



اىكو للوجهاٲ
ECO FAÇADE
ENVIRONMENTAL ENVELOPE

Design
Engineering
Supply
Fabrication
Installation

Eco Clad (100% Natural Bamboo Fibre & waste paper) from USA

Otefal 100% Solid Aluminium & Perforated from Italy

Aurubis Architectural Copper from Finland

ArGeTon clay Cladding from Germany

PAROC (Fire Proof panel) from Finland

Natural Stone Cladding

Space frame system

Wire Mesh



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Perforation without limits...

Welcome to the Pattern Catalogue of Ecofaçade

The aim of this catalogue is to inspire and provide you with information about the many different kinds of perforation we can offer. We have more than 30,000 different patterns ready for production, of which we have chosen to show a small selection in this catalogue. Therefore, if you do not see what you are looking for we would like to invite you to visit our homepage for a more detailed list of available patterns (many thousands of patterns are listed in our online pattern catalogue at www.rmig.com) or to contact one of our sales representatives to discuss your exact needs.

If we do not have tools in stock for the exact pattern you want, our tooling department will be more than pleased to produce a new tool, enabling us to supply perforated sheets exactly to your wishes.

Ecofaçade is the largest manufacturer and supplier of perforated metal with manufacturing units and sales offices throughout Qatar. With over a century's experience in the perforation industry we have gathered vast experience in various application areas where our products are used, this allows us to serve as a knowledgeable partner to you, finding the right solution to your needs.

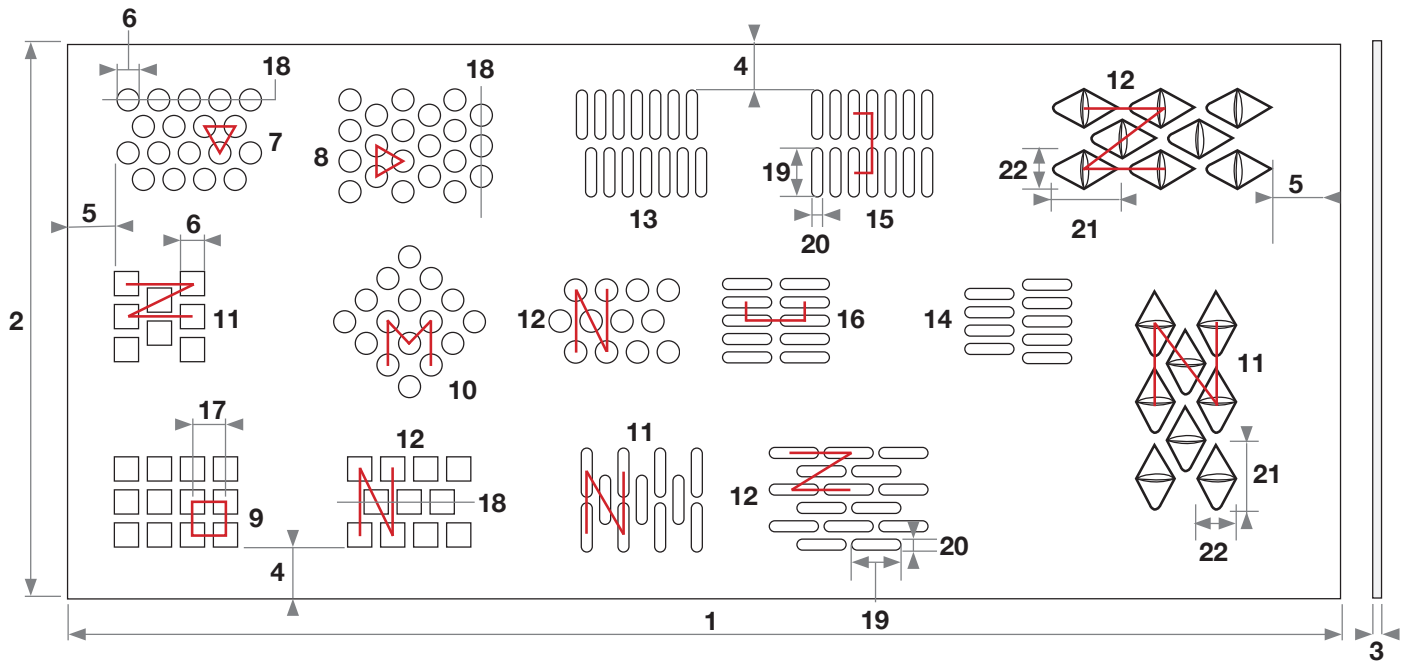
We look forward to hearing from you.



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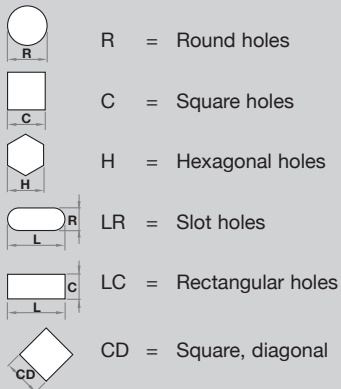
Description of a perforated sheet



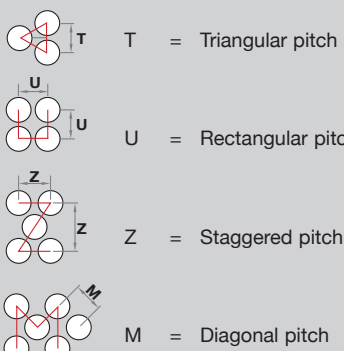
Hole shape and arrangement

RMIG uses the international ISO norm 7806-1983(E) when describing hole shape and arrangement

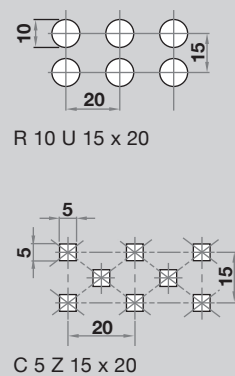
Shape of holes:



Arrangement of holes:



Examples:

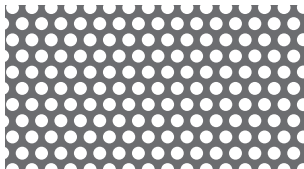


Guidance

- 1 Length
- 2 Width
- 3 Sheet thickness
- 4 Margins (long sides)
- 5 Margins (short sides)
- 6 Hole size
- 7 Triangular pitch, longitudinal
- 8 Triangular pitch, transverse
- 9 Rectangular pitch
- 10 Diagonal pitch
- 11 Staggered pitch parallel to width
- 12 Staggered pitch parallel to length
- 13 End staggered pit. parallel to width
- 14 End staggered pit. parallel to length
- 15 Rectangular pitch parallel to width
- 16 Rectangular pitch parallel to length
- 17 Measure of pitch
- 18 Row of holes
- 19 Slot hole length
- 20 Slot hole width
- 21 Hole length nose screen
- 22 Hole width nose screen

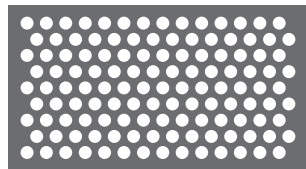
Margins

Fig. A



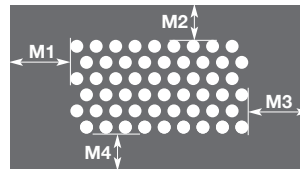
Perforated sheet without margins

Fig. B



Perforated sheet with margins

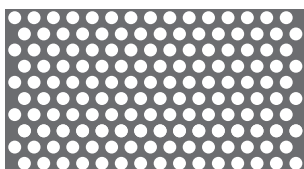
Fig. C



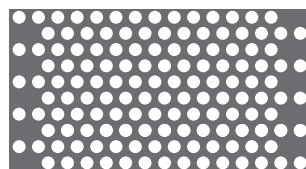
Perforated sheet with margins

Toolsettings

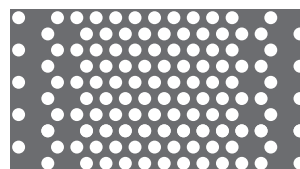
1.



2.



3.





Technical characteristics

Besides its basic features (as shape and arrangement of the holes) a perforated product is defined by a number of technical characteristics as listed. The requested range of tolerances will strictly depend on the technical needs of each specific application. Please note that the requested tolerances affect the complexity of the manufacturing processes of the perforated products and therefore their final costs.

- Overall length and width of the sheet/coil
- Length and width of the perforated areas and unperforated margins
- Flatness
- Squareness
- Surface aspects: free of oil, free of scratches
- Burrs on holes and shearing burrs
- Mis-pitching and missing holes

All these issues must be considered and their acceptable tolerances quantified and approved during the first negotiation process between manufacturer and customer. RMIG has the knowledge and experience to assist. We can actively participate in that process whatever application and complexity level. Please contact us for any additional information you may require.

Formula for calculation of the weight of a perforated sheet:

(Please insert measures in mm)

$$\frac{\text{Width} \times \text{length} \times \text{thickness} \times \text{specific gravity}}{1,000,000} = \text{weight of raw sheet}$$

Weight of raw sheet x (1-% open area) = weight of perforated sheet in kilos

Overview of specific gravity (kg/dm³)

Aluminium:	2.70
Brass:	8.55
Mild steel:	7.92
Stainless steel:	7.92

Perforation formulas

Arrangement of holes	Description	Open area %	Number of holes per sq. m.
	R - T	$\frac{R^2 \times 90.69}{T^2}$	$\frac{1,154,700}{T^2}$
	R - U	$\frac{R^2 \times 78.5}{U_1 \times U_2}$	$\frac{1,000,000}{U_1 \times U_2}$
	C - U	$\frac{C^2 \times 100}{U_1 \times U_2}$	$\frac{1,000,000}{U_1 \times U_2}$
	C - Z ₁ , Z ₂	$\frac{C^2 \times 100}{0.5 \times (Z_1 \times Z_2)}$	$\frac{1,000,000}{0.5 \times (Z_1 \times Z_2)}$
	LR - Z ₁ , Z ₂	$\frac{(L \times R - 0.215R^2) \times 100}{0.5 \times (Z_1 \times Z_2)}$	$\frac{1,000,000}{0.5 \times (Z_1 \times Z_2)}$
	LC - Z ₁ , Z ₂	$\frac{L \times C \times 100}{0.5 \times (Z_1 \times Z_2)}$	$\frac{1,000,000}{0.5 \times (Z_1 \times Z_2)}$

Calculation formula for a sheet before folding

Formula valid for inner radius = 1 mm:

$L_1 + L_2 + L_3 + (\text{bend} \times 2) = \text{unfolded sheet}$

Example:

$L_1 = 25 \text{ mm}$

$L_2 = 25 \text{ mm}$

$L_3 = 50 \text{ mm}$

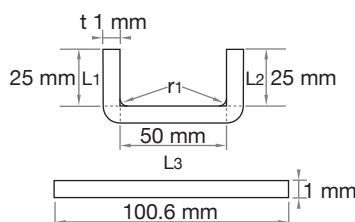
$t = 1 \text{ mm}$

$L = \text{Inner side length}$

$t = \text{Sheet thickness}$

$r_1 = \text{Radius 1 mm}$

Unfolded measures = $25 + 25 + 50 + (0.3 \times 2) = 100.6 \text{ mm}$



Add all L-measures + addition per bend

e.g. at sheet thickness 1 mm: addition = 0.3 mm (see table)

Thickness of sheet (mm)	Addition per bend (mm)
0.50	0.15
1.00	0.30
1.50	0.45
2.00	0.60
2.50	0.75
3.00	0.90



Coils and sheets



Perforated material can be supplied in coils of different widths and lengths, as well as in sheets of different sizes.

Sheets can be delivered in thicknesses between 0.3 and 6 mm.

The available widths of perforated coils go from 55 mm to 1500 mm, with a maximum weight of approx. 8000 kilos. Thicknesses range from 0.3 to 3.0 mm.

Guide to raw materials

Ecofacade offers perforated products in a wide range of materials. The qualities of the most commonly requested materials are described below:

Carbon steel (mild steel)

Carbon steel is the most commonly used raw material. Principally there are two types of carbon steel:

- Carbon steel cold rolled. It has a quite bright surface. It is used in thicknesses from 0.3 to 3.0 mm.
- Carbon steel hot rolled pickled or black. The former has an opaque surface and the second has a quite black surface. They are used for thicknesses from 1.5 mm and above.

Pre-galvanised steel

This is carbon steel that has gone through a hot zinc bath just after rolling. This process gives quite a good protection against oxidation and rust, but it can only be used indoors as the protective layer is interrupted where the holes are punched. However, some of the zinc is pushed into the holes so that there is some protection at these points for indoor use.

Steel and aluminium

Terms under the European norm and the most used terms in DK, SE and DE.

New EN term	Old EN term	Denmark	Sweden	Germany
DC01	Fe PO1	St. 1203	SS 1142	St. 1203
DC04	Fe PO4	St. 1403	SS 1147	St. 1403
S235JRG2	Fe 360	St. 37-2	SS 1312	St. 37-2
DD 11	St. W 22	St. W 22	St. W 22	St. W 22
DX 51D+Z	Fe PO2 G	St. 02Z	SS 1151	St. 02Z
EN 1.4301	EN 1.4301	AISI 304	SS 2333	W 1.4301
EN 1.4401	EN 1.4401	AISI 316	SS 2347	W 1.4401
EN 1.4404	EN 1.4404	AISI 316L	SS 2348	W 1.4404
EN 1050 A	EN 1050 A	ALU 2S	SS 144007	W 3.0255
EN 5754	EN 5754	AlMg 3	SS 144133	W 3.3535

Electro galvanised steel

This is carbon steel that has passed through an electrolytic bath of zinc which deposits a zinc coating onto the surface.

Pre-painted steel

This is usually pre-galvanised or electro galvanised steel that has been painted. A wide range of different bright or opaque colours is available. Usually the upper surface is protected by a polyethylene film. Principally there are two categories of paint. One for indoor use and the other for outdoor use where atmospheric agents are more aggressive.

Stainless steel

Stainless steel is a general name for different kinds of steel alloyed with nickel and chrome, combined with other elements. The three most common types are EN 1.4301 (AISI 304), EN 1.4404 (AISI 316L) and EN 1.4016 (AISI 430) (chromatic steel). EN 1.4301 is resistant to corrosion from humidity, and EN 1.4404 is resistant to corrosion from humidity and less aggressive acids. EN 1.4016 is less corrosion resistant than the other two types.

The surface can be finished in different ways. Besides the standard surface (2B) one of the most commonly requested finishes is a ground surface.

This kind of treatment entails a brushed finish on the surface of the steel. It is possible to ask for various brushed finishes and even shiny effects such as (BA), these are good for decorative purposes.

Aluminium and its alloys

This material is particularly interesting because of its weight advantages, being only one-third the weight of steel. It is also quite resistant to corrosion even in an untreated condition. The wide range of available alloys extends the application possibilities in high-tech segments.

Titanium

Titanium is characterized by an excellent resistance to corrosion, from the most oxidant acids to saline atmospheres.

Copper

Copper is a very malleable and corrosion resistant material.

Brass

Brass includes a wide range of copper-zinc alloys that are strong, durable, hard, conductive, and resistant to wear and corrosion. Brasses can easily be punched, fabricated and formed.

Plastic

As in all other industrial sectors plastic has been introduced as a material for perforated products.

Other materials

It is possible to perforate other materials, and our technicians are at your disposal for further information and consultation.

Please contact us for other needs.



Guide to additional finishing

The following additional finishing processes are available to our customers:

Flattening

For some applications a high level of flatness of the sheet or the coil is required.

Cutting

A perforated sheet may be cut to a specific size or shape, meeting the needs of the final application. There are various means of cutting e.g. laser, flame, shears, water etc.

Notching

This type of finishing is necessary to obtain areas without material or to prepare the sheet for bending of edges.

Forming

This work is necessary to obtain products with a concave or convex shape and requires a special tooling. This process can furthermore give the sheet more resistance and extra rigidity.

Rolling

This process is used to give the sheet a cylindrical form.

Welding

Welding joins two or more parts of different products. It can be carried out in different ways.

Surface treatment

Surface treatment is principally needed for two reasons: to protect or to decorate the final product. A very wide range of possibilities is available according to the type of material.

Painting

Lots of different bright or opaque colours are available. There are options for items to be in contact with atmospheric agents and others for items to be used only in sheltered areas.

Anodizing

Anodizing is principally used on aluminium and is available in various colours.

Grinding

Grinding is principally carried out on stainless steel (2B) and aluminium. It can be processed to different finishes.

Degreasing

Degreasing is possible on all kinds of materials and is above all used when further finishing processes like painting or welding are requested.

Polishing

This process is necessary to achieve a shiny effect of the treated surface and is generally carried out on stainless steel.

Hot dip galvanising

This kind of finishing is used extensively to obtain good protection against atmospheric agents and therefore against oxidation. The finished product is immersed into a hot liquid zinc bath for full protection.

Protection film application

The application of protective film may be necessary to protect the material from scratches, spots or marks during perforation or transportation.

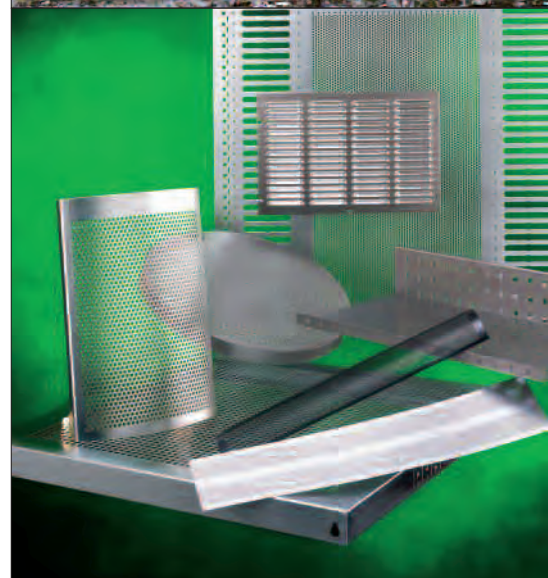
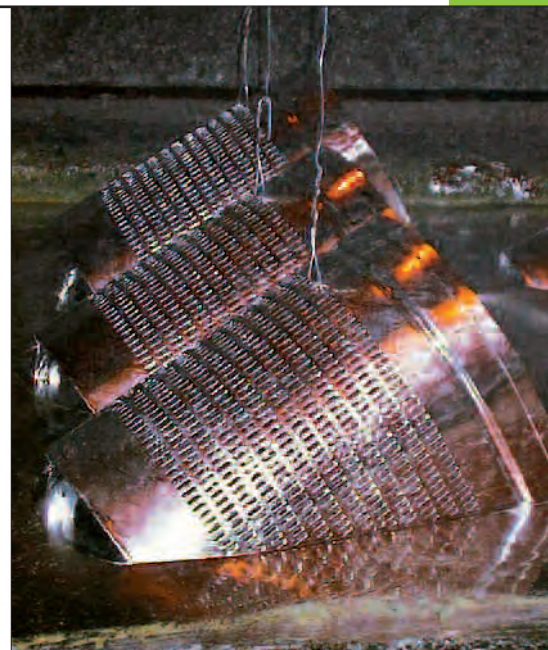
Deburring

This process is very useful to reduce sharp edges on perforated sheets. This is necessary for particular applications where a burr may compromise the correct function or look of the final product.

Autophoretic coating

Autophoretic coating is an ecological surface treatment for steel components and improves resistance to corrosion. It consists in a deposition of organic drops through a chemical reaction with positive ions released from the treated metal.

Please contact us for any other needs.





Solution provider

Design

We offer to you our wealth of expertise in perforation. From the initial idea to the final specification of your perforated product, we are your sure choice to obtain the optimum solution. We will be your partner from the concept stages of design, offering advice and expertise and ensuring that you get the best advice from the start.

Focus on the customer's needs and on quality

For RMIG it is vital to get a good understanding of your product specification. Our experienced team will understand your needs, and whether your concern is quality or service we will work closely with you throughout.

Scope

We offer one of the world's largest ranges of perforation patterns, from traditional round and square holes to decorative and complex shapes. Our tools are manufactured and maintained by our own tooling department. When there is a demand for specific tooling, we can develop this for you.

Equipment

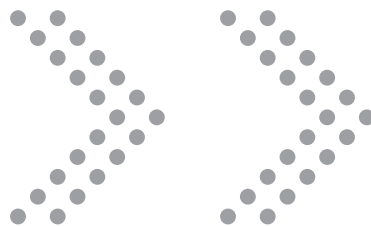
Our production sites use "State of the Art machinery", able to manufacture the full spectrum of perforated products. No job is too big, and none are too small.

Quality

Quality is of prime importance to us, as it is to you. Precision and uniformity are properties secured and controlled by our extensive quality management. We have been constantly refining and developing our quality systems and awareness since our first company became accredited to ISO 9002, in 1989. We see this as our service guarantee.

Additional finishing

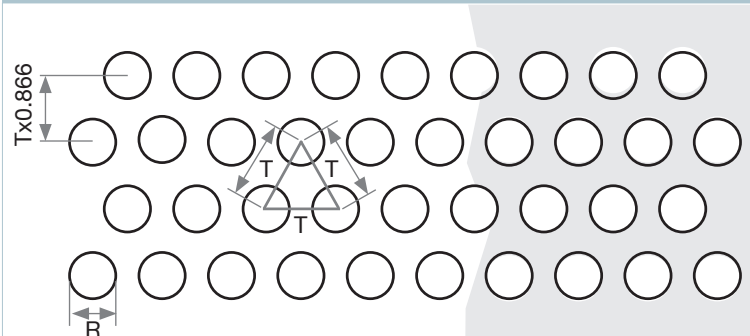
Take your requirements a step nearer to the finished article. We offer options of rolling, cutting, bending and welding, complemented with a variety of surface treatments and finishes.





Round holes

Round holes, triangular pitch



Triangular pitch - a few examples

No.	R	T	Open area
R0.5T1.09	0.50	1.09	19.0%
R0.75T1.5	0.75	1.50	22.7%
R1T2	1.00	2.00	22.7%
R1.2T2	1.20	2.00	32.7%
R1.5T3	1.50	3.00	22.7%

Triangular pitch - a few examples

No.	R	T	Open area
R2T3.5	2.00	3.50	29.6%
R3T4	3.00	4.00	51.0%
R3T5	3.00	5.00	32.7%
R4T5	4.00	5.00	58.0%
R4T7	4.00	7.00	29.6%
R5T8	5.00	8.00	35.4%
R6T9	6.00	9.00	40.3%
R7T10	7.00	10.00	44.4%
R8T11	8.00	11.00	48.0%
R10T14	10.00	14.00	46.4%
R10T16	10.00	16.00	35.4%
R12T16	12.00	16.00	51.0%
R15T21	15.00	21.00	46.3%
R20T27	20.00	27.00	46.8%
R25T39	25.00	39.00	37.3%
R30T35	30.00	35.00	66.6%

R0.5T1.09

(705-020) 1:1

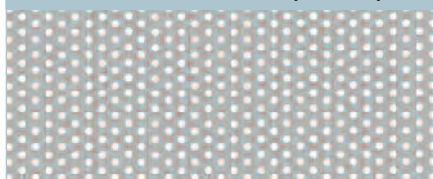


R: 0.50 T: 1.09

Open area: 19.0%

R1T2

(710-000) 1:1

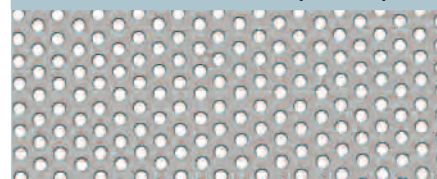


R: 1.00 T: 2.00

Open area: 22.7%

R1.5T3

(715-001) 1:1

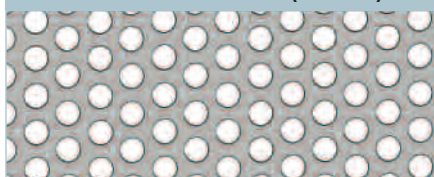


R: 1.50 T: 3.00

Open area: 22.7%

R3T5

(730-000) 1:1



R: 3.00 T: 5.00

Open area: 32.7%

R5T8

(750-002) 1:1

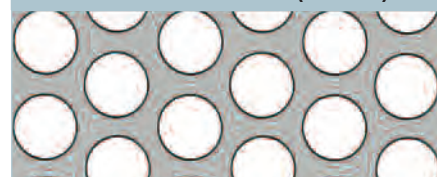


R: 5.00 T: 8.00

Open area: 35.4%

R8T11

(780-020) 1:1



R: 8.00 T: 11.00

Open area: 48.0%

R10T14

(810-044) 1:1



R: 10.00 T: 14.00

Open area: 46.4%

R20T27

(820-029) 1:1



R: 20.00 T: 27.00

Open area: 46.8%

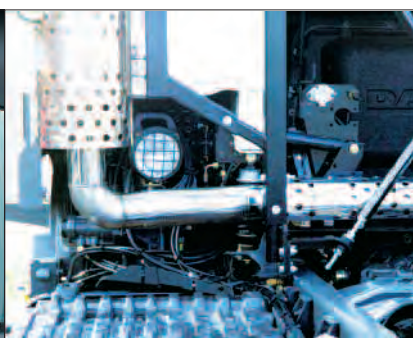
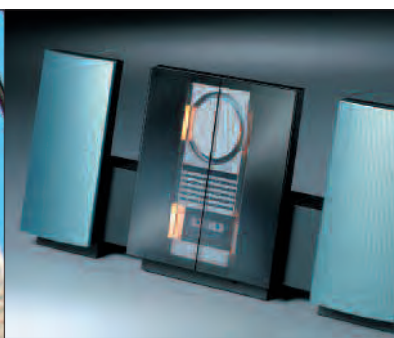
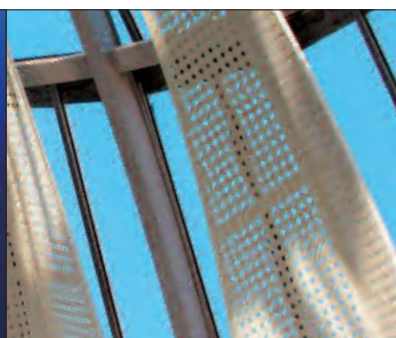
R25T39

(825-001) 1:1



R: 25.00 T: 39.00

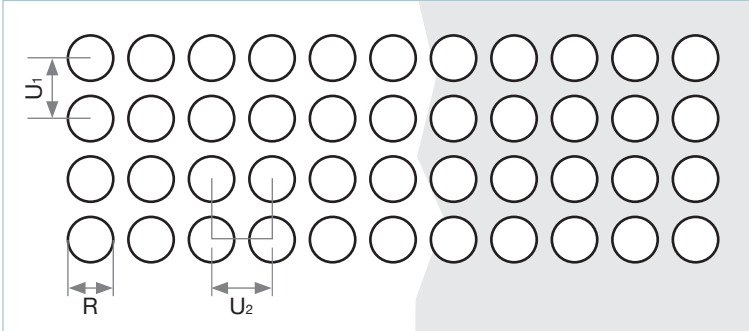
Open area: 37.3%





Round holes

Round holes, rectangular pitch



Rectangular pitch - a few examples

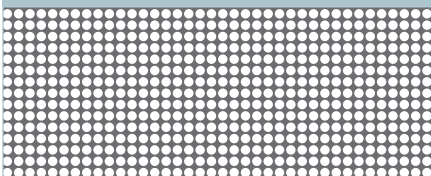
No.	R	U ₁	U ₂	Open area
R0.5U22.68	0.50	22.68	22.68	0.4%
R0.75U5.22	0.75	5.22	5.22	1.6%

Rectangular pitch - a few examples

No.	R	U ₁	U ₂	Open area
R1.25U1.5	1.25	1.50	1.50	54.8%
R2.5U5.5	2.50	5.50	5.50	16.6%
R3U5	3.00	5.00	5.00	28.3%
R5U12.5	5.00	12.50	12.50	12.6%
R6U8	6.00	8.00	8.00	44.2%
R7U10	7.00	10.00	10.00	38.5%
R8U16	8.00	16.00	16.00	19.6%
R10U15	10.00	15.00	15.00	34.9%
R12U38	12.00	38.00	38.00	7.8%
R16U25	16.00	25.00	25.00	31.2%
R20U35	20.00	35.00	35.00	25.6%
R25U50	25.00	50.00	50.00	19.6%
R30U50	30.00	50.00	50.00	28.3%
R50U64	50.00	64.00	64.00	47.9%

R1.25U1.5

(712-025) 1:1

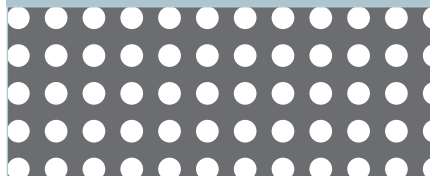


R: 1.25 U: 1.50

Open area: 54.8%

R3U5

(730-053) 1:1



R: 3.00 U: 5.00

Open area: 28.3%

R5U12.5

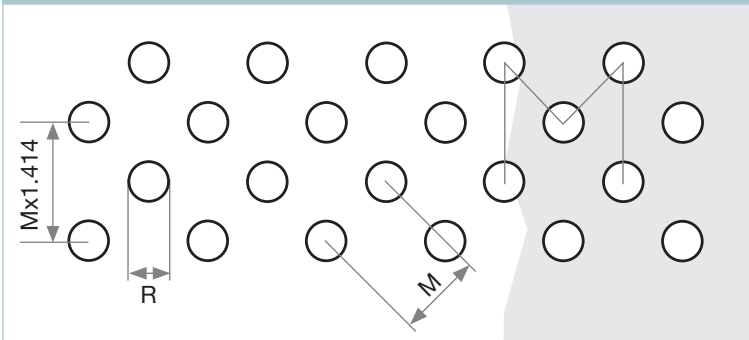
(750-019) 1:1



R: 5.00 U: 12.50

Open area: 12.6%

Round holes, diagonal pitch

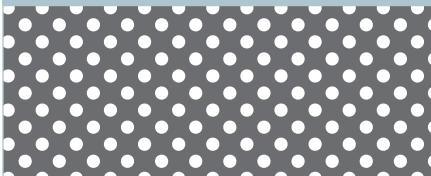


Diagonal pitch - a few examples

No.	R	M	Open area
R1.5M4	1.50	4.00	11.0%
R1.75M3.18	1.75	3.18	23.7%
R2M4.24	2.00	4.24	22.0%
R2.5M7	2.50	7.00	10.0%
R3.5M5.5	3.50	5.50	31.0%
R4.3M11.3	4.30	11.30	11.4%
R5M11.31	5.00	11.31	15.3%
R9M15	9.00	15.00	28.3%

R1.75M3.18

(717-007) 1:1

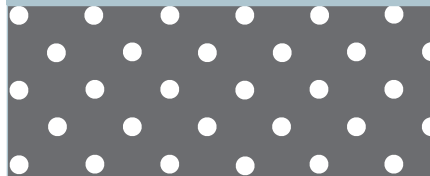


R: 1.75 M: 3.18

Open area: 23.7%

R2.5M7

(725-027) 1:1

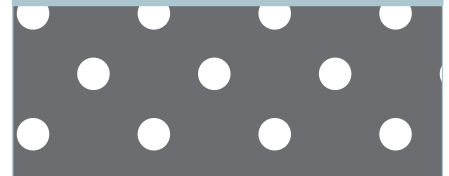


R: 2.50 M: 7.00

Open area: 10.0%

R4.3M11.3

(743-001) 1:1



R: 4.30 M: 11.30

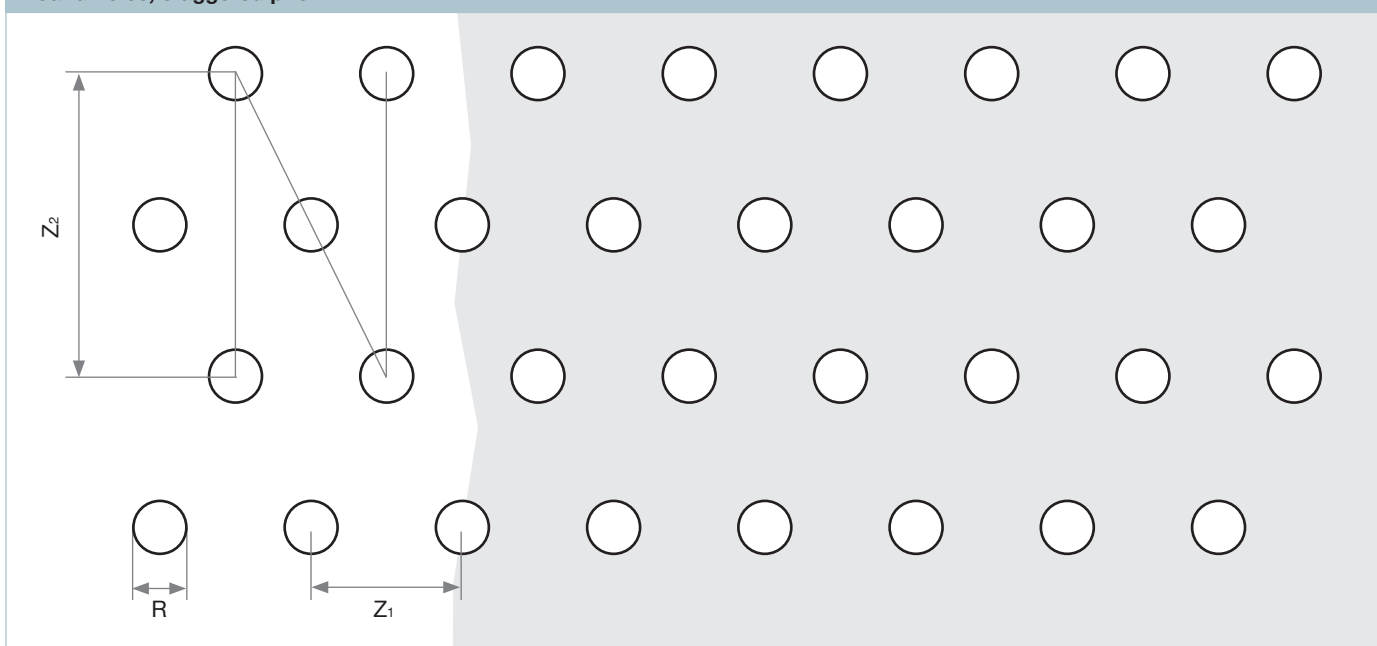
Open area: 11.4%





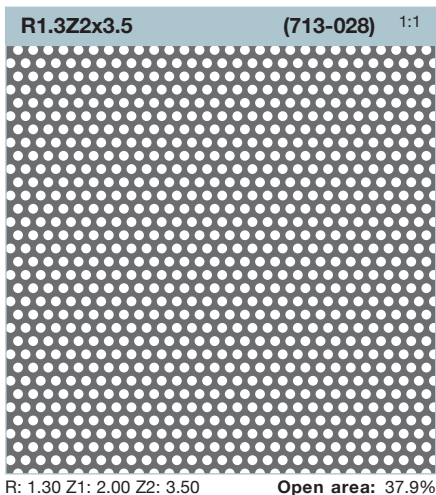
Round holes

Round holes, staggered pitch



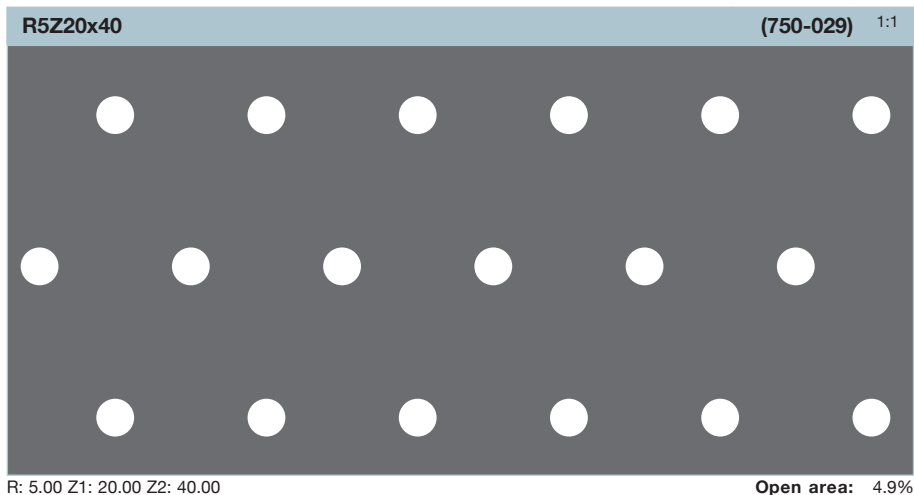
Staggered pitch - a few examples

No.	R	Z1	Z2	Open area
R1.3Z2x3.5	1.30	2.00	3.50	37.9%
R3Z4x8	3.00	4.00	8.00	44.9%
R5Z20x40	5.00	20.00	40.00	4.9%
R7Z20x40	7.00	20.00	40.00	9.6%
R22Z44.2x70	22.00	44.20	70.00	24.6%
R70Z100x160	70.00	100.00	160.00	24.0%



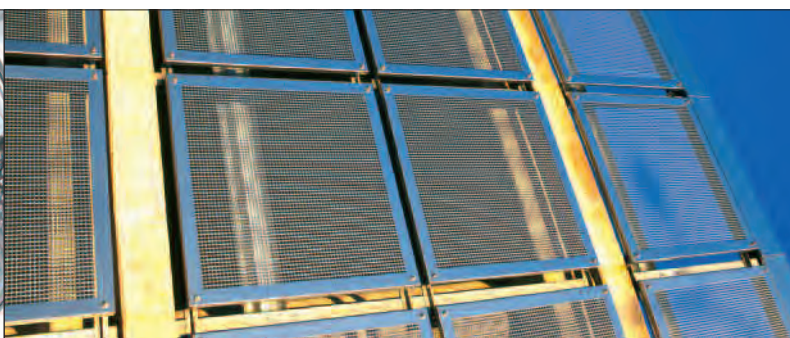
R: 1.30 Z1: 2.00 Z2: 3.50

Open area: 37.9%



R: 5.00 Z1: 20.00 Z2: 40.00

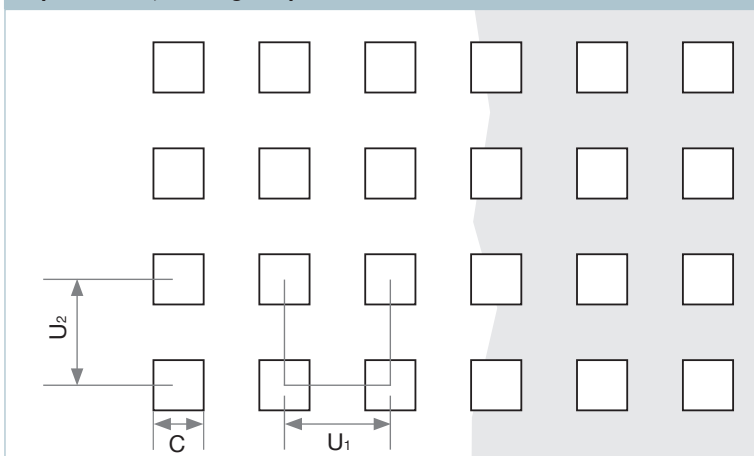
Open area: 4.9%





Square holes

Square holes, rectangular pitch



Rectangular pitch - a few examples

No.	C	U ₁	U ₂	Open area
C1.2U1.7	1.20	1.70	1.70	49.8%
C3U5	3.00	5.00	5.00	36.0%
C4U6.38	4.00	6.38	6.38	39.3%
C5U7.5	5.00	7.50	7.50	44.4%
C8U12	8.00	12.00	12.00	44.4%
C9U34	9.00	34.00	34.00	7.0%
C9.5U13.33	9.50	13.33	13.33	50.8%
C10U12	10.00	12.00	12.00	69.4%
C15U20	15.00	20.00	20.00	56.3%
C20U25	20.00	25.00	25.00	64.0%
C50U62	50.00	62.00	62.00	65.0%

C4U6.38

(404-000) 1:1



C: 4.00 U: 6.38

Open area: 39.3%

C9U34

(409-005) 1:1



C: 9.00 U: 34.00

Open area: 7.0%

C9.5U13.33

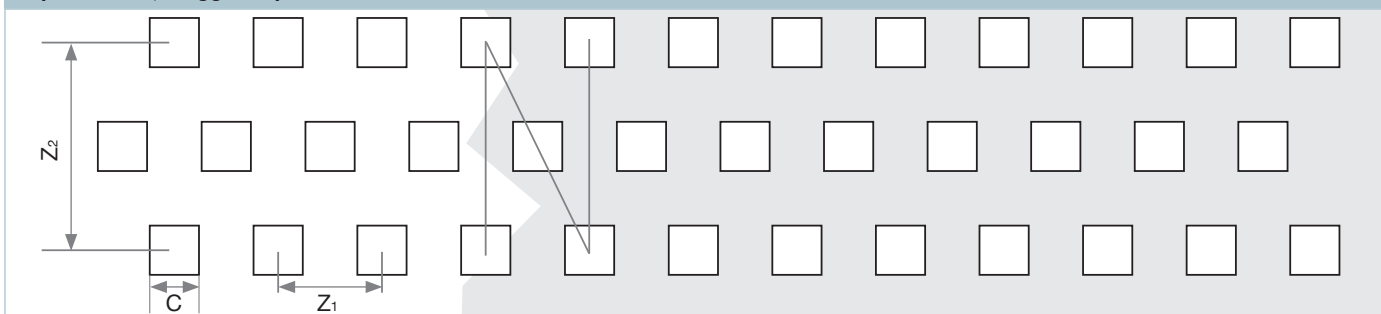
(409-013) 1:1



C: 9.50 U: 13.33

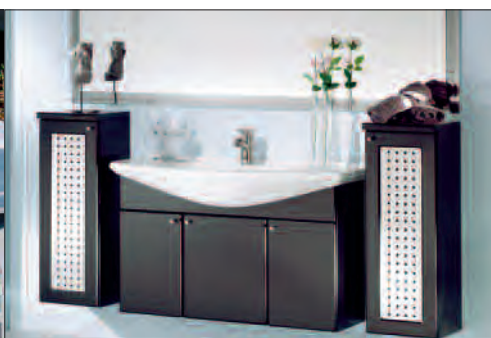
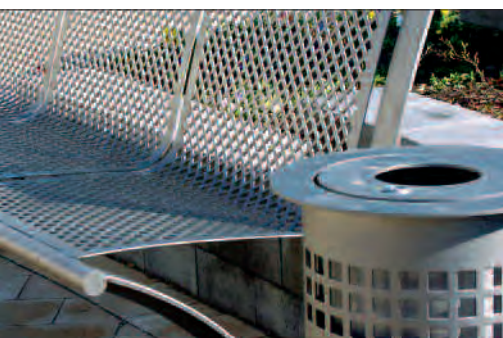
Open area: 50.8%

Square holes, staggered pitch



Staggered pitch - a few examples

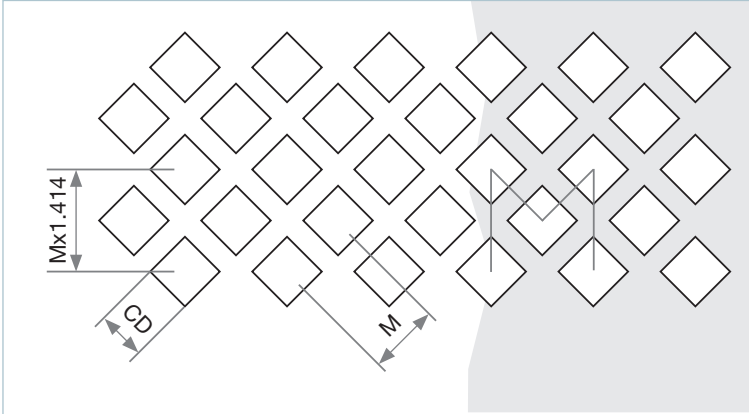
No.	C	Z ₁	Z ₂	Open area
C2.2Z4.25x8.5	2.20	4.25	8.50	26.9%
C7Z8.5x17	7.00	8.50	17.00	67.8%
C8Z11x22	8.00	11.00	22.00	52.9%
C12.7Z16x32	12.70	16.00	32.00	63.0%
C100Z120x240	100.00	120.00	240.00	69.4%





Square holes

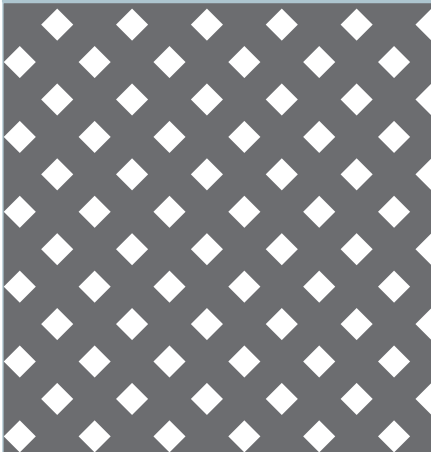
Square holes, diagonal pitch



Diagonal pitch - a few examples

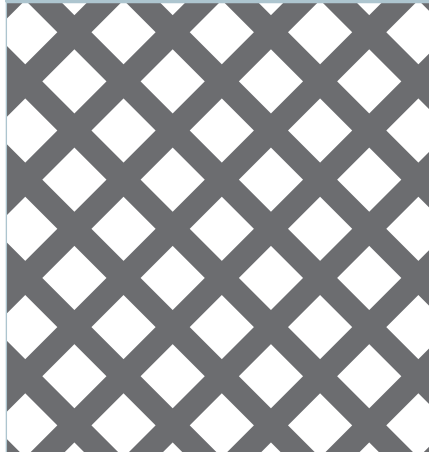
No.	CD	M	Open area
CD3M7	3.00	7.00	18.4%
CD6M9.19	6.00	9.19	42.6%
CD7.5M11.5	7.50	11.50	42.5%
CD11M15.23	11.00	15.23	52.2%
CD12M18.5	12.00	18.50	42.1%
CD15M20	15.00	20.00	56.3%
CD20M27.57	20.00	27.57	52.6%
CD20M26.5	20.00	26.50	57.0%
CD30M38	30.00	38.00	62.3%
CD40M50	40.00	50.00	64.0%

CD3M7 (3403-000) 1:1



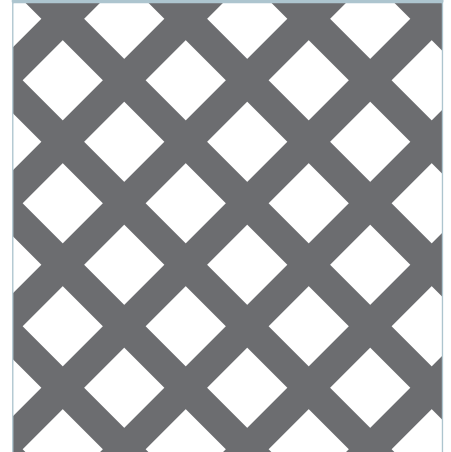
CD: 3.00 M: 7.00 Open area: 18.4%

CD6M9.19 (3406-000) 1:1



CD: 6.00 M: 9.19 Open area: 42.6%

CD7.5M11.5 (3407-008) 1:1



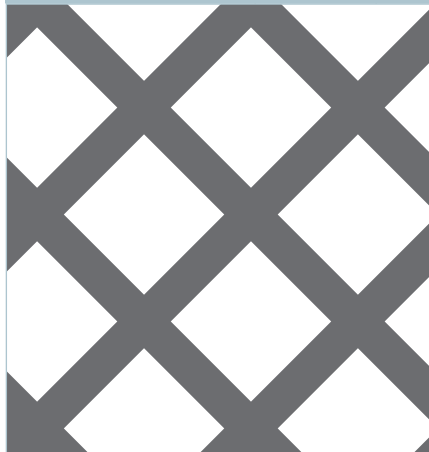
CD: 7.50 M: 11.50 Open area: 42.5%

CD12M18.5 (3412-000) 1:1



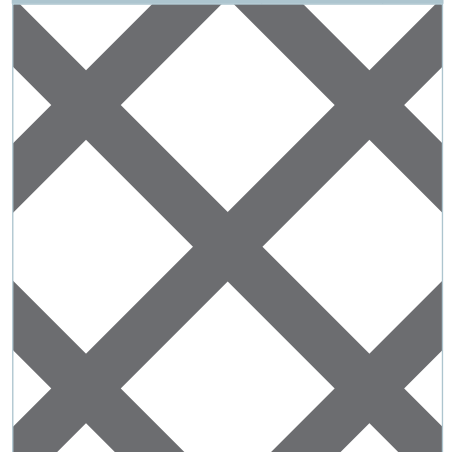
CD: 12.00 M: 18.50 Open area: 42.1%

CD15M20 (3415-000) 1:1

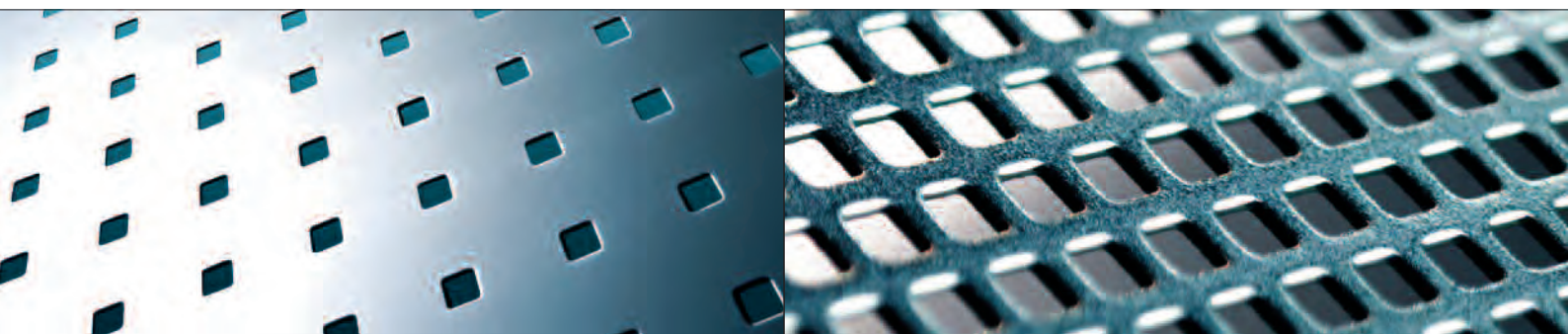


CD: 15.00 M: 20.00 Open area: 56.3%

CD20M26.5 (3420-000) 1:1



CD: 20.00 M: 26.50 Open area: 57.0%





Conical holes

Conical holes

For normal perforation, the maximum thickness of mild steel sheets may exceed the hole diameter by approximately 25%. Therefore, for normal perforation, 2 mm holes can be perforated in sheets up to 2.5 mm thickness.

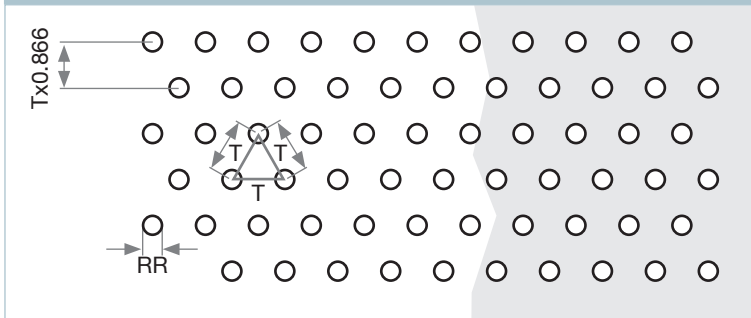
For special perforation, the sheet thickness may exceed the hole diameter considerably. For example, using mild steel sheets we can punch 2 mm conical holes in 4 mm thick sheets, and punching conical holes their diameters may be even smaller.

Conical holes are smooth from top to bottom.

On this page some of the patterns are shown for which tools are available.

Where very small holes are required, relative to the sheet thickness, the solution may be a Perfocon sheet as described on page 20.

Conical holes, triangular pitch



Triangular pitch - a few examples

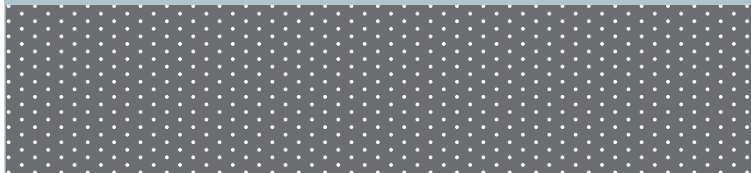
No.	RR	T	t	Open area
RR0.2T1.6	0.20	1.60	0.50	1.4%
RR0.3T2.88	0.30	2.88	0.70	1.0%
RR0.5T1.5	0.50	1.50	0.90	10.0%
RR0.5T2	0.50	2.00	0.90	5.7%
RR0.75T2	0.75	2.00	1.00	12.6%
RR2.5T7.5	2.50	7.50	2.00*	10.0%

t = max thickness of sheet in mild steel

* = max thickness of sheet in stainless steel

RR0.5T2

(3505-000) 1:1

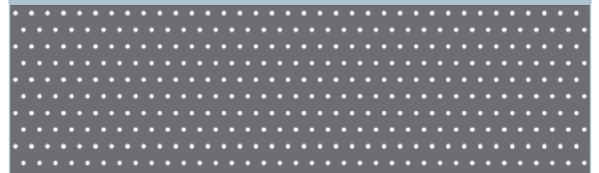


RR: 0.50 T: 2.00

Open area: 5.7%

RR0.75T2

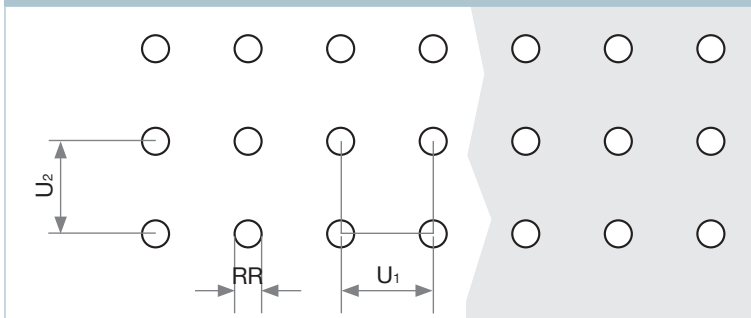
(3507-008) 1:1



RR: 0.75 T: 2.00

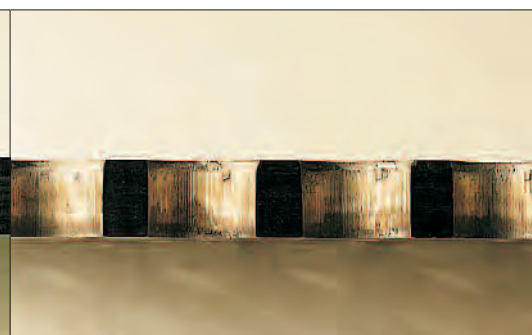
Open area: 12.6%

Conical holes, rectangular pitch



Rectangular pitch - a few examples

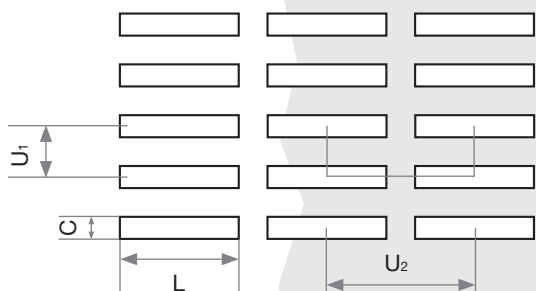
No.	RR	U ₁	U ₂	Open area
RR0.8U1.75x1.5	0.80	1.75	1.50	19.1%
RR1.5U10	1.50	10.00	10.00	1.7%
RR3.5U5.33x10	3.50	5.33	10.00	12.6%





Rectangular holes

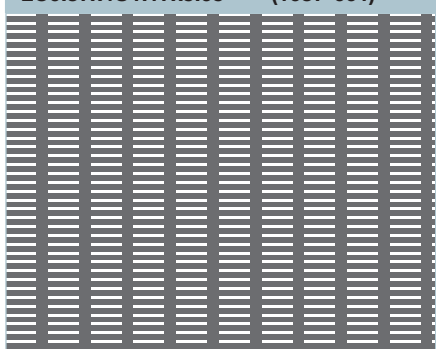
Rectangular holes, rectangular pitch



Rectangular pitch - a few examples

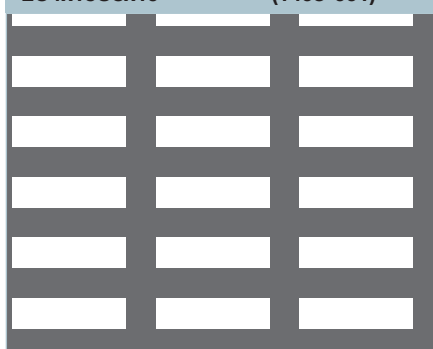
No.	L	C	U ₁	U ₂	Open area
LC0.37x4U1.17x5.65	4.00	0.37	1.17	5.65	22.4%
LC4x15U8x19	15.00	4.00	8.00	19.00	39.5%
LC5x15.7U7.5x18.2	15.70	5.00	7.50	18.20	57.5%
LC1.05x20U10x24	20.00	1.05	10.00	24.00	8.8%
LC20x25U40x55	25.00	20.00	40.00	55.00	22.7%
LC33x51.1U43x60	51.10	33.00	43.00	60.00	65.4%

LC0.37x4U1.17x5.65 (1037-001) 1:1



L: 4.00 C: 0.37 U₁: 1.17 U₂: 5.65 **Open area: 22.4%**

LC4x15U8x19 (1403-001) 1:1



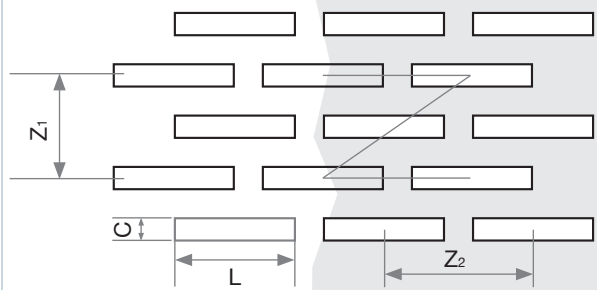
L: 15.00 C: 4.00 U₁: 8.00 U₂: 19.00 **Open area: 39.5%**

LC5x15.7U7.5x18.2 (1503-001) 1:1



L: 15.70 C: 5.00 U₁: 7.50 U₂: 18.20 **Open area: 57.5%**

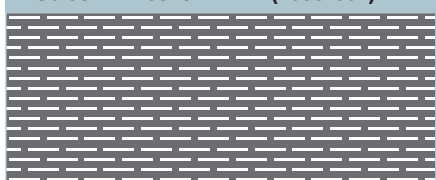
Rectangular holes, staggered pitch



Staggered pitch - a few examples

No.	L	C	Z ₁	Z ₂	Open area
LC0.4x2.5Z2.6x3.5	2.50	0.40	2.60	3.50	22.0%
LC0.9x10Z5.92x14	10.00	0.90	5.92	14.00	21.3%
LC1.5x16Z11x20	16.00	1.50	11.00	20.00	21.8%
LC0.35x4Z2.68x5	4.00	0.35	2.68	5.00	20.9%
LC4x15Z16x19	15.00	4.00	16.00	19.00	39.5%
LC12x40Z40x48	40.00	12.00	40.00	48.00	50.0%
LC20x30Z52x36	30.00	20.00	52.00	36.00	64.1%

LC0.35x4Z2.68x5 (1035-007) 1:1



L: 4.00 C: 0.35 Z₁: 2.68 Z₂: 5.00 **Open area: 20.9%**

LC1.5x16Z11x20 (1154-004) 1:1

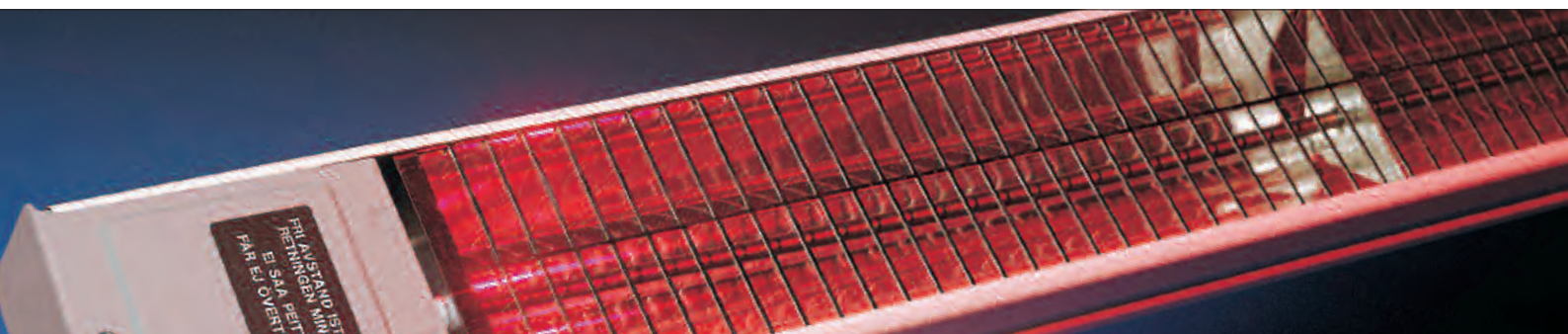


L: 16.00 C: 1.50 Z₁: 11.00 Z₂: 20.00 **Open area: 21.8%**

LC4x15Z16x19 (1403-003) 1:1



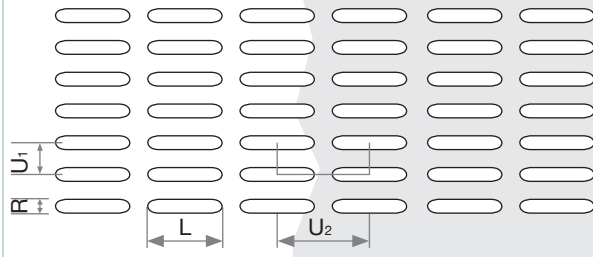
L: 15.00 C: 4.00 Z₁: 16.00 Z₂: 19.00 **Open area: 39.5%**





Slot holes

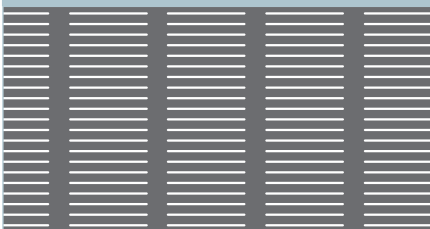
Slot holes, rectangular pitch



Rectangular pitch - a few examples

No.	L	R	U ₁	U ₂	Open area
LR0.3x10U1.4x13	10.00	0.30	1.40	13.00	16.0%
LR1x20U2.5x24	20.00	1.00	2.50	24.00	33.0%
LR2.5x20U5x24	20.00	2.50	5.00	24.00	40.5%
LR5.5x20U9x24	20.00	5.50	9.00	24.00	47.9%
LR3x25U12x30	25.00	3.00	12.00	30.00	20.3%
LR6x25U10x32	25.00	6.00	10.00	32.00	44.5%
LR20x100U40x120	100.00	20.00	40.00	120.00	39.9%

LR0.3x10U1.4x13 (1031-000) 1:1



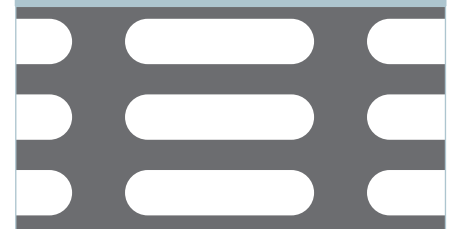
L: 10.00 R: 0.30 U₁: 1.40 U₂: 13.00 **Open area: 16.0%**

LR2.5x20U5x24 (1255-000) 1:1



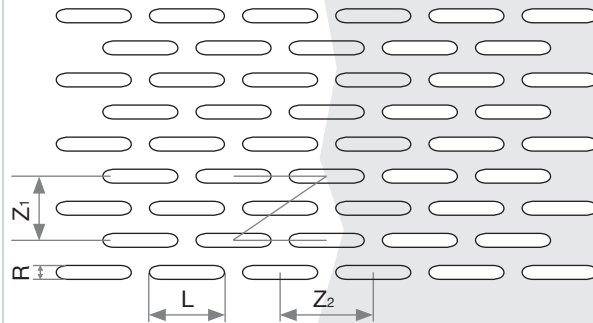
L: 20.00 R: 2.50 U₁: 5.00 U₂: 24.00 **Open area: 40.5%**

LR6x25U10x32 (1606-000) 1:1



L: 25.00 R: 6.00 U₁: 10.00 U₂: 32.00 **Open area: 44.5%**

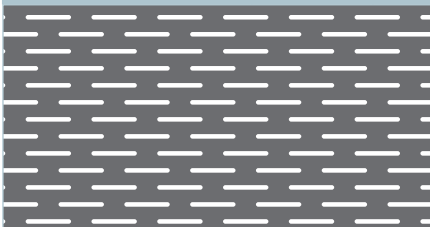
Slot holes, staggered pitch



Staggered pitch - a few examples

No.	L	R	Z ₁	Z ₂	Open area
LR0.6x6Z4.5x8.7	6.00	0.60	4.50	8.70	18.0%
LR1.5x20Z7.5x24	20.00	1.50	7.50	24.00	33.0%
LR2x20Z8.88x24	20.00	2.00	8.88	24.00	36.7%
LR2.5x20Z10.8x24	20.00	2.50	10.80	24.00	37.5%
LR3x20Z12x24	20.00	3.00	12.00	24.00	40.3%
LR10.5x20Z30x24	20.00	10.50	30.00	24.00	51.8%
LR4x25Z16.5x50	25.00	4.00	16.50	50.00	23.4%
LR8x25Z28x34	25.00	8.00	28.00	34.00	39.1%
LR20x60Z62x72	60.00	20.00	62.00	72.00	50.0%

LR0.6x6Z4.5x8.7 (1063-006) 1:1



L: 6.00 R: 0.60 Z₁: 4.50 Z₂: 8.70 **Open area: 18.0%**

LR3x20Z12x24 (1305-006) 1:1

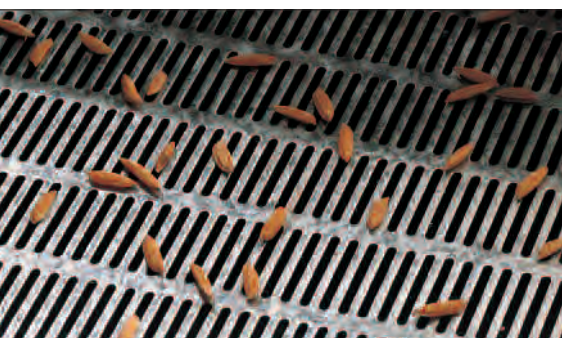


L: 20.00 R: 3.00 Z₁: 12.00 Z₂: 24.00 **Open area: 40.3%**

LR8x25Z28x34 (1806-006) 1:1



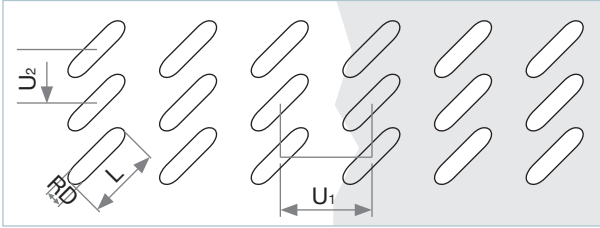
L: 25.00 R: 8.00 Z₁: 28.00 Z₂: 34.00 **Open area: 39.1%**





Slot holes

Slot holes, rectangular pitch



Rectangular pitch - a few examples

No.	L	RD	U ₁	U ₂	Open area
LRD6x25U17.1x22.2	25.00	6.00	17.10	22.20	35.6%
LRD3.25x35U29x10	35.00	3.25	29.00	10.00	38.4%
LRD8x40U37x20	40.00	8.00	37.00	20.00	41.4%
LRD11x60U35x139	60.00	11.00	35.00	139.00	1.7%
LRD14x60U56x32	60.00	14.00	56.00	32.00	44.5%

LRD6x25U17.1x22.2

(1606-019) 1:1



RD: 6.00 L: 25.00 U₁: 17.10 U₂: 22.20

Open area: 35.6%

LRD8x40U37x20

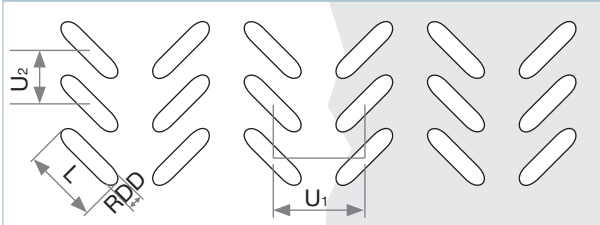
(1808-019) 1:1



RD: 8.00 L: 40.00 U₁: 37.00 U₂: 20.00

Open area: 41.4%

Slot holes, herringbone pitch



Herringbone pitch - a few examples

No.	L	RDD	U ₁	U ₂	Open area
LRDD6x12U13.75x13.33	12.00	6.00	13.75	13.33	35.1%
LRDD3.5x16U16x10	16.00	3.50	16.00	10.00	33.4%
LRDD2.5x20U17x7	20.00	2.50	17.00	7.00	46.3%
LRDD3x20U17.5x8	20.00	3.00	17.50	8.00	41.5%
LRDD1.8x25U20.7x7	25.00	1.80	20.70	7.00	30.6%

LRDD2.5x20U17x7

(1254-019) 1:1



L: 20.00 RDD: 2.50 U₁: 17.00 U₂: 7.00

Open area: 46.3%

LRDD6x12U13.75x13.33

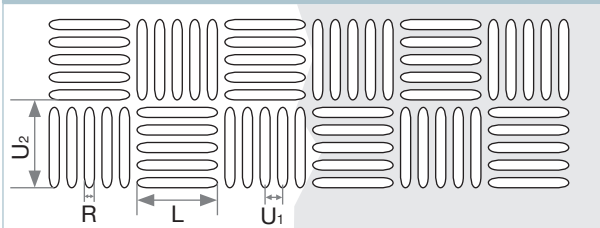
(1602-019) 1:1



L: 12.00 RDD: 6.00 U₁: 13.75 U₂: 13.33

Open area: 35.1%

Slot holes, cross pitch



Cross pitch - a few examples

No.	L	R	U ₁	U ₂	Open area
LR1.74x20Ux[5]4.57x24	20.00	1.74	4.57	24.00	29.3%
LR2.5x25Ux[5]5.68x28	25.00	2.50	5.68	28.00	39.0%
LR3.2x20Ux[4]5.77x25	20.00	3.20	5.77	25.00	39.6%
LR4x25Ux[4]7.54x31	25.00	4.00	7.54	31.00	40.2%

LR1.74x20Ux[5]4.57x24

(1175-003) 1:1



L: 20.00 R: 1.74 U₁: 24.00 U₂: 4.57

Open area: 29.3%

LR2.5x25Ux[5]5.68x28

(1256-001) 1:1



L: 25.00 R: 2.50 U₁: 28.00 U₂: 5.68

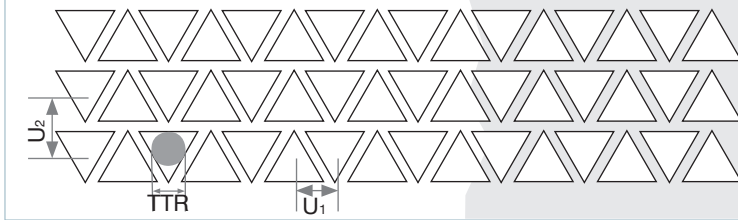
Open area: 39.0%





Triangular and hexagonal holes

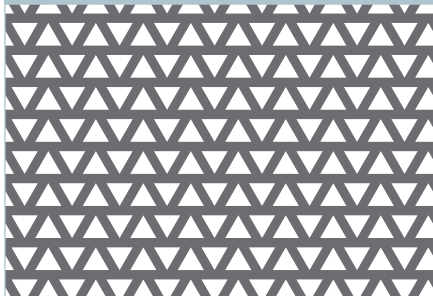
Triangular holes



Triangular holes - a few examples

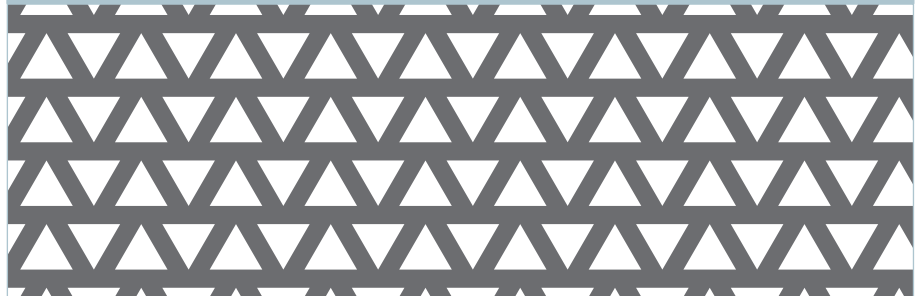
No.	TTR	U ₁	U ₂	Open area
TTR0.75U1.35x1.75	0.75	1.35	1.75	30.9%
TTR2U3.14x4.24	2.00	3.14	4.24	39.0%
TTR2.55U3.68x5	2.55	3.68	5.00	41.5%
TTR4U6.24x8.4	4.00	6.24	8.40	39.7%
TTR5.5U7.75x10.77	5.50	7.75	10.77	47.1%

TTR2U3.14x4.24 (3820-000) 1:1



TTR: 2.00 U1: 3.14 U2: 4.24 **Open area: 39.0%**

TTR4U6.24x8.4 (3840-000) 1:1



TTR: 4.00 U1: 6.24 U2: 8.24

Open area: 39.7%

Hexagonal holes



Hexagonal holes - a few examples

No.	H ₁	H ₂	T	Open area
H1.5T2	1.50	1.73	2.00	56.3%
H1.9T2.5	1.90	2.19	2.50	57.8%
H2.3T3	2.30	2.66	3.00	58.7%
H9T12	9.00	10.39	12.00	56.3%
H6T8.25	6.00	6.92	8.25	52.9%
H22T34	22.00	25.40	34.00	41.9%
H24T30	24.00	27.71	30.00	64.0%
H40T49.7	40.00	46.19	49.70	64.0%

H9T14 (959-000) 1:1



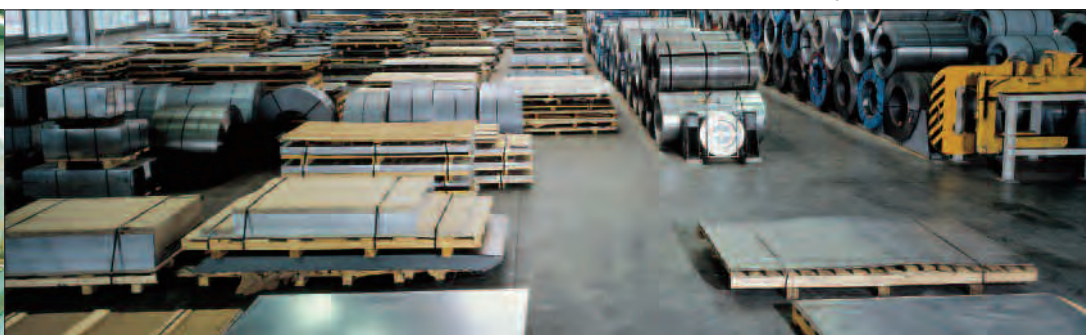
H1: 9.00 H2: 10.39 T: 14.00 **Open area: 41.3%**

H24T30 (974-000) 1:1



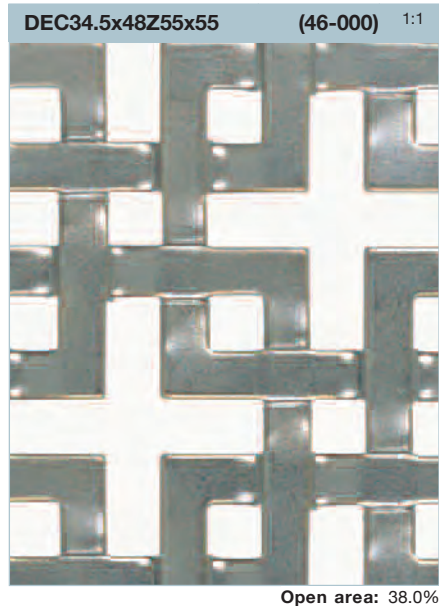
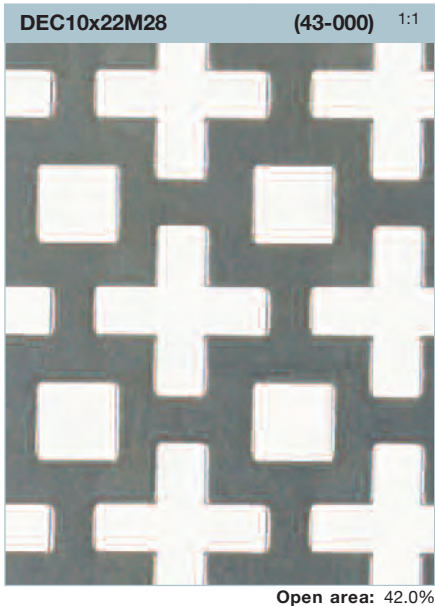
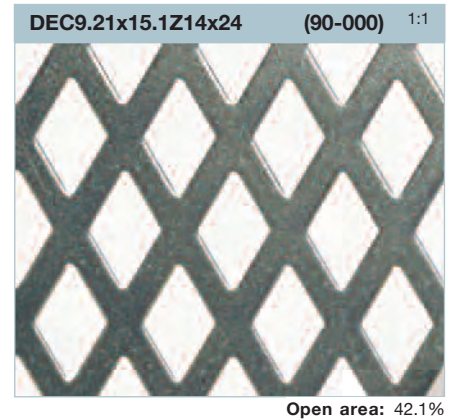
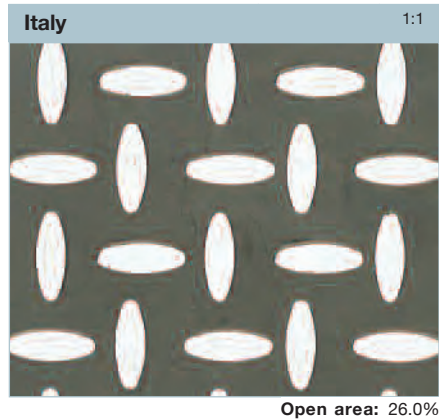
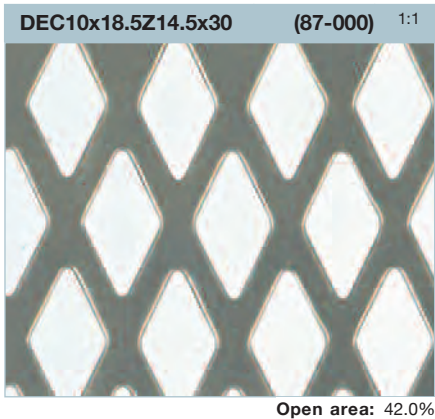
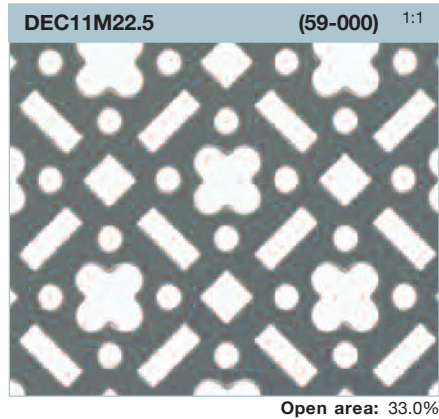
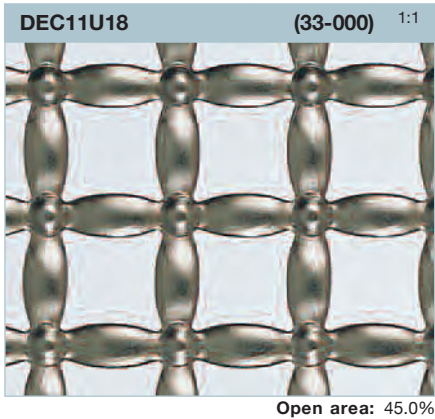
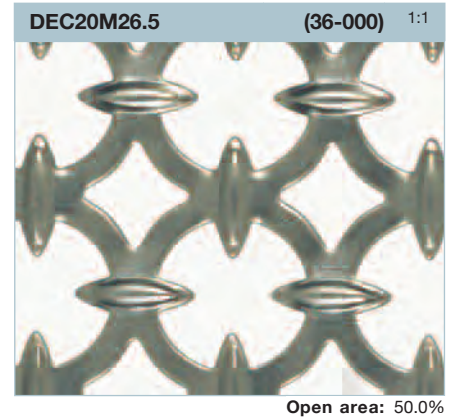
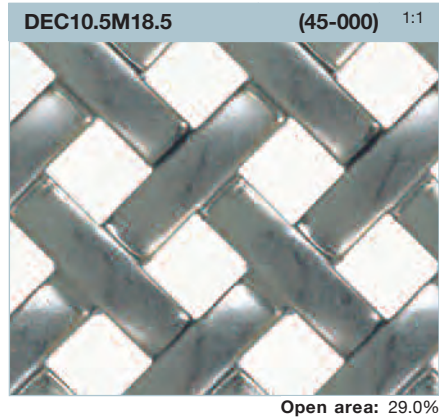
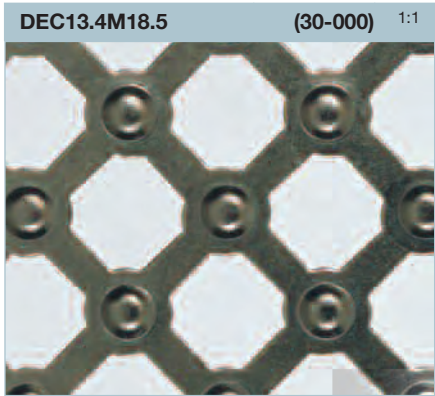
H1: 24.00 H2: 27.71 T: 30.00

Open area: 64.0%





Ornamental perforations





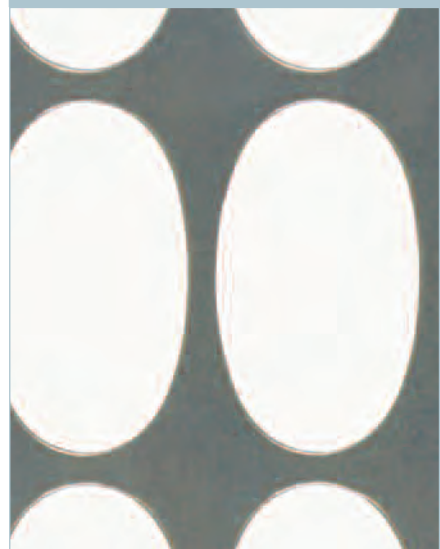
Ornamental perforations

DEC23x40Z52x36 (3-000) 1:1



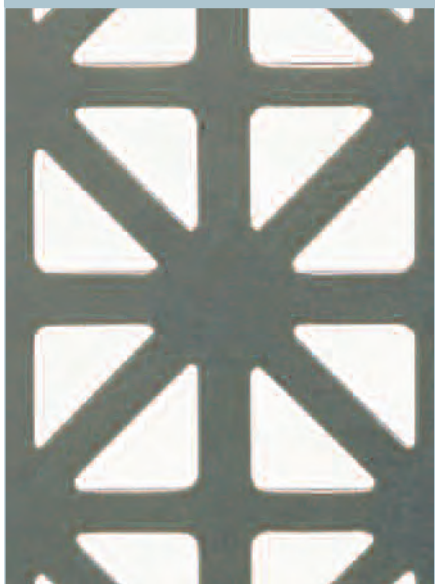
Open area: 56.0%

DEC26x45.5U50x30 (523-001) 1:1



Open area: 62.0%

DEC45U51.5 (40-000) 1:1



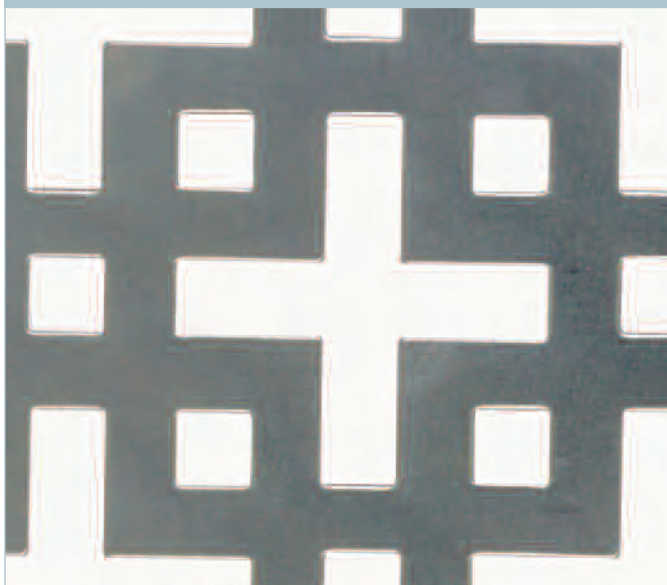
Open area: 33.0%

DEC43U48 (39-000) 1:1



Open area: 48.0%

DEC50.5x71Z81x81 (42-000) 1:1



Open area: 37.0%

DEC8x21.5Z12.5x25 (613-000) 1:1



Open area: 42.0%

TAILOR MADE PERFORATION

