total weight of max. 15 t.
- Heavy construction vehicles with a maximum wheel load of 50 kN (SLW 30) are only permitted to drive over a compacted covering that has a minimum height of 0.8 m.
- In the case of ditch-box gravel trenches with a percolation ditch and a box-gravel trench underneath, the ditch overflow is spread across the boxes once the geotextile filter has been folded back. A 0.1 m-thick layer of sand is then put on top of the gravel trench and the 0.3 m-thick layer of top soil on top of that. The ditch is then profiled with the intended border incline and if necessary, covered with a ditch planting grid (on-site).
- It is to be ensured that no construction vehicles

drive over the percolation ditch of the ditch-gravel trench! Where there is ditch overflow, the sand and top soil layer is recessed into a funnel shape. This funnel is filled with coarse gravel of grain size 8/32 until the ditch overflow is covered.

02.05.10 Determining operational measures



RAUSIKKO Box SC cleaning and distribution channel



Percolation ditch of a ditch-gravel trench after completion

- If possible, do not make the percolation system operational until the catchment area has settled and is green again.
- Ensure good drainage during the construction period.
- As rooting in the percolation system is to be avoided, only plant shallow-rooted plants in the vicinity of the percolation system. In the case of existing or newly planted trees, the distance between the tree trunk and the edge of the gravel trench should be at least equal to half the diameter of the crown of the tree. If this minimum distance cannot be observed, the top side of the gravel trench and the side surface facing the tree should be covered with a geotextile root protector. Where the root protector intersects, there should be an overlap of at least 0.5 m.
- RAUSIKKO Chambers and inlets/outlets of the cleaning channels should be inspected every six months and also after heavy rain and accidents; any contaminants which could be present are to be removed.
- Information on how to operate percolation systems and relevant operational measures can be found in work sheet DWA-A 138. Please observe the instructions therein.
- If necessary, the RAUSIKKO Boxes' cleaning and distribution channels can be high pressure cleaned with up to 120 bar. Flushing heads in accordance with the Hamburg model, as described in RSV data sheet 1, with 4 + 4 jet nozzles and a nozzle spray angle of 30° are suitable for this. No hitting tools or chain spinning tools may be used. Any contaminants washed out into the sand trap of the connection chamber are to be extracted.

02.06 RAUSIKKO Connection adapter DN 315–500

02.06.01 Application and function

The RAUSIKKO Connection adapter DN 315–500 connects smooth-walled sewer pipes (e.g. AWADUKT PP) to RAUSIKKO Box systems for rainwater percolation or retention.

The RAUSIKKO Connection adapter is compatible with RAUSIKKO Boxes 8.6 S, 8.6 SC, 8.6 H, 8.6 HC and 8.6 SX. It helps to ensure levelled connection of sewer pipes DN 315 to DN 500.



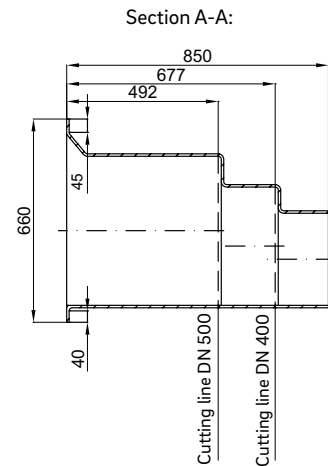
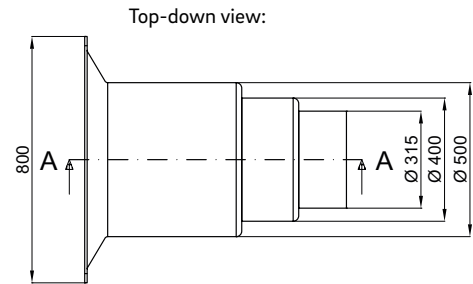
The inflow passes through a funnel-shaped inlet that provides optimum supply to the gravel trench and allows a jetting hose or an inspection camera to be inserted.

02.06.02 Preparation and installation

1. Cut the connection adapter on-site using a fine-toothed saw at the desired diameter. The adapter features circular cutting guidelines for DN 315, DN 400 and DN 500 connections.



It is important to cut the adapter along the markings so as to ensure that the socket can be inserted sufficiently deep.



2. Fasten the connection adapter to the corners of the RAUSIKKO Box with 4 wood screws (not included in delivery contents).
3. Coat the pipe connection of the adapter (spigot) with lubricant and carefully push the socket of the sewer pipe onto the spigot.



Connection to the RAUSIKKO Box 8.6 SC

Note: The connection to all RAUSIKKO Box variants (construction height 0.66 m) should be carried out in the same manner.

02.07 RAUSIKKO Ventilation plate



Ventilation plate DN 160

A vent is to be provided so that the air displaced when filling the box-trench or the box-reservoir can escape.

1. Install a ventilation plate on the cover of a RAUSIKKO Box (e.g. using cable ties).



Ventilation plate on Box SX

2. Plug a KG pipe AWADUKT DN 160 (with socket) into the ventilation plate.

3. Guide the plugged-in pipe to a RAUSIKKO C3 or AWASCHACHT and fasten it there using an AWADOCK connection system (composite pipe type B DN 160).



Connecting the ventilation to the chamber extension using AWADOCK

Alternatively, ventilation can take place via a ventilation plate with spigot DN 350, an unlacerated RAUSIKKO pipe DN 350 fitted to it and a cast cover DN 400 with ventilation.