THE GeoCollect PRINCIPLE

/ Planning and Installation Manual

This is the transition

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Here’s who we are

GeoCollect GmbH is a manufacturer of geothermal heat collectors with its headquarters in Chemnitz/Germany. It helps architects, planners, investors and heating engineers to configure the system. Thanks to their clever design, the high-performance collectors extract a maximum amount of heat from the soil – considerably more than the usual plastic pipes often used for near-surface heat production do. Our collectors are made of PP-R, a plastic which is robust yet easy to process and completely recyclable.

GeoCollect in statistics

2012

was the year when GeoCollect was founded. The company is based in Chemnitz.

Approx. **250,000**

collectors have been installed since 2012.

Approx. **5,000**

projects have been realized in Germany since the company was founded.

Approx. **5,000**

heat pumps have been connected up to now.

Approx. **50 million**

KWh of heat output per year have on average been produced.

Approx. **10,000 t**

of CO_2 have been saved every year by our systems.

Contents

Notes and regulations

If collectors have been installed below ground level, plants with roots extending to a maximum depth of 80 cm can grow above them.

1 / Notes on installation

1.1 / Safety information

This installation manual is only intended as a tool for planning and installing the heat source system. It can and should not replace expert technical knowledge and planning on the part of a specialist company.

1.2 / Safekeeping of the installation manual

The installation manual for the GeoCollect geothermal absorber system must be kept safely along with all the other documents concerning the system.

1.3 / Certification and professional requirements

Specialist companies with a permit for the installation of GeoCollect systems must be certified by the factory and according to the German Ordinance on Installations for the Handling of Substances Hazardous to Water (AwSV).

On demand, certified processors must present proof of liability insurance which will pay an amount of 5 million € per case of injury to persons and damage to property .

The excavation work must be carried out according to DIN 4124. All welding work must be carried out by trained welders according to the standards DVS 2207-11 and/or WVS 2207-1, and alternatively according to DVGW GW 330.

All health and safety regulations of the German Statutory Accident Insurance (DGUV) must be complied with.

1.4 / Temperature during installation / avoidance of direct sunlight

GeoCollect geothermal absorbers should only be processed or put under mechanical stress if both the ambient temperature and the material temperature amount to at least +5 °C. There is an increased risk of breaking otherwise. The ideal processing temperature is > +10 °C; at temperatures below this value, increased care is required when handling the absorbers. The GeoCollect geothermal absorber modules must be protected from lengthy periods of direct sunlight (≤ 2 days) as UV light has a detrimental effect on the properties of the material.

1.4 / NOTE

a / To ensure the perfect functioning of the system and for warranty reasons, it is vital to proceed according to this manual and use components prescribed or approved by GeoCollect GmbH.

b / Safety note on excavation: the relevant regulations concerning shoring and sloping must be complied with and are in the responsibility of the company doing the work.

c / This product should only be used by persons (including children) with restricted physical or mental abilities or with insufficient experience and/or knowledge if these persons are supervised and guided by a responsible person.

d / We accept no liability for technical changes, mistakes or printing errors!

2 / Regulations

2.1 / Necessary installation area

The installation area required for GeoCollect geothermal energy systems must be ascertained during the planning phase and coordinated with the site layout.

In the standard laying pattern, a trench length of 5 m is required for each module circuit (= 10 individual modules). The module series are set up at a lateral distance of at least 0.7 m or more. The standard installation depth is 1.5 m, but at least 20 cm below the natural ground frost depth in terms of the upper edge of the GeoCollect absorber modules (component height 350 mm).

The nominal area for a GeoCollect strand (without connecting pipes) thus amounts to 7 m². (See also section 4.2 “Standard laying pattern for 1 kW heat extraction rate”.)

Installation on two levels is possible if a minimum height difference of 65 cm is observed between the lower edge of the upper level and the upper edge of the lower level. This means that the space requirements can be reduced if the space in between is filled with sand only (grain diameter 0.63 – 2.00 mm).

The special requirements for installation on two levels must be complied with.

2.2 / Installation distances

The following installation distances must be complied with:	
to masonry of any kind:	**100 cm**
to light wells:	**100 cm**
to water pipes:	**100 cm ***
to rainwater pipes:	**100 cm ***
to drainage pipes above the collectors:	**30 cm**
to grey water pipes:	**30 cm**
to all other media:	**50 cm**
to property boundaries:	**100 cm ****
Max. root depth in the case of overplanting:	**80 cm**

* At lower distances, appropriate insulation is vital.

** If municipal regulations do not stipulate larger installation distances.

2.3 / Utilization limits

The standard configuration of the system is carried out with a utilization limit of -10 °C for the brine output temperature from the heat pump to the absorber field. This configuration is optimal when the surrounding soil / filling material exhibits an average water saturation of between 15 % and a maximum of 50 % as well as a capillary structure. Only under these conditions can the intended ice formation in the soil build up on the flanks of the GeoCollect modules in such a way that the volume change can find room in the capillarity of the soil. Permanently water-saturated soils or compact clay soils require the special measures described on the following pages if elevations and depressions on the surface are to be prevented at all costs.

The installation of a GeoCollect system in dry gravelly soils requires the introduction of a barrier layer below the geothermal absorbers and filling with sand to achieve an average water saturation of 15 %.

Installation in stony soils may be possible with considerably higher excavation effort if the GeoCollect system is also back-filled with sand.

Optimizing a GeoCollect system using rainwater infiltration via drainage pipes or other infiltration systems is basically possible if the soil is highly permeable. At the standard installation depth of 1.5 m for the lower edge (= 1.15 m for the upper edge of the absorber below ground level), fleece-covered drainage pipes with a distance of 30 cm to the GeoCollect absorber can be introduced centrally at a depth of 1 m. It is also possible to use other infiltration systems depending on the manufacturer information provided in each case.

It is important to make sure that stagnant water does not collect in the drainage pipe (or any other irrigation systems). This means that any water which does not undergo infiltration ultimately has to be drained off. This is the only way to ensure that the drainage pipes cannot be blocked by ice formation.

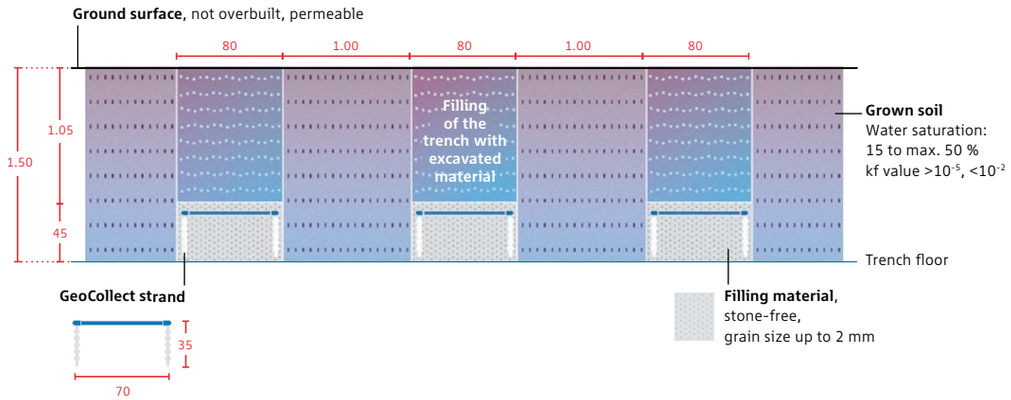
The installation of the modules must be adapted to fit the circumstances on the plot of land concerned. The positioning of the module circuits must be marked in the site layout for the purposes of later excavation.

When filling the trenches / the excavation pit, warning tape must be deployed about 50 cm above the upper edge of the GeoCollect strands.

(CONTINUED ON PAGE 14)

2.3 / IDEAL SOIL CONDITIONS FOR GEOCOLLECT STANDARD CONFIGURATION

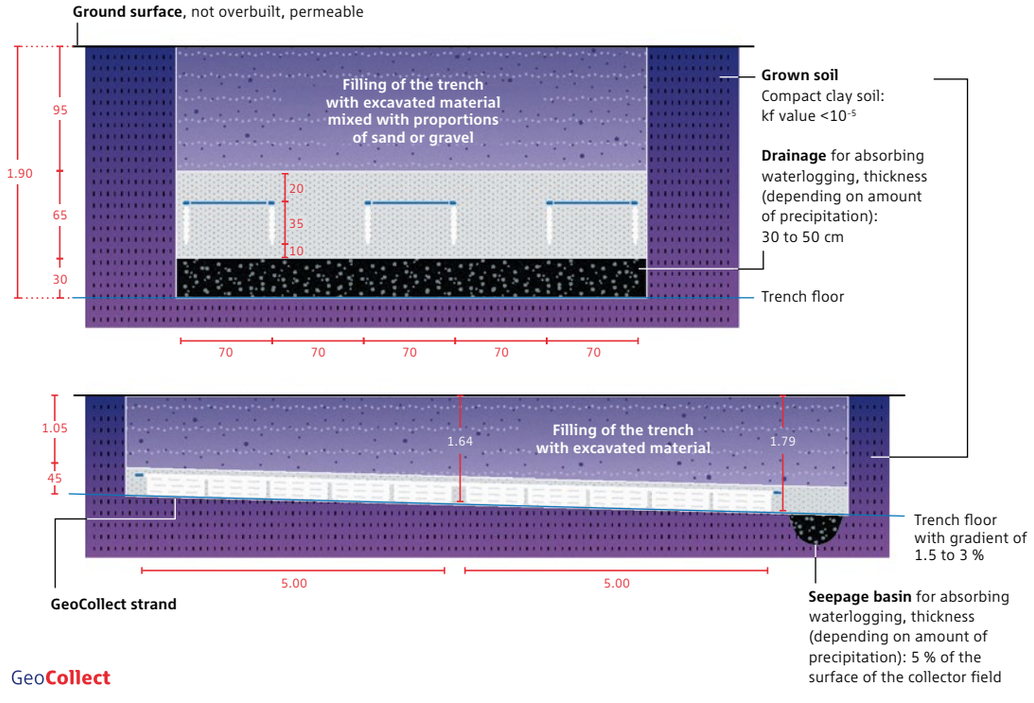
Potential configuration conditions:
a / Lowest brine exit temperature from heat pump to soil: -10 °C to -12 °C
b / Standard configuration according to the configurator in accordance with the climate zone is no problem
c / As an alternative to trenches, complete excavation is also possible
d / Minimum distance of 70 cm also possible between the trenches, attention: danger of collapse



2.3 / PECULIARITIES OF CONFIGURATION FOR COMPACT CLAY SOILS

(if elevations and depressions on the surface must be prevented at all costs)

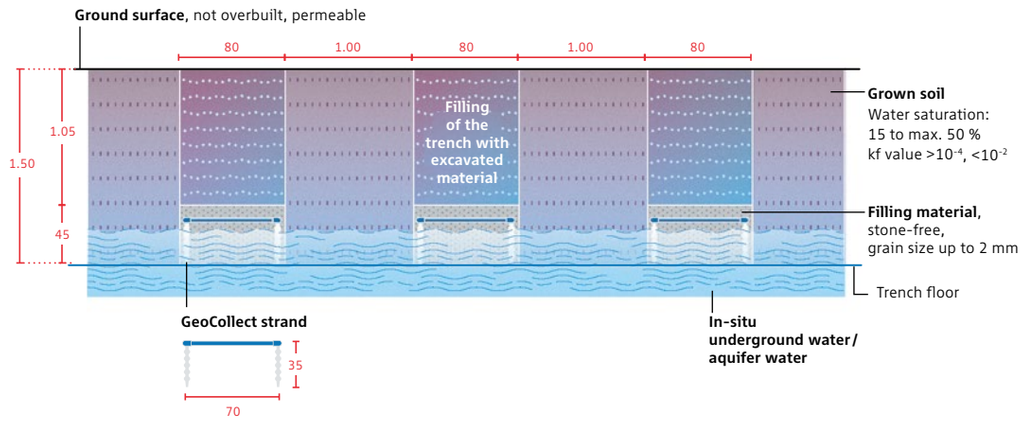
Compact clay soil = no capillary structure present + danger due to waterlogging
Two possible alternative measures:
a / Standard configuration when soil structure (excluding complete excavation) is as shown above; drainage below the GeoCollect system
b / Standard configuration for installation with a gradient of 1.5 – 3 % and a gravel sump at the lowest point as shown below
c / Possible configuration conditions: temperature limitation to -6 °C (lowest brine exit temperature from the heat pump)
-> Enlargement of the GeoCollect system with the help of the configurator under www.geocollect.de



2.3 / PECULIARITIES OF CONFIGURATION IN THE CASE OF UNDERGROUND WATER AND/OR PRESSING WATER

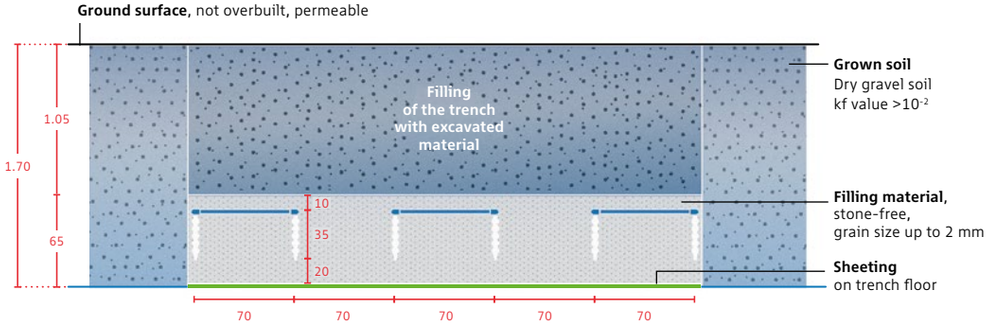
(if elevations and depressions on the surface are to be prevented at all costs)

Possible configuration conditions:
Temperature limitation to -6 °C (lowest exit temperature of brine flowing from the heat pump)
-> Enlargement of the GeoCollect system with the help of the configurator under www.geocollect.de

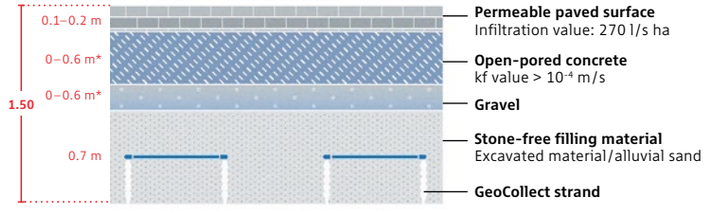


2.3 / PECULIARITIES OF CONFIGURATION IN THE CASE OF COMPACT CLAY SOILS

Possible configuration conditions:
a / Lowest exit temperature of brine from heat pump to soil: -10 °C to -12 °C
b / Standard configuration according to the configurator in correspondence with the climate zone is no problem
c / Only complete excavation possible



2.4 / EXAMPLE DIAGRAM OF A GEOCOLLECT SYSTEM OVERBUILT WITH A PERMEABLE PAVED SURFACE (SEE PAGE 14)



GeoCollect strands can only be installed on slopes with a maximum gradient of 15 %.

Only stone-free material with grain sizes of up to 2 mm should be used to fill the GeoCollect system. The system generally has to be covered with 5 cm of slurry to ensure that there is a compact connection between the GeoCollect absorber modules and the surrounding soil. If the subsoil of the excavation pit on which the GeoCollect absorber modules stand is uneven or stony, a granular subbase of sand must be prepared.

GeoCollect systems back-filled with sand must generally be configured according to the ground type “sand”.

Besides the soil conditions, the climatic conditions, which are subdivided into 15 climate zones in Germany, are vital for the configuration of GeoCollect systems. Besides the generalized selection of the climate zone, it may be necessary to take a microclimate at the installation site of the system into account. A system which is for example planned to be completely in the shade achieves a considerably lower regeneration performance than a system located at a site which is exposed to sunlight all day long.

For this reason, a system which deviates from the general climatic data must be configured to be larger, for example based on a “less good” climate zone, in order to ensure economic operation.

The utilization limits of the GeoCollect absorber system in continuous operation lie between -15 °C and +40 °C.

The maximum permissible working pressure is 2.5 bars.

2.4 / Overbuilding

Overbuilding is generally not possible. Exceptions require additional measures for the humidification of the soil in the vicinity of the GeoCollect system and possibly also additional regeneration measures according to individual professional planning.

For example, installation below permeable paved surfaces is possible if the permeability value is ≥ 270 l/s ha. The information provided by the manufacturer is decisive here. Under the permeable paved surface, it is possible to use open-pored concrete (kf value > 10-4 l/ s) to realize the corresponding loads starting at 15 cm above the GeoCollect modules. For each type of implementation of overbuilding according to special planning, it is vital to replace the soil with filling material exhibiting a high capillary action as the ice formation on the GeoCollect absorber would otherwise lead to distortions at ground level and on the adjoining buildings. Supply pipes running between the GeoCollect strands and the distributors and/or pipes running between distributor and utility entry point which are installed below paved surfaces must be laid in empty ducts with the necessary dimensions or insulated to make them impermeable.

In the case of critical overbuilding, we recommend -6 °C as the lowest brine temperature for the configuration (exit from the heat pump to the soil).

(SEE INFO DIAGRAM ON PAGE 13)

Example: parking area with permeable paving above the GeoCollect system

Our collectors are certified, have a service life of at least 100 years and are recyclable. Nature will say “thank you”.

The absorber

Near-surface geothermal energy is an important component of the energy transition. GeoCollect makes its contribution to this. Our collectors extract a maximum amount of heat from a small area of ground – on average between 100 and 200 watts per square metre. The high extraction power results from the special surface of the collector.

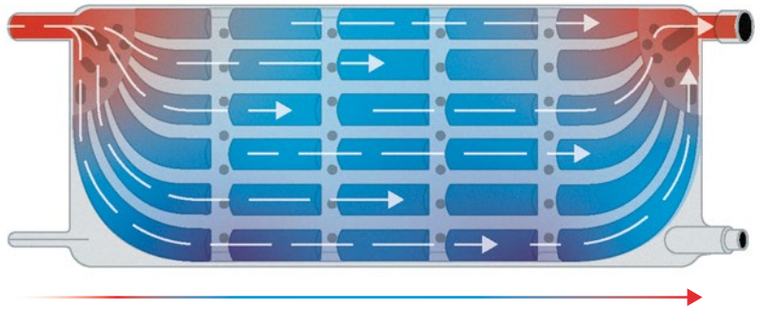
3 / Technology and mode of functioning

3.1 / The technology behind the absorber

The GeoCollect absorber module is a robust, full-surface, thin-layered geothermal energy medium with stimulated turbulent throughflow. The inner heat exchanger area is 0.8 m^2 and the absorption area effective externally is 2 x 0.31 m^2.

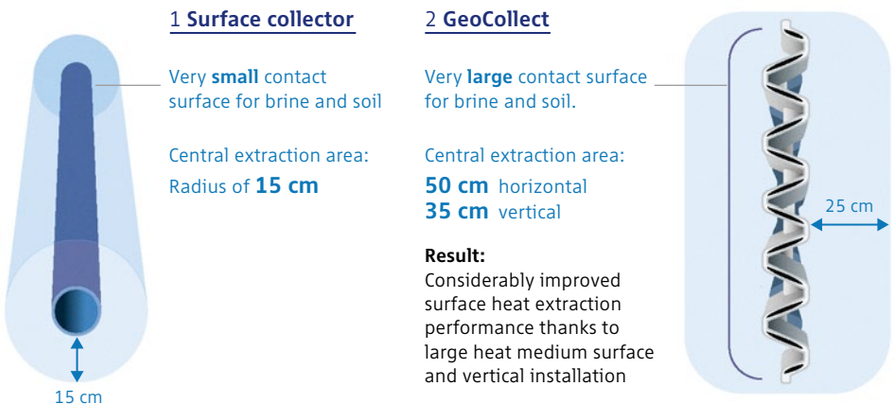
3.2 / Dimensioning and throughflow

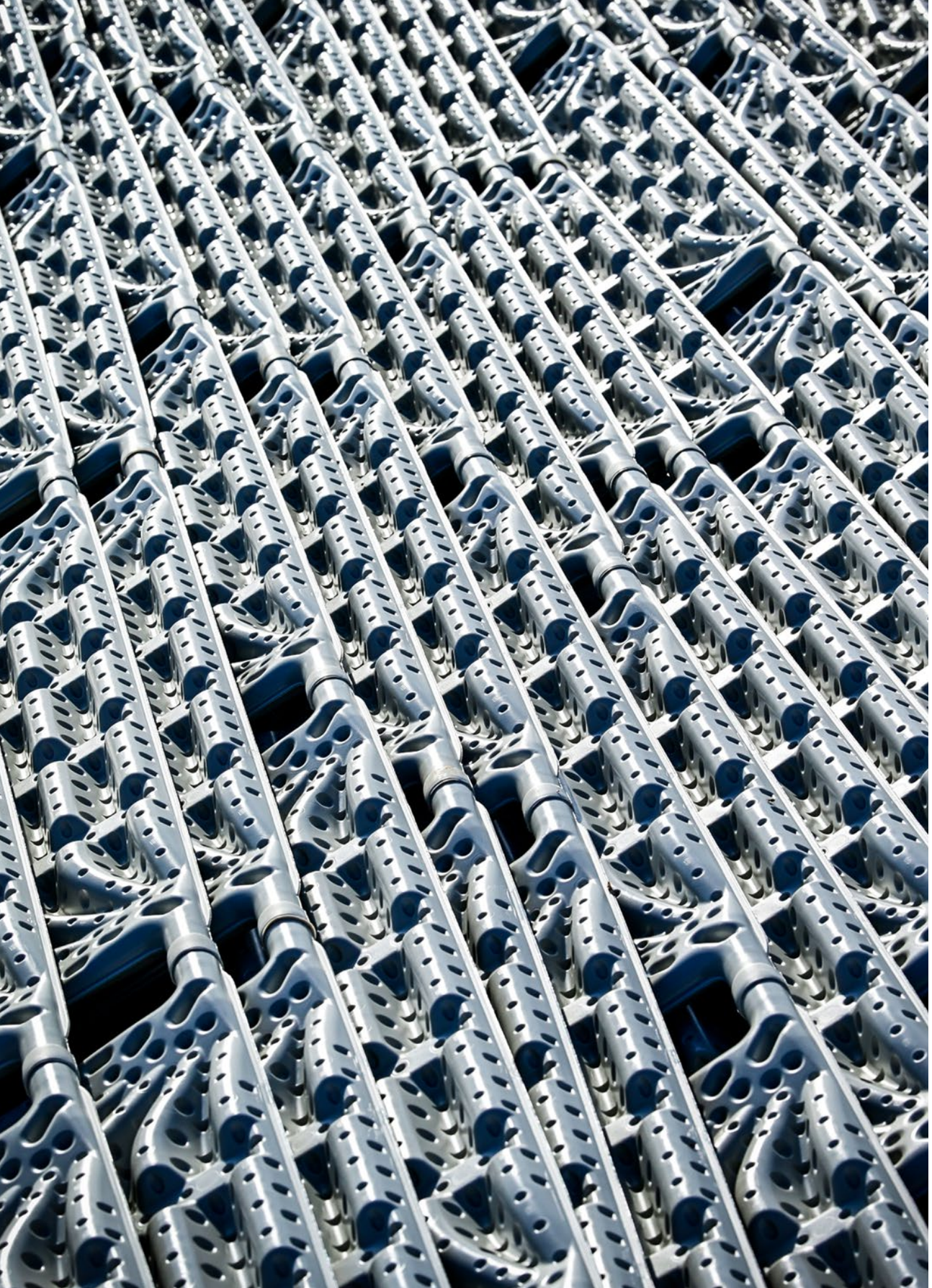
Flow simulation of the GeoCollect absorber



The GeoCollect Absorber exhibits uniform stimulated turbulent throughflow over its full surface.

Pipe-based surface collector (1) **in comparison with the GeoCollect absorber** (2)





Planning assistance

The GeoCollect absorber module: smart design for maximum energy yield.

4 / Planning assistance

4.1 / Configuration of the heat source system

The GeoCollect system is configured according to the following criteria:
- The heating load (possibly incl. water heating) and the heat output of the heat pump
- The maximum source-side volume flow of the heat pump
- The annual heat requirements (incl. water heating)
- When required, according to cooling load and annual hours for passive cooling (tempering) at a flow temperature of 19 °C
- When configuring the GeoCollect system, a control calculation must be carried out with regard to the full-load hours to be performed (usually 2,400 h for heating and water heating and/or 1,860 h for heating only) and any necessary adjustments must be made.

4.1 / NOTE

It is always the "most unfavourable" configuration which ultimately decides on the actual size of the GeoCollect system. The number of strands (X) is always rounded up to whole numbers. The heat pump must always be chosen in such a way that it can guarantee the required heating load under all operating conditions.

4.1.1 / Configuration according to the heating load

Professional configuration is based on an annual COP of 5.
In other words, it must be possible to provide 80 % of the heat output through the heat extraction rate and 20 % of the heat output through the compressor performance.

The formula is: $X = \frac{\text{Heating load / heat output}}{1.2}$ X = Number of GeoCollect strands

Constraint: the heat extraction rate according to the configuration table* exceeds 142.61 W/m².
Use the following correction factor otherwise:

* See annex 7.1 to this manual

$$X_{final} = X \times \frac{142.61}{\text{(Value from configuration table)}}$$

4.1.2 / Configuration according to the source-side volume flow of the heat pump at a spread of 3 K

- One GeoCollect strand has a rate of flow of (max.) 5 l/min or 300 l/h.
- The spread should equal 3 K. As a result, the following applies for the number of GeoCollect strands:

$X = \frac{\text{Volume flow of the heat pump}^*}{300}$ X = Number of GeoCollect strands

* At values given in l/h – please convert any other values.
For modulating or inverter heat pumps, the volume flow at maximum power output is decisive.

4.1.3 / Configuration according to the annual heat requirements

- One GeoCollect strand activates a site area of 7 m² at an installation distance of 0.7 m.
- Calculation is based on an annual COP of 5.
- The following therefore applies for the number of GeoCollect strands according to the annual heat requirements:

$$X = \frac{\text{Annual heat requirements}}{\text{Value from configuration table}^*} \div 7 \div 1.2$$

4.1.4 / Configuration according to the cooling load (passive cooling, tempering only)

- According to the recommended value, one GeoCollect strand has a passive cooling capacity of 1 kW at a flow temperature of 19 °C and a spread of 3 K over max. 500 h/season.
- Flow temperatures < 19 °C cannot be achieved permanently through passive cooling.
- It is not possible to give a generally guaranteed performance for passive cooling. Nevertheless, it improves the comfort in the tempered rooms. The recommended value for the calculation of the number of GeoCollect strands required for passive cooling can be calculated as follows:

$X = \frac{\text{Cooling load} \times \text{cooling time (h)}}{500}$ $X = \frac{19}{\text{Cooling temperature}}$

4.1.5 / Configuration for hybrid source systems

With hybrid sources, we make a distinction between pure regeneration sources and so-called changeover sources. In the former case, the system is configured as described in 4.1.1. to 4.1.4.
The regeneration source serves to increase the average source temperature throughout all annual operating hours and thus improve the annual COP. This can be useful for existing buildings with high flow temperatures. Also, GeoCollect systems with sufficiently dimensioned regeneration sources can be installed on more than just two levels.

For changeover sources in which the "other" source supplies between 50 and 80 % of the operating hours of the heat pump and actively provides additional yields for the regeneration of the soil (the precise configuration of the "other" source must be known), the GeoCollect system can be configured as follows:
- The only configuration parameter for the number of GeoCollect strands is the source-side nominal flow rate of the heat pump at maximum output and a spread of 3 K.

$X = \frac{\text{Flow rate in l/h}}{300\ \text{l/h}}$ = Number of GeoCollect strands

- The installation distance can be reduced from 0.7 m to 0.5 m – when installed on one level, the space requirements per strand drop from 7 to 5 m².
- Installation can be carried out on any desired number of levels. The space requirements then drop accordingly.

4.2 / Standard laying pattern for 1 kW heat extraction rate

Partial strands with 5 absorbers each

Example photograph of distribution shaft

4.3 / Laying pattern version 2 for 2 kW heat extraction rate

When installing 2 strands in a trench with a width of 80 cm (70 cm installation distance), this laying pattern allows a heat extraction rate of 2 kW to be achieved in a trench with a length of 10 m.

Strands with 10 absorbers each

Example photograph of distribution shaft

4.4 / Laying pattern version 3 for 10 m long slits, 1.5 m below ground level

In this case, the flow and return flow pipes are welded to the GeoCollect strands outside of the trench over their full length. The complete strands are then let down into the narrow trench on ropes by at least 3 persons.

Strand with 10 absorbers

Example photograph of distribution shaft

4.5 / Laying pattern version 4 for GeoCollect systems usually larger than 100 kW

In GeoCollect systems larger than 100 kW, 10 to a maximum of 12 GeoCollect strands are piped according to Tichelmann and directed as a group to a large distributor using a 40 mm PP pipe. This makes it unnecessary to connect each individual GeoCollect strand to a distributor. To flush and ventilate a system of this kind, a flushing pump with sufficient power is required.

10 to 12 strands, each consisting of 10 absorbers with parallel throughflow

Example photograph of distribution shaft

4.6 / Hydraulic components and performance limits

The following elements are usually included in the scope of delivery of the GeoCollect system:

- GeoCollect absorber modules
- Pipes and sockets for connecting the absorber strands (1 strand consists of 10 modules) to the distribution shaft
- Distribution shaft with volume flow controllers for the hydraulic balancing of the strands
- Connecting pipe and sockets for the utility entry point
- Two ball valves (flow and return flow) with brass adapter or loose-type flange as a transfer point in the building services room
- Two ring seals for sealing the utility entry point

Services provided on site:

- Core holes (when the building services room is in the cellar) with a centre-to-centre distance of 30 cm at 1.15 m below the ground surface
- or 2 KG pipes with a centre-to-centre distance of 30 cm at 1.15 m below the ground surface with an arc with max. 15° in the vicinity of the planned distribution shaft

The dimensions of the pipes for the utility entry point, the core holes or KG pipes and the ring seals depend on the size of the GeoCollect system and the distribution shaft used. In the case of double-walled cellars, empty ducts must be used for running pipes through the walls.

The specialist company connecting the heat pump must install the following components which are not included in the GeoCollect scope of delivery.

- Diaphragm expansion vessel (at least 4 % of the heat transfer fluid present in the system pre-pressurized to 1 bar) or vacuum spray tube degassing unit
- Filling and flushing valve in the building services room
- Safety group and pressure monitor (operating pressure in the heat source circuit: 2 bars)
- Impermeable cold insulation of all brine pipes located on the inside

4.7 / Possible requirements and special solutions in drinking water protection areas (zone 3 a/b)

Pressure monitor and warning signal

A requirement which frequently has to be met in connection with GeoCollect systems in drinking water protection areas is the installation of a pressure monitor which switches off the heat pump and issues a warning signal when a pressure drop occurs in the brine circuit.

This requirement must be met by the heat pump manufacturer and the specialist company commissioned to install the heat pump. In other words, this requirement does not directly concern the GeoCollect system in the narrow sense.

Substructure of a bentonite barrier layer when ground water levels are high

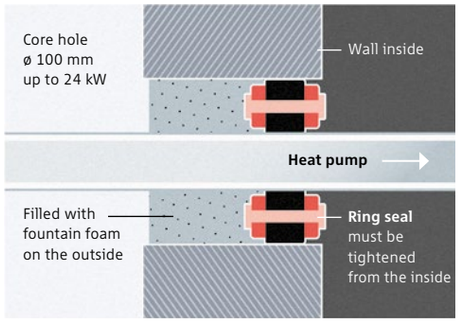
If the thickness of the soil between the installation depth of the GeoCollect system (usually 1.5 m) and the highest ground water tables to be expected is less than 2 m, and depending on the impermeability of the soil above the aquifers, it can be necessary to prescribe a barrier layer made of bentonite to prevent the water-glycol mixture from leaking into the groundwater. In weakly permeable soil (usually ≤ 10^{-5} m/s), a thickness of 1 m between the GeoCollect installation depth and the highest groundwater levels is usually sufficient.

It is advisable to enter into a dialog with the local water authority in good time before detailed planning starts.

Installation of a measuring device for the groundwater level in the bentonite trough

The authority can demand proof of the impermeability of the bentonite barrier layer. This can be achieved by means of a simple fleece-covered and perforated KG pipe and a dipstick located at a lower position within the bentonite barrier layer.

4.6 / UTILITY ENTRY POINT THROUGH CELLAR WALL OR FLOOR PANEL



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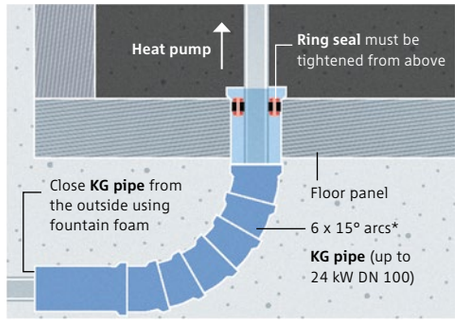


2/

1/ Utility entry point through cellar wall

2/ Utility entry point through floor panel*

4.7 / BENTONITE BARRIER LAYER AND MEASURING DEVICE

1/

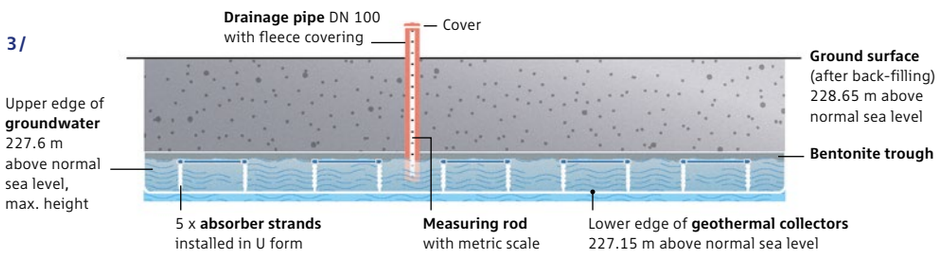
2/

1 / Installation of a bentonite barrier layer

2 / Perforated KG pipe to take up the groundwater dipstick

3 / Basic structure with bentonite barrier layer (cross-section)

3/



* For systems > 15 kW, we recommend installing pre-insulated pipes with the necessary dimensions between the building services room and the end of the floor panel. For systems > 24 kW, the utility entry point can only be installed under a floor panel in this way.

Installation and commissioning

The collectors are connected via plastic welding and installed vertically below the ground surface.

5 / Installation

5.1 / Installation sequence

- ○ Ascertainment of the space requirements and determination of the laying pattern
- ○ Execution of earthworks and pre-assembly of the GeoCollect strands
- ○ Introduction and connection of the pre-assembled strands according to the laying pattern
- ○ Installation of the heat source distributor
- ○ Welding on of the absorber strands according to the strand pattern
- ○ Connection of the flow pipes and return flow pipes via the distributor
- ○ Leak test (air) with report (SEE ANNEX 7.8)
- ○ Filling and ventilation of the GeoCollect system with a water-glycol mixture
- ○ Leak test (brine) with report (SEE ANNEX 7.8)
- ○ Fixing and slurrying of the modules in the trench using stone-free soil / sand
- ○ Filling of the excavation trench with excavated material or permeable materials (SEE 5.7)

5.1 / NOTE

The maximum length of the individual 25 mm connection pipes leading from the distributor to the GeoCollect absorber series should be 50 m. At pipe lengths of up to 250 m, PP-R pipes with an external diameter of 32 mm should be used, and 40 mm PP pipes for strands connected according to Tichelmann. It may be necessary to adjust the pump output to match the requirements.

5.2 / Preparations for installation

The GeoCollect absorber modules are installed at a depth of 1.50 m*. The ground must be flattened and freed from sharp objects such as stones (if necessary, granular subbase using sand).

5.2 / NOTE

a / The heat transfer mixture used is an ethylene glycol mixture with 25 to 29 vol. % and a flocculation point of -12 to -15 °C.

b / In drinking water protection areas, the use of a food-safe propylene glycol mixture with 35 vol. % can be requested.

c / Only the heat transfer medium recommended by GeoCollect GmbH should be used (coordinate with GeoCollect GmbH if necessary).

5.3 / Installation of the heat source distributors

The distribution shafts used in this case are placed in the field in the vicinity of the GeoCollect system.

For hydraulic reasons, the heat source distributor should be installed no further than 20 m from the house and the ventilation should be located at the highest point. If the distance is larger for structural reasons, the connecting pipe from the heat pump to the distributor must be determined via pipe network calculation.

* The upper edge of the GeoCollect modules should be located at least 30 cm below the natural frost line. Installation depths can be below 1.5 m at times. Installation on two levels is possible, the lower level being located 1 m below the upper level. The space in between must be filled with sand and slurry. Special configuration conditions must be complied with for installation on several levels.

Pipes between absorber field and distributor or between distributor and utility entrance point which run below sealed surfaces or areas overbuilt in other ways must be installed in empty ducts and sealed using fountain foam.

The pipes on the distribution shafts must be connected in the voltage-free state at all times. The installation information provided by the manufacturer of the distribution shaft used is valid here. This also applies for the on-site orientation, being able to walk or drive over the system and hydraulic balancing.

All connections made on distribution shafts located on the outside must be indissoluble (polyfusion welding or Geopress). Welded connections can only be made between identical materials (PP with PP or PE with PE). Connections between PE exits on the distributor and the PP material of the GeoCollect system can only be made using Geopress.

If brine distributors are installed in the building without a distribution shaft, they must be provided with at least 19 mm of cold insulation.

5.4 / Installation of the GeoCollect absorber modules

It is advisable to install the distributors prior to the installation of the GeoCollect field so that the GeoCollect strands are already connected with the distributor when pressure testing is carried out.

You will find lots of tips, presentations and training videos on the installation of the system under www.geocollect.de/blog.

Please ensure that the open pipes are always closed during installation in order to prevent dirt from entering the pipe system. For the welding process, please comply with the attached "Welding instructions for socket welding with polypropylene PP" (SEE SECTION 5.5).

The pipe material should be rolled out until it has the required length and be cut using cutting pliers only (do not use a saw!). The interfaces must immediately be fitted with sealing plugs.

10 GeoCollect absorber modules form each strand. In the standard laying pattern, 5 absorbers are welded together via the Fusiotherm welding technique using the welding sockets already attached to the absorber.

Both partial strands with 5 absorbers each are interconnected on the socket-free end using 90° welding arcs and a 65 cm long 32 mm PP pipe.

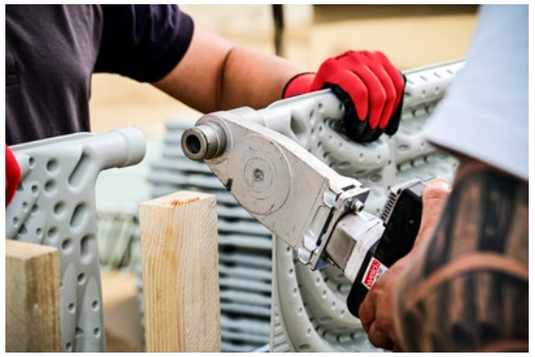
At the end of the series of 5 absorbers facing towards the brine distributors, reducing sleeves DN 32 to DN 25 are welded into the sockets attached to the absorber there. 25 mm PP pipes of adequate length are welded on until they reach the location of the brine distributors.

The flow and return flow pipes leading from the series of absorbers to the brine distributors should be installed adjacent to one another on the floor at an approximate distance of 30 cm. In trenches containing many flow pipes and return flow pipes, the pipes should be fixed above the absorbers. Flow pipes and return flow pipes should not be bundled together here; there should be nothing but flow pipes on the one side and return flow pipes on the other.

The flow pipes on the one side and the return flow pipes on the other: they are fixed above the collectors.

5.5 / Welding instructions for socket welding with polypropylene PP

1 / Assemble welding unit and heat to operating temperature (260 °C). The welding tools must be free of contaminations and damage.
2 / Pipes ends must be cut using suitable cutting pliers only. The insertion depth must be marked with a pen. (SEE TABLE 5.5.1). Splintering tools (such as saws or angle grinders) are not permitted.
3 / Clean the fittings and the pipe from dust and dirt.
4 / First push the fitting onto the relevant welding insert and warm it up.
5 / The fitting remains on the welding insert.
6 / Then push the pipe onto the necessary welding insert up to the marking and warm it up. Note the warming up times as they differ depending on the diameter (SEE TABLE 5.5.1).
7 / Pull the fitting and the pipe from the welding inserts at the same time.
8 / Push the fitting and the pipe together briskly without twisting them and hold them for several seconds (SEE TABLE 5.5.1). Do not push the pipe too far into the sockets (use markings with a depth stop).
9 / The cooling time must be complied with (SEE TABLE 5.5.1).



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5.5.1 / Recommended values for the heating element socket welding of PP pipes at an outside temperature of 20 °C and moderate air circulation.

External diameter of pipe	Welding depth	Warming up time for fitting / pipe	Warming up time for absorber	Max. processing time	Holding time	Cooling off time
25 mm	15 mm	6 - 7 s		3 - 5 s	10 s	4 min
32 mm	18 mm	8 - 10 s	5 - 7 s	3 - 5 s	10 s	4 min

5.5.2 / Welding the PE collector pipes leading from the distribution shaft to the building services room

The PE pipes leading from the distribution shaft to the building services room can be connected over a distance of up to 63 mm using either a commercially available heating spiral or the socket welding technique. The guidelines of the manufacturers of the welding units and the welding fittings are decisive here.

5.5.3 / Recommended values for the heating element socket welding of PE pipes at an outside temperature of 20 °C and moderate air circulation.

External diameter of pipe	Welding depth	Warming up time for fitting / pipe	Max. processing time	Cooling off time
40 mm	18 mm	12 s	6 s	4 min
50 mm	20 mm	18 s	6 s	5 min
63 mm	24 mm	24 s	6 s	6 min

5.5. 3 / NOTE

a / The welded connections cannot be fully stressed until after approx. 30 minutes!
b / There is a risk of burns when changing the welding inserts.
Disconnect the welding machine from the mains and leave it to cool down!!!

1 /

2 /

1 / Leak test using air at 6 bars for 1 h.

2 / Let out air down to a pressure of 3 bars during the excavation work until the system is filled

5.6 / Necessary pressure tests

Before a GeoCollect system is finally handed over, two pressure tests must be performed.

5.6.1 / Leak test with compressed air at 6 bars

Before the trenches are filled, a leak test of the installed GeoCollect strands must be carried out for one hour using compressed air at a pressure of 6 bars.

The system must be checked for leaks. To ensure the successful execution of the leak test using compressed air, it is necessary to create a correctly completed report (SEE ANNEX 7.8).

The maximum permitted tolerance complies with the specifications of the German Technical and Scientific Association for Gas and Water (DVGW), in this case a maximum of 0.05 bars.

If a higher deviation is detected but a leak cannot be found, the leak test has to be repeated.

5.6.2 / Main test with heat transfer liquid at 3 bars

After the leak test, the system must be filled with heat transfer liquid and subjected to a test pressure of 3 bars. The heat transfer liquid must ensure frost protection down to at least -12 °C and match the acceptance criteria of the heat pump manufacturers. This test state must be maintained for a period of at least 3 and at most 15 hours and logged in detail (SEE ANNEX 7.8).

After the leak test or the main test, the trades which come next can start working. The heat source system must be kept under 50% of the test pressure at all times so that any damage caused by the trades which come next can be discovered and eliminated without delay. Filling the trenches is sometimes necessary and permissible after successful leak testing with air. The main test is carried out after the installation of the GeoCollect system (including the distribution shaft).

The test reports must be filled in completely and sent to GeoCollect GmbH.

5.6. 2 / NOTE

a / The presentation of the test reports within a reasonable period (14 days) after the creation of the pressure samples and the use of the system components recommended by GeoCollect are the prerequisites for all warranty claims.

b / Do not use the GeoCollect geothermal energy absorber system to dry the screed and the building, especially if the heating period begins shortly afterwards. This is because the regeneration time is one summer. This process must be carried out using an alternative source of heat (such as a heating cartridge).

c / If the brine / water heat pump is also used to heat a swimming pool, a higher number of annual hours at full use can be expected, making it necessary to enlarge the heat source.

5.7 / Filling the trenches

The modules must be fixed with a loose layer of soil (possibly sand according to DIN 4022 (coarse sand) or with a small grain diameter of 0.63 – 2.00 mm) and slurried. The final slurrying is carried out after covering the modules up to a height of 10 cm. Then the trench can usually be completely filled with the existing excavation material and consolidated.

A warning tape must be deployed above the GeoCollect strands at a depth of 0.5 to 0.6 m below the ground surface.

Starting from a covering of 50 to 80 cm above the upper edge of the GeoCollect strands, mechanical consolidation of the excavation trench is no problem if the GeoCollect strands have been back-filled with sand and slurried.

5.7 / NOTE

Clay soils are unsuitable for filling in the vicinity of the GeoCollect absorbers as they cannot be consolidated correctly after slurrying and do not have a capillary structure.

5.8 / Special notes on bridging long flow and return flow distances using PP pipes with an external diameter of 32 mm

To prevent high pressure losses, it is advisable at distances of > 50 m between the series of absorbers and the brine circuit to change from pipe with an ED of 32 mm to pipe with an ED of 32 mm using a reducing sleeve and then weld the pipe directly to the socket side of the absorber.

5.9 / Handling welding errors

The absorbers are manufactured in such a way that a faulty weld can be cut off on both sides directly adjacent to them. Then the modules are welded together again using a DN 32 PP-R welding socket. The absorber modules affected only need to be replaced if this attempt fails.

6 / Commissioning

6.1 / Filling the heat source

After the necessary leak test of the GeoCollect absorber system (cf. 5.6), the system must be flushed and ventilated completely. The operating pressure should exceed 2 bars.

It is vital to use a flushing system to flush the pipes. This is connected to the flushing and filling units on the heat source inlet side or the connectors provided for this purpose. The direct brine throughflow must be disabled when this work begins. The stopcocks on the flushing system must be opened. Now the circulating pump in the flushing system is activated. This pump pumps the brine from the flushing container and circulates it through the absorber strands.

When brine flows back to the flushing container from the upper inlet nozzle, it means that the brine circuit is filled. To flush all module circuits and make them free from dust and bubbles, all connections but one on the brine distribution bar must be closed. This ensures that this remaining strand is flushed intensively and any air bubbles or dirt particles are flushed out. The flushing process for one strand is considered as adequate when neither air bubbles nor foam form in the brine as it flows back.

Now the next strand can be opened and the strand flushed previously can be closed again. This process is repeated until all strands have been flushed in succession. The flushing pump to be used should have a delivery head of at least 50 m at a delivery rate of at least 50 l/min. For groups of strands interconnected according to Tichelmann, a flushing pump with a delivery rate of at least 120, or preferably 160 l/min, should be used.

6.2 / Notes on brine-side system connection and insulation

In the heat pump, the brine connecting arcs must be checked for correct insulation and insulated afterwards if necessary. It is in particular necessary to ensure that insulation is carried out and suitable insulation material is used. A wall thickness of at least 19 mm is prescribed for the diffusion-proof insulation material used (and so is UV resistance in the case of installation outdoors).

6.3 / Notes on the suitability of GeoCollect systems for being driven over

The area of GeoCollect absorber strands which have been completely back-filled with sand and carefully slurried can be driven over safely with axle loads of 10 t after the strands have been covered with 80 cm of soil.

Of course, the load-bearing capacity of the superstructure has to be achieved according to the generally accepted rules of technology. However, it is vital to guarantee the permeability (kf value $>10^{-5}$ m/s). The final production and consolidation of the upper excavation pit is not included in the scope of delivery of the GeoCollect processors but in the scope of work performed by the trades which come next.
The above does not apply in the vicinity of the distribution shafts (radius 2 m). It may be necessary to build load bridges here. The axle load must not exceed 1 t in this place.

6.4 / Setting the heat source distributor

For the perfect functioning of the heat source system, it is necessary to carry out hydraulic balancing on the heat source distributor in such a way that the same volume flow passes through all GeoCollect strands.

The distribution shafts include flow limiters which display a compulsory flow direction. It is vital to pay attention to the correct flow direction when connecting the heat pump. For this purpose, following the installation of the GeoCollect system, unambiguous markings must be affixed in the building services room when connecting the heat pump, and the trade which comes next has to comply with them.

The hydraulic balancing on the heat source distributor is performed as part of the commissioning of the heat pump after the volume flow has been set in such as way that it as far as possible runs with a spread of 3 K. The person doing the commissioning is responsible for hydraulic balancing.

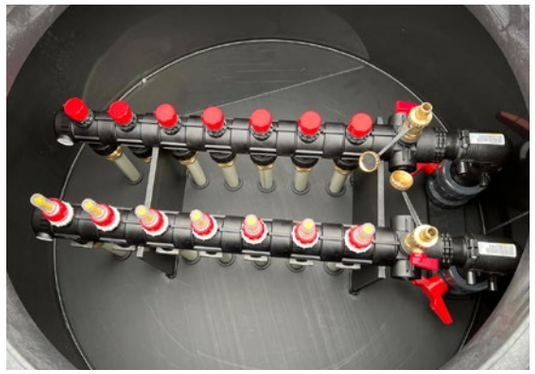
6.5 / Setting the heat pump

The working principle of the GeoCollect system partly corresponds with that of an ice store. In the standard configuration, a minimum brine exit temperature (from the heat pump into the soil) of -10 °C is assumed. The heat pump must be put into the operating mode provided for this purpose (shutdown at a brine exit temperature from the heat pump of -10 °C to -12 °C, depending on the concentration of the water-glycol mixture used). Other configurations are possible and must be planned in the runup to installing a GeoCollect system. The spread between brine flow and return flow should equal 3 K. The brine expansion tank must be pre-pressurized to 1 bar and the system pressure to 2 bars.

6.6 / Documentation obligations

After the installation of a GeoCollect system has been completed, the following markings and documentations must be provided and handed over to the building owners:

- Creation of a pressure testing and handover report
- Creation of a revision drawing
- Numbering of the GeoCollect strands in the distribution shaft and identical numbering on the revision drawing



1/

2/

3/

1 / The arrow below the flow limiter displays the flow direction from the heat pump into the ground. At the beginning of hydraulic balancing, the stopcocks on the one distributor bar and the control valves of the flow limiters on the other bar must be fully opened. For this purpose, the white stop below the flow limiters must be lifted slightly so that the control valves can be fully opened. During hydraulic balancing, the strands which display a higher flow than other strands must be throttled slightly. Hydraulic balancing has been successfully completed when all strands display the same flow.

2 + 3 / The arrow to the side of the flow limiter shows the flow direction from the ground to the heat pump. The end of the yellow float valve pointing towards the wall of the shaft displays the flow here (shown without the flow on the figure). Using the ball valves, each strand must be set to the same flow after the commissioning of the system; i.e. strands with a higher flow are throttled slightly.

Annexes

7.1 / Performance table

No.	Climate zone	Heat extraction rate in W/m² * Annual COP in kWh/m² *	Sand	Loam/silt	Sandy clay
1	Bremerhaven	Heat extraction rate	144	158	174
	North Sea Coast	COP	273	284	295
2	Rostock-Warnemünde	Heat extraction rate	125	138	151
	Baltic Coast	COP	265	276	287
3	Hamburg-Fuhlsbüttel	Heat extraction rate	144	158	174
	Northwest German Plain	COP	270	281	292
4	Potsdam	Heat extraction rate	134	147	162
	Northeast German Plain	COP	237	246	256
5	Essen	Heat extraction rate	144	158	174
	North Rhine Westphalian Lowland & Emsland	COP	286	297	309
6	Bad Marienberg	Heat extraction rate	132	145	160
	Northern and Western Highlands, outlying areas	COP	291	303	315
7	Kassel	Heat extraction rate	137	151	166
	Northern and Western Highlands, central areas	COP	257	268	278
8	Braunlage	Heat extraction rate	125	138	151
	Upper Harz Mountains and Black Forest (medium altitude)	COP	304	316	329
9	Chemnitz	Heat extraction rate	123	135	149
	Thuringian Basin and Saxon Highlands	COP	255	265	276
10	Hof	Heat extraction rate	123	135	149
	Southeastern Highlands up to 1,000 m	COP	257	268	278
11	Fichtelberg	Heat extraction rate	94	103	114
	Ore Mountains, Bohemian and Black Forest above 1,000 m	COP	257	268	278
12	Mannheim	Heat extraction rate	151	166	183
	Upper Rhine Rift Valley and Lower Neckar Valley	COP	242	251	262
13	Passau	Heat extraction rate	125	138	151
	Swabian-Franconian Plateau and Alpine Foreland	COP	263	273	284
14	Stötten	Heat extraction rate	130	143	157
	Swabian Mountains and Baar	COP	273	284	295
15	Garmisch-Partenkirchen	Heat extraction rate	134	147	162
	Alpine Foothills and Valleys	COP	270	281	292

- **Dimensions of the underlying trench collector (H x L): 350 x 990 mm**
- **Physical surface of the trench collector: 0.8 m²**
- **Installation depth of lower edge, vertical installation: 1.5 m**
- **Average throughflow width: 3.0 mm**
- **Average wall thickness of the trench collector: 2.5 mm**
- **Type of throughflow: laminary stimulated turbulent throughflow**

* At a laying distance of 0.7 between the absorber strands and a working range of the heat pump of up to -7/-10 °C. Configuration data for working ranges from -3 to -10 °C are available and can be provided on demand. Configuration with differing utilization limits can be performed using the configurator at www.geocollect.de.

7.2 / Technical data of the GeoCollect geothermal absorber

Properties/dimensions/operating parameters		Test procedure	Value
Material	Polypropylene (PP-R)		
Density		ISO 1183	898 kg/m³
Hardness	Shore D	ISO R868	66
Melt index 190°C/5 kg		ISO R1133	0.5 g/10 min
Melt index 230 °C/2.16 kg		ISO R1133	0.3 g/10 min
Tensile test	50 mm/min	ISO R527/II	
Yield stress			28 MPa
Tear resistance			43 MPa
Elongation at break			800 %
Test pressure air/brine	1 h/12 h		6 bars/3 bars
Flexural modulus of elasticity		ISO R178	1,200 MPa
Melting point		DSC/ISO 3146	150 °C
Bursting pressure	at 20 °C	TÜV certificate (annex 7.4)	12.3 bars
Vicat softening temperature	at 10 N		147 °C
	at 50 N		68 °C
Dimensions of a module	(L x H x D)		990 X 350 x 40 mm
Heat exchanger surface of a module	inside		0.8 m²
Perimeter surface of a module	outside		2 x 0.31 m²
Weight			1.95 kg
Cooling capacity/heat extraction rate per module with a 25% water-ethylene glycol mixture (at a spread of 3 K, 5 l/min flow area and up to K delta T between fluid and soil temperature*)			99.83 W
Pressure loss per module			150 Pa
Length of a module strand	10 modules	5/70 cm DN 32 pipe/5	10 m
Trench length			5 to 5.5 m
Pressure loss per strand with 2 x 10 m connecting pipe (25 mm) and 70 cm connection (32 mm)			2.0 - 3.5 kPa
Working pressure of the modules leading to the brine distributor			1.5 up to max. 2.5 bars
Throughflow rate per strand			5 l/min
Filling quantity			1.75 l
Introduction	standing vertically		
utilization limit	continuous operation momentary		-15 to +40°C -20 to +60°C

* depending on the specific thermal conductivity and the specific heat capacity of the surrounding soil

7.3 / Declaration of conformity of the geothermal absorber system from GeoCollect GmbH

We hereby declare the harmlessness of the use of our products, which correspond with the state of the art and the usual rules. Also, the use of our components as intended does not put user and environment.at risk.

Clearance certificate for the GeoCollect geothermal absorber system

We hereby certify that the polypropylene type PP used is harmless physiologically and toxicologically. In its recommendation 7 “Polypropylene”, the Federal Health Office (BGA) regulates its use in the manufacture of consumer articles in the sense of section 5.1 of the Foodstuffs and Commodities Act (LMBG). According to the recommendation, polypropylene matches the regulations of the Federal Health Office, notification 152, sheet 25 from 04 April 1982 and the aforementioned applicable KTW recommendations. Plastic, containers and closures for storing foodstuffs can be manufactured from polypropylene without hesitation. Also, polypropylene is suitable for manufacturing pharmaceutical packagings.

The “Recommendations for the Health Assessment of Plastics and Other Non-metallic Materials for the Drinking Water Sector”, also known as the “KTE Recommendations”, are applicable for drinking water supply systems. Polypropylene matches these recommendations. Polypropylene is ground water neutral and is not attacked by microorganisms. The chemical composition of the polypropylene used complies with national and international rules for the use of materials coming into contact with drinking water.

The polypropylene offered by GeoCollect GmbH was investigated by the Research Institute for Plastics Technology and Manufacturing Chemistry. In the course of these investigations, it was discovered that the polypropylene we use complies with the following guidelines:

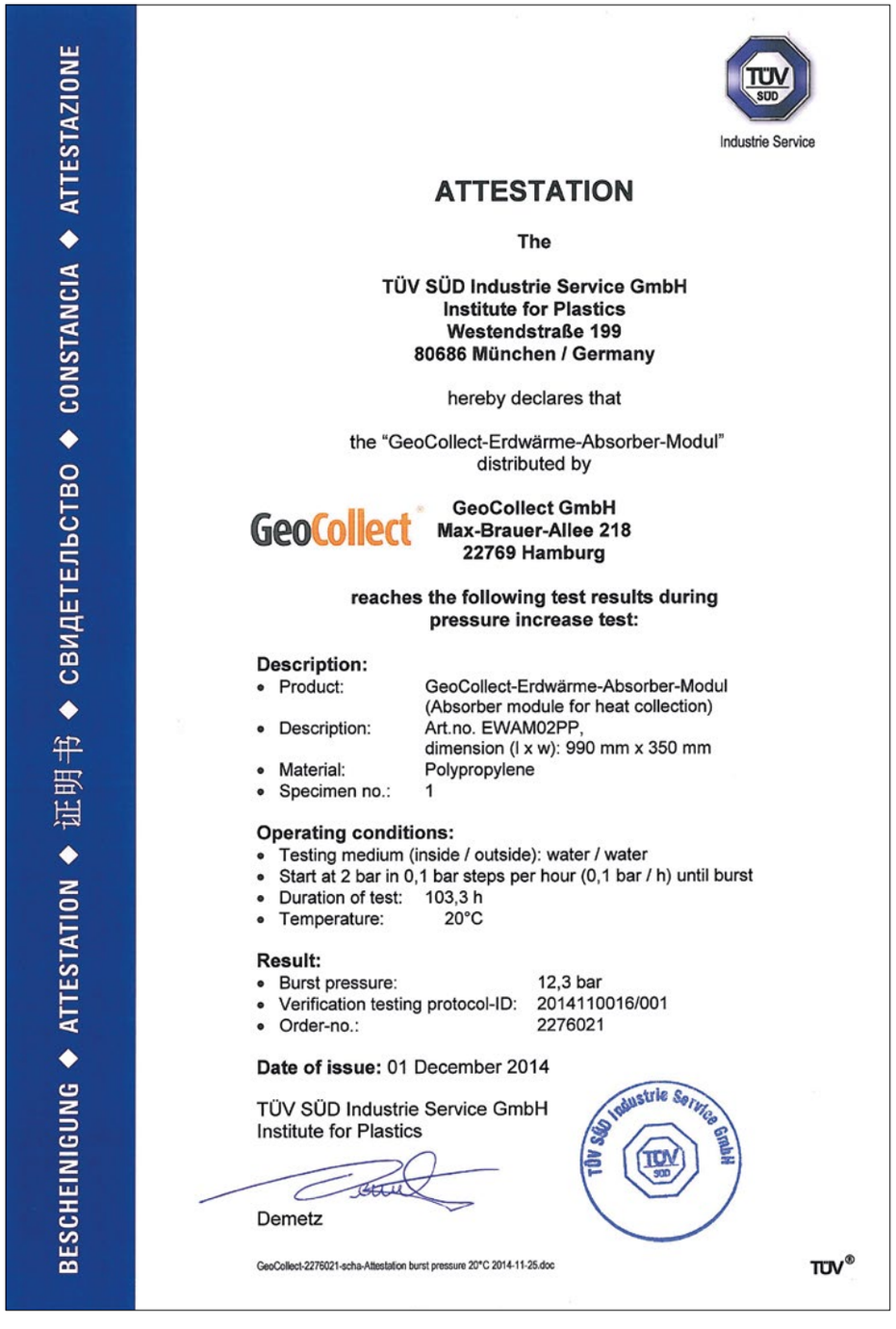
- List for Monomers 260/92 issued by the Ministry for Trade and Industry.
- List for Monomers of the European Union, Directive 90/128/EEC and 92/93 EEC and 93/9/EEC
- Positive List of the German Federal Health Office (BGA) for polypropylene
- Positive List of the KTW (Germany) for polypropylene coming into contact with water

The polypropylene we use meets the requirements of the following countries for products coming into contact with water: Belgium, Germany, the UK, Italy, the Netherlands, Spain and the European Union.

GeoCollect

Chemnitz, March 2023

7.4 / TÜV certificate



BESCHEINIGUNG ◆ ATTESTATION ◆ 证明书 ◆ СВИДЕТЕЛЬСТВО ◆ CONSTANCIA ◆ ATTESTAZIONE

TÜV SÜD
Industrie Service

ATTESTATION

The

TÜV SÜD Industrie Service GmbH
Institute for Plastics
Westendstraße 199
80686 München / Germany

hereby declares that

the "GeoCollect-Erdwärme-Absorber-Modul"
distributed by

GeoCollect
GeoCollect GmbH
Max-Brauer-Allee 218
22769 Hamburg

reaches the following test results during pressure increase test:

Description:
- Product: GeoCollect-Erdwärme-Absorber-Modul (Absorber module for heat collection)
- Description: Art.no. EWAM02PP, dimension (l x w): 990 mm x 350 mm
- Material: Polypropylene
- Specimen no.: 1

Operating conditions:
- Testing medium (inside / outside): water / water
- Start at 2 bar in 0,1 bar steps per hour (0,1 bar / h) until burst
- Duration of test: 103,3 h
- Temperature: 20°C

Result:
- Burst pressure: 12,3 bar
- Verification testing protocol-ID: 2014110016/001
- Order-no.: 2276021

Date of issue: 01 December 2014

TÜV SÜD Industrie Service GmbH
Institute for Plastics

Demetz

TÜV SÜD Industrie Service GmbH TÜV SÜD

GeoCollect-2276021-scha-Attestation burst pressure 20°C 2014-11-25.doc

TÜV®

7.5 / Tender text for a GeoCollect geothermal absorber system

Tender text: ..... strands	**Geothermal absorber system ***
Specifications:	**Sanitary and heating technology**
Trade:	**Heat supply technology**
Title:	**Geothermal collector**
Type/short description:	**GeoCollect geothermal absorber system**
Article no.:	**EWAM02PP**

Description of the unit

Geothermal collector module series for the production of near-surface geothermal energy using an absorber system.

The modules consist of soil-resistant plastic (polypropylene). Module series standing vertically with 10 absorber modules per circuit are formed, including fittings and 32 mm pipes for connecting the partial strands, each of which consists of 5 absorbers.

The modules are connected using polyfusion welding.

Installation is carried out in trenches with a width of approx. 70 cm and a depth of approx. 1.50 m. The route between brine distributor and absorber field up to a distance of 50 m is made from 25 mm PPP pipe and over a distance of from 50 m to a maximum of 250 mm using 32 mm PP pipe.

One strand consists of 10 modules and usually produces 1 kW of heat extraction capacity. The exact number of strands must be provided for according to the regulations of the Planning and Installation Manual for the GeoCollect geothermal absorber system, section 4.1.

The "Planning and Installation Manual" of GeoCollect GmbH is applicable.

Technical Data

Dimensions (LxWxH):	**990 X 350 x 40 mm**
Material	**Polypropylene (PP)**
Weight:	**1.950 g**
Surface heat extraction performance:	**According to configuration table (Planning and Installation Manual, annex 7.1)**
Cooling capacity:	**Nominally 99.83 watts / module**
Pressure loss per module:	**110 Pa**
Throughflow rate per strand:	**2.0 to 3.5 kPa (with 2 x 5 m of 25 mm connecting pipe PP)**
Working pressure of the modules:	**from 1.5 up to max. 2.5 bar**
Throughflow rate per strand:	**5 l/min**
Filling quantity:	**1.75 l**
Max. strand	**10 modules**
Introduction:	**standing**

* The number of pieces of the components listed has to be multiplied by the planned number of GeoCollect strands. For systems consisting of >10 strands, individual tender texts must be prepared or requested.

Functionally necessary accessories for a GeoCollect strand *:

- ○ 10 GeoCollect geothermal absorber modules “EWAM02PP”
- ○ 1 PP pipe 32 mm x 0.65 m
- ○ 30 m PP pipe 25 mm x 100 m on a roll **
- ○ 2 x angles 90° DN 32 (2 pieces / strand),
- ○ 2 x reducing sleeves DN 32x25 (2 pieces / strand),
- ○ 2 x sockets DN 25 (2 pieces / strand),
- ○ X *** x distribution shafts with PP welding sockets X x DN 25 and 2 x 40 mm PE welding sockets on the collectors
- ○ 30 l brine (25% ethylene glycol) **
- ○ Connecting accessories (PE) for the connection between the distribution shaft and the building services room
- ○ Earthworks as well as installation and pressure testing provided on site

* The number of pieces of the components listed has to be multiplied by the planned number of GeoCollect strands. For systems consisting of >10 strands, individual tender texts must be prepared or requested.

** At a pipe length of 15 m between brine distributor and absorber strands. When deviations occur, the actual pipe lengths and filling quantities for the brine must be taken into account. At lengths of over 50 m between the absorber field and the distribution shafts, this tender text cannot be used. Additional work by GeoCollect GmbH can be requested in this connection.

*** “X” must be replaced by the number of absorber strands.

GeoCollect

Please send to:
Fax: +49 40 2263306 66
E-mail: info@geocollect.de

7.6 / Checklist for your GeoCollect system

Which building project is concerned?

_____

_____

Who is making the request?

_____

_____

_____

Who is to receive the offer?

_____

_____

_____

What kind of offer is concerned?

☐ Complete offer of a processor ☐ Material offer to processor
☐ including earthworks ☐ excluding earthworks

Technical details:

Heating load: _____ ☐ Heating load calculation is attached
Flow temperature of the heating: _____ ° C
Annual heat requirements: _____ ☐ Heat requirements calculation is attached
Old heating (gas / oil / etc.): _____ Old consumption: _____
Exact type designation of the planned heat pump: _____
Is a hybrid source planned? ☐ Solar thermal system ☐ PVT, energy fence, swimming pool collector

The following documents are attached for planning purposes:

☐ Site layout ☐ Subsoil report ☐ Drainage plan / media plan ☐ Technical details of the heat pump

Optional:

☐ The system is to be used for passive cooling
Cooling load: _____ ☐ Cooling load calculation is attached
Annual cooling hours: _____ ☐ Summertime thermal insulation certificate is attached
Maximum flow temperature for passive cooling: _____

7.7 / Notification / application * for a use of geothermal energy using geothermal collectors with a heat output of up to 30 kW

Notifier:

Name, first name _____

Street, postcode, town _____

Telephone, e-mail _____

Please also specify whether the notifier, the operator or the owner are different persons

Location of the geothermal heat pump and the collector field

Street, postcode, town _____

Local sub-district, cadastral district, cadastral unit _____

Within a water protection area: no ☐ yes ☐, in zone: _____

Within a healing spring protection area: no ☐ yes ☐, in zone: _____

Geothermal heat pump

Manufacturer, type _____

Heating capacity (kW) _____ Heat extraction capacity (kW) _____

Working or cooling media

Name: _____ Water hazard class: 1

Quantity**: _____ l concentrate / _____ l ready-to-use mixture

Certificate of the supplier confirming that the working or cooling medium is a substance belonging to water hazard class 1 .

Collector field***

_____ m² _____ trench collectors (_____ strands) of 9800 x 350 x 40 mm; vertical installation

Each strand consists of 10 trench collectors, lateral distance 0.7 m

Installation depth of the collector

1.5 m below the ground surface

Distance between the lower edge of the collector and the highest ground water table

Larger than 1 m: no ☐ yes ☐

Confirmation of the notifier

The water protection requirements for geothermal heat pumps are complied with:

no ☐ yes ☐

_____

Town, date, signature

Attached documents

☐ Excerpt from the real estate map with entry of the geothermal heat pump and the collector field

☐ Certificate of the supplier of the heat transfer medium confirming that the working or cooling medium is a substance belonging to water hazard class 1.

* Subject to approval in Saarland and North Rhine Westphalia, otherwise only subject to notification of the local water authority of the administrative district

** Approx. 7.5 l of concentrate or 30 l of ready-to-use mixture per GeoCollect strand

*** Activated site area for 1 GeoCollect strand = 7 m²

7.8 / Handover certificate for a GeoCollect system

1 / Building project/site

1.1 / Name of building project: _____

1.2 / Number of cadastral unit/ property: _____

1.3 / Size of GeoCollect system: _____

1.3. 1. / Number of absorber elements: _____

1.3. 2. / Number of strands: _____

2 / Laying pattern and revision drawing (SEE ANNEX)

3 / Photo documentation (SEE ANNEX)

4 / Pressure test (see annex for pressure test report)

4.1 / Pressure test with air was performed at a pressure of _____ bars on _____ by: _____

4.2 / Pressure test with air was performed at a pressure of _____ bars on _____ by: _____

5 / Filling/mixing ratio (SELECT WHERE APPLICABLE AND ATTACH SAFETY SPECIFICATION)

5.1 / ☐ System is filled with a quantity of: _____ litres of water-ethylene glycol mixture,

mixing ratio safeguarded up to a temperature of: _____ °C.

5.2 / ☐ System is filled with a quantity of: _____ litres of water-ethylene glycol mixture,

mixing ratio safeguarded up to a temperature of: _____ °C.

The ready-to-operate GeoCollect system was handed over correctly according to VDI 4640.

The system was ventilated and handed over in the filled state on: _____

The professional execution and impermeability
of the GeoCollect system is confirmed by: _____

Date / signature: _____ Stamp:

7.9 / Pressure test report

Building project:	Executing company:
Project manager:	Report no.:
Pressure test with air * ☐	
Pressure test with brine * ☐	

No.	Partial path		Pressure	Time	Date	Signature	Remark
1		Start End					
2		Start End					
3		Start End					
4		Start End					
5		Start End					
6		Start End					
7		Start End					
8		Start End					
9		Start End					
10		Start End					
11		Start End					
12		Start End					
13		Start End					
14		Start End					
15		Start End					

Attention: the creation of correctly completed reports on the pressure tests performed is the prerequisite for the 10-year extended warranty given by GeoCollect GmbH for the geothermal absorber modules it supplies.

I hereby confirm that I have successfully performed a pressure test according to the GeoCollect installation manual.

Name of tester	Date / signature
Name of building owner	Date / signature
Name of site manager / architect	Date / signature

* Please mark where applicable

ARE YOU READY?

Invest in the future with GeoCellect

LEGAL NOTICE

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This manual was printed on 100% recycled paper.

GC0523

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This project has received funding from the European Union´s Horizon 2020 research and innovation programme under grant agreement no. 768292