

Turbosorber®



...von

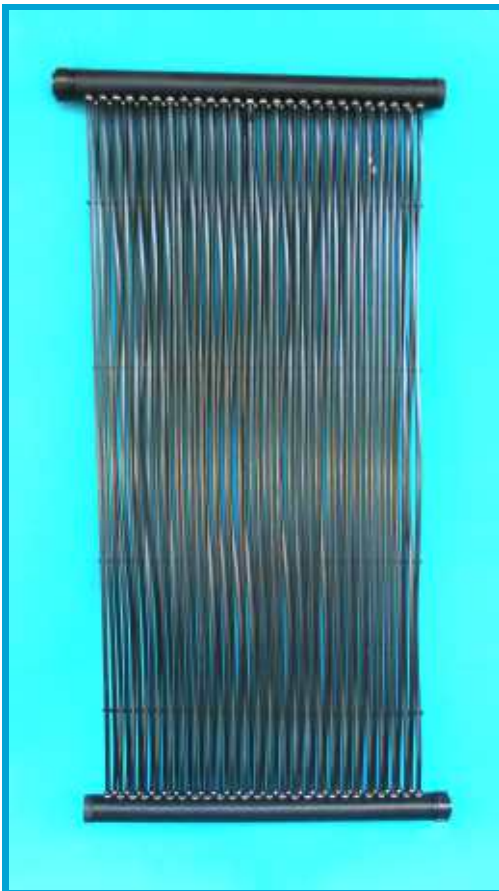


... wir erfinden's einfach

Professional quality

The cleverly designed and hygienic smooth pipe absorber made of insensitive polyethylene (PE)

- ☛ Experience has shown that PE is UV and frost-resistance for decades, chlorine and saltwater resistance
- ☛ PE has 36% higher thermal conductivity or energy transfer compared to PP absorbers
- ☛ One of the most powerful solar/air absorbers on the market
- ☛ For heating pool water, preheating hot water systems, regenerating ice storage heating systems
- ☛ Energy-efficient - the surface of the pipe system has a ratio of collector surface to absorber surface of 1:2.6. (panel absorbers only 1:2)
- ☛ Customised
- ☛ Safe, pressure- and temperature-resistant EPDM plug-in connections. No sensitive glued connections.



Compact customised assemblies. A lot of energy packed into a small area



The double-row technique allows close pipe spacing and an extended absorber surface











Example

Turbosorber 40 m² made of one piece instead of several individual modules (assembly on site).



Absorber fencing designed as a rail system incorporating a privacy protection screen, e.g. for regeneration of ice storage systems or other applications (with special PE-pipes)

Turbosorber Versatile application

-  For large and private pools - the Turbosorber is particularly good value for money for pools over 30 m³ in size.
-  For hotel pools.
-  For public baths.
-  For ice storage heating systems.
-  For preheating hot water systems.
-  For heating / cooling natural swimming pools.
-  For seawater desalination plants for the generation of drinking water (special application).
-  Instead of heating purposes, the system can also be used for cooling pool water (at night).



Turbosorber Example



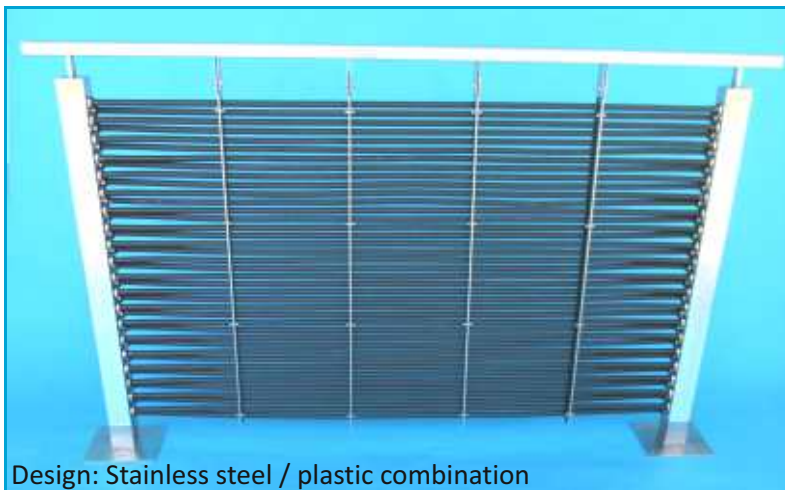
Turbosorber Large system also acts as a pergola
 - provides pleasant partial shading.
 - can also be supplied with supports for snow loads.



Obstacles can be circumvented with ease (horizontal)



Absorber fencing incorporating privacy protection screens for heating pools or regenerating ice storage or earth collectors, heating/cooling systems



Design: Stainless steel / plastic combination

Attractive privacy protection element (70% non-transparent), available in various sizes. Option: The customer produces the railing system and Elomat only supplies the absorber system consisting of distribution system, collector, absorber pipes and spacers



For vertically suspended mounting, a high degree of pull-out resistance of 200 kg per linear metre

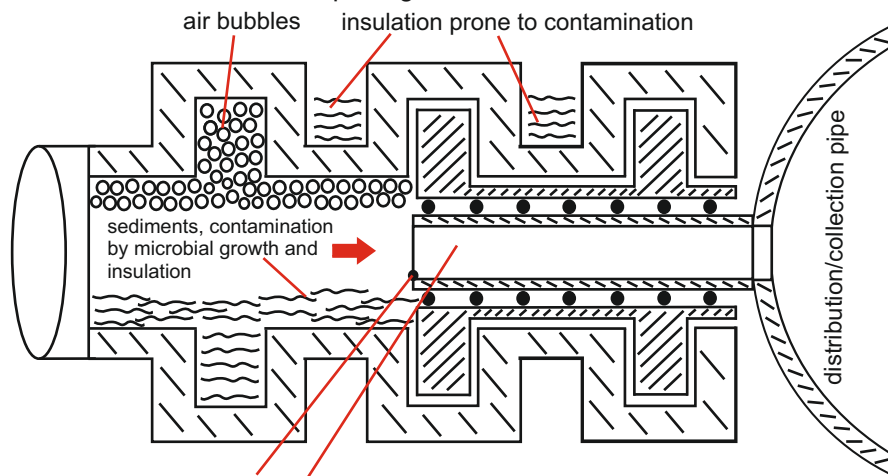
Turbosorber[®]

Hygiene / hydraulic system / performance

- ☛ The smooth inner surface of the PE piping is virtually free of dead spaces, thus minimising legionella contamination and other pathogens.
- ☛ Low risk of contamination by microbial growth.
- ☛ Fewer chemicals required for the pool water.
- ☛ The smooth pipe Turbosorber minimises air bubbles and sediment deposits which impact the level of efficiency. For this reason, the circulation volume and pump performance need not be as high as for ribbed-pipe or panel absorbers, for example. The Turbosorber only needs 80 - 120 litres/m²/h for optimum efficiency and circulation to ensure any air bubbles are discharged.
- ☛ A smooth pipe surface means that foliage and dirt can be more easily rinsed away by rain. Any debris caught in grooves insulates and results in loss of performance

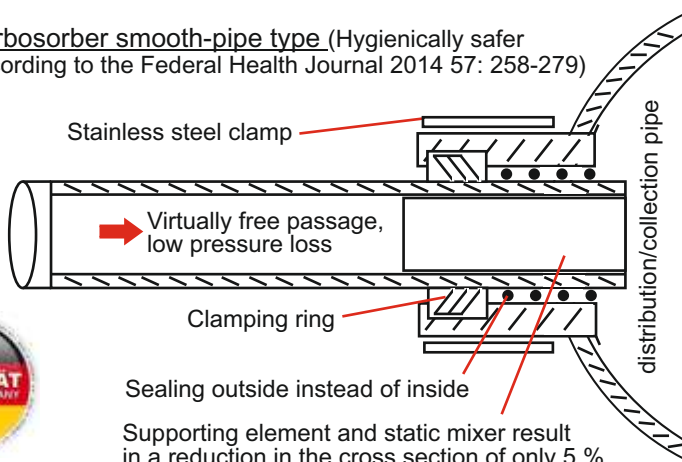
Comparison

Product e.g. ribbed pipe, by a different manufacturer (Hygienically critical, ideal breeding ground for legionella, coli and other pathogens)



Obstacle including up to 50 % reduction in the cross-section at the connection socket

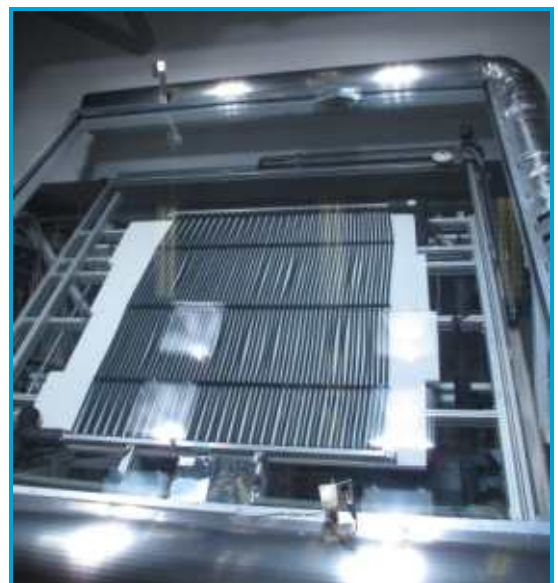
Turbosorber smooth-pipe type (Hygienically safer according to the Federal Health Journal 2014 57: 258-279)



Current tests:

The leading institution for solar research in Europe has repeatedly tested our absorber systems.

Fraunhofer Institute for Solar Energy Systems SID D-79110 Freiburg/Germany

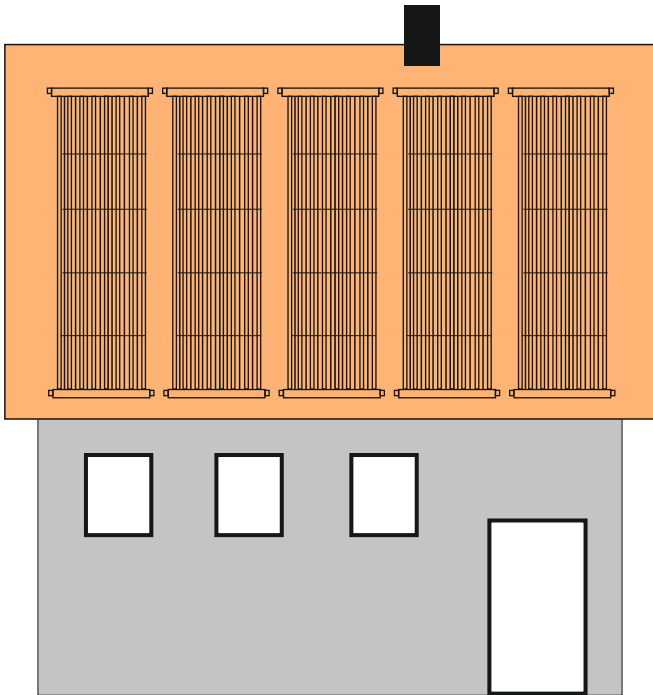


Performance test: Indoor test rig at the Fraunhofer Institute

- ☛ Suitable for long-term use in chlorinated pool water.
- ☛ May also be used with chemical heat transfer media (ice storage regeneration).
- ☛ Suitable for seawater.
- ☛ The double-row connections of the absorber pipes permit a large surface area and a low space requirement.
- ☛ The Turbosorbers are made of PE (polyethylene) which has a 36% higher thermal conductivity than absorbers made of PP (polypropylene)

The benefits in brief:

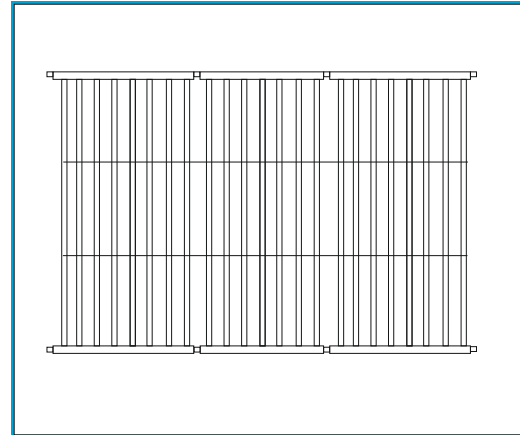
- Hygienic smooth pipe system – because ribbed pipes encourage the build-up of deposits
- Quick assembly and installation on site. The highly flexible absorber pipe is simply cut from the coiled bundle and put together with a retaining ring. No tools are required.
- Up to 50 % less circulation volume required - only about 80 - 120 l/m²/h - compared with other systems. This translates into low operating costs/electricity costs and a positive energy balance.
- With Turbosorber it is not necessary for huge volume flows to be pumped around the circuit to keep the pipe filled and free of air bubbles. Turbosorber does not have a sensitive capillary pipe system.
- Favourable hydraulics and optimised purging thanks to the smooth inner surface of the absorbers.
- Only minimal constriction of the cross-section and drop in pressure at the absorber pipe connections.
- Large distribution/collection pipes. Depending on type and requirement, PE square pipes 60/60 or PE round pipes, dia. 125 mm or 160 mm, are used.
- Minimal air bubbles or cavities compared with ribbed pipe systems.
- High degree of pull-out resistance including at high temperatures. Can be mounted securely like a curtain.
- Less turbulence due to smooth inner surface – because turbulence uses additional pump power, i.e. increases electricity costs.
- Compared to ribbed pipe systems, the Turbosorber is less susceptible to cooling in the event of wind and showers.
- Hygienically smooth outer and inner surfaces minimise microbial corrosion and biofilm formation in accordance with the requirements of the Federal Health Journal 2014 57: 258-279 (hygiene requirements for baths).
- Less disinfectant required in swimming pools since the smooth inner surfaces of the Turbosorber pipes largely prevent the accumulation of deposits and dirt.
- Significantly lower risk of contamination with legionella and coli etc.
- Good resistance to outside pressure and good accessibility, e.g. for cleaning purposes. Moreover, the Turbosorber can be cleaned using a high-pressure cleaner with 150 bar.
- No concertina effect or material fatigue due to temperature differences as PE is also particularly suitable for use in sub-zero temperatures.
- Distribution/collection pipes are made from a single piece and can be extended by adding further modules using electrofusion couplers.
- Low deadweight and low total weight of 4 kg/m² (11 kg/m² when filled with a medium).
- Due to the arrangement of the push-in fittings on the distributor pipe (2 lines) more absorber pipes can be efficiently accommodated in a small space.
- If assembled incorrectly, the system can be easily dismantled and reused.
- Improved emptying + hygiene on decommissioning, i.e. very little water remains in dead spaces (which encourages the growth of bacteria in the grooves of ripped pipes).
- Less rinsing, cleaning and disinfection required on re-commissioning, low-maintenance.
- Enhanced self-cleaning effect when it rains as the surface has no grooves (preventing build-up of foliage, dirt, snow etc.)
- Resistant to hail, even in sub-zero temperatures, since the PE material is not sensitive to frost, even at temperatures as low as -40°C, no embrittlement.
- In the 10 years that the systems have been available, no cases of damage caused by marten bites or rodent attacks on the PE pipes have been reported.
- Good handling and transport.



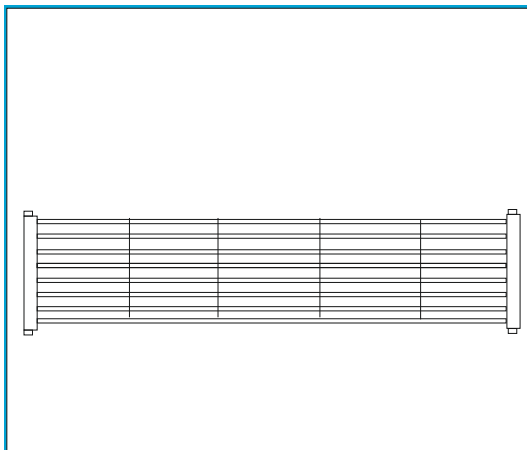
Setup locations

- on a pitched roof
- on a flat roof
- on level sites
- on walls

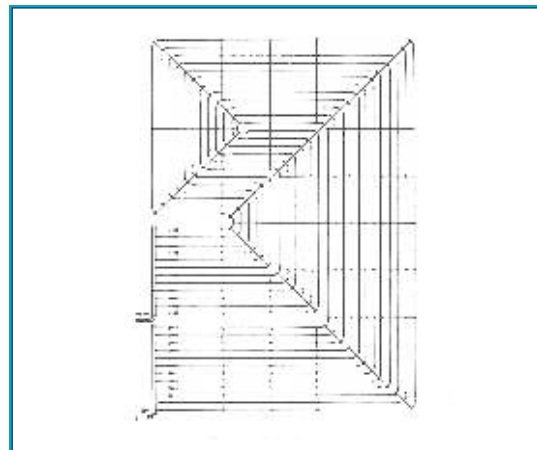
Examples for setup positions:



Longitudinal alignment on roofs and surfaces or wall-suspended

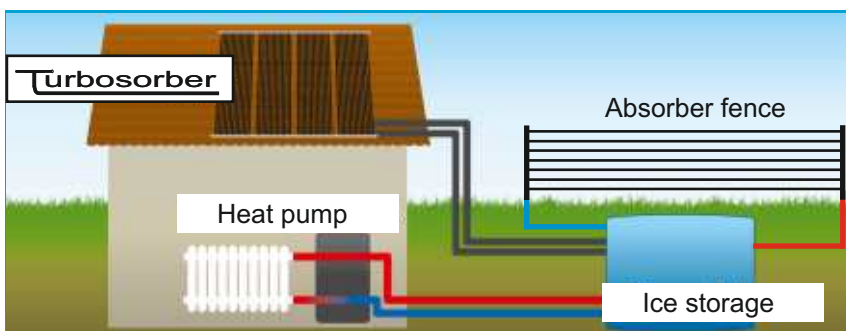


Vertical transverse alignment, e.g. as handrail, fence, walls etc.



Specific meander-shaped arrangement

Turbosorber for modern heating and cooling systems



Turbosorber is also ideal for regenerating ice storage systems. A solar/air absorber is a more cost-effective and the simplest absorber technology for operating ice storage or earth collector systems efficiently

Dimensioning of the collector surface

Depending of the geographic region, a surface area of between 0.4 and 1,5 m² is needed to achieve a water temperature of up to 30° C in summer for 1 m³ pool water.

An adequate collector size should be selected.

Little solar energy is required for pool heating during July/August.

However, where the bathing season is extended to spring or autumn, a larger collector surface is needed than in midsummer and this needs to be taken into account during dimensioning.

After all, you probably prefer bathing in pool water at a pleasant temperature during this season too! During the summer months of July/August hardly any pool heating would be required at all.

Collector modules customised by the manufacturer including spacers

Distribution/collection pipes made of PE square pipes, 60x60 mm

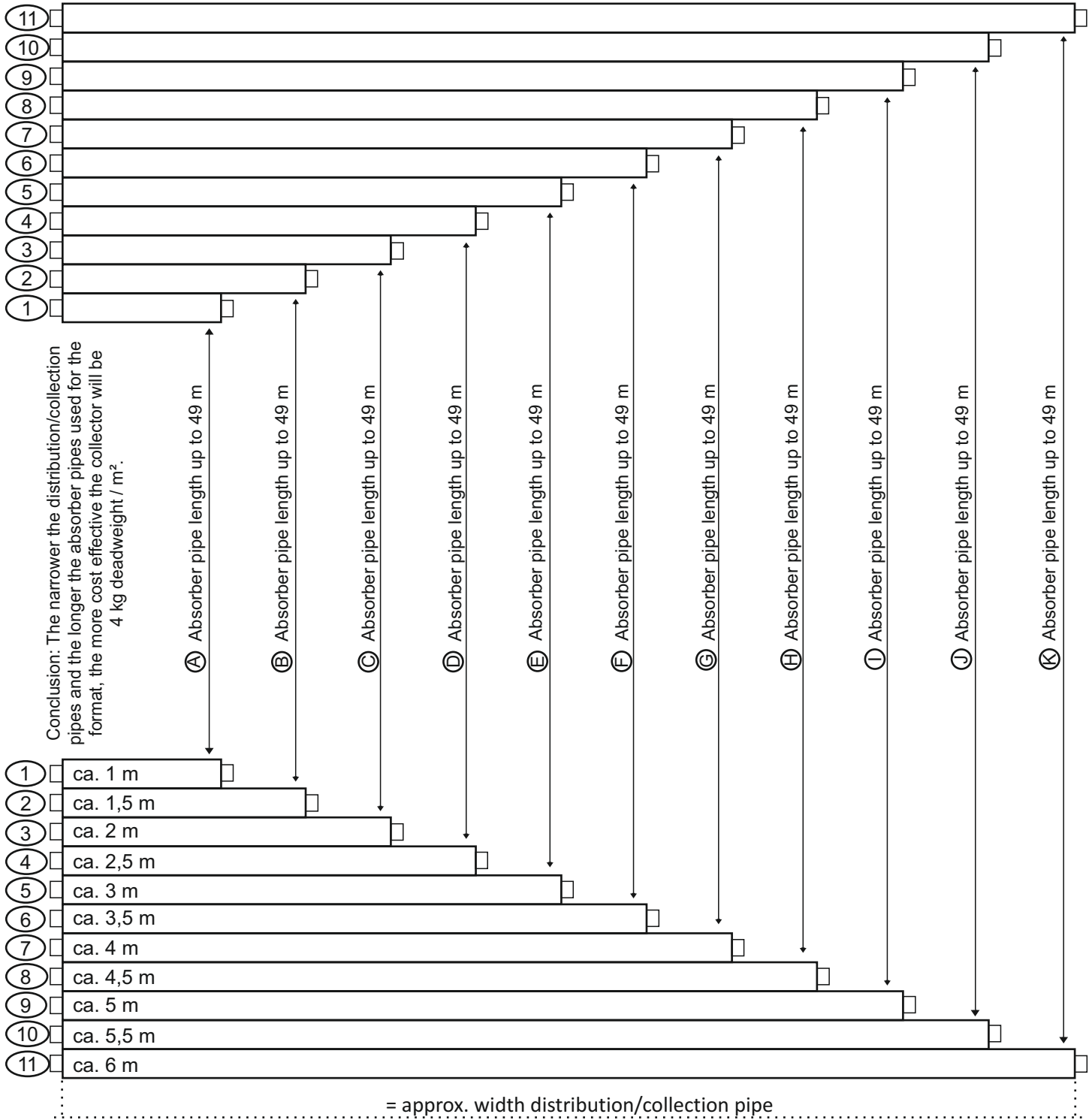
If the deadweight per collector module is more than 100 kg, the Turbosorber should be assembled on site or directly at the setup location, e.g. flat roof, for handling and weight reasons³⁰

①	1 piece	1 m x 4 m	=	4 m ² collector	(about 16 kg deadweight)
②	1 piece	1 m x 5 m	=	5 m ² collector	(about 20 kg deadweight)
③	1 piece	1 m x 6 m	=	6 m ² collector	(about 25 kg deadweight)
④	1 piece	1 m x 7 m	=	7 m ² collector	(about 30 kg deadweight)
⑤	1 piece	1 m x 8 m	=	8 m ² collector	(about 35 kg deadweight)
⑥	1 piece	1 m x 9 m	=	9 m ² collector	(about 40 kg deadweight)
⑦	1 piece	1 m x 10 m	=	10 m ² collector	(about 45 kg deadweight)
⑧	1 piece	1 m x 11 m	=	11 m ² collector	(about 50 kg deadweight)
⑨	1 piece	1 m x 12 m	=	12 m ² collector	(about 55 kg deadweight)
⑩	1 piece	1 m x 13 m	=	13 m ² collector	(about 60 kg deadweight)
⑪	1 piece	1,5 m x 4 m	=	6 m ² collector	(about 25 kg deadweight)
⑫	1 piece	1,5 m x 5 m	=	7,5 m ² collector	(about 37 kg deadweight)
⑬	1 piece	1,5 m x 6 m	=	9 m ² collector	(about 45 kg deadweight)
⑭	1 piece	1,5 m x 7 m	=	10,5 m ² collector	(about 53 kg deadweight)
⑮	1 piece	1,5 m x 8 m	=	12 m ² collector	(about 60 kg deadweight)
⑯	1 piece	1,5 m x 9 m	=	13,5 m ² collector	(about 68 kg deadweight)
⑰	1 piece	1,5 m x 10 m	=	15 m ² collector	(about 76 kg deadweight)
⑱	1 piece	1,5 m x 11 m	=	16,5 m ² collector	(about 84 kg deadweight)
⑲	1 piece	1,5 m x 12 m	=	18 m ² collector	(about 92 kg deadweight)
⑳	1 piece	1,5 m x 13 m	=	19,5 m ² collector	(about 99 kg deadweight)
㉑	1 piece	2 m x 4 m	=	8 m ² collector	(about 40 kg deadweight)
㉒	1 piece	2 m x 5 m	=	10 m ² collector	(about 45 kg deadweight)
㉓	1 piece	2 m x 6 m	=	12 m ² collector	(about 55 kg deadweight)
㉔	1 piece	2 m x 7 m	=	12 m ² collector	(about 60 kg deadweight)
㉕	1 piece	2 m x 8 m	=	16 m ² collector	(about 70 kg deadweight)
㉖	1 piece	2 m x 9 m	=	18 m ² collector	(about 75 kg deadweight)
㉗	1 piece	2 m x 10 m	=	20 m ² collector	(about 85 kg deadweight)
㉘	1 piece	2 m x 11 m	=	22 m ² collector	(about 90 kg deadweight)
㉙	1 piece	2 m x 12 m	=	24 m ² collector	(about 100 kg deadweight)
㉚	1 piece	2 m x 13 m	=	26 m ² collector	(about 105 kg deadweight)

Examples of formats for on-site assembly. In this process, absorber pipes are cut from cut-to-length rolls each measuring 100 m in length

Pos. 1-11 Width dimensions of the distribution/collection pipes
Pos. A-K maximum connectable absorber pipe lengths

Issue 10/18



Number of absorber connections

① 51 pieces	④ 121 pieces	⑦ 201 pieces	⑩ 271 pieces	Spacing of spreader bars (recommended about 70-100 cm)
② 71 pieces	⑤ 146 pieces	⑧ 221 pieces	⑪ 296 pieces	
③ 96 pieces	⑥ 171 pieces	⑨ 246 pieces		

Assembly on site

With systems up to 50 m² collector surface in one piece rather than in adjacent rows, i.e. produced as a large format, the Turbosorber can be easily assembled by 2 persons with the necessary craftsman's skills. Depending on the size, the absorber can, for example, be assembled on a flat roof or a roof with low inclination or on the ground and then lifted by a crane. The flexible absorber pipes (ID about 13 mm) are then cut from the supplied 100 m rolls on site and easily connected with supporting elements which are inserted into the EPDM fittings of the distribution and collection pipes. As an alternative, an assembly device, including a length-cutting attachment for quick and easy assembly, can be provided at a reasonable price.

First, the bottom row is assembled, after which the stainless steel one ear clamps are fitted and crimped. This is followed by the upper row. The clamping strips are then inserted beneath the collector surface with a spacing of around 50 - 70 cm. Finally, the absorber pipes are clicked into the clamping strips to ensure they are relatively parallel. After that, the absorber pipes can be easily clicked into the clamping strips. A leakage test must be carried out on site in accordance with the assembly instructions.

Elomat collaborates with installation companies. If assembly is not to be carried out by an installation company, we can provide you with a quotation for supplying and assembling the system after prior inspection. However, we only install systems of 500 m² or larger on site

Assembly on site: So quick and easy:



1. Spray the connection ports of the collector pipes with liquid soap.
2. Apply and press rubber nipple

3. Plug in the absorber pipes at the setup location or on the ground (bottom row first)



The plug-in depth with a generous tolerance of + - 2 cm from the mean dimension of 6 cm makes a millimetre-precise plug-in dimension redundant

Apply sparingly a lubricant approved for drinking water pipes to the pipe end and the plug-in sleeve (paste-type soap supplied). The pipe can be then inserted and adjusted easily



Turbosorber



Apply gentle and quick pressure to the VA one-ear clamp with stop-collar crimping pliers. In addition, the stainless steel clamp serves as UV protection and protection against martens/rodents for the EPDM rubber joint connection,



In the event of incorrect assembly, the stainless steel clamp is taken off the rubber nipple with a removal lever. The rubber nipple can then be easily pushed out with the removal lever. The rubber nipple is not damaged and can be used several times. The stainless steel clamp can also be re-formed with special pliers and reused



Turbosorber can be accessed without any problems by persons weighing up to 110 kg, e.g. for service or cleaning with a high-pressure cleaner (max. 150 bar)

Required components



1 set PE distribution/collection pipes; depending on the format size made of PE square pipe 60/60 mm, or round pipe OD125 or OD160 mm
Flow and return connections as individually required.

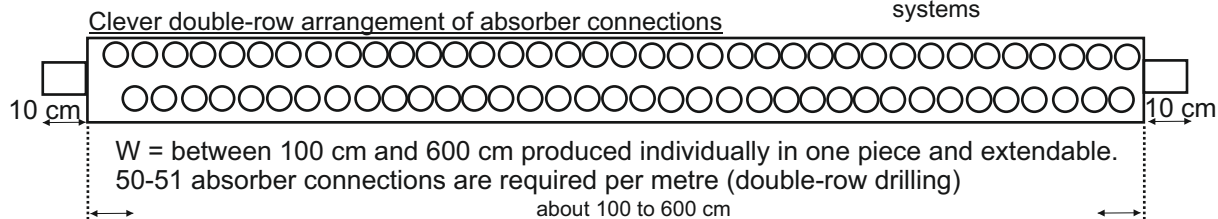


EPDM plug-in nipple with stainless steel on ear clamp per linear metre 50 - 51 Stk.



PE flexible absorber pipe 16 mm OD for pool water / seawater.
1 coiled bundle 100 m.
2 executions
- LD 16 x 1.6 60° 1 bar operating pressure
RC 16 x 1.6 60° 2 bar with ice storage systems

Distribution and connection pipes are available in the following widths:



The clamping strip can be easily cut from 2m PE lengths. On even ground it can be inserted beneath the collector surface and then turned upright. Laying distance about 60-80 cm. (Order No. Turbo0.1).



Electrofusion coupler for distribution/collection pipes for connecting further modules to round pipe, dia. 125 or dia. 160 mm (Order No. Turbo0.3)



Turbosorber



Only few tools are required for assembly (on loan or purchase)



Practical pipe cutters for 10° bevel cut



Crimping tool, pneumatic or manual, used with fixed pressure limitation for clamping the one-ear clamps). Removal lever for loosening the plug-in connections in case of incorrect assembly (easy to repair)



Practical removal lever for easy repair

Ersatzteile



Händleradresse

EPDM plug-in connector Stainless steel one-ear clamp double clamp OD 6 dia

Technical data:	
Ratio of collector surface to absorber surface:	1:2,6 (relevant as air absorber)
Physically max achievable solar radiation m ² :	1000 W
Transferable solar power per m ² collector surface:	up to 900 W
Thermal efficiency PE absorber pipes:	0.3 W / (mK) (PP only 0.22 W/m ²)
Basis of calculation for the circulation volume:	about 100 l/m ² /h
Pressure loss, general data not available, depends on format size, e.g: 3m x L: 10m = 30m ² = about 150 mbar/3m ³ /h	
Minimum - maximum operating pressure as pool absorber: 0.3 - 1 bar -Test pressure 1.5 bar, ice storage absorber 2 bar	
Compatibility of standstill temperature filled with medium without pressure:	70°C
Material distribution/collection pipes:	PE HD
Material quality of the highly flexible solar absorber pipes	Special PE, ID dia. around 13 mm
Resistance of the materials in contact with the medium:	for pool water, seawater, glycol, glysantin or similar suitable
Bending radius:	suitable > 20 cm
Push-in fittings:	EPDM black, as above, resistant
All medium-carrying materials are toxicologically + physiologically safe	
Solar pipe distance, centre-to-centre	about 20 mm
Pipe and connection socket left + right-hand distribution/collection pipes:	Up to 6 m 1 1/2" inner thread above to individual need
Dimensional stability:	prior to frost, lower overall pressure and empty distribution/collection pipes to at least just below the absorber connections.
Processing ambient temperature:	+ 10°C - + 35°C
Length extension / reduction:	about 2 mm / 10°C
Weight, empty, per m ² element surface without distribution/collection pipes:	approx. 4 kg/m ²
Weight filled per m ² element surface without distribution/collection pipes:	approx. 11 kg/ m ² (virtually no impact on structural design)
Filling medium: water / pool water / salt water (others)	
Material properties:	recyclable, resistant to vacuum pressure
Load applied by a person walking on the absorbers at 50°C absorber temperature:	max. 110 kg / person
Resilience to surface pressure, 1 h at 50°C absorber temperature:	approx. 1500 kg/m ²
Anticipated service life of PE plastic absorber pipes:	up to 30 years (UV irradiated, many years of experience with black PE)

