



Chilled Metal Ceiling Sail with Nozzle Channel

Powerful integrated

Tailor-made solutions for indoor climate



Powerful integrated

Thanks to its comprehensive functionality, the chilled metal ceiling sail with integrated nozzle channel creates a perfect room climate in any environment. It combines high water cooling capacities with comfortable supply air routing, a low installation height and excellent acoustic properties.

- High water cooling capacity
- Supply air volume flow up to 35 m³/h*lm
- Very high sound absorption values
- Integrated telephony sound attenuation
- High and effective mass connection also above the sail



Ceiling System
Sail

Operating Principle
Radiation / Convection

Air Supply
not visible

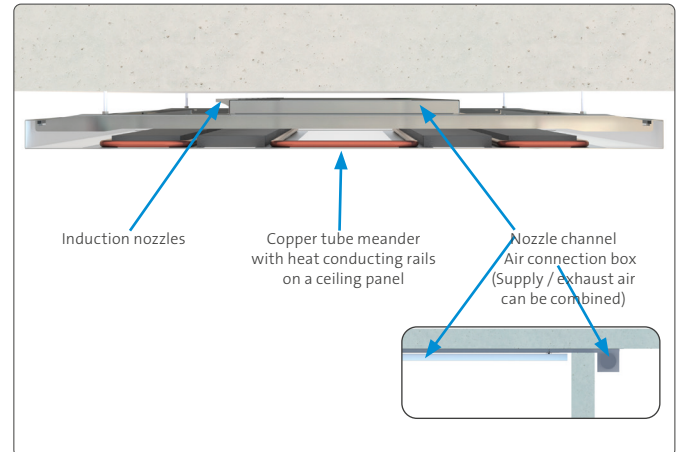
Water Capacity
Cooling: 120 W/m² (8 K), EN 14240
Heating: 135 W/m² (15 K), EN 14037₂₀₀₃

Acoustics
 α_w : up to 0,95
Sound absorption class A, EN ISO 11654

Room Comfort
Thermal comfort according to EN ISO 7730, SIA 382/1

Description

With supply air quantities of up to 35 m³/h*lm per sail, the supply air is introduced horizontally into the room on one side of the sail above the ceiling panels. The warm room air is drawn in by specially developed high-performance induction nozzles on the opposite side of the sail, accelerated above the supply air channel and thereby achieved a high energy transfer into the concrete. The temporarily stored energy can be dissipated at night – if possible with free cooling. Due to the high ventilation efficiency in the room, a draft-free and complete room mixing with a homogeneous temperature profile is created within a very short time.



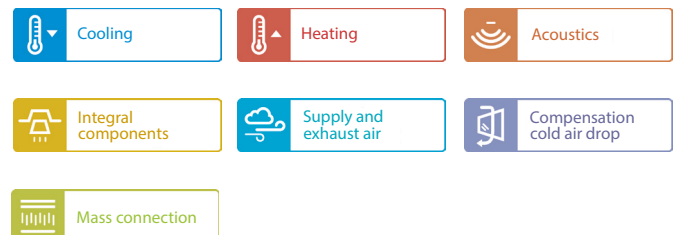
Activation

- Water system
- Copper tube meander on heat conducting rails (hcr)
 - Copper tube \varnothing outer: 12 mm

Supply Air

- Supply air volume flow up to 35 m³/h*lm
- Nozzle channel with induction nozzles
 - Air connection box for access in the corridor

Functions



Capacity

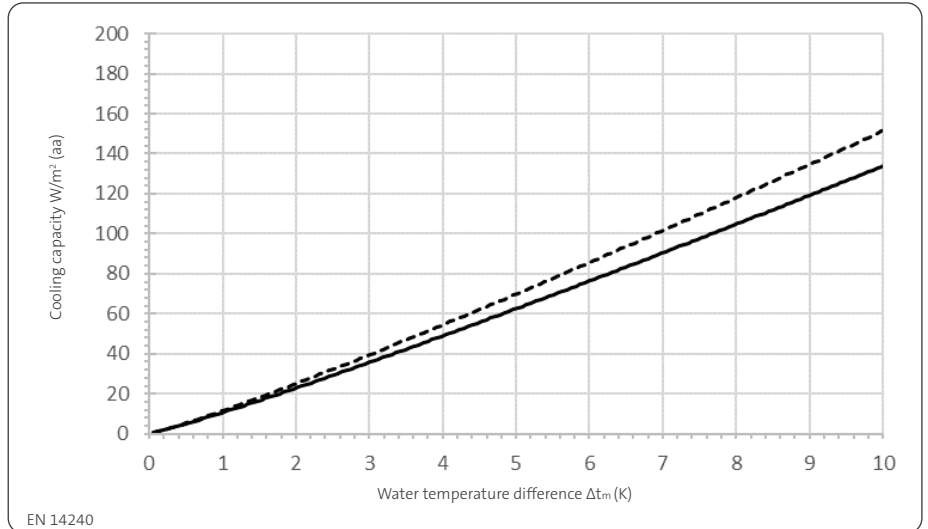
Capacity water

- Capacity information without object-specific performance-increasing factors.
- Depending on the configuration, an output of 20 W/m² of panel area is achieved through concrete management.



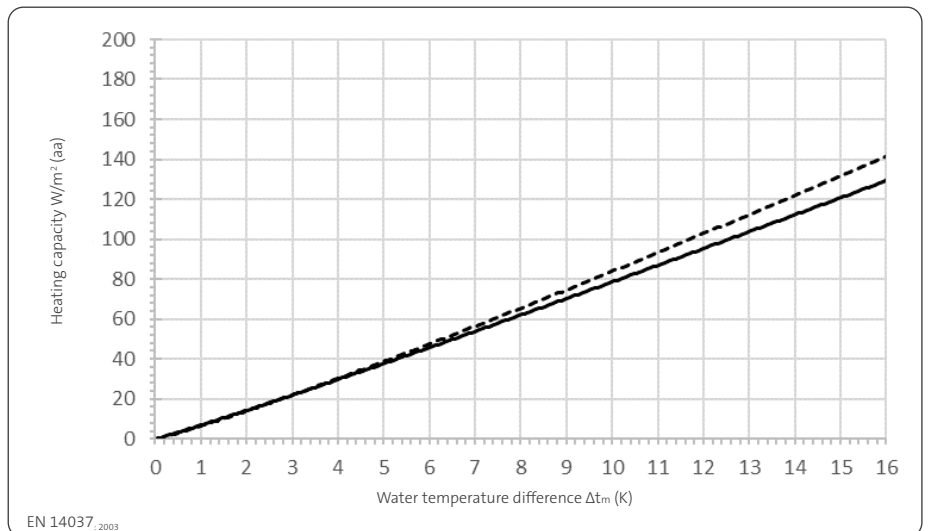
Cooling

- Aluminum ceiling panel whole area with fleece
- Steel ceiling panel whole area with fleece



Heating

- Aluminum ceiling panel whole area with fleece
- Steel ceiling panel whole area with fleece



Capacity air

Air volume	2 K	4 K	6 K	8 K	10 K
50 m ³ /h	32 W	64 W	96 W	128 W	160 W
75 m ³ /h	48 W	96 W	145 W	192 W	240 W
100 m ³ /h	64 W	128 W	192 W	256 W	320 W
200 m ³ /h	128 W	256 W	384 W	512 W	640 W

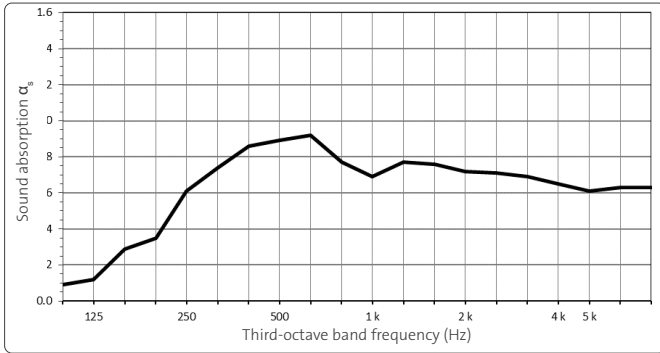
Base: ρ_L = 1,15 kg/m³ / c_L = 1,006 KJ/kgK

Recommended use for EN ISO 7730, class A / B. Further uses possible according to project-specific evaluation.

Acoustics

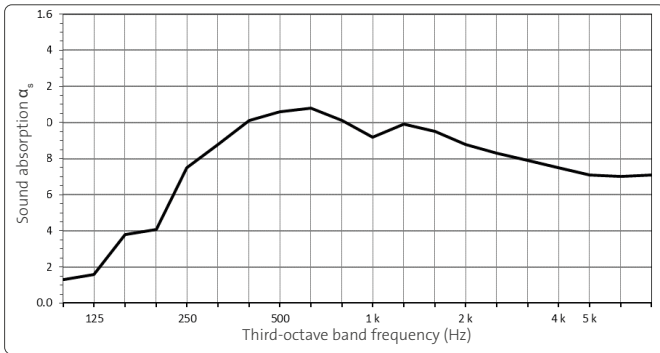
Sound absorption (ceiling panel)

Info: With supply air channel the total sound absorption level decreased α_w by 0,05 [-].



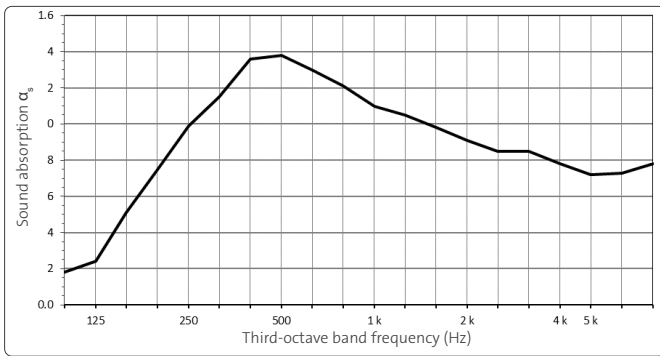
Chilled metal ceiling sail perforated

Perforation 1,5 mm – 11 %	with acoustic fleece
Additional inlay	without
practical Sound absorption α_p	250: 0,55 500: 0,90 1k: 0,75 2k: 0,75 4k: 0,65
Sound absorption α_w	α_w : 0,75
Sound absorption class	C (EN ISO 11654)



Chilled metal ceiling sail perforated

Perforation 1,5 mm – 11 %	with acoustic fleece
Additional inlay	1 strip on the long sides of cp
practical Sound absorption α_p	250: 0,70 500: 1,00 1k: 0,95 2k: 0,90 4k: 0,75
Sound absorption α_w	α_w : 0,90
Sound absorption class	A (EN ISO 11654)



Chilled metal ceiling sail perforated

Perforation 1,5 mm – 11 %	with acoustic fleece
Additional inlay	Strips between hcr
practical Sound absorption α_p	250: 0,95 500: 1,00 1k: 1,00 2k: 0,90 4k: 0,80
Sound absorption α_w	α_w : 0,95
Sound absorption class	C (EN ISO 11654)

Air connection box

Telephony sound attenuation	only supply air	combination supply and exhaust air
without internal attenuation	$R_w = 43$ dB $D_{ne} = 51$ dB	$R_w = 41$ dB $D_{ne} = 48$ dB
with internal attenuation	$R_w = 48$ dB $D_{ne} = 55$ dB	$R_w = 46$ dB $D_{ne} = 43$ dB

Sound power level L_{WA}

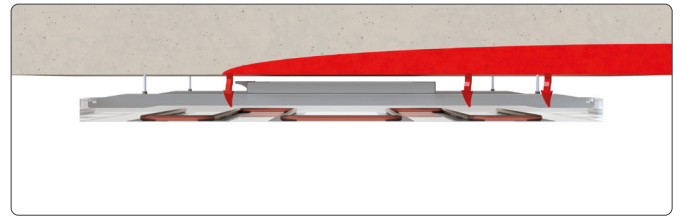
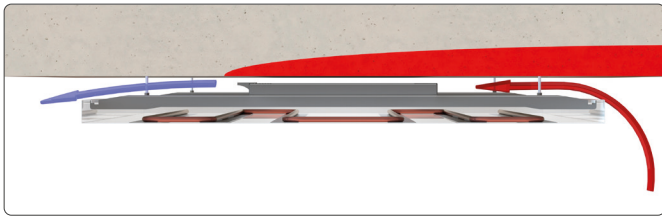
Supply air volume	q_v q_v/lm channel	m^3/h m^3/lm^*h	76 25	90 30	104 35	118 40	136 45
Sound power level	L_{WA}	dB	24,1	27,3	31,0	34,7	38,2

Technical specifications

Functional description

Day: The hygienically necessary air volume flow emerges from the high-performance induction nozzles. This induces warm room air from behind the sail. Part of the energy is dissipated directly, another heats the concrete. The room temperature always remains comfortable.

Night: At night, no supply air is required in the building. The water can be cooled by free cooling (without the use of the refrigerator). Through the exchange of radiation between warm concrete and cold heat conducting rails, the energy is extracted from the concrete and prepared for the absorption of excess energy the next day.



Calculation of the number of nozzles per linear meter of channel

An air velocity of 8 m/s should be achieved per nozzle in full load operation. A maximum of 5 nozzles are possible per linear meter of supply air channel. Unused nozzles must be sealed with a blind stub. The pressure loss at a maximum air volume flow is 35 Pa.

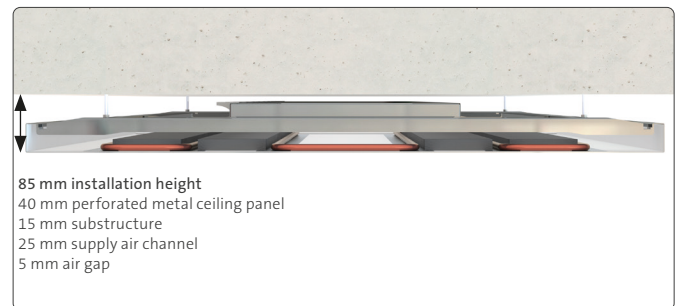
The number of nozzles is calculated as follows:

$$\text{Number of nozzles per lm} = \text{round up} \left(v_{\text{max}} / 7 \frac{\text{m}^3}{\text{h}} \right)$$

Supply air volume flow max. per lm of nozzle channel	Low temperature 6 K	Low temperature 8 K	Low temperature 10 K
	35 m ³ /h	33 m ³ /h	30 m ³ /h

System construction

If you want to be able to easily replace nozzles at a later time (e.g. for blind nozzles), the upper edge of the channel must be away 20 mm from the concrete ceiling. The nozzles can be used from above without screws. Alternatively (if no 20 mm above the channel is possible) they can be inserted into the channel from below (ATTENTION: the direction of the nozzle discharge changes! The nozzles must be screwed!). With nozzles from below it should be noted that the nozzles still blow out OVER the panel edge (loss of capacity).



Dimensions standard

Sail length	Sail width	Sail height
min. 1000 mm	min. 400 mm	*min. 80 mm
project-specific	max. 1200 mm	max. 200 mm

*System structure without tolerance of the concrete ceiling

Material and weight

Material ceiling panel	Weight ceiling panel (incl. water)
Aluminum 1,00 mm	3,8 – 6,5 kg/m ²
Steel 0,70 mm	6,5 – 9,0 kg/m ²

Switzerland



Barcol-Air Group AG

Wiesenstrasse 5
8603 Schwerzenbach
T +41 58 219 40 00
F +41 58 218 40 01
info@barcolair.com

Barcol-Air AG

Wiesenstrasse 5
8603 Schwerzenbach
T +41 58 219 40 00
F +41 58 218 40 01
info@barcolair.com

Barcol-Air AG

Via Bagutti 14
6900 Lugano
T +41 58 219 45 00
F +41 58 219 45 01
ticino@barcolair.com

Germany

Barcol-Air GmbH

Bahnhofstrasse 39
21614 Buxtehude
T +49 4161 800 28 0
F +49 4161 800 28 20
verkauf-deutschland@barcolair.com

France

Barcol-Air France SAS

Parc Saint Christophe
10, avenue de l'Entreprise
95861 Cergy-Pontoise Cedex
T +33 134 24 35 26
F +33 134 24 35 21
france@barcolair.com

Italy

Barcol-Air Italia S.r.l.

Via Leone XIII n. 14
20145 Milano
T +41 58 219 45 40
F +41 58 219 45 01
italia@barcolair.com

Scandinavia

Exclusive Partner:

Mogens Rasmussen A/S

Industrivej 3B
5500 Middelfart
T +45 6441 8033
mra@mras.dk

barcolair.com

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