VECTA design

STRETCH CEILING SYSTEMS

ACOUSTIC SOLUTIONS PERFORATED STRETCH MATERIAL

Maximize great first impressions and everyday comfortability

sound absorption

flame-retardant

fade resistant

UV protection

water-resistant

tear strength

antibacterial

easy maintenance

STUDIES SHOW THAT OPTIMIZED ROOM ACOUSTICS

improves our daily well-being and raises the ability to concentrate and work

Vecta Design LTD
Pärlimõisa tee 20, Pärnu
80010 Eesti
Landline: +372 (44) 23 023
Mobile: +372 53 002 424

e-mail: info@vectadesign.com
www.vectadesign.com
Skype: vecta-design
Facebook: Vecta Design
LinkedIn: Vecta Design

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 perforation patterns 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

sound eco

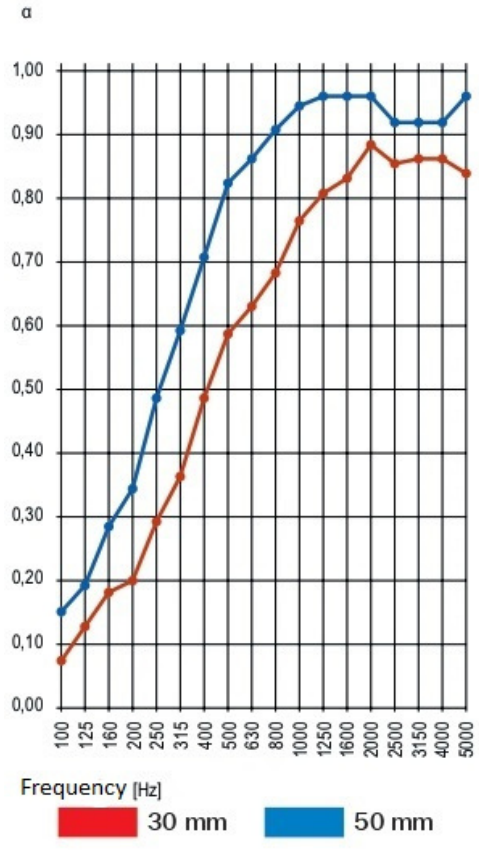
Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

80010 Eesti
skype: vecta-design
FB: Vecta Design

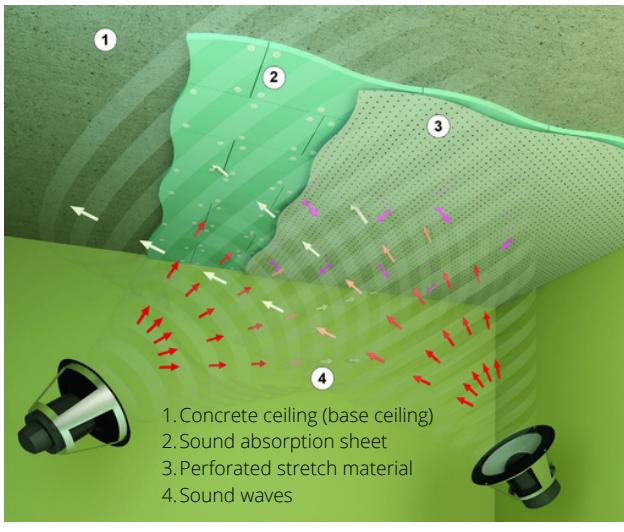
SOUND ABSORPTION SHEET

VECTA STRETCH CEILING SYSTEMS design



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*



Sound absorption classes and corresponding factors are as follows:

sound absorption class	coefficient
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

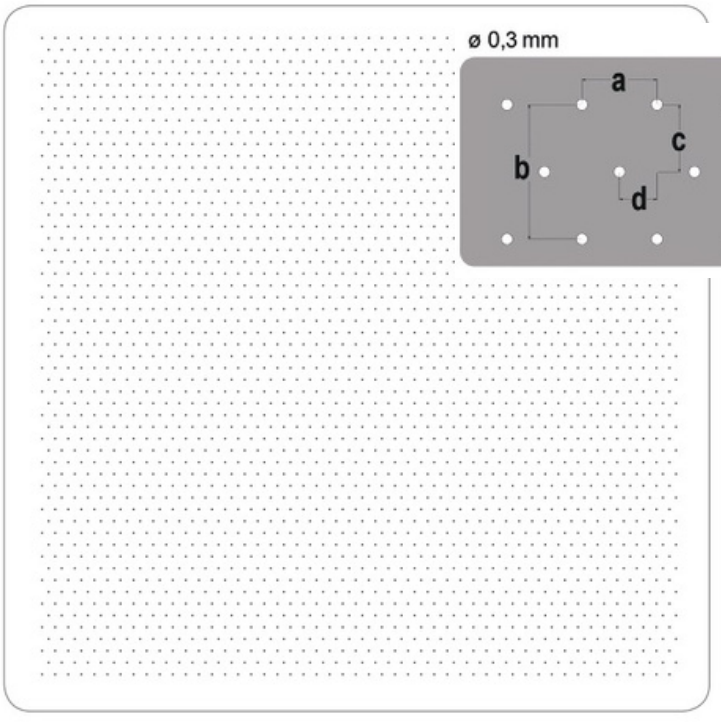
The main parameter determining the sound absorption of insulation products is the sound absorption coefficient. The value of the coefficient can be 0-1, where "1" means that the sound is completely absorbed and "0" means that it is completely reflected. Sound absorption classes have been introduced in 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.

| 100 + colors available on stock | up to 100% acoustic absorption | flexibility & creativity

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	

PERFORATIONS

MICROPERFORATION ORION



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

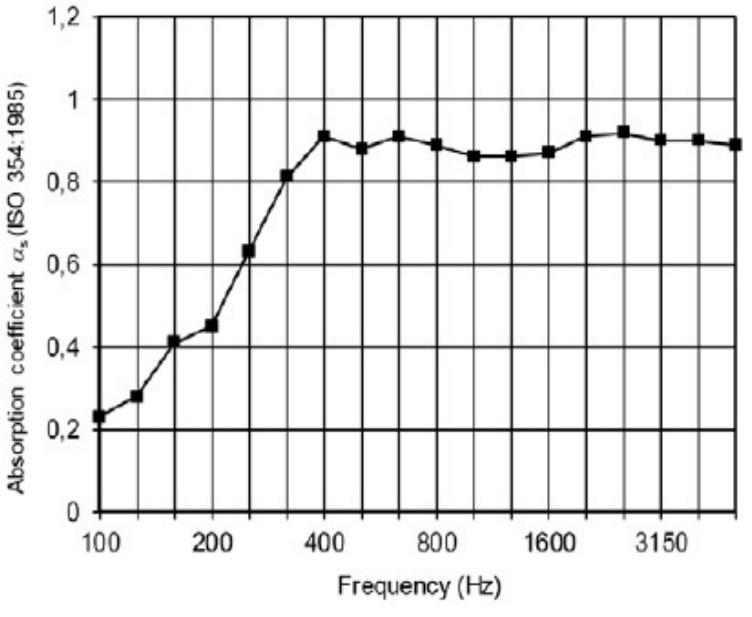
Density of perforation:
290 000/m2
Hole diameter: 0,30 mm

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.

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



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

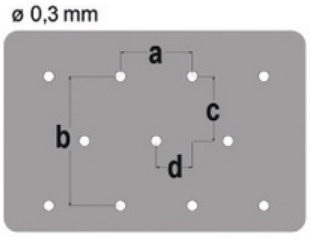
Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

80010 Eesti
skype: vecta-design
FB: Vecta Design

Perforations

Microperforation ORION



Areas and surfaces that cause poor acoustics:

- Hard surfaces, like glass walls, wood or concrete floor or ceiling, white boards, and large screens
- High traffic areas with a lot of ambient noise

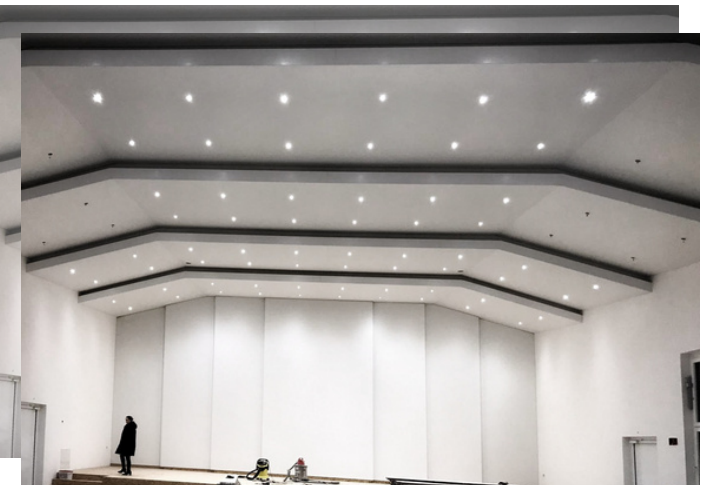
Projects done with this perforation

Installer: Vecta Design
an object: Transferwise office

Seminar and meeting rooms (offices)

***Material**: microperforated translucent T403 White*
***profile**: AL 22, AL 27*
Sound absorption sheet: 50mm
LED modules:

For customized and functional design the acoustic qualities can be combined with led modules. In a meeting room acoustics can make or break an important conference call or video conference. If your employees and clients can't hear or understand each other, it can be difficult to get business done. Sound absorption products such as perforated stretch ceiling and wall solutions, trap the noise bouncing around your conference room and prevent it from creating echoes and reverberations that make speech difficult to hear and understand.



Installer: Diewert Busse GmbH & Co. KG
an object: a church in Minden

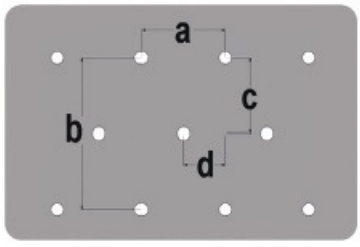
In a church and concert halls

***Material** being used: Orion S 20-701 Neige premium*
***Profile** being used: AL 26, AL 27 and AL 03*
***For walls profiles** being used: AL25W*
***Lighting fixtures**:*

Most of the churches are multi-used facilities and long reverberation time as well as problems with echo must be managed. Echoes can be great fun in a desert canyon but are universally problematic in church acoustics therefore it is especially important to avoid hard and reflective surfaces in church interior. Installing acoustic materials into the room to absorb echoes also acts to reduce the reverberation. Two benefits for the price of one. A good reverb. time in a church should be around 1.25 to 1.5 seconds. *Sound absorbing acoustic panels work especially well for* the high frequency range.

PERFORATIONS

MICROPERFORATION AURIGA

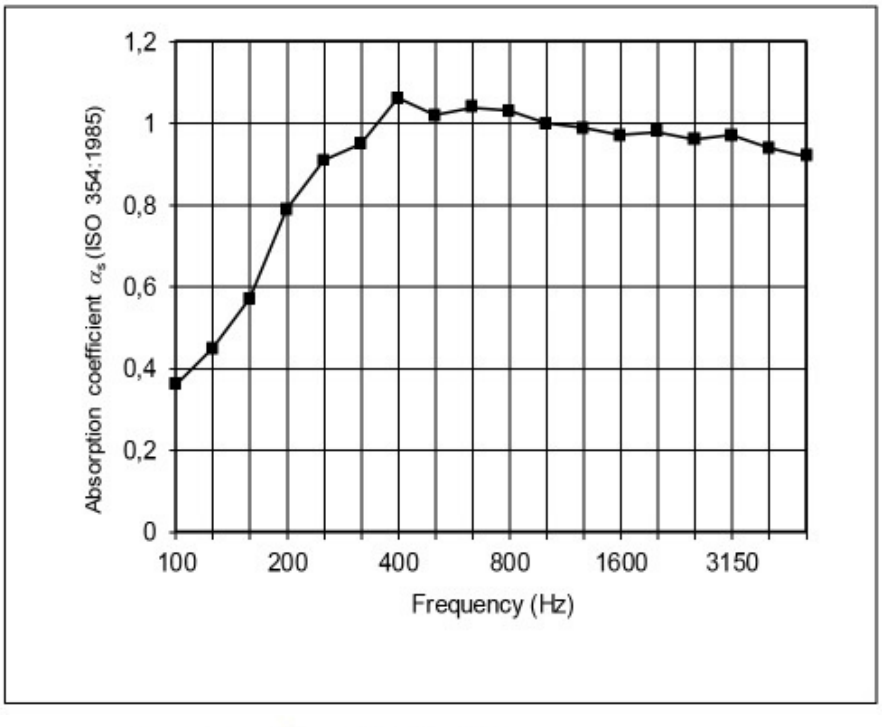


a - 2 mm
b - 4 mm
c - 2 mm
d - 1 mm
O - 0,1 mm

Density of perforation:
275 000/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.

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



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		0,45
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

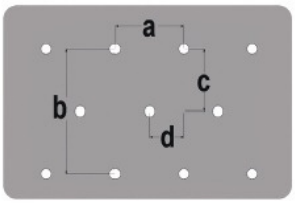
Weighted absorption coefficient, α_w : 1

Sound absorption class: A

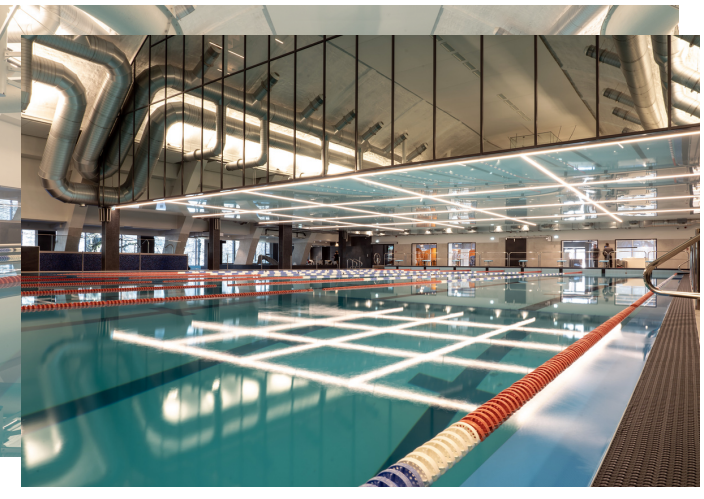
Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com
Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com
80010 Eesti
skype: vecta-design
FB: Vecta Design

PERFORATIONS

MICROPERFORATION AURIGA



Higher ceilings increase volume in a room meaning sound is lost in the 'dead space' above our heads. They also result in higher reverberation times as sound waves have to travel a long way before they are reflected by a hard surface. Both of these reasons combined mean that high ceilings are bad for room acoustics.

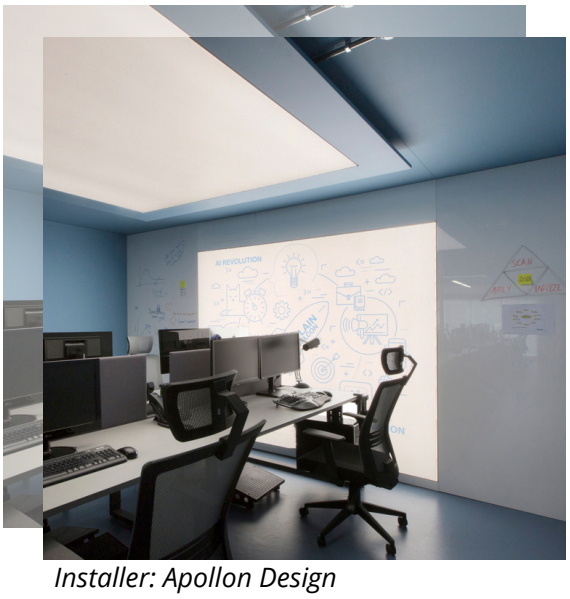


Installer: Vecta Design an object: Kalev Spa

Swimming halls and spas

***Material** being used: microperforated Blanc Premium and Alpine White, ANTIbacterial and antifungal biopruf material.*
***profile** being used: cornice AL 25, for light lines AL 23 and AL 22*
***Lighting**: special LED elements for high humidity rooms*

The goal with the soundproofing treatment in swimming pool room is to improve the sound quality by lowering the level of ambient echo. By reducing the background noise, we produce a more user-friendly swimming environment. This is accomplished by installing custom made sound-absorbing stretch ceiling and wall panels, combined with absorption sheet, that can effectively capture unwanted echoes in the room. Acoustic panels can be wall or ceiling mounted and created in different shapes, colors and types. Studies have shown that adding absorbents (such as perforated stretch material), lowering the ceiling height (easily achievable with our ceiling installing support system) and creating one tilted wall helps to improve swimming hall acoustics in significant way.



Installer: Apollon Design
an object: Xplain Offices

Educational rooms (from pre-school to university)

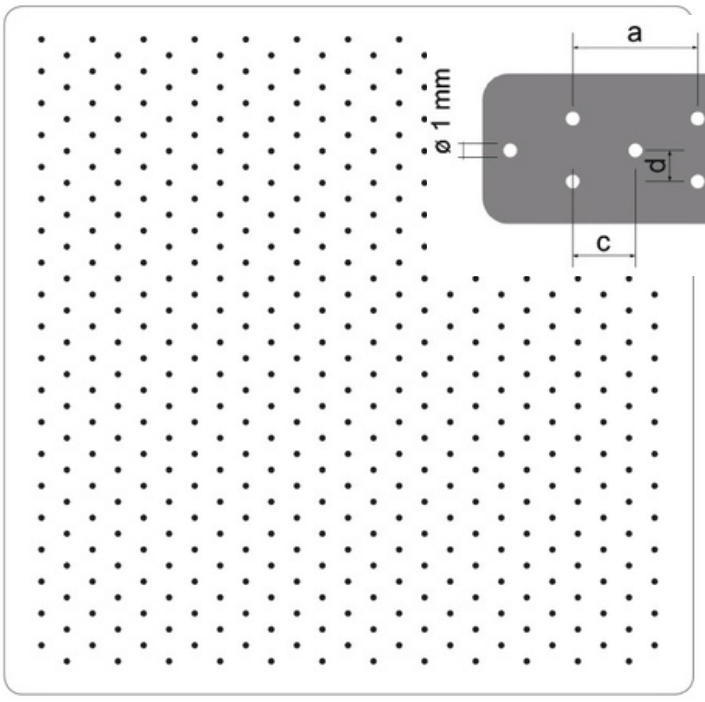
***Material** being used: microperforated translucent T402 Crystal, printed lacquered Blanc Super*
***profile** being used: AL 25*

If a classroom contains high or persistent levels of background noise, the learning environment is severely compromised. Classrooms generally contain a lot of hard surfaces: cabinets, desks, walls, whiteboards and chalkboards, windows and even tile floors. These hard surfaces reflect nearly all of the sound that bounces off of them, and they reflect that sound back into the room and into the ears of the students and teacher. Soundproofing a room keeps noise from escaping and bleeding into surrounding spaces. Adding acoustic panels to the ceilings and walls can completely transform the acoustic characteristics of a classroom. There are different design options - we can print on the perforated material some formulas, smart quotes, or child-friendly content and visuals. A dual-purpose sound-reducing acoustic treatment which is also fire-rated.

Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com
Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com
80010 Eesti
skype: vecta-design
FB: Vecta Design

PERFORATIONS

MACROPERFORATION CETUS

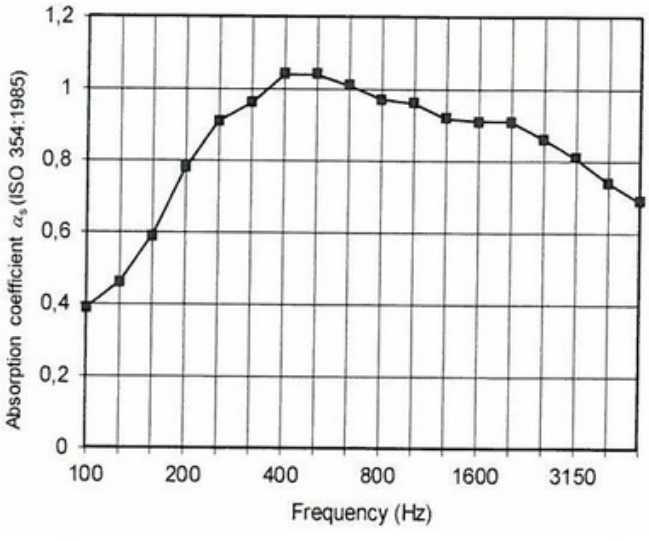


a - 8 mm
b - 5 mm
c - 4 mm
d - 2,5 mm
O - 1 mm

Density of perforation:
52 000/m2
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

Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

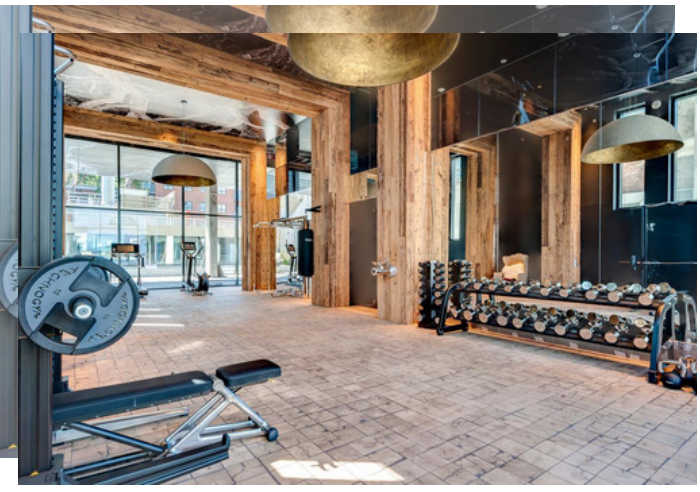
80010 Eesti
skype: vecta-design
FB: Vecta Design

PERFORATIONS

MACROPERFORATION CETUS

A style-friendly way to improve acoustics...

is done with perforated stretch material. In combination with our support system adjusting the height of a ceiling evenly is an easy and effortless task. Covering the opposite walls and high ceiling with absorptive material and using proper shapes in the interior design (not rounded) will help to reduce echoes.

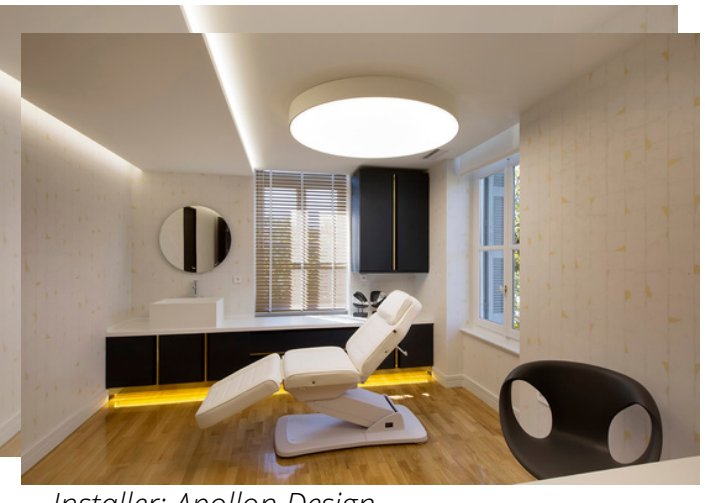


Installer: LHV Design
object: gym

Gyms and fitness centers

***Material** being used: printed black glossy lacquer Noir*
***Profile**: AL 25 for creating multi-level interior and adding ambient decorative light elements to the room*

The use of acoustic materials reduces the room's echoing and noise during the exercise machines operation or during sports events (group classes, etc.) All this favorably influences the quality and the result of sports activities.
The recommended reverberation time for the gym is 1-2 seconds and the maximum permissible level of the noise penetrating into a gym as per the CR "Noise Protection" is 45 dBA.



Installer: Apollon Design
object: Vivify, Kifisia

Healthcare rooms and clinics

***Material** being used: translucent T403*
***Profile** being used: AL 22 as a rounded lamp and AL 22 for creating decorative light lines*

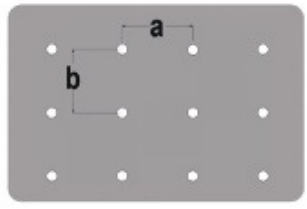
A good acoustic environment is a key element in such a busy places like hospitals and clinics. Besides human sounds, machines produce also many noise. The staff needs to detect and analyze different sounds such as alarm sounds of machines and ring sounds of patients (clients). Flawless and comfortable communication also needs great sound absorption qualities of the space - acoustic wall and ceiling panels will improve the acoustic and solve the noise problem.
Besides stretch ceiling keeps the air cleaner because "bacterial nutrients" cannot mount on the ceiling, because it is antistatic.

EMISSIONS FROM THE CEILING INTO INDOOR AIR A+ A+ A B C

sound eco

PERFORATIONS

MICROPERFORATION VOLANS PREMIUM



a - 1,8 mm
b - 1,8 mm
O - 0,15 mm

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

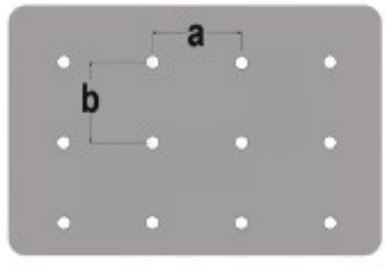
If all floors, ceilings and walls have a smooth and hard surface that does not absorb sound, the sounds are easily reflected from them, spread in the room and increase the overall noise level. The echo effect, which would othervise spread in all directions is well reduced by the microperforated stretch 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
O - 0,1 mm

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

sound eco

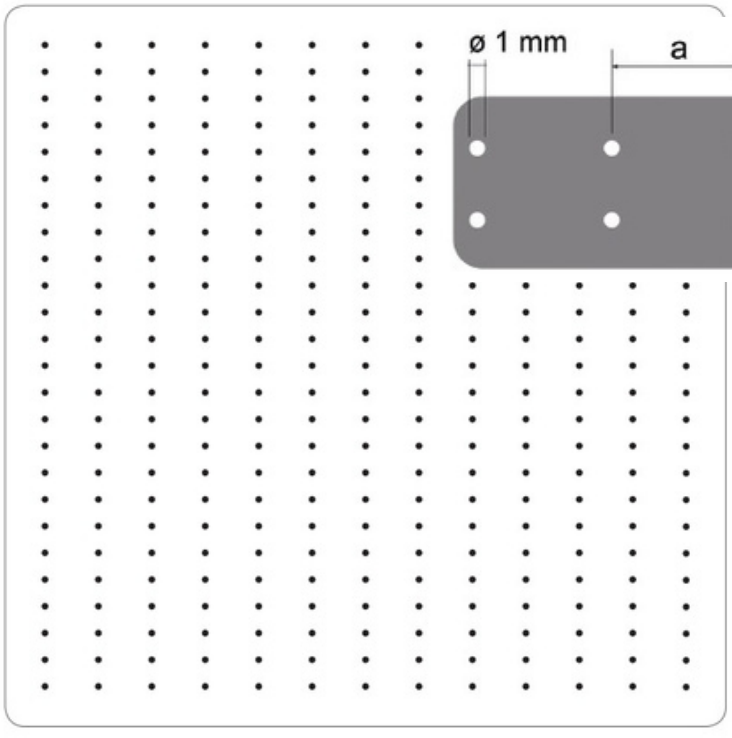
Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

80010 Eesti
skype: vecta-design
FB: Vecta Design

PERFORATIONS

MACROPERFORATION CRATER

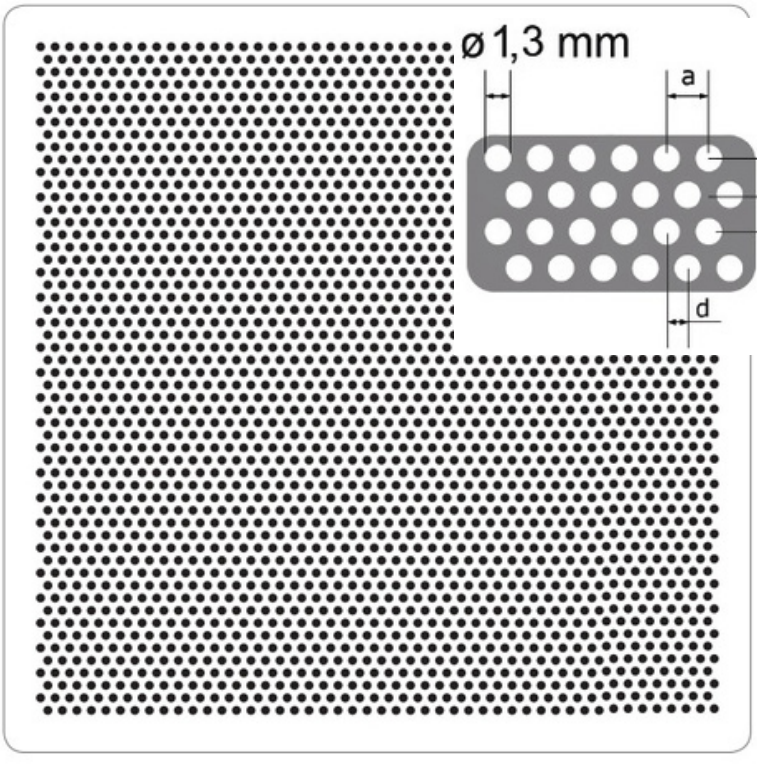


a - 8 mm
b - 4 mm
O - 1 mm

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
O - 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.*

Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

80010 Eesti
skype: vecta-design
FB: Vecta Design

VECTA STRETCH CEILING SYSTEMS design

ACOUSTICS AS AN INTEGRAL PART OF ANY INTERIOR DESIGN

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

Hunter restaurant in New York

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

sound eco

Vecta Design LTD
Phone +372-(44)-23-023
info@vectadesign.com

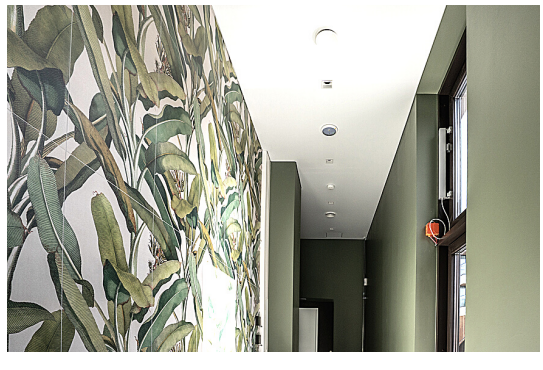
Pärlimõisa tee 20, Pärnu
Fax: +372-(43)-70-339
www.vectadesign.com

80010 Eesti
skype: vecta-design
FB: Vecta Design

Different installing possibilities

Horizontal and vertical wall panels and ceiling modules

Acoustic stretch ceilings



Acoustic walls

Printed acoustic solutions

Special shaped
acoustic solutions

WARRANTY
10
YEARS

PRODUCED
IN ESTONIA

TAILOR-MADE
DESIGN

150 - 200cm

VECTA design

STRETCH CEILING SYSTEMS

VECTA DESIGN LTD

Pärlimõisa tee 20, Pärnu 80010
Eesti

Telefon: +372 - (44) - 23 - 023
+372 - 53 - 002 - 424

info@vectadesign.com
www.vectadesign.com
skype: vecta-design

THIS IS HOW YOU ENJOY THE SILENCE