VECTA design
STRETCH CEILING SYSTEMS

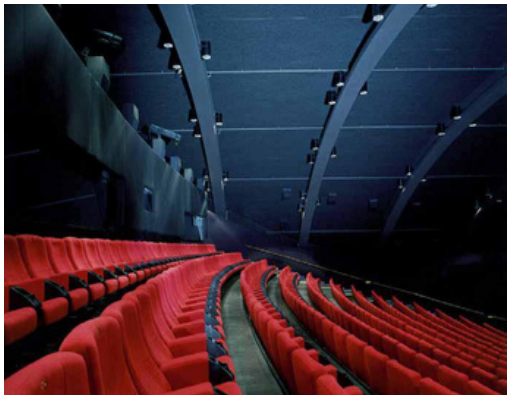
ACOUSTIC SOLUTIONS PERFORATED STRETCH MATERIAL

Maximize great first impressions and everyday comfortability

VECTA design
STRETCH CEILING SYSTEMS

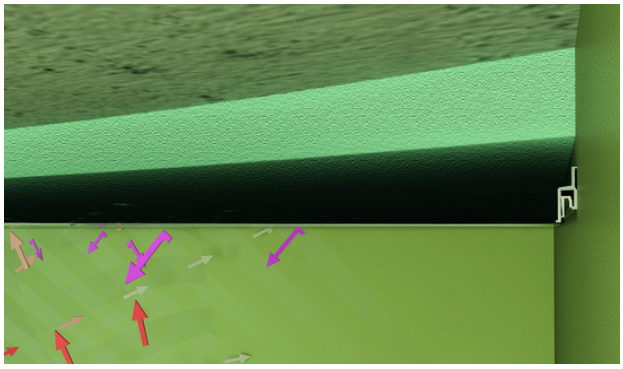
ROOM ACOUSTICS

When entering a room for the first time, the layout, materials used, design and surfaces help to create the first impression. While in the room, you will also experience the peculiarities of the acoustics - the **quality of the sound and its beauty**. **Vecta Design** strives to ensure that the **refined design** optimally combines a beautiful finish with the best acoustic qualities to meet the customer's needs. The most suitable solution to improve the acoustics of a room depends on its intended use, the dimensions of the room and other special construction features. To achieve optimal acoustics, Vecta Design offers maximum, **Class A**, **sound-absorbing ceiling modules** and **wall panels** that can be created as a **tailor-made solution**, in the size you want, in the desired shape and color or surface effect. The material allows also integrating light elements, to create light ceilings or add light to a niche.



To ensure the building and its elements meet the requirements for acoustic standards and the needs of acoustic comfort of the occupants, many buildings and space solutions require additional insulation. Most unwanted sounds can be eliminated by choosing solutions with perforated ceiling materials and wall panels with suitable parameters. Vecta Design offers seven perforated materials with different sound absorption properties, affected by perforation densities and perforation diameters.

To achieve the most effective result, we recommend using Vecta Design perforated ceilings, panels and modules with sound absorption sheet, which also acts as a thermal insulation material. We offer two types of sound absorption sheet with a density of 25 kg / m3: **30 mm** thick and **50 mm** thick.



*PERFORATED STRETCH CEILING (AURIGA) WITH ABSORPTION SHEET

Sound absorption rating according to ISO 11654
Weighted sound absorption coefficient αw = 0.90 (L)
Sound absorption class: A

Sound absorption rating according to ASTM C423:
Noise Reduction Coefficient NRC = 1.00
Sound Absorption Average SAA = 1.00

*PERFORATED STRETCH CEILING (AURIGA) WITHOUT ABSORPTION SHEET

Sound absorption rating according to ISO 11654
Weighted sound absorption coefficient αw = 0.45 (L)
Sound absorption class: D

Sound absorption rating according to ASTM C423:
Noise Reduction Coefficient NRC = 0.55
Sound Absorption Average SAA = 0.55

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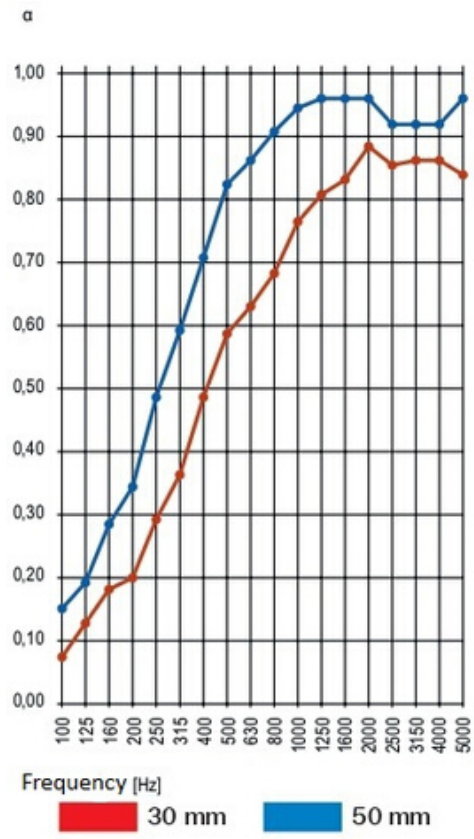
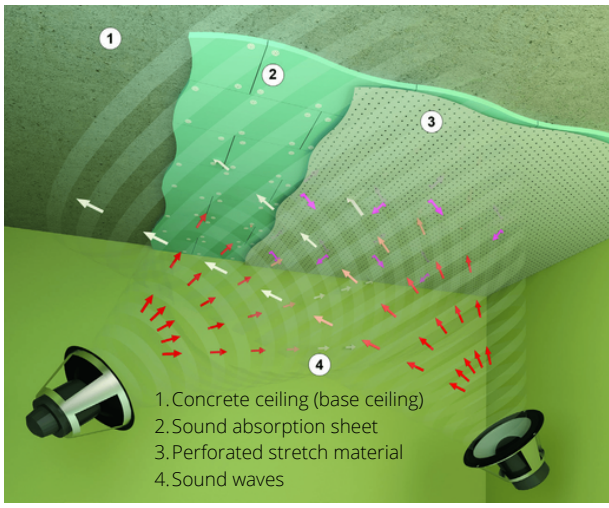
SOUND ABSORPTION SHEET





Perforated stretch material and sound absorption sheet do not contain any toxic substances and are safe for health to use. Our perforated interior design solutions for ceilings and walls are suitable for use in public spaces and private objects where it is important to reduce sound intensity, such as recreation area, libraries, classrooms, airports, hotels, museums, industrial premises, churches, concert halls, cinemas, nightclubs, restaurants, etc.

Figure 1. *Attenuation properties of two types (different measures) of sound absorption sheet*

The main parameter determining the sound absorption of insulation products is the sound absorption coefficient. The value of the coefficient can be 0-1, where "1" means that the sound is completely absorbed and "0" means that it is completely reflected. Sound absorption classes have been introduced in accordance with EN ISO 11654: 1999 to systematise sound-absorbing products. These classes are denoted by the letters A, B, C, D and E and are assigned to the products according to the measured sound absorption coefficients.

Sound absorption classes and corresponding factors are as follows:

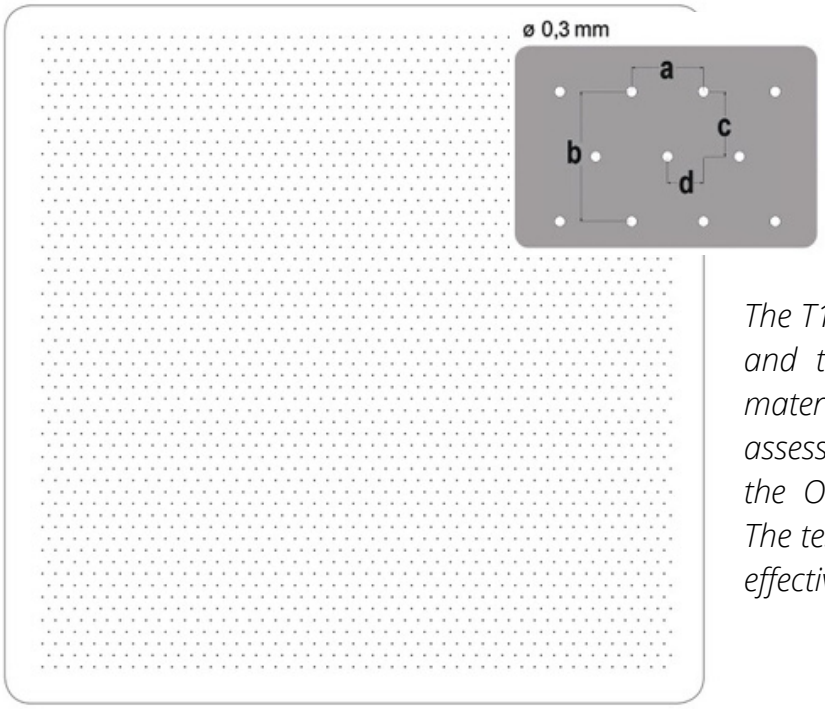
Frequency (Hz)	Factors
A	1,00; 0,95; 0,90
B	0,85; 0,80
C	0,75; 0,70; 0,65; 0,60
D	0,55; 0,50; 0,45; 0,40; 0,35; 0,30
E	0,25; 0,20; 0,15
unclassified products	0,10; 0,05; 0,00

Frequency [Hz]	Reverberation times, [S]		Sound absorption coefficient, α_s	Expanded uncertainty, U	Effective degrees of freedom	Coverage factor	Coverage probability [%]
	Empty room, T1	Room with sample T_2					
100	12,7	9,3 / 7,2	**0,07 / 0,15**	0,02 / 0,01	30 / 34	2,09 / 2,08	95,45
125	11,6	7,3 / 6,2	**0,12 / 0,19**	0,01 / 0,01	29 / 26	2,09 / 2,11	
160	11,6	6,4 / 5,1	**0,18 / 0,28**	0,01 / 0,02	33 / 23	2,08 / 2,11	
200	11,3	5,9 / 4,4	**0,20 / 0,34**	0,01 / 0,02	26 / 19	2,11 / 2,14	
250	11,1	4,8 / 3,5	**0,29 / 0,48**	0,02 / 0,03	19 / 18	2,14 / 2,16	
315	11,5	4,3 / 3,0	**0,36 / 0,59**	0,01 / 0,02	26 / 20	2,11 / 2,14	
400	10,4	3,4 / 2,6	**0,48 / 0,71**	0,02 / 0,03	20 / 18	2,14 / 2,15	
500	9,3	2,9 / 2,3	**0,58 / 0,83**	0,04 / 0,04	17 / 17	2,16 / 2,16	
630	9,1	2,7 / 2,2	**0,63 / 0,86**	0,02 / 0,03	18 / 17	2,16 / 2,16	
800	8,4	2,5 / 2,0	**0,68 / 0,91**	0,02 / 0,03	18 / 18	2,15 / 2,16	
1000	7,5	2,3 / 1,9	**0,77 / 0,94**	0,02 / 0,02	18 / 18	2,15 / 2,15	
1250	6,0	2,0 / 1,8	**0,81 / 0,96**	0,02 / 0,03	19 / 19	2,15 / 2,15	
1600	5,7	2,0 / 1,8	**0,83 / 0,96**	0,02 / 0,03	20 / 18	2,14 / 2,16	
2000	5,3	1,8 / 1,7	**0,88 / 0,96**	0,01 / 0,02	20 / 20	2,14 / 2,14	
2500	4,4	1,8 / 1,7	**0,85 / 0,92**	0,02 / 0,02	19 / 19	2,14 / 2,14	
3150	3,6	1,6 / 1,5	**0,86 / 0,92**	0,01 / 0,02	23 / 19	2,12 / 2,15	
4000	2,9	1,4 / 1,4	**0,86 / 0,92**	0,02 / 0,02	22 / 23	2,12 / 2,11	
5000	2,3	1,3 / 1,2	**0,83 / 0,96**	0,02 / 0,02	25 / 23	2,11 / 2,11	

VECTA design
STRETCH CEILING SYSTEMS

PERFORATIONS

MICROPERFORATION ORION



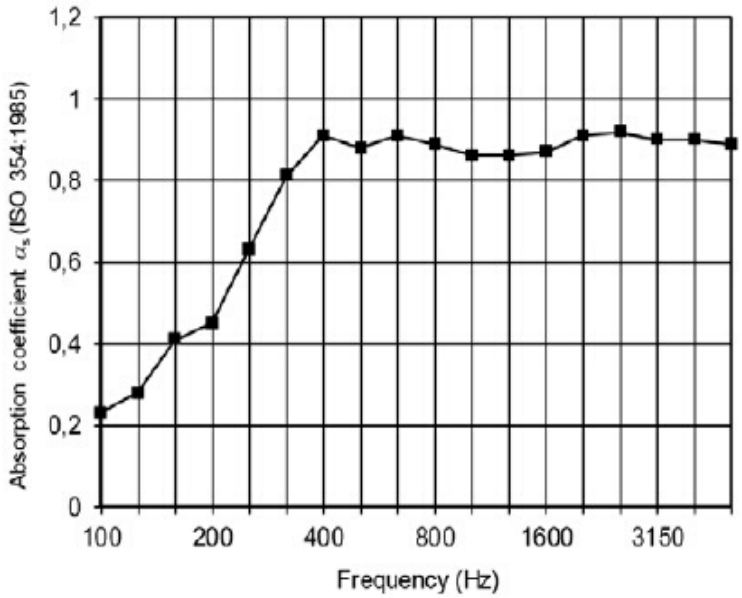
a - 2 mm
b - 3,6 mm
c - 1,8 mm
d - 1 mm
ø - 0,30 mm

Density of perforation: 290 000/m²
Hole diameter: 0,30 mm

The T1 test shows the results made in an empty room and the test T2 shows the results done with test material. As the noise level in the room increases, the assessment of sound absorption by the Orion microperforated material also improves. The test results show that the material performs most effectively at medium and high sound frequencies.

Over the years, Vecta Design has created a wide range of interior design solutions that improve acoustics in different health, sports and cultural facilities, which allows us to confidently recommend to our customers the Orion microperforated stretch ceiling.

The tests are performed with a combination of Orion perforated stretch material and 50 mm sound absorption sheet.



Frequency (Hz)	T_1 (s)	T_2 (s)	α_s
100	5,44	3,71	0,23
125	5,14	3,35	0,28
160	5,33	2,94	0,41
200	4,71	2,65	0,45
250	5,39	2,38	0,63
315	5,73	2,10	0,81
400	4,90	1,85	0,91
500	4,74	1,86	0,88
630	4,89	1,84	0,91
800	4,93	1,88	0,89
1000	5,06	1,94	0,86
1250	4,80	1,89	0,86
1600	4,30	1,80	0,87
2000	3,94	1,69	0,91
2500	3,56	1,61	0,92
3150	3,07	1,52	0,90
4000	2,61	1,40	0,90
5000	2,13	1,26	0,89

Frequency (Hz)	Reference curve	α_p
125		0,30
250	0,70	0,65
500	0,90	0,90
1000	0,90	0,85
2000	0,90	0,90
4000	0,80	0,90

Weighted absorption coefficient, α_w : 0,9

Sound absorption class: A

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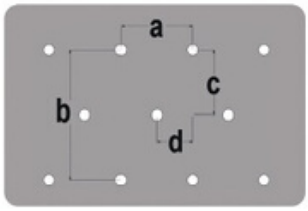
PERFORATIONS

MICROPERFORATION AURIGA



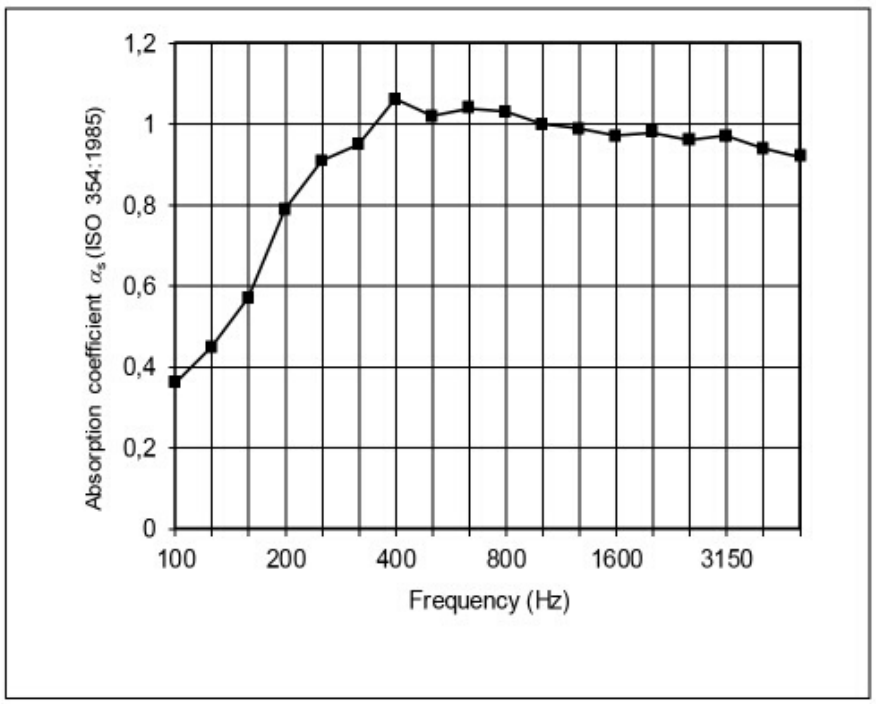
a - 2 mm
b - 4 mm
c - 2 mm
d - 1 mm
ø - 0,1 mm

Density of perforation: 250 000/m²
Hole diameter: 0,1 mm

The T1 test shows the results made in an empty room and the test T2 shows the results done with test material. As the noise level in the room increases, the assessment of sound absorption by the Auriga microperforated material also improves. The test results show that the material performs most effectively at medium and high sound frequencies.

Frequency (Hz)	T_1 (s)	T_2 (s)	α_S
100	5,44	3,71	0,23
125	5,14	3,35	0,28
160	5,33	2,94	0,41
200	4,71	2,65	0,45
250	5,39	2,38	0,63
315	5,73	2,10	0,81
400	4,90	1,85	0,91
500	4,74	1,86	0,88
630	4,89	1,84	0,91
800	4,93	1,88	0,89
1000	5,06	1,94	0,86
1250	4,80	1,89	0,86
1600	4,30	1,80	0,87
2000	3,94	1,69	0,91
2500	3,56	1,61	0,92
3150	3,07	1,52	0,90
4000	2,61	1,40	0,90
5000	2,13	1,26	0,89

The tests have been performed with a combination of Auriga perforated tension material and 50 mm acoustic wool.



Frequency (Hz)	Reference curve	α_P
125		0,45
250	0,80	0,90
500	1,00	1,05
1000	1,00	1,00
2000	1,00	0,95
4000	0,90	0,95

Weighted absorption coefficient, α_W : 1

Sound absorption class: A

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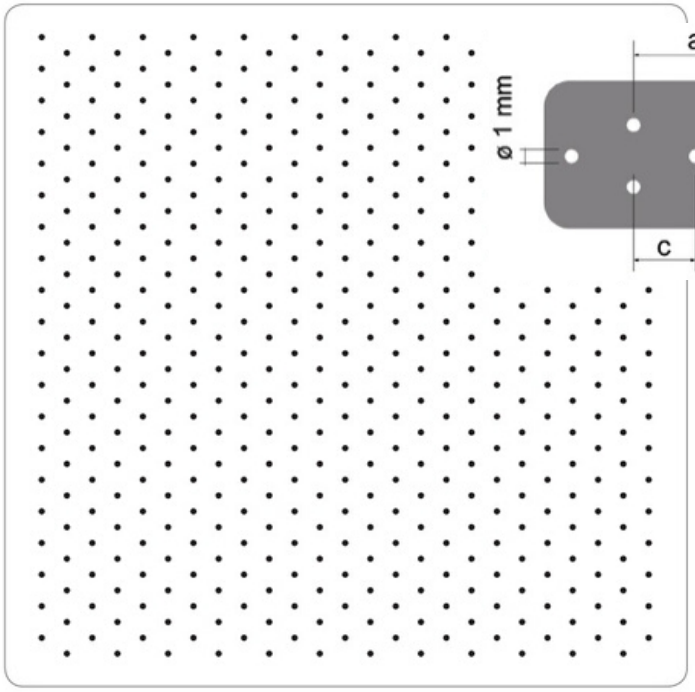
PERFORATIONS

MACROPERFORATION CETUS



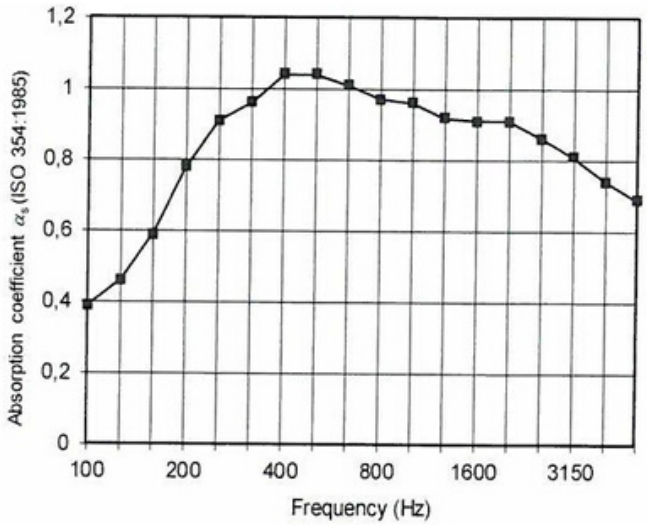
Density of perforation: 52 000/m²

a - 8 mm
b - 5 mm
c - 4 mm
d - 2,5 mm
ø - 1 mm

Hole diameter: 1 mm

The larger the hole diameter of the material, the better the sound absorption properties of the created solution. In rooms with high ceilings, eg public buildings, where the echo effect is higher due to construction features and the acoustic comfort of the room users may be disturbed, we recommend installing test-approved, effective products made of macroperforated stretch material (wall panels and ceiling modules). Examples of such premises are: concert and sports halls, museums, exhibition halls, cultural buildings, as well as office and study buildings, etc. The test results show that Cetus perforated stretch material works most effectively at medium and high sound frequencies.

The tests have been performed with a combined solution of Cetus perforated tension material and 80 mm sound absorption sheet.



Frequency (Hz)	Reference curve	α_p
125		0,50
250	0,70	0,90
500	0,90	1,05
1000	0,90	0,95
2000	0,90	0,90
4000	0,80	0,75

Weighted absorption coefficient, α_w : 0,9

Sound absorption class: A

Frequency (Hz)	T_1 (s)	T_2 (s)	α_s
100	5,44	3,03	0,39
125	5,14	2,73	0,46
160	5,33	2,46	0,59
200	4,71	2,00	0,78
250	5,39	1,91	0,91
315	5,73	1,88	0,96
400	4,90	1,69	1,04
500	4,74	1,68	1,04
630	4,89	1,73	1,01
800	4,93	1,78	0,97
1000	5,06	1,81	0,96
1250	4,80	1,82	0,92
1600	4,30	1,75	0,91
2000	3,94	1,69	0,91
2500	3,56	1,67	0,86
3150	3,07	1,60	0,81
4000	2,61	1,52	0,74
5000	2,13	1,38	0,69

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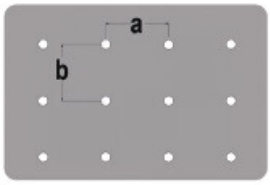
PERFORATIONS

MICROPERFORATION VOLANS PREMIUM



a - 1,8 mm
b - 1,8 mm
ø - 0,15 mm

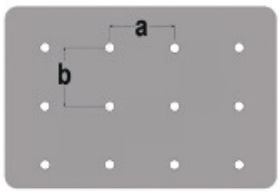
Density of perforation: 300 000/m²
Hole diameter: 0,15 mm

If all floors, ceilings and walls have a smooth and hard surface that does not absorb sound, the sounds are easily reflected from them, spread in the room and increase the overall noise level. The echo effect, which would otherwise spread in all directions is well reduced by the microperforated stretch material design solutions in the interior, which have a smooth overall appearance.
High-density micro-perforated material, converts sound energy into heat energy, thus reducing the echo effect. The effectiveness of Volans and Volans Premium perforations is comparable to Auriga perforation.

Due to the small diameter of holes, the material is especially suitable for use in rooms with lower ceilings, such as offices, some private houses, but also rooms in educational institutions, entertainment establishments, recreation areas and other places where people tend to communicate intensely and many different activities are carried out through the day.

MICROPERFORATION VOLANS

The optimal size of a perforated ceiling to be installed in one piece is 40-50 m2 to ensure that the ceiling material does not penetrate. However, if the ceiling to be installed contains many cut-outs, it is also possible to make larger perforated ceilings, as there are more places attached to the ceiling. Thus, the size of the maximum perforated ceiling depends on the specific project.



a - 1,8 mm
b - 1,8 mm
ø - 0,1 mm

Density of perforation: 300 000/m²
Hole diameter: 0,1 mm

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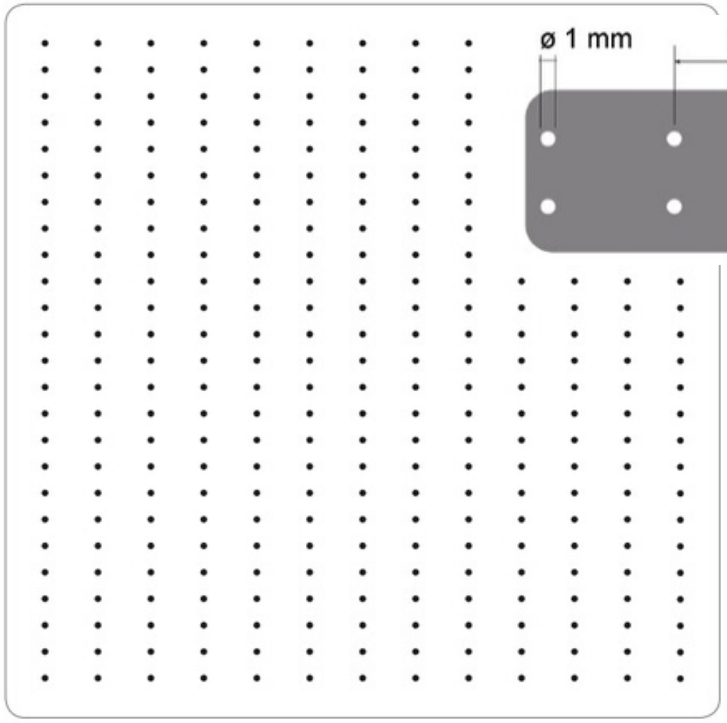
PERFORATIONS

MACROPERFORATION **CRATER**

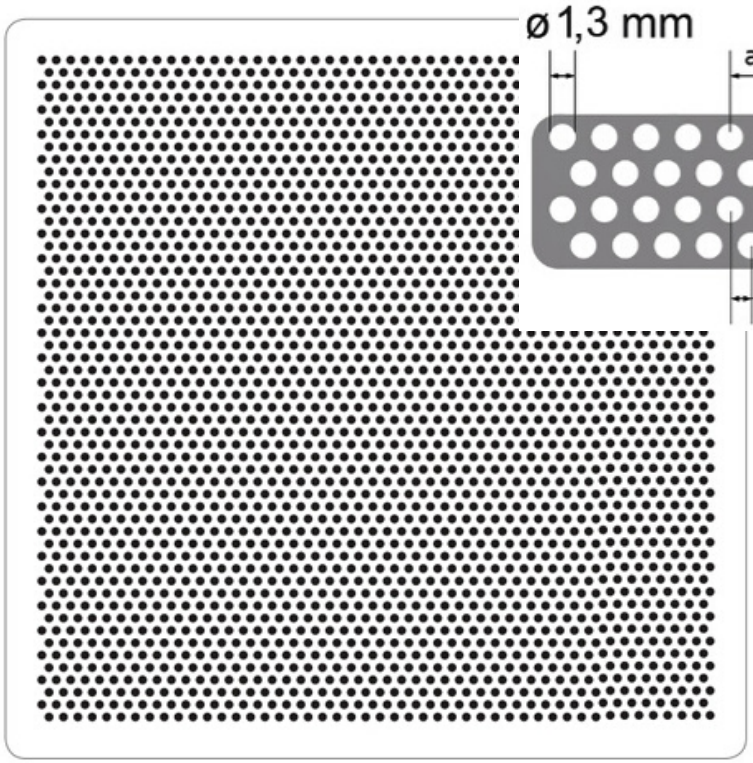


a - 8 mm
b - 4 mm
ø - 1 mm

Density of perforation: 32 500/m²
Hole diameter: 1 mm

As an acoustic material, both Crater and Libra offer designs with very good sound absorption properties, both as wall and ceiling-mounted panels, modules and complete ceiling solutions. The ***perforated material improves the acoustics of each room****, but the macroperforated tension material is especially suitable for rooms with a lot of direct sound, such as cinemas, playrooms, educational institutions, theaters and concert halls, shopping malls, airports, etc. The tension material provides an opportunity to combine the materials with different effects, which results in unique interior design solutions.*

MACROPERFORATION **LIBRA**



a - 2,1 mm
b - 3,63 mm
c - 1,82 mm
d - 1,05 mm
ø - 1,3 mm

Density of perforation: 254 000/m²
Hole diameter: 1,3 mm

An important advantage of ***high-quality*** *and* ***certified stretch material*** *as an acoustic improving solution is its* ***technical flexibility*** *and suitability for use in both* ***dry and wet rooms*** *(spas, bathrooms). The environmental friendliness of acoustic stretch materials lies in their* ***longevity*** *and the possibility of material* ***recycling*** *after being used.*

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WHERE THESE SOLUTIONS FIT?

Radisson hotel in Sweden

Hotels, showrooms, libraries, concert halls, theaters, art galleries, opera houses, cinemas, classrooms, seminar and meeting rooms, offices

Hilton hotel in Tallinn

SPAs, swimming pool rooms, shower rooms, fitness and health centers, recreation areas, shopping centers, medical institutions, exhibition centers

Thule Koda in Estonia

Restaurants, lounges, cafes, studios, cultural institutions, private houses, playrooms, shops, beauty salons, airports, bus stations

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