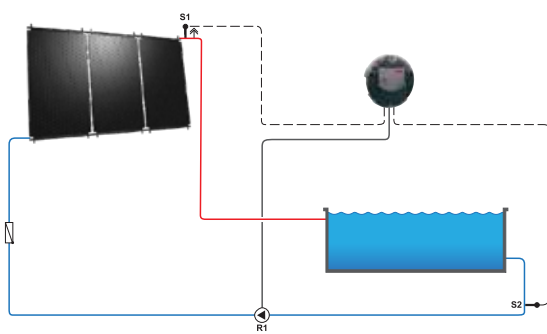


**Technical information and
assembly instructions**





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System description

■ System description and system benefits

Roth applied its specialist know-how in the processing of plastics when it developed the Roth HelioPool® from top-quality UV-resistant High Density Polyethylene (HDPE) as an environmentally-friendly and energy-saving primary method of pool heating. You can find other areas of application below.

Fitted with eight outlets, the absorber comes equipped to satisfy any installation requirements. Simple installation is thus guaranteed with just one type of absorber.

The outstanding features of the Roth HelioPool® absorber are its optimal size of 2,22 m² and its high degree of efficiency.

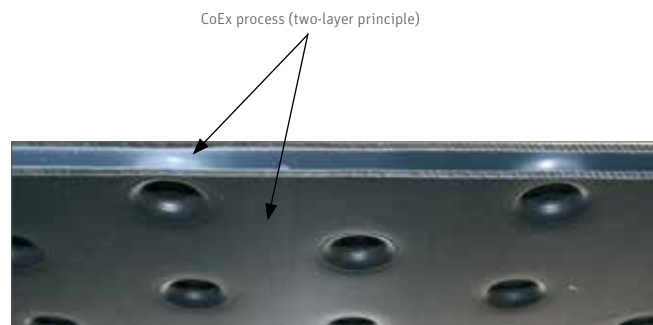
Overview of the benefits:

- > one absorber type to fit all installation methods thanks to eight outlets on absorber, making installation simple and cutting down on storage needs
- > optimal absorber size with 2,22 m² of effective surface area
- > suitable for horizontal or vertical installation
- > high degree of efficiency
- > full-surface throughput, frost-resistant* and strong enough to walk on
- > durable, UV-resistant, high-quality absorber material made from black HDPE
- > optimal absorber thickness
- > low pressure loss due to special absorber design
- > cost-efficient swimming pool heating solution
- > suitable for direct flow-through of swimming pool water
- > complete system including attachments, connections and control unit
- > other areas of application are possible

* Frost-resistant if combined with antifreeze.
If antifreeze is not used, the Roth HelioPool® swimming pool absorber must be drained if there is a risk of frost.

It boasts full-surface throughput, frost-resistance* and sufficient strength to support the weight of a person and is suitable for the direct flow-through of swimming pool water. The absorber is specially designed with the ideal thickness to guarantee low pressure loss.

The CoEx process used in the manufacture gives the absorber a two-layer material structure with different characteristics. This results in a high level of stability and weather-resistance, guaranteeing the durability of the HelioPool.



System description

■ Other possible applications

Heating domestic water

The Roth HelioPool® can be used in combination with a heat exchanger to heat domestic water in southern countries.



Thermosiphon system

It can also be used in a thermosiphon system.



Heat exchanger

In a system for emitting or extracting hot/cold air, the Roth HelioPool® can be used as a heat exchanger.



System description

■ System components

Roth HelioPool®

The Roth HelioPool®, consisting of black HDPE, is used mainly for the direct solar heating of swimming pool water using the constant flow principle. Each absorber has eight connections (four with a diameter of 25 mm and four with a diameter of 40 mm) that can be used in different ways depending on the type of connection.

Installation type: horizontal or vertical

Area: 2,22 m²

Dimensions: 2,0 m x 1,11 x 0,015 m/weight 14 kg

Item number: 1135004070



Roth HelioPool® 40 mm connection set

The 40 mm Roth connection set enables the direct linking of the 40 mm collector connections. Comprising: 1 fabric hose 40 x 47 mm to be divided into pieces on site*, 240 mm long and 4 hose clamps, 32 x 50 mm.

Item number: 1135004071



Roth HelioPool® 25 mm connection set

The 25 mm Roth connection set enables the direct linking of the 25 mm collector connections. Comprising: 1 fabric hose 25 x 32 mm to be divided into pieces on site*, 240 mm long and 4 hose clamps, 20 x 32 mm.

Item number: 1135004073



Roth HelioPool® 25 mm end stopper set

The 25 mm Roth end stopper set closes off the 25 mm collector connections that are not in use. Comprising: 1 fabric hose 25 x 32 mm to be divided into pieces on site*, 200 mm long and 4 hose clamps, 20 x 32 mm, 2 end stoppers, 35 x 40 mm.

Item number: 1135004072



* Note: The fabric hose should be divided into pieces on site during assembly.

System description

Roth E^x SW solar regulation unit

Roth E^x SW solar regulation unit for easy temperature difference controlling featuring the following functions: fix-speed pump

control or direct control of the 3-way switching valve, collector protection function, function according to BAW guidelines, 2 sensor inputs, power supply 230 V, incl. 2 PT 1000 sensors, assembly instruction in 6 languages, Max. control: 2 temperature sensors and 1 output.

Dimensions: 130 x 40 mm

The Roth E^x SW solar regulation unit provides a simple way of controlling differences in temperature. It does not have a temperature display. Settings are made using a DIP switch and potentiometer. The regulation unit can always be used whenever only temperature difference regulation is required, e.g. for the regulation of swimming pools using Roth HelioPool® or the regulation of standard solar systems with a storage tank or return riser. Two PT 1000 temperature sensors can be connected.

Material Number: 1135007886



Roth 3-way switching valve

Roth 3-way switching valve for PCV pipes 50 mm (DN40)

Motor resetting.

Positioning time 10 seconds.

Material number: 1135007932



Roth HelioPool® installation methods

The Roth HelioPool® can be assembled in various ways, depending on the structural conditions. The collector field should always be installed as near to the substructure as possible.

When assembling the collector field by laying the collectors directly onto a flat roof or an open space, the collectors should be protected from wind load on site. They can be screwed directly onto the installation area, or secured using a rail placed on top.

To install the collectors on a roof with tiles or slate, the Roth universal attachment anchor (item number 1135004084) can be used.

System description



Roth universal attachment anchor horizontal extension

The Roth universal attachment anchor horizontal extension is made up of two stainless steel universal attachment anchors (height-adjustable by 30 mm) including dry wall screws for mounting on the roof. (Suitable for roof tiles/S-shaped interlocking pantiles, plain tiles, slate and fibre cement corrugated sheets.)

Item number: 1135004082

For roof covers in Mediterranean areas, the Roth HelioPool® mounting set for on-roof attachment (item number 1135004075 or 1135004074) is recommended.

Due to the specific method of mounting the absorber, an additional substructure should be built for a larger installation area and to prevent slight sagging.



Roth HelioPool® mounting set for on-roof attachment

The Roth HelioPool® mounting set is designed to mount one HelioPool® collector on the roof. Comprising: 2 supports, incl. mounting material, screws and a drill guide bush for exact positioning of the bore holes in the area of the absorber. This set is primarily used for Mediterranean roof covers.

Item number: 1135004075



Roth HelioPool® height-adjustable mounting set for on-roof attachment

The Roth height-adjustable HelioPool® mounting set is designed to mount one HelioPool® collector on the roof. Comprising: 2 height-adjustable supports, incl. mounting material, screws and a drill guide bush for exact positioning of the bore holes in the area of the absorber. This set is primarily used for Mediterranean roof covers.

Item number: 1135004074

System description

■ Installation examples for the Roth HelioPool®



Flat roof installation



Free-standing/Special design



Open space installation



Mounting on a slope



Sloping roof installation

System description

■ Technical specifications

Technical specifications	
Length	2 000 mm
Width	1 100 mm
Height	15 mm
Gross surface area	2,22 m ²
Weight	14 kg
Filling capacity	16 l
Connections	Eight, four with a diameter of 40 mm and four with a diameter of 25 mm. These can be used freely depending on the method of connecting the collectors.
Pressure loss from the HelioPool®	0,003 bar at 200 l/h x m ²
Flow-through amount	120 - 180 l/h x m ²
Maximum pressure	3 bar
Operating pressure	1 bar
Material	UV-resistant HDPE (black)
Maximum number of collectors connected horizontally	8
Maximum number of collectors connected vertically	4
Use when there is a risk of frost	Frost-resistant if combined with antifreeze. If antifreeze is not used the Roth HelioPool® swimming pool absorber must be drained if there is a risk of frost.
Pump selection	The delivery volume of the pump is the flow-through amount x the area of the HelioPool®. The delivery height required can be calculated from the height difference between the swimming pool and the absorber field.

Performance data

■ HelioPool® performance data

The performance values for the Roth HelioPool® Collector cannot be compared with the values for a glazed collector with heat insulation, so the application is heavily dependent on local conditions.

Air velocity 0,5 to 1,5 m/s
 $\eta_0 = 81,7\%$
 $a_1 = 24,29 \text{ W/m}^2\text{K}$

As a rule of thumb, the following can be used to calculate the system dimensions:

70% of the swimming pool surface in $\text{m}^2 = \text{collector area in } \text{m}^2$

Example:

Size of swimming pool: $10 \text{ m} \times 5 \text{ m} = 50 \text{ m}^2$
Collector area: $0,7 \times 50 \text{ m}^2 = 35 \text{ m}^2$
Number of collectors: $35 \text{ m}^2 / 2,22 \text{ m}^2 = 15,76 \rightarrow 16 \text{ collectors}$

Since the strength of the sun's rays depends on the location, there may be differences when determining the number of HelioPool® collectors required.

For special projects, simulation software can be used to determine the predicted solar yield and the resulting savings.

■ Heating outdoor and indoor swimming pools

Outdoor swimming pool

The amount of heating required to heat the water in an outdoor swimming pool depends on how the pool is used.

It can - in terms of size - be similar to the heating needed for a house, and must be calculated separately in these cases.

When calculating an estimate of the heating required, the following aspects need to be considered:

- > exposure of the pool to the wind
- > temperature of the pool
- > weather conditions
- > period of use
- > whether the surface of the pool can be covered

When heating the pool for the first time to a temperature of more than 20 °C, a heat flow volume of approx. 12 kWh/m³ of the pool's contents is required. Depending on the size of the pool and the output of the heating installed, the pool will take one to three days to heat up.

Reference values for the heating requirements for outdoor swimming pools used from May to September:

	Water temperature		
	20 °C	24 °C	28 °C
with cover	100 W/m ²	150 W/m ²	200 W/m ²
without cover/sheltered location	200 W/m ²	400 W/m ²	600 W/m ²
without cover/partially sheltered location	300 W/m ²	500 W/m ²	700 W/m ²
without cover/unsheltered location	450 W/m ²	800 W/m ²	1 000 W/m ²

Performance data

Indoor swimming pool

The room is usually heated by radiators or underfloor heating and/or a heat exchanger in the dehumidification/ventilation system. In both cases, the amount of heating required needs to be calculated according to the technical solution.

The heating required to heat the water in the pool depends on the following factors:

- > temperature of the pool
- > difference in temperature between the pool water and the room
- > how the pool is used

Room temperature	Water temperature		
	20 °C	24 °C	28 °C
23 °C	90 W/m ²	165 W/m ²	265 W/m ²
25 °C	65 W/m ²	140 W/m ²	240 W/m ²
28 °C	20 W/m ²	100 W/m ²	195 W/m ²

These values can be reduced by up to 50% for private swimming pools with a pool cover and a maximum use of two hours per day.

Assembly instructions

■ Installation requirements

The HelioPool® Collector can be installed on open areas and roofs with various gradients. There are different mounting options for each type of roof tile (pantiles, mixed tiles, monk and nun tiles). For natural stone roofs, the mountings must be fitted by qualified professionals.

Caution:

Additional installation materials may be required, such as ventilation tiles for the feeding through of the collector field pipes (available from a building supplies shop or from roofing companies), wooden rails for various support purposes etc.

■ Safety instructions

Please read these safety instructions carefully before starting the installation. It is essential that you follow all the instructions specified here during the installation. Please also observe all relevant **accident prevention regulations**, particularly for working on roofs.

You can find further information on accident prevention regulations for construction work in the applicable legal provisions. You can also obtain detailed information about this from employers' liability insurance associations for construction.

Standards and directives

- › Roof installations:
 - DIN 18338 Roof covering and roof sealing work
 - DIN 18339 Sheet metal roofing and wall covering work
 - DIN 18451 Scaffolding work
- › Connecting thermal solar systems:
 - DIN 4757 Parts 1 and 3
- › Electrical connection:
 - VDE 0100 Installing electrical equipment
 - VDE 0185 General directive on installing lightning protection systems
 - VDE 0190 Main equipotential bonding of electrical systems
 - DIN 18382 Electrical cable and wiring systems in buildings

■ Tools

- › drill with suitable drill bit for the material (6) and screwdriver function
- › plugs that are suitable for the roof covering material
- › marker, string and tape measure
- › pen
- › flat head and Phillips screwdriver
- › allen key (6)

Important:

- › The HelioPool® Collector is supplied with two open outlets (Ø 25). If the collectors are stored without their packaging before installation, the outlets should be closed off to prevent foreign bodies from entering them, which could lead to damage to the collector and/or the installation. This mainly applies when the collectors are stored outside.
- › When used without antifreeze, the collectors must be completely drained in winter and depressurized to avoid frost damage.

Proper use of ladders

Ladders should only be used for a working height below 5 m. Position the ladder at an angle of 65° to 75° and secure. The top end of the ladder must extend at least 1 m above exit point.

Fall protection

If working at a height above 3 m, always use fall protection equipment when working on sloping roofs (20° to 60°) (VBG 37, § 8).

The vertical distance for a workplace safety device (roof safety platform or other kind of protective roof barrier) is max. 5 m. A safety harness may also be used as fall protection. Secure roof safety hooks to load-bearing parts above the worker. Do not use ladder hooks!

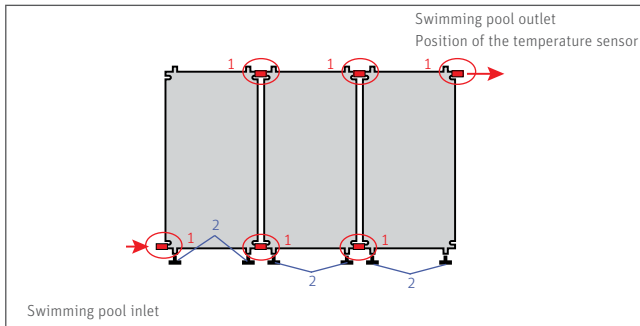
Protection against falling objects

Access routes and workplaces located below the work site must be protected against falling objects. These areas must be clearly signed and cordoned off.

Assembly instructions

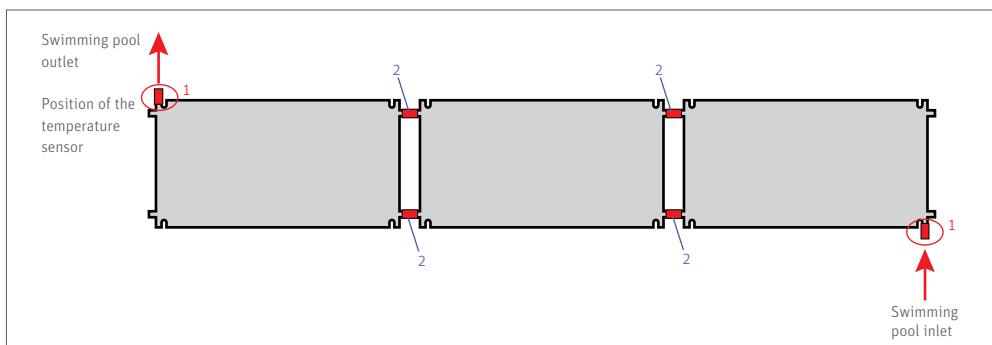
■ Calculation guide for the materials

Option 1



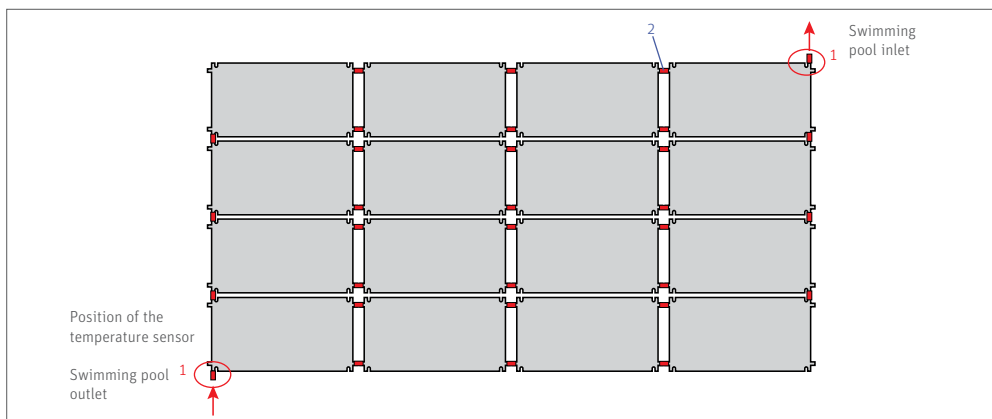
Material	Example
1 Connection set for 40 mm connections = number of collectors	3 x 1135004071
2 End stopper set for 25 mm connections = number of collectors	3 x 1135004072
3 Mounting set = number of collectors x 2	6 x 1135004075

Option 2



Material
1 Connection set for 40 mm connections = 1
2 Connection set for 25 mm connections = number of collectors - 1
3 Mounting set = number of collectors x 2

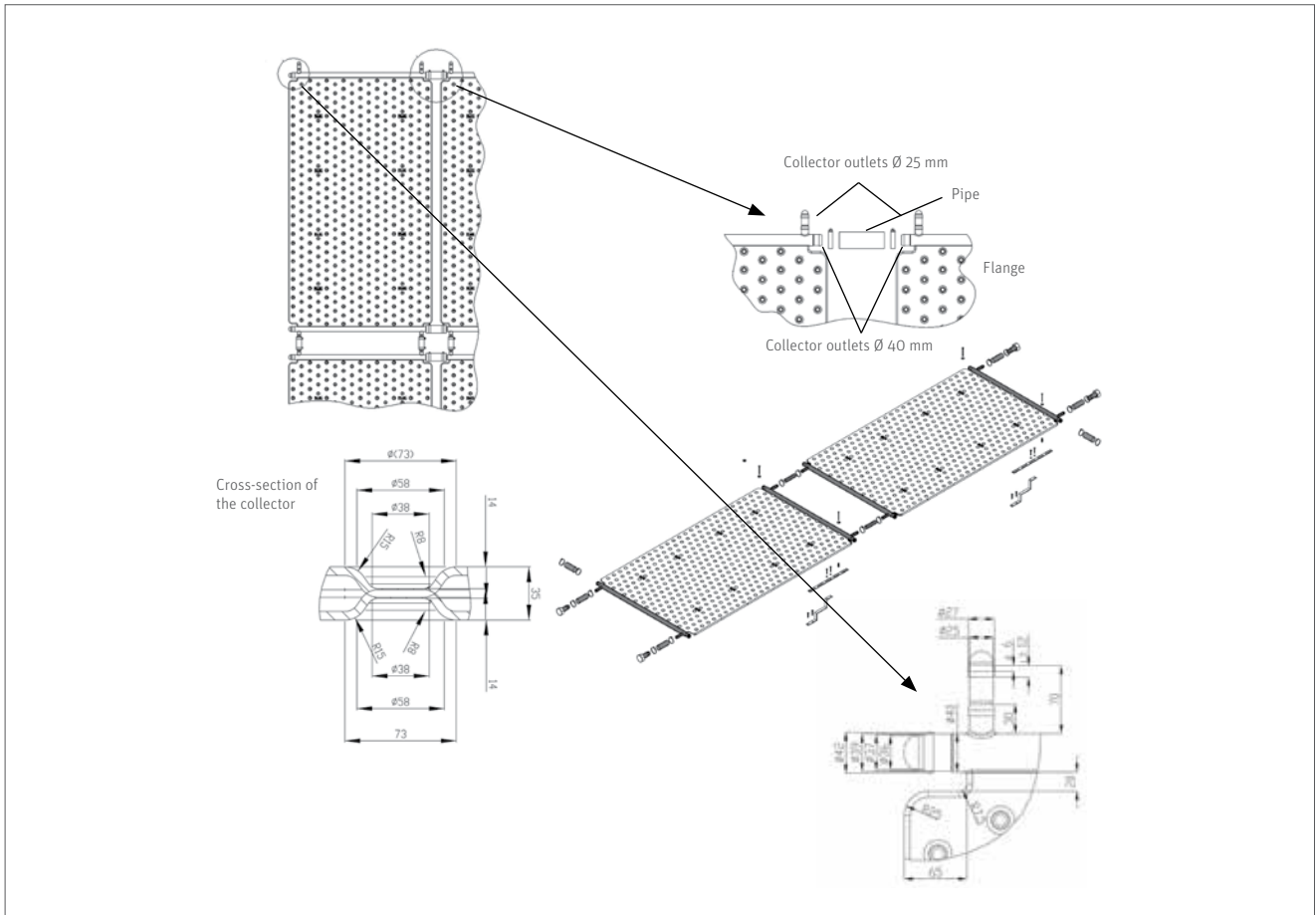
Option 3



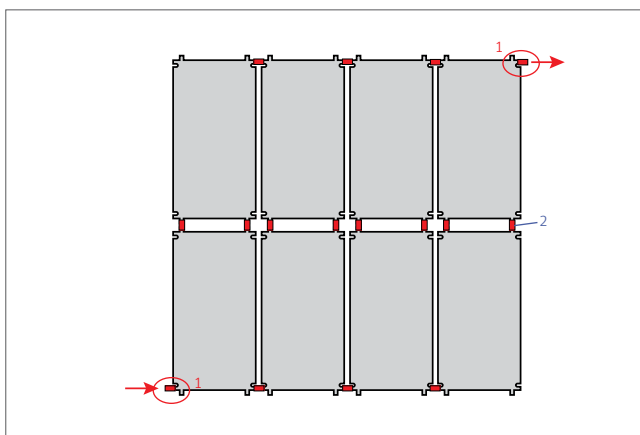
Material
1 Connection set for 40 mm connections = number of rows above one another
2 Connection set for 25 mm connections = (number of rows side by side - 1) x (number of rows above one another)
3 Mounting set = number of collectors x 2

Assembly instructions

Examples of assembly options



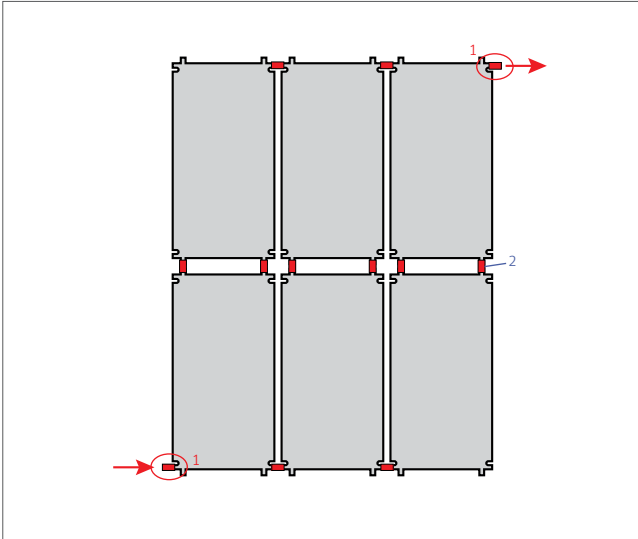
Option 4x2 vertical



Material	Example
1 Connection set for 40 mm connections = number of collectors	4 x 1135004071
2 Connection set for 25 mm connections = number of collectors	4 x 1135004073
3 Mounting set	12 x 1135004074 or 1135004075

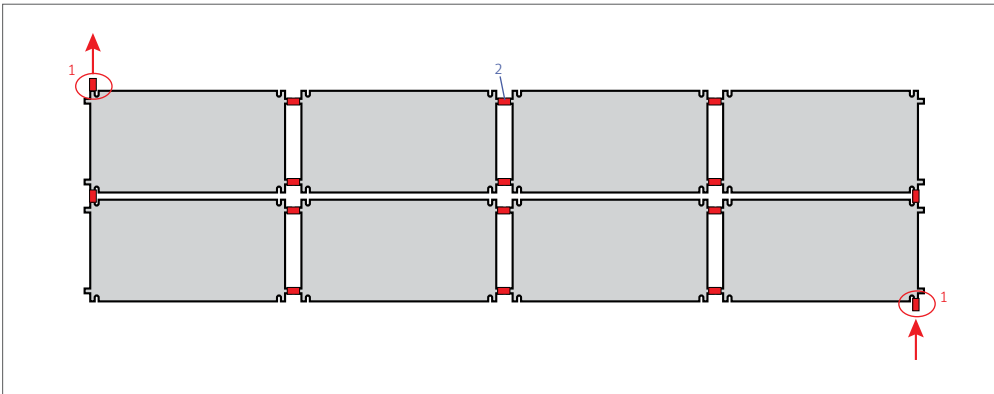
Assembly instructions

Option 3x2 vertical



Material	Example
1 Connection set for 40 mm connections = number of collectors	3 x 1135004071
2 Connection set for 25 mm connections = number of collectors	3 x 1135004073
3 Mounting set	9 x 1135004074 or 1135004075

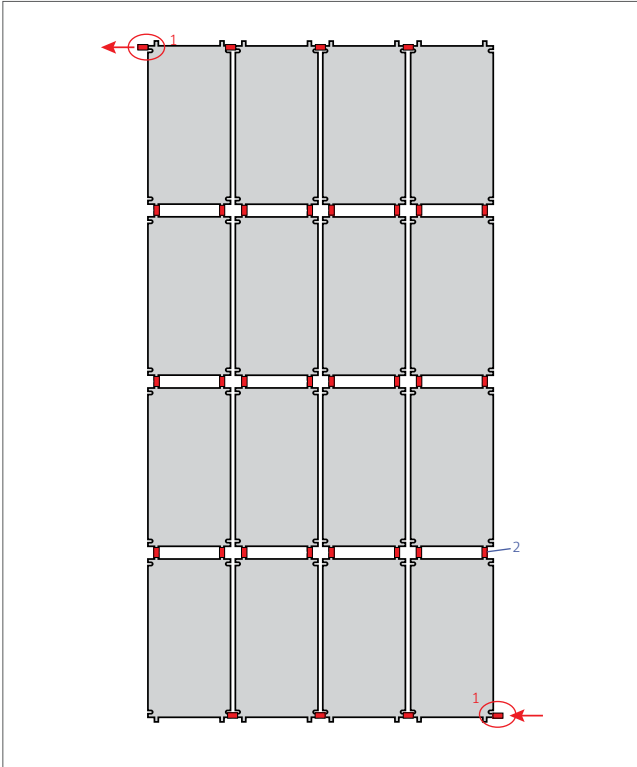
Option 4x2 horizontal



Material	Example
1 Connection set for 40 mm connections = number of collectors	2 x 1135004071
2 Connection set for 25 mm connections = number of collectors	6 x 1135004073
3 Mounting set	16 x 1135004074 or 1135004075

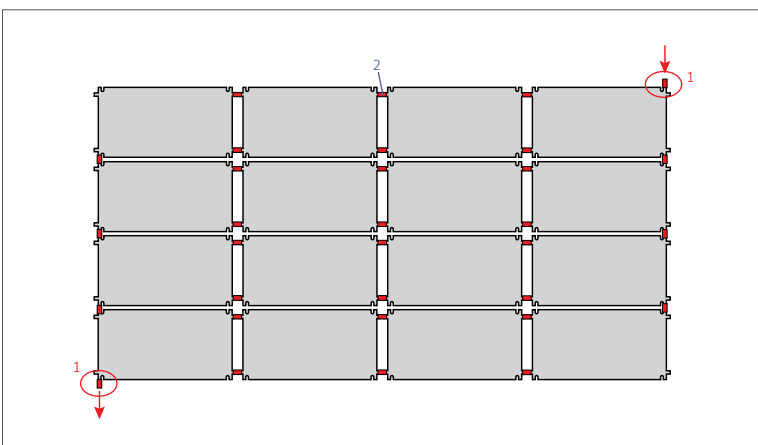
Assembly instructions

Option 4x4 vertical



Material	Example
1 Connection set for 40 mm connections = number of collectors	4 x 1135004071
2 Connection set for 25 mm connections = number of collectors	12 x 1135004073
3 Mounting set	20 x 1135004074 or 1135004075

Option 4x4 horizontal



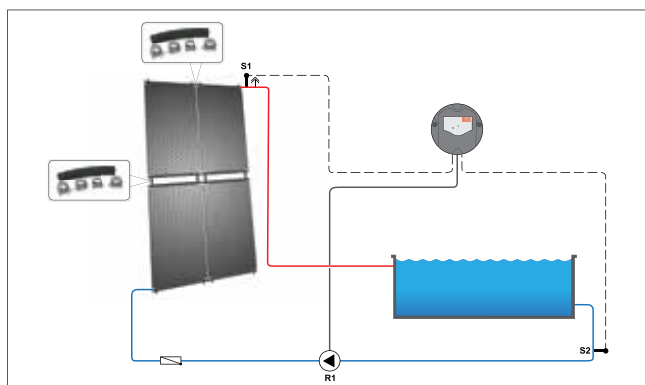
Material	Example
1 Connection set for 40 mm connections = number of collectors	4 x 1135004071
2 Connection set for 25 mm connections = number of collectors	12 x 1135004073
3 Mounting set	32 x 1135004074 or 1135004075

Assembly instructions

■ System hydraulics

The swimming pool water flows directly through the Roth HelioPool®; it is not necessary to separate the system.

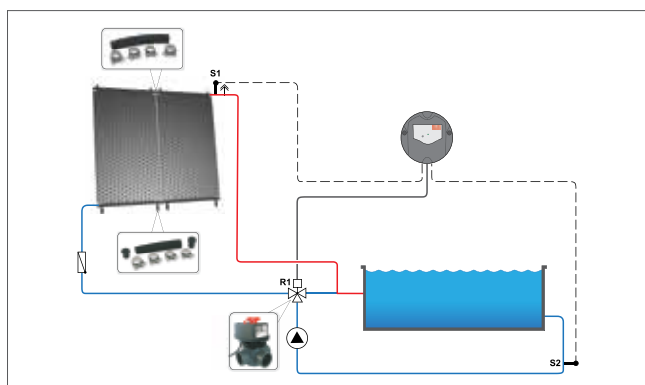
Three different connection options are explained below:



Operation with its own pump and the Roth E* SW solar regulation unit, piping separate from the filter system

This option is appropriate when the filter piping is difficult to access. Water is drawn from the swimming pool by a submerged pipe and pumped through the HelioPool®. The heated water is then fed back into the swimming pool.

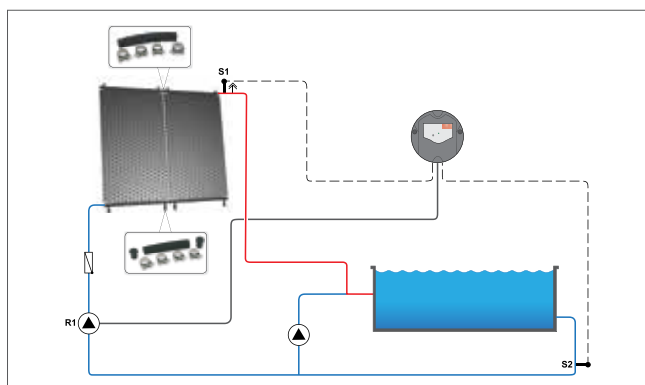
The Roth E* SW solar regulation ensures that the pump only operates when the solar yield is sufficient. Depending on the structural conditions, a non-return valve may be required.



Operation with its own pump and a 3-way switching valve in combination with the Roth E* SW solar regulation unit

This connection option can usually always be chosen, as long as the absorbers are not mounted higher than 6 m above the surface of the water. A 3-way switching valve is installed in the pressure pipe after the filter.

This valve is triggered by the Roth E* SW solar regulation unit as soon as the absorber temperature is higher than the temperature of the swimming pool water. The water flowing through the filter is then pumped through the absorber. The heated water flows back into the filter system via a T connector. Depending on the structural conditions, a non-return valve may be required.



Operation with its own pump and the Roth E* SW solar regulation unit integrated into the filter system

In some cases, it is advisable or necessary to install a separate pump for the solar heating, such as when the delivery height from the surface of the water to the absorber field is more than 6 m. The water is diverted via a T connector before the filter system and pumped through the absorbers by the additional pump. This pump is controlled by the Roth E* SW solar regulation unit, which ensures that

the pump only operates when the yield is sufficient. The filter pump and solar pump are controlled separately. Depending on the structural conditions, a non-return valve may be required.

Assembly instructions

Safety instruction:

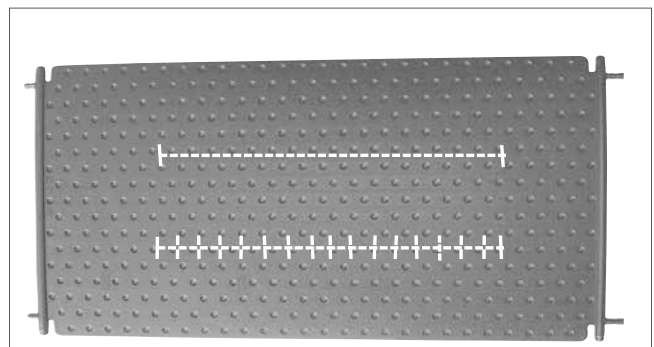
For your own safety, always use a safety harness when working on roofs (see page 12).



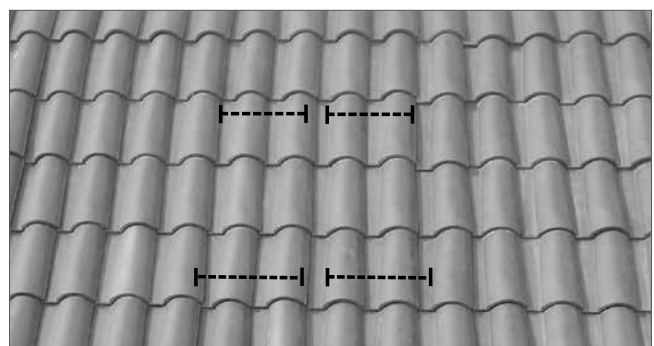
First decide where the solar collector field is to be attached to the roof. Make sure that there is enough space for the installation in the planned location.



Consider the total dimensions of the collector field and the distance required between the collectors when deciding on the position of the mounting components on the roof.



Please also observe the distances between the mounting areas (observe the distance between troughs on tiled roofs), as well as the width of these areas.



Assembly instructions



When you have decided where the rafter anchors should be attached, remove the appropriate roof tile. You must choose the appropriate mounting set for your roof tiles.



Mount the first rafter anchor on the roof covering. Measure out the position exactly, so that the brackets will be perfectly aligned with the knobs on the collector later. Use this rafter anchor to determine the position of the next one. When determining the position of the second rafter anchor, observe the distance between the knobs, the distance between the potential mounting areas and the width of these areas.

Note: The individual collectors are only held by the two rafter anchors near the top. The bottom of the collectors does not need to be attached, unless it is the bottom row.



Put the roof tile back in its original position.

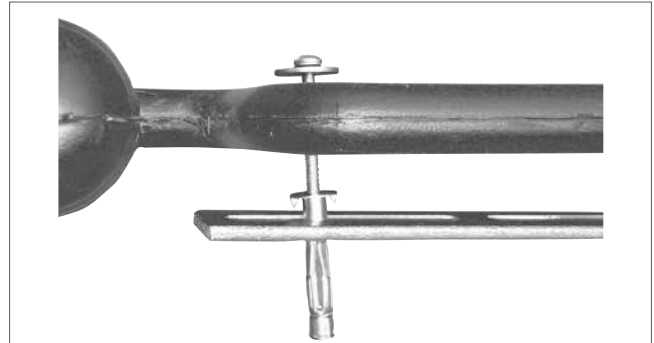


Using the guide plate supplied, drill a hole in the knobs for mounting the collector later.

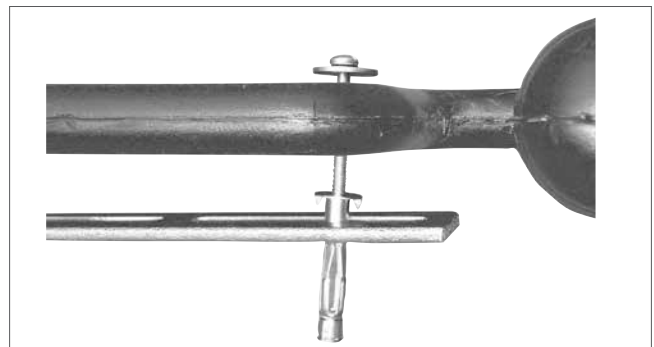


Assembly instructions

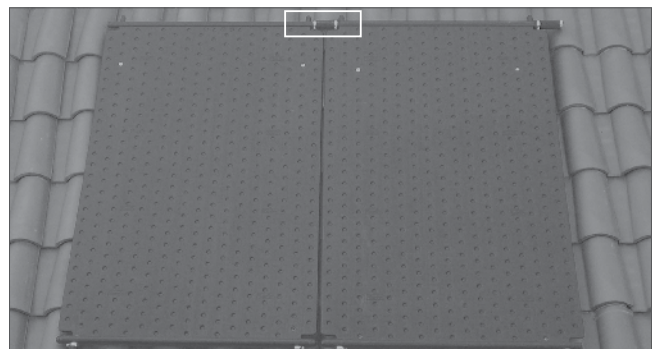
Insert the cavity plug into the flat connector.
Then insert the screw into the plug through the hole drilled in the previous step.



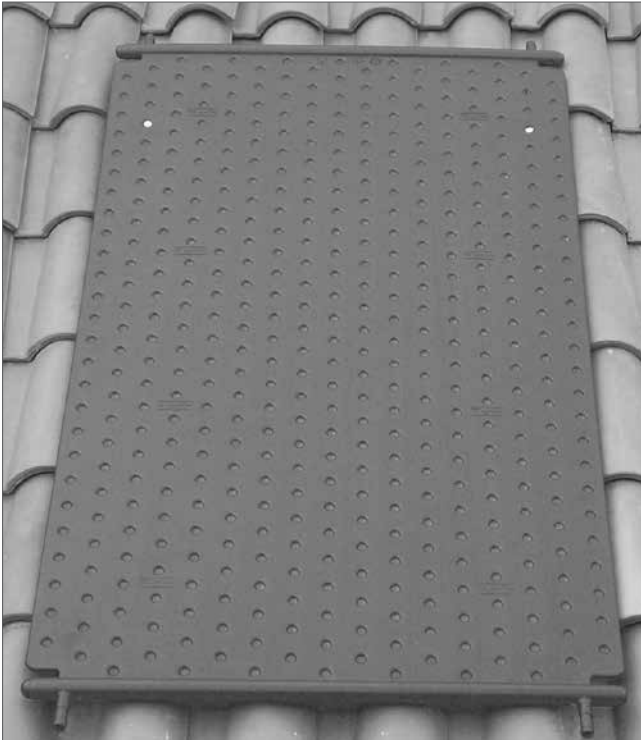
Using a drill with a screwdriver function, tighten the screw, until the plug is properly expanded.



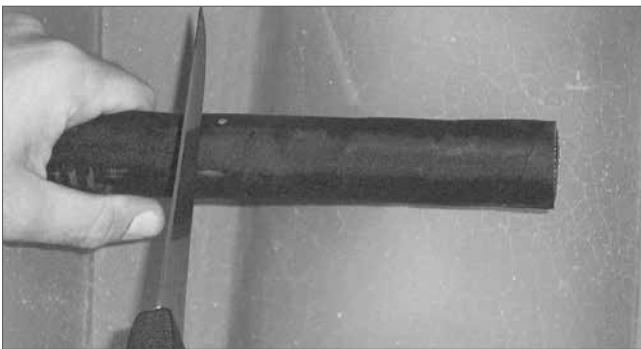
Once this is complete, mount the first collector, then mount the second collector. While doing this, you must again consider the distance between the collectors, the distance between the potential mounting areas and the width of these areas. The distance between the sides of the collectors must be approximately 1 cm. Mount the remaining collectors by repeating the steps above.



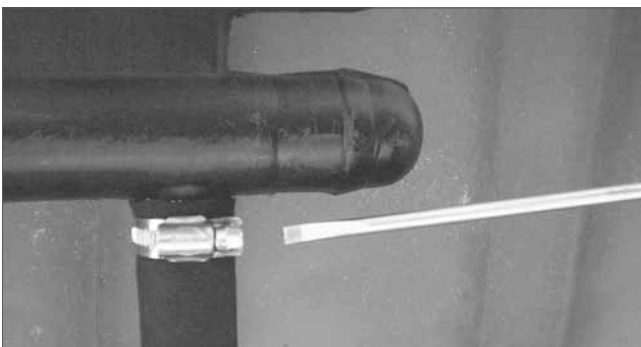
Assembly instructions



Each collector only needs two rafter anchors on the back (vertical layout).
The number of rafter anchors varies depending on the assembly option.



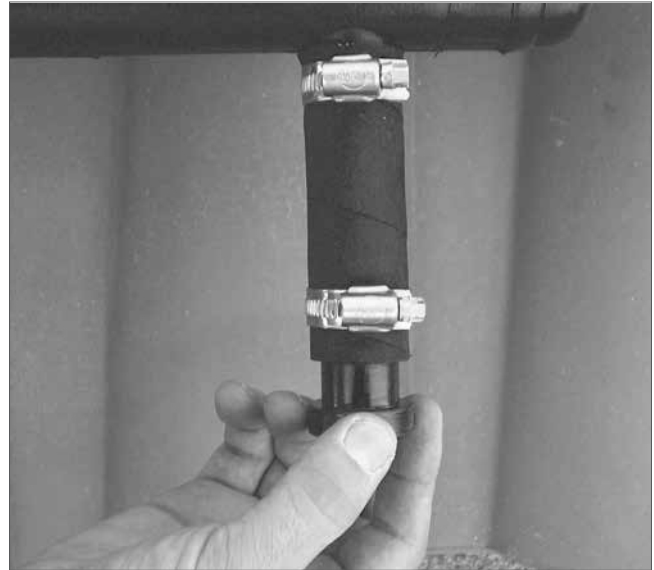
Cut the fabric hoses supplied with the connection and end stopper sets to the length required.



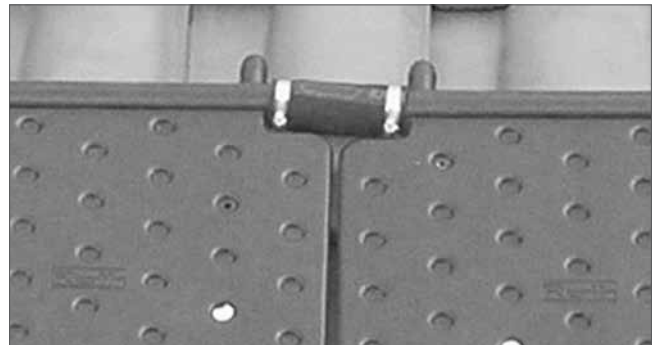
To use the end stopper set for closing off connections with a diameter of 25 mm that are not needed, first fasten the fabric hose with hose clamps.

Assembly instructions

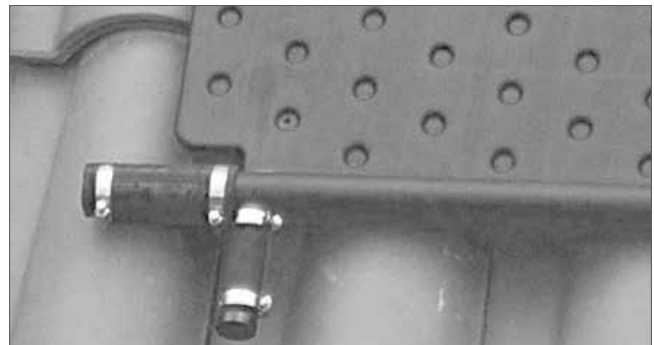
Close the open hose end with an end stopper and fasten with the hose clamp.



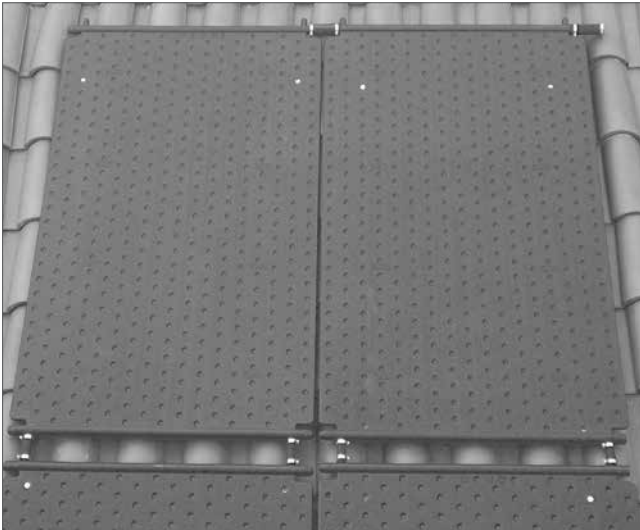
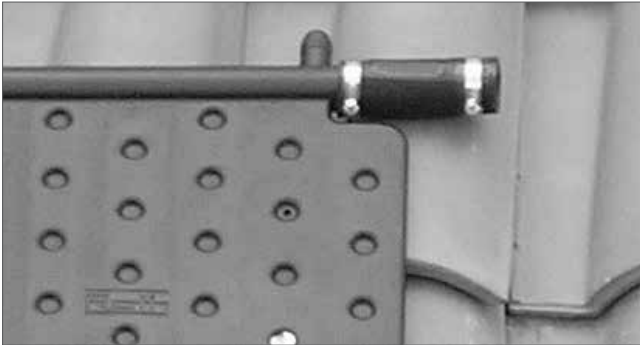
For the hydraulic connections between the collectors, use a knife to cut open the closed outlets with the diameter required (25 or 40 mm). Connect the open ends with the fabric hoses and fix them with hose clamps.



After completing the above steps, connect the collector field to the swimming pool circulation system.



Assembly instructions



Attach the temperature sensor to the **outside** of the final collector in the collector field (pointing towards the swimming pool). To do this, the temperature sensor can either be attached on site with a Roth pipe attachment adapter or inserted directly into the water using an immersion sleeve.

Note:

A cable cross-section of $2 \times 0,75 \text{ mm}^2$ is sufficient for sensor cables of up to 50 m in length. For longer cables, a cable cross-section of $2 \times 1,5 \text{ mm}^2$ is required.

References



- 1 **Outdoor pool Gramming, DE**
336 Roth swimming pool absorber HelioPool®
- 2 **Outdoor pool Arnstorf, DE**
142 Roth Sswimming pool absorber HelioPool®
- 3 **Outdoor pool Mühldorf am Inn, DE**
28 Roth swimming pool absorber HelioPool®
- 4 **Outdoor pool Niedereisenhausen, DE**
120 Roth swimming pool absorber HelioPool®
- 5 **Outdoor pool Knüllwald-Remsfeld, DE**
Roth swimming pool absorber HelioPool®
- 6 **Small system Nordhorn, DE**
4 Roth swimming pool absorber HelioPool®

Our strengths

Your benefits

Innovation

- > Early identification of market requirements
- > In-house materials research and development
- > In-house engineering
- > Certified in accordance with DIN EN ISO 9001

Service

- > Extensive field network of qualified sales professionals
- > Hotline and project planning service
- > Factory training courses, planning and product seminars
- > Fast availability of all Roth brand product ranges throughout Europe
- > Comprehensive guarantee and extended liability agreements

Products

- > Complete range of easy-to-install product systems
- > Manufacturing expertise for the complete product range within the Roth Industries group of companies

A large, stylized white Roth logo is centered on a dark grey background. The logo features the word "Roth" in a bold, sans-serif font, with horizontal lines above and below the text. In the bottom left corner, a human hand is shown palm-up, appearing to hold or present the logo.



Roth Energy and Sanitary Systems

Generation

- > Solar systems
- > Heat pump systems
- > Solar heat pump systems

Storage

- Storage systems for
- > Domestic & heating water
 - > Combustibles and biofuels
 - > Rainwater and waste water

Application

- > Radiant heating and cooling systems
- > Pipe installation systems
- > Shower systems

Roth

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