

U4X

Hybrid system with thermal building mass connection



QUICK FACTS

- Thermal comfort according to EN ISO 7730, SIA 382/1
- Building material class A2-s1, d0 according to EN 13501-1
- Very high heating and cooling capacity
- Superior sound absorption values (class A)
- Building mass can be used as an additional thermal storage mass
- Free cooling can be used depending on location, operating conditions and system concept
- Integration of various components
 - Different lighting designs
 - Sprinklers
 - Smoke detectors
 - Supply / extract air elements

Output (water)	
Cooling	Heating
Up to 87 W/m ² (8 K), EN 14240:2004	Up to 103 W/m ² (15 K), EN 14037:2016
Acoustics	
α _w : up to 0,90	



Technical description

General

The U4X Hybrid system is a multifunctional climate ceiling system for different room temperature control and acoustic requirements. A special feature of the system is the thermal integration of the building mass through direct connection to the concrete ceiling. This means that, in addition to conventional water- and air-based cooling, the storage capacity of the building mass is also available.

Activation

Water system: The radiant ceiling is a passive system that in the case of cooling absorbs heat from the room via the ceiling surface, transfers it to the water, which is conducted in activation registers, and dissipates it, respectively emits heat in the case of heating.

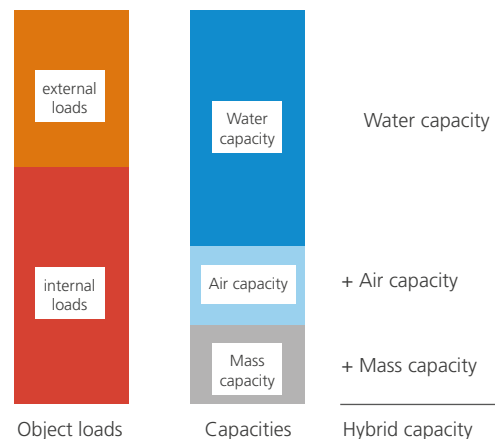
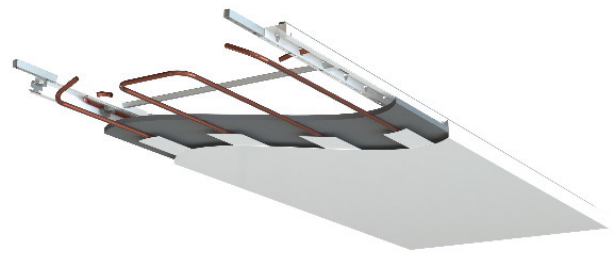
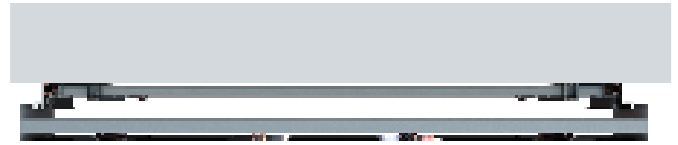
The activation of the U4X consists of meandering copper pipes (outside diameter 12 mm) and aluminum heat-conducting rails (width 80 mm), which are connected by laser spot welding and glued into the ceiling panels.

Functions

The U4X hybrid ceiling module is multifunctional. In addition to the thermal functions of cooling/heating, there is the possibility of further integration: various built-in components (e.g. smoke detectors, lighting).

Functional description of the U4X

The special design of the U4X module, consisting of ceiling panel and frame, makes it possible to utilise the advantages of a radiant ceiling module, whilst also incorporating the building mass as an energy store. Thanks to the thermally active frame, the concrete ceiling directly above can be actively managed and the building mass utilised as an energy store. This allows load peaks to be shifted.



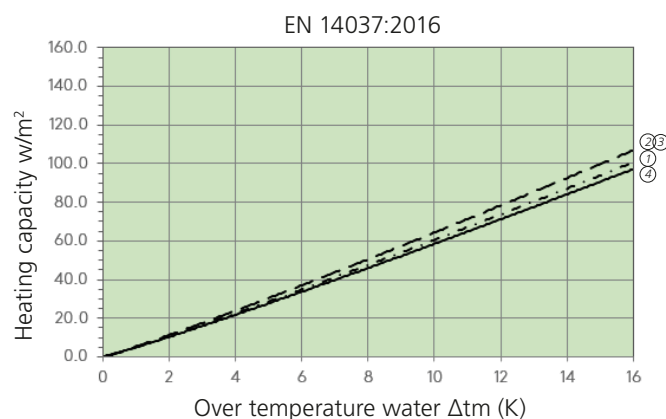
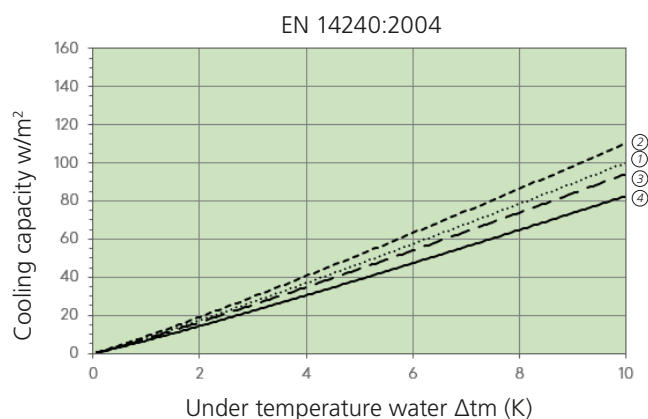
Technical data

Capacity

Initial data is presented below.

Material ceiling panel	Aluminum	Steel
Perforation	Rg 1,5 – 11 %	Rg 1,5 – 11 %
Distance heat conducting rails (hcr)	100 mm --- ② 150 mm — ③	100 mm ① 150 mm ——— ④
Activation method	on fleece	on fleece

(Capacity information without project-specific performance-influencing factors.)



Version	Cooling 8 K	Cooling 10 K	Heating 15 K
① Steel 100 mm	up to 79 W/m ²	up to 100 W/m ²	up to 94 W/m ² (.....)
② Aluminum 100 mm	up to 87 W/m ²	up to 110 W/m ²	up to 103 W/m ² (-----)
③ Aluminum 150 mm	up to 74 W/m ²	up to 94 W/m ²	up to 100 W/m ² (-----)
④ Steel 150 mm	up to 65 W/m ²	up to 83 W/m ²	up to 91 W/m ² (———)

Notice

- SN EN 14240: The cooling capacity is related to the active area according to SN EN 14240:2004. The active area is calculated according to SN EN 14240 from the number of heat-conducting rails x length of heat conducting rail x distance between heat conducting rails.
- SN EN 14037: The heating capacity is related to the active area according to SN EN 14037:2016. The active area is calculated according to SN EN 14037 from the length of the ceiling panel x the width of the ceiling panel.

Recommendations for operation

Water

- Temperature
 - Cooling 16 – 18 °C
 - Heating 28 – 37 °C
- Temperature distance Δt (VL-RL): 2 – 3 K
- Pressure drop: 20 – 25 kPa
- Water flow: 80 – 150 l/h
- Max. operating pressure up to 9 bar
- Water quality according to: SWKI BT 102-01, BTGA 3.003, VDI 2035

Surrounding

- Ambient temperatures: +5 – 50 °C
- Humidity: up to 90 % relative humidity

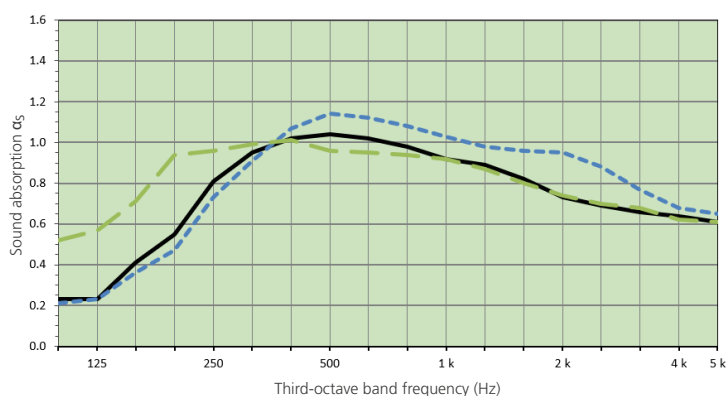
Air

- Supply air under temperature cooling
 - min. 16 °C
 - max. 24 °C
- Supply air temperature heating
 - max. 1 K below room temperature

Acoustics

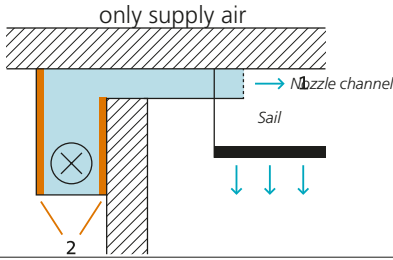
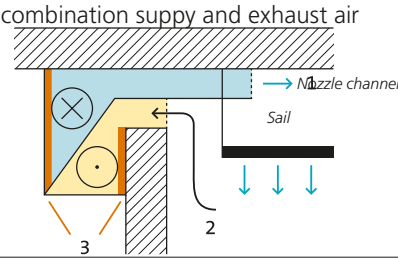
Initial data is presented below.

Perforation	Rd 1,5 – 22 %	Rg 1,5 – 11 %	Rg 1,5 – 11 %
Acoustic inlay	with 	with 	with 
Additional inlay	Soundabsorber	Mineral wool in PE	Mineral wool in PE + additive
Sound absorption α_p	250: 0,70 500: 1,00 1k: 1,00 2k: 0,95 4k: 0,70	250: 0,75 500: 1,00 1k: 0,95 2k: 0,75 4k: 0,65	250: 0,95 500: 0,95 1k: 0,90 2k: 0,75 4k: 0,65
Sound absorption α_w	α_w : 0,90	α_w : 0,80	α_w : 0,80 (L)
Sound absorption class (EN ISO 11654)	A	B	B



Air connection box

Standard sound level difference (Telephony sound attenuation)

Versions		
without internal attenuation	$D_{n,e,w} = 58 \text{ dB}$	$D_{n,e,w} = 50 \text{ dB}$
with internal attenuation	$D_{n,e,w} = 62 \text{ dB}$	$D_{n,e,w} = 55 \text{ dB}$

Sound power level L_{WA}

Supply air volume	q_v $q_v / \text{lm channel}$	m^3/h $\text{m}^3/\text{lm} \cdot \text{h}$	76 25	90 30	104 35	118 40	136 45
Sound power level	L_{WA}	dB	24,1	27,3	31,0	34,7	38,2

System

Ceiling system

- Ceiling module with building mass connection
 - Rectangular panels
 - Frame

Installation systems

- Installation high: 75 mm
 - Frame construction for mounting on the concrete ceiling

Materials, weight and dimensions

Materials and weight

Material	Weight (incl. activation, water)
Steel 0,70 mm	approx. 12,5 kg/m ²

Building material class: A2-s1, d0, EN 13501-1 (depending on the acoustic solution).

Dimensions

Length	Width	Height
min. 800 mm	min. 400 mm	min. 50 mm
max. 3000 mm	max. 1200 mm	max. 100 mm

Special dimensions on request.

Surface

Versions

- Powder coating
- Digital printing on request

Colors

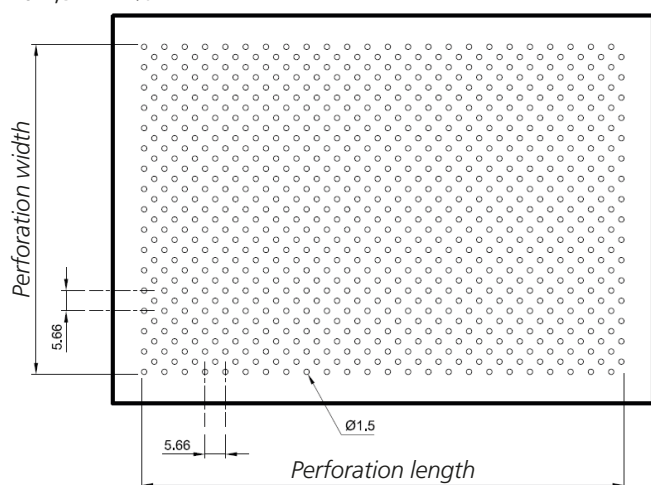
- Standard RAL 9010
- Other RAL / NCS colors on request

Perforations

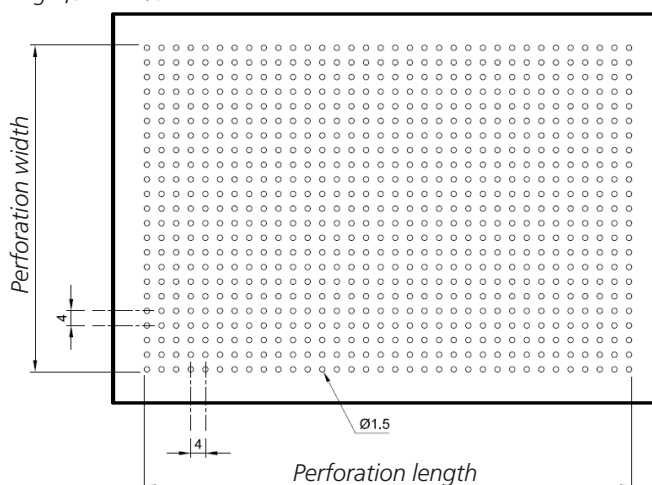
- Standard perforations
- Other perforations on request

Standard-Perforationen:

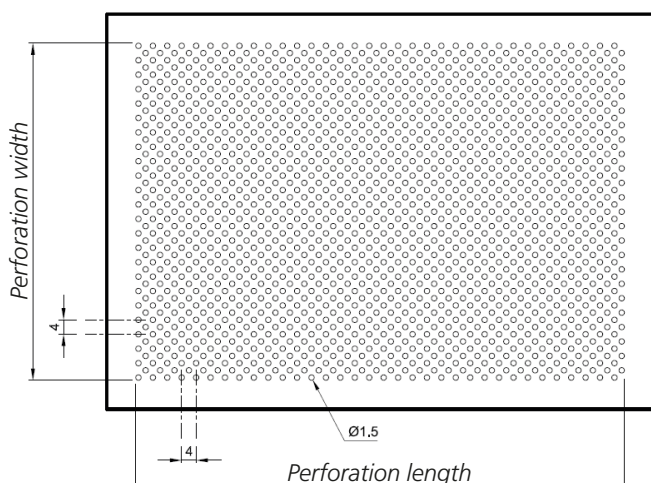
Rd 1,5 – 11 %



Rg 1,5 – 11 %



Rd 1,5 – 22 %



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