Hydrokapillare

Unique radiant heat exchange technology

Suitable for different types of premises

creates comfortable room conditions -

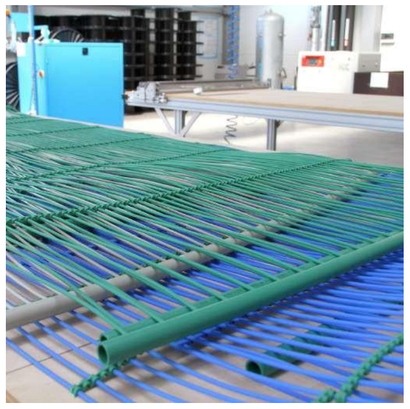
meets high hygiene requirements -

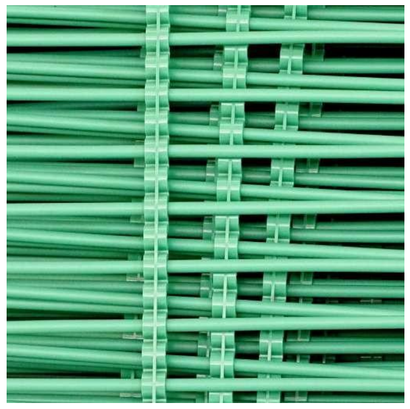
reduces energy costs up to 75% -

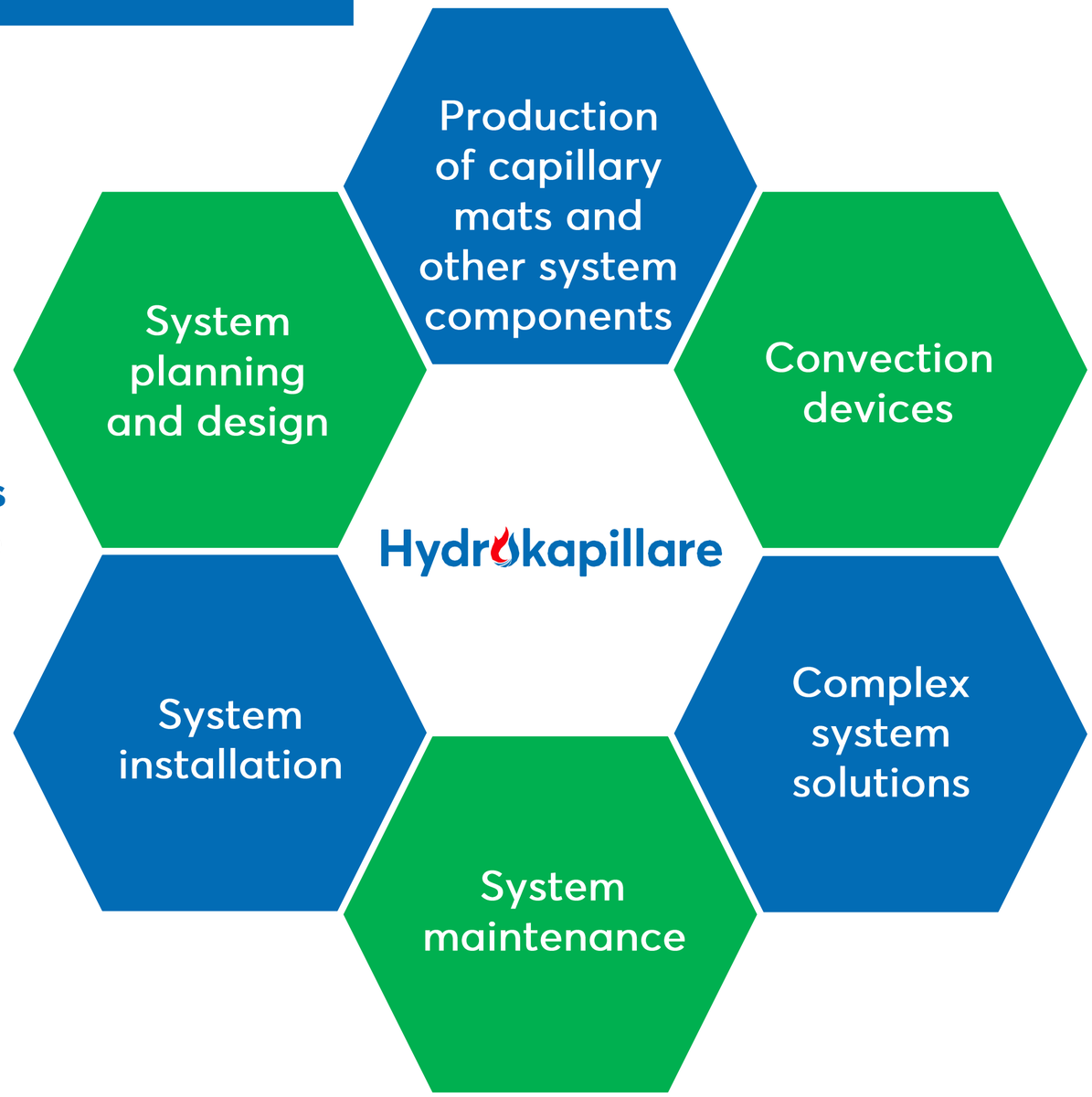
SIA Hydrokapillar Tech

SIA Hydrokapillar Tech offers a full range services for the implementation of a highly energy efficient and innovative water capillary mat heating and cooling system under the brand name **Hydrokapillare**.

360iResearch's Radiant Heating & Cooling Systems Market - Global Forecast 2024-2030 report lists the company among the 30 companies worldwide operating in the field of radiant heating/cooling technology.







Conserve buildings

- step No.1

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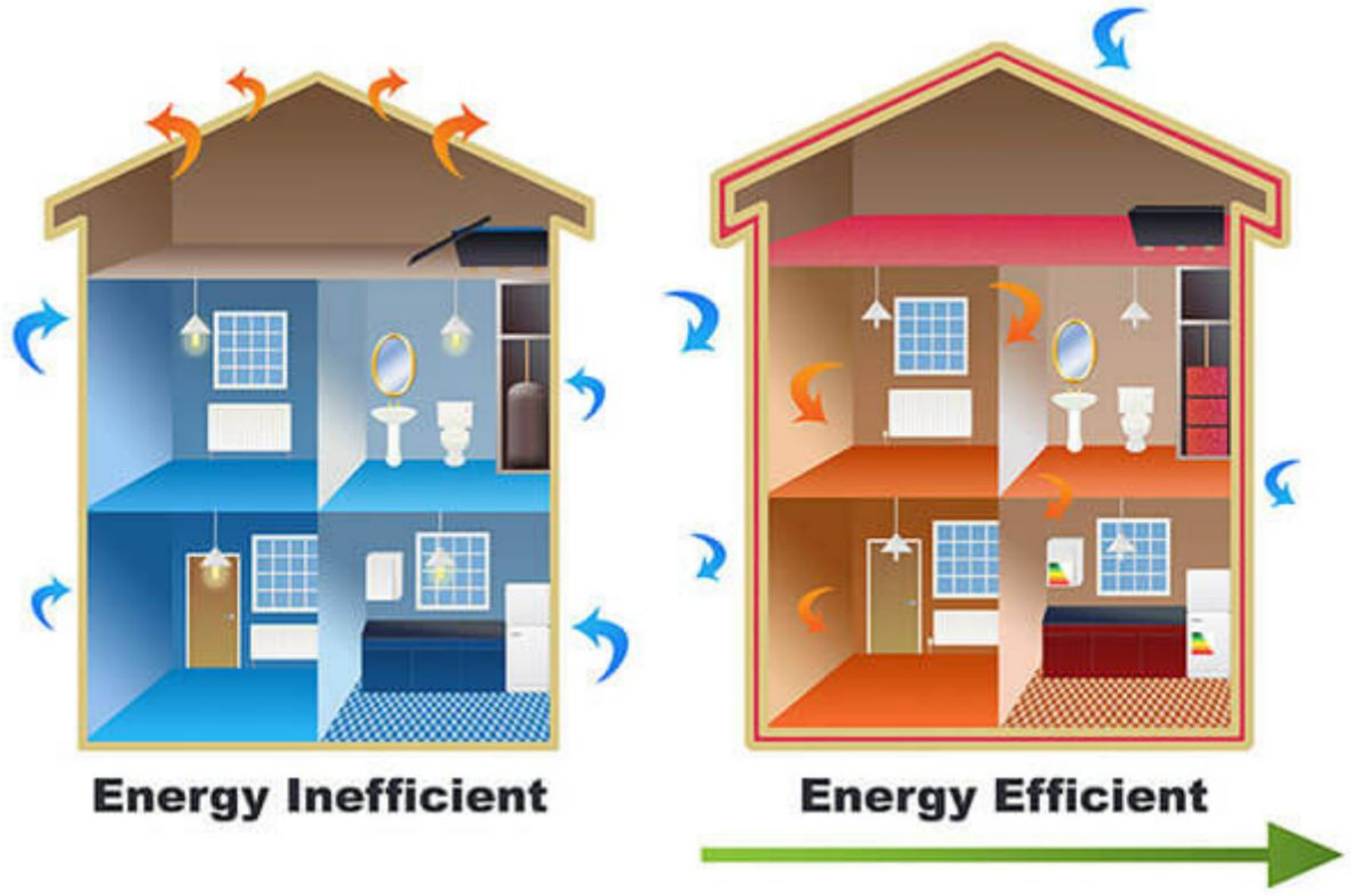

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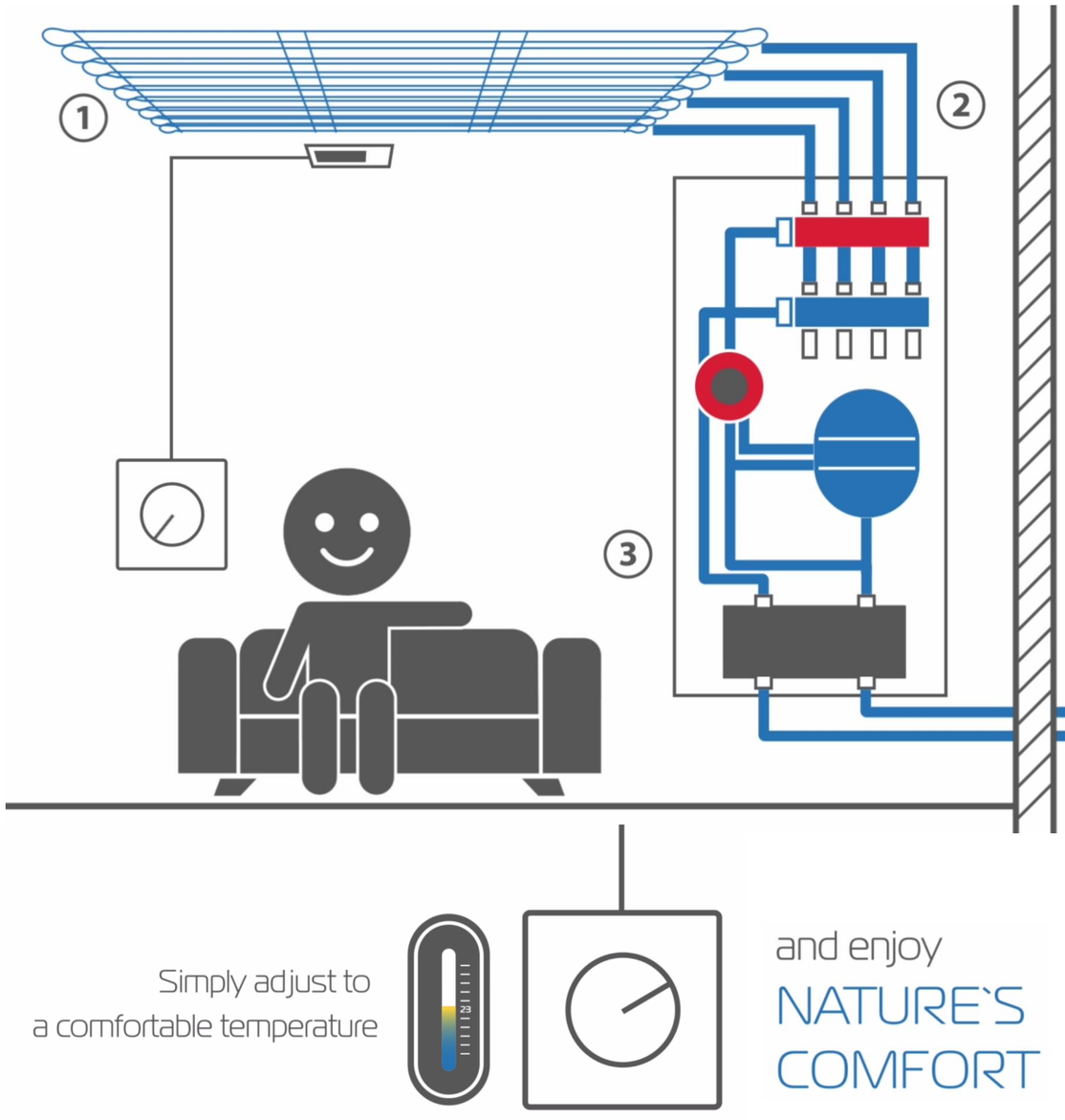
Efficient heating and cooling in one system



The water capillary mats system can be connected to various sources of heat/cold supply:

- Heat pump
- Gasboiler
- Pellet boiler
- Central heating
- Solar panels

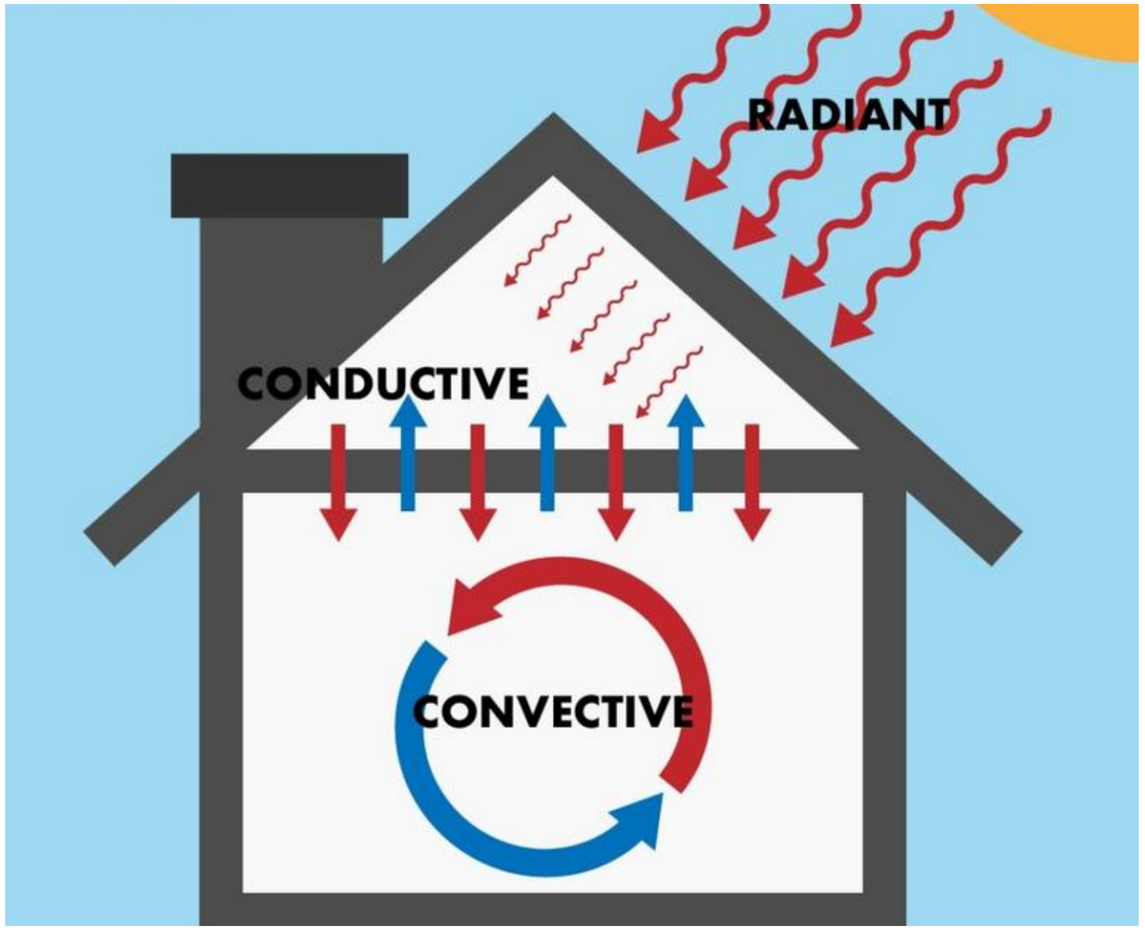
Simply adjust to a comfortable temperature

and enjoy
NATURE`S
COMFORT

Heat transfer principles

Hydrokapillare

- Heat transfer principles – conduction, convection and heat radiation



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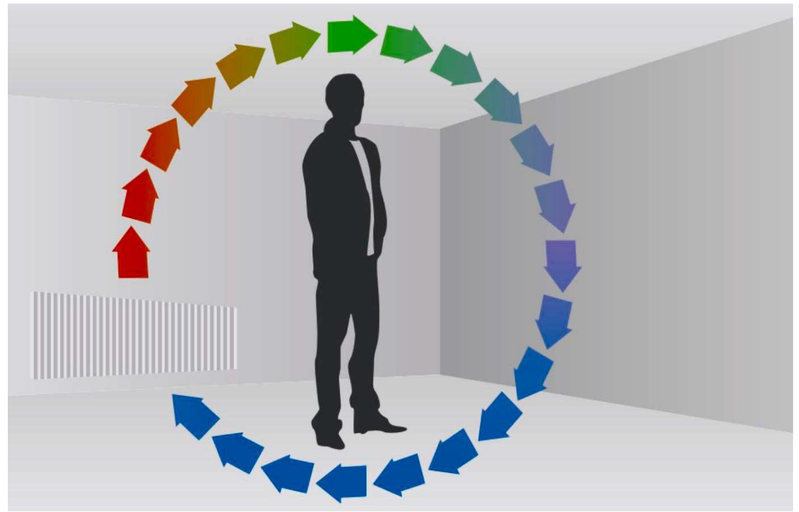
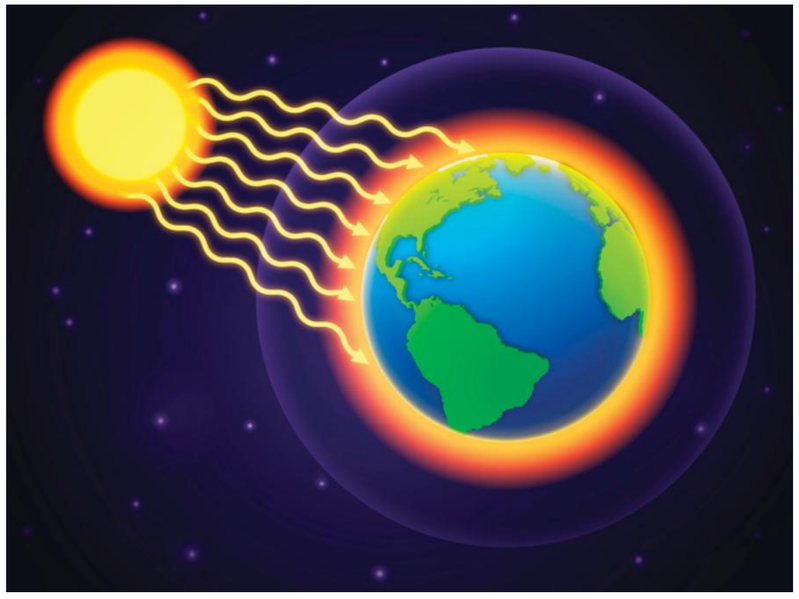
Classification of heating systems – by type of energy transfer

1. **Convection heating** - hot and cold air tranfer

2. **Infrared (radiation)** - heat is transmitted by radiation

3. **Convection-radiant** - most heating appliances (radiators, convectors, floor, wall and ceiling panels). Different % distribution.





Parity of radiant energy determines heat quality

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Operation of the water capillary mats system

Thermal radiation

Heating operates based on the principle of heat radiation

Warm water

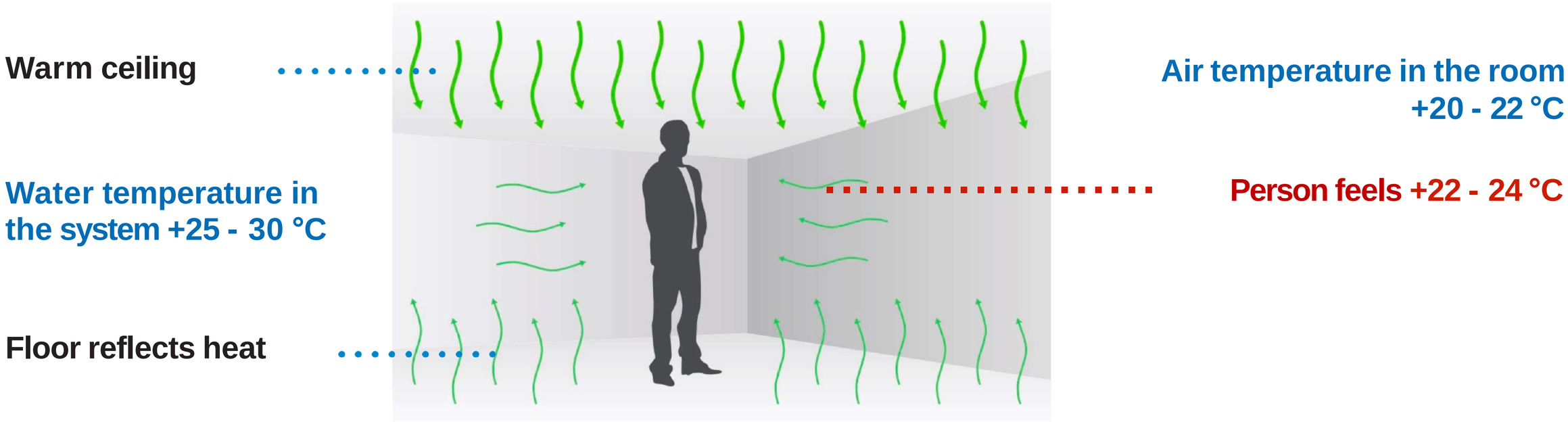
Water temperature in the system: +25–30 °C

Air quality

Low circulation of dust and bacteria

Heat distribution

Even heat distribution in the room



How to make a heat pump work efficiently?

Hydrokapillare

- An air–water type heat pump's efficiency depends on multiple factors, but most notably temperature.
- Higher temperature outside means that a heat pump has to work less hard and therefore requires less electricity for heating.
- Another factor – water temperature in the heating system. Lower temperature in the system means that a heat pump must heat up less water and thus creates savings on electricity costs.

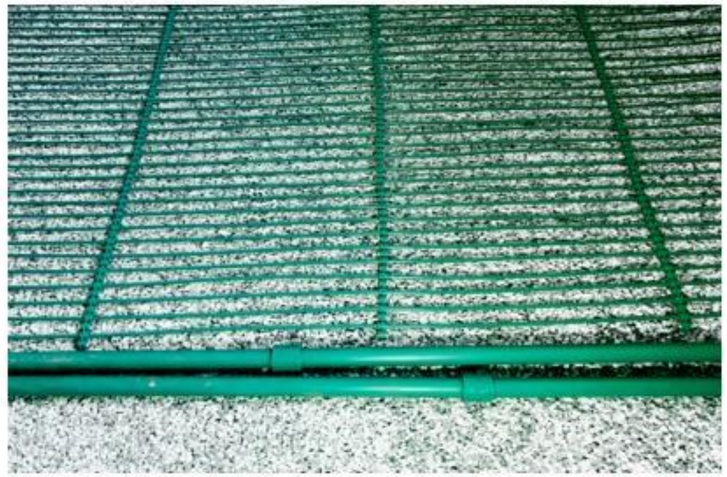
- **We can't influence the temperature outside but we can use a low temperature heat transfer system in the house.**

+40-55°C

Radiator heating – 80% convection

+35-40°C

Underfloor heating with single pipe technology



+25-32°C

Hydrokapillare heating/cooling

COP and EER

Hydrokapillare

Air to Water Heatpump
AQUACIAT POWER ILD HE 1000D

Seasonal Energy Efficiency

SEER 12/7°C Comfort low temp	:	**4.21 kWh/kWh**
SEER 23/18°C Comfort medium temp	:	**4.90 kWh/kWh**
SEPR 12/7°C Process high temp	:	**5.39 kWh/kWh**
ESEER	:	**4.08 kW/kW**
SCOP (Low 30°C/35°C)*	:	**3.39 kWh/kWh**

All data related to seasonal efficiency are given for standard units .

*** ECODESIGN Compliance value as per (EU) N° 813/2013**

Non contractual photo

Unit Information

Refrigerant / GWP	:	**R410A / 2088**
kg / tCO2Equ	:	**63/132**
Number of Refrigerant Circuit	:	**2**
Capacity Control Steps	:	**5**
Starting Mode	:	**In cascade**
Altitude	:	**0 m**
Unit Dimensions (LxWxH)	:	**3604/2253/2297 mm**
Operating/Shipping Weight	:	**2294/2267 kg**

Cooling Mode

Cooling Capacity	:	**256.9 kW**
Cooling Efficiency (EER)	:	**2.76 kW/kW**
Unit Power Input	:	**93.22 kW**
Fluid Type	:	**Ethylene Glycol**
Fluid Concentration	:	
Leaving/Entering Temperatures	:	**7.0/10.6 °C**
Fluid Flow	:	**19.12 l/s**
Total Pressure Drop	:	**61.1 kPa**
Fouling Factor	:	**0.0000 (sqm-K)/kW**
Connection Diameter	:	**114.3 mm**
Entering Air Temperature	:	**35.0 °C**

Heating Mode

Heating Capacity (Instantaneous)*	:	**293.9 kW**
Heating Capacity	:	**293.9 kW**
Heating Efficiency (COP) (Instantaneous)*	:	**3.66 kW/kW**
Heating Efficiency (COP)	:	**3.66 kW/kW**
Unit Power Input	:	**80.3 kW**
Fluid Type	:	**Ethylene Glycol**
Fluid Concentration	:	**35 %**
Leaving/Entering Temperatures	:	**37.0/33.0 °C**
Fluid Flow	:	**19.10 l/s**
Total Pressure Drop	:	**50.9 kPa**
Fouling Factor	:	**0.0000 (sqm-K)/kW**
Connetion Diameter	:	**114.3 mm**
Entering Air Temp (Dry bulb)	:	**7.0 °C**
Relative Humidity	:	**87.0 %**

Sound Power Level (LwA)	:	**92 dB(A)**
Sound Pressure Level at 10.0m (LpA)	:	**60 dB(A)**

Number of Fans	:	**5**
Fan Power Input	:	**7.77 kW**
Fan Speed	:	**951 rpm**

Air to Water Heatpump
AQUACIAT POWER ILD HE 1000D

Seasonal Energy Efficiency

SEER 12/7°C Comfort low temp	:	**4.21 kWh/kWh**
SEER 23/18°C Comfort medium temp	:	**4.90 kWh/kWh**
SEPR 12/7°C Process high temp	:	**5.39 kWh/kWh**
ESEER	:	**4.08 kW/kW**
SCOP (Low 30°C/35°C)*	:	**3.39 kWh/kWh**

All data related to seasonal efficiency are given for standard units .

*** ECODESIGN Compliance value as per (EU) N° 813/2013**

Non contractual photo

Unit Information

Refrigerant / GWP	:	**R410A / 2088**
kg / tCO2Equ	:	**63/132**
Number of Refrigerant Circuit	:	**2**
Capacity Control Steps	:	**5**
Starting Mode	:	**In cascade**
Altitude	:	**0 m**
Unit Dimensions (LxWxH)	:	**3604/2253/2297 mm**
Operating/Shipping Weight	:	**2294/2267 kg**

Cooling Mode

Cooling Capacity	:	**313.9 kW**
Cooling Efficiency (EER)	:	**3.25 kW/kW**
Unit Power Input	:	**96.59 kW**
Fluid Type	:	**Ethylene Glycol**
Fluid Concentration	:	
Leaving/Entering Temperatures	:	**13.0/18.4 °C**
Fluid Flow	:	**15.49 l/s**
Total Pressure Drop	:	**39.1 kPa**
Fouling Factor	:	**0.0000 (sqm-K)/kW**
Connection Diameter	:	**114.3 mm**
Entering Air Temperature	:	**35.0 °C**

Heating Mode

Heating Capacity (Instantaneous)*	:	**296.4 kW**
Heating Capacity	:	**296.4 kW**
Heating Efficiency (COP) (Instantaneous)*	:	**3.95 kW/kW**
Heating Efficiency (COP)	:	**3.95 kW/kW**
Unit Power Input	:	**75.0 kW**
Fluid Type	:	**Ethylene Glycol**
Fluid Concentration	:	**35 %**
Leaving/Entering Temperatures	:	**33.0/28.0 °C**
Fluid Flow	:	**15.47 l/s**
Total Pressure Drop	:	**35.3 kPa**
Fouling Factor	:	**0.0000 (sqm-K)/kW**
Connetion Diameter	:	**114.3 mm**
Entering Air Temp (Dry bulb)	:	**7.0 °C**
Relative Humidity	:	**87.0 %**

Sound Power Level (LwA)	:	**92 dB(A)**
Sound Pressure Level at 10.0m (LpA)	:	**60 dB(A)**

Number of Fans	:	**5**
Fan Power Input	:	**8.08 kW**
Fan Speed	:	**951 rpm**

Operational efficiency in heating mode

Hydrokapillare

Heating days	Outdoor t ^{0}C	Hydrokapillare		Classic, underfloor heating system		Metal radiators	
		COP at energy carrier t = 30^0 C	Expenses EUR/per.*	COP at energy carrier t = 40^0 C	Expenses EUR/per.*	COP at energy carrier t = 50^0 C	Expenses EUR/per.*
30	-15	2.73	342	1.96	476	1.56	598
30	-7	3.24	288	2.27	411	1.77	527
30	+2	4.36	214	2.81	332	2.17	430
30	+7	5.42	172	3.71	252	2.84	329
60	+10	5.62	332	3.83	487	2.94	635
Average expenses, EUR/month:		112		163		210	
Percentage:		100%		145%		187%	

Savings are generated due to a smaller △T between the outdoor t^0 and the t^0 of the energy carrier.

Heat source:
heat pump

Time period:
September – May:
180 days

Heating period in hours:
4320 hours

Price of electricity:
0,18 EUR/kWh

Heat loss: 80 W/m^2

Area: 180 m^2

COP – Coefficient of Performance – the generated heat capacity relative to the energy capacity consumed.

* Example from a project in North Germany

Hydrokapillare

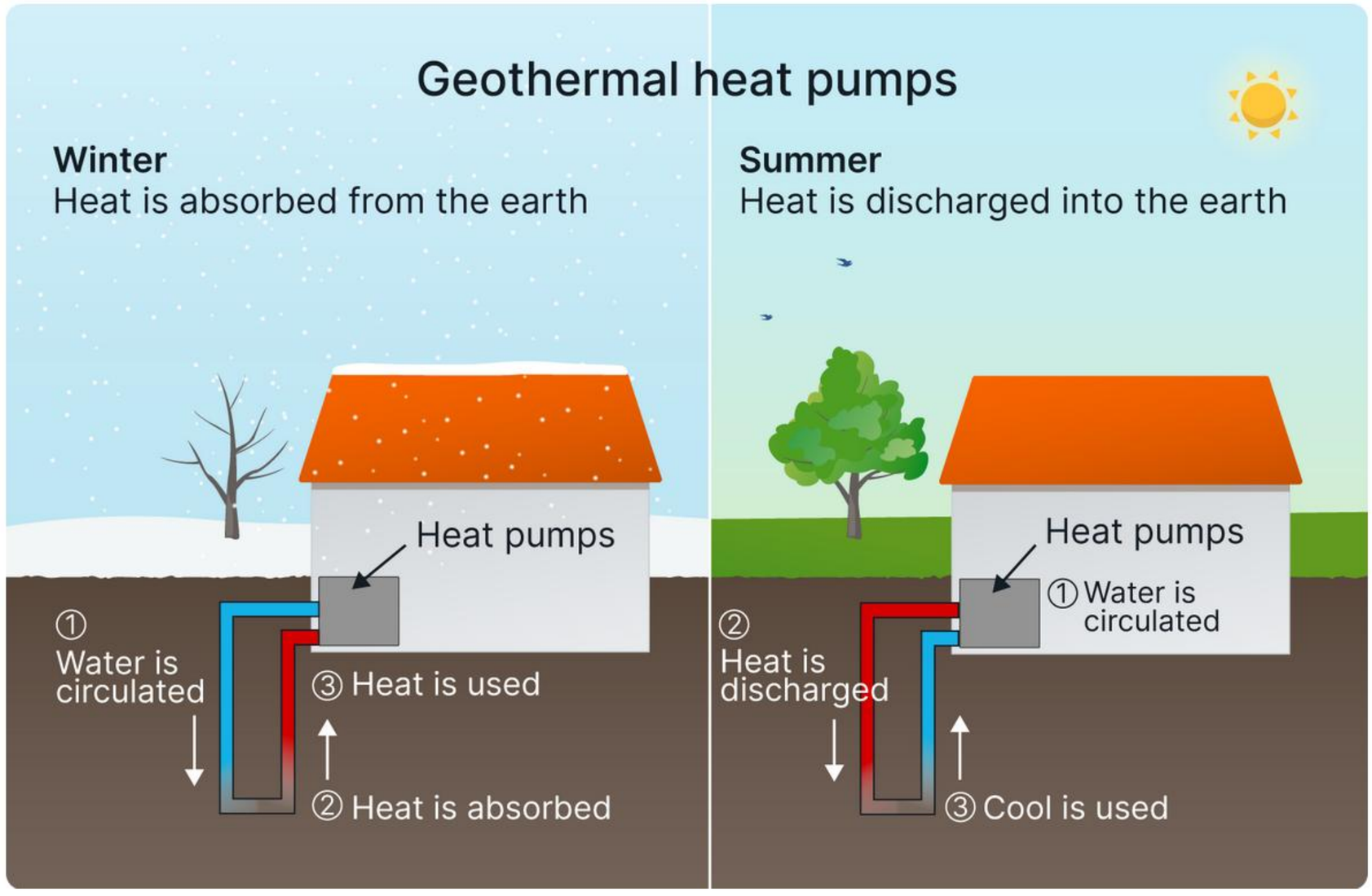
Geothermal HP vs air-water

Air-water Heat pump:

- **Less capital expenditures and more easy installation**
- **Noise from outdoor block**
- **Less efficient, especially with low outside air temperatures and high temperatures in heating system**

Geothermal heat pump:

- **Higher initial investments**
- **High operational efficiency in heating and cooling mode, especially when passive cooling mode is used**
- **Long life span**
- **No noise**



What can Hydrokapillare offer?

Hydrokapillare

- Low temperature (+25-30C) radiant heating system based on the flow of water in the capillary heat exchangers (mats) which can be installed in any surface of a building. The system can be connected to any energy source (district heating, heat pump, gas boiler, pellet boiler etc.) through the heat exchanger;
- the same system can be used for passive radiant cooling if it's connected to a heat pump or other cooling energy source;
- the ceiling cooling panels and wall panels with the capillary mats for the cooling in warehouses, industrial and similar buildings.

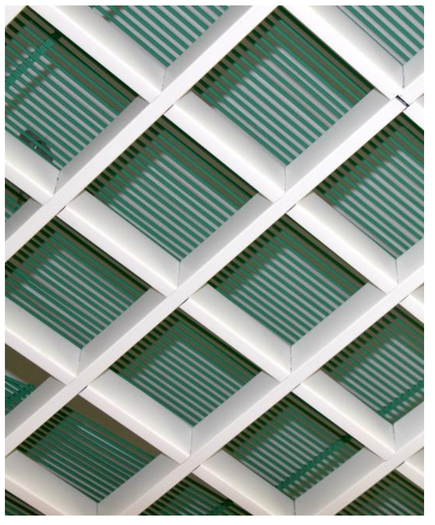
Hydrokapillare – a technology for any building (new or retrofit):

- Public and office buildings
- Residential, hotels, schools
- Historical buildings
- Industrial buildings
- Hospitals and clinics
- Cooling of PV panels, data centres and other processes,geothermal collectors







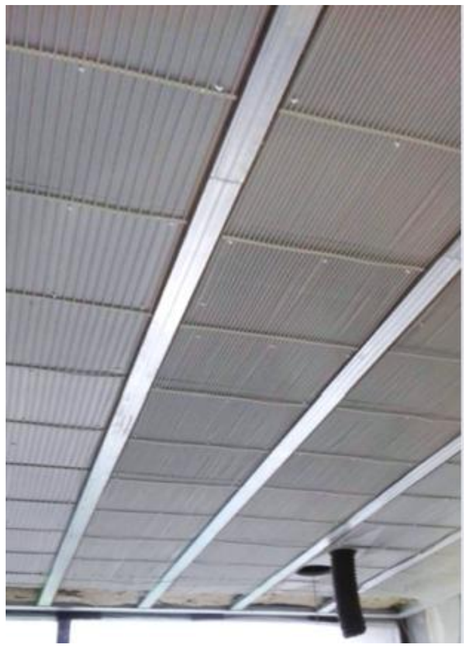


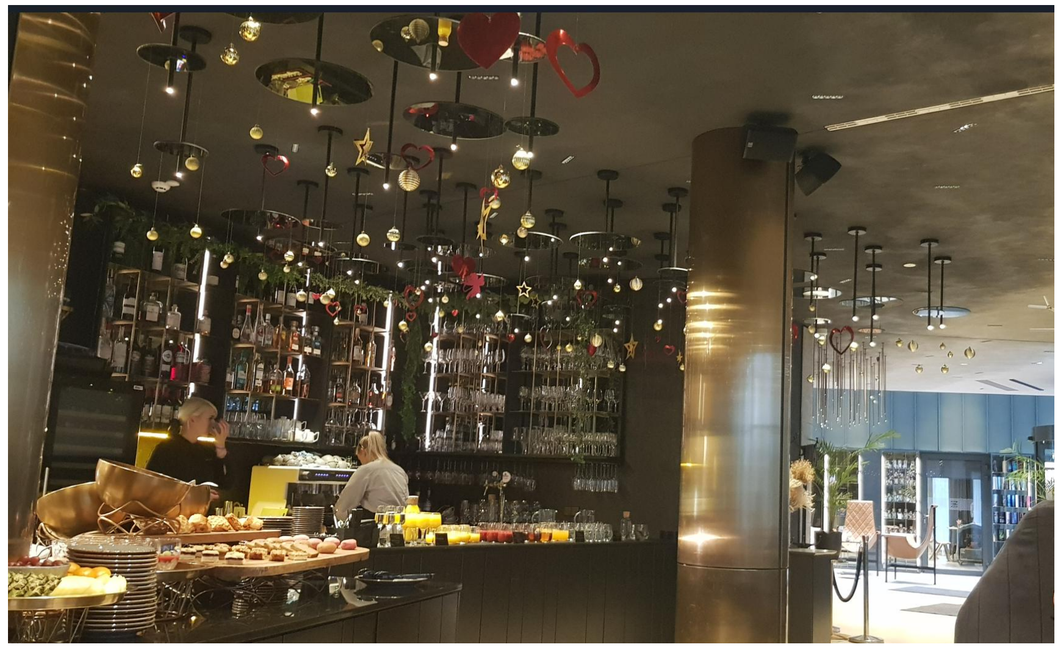
Installation of the capillary system

Hydrokapillare

Mana Sleep & Spa Hotel , Lithuania

- 5* Spa hotel with 100 rooms;
- Installation in the ceiling between metal profiles (with plasterboard finish)
- Heating/cooling modes together with geothermal heat pumps
- Separate regulation for each room
- Consumption of electricity during the summer time for cooling - ~ **200 EUR/per month;**
- Water temperature in the capillary system for heating - +25-29 °C – the reduction of costs by **45-50% in comparison with radiators**





Installation of the capillary system

Hydrokapillare

Mana Sleep & Spa Hotel , Lithuania

- 3 geothermal heat pumps
- 2 Buffer tanks 2000 l
- Installation of capillary system in the ceiling between metal profiles (with plasterboard finish)
- Automated regulation of heating/cooling supply
- Possibility to switch on one wing in heating mode and another wing in cooling mode if needed

Guest reviews for Mana Sleep & Spa

9.6 Exceptional
3,169 reviews

We aim for 100% real reviews

Write a review

Categories:

Staff	9.7	Facilities	9.6	Cleanliness	9.8
Comfort ↑	9.8	Value for money	8.9	Location	9.7
Free WiFi	9.5				

↑ High score for Druskininkai

Installation in ceiling - heating and cooling

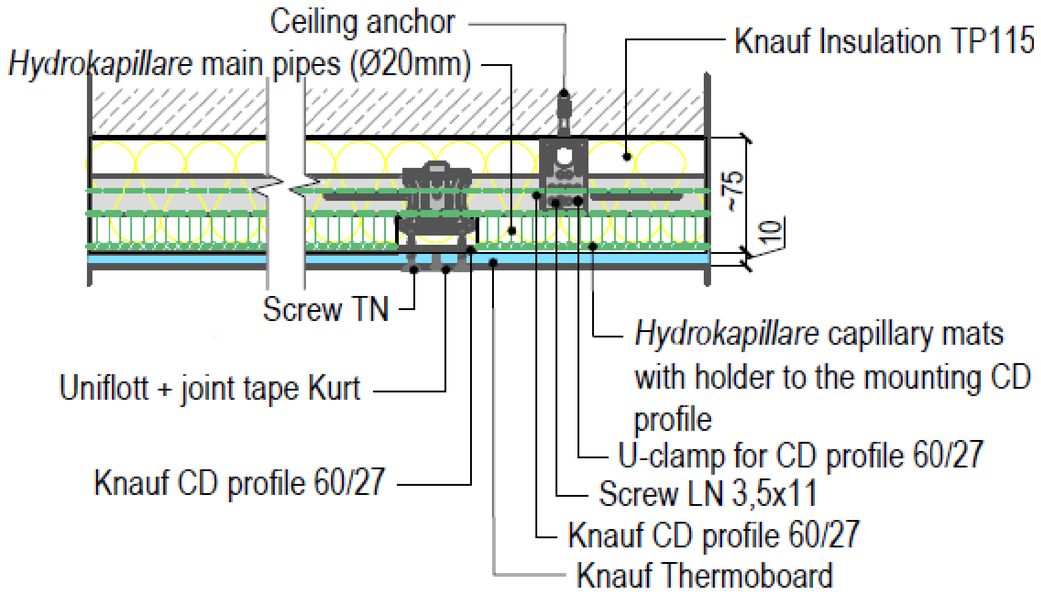
Hydrokapillare

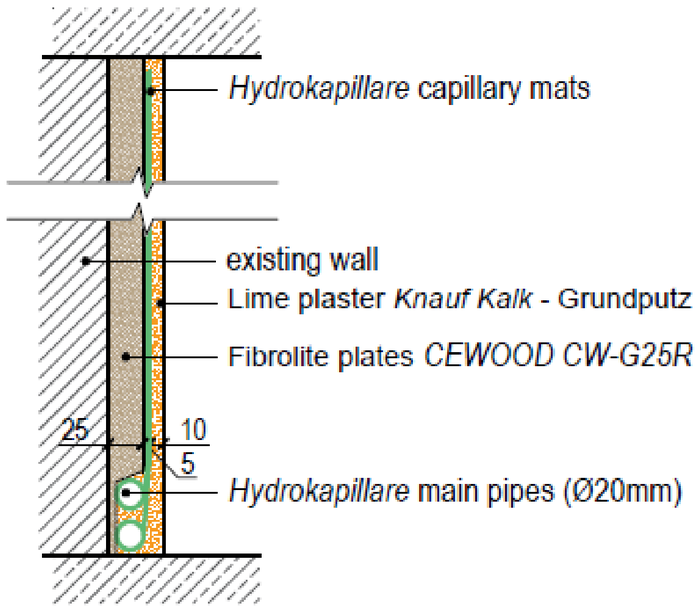
- Cover the walls and the floor with with plastic foil and/or cardboard to preserve the existing final finish;
- Install 2-level metal profile system with the distance between the axes of lower profiles 500 mm or less;
- Install the facade insulation plates or other insulation material between the metal profiles;
- Install the capillary mats and attach its with the fasteners to the metal profiles;
- Install the plasterboard plates and make the final finish of plasterboard works

D112 KNAUF 2-level metal profile system or similar

Insulation by KNAUF rockwool or similar

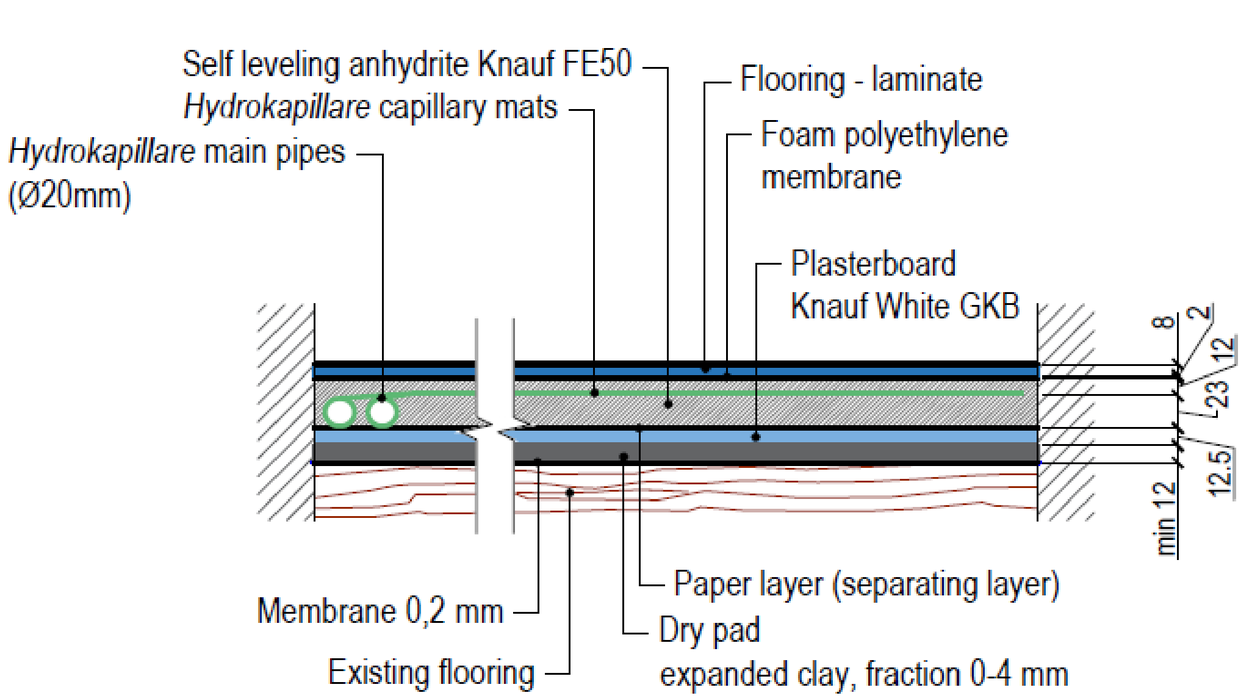
Installation in ceiling/walls - heating and cooling

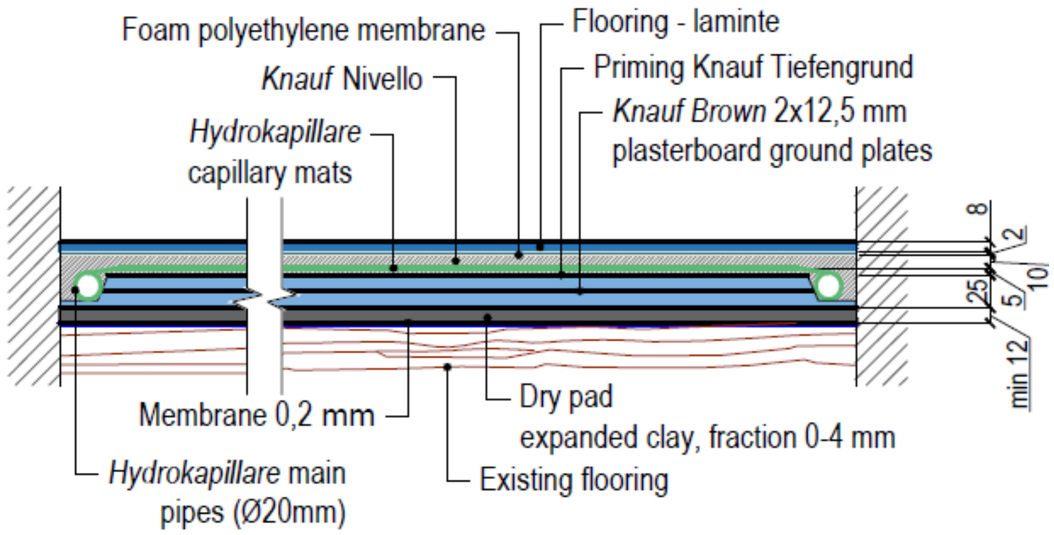




Underfloor installation - heating and “soft” cooling

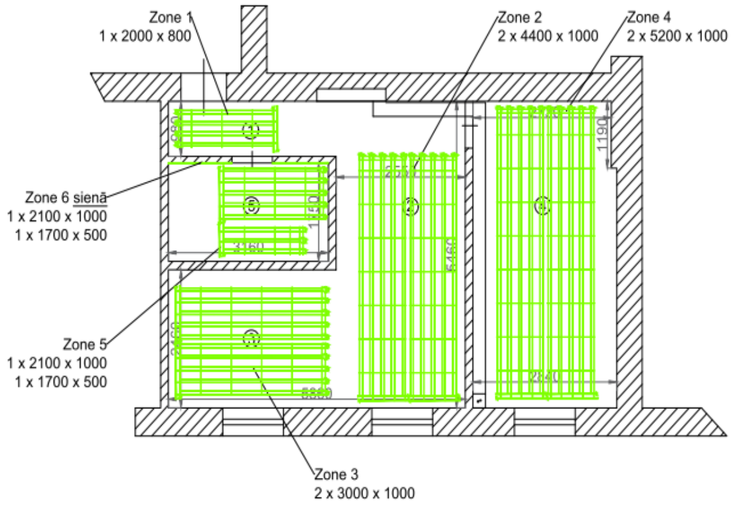
Hydrokapillare





Analysis of heating consumption

Hydrokapillare



- Art Nouveau style building, built in 1912, partially renovated in 2018-2019.
- Area of the apartment – 45.5 m^2; height of the room – 2.7 m.
- Building envelope - 60 cm brickwork, wooden windows with double glazing.
- Connection to the district heating network via a heat exchanger.
- Capillary mats are embedded in the floor of all rooms and in one bathroom wall.
- The temperature of the heat carrier in the capillaries is +25°C/+22°C for 3 heating seasons.
- Room temperature 21-22°C (depending on outside temperature).

Manifold - 5 loops of the capillary system

Heat exchanger,circulation pump, expansion vessel,valves – **hydraulic separation module. Could be one for a whole building.**

Analysis of heating consumption

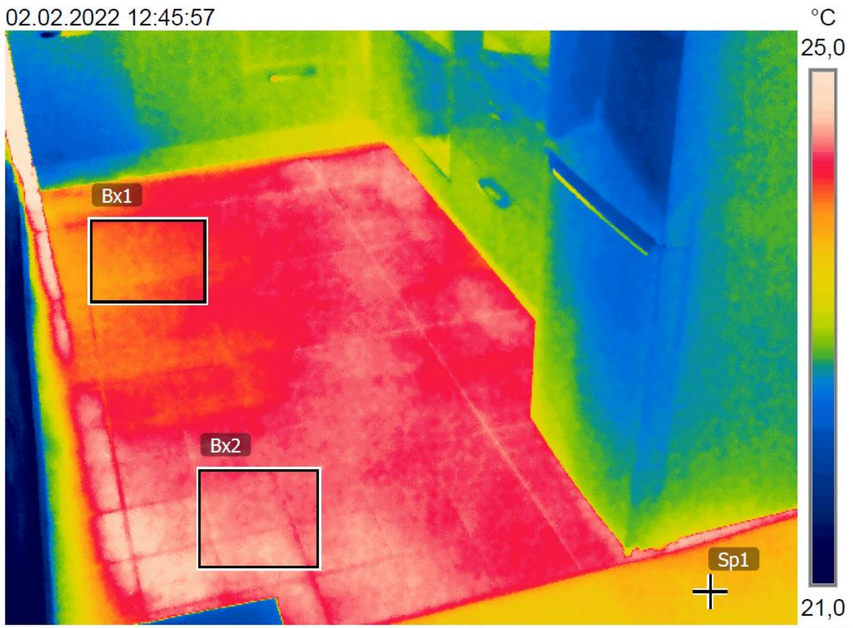
Hydrokapillare

Measurements		
Bx1	Average	24,0 °C
Bx2	Average	24,5 °C
Sp1		23,7 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C

Geolocation	
Compass	334° NW

02.02.2022 12:45:57



IR_1162.jpg FLIR T650 55905022

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DC_1163.jpg

Surface temperature (ceramic tiles and laminate): +23.7-24.5°C
Supply temperature in the capillary system: +26.5°C
Outside air temperature: -5°C

Analysis of heating consumption

Hydrokapillare

Measurements	
Sp1	26,5 °C
Sp2	45,0 °C
Sp3	26,0 °C

Parameters	
Emissivity	0.95
Refl. temp.	20 °C

Geolocation	
Compass	347° N

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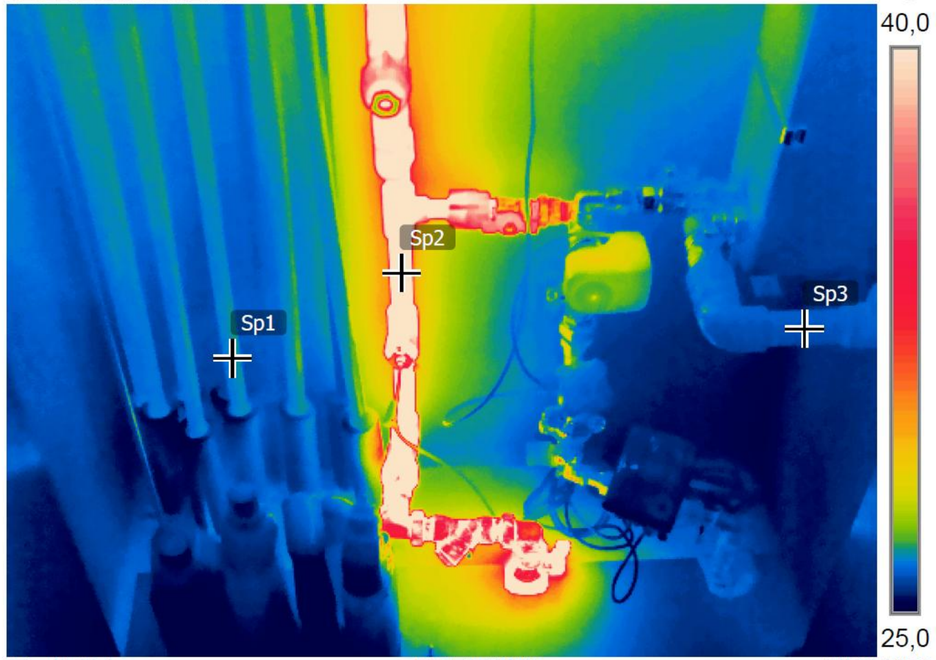

IR_1150.jpg FLIR T650 55905022

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Heat exchanger

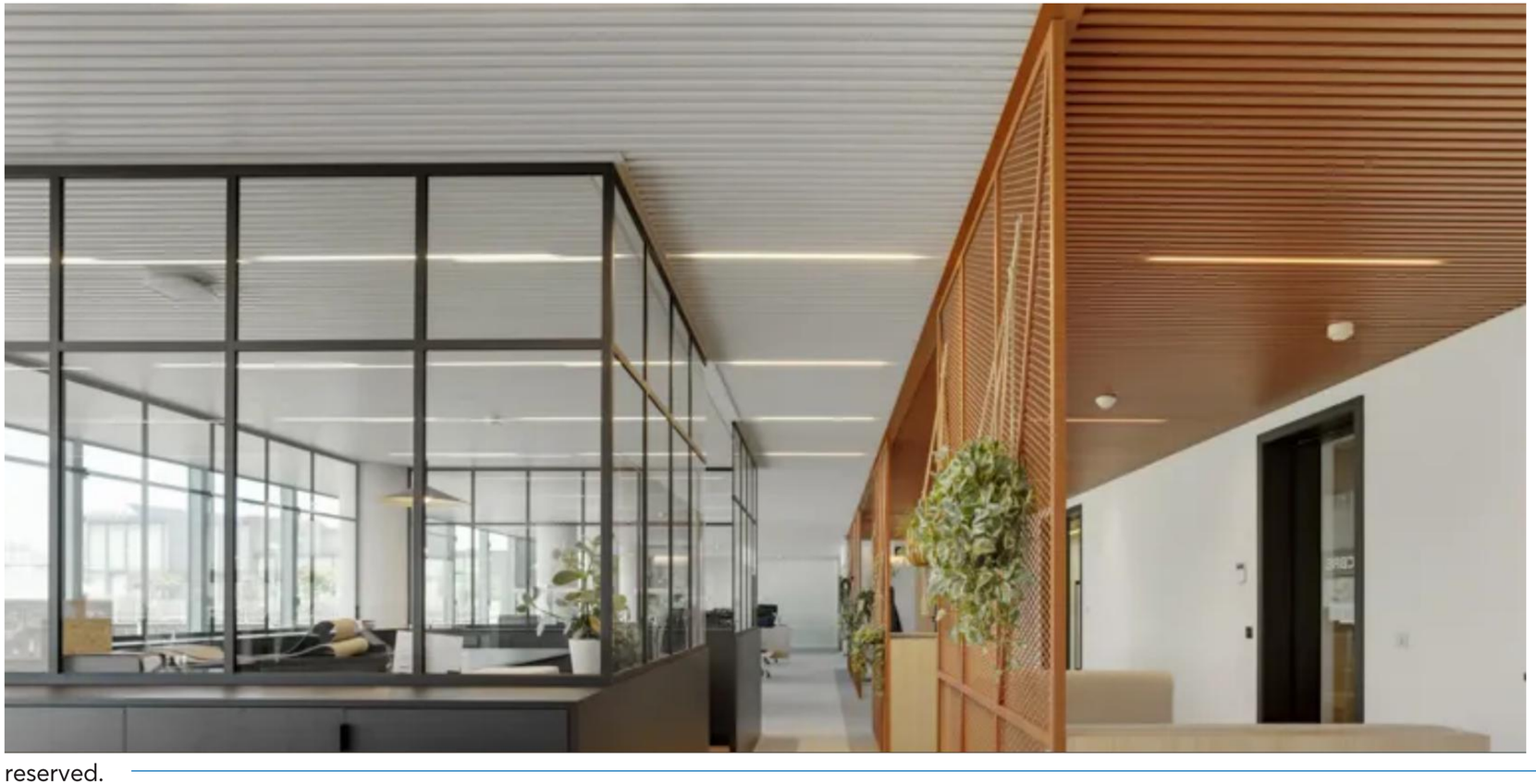
Supply temperature from the district heating: +45°C
Supply temperature in the capillary system: +26.5°C
Outside air temperature: -5°C

Installation of the capillary system in metal ceilings

Hydrokapillare

In partnership with interalu SMART CEILINGS

With offices in Luxembourg, Rotterdam, Paris and a partner in Italy, Interalu is an international player in the climate ceilings market, i.e. ceiling solutions that provide cooling and heating thanks to integrated systems.



Advantages and benefits over conventional HVAC

Hydrokapillare

Savings

- significantly lower energy consumption and, consequently, operational costs

For building owners and developers:

- supports return on investment (ROI) and marketability
- lower operating and maintenance costs

Hygiene

significantly reduces air circulation, and hence the circulation of dust, allergens and microorganisms

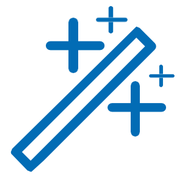
Functionality

heating/cooling and humidity control in one system, higher comfort level, self-regulating temperature control

Flexibility

invisible installation, simple assembly, significant space savings in the building

Efficiency



much faster regulation of heating output and room temperature, possibility to combine with the central ventilation system

Cooling with Hydrokapillare

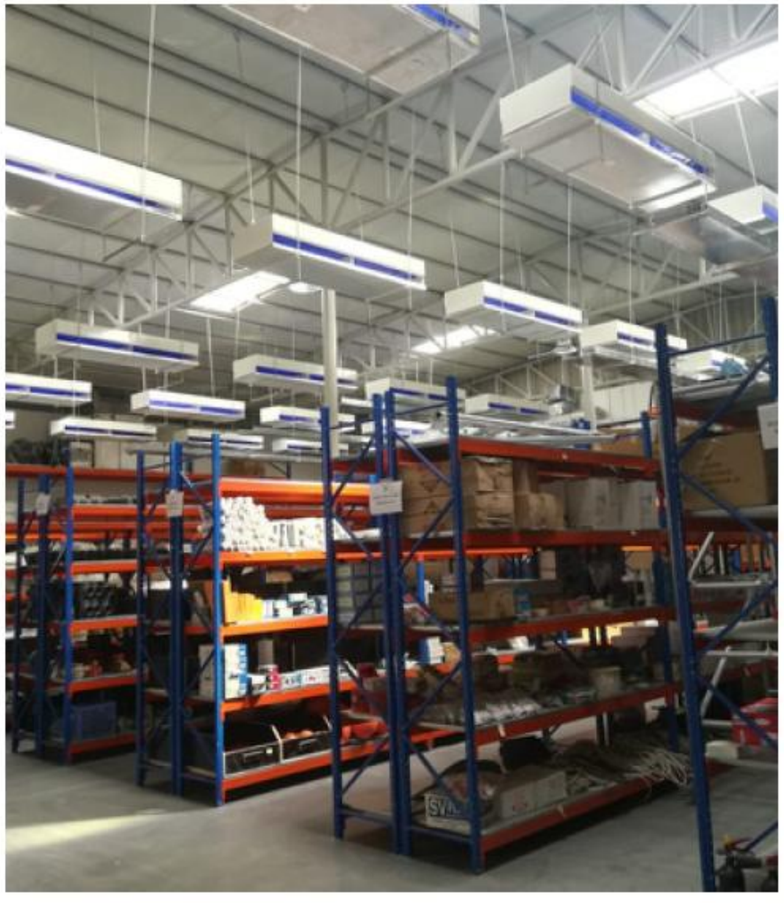
ceiling panels

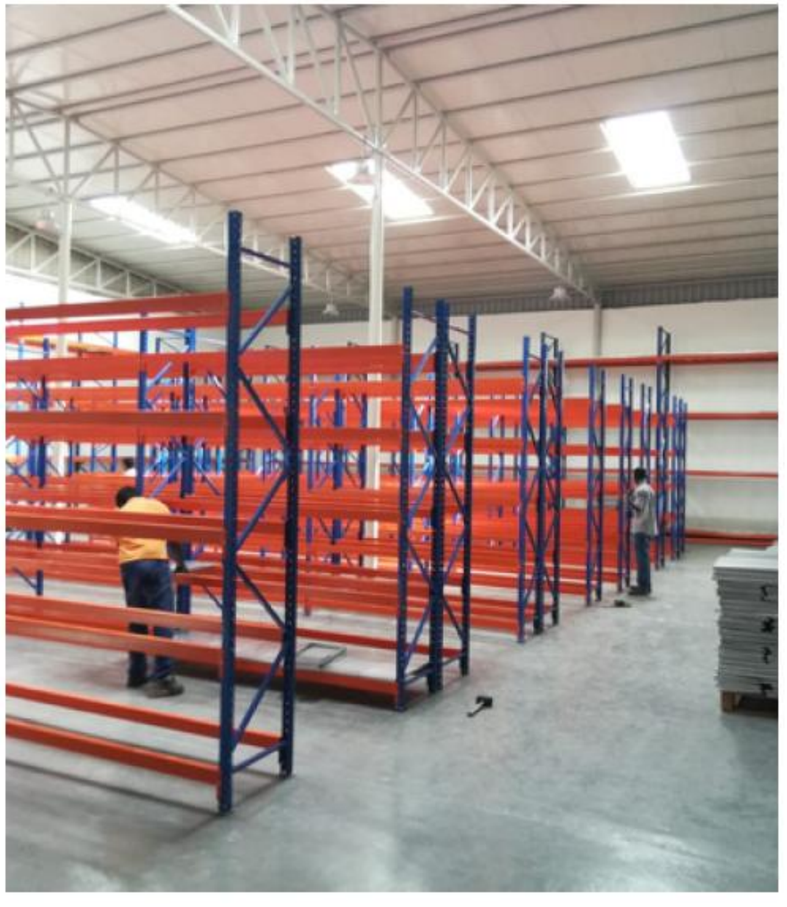
Hydrokapillare

- **Convective passive radiant cooling by panels with the capillary heat exchangers (mats);**
- **Suitable for a data center, warehouses, industrial premises and other similar buildings;**
- **Potential savings of energy in average 50-60% in comparison with air conditioning;**
- **Can be used for a heat recovery from a data center and further use of waste heat for the support of heat pump and district heating network.**

Case study – warehouse in Abu Dhabi, UAE

Hydrokapillare





- 500 m2 warehouse, 8 m ceiling height
- Required temperature inside + 24° C
- 32 kW cooling units (30 pcs) were installed at 6,5 m height using chain and suspension brackets
- Cooling water temperture +7-12 ° C
- **Cooling costs were reduced by 60% in comparison with the previous AC**

Hydrokapillare

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