REHAU®
Unlimited Polymer Solutions

AWADUKT THERMO GROUND-AIR HEAT EXCHANGER

RENEWABLE COOLING SOLUTION FOR LOW ENERGY BUILDINGS

REHAU QUALITY ENERGY EFFICIENCY

www.rehau.co.uk

Building Solutions
Automotive
Industry

INTRODUCTION

AWADUKT THERMO GROUND-AIR HEAT EXCHANGER

Our fossil fuels are in short supply. This is why architects, specifiers and contractors have been thinking laterally for the past few years. Energy-saving construction concepts are becoming ever more important.

The AWADUKT Thermo ground-air heat exchanger from REHAU makes an important contribution to reducing a building's energy requirements. The ground's ability to store energy is used to achieve an energy-efficient controlled ventilation solution. REHAU has developed the first ground-air heat exchanger with an antimicrobial inner layer. So, as well as saving both costs and energy, property developers can also make a considerable improvement to the comfort of occupants inside their buildings.

BANFF & BUCHAN COLLEGE

FRASERBURGH, SCOTLAND

AWADUKT THERMO

HOW A GROUND-AIR HEAT EXCHANGER WORKS

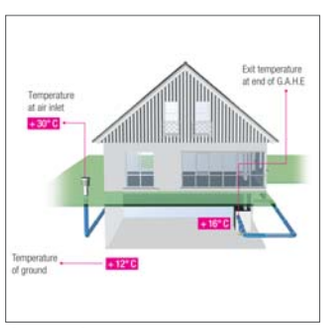
Ground-air heat exchangers (also known as earth tubes) offer an innovative method of heating and cooling a building and are often used on zero carbon / Passivhaus buildings. Linked up with a mechanical ventilation system with heat recovery (MVHR), they can offer significant energy savings for the client.

Ventilation air is simply drawn through underground pipes at 1.5m deep which pre-heats the air in the winter and pre-cools the air in the summer. At this depth the ground is approx. 7-13°C throughout the year. Experience has shown it is possible for a system to cool the air by 14K in the summer and heat it by 9K in the winter.

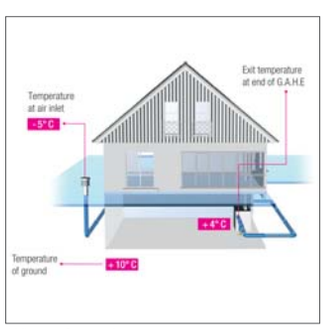
AWADUKT Thermo pipework was specifically designed for this application with its integrated antimicrobial silver layer.

Benefits at a glance:

- Integrated antimicrobial silver lining to combat microbial growth
- Thermally optimised polypropylene material to improve heat transfer
- REHAU have bespoke design software to calculate project specific energy savings
- Complete system offered including air inlet, condensation chambers and fittings
- Suitable for both residential and commercial applications
- Award winning system: Homebuilding & Renovating Product Excellence Awards in 2011 for Ventilation & Air Tightness & Finalist at Grand Designs Awards 2009



Summer Operation



Winter Operation

AWADUKT THERMO
DOMESTIC APPLICATIONS

DN200 air inlet tower

AWADUKT Thermo linked up to MVHR

AWADUKT Thermo has been extensively used in the self-build sector, in particular on projects aiming for Passivhaus or Code 5/6 for Sustainable Homes certification. Often these properties are insulated to very high levels with large areas of glazing which can lead to potential overheating issues in the summer. New build properties often incorporate mechanical ventilation with heat recovery (MVHR) which is the ideal accompaniment to AWADUKT Thermo.

The system requires a minimum of 40m of pipe for optimum performance. This can be laid in a ring pattern around the house, a meander pattern or in a straight line away from the building.

REHAU have created 4 different domestic packages for different size properties, which include all the key components such as pipe, fittings, condensation chamber, wall inlets and air inlet tower.

For properties with an air flow <300m³/h	Package 1	42m of pipe
	Package 2	60m of pipe
For properties with an air flow <450m³/h	Package 3	42m of pipe
	Package 4	60m of pipe

For potential energy savings of these packages, please contact your local REHAU Authorised Partner who can assist.

A domestic AWADUKT Thermo installation manual is available to assist with installation. Please request a copy via your local Authorised Partner or email enquiries@rehau.com.

AWADUKT THERMO
COMMERCIAL APPLICATIONS

AWADUKT Thermo has been extensively specified in the commercial sector, in particular in the education sector, but also visitor centres, offices and supermarkets across the UK and Europe.

Often the system is linked with a mechanical ventilation system with heat recovery but in some cases, it has been used to deliver pre-cooled air into buildings using passive stack ventilation.

For a commercial project, a Tichelmann grid is used. This is a self-balancing system to ensure the air can only travel the same distance through each heat transfer pipe. The heat transfer pipe is typically DN200-250 diameter, but then header pipe could be anything from DN315 to ID1200mm pipework. The system size is based on 3m/s maximum velocity through the heat transfer pipes.
Tichelmann grid systems are often installed under grass areas or car parks, but in some cases, can alternatively be installed under buildings.

A RIBA / CIBSE approved CPD on 'Ground-air Heat Exchangers' is available on request, which provides an overview of GAHE systems, basic design guidance and case studies including performance data.

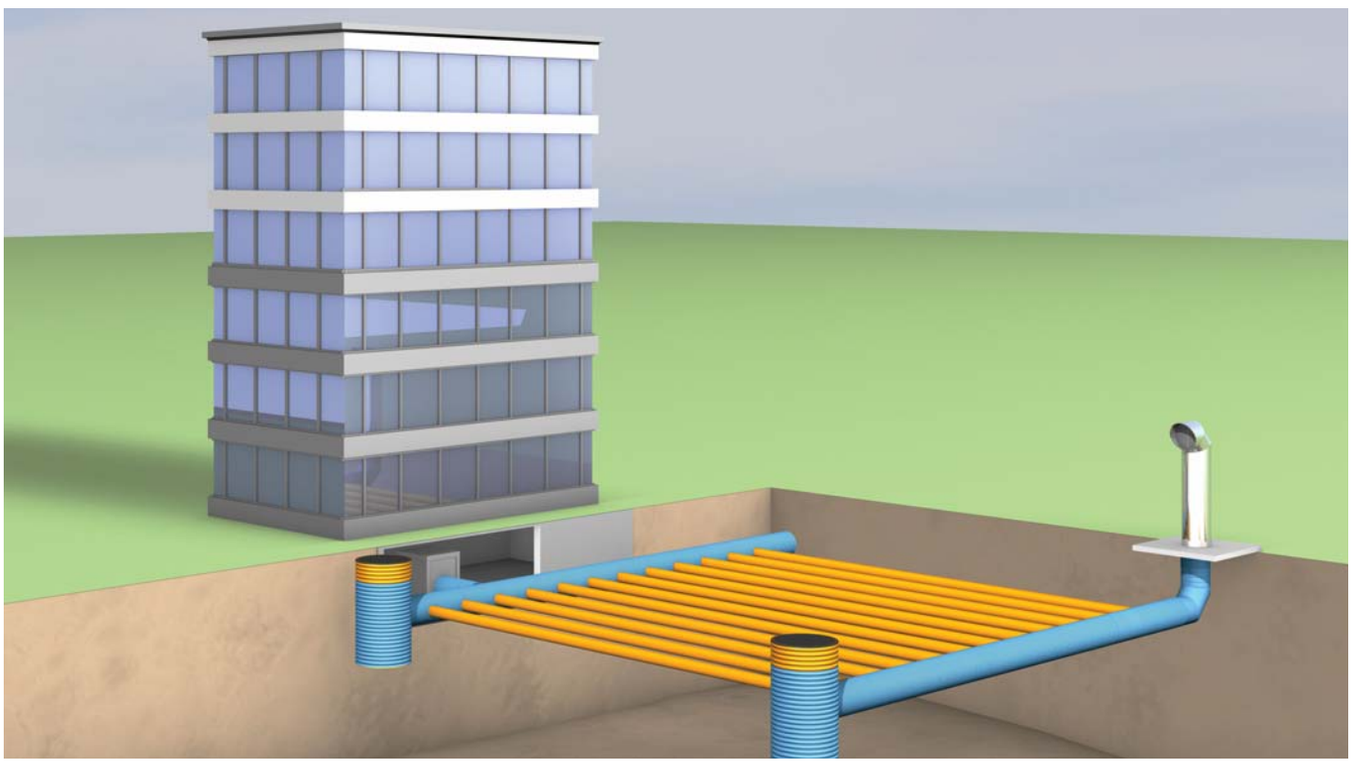
To discuss your project requirements, please contact your local REHAU Sales Office.

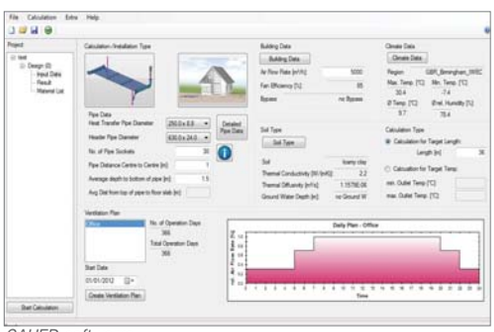
Commercial Air Inlets

Tichelmann grid system

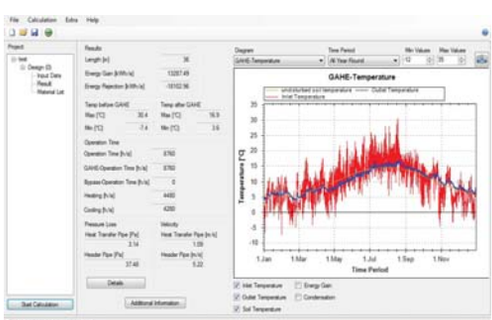
AWADUKT THERMO

BEDSPOKE DESIGN SOFTWARE





GAHED softwarre



GAHED outputs

There are many external factors involved in calculating the performance of a ground-air heat exchanger system, which is why REHAU created bespoke design software to estimate the potential energy savings.

Our GAHE software takes into account the following variable factors:

- Air flow rate
- Soil type
- Weather data (various UK locations)
- Pipe diameter & length

The REHAU software gives a building designer a comprehensive summary of the potential energy savings and outputs which could be achieved by installing a ground-air heat exchanger system. These include:

- Inlet and outlet temperatures in both summer and winter
- Energy savings in kWh/a in both cooling and heating mode
- Pressure losses
- Air velocities
- Condensation produced

REHAU are happy to look at your project and calculate the estimated energy savings. Please email *enquiries@rehau.com* or contact your local sales office to discuss your project in more detail.

AWADUKT THERMO
DOMESTIC CASE STUDIES

Project Name: The Lakes By Yoo, Lechlade, Cotswolds

REHAU's AWADUKT Thermo is an integral part of the renewable energy solution developed for the prestigious The Lakes by Yoo second homes development near Lechlade in the Cotswolds. The development of 160 lakeside homes, hotel and leisure facilities is designed by The Raven Group in collaboration with the Yoo Design Studio, founded by Philippe Starck.

Other REHAU Products: REHAU underfloor heating, REHAU flexible pipework, RAUGEO ground-source pipework.

Project Name: Lowfields Farm, North Allerton

Skipton-based ADM Systems has developed a solution for the new build property which uses renewable energy to maximise the efficiency of a whole house ventilation and heat recovery system.

Installed in 2009 with a 60m long DN250 AWADUKT Thermo system. Air flow rate is a max. 330m^3/h. Datalogging showed a cooling performance of 14K in Summer 2010.

Project Name: Craigie Drive, Dundee

If REHAU built houses, they would probably look like this one. A stunning, new build property in Dundee, Scotland has been constructed using REHAU's complete range of building solutions, from PVC-U windows to underfloor heating, a ground – air heat exchanger and even composite decking.

The luxury house, built for a private client by Discovery Homes, is designed to be as efficient and environmentally friendly as possible and uses REHAU solutions wherever possible in line with the quality specification and to reduce running costs.
REHAU's award winning AWADUKT Thermo ground– air heat exchanger system to provide a sustainable source of fresh, filtered ventilation air.

Other REHAU Products: REHAU underfloor heating,REHAU flexible pipework, RAUPIANO, REHAU PVC-U windows throughout, RAUVACLEAN central vacuum system and the RELAZZO composite decking system outside.

AWADUKT THERMO
COMMERCIAL CASE STUDIES

Project Name: Interserve Headquarters, Leicestershire

The REHAU AWADUKT Thermo ground – air heat exchanger has been installed in only the third office in the UK to be fully certified to Passivhaus standard. In conjunction with environmental building services consultants Couch Perry & Wilkes, Interserve chose the REHAU AWADUKT Thermo system because it was appropriate for the compact site and was more cost effective than a borehole solution.

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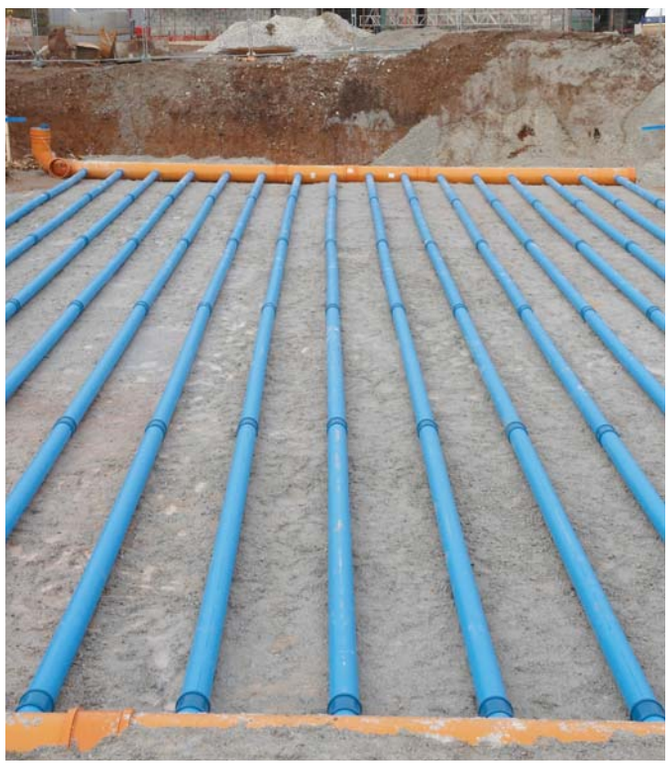
Other REHAU Products: REHAU GENEO® Windows

Project Name: REHAU Head Office, Erlangen, Germany

Renovating REHAU's head office allowed a full size grid to be installed and measured with 120 sensors as part of a MSc thesis.
In summer, the temperature was reduced by the GAHE from 33°C to 20°C and in winter, it heated the air from -18°C to +1°C.

Air flow rate: Up to 18,000m^3/h
Grid size: 24 x 48m runs



Project Name: Carclaze Community Prmary School, Devon

The REHAU AWADUKT Thermo ground – air heat exchanger which is making such an impact in the new build education sector has been chosen for another new school at St Austell in Cornwall.

Being delivered by Kier Western, the school has been designed by architects Poynton Bradbury Wynter Cole, and takes advantage of a sloping site to create a two-storey building with far reaching views.

An innovative 'Heart' area on the lower ground floor is a shared space for practical and creative learning but it has limited natural ventilation so M&E consultants EIC specified the REHAU AWADUKT Thermo to provide 3,457m^3/h of pre-tempered air.

The pipework for the AWADUKT Thermo system has been laid in a 16m x 30m array 1.5m below what will eventually be the new school's playing fields. 16 runs of 30m of 250mm pipework and 500mm header pipe were installed by main contractors Kier Western who received training and technical support direct from REHAU.

QUEEN ELIZABETH'S SCHOOL

WIMBOURNE, DORSET

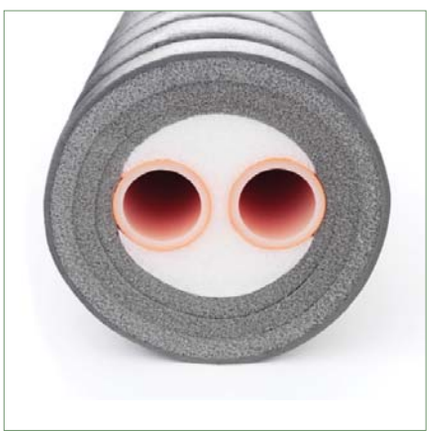
REHAU PRODUCT RANGE

ENERGY EFFICIENT BUILDING SOLUTIONS FROM REHAU

RAUGEO PE-Xa Probes

RAUGEO PE-RC & PE 100 Probes

RAUGEO Medium Manifold Chamber



RAUVITHERM Pre-Insulated PE-Xa pipe

RAUTHERMEX Pre-Insulated PE-Xa Pipe

REHAU Underfloor Heating

UK & IRELAND SALES OFFICES

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