



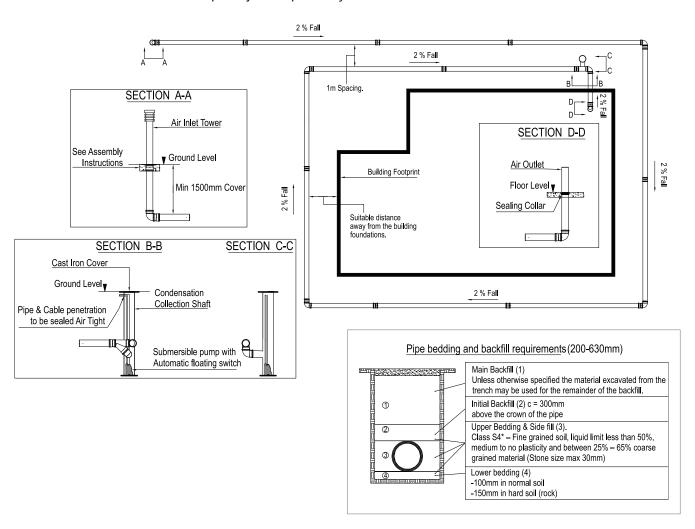
AWADUKT THERMO

DOMESTIC PROJECT INSTALLATION GUIDELINES

## AWADUKT THERMO

## **INSTALLATION**

### Sample Project component layout



## Key Points to Consider for Ground-Air Heat Exchanger (GAHE) Installation:

- Electrical supply & drainage point for condensation pump.
- Access to Condensation Collection Shaft.
- Check suitability of on site soil for GAHE against supplied specification.
- GAHE shall be located at suitable distance away from piles & structures. (Structural Engineer advice can be sought).
- GAHE shall be located at a suitable distance from any services (e.g. Electrical, Gas, Drains).
- 1.5m soil cover is recommended over the pipes.
- GAHE is recommended to be installed with 2% fall back to condensation chamber.

As no British Standard for the installation of ground air heat exchangers currently exists, we recommend that BS EN 1610 (Construction and Testing of Drains and Sewers) is used for guidance on structural and installation issues.



Please ensure that the Ground-Air Heat Exchanger system is installed according to the relevant plans/designs.

Pipes and fittings should be visually checked for any damage prior to installation.

### 1.1 Trench Excavation

- Excavate the trench as per site requirements.
- The trench depth should allow for the specified thickness of soil cover (min 1.5m) above the pipe crown
- The trench base should be free of stones, flat with a 2% fall towards the condensation chambers
- Trench width for a pipe outer diameter (OD) + 0.5m (for pipe sizes up to 315mm)

### 1.2 Lowering pipes into trenches

- Use adequate machinery in order to lower the pipe into the trench
- Lower the pipe carefully to avoid any damage
- For DN/OD 200 to 630 pipes, remove the protection cap directly before connecting the pipes to the sockets. If work is interrupted please put them on again so that any entry of foreign material is avoided

#### 1.3 Joining pipes

- The pipes should be jointed in the excavated area and laid on the prepared bed so that the pipes are fully supported along their length
- Small depressions should be made at proposed joint position to accommodate the pipe sockets and couplings



Once the joint is complete, these depressions should be carefully in filled, taking care that no voids remain under or around the joint.

### 1.3.1 Joining 200 – 630 (DN/OD) pipes

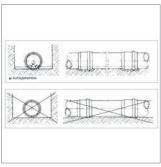
- Clean both the socket and the end of the pipe
- In order to check if the pipe has been introduced into the socket at the defined length, mark the required insertion depth on the pipe (if not already marked) before assembly
- Lubricate the bevelled end of the pipe with REHAU lubricant
- Push the bevelled end of the pipe up to the base of the socket
- The insertion force has to be centric along the pipe axis and can be carried out by hand or with levers
- When using levers, a square timber should be laid across the pipe in order to achieve an even force distribution and avoid damage

### 1.3.2 Cutting of 200 - 630 (DN/OD) pipes

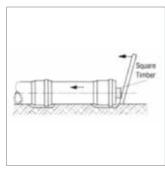
- Use a jig saw, pipe cutter or an equivalent in order to cut the pipe, ensure that a rectangular cut is achieved
- Chamfer the shortened end of the pipe with a file or with a chamfering tool



Example of good compaction



Depressions at pipe joints



Using square timber for making joints



Application of lubricant

Traffic loads from plant machinery is only permissible on a compacted backfill of at least 0.8m in height. (For further information, please contact REHAU)

### 1.4 Supervision

The system must be installed and supervised by suitably competent personnel. In this way careless work and the subsequent appearance of problems can be avoided.

## 1.5 Pump installation

Small Submersible pump¹ for condensation should be installed in the shaft (see sample project component layout picture), the drilled holes to the condensation shaft for the discharge pipe and power cable should be sealed airtight.

Note: Submersible pump is not supplied by REHAU.

### 1.5.1 Advice on pump selection

Pump Diameter (incl. discharge pipe)  $\leq$  290mm Flow rate 1.5m³/Hr @ 6m head. Pump with integrated automatic floating switch with

### 1.5.2 Condensation Discharge with ball siphon

minimum draining level (i.e minimum standing water).

Another option for condensation removal is via gravity. The condensation discharge is installed internally in a basement at a 2% fall and the condensation can be collected in a container. This can only be done in houses with basements.

### 1.6 GAHE Pressure testing (up to 400mm pipes)

The GAHE pipes must be pressure tested before and after backfilling to ensure the pipes are air and water tight.

Pipes shall be air pressure tested to 100 mm of water over air (0.01 Bar or 1kPa) with allowed pressure drop of 25mm of water (0.0025 Bar or 0.25kPa) in 10 minutes.

#### Estimation of condensation

Example estimates of condensation volume according to Mollier diagram:

	Example 1	Example 2
Climate Conditions	35°C / 45°C% humidity	280C / 80°C% humidity
Temperature drop	18K	12K
Air flow rate	150m³/h	1503m³/h
Condensation	approx 0.4 l/h	approx. 0.8 l/h

<sup>\*</sup> Pressure above atmospheric pressure.

# 2. AWADUKT THERMO

## PIPE TRANSFER AND STORAGE



## 2.1 Pipe transport 200 – 630 (DN/OD) Pipes

- Treat the pipes carefully in order to avoid any damage
- The pipe has to be supported over its length in order to avoid sagging
- Loose pipes have to be secured against movement during transport

## 2.2 Pipe storage

## 2.2.1 200 - 630 (DN/OD) Pipes:

- Pipes are to be stored on a level base and secured to ensure they are not damaged by rolling off
- Protect the pipes against damage and pollution
- Excessive stacking heights should be avoided, so as not to place too much load on the bottom part of the stack
- Do not store the pipes near open trenches
- Protect the pipes against weather influence, e.g. direct solar radiation, hail, ice on the ground, etc.

## ASSEMBLY INSTRUCTIONS

## AIR INLET TOWERS DN 200 - DN 630





Note: Assuming a worst-case scenario for installation in Wind Zone 4 with a wind pressure of qref= 0,56kN/m<sup>2</sup>

The AWADUKT Thermo Air Inlet Tower consists of three elements:

- Vertical Pipe with base plate
- Top attachment with filter grate
- Louvre cap



• Ensure that the underground AWADUKT Thermo pipe ends with a double-fit sleeve joint. Pour a cement foundation around the socket using cement with a rating of C20-25.

See the table below for proper dimensioning. It is important that the surface of the cement and the top of the socket are level.



Air Inlet Tower S	ze Foundation Dime	nsions (mm)
DN 200	600 x 600 x 200	
DN 250	600 x 600 x 300	
DN 315	700 x 700 x 300	
DN 400	1000 x 1000 x 50	0
DN 500	1200 x 1200 x 50	0
DN 630	1200 x 1200 x 80	0

- 2 Before inserting the vertical inlet pipe into the socket, coat the gasket with REHAU lubricant. Use approximately 8 grams, spreading it evenly around the gasket.
- Insert the vertical inlet pipe into the socket. Ensure that the base plate rests directly on the foundation slab. For fastening onto the base plate, two options are recommended:

Option 1: Using the boreholes in the base plate as a guide, carefully drill holes into the cement. Avoid any damage to the base plate. After drilling, make sure the drill bit is free of concrete before beginning the next hole. REHAU recommends using anchor bolts FAZ A4 M8 from Fischer for the fastening of the base plate to the cement foundation (follow the manufacturer's installation instructions).

**Option 2:** Insert four retaining bolts in the cement foundation, using the same drilling process as described above. The retaining bolts must protrude at least 30mm from the surface of the concrete. When screwing in the bolts, ensure that the retaining bolts align with the holes in the base plate.

4 Mount the top attachment of the air inlet tower so that the four side holes align.



Insert the expansion rivets into the holes. Place the bottom piece in first, followed by the pin. When using other tools to help insert the expansion rivets, be careful not to damage the air inlet tower.

In areas where vandalism may be of concern, the use of blind rivet pliers (with rivets fitting a hole diameter of 4mm) are necessary.



If using a filter proceed to "Installation of the Air Filter" now.

6 Place the louvre cap over the filter grate and filter (if present). Fasten the louvre cap to the air inlet tower by inserting and rotating the screws into the slots (fig 6).

Once in place, hand-tighten the three M8 nuts with a wrench (size 13).

Check to ensure all parts of the inlet tower are correctly installed and secure.

# Installation of the Air Filter (to be competed between steps 5 and 6):

As an additional element, Rehau offers air filters for the air inlet tower with ratings of G4 (coarse filter) and F6/G2 (filter set consisting of coarse and fine filters). The course filters are cylindrical, such that they can be pulled over the inlet tower grating (Figure 8). After installation, ensure that no unfiltered air can enter the system.

For the filter set F6/G2, first mount the F6 filter, followed by the G2 filter.

#### Alternative Installation Variation for Wind Zone 1:

Air inlet towers DN 200 and DN 250 may be installed without a cement foundation if the system is located in Wind Zone 1. For this installation method, earth nails with a minimum length of 20cm are required.

Insert the earth nails through the holes in the base plate of the air inlet tower. When installing the air inlet tower without a cement foundation, the stability of the installation must be checked separately.



For optimal performance and air quality, filters must be replaced at regular intervals. For air inlet towers with a flow rate less than 1000 m³/h, filters should be replaced at least once a year. For larger flow rates, filters should be replaced at least twice a year.









# 4. AWADUKT THERMO WALL PENETRATIONS

## THREE DIFFERENT OPTIONS AVAILABLE

REHAU have three options for wall/floor penetrations in our range to suit different types of projects. It is the system's designer's responsibility to select the most suitable penetration for each project, please contact REHAU's technical team if you want to discuss suitability of an option.

# Option 1: Ring Seal and GAHE wall casing piece

This is REHAU's preferred wall penetration solution to the excellent seal achieved and its suitability for projects with high groundwater levels (can take pressures up to 3 bar).

The wall casing piece is installed when the slab is poured / wall is constructed. Alternatively, a hole can be core drilled and the inside surface of the hole coated with an epoxy resin solution.

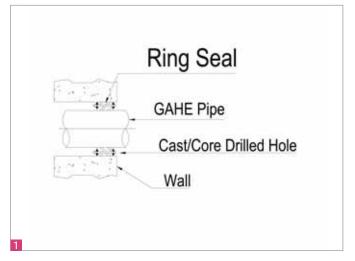
This creates a smooth hole for the pipe (and attached ring seal) to be inserted through. The ring seal is an adjustable rubber seal which is tightened by hand using a torque wrench to achieve an excellent hydraulic seal around the pipe and is installed after the pipe.

## 2 Option 2: GAHE sealing collar

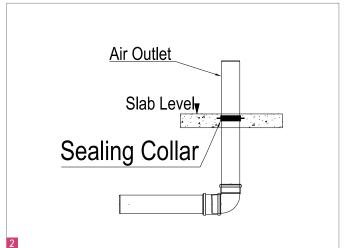
Pipe sealing collars are cast in place with the pipe, tight to groundwater and pressurised water up to 5 bar.

## 3 Option 3: Standard wall inlet

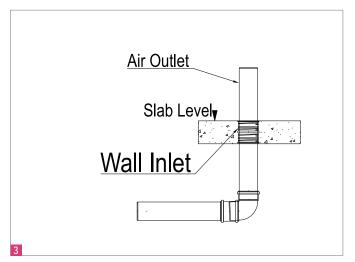
Basic cast in place solution (not suitable for all projects). It cannot be used where groundwater pressure is present.













## AWADUKT THERMO

## INSPECTION AND CLEANING OF AWADUKT THERMO

#### 5.1 General

- The GAHE system should be maintained to the HVCA TR/19 guide to good practice – Internal Cleanliness of Ventilation Systems
- All inspection and cleaning shall be carried out by personnel qualified for maintenance of ventilation systems

### 5.2 Pre-Commissioning Cleaning

- On completion of building works ensure GAHE pipework is cleaned and disinfected to HVCA / TR19 standards to remove the presence of any sediment. A possible method of cleaning could be by rotarised brush via the access points; disinfection could be completed by fogging the system using an approved disinfectant which is drawn through the system using a negative air unit
- Note an additional pump may have to be used to remove the cleaning water if the capacity of the condensation pump is exceeded

- Ensure water used for disinfection is provided from a known source of suitable quality
- When using wet cleaning methods, the system should be dried thoroughly prior to commissioning
- The introduction of cleaning chemicals or biocides should only be considered when a risk assessment has been carried out. A formal method statement should also be completed
- Care should be taken to ensure that condensed vapours and cleaning fluids can be removed from the ductwork system

# 5.3 Additional safety measures for condensation sump pumps

Ground level sensors could be installed that in the event of condensation discharge pump failure an audible or visual alarm is activated, indicating attention is required.

## **Maintenance Recommendations**

Based on Risk Assessment carried out in acc. with ACOP L8:

GAHE Ventilation System	Frequency
Inspect condensation shaft for build up of condensation or contamination	3 monthly
Ensure condensation sump pump is in good working order	3 monthly
Clean air inlet with a cleaning cloth and replacement of particle filter on air inlet to system to prevent build up of excess contamination	6 monthly
Cleaning and disinfection of condensate sump	6 monthly
Inspection of internal surfaces of GAHE ductwork for presence of contamination build up	Annually



## UK & IRELAND SALES OFFICES

London, REHAU Ltd, The Building Centre, 25 Store Street, London WC1E 7BT Slough, Units 5 J & K, Langley Business Centre, Station Road, Langley, Slough SL3 8DS Phone: 01753 588500 Fax: 01753 588501 Manchester, Brinell Drive, Irlam, Manchester M44 5BL Phone: 0161 777 7400 Fax: 0161 777 7401 Glasgow, Phoenix House, Phoenix Crescent, Strathclyde Business Park, Bellshill, North Lanarkshire ML4 3NJ Phone: 01698 503700 Fax: 01698 503701 Dublin, 9 St. Johns Court, Business Park, Swords Road, Santry, Dublin 9 Phone: 00353 (0)1 8165020 Fax: 00353 (0)1 8165021

Our verbal and written application engineering advice is based upon experience and the best of our knowledge. However it is to be regarded as non-binding information. Working conditions and use under conditions for which the product was not intended and over which we have no influence exclude any claim resulting from our information. We recommend that a suitable check is made as to whether the REHAU product is suitable for the envisaged purpose. Application, use and processing of the products is carried out beyond the scope of our control and are therefore carried out exclusively at your own responsibility. If liability should still apply, then this is restricted, in the case of all damage, to the value of the goods supplied by us and used by you. Our warranty applies to the consistent quality of our products as per our specification and in accordance with our general terms and conditions of delivery and payment. This document is protected by copyright. All rights based on this are reserved. No part of this publication may be translated, reproduced or transmitted in any form or by any similar means, electronic or mechanical, photocopying, recording or otherwise, or stored in a data retrieval system.

www.rehau.co.uk 342683EN/DAIR/06.10

12