

Perforations

Intelligent sound control

HOW TO CHOOSE THE RIGHT PERFORATION ?

Metal ceilings combine smart soundproofing with an attractive indoor environment. Armstrong Metal Perforations offer a wide range of design options and effective acoustic comfort.

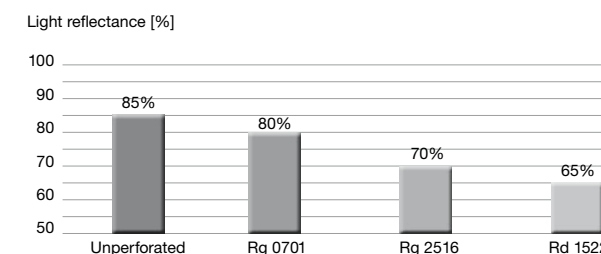
Reverberation time

It's important to optimise a room's reverberation time, according to how it is used – the reverberation depends on the available space and total absorption.

Sound absorption

One of the key functions of a metal ceiling is to create a pleasant atmosphere enhanced by intelligent noise abatement. Armstrong perforations offer a vast spectrum of aesthetic solutions for effective acoustic comfort. Depending on the intended purpose of a room, reverberation times will need to be optimised as well. This parameter depends on the total absorption capacity of the room. Airborne sound absorption is based on the conversion of sound energy into heat by friction processes which take place in absorbing materials and systems.

Perforation and light reflectance



Comparative measurements with coated white RAL 9010 ceiling tiles.
Measured in accordance with EN ISO 7742-2 & EN ISO 7742-3

The brighter the ceiling surface, the better the light reflectance. Thus a surface with fewer perforations has a higher light reflectance.
For example, the Ultra Microperforation Rg 0501, with just a 0.64% perforation level, reflects significantly more light than other variants.

Armstrong perforation description

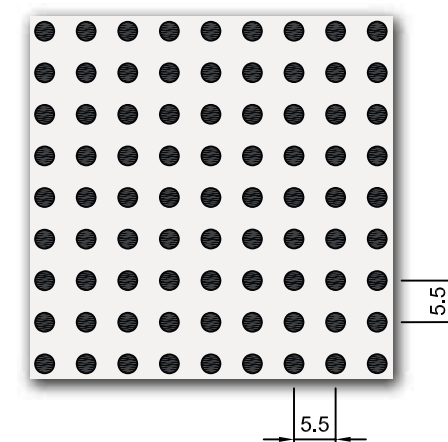
The following product prefixes describe the shape and arrangement of perforations:

- Rd** = Round perforations, diagonal
- Rg** = Round perforations, square pitch
- Rv** = Round perforations, straight
- Qg** = Square perforations, square pitch
- Qd** = Square perforations, diagonal
- Lg** = Slotted perforations, square pitch
- Lv** = Slotted perforations, straight
- Tv** = Diamond perforations, straight

The numbers define the perforation size and free area. The first two, and occasionally three, numbers denote the hole diameter in tenths of millimetres and the last two digits the proportion of free cross-sectional area.

Example: Rg 2516

- Round perforation, square pitch
- Hole diameter: 2.5 mm
- Free area: 16%



Manufacturing accreditation

In our manufacturing operations, not only do we continue to take care in the selection of raw materials and energy, reduce waste and embrace effective recycling methods, but we also ensure that our products conform to safety, environmental and quality standards.

Our European manufacturing plants are certified to:

ISO 9001:2008
ISO 14001:2004
OHSAS 18001:2007

Memberships and associations

Armstrong is a member of TAIM (Technical Association of Industrial Metal Ceilings).

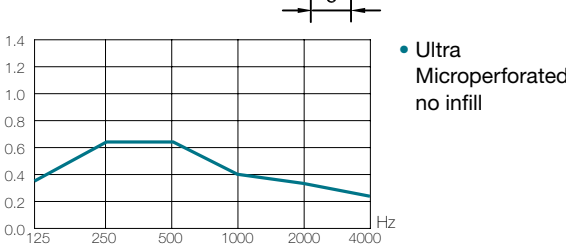
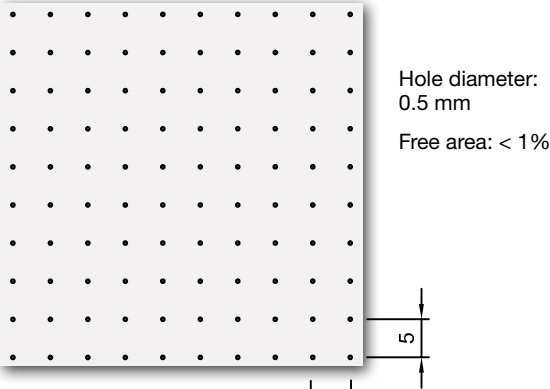
TAIM was founded in 1988 and its primary objective is to promote quality and to set minimum quality standards and requirements for metal ceilings systems.



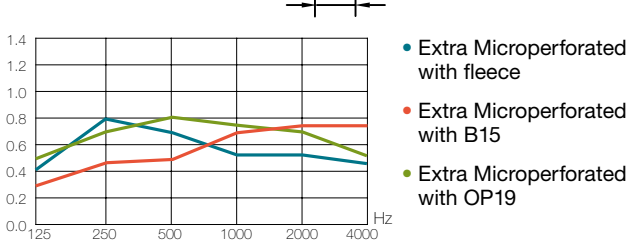
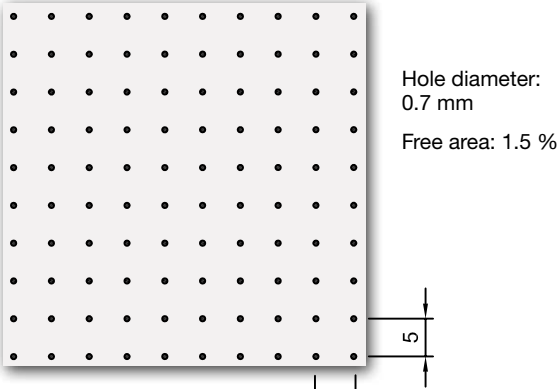
STANDARD PERFORATIONS

Armstrong has a wide range of standard perforation products, with special variants also available. Since the maximum continuity and perforation can vary according to the tool, not all perforations are available in all widths. For further details, please contact us.

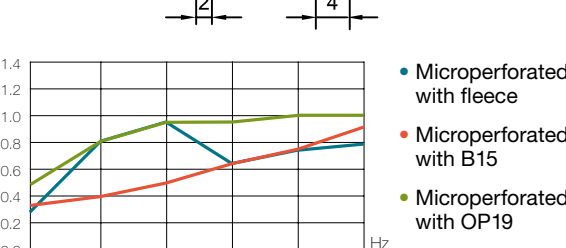
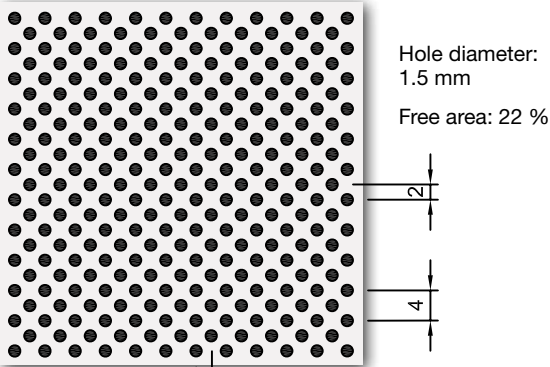
Ultra Microperforation - Rg 0501



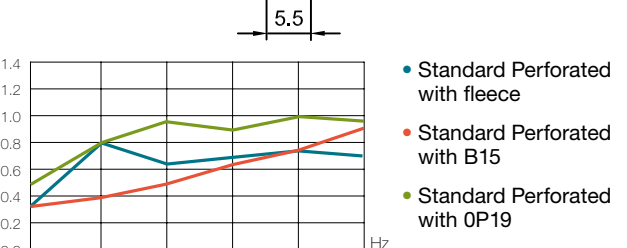
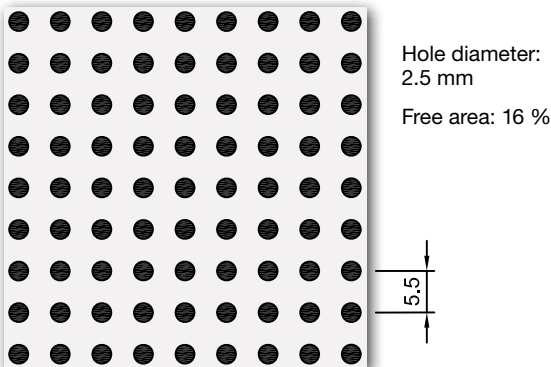
Extra Microperforation - Rg 0701



Micro Perforation - Rd 1522



Standard Perforation - Rg 2516



Sound absorption											Sound attenuation		Sound reduction	
αw	NRC	125	250	500	1000	2000	4000	Hz	Abs Class	Cert N°	Dncw	Cert N°	Rw	Cert N°

Ultra Microperforated - no infill														
• 0.40(LM)	0.55	0.35	0.65	0.65	0.40	0.35	0.25	α_p	D	2252	18 dB	3844-98-1	-	-

Extra Microperforated with fleece														
• 0.55(L)	0.65	0.40	0.80	0.70	0.55	0.55	0.45	α_p	D	2253	30 dB	2432	-	-

Extra Microperforated with B15														
• 0.65	0.60	0.30	0.45	0.50	0.70	0.75	0.75	α_p	C	2334	40 dB	2427	-	-

Extra Microperforated with OP19														
• 0.70	0.75	0.50	0.70	0.80	0.75	0.70	0.50	α_p	C	6714a	31 dB	6720a	15 dB	6725a

Microperforated with fleece														
• 0.75	0.80	0.30	0.80	0.95	0.65	0.75	0.80	α_p	C	2175	20 dB	2437	6 dB	5939

Microperforated with B15														
• 0.60(H)	0.60	0.35	0.40	0.50	0.65	0.75	0.90	α_p	C	2337	41 dB	2443	18 dB	5941

Microperforated with OP19														
• 1.00	0.90	0.50	0.80	0.95	0.95	1.00	1.00	α_p	A	6713a	27 dB	6719a	12 dB	6724a

Standard Perforated with fleece														
• 0.75	0.75	0.35	0.80	0.65	0.70	0.75	0.70	α_p	C	141401	20 dB	2437*	6 dB	5939*

Standard Perforated with B15														
• 0.60(H)	0.60	0.35	0.40	0.50	0.65	0.75	0.90	α_p	C	2340	41 dB	2443*	18 dB	5941*

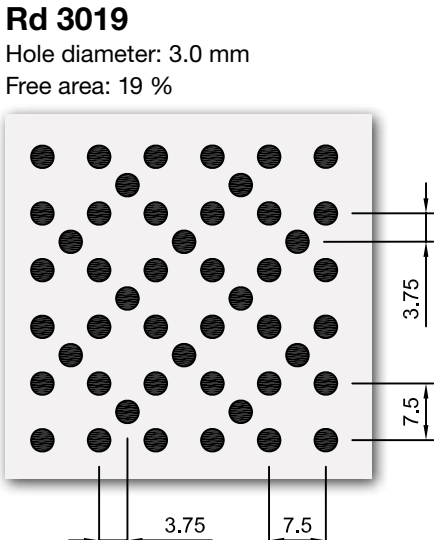
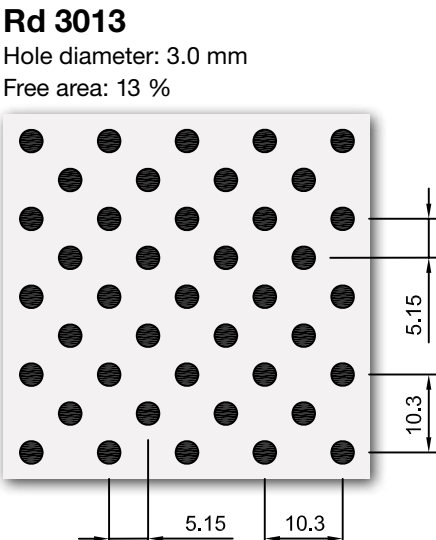
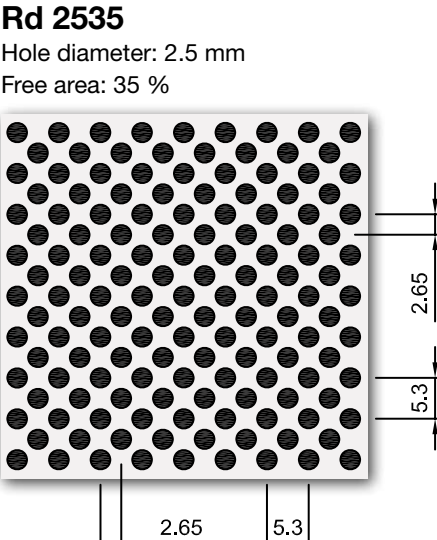
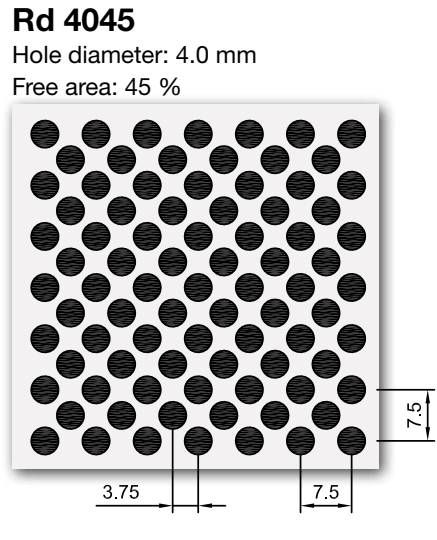
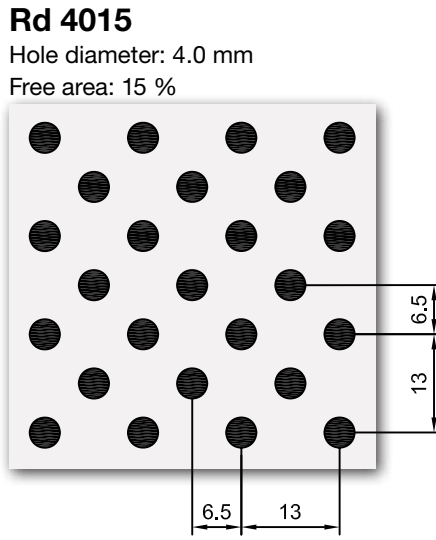
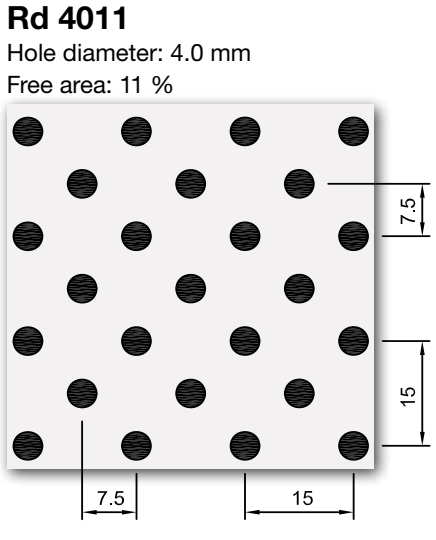
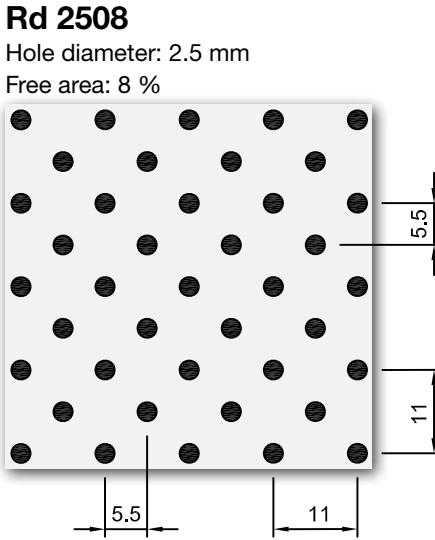
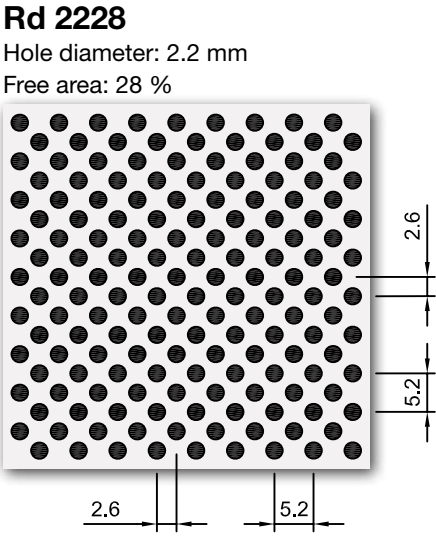
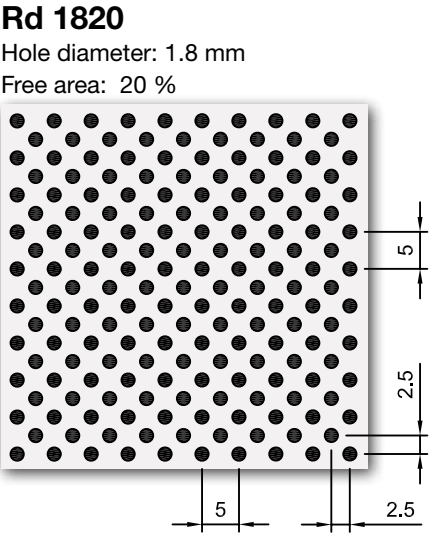
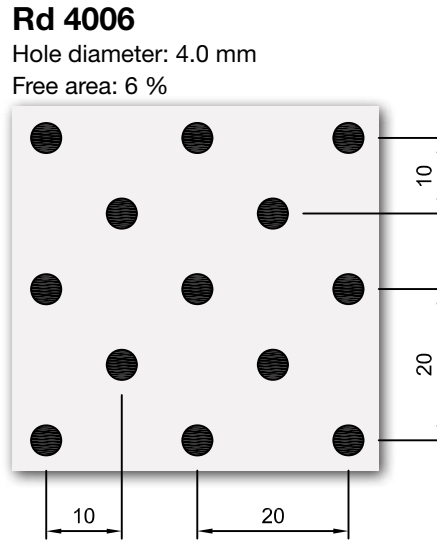
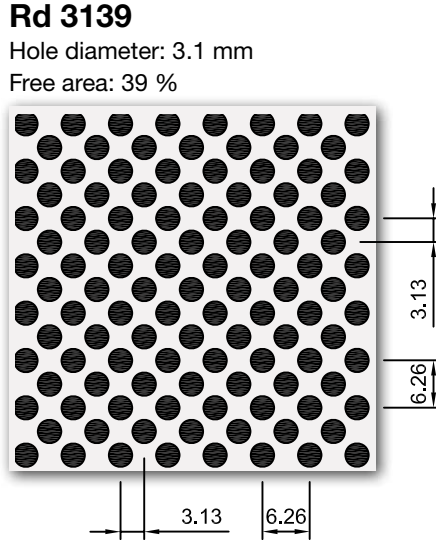
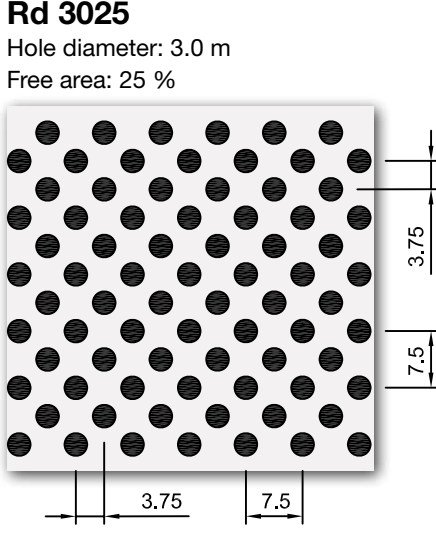
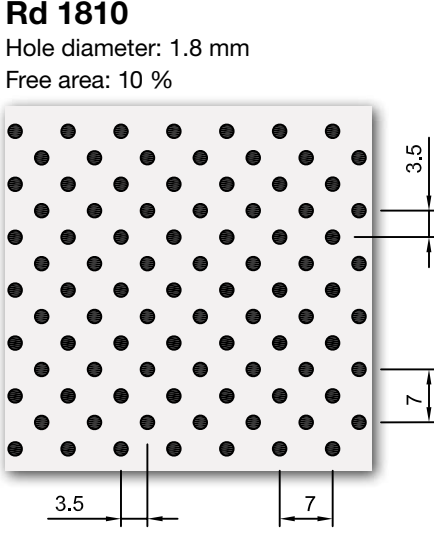
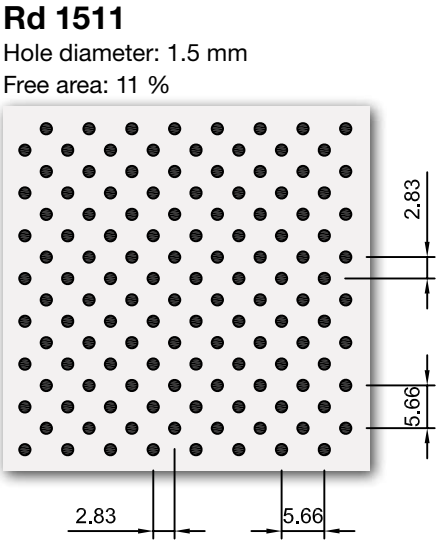
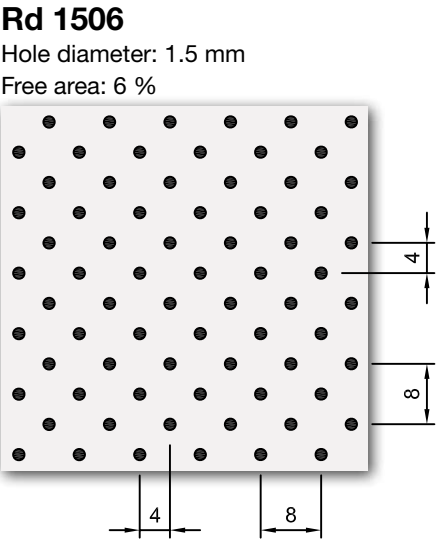
Standard Perforated with OP19														
• 0.95	0.90	0.50	0.80	0.95	0.90	1.00	0.95	α_p	A	6715a	28 dB	6721a	13 dB	6726a

* Highlighted Dncw and Rw performances for the Standard Perforation (16% open area) are estimated as being not less than the tested Microperforated (22% open area) performance.
All Armstrong acoustic testing is conducted at independent third party accredited laboratories.

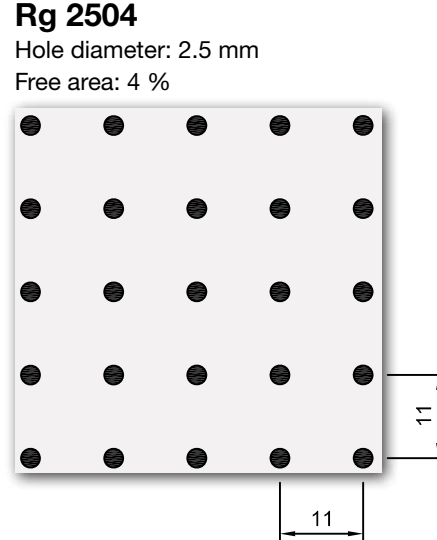
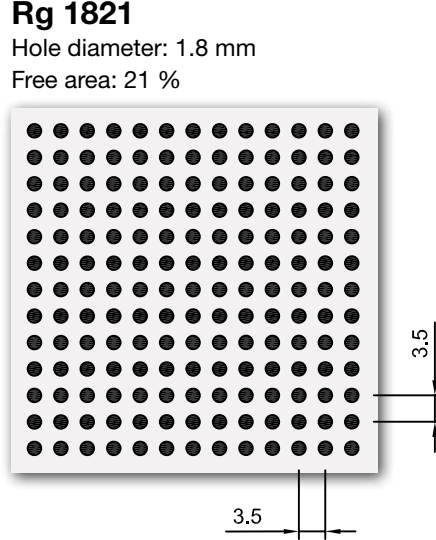
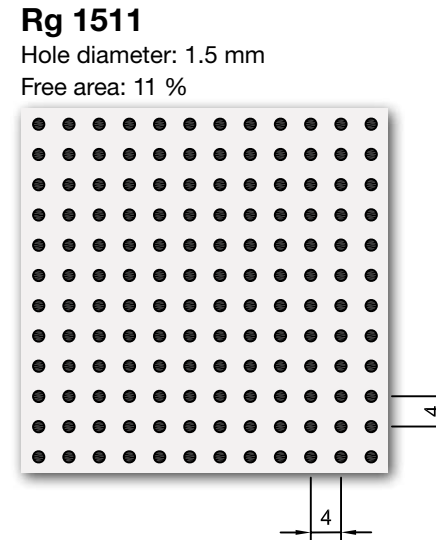
Armstrong metal ceilings with the revolutionary Ultra Microperforation have set new standards. No additional acoustic infills are needed to absorb sound waves; the Armstrong metal ceiling achieves the necessary sound absorption using near-invisible 0.5mm perforations.

SEMI STANDARD PERFORATIONS

Rd - Round perforations, diagonal

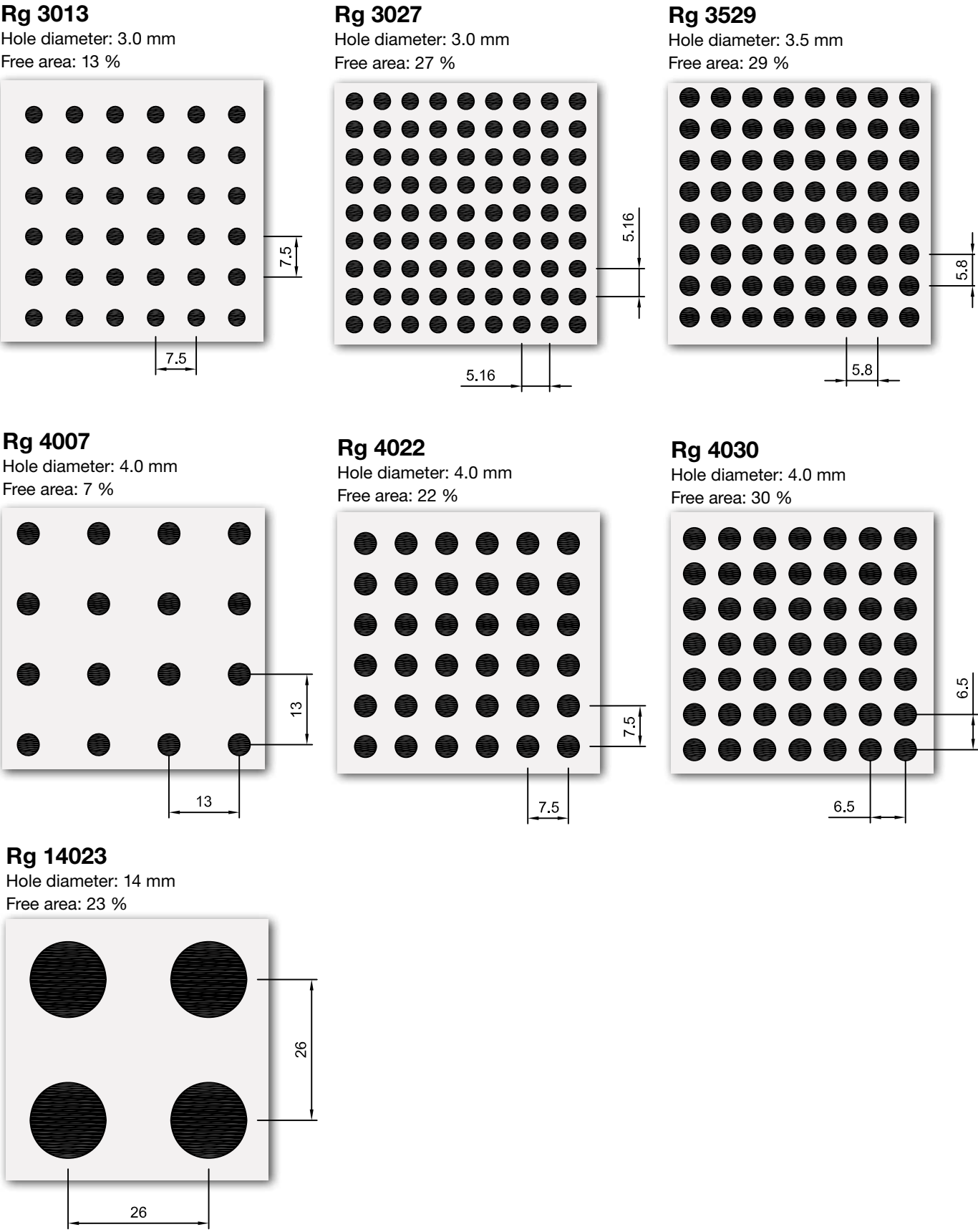


Rg - Round perforations, square pitch

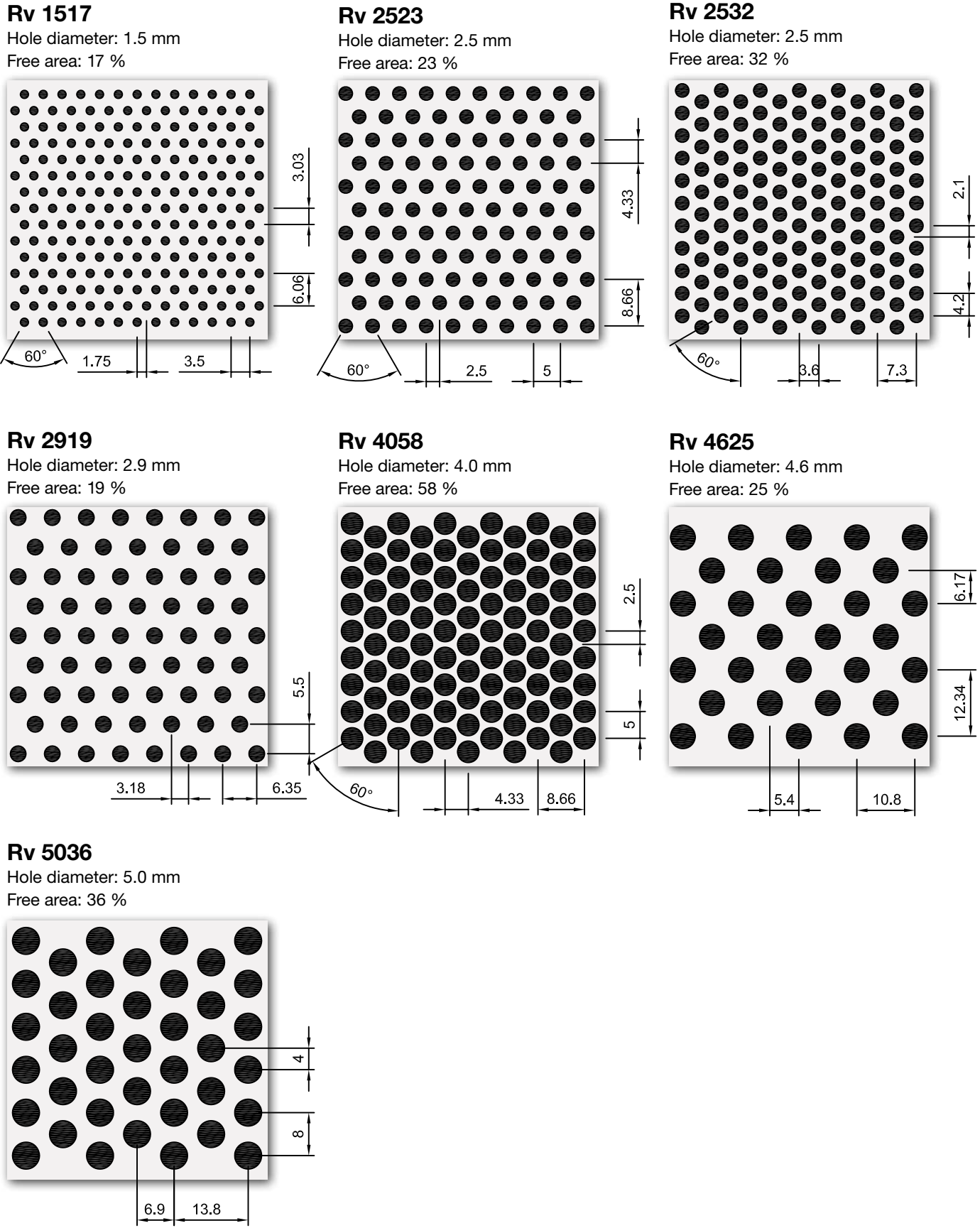


SEMI STANDARD PERFORATIONS

Rg - Round perforations, square pitch



Rv - Round perforations, straight

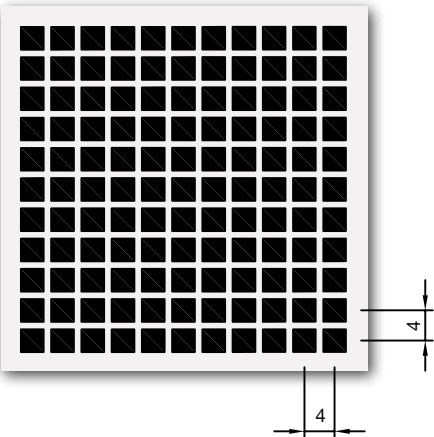


SEMI STANDARD PERFORATIONS

Qg - Square perforations, square pitch / Qd - Square perforations, diagonal

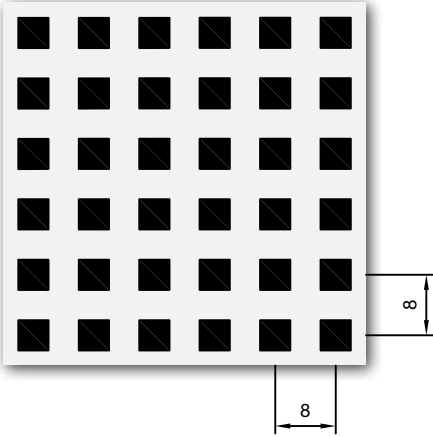
Qg 3056

Hole diameter: 3 x 3 mm
Free area: 56 %



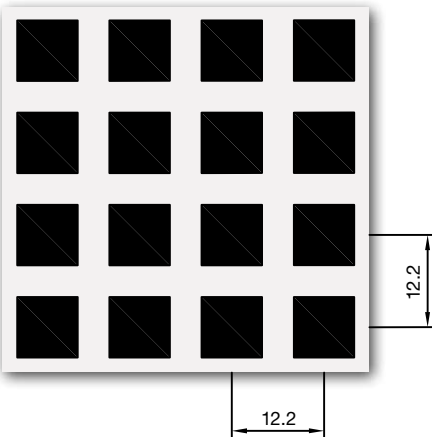
Qg 4025

Hole diameter: 4 x 4 mm
Free area: 25 %



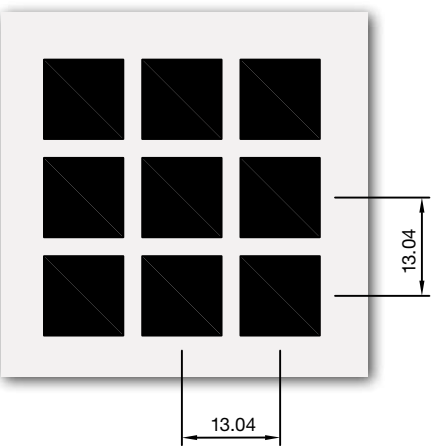
Qg 8043

Hole diameter: 8 x 8 mm
Free area: 43 %



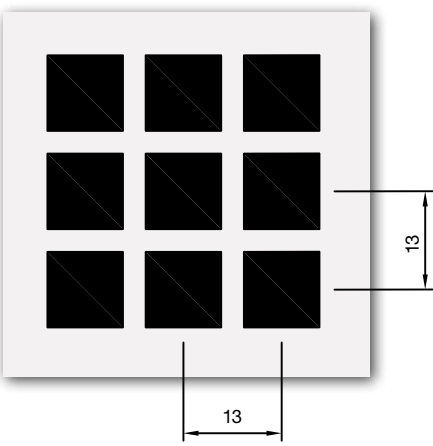
Qg 10059

Hole diameter: 10 x 10 mm
Free area: 59 %



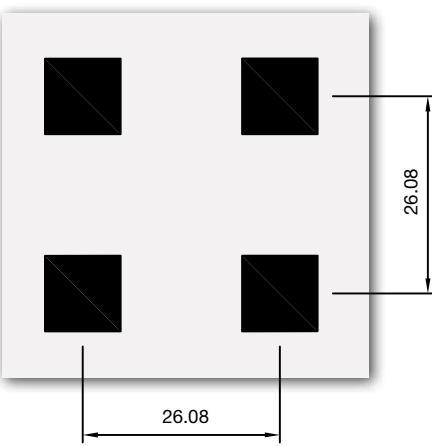
Qg 10565

Hole diameter: 10.5 x 10.5 mm
Free area: 65 %



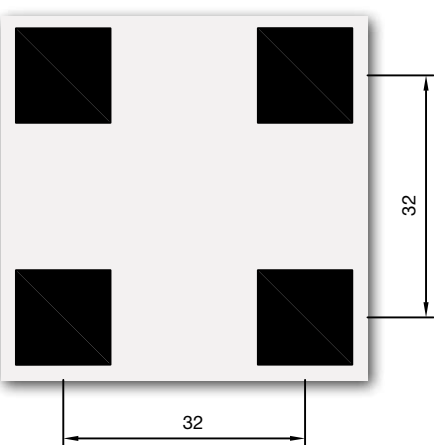
Qg 10015

Hole diameter: 10 x 10 mm
Free area: 15 %



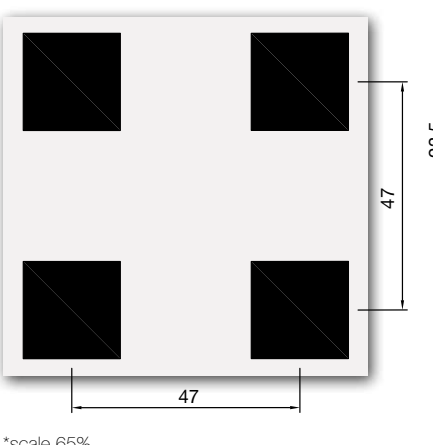
Qg 12515

Hole diameter: 12.5 x 12.5mm
Free area: 15 %



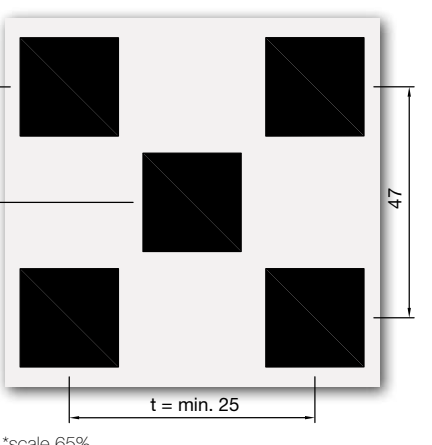
Qg 20018*

Hole diameter: 20 x 20 mm
Free area: 18 %



Qd 20034*

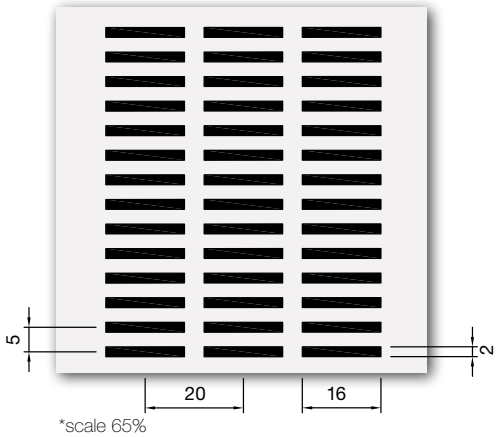
Hole diameter: 20 x 20 mm
Free area: 34 %



Lg - Slotted perforations, square pitch / Lv - Slotted perforations, straight

Lg 16032*

Hole diameter: 16 x 2 mm
Free area: 32 %



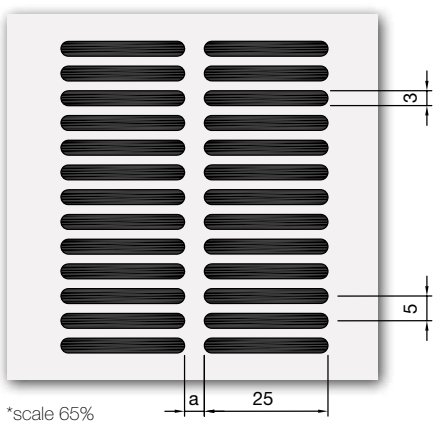
Lg 42003*

Hole diameter: 42 x 2 mm
Free area: 3 %



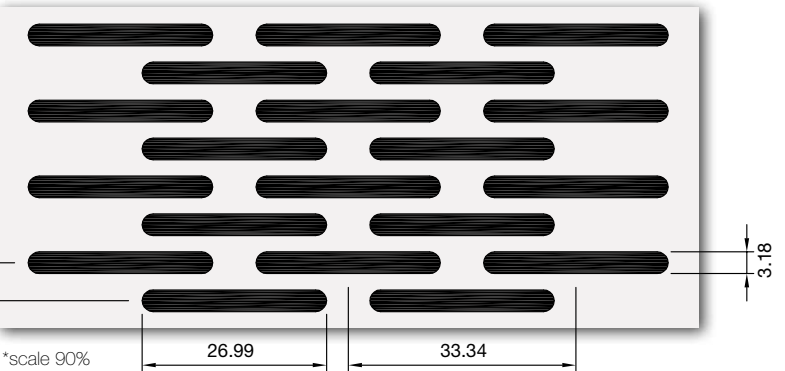
Lg 25042*

Hole diameter: 25 x 3 mm
Free area: 42 %



Lv 27045*

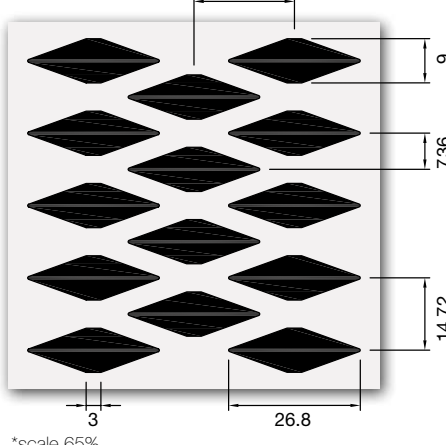
Hole diameter: 3.18 x 26.99 mm
Free area: 45 %



Tv - Diamond perforations, straight

Tv 26845*

Hole diameter: 26.8 x 9 mm
Free area: 45 %



APPLICATIONS

Perforation description	Max. perforation width (mm)	Max. opening width (mm)	Material thickness (mm)	
			Steel	Aluminium
Rd 1511	1,258	1,280	0.5 - 0.7	0.6 - 0.8
Rd 1522	1,595.5	1,600	0.5 - 0.7	0.6 - 0.8
	1,551.5	1,600	1.0 - 1.25	1.0 - 1.25
Rd 1506	1,595.5	1,600	0.5 - 0.7	0.6 - 0.8
Rd 1810	701.8	770	0.5 - 0.7	0.6 -0.8
Rd 1820	675	750	0.5 - 0.6	--
Rd 2228	1,497.2	1,600	0.5 - 1.0	0.6 -1.0
Rd 2508	1,509.5	1,600	0.5 - 1.0	0.6 -1.2
Rd 2535	1,274.5	1,280	0.5 - 0.7	0.6 -0.8
Rd 3013	621	745	0.5 - 1.0	0.6 -1.0
Rd 3019	708	770	0.5 - 0.9	0.6 -1.0
Rd 3025	708	770	0.5 - 0.9	0.6 -1.0
Rd 3139	901.41	950	0.5 - 0.7	0.6 -0.8
Rd 4006	704	770	0.5 - 0.9	0.6 -1.0
Rd 4011	611.5	745	0.5 - 1.0	0.6 -1.0
Rd 4015	702	750	0.5 - 0.6	--
Rd 4045	750	810	0.5 - 0.6	--
Rg 0501	625.5	745	0.5	--
Rg 0701	1,500	1,600	0.5 - 0.7	0.6 - 0.7
Rg 1511	1,593.5	1,600	0.5 - 0.7	0.6 - 0.8
	1,549.5	1,600	1.0 - 1.25	1.0 - 1.25
Rg 1821	701.8	770	0.5 - 0.7	0.6 -0.8
Rg 2516	1,509.5	1,600	0.5 - 1.0	0.6 -1.2
Rg 2504	1,498.5	1,600	0.5 - 1.0	0.6 -1.2
Rg 3013	708	770	0.5 - 0.9	0.6 -1.0
	615	745	0.5 - 1.0	0.6 -1.0
Rg 3027	616.5	745	0.5 - 1.0	0.6 -1.0
Rg 3529	1,575.3	1,600	0.5 - 1.0	0.6 -2.0
Rg 4022	611.5	745	0.5 - 1.0	0.6 -1.0
Rg 4030	702	750	0.5 - 0.6	--
Rg 4007	702	750	0.5 - 0.6	--
Rg 14023	638	745	0.5 - 1.0	0.6 -1.0
Rv 1517	1,510.25	1,600	0.5 - 0.75	--
Rv 2523	1,252.5	1,280	0.5 - 0.9	0.6 -1.0
Rv 2532	1,590	1,600	0.5 - 0.75	0.6 -1.2
Rv 2919	685.8	750	0.5 - 0.6	--
Rv 4058	775	1,010	0.6 - 0.8	--
Rv 4625	949.6	1,080	0.5 - 0.7	0.6 -1.0
Rv 5036	483	550	0.5 - 0.6	--
Qg 3056	699	1,280	0.5 - 0.7	--
Qg 4025	708	770	0.5 - 0.7	0.6 -0.8
Qg 8043	642.4	745	0.5 - 1.0	0.6 -1.0
Qg 10059	647	745	0.5 - 0.8	--
	650	750	0.5 - 0.6	--
Qg 10015	650	750	0.5 - 0.6	--
Qg 10565	647	745	0.5 - 0.8	--
Qg 12515	1,004.5	1,280	0.5 - 0.7	0.6 -0.8
Qg 20018	631	745	0.5 - 0.8	0.6 -0.8
Qd 20034	631	745	0.5 - 0.8	0.6 -0.8
Lg 16032	778	810	0.5 - 0.6	--
Lg 25042	619	745	0.5 - 0.8	0.6 -0.8
Lg 42003	1,001	1,100	0.5 - 0.8	0.6 -0.8
Lv 27045	850	860	0.5 - 0.7	--
Tv 26845	803.7	1,010	0.6 - 0.7	--

Retail & Leisure



PROJECT:::: O2 ARENA,
Main and VIP Lobby, Berlin (D)
ARCHITECT:::: HOK Sport
Schmidhuber & Partner, Berlin
CEILING CONTRACTOR:::: Rogge
Spezialbau, Berlin
SOLUTION:::: R-H 200 Ceiling, W-H 1100
Wall Cladding

Custom made round
perforation



PROJECT:::: Emerald
Headquarter (PL)
OWNER:::: EMERALD
ARCHITECT:::: ARCHITEL
Renata Baczowska
SOLUTION:::: Lay-In Axal Vector

Perforation Rg 0701
Acoustic performance
VLS (black)

Office



PROJECT:::: Theological Faculty of
Silesian University (PL)
OWNER:::: The Metropolitan Curia
of Katowice Achidiocese
ARCHITECT:::: STABIL SP. Z O.O.
SOLUTION:::: Lay-In Tegalur

Perforation Qg 3056
Acoustic performance
VLS (black)

Education

Transport



PROJECT::::Aeropuerto de Barajas (SP)
ARCHITECT:::: Ingenor Siglo XXI & Ineco - Aena
CEILING CONTRACTOR:::: CORRAL TELLEZ, S.L.
SOLUTION:::: Lay-In Tegalur

Perforation Rd 1522
Acoustic performance
VLS (black)

WESTERN EUROPE

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