Ahead from the beginning.

Graepel gratings and more for underfoot safety

Technical Information incl. stock list
for designers, planners, architects, builders and others interested in technology

January 2020

Graepel®

Content

■ Overview of Graepel perforations

Graepel perforations for the public sector	Graepel perforations for the industrial

Graepel-Perl

formerly Graepel Cone
program controllable

Graepel-Spikes

program controllable

Graepel-Universal

formerly Graepel Round S
program controllable
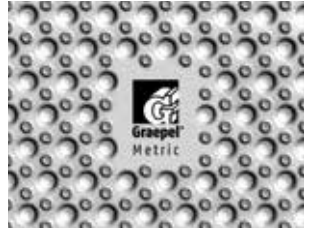
Graepel-Metric

program controllable

Graepel-Rhombus

program controllable

Graepel-Indoor

formerly Graepel Round A
program controllable
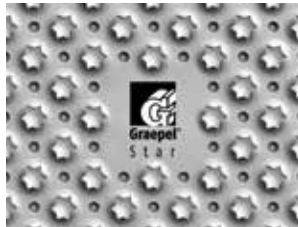
Graepel-Star

formerly Graepel Round Z
program controllable

Graepel-Stabil

program controllable

Graepel-City

formerly Graepel Round B
program controllable

Graepel-Garden

formerly Graepel Round No8
program controllable

Graepel-Open

program controllable

Graepel-Steg

Graepel-Eco

formerly Graepel Round K

The perforations are shown
at a scale of 1:5.

Special perforations

Special perforations with slip resistance (selection)
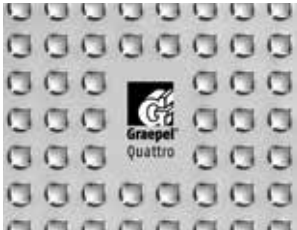
Graepel-Quattro

program controllable

Graepel-Special P-12

formerly Graepel Round N12
program controllable
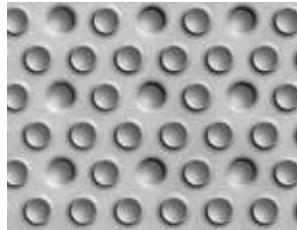
Graepel-Special 14-14

formerly Graepel Round
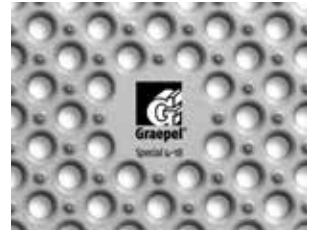
Graepel-Special 4-18

formerly Graepel Round F
program controllable

Graepel-Stabil Xtrem

formerly Graepel Stabil S
program controllable

Graepel-Rubber-Stud

Graepel-Lightprofile

Special perforations without slip resistance (selection)

Graepel-Glide 4

program controllable
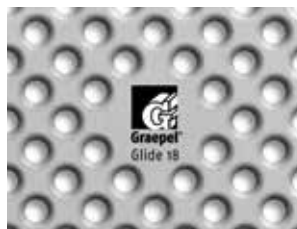
Graepel-Glide 18

formerly Graepel Round C
program controllable

5

Characteristics

Graepel gratings have the following properties:

- Slip resistance is realized through an upward embossment.

- Drainage is possible through downward perforation.

- The change between upward and downward impressions creates different surface patterns – hereinafter referred to as "perforations."

- Longitudinal stability is created by the C profile. The possible loads are dependent on material thickness, bend height, inner edges, perforation, and the chosen material. The lateral load capacity of the gratings is determined by material thickness and perforation.

Graepel gratings have a low dead weight and offer highest load capacities. This gives them significant advantages over open mesh flooring in steel construction since less substructure is required due to the load capacity in longitudinal direction. Graepel gratings are available in materials such as steel, galvanized steel, stainless steel and aluminum.

Well thought-out joining elements facilitate mounting between the gratings and to the substructure.

Application

Graepel gratings primarily provide underfoot safety. They are ideal as coverings for walkways and platforms, stairways, ladder rungs, and steps.

Increasingly more architects have discovered the aesthetic attributes of the perforations and their unique structures. They use Graepel gratings as ceiling lining and facade cladding because of their metallic surface, permeability to air and light as well as their durability. Graepel gratings can also be used as enclosures and covers for machines and installations.

In order to make it easier to select the appropriate perforation for the intended purpose, we have renamed some of our perforations. The previous names are given in brackets on the corresponding sub-pages.

We distinguish perforations between 3 fields of application:

Public sector	pages 12–27
Industrial sector	pages 28–49
Special perforations	pages 50–59

Options

- By default, Graepel gratings have a side perforation (edge perforation) on the long side of the beveled edge which facilitates the mounting of the gratings.

- Gratings with unperforated edges on one or both sides are also possible.

- Most of the Graepel perforations are program controllable. This means that unperforated areas are also possible in the surface pattern where holes, company logos, or cut-outs can later be placed.
  Controllable perforations also allow an adjustment of the perforations to a contour.

- All Graepel gratings are also available in the flat without folded edges.
  These plates have a slightly curved form.

We are at your disposal for further technical questions.

Explanation of symbols

Barefoot
This perforation is suitable for barefoot walking.

Sturdy shoes
Sturdy shoes are required for walking on this perforation.

Slip resistance
This perforation has slip resistance properties.

Fine shoes
This perforation is according to the DGUV suitable for shoes with common heels.

Drainage
This perforation has drain holes.

Basic technical terms

① **Good anti-slip properties, due to gripping surfaces.**
The anti-slip properties are tested by IFA.

② **Lengths up to 6,000 or 12,000 mm:**
This permits a wide bearing span and/or utilization as walkway surface, reducing the cost for steel constructions.

③ **Lump loads:**
Lump loads act directly on the surface. To allow these concentrated loads to be supported, a **joint bearing width** (bm) of the grating surface forms in the lengthwise direction, which is related to the width of the grating B and the size of the load surface. The equation is:
bm = a2 + 0.625 x B (B = grating width: a2 = length of load surface in lengthwise direction of the grating)

④ **The unperforated edge**
assumes the function of an upper boom for the static cross section.

⑤ **The inward edge fold**
forms the lower boom of the static cross section.

⑥ **The material thickness (2.0 | 2.5 | 3.0 | 3.5 mm)**
is taken into account for calculating the load-bearing capacity.

⑦ **Widths depending on surface**
(see standard dimensions)

⑧ **The load bearing height (H)**
(30 | 40 | 50 | 75 | 100 mm) e.g. increasing from 40 to 50 or from 50 to 75 mm results in a greater increase in the load bearing capacity compared to increasing the material thickness (D) from 2.0 to 3.0 mm (which also increases the amount of material required and the dead weight of the gratings by 50%).

A **"lightweight" element**, on the other hand, increases the loading capacity within the structure and simplifies handling and installation.

⑨ **Embossed field**
is measured from outer edge to outer edge of the outer holes.
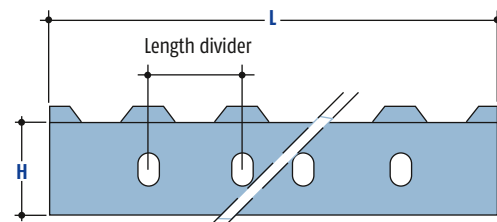
The lateral perforation simplifies installation on site.

Dimensional information on all drawings in mm. L = length, B = width, H = height, D = material thickness.
The dimensions stated may vary slightly for technical reasons.

■ Load types

Preliminary remarks to the tables on the following pages

Graepel gratings are dimensioned for the elastic material sector. Grating dimensions are determined either in consideration of the permissible stress of the material or considering the permissible deflection. The table values always consider the least advantageous value.

The permissible deflection of the "Graepel grating" beam is L / 200, where L is the support width.

If greater deflections are required, the deflection is to be calculated with the aid of the geometrical moment of inertia of the individual grating type according to the normal structural calculations.

For gratings lying next to each other, the deflection of the loaded individual grating must not be larger than 4 mm. In the case of a higher deflection, the gratings must be bolted together. A bolt spacing of approximately 500 mm is recommended.

The following loads may occur:

a) uniformly distributed loads acting vertically on the surface of the grating in kN/m²;*
b) concentrated load acting vertically in kN, that is effective over the whole grating width and can be distributed on a surface area of B x 200 mm. Here, the concentrated load is to be placed in the most disadvantageous position.*
c) lump load in kN acting vertically on a surface area of a1 x a2. The sizes of the loads and the long effective surface can be determined using DIN EN 1991-1-1 or DIN 1072.**

The force that is relevant for the load on the grating is the smaller one of the two forces resulting from concentrated load and lump load.
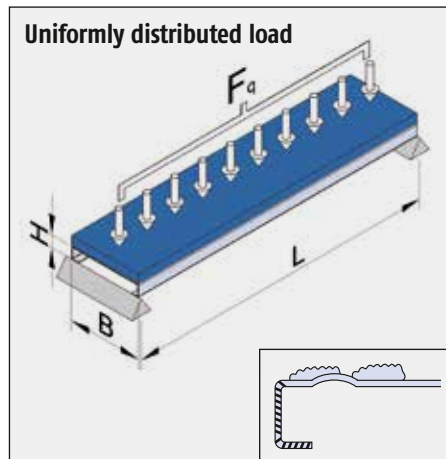
Uniformly distributed load

Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating.

Concentrated load

Lump load
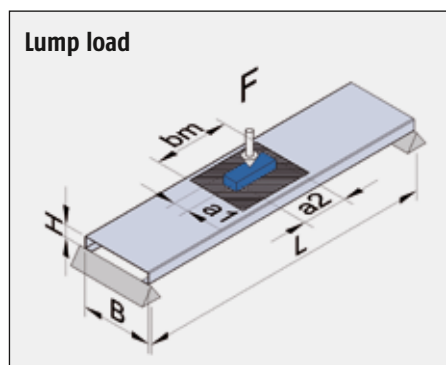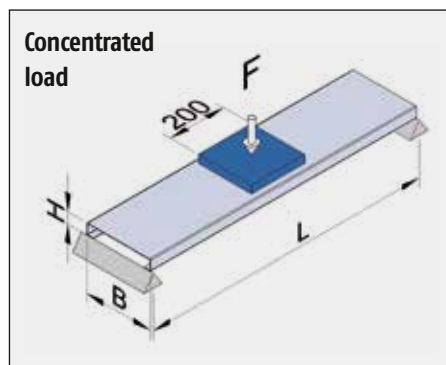
Determination of the permissible uniformly distributed load

Conversion of the replacement load Fq from the table into a distributed load Q:

$$Q = \frac{10^6 \times Fq}{B \times L}$$

Q = Distributed load for a grating [in kN/m²]
Fq = Replacement load from load table of the chosen perforation with reference to the support width [in kN]
B = Grating width [in mm]
L = Support length [in mm]

Calculation example: (dimensions in mm)
Perforation: Graepel-Universal
Material: DD 11, Material thickness: D = 2.5
Bend height: H = 40, Support length: L = 1,250
Table value: Fq = 3.41 kN
Grating width: B = 240

$$Q = \frac{10^6 \times 3.41}{240 \times 1,250} = 11.36 \text{ kN/m}^2$$

Determination of the permissible concentrated load

The value of the permissible concentrated load with reference to the material, material thickness, bend height, and support width can be read directly from the tables.

This assumes that the load surface acts over the whole grating width B. If this is not the case, then the load values of the table must not be exceeded. The smaller value is most relevant.

Load increases

1. When placing the grating over several supports (continuous beam), the permissible loads can be increased according to normal structural calculations.
2. If the gratings are bolted together such that the load only acts on the middle grating, then the permissible load values from the table "Concentrated load" can be doubled.

* for dimensioning the grating when loaded in the longitudinal direction
** for dimensioning the grating when loaded in the transverse direction

Materials | Surface treatment

The following table summarizes the materials
that we use.

Material	Designation	Previous designation	Material No.	Standard
Steel	DC 01 DC 04 DD 11 S 355 MC	St 1203 St 1403 StW 22 QSTE 380	1.0330 1.0338 1.0332 1.0978	DIN EN 10027-2 DIN EN 10027-2 DIN EN 10111 DIN EN 10149
Pre-galvanized steel	DX 51D		1.0226	DIN EN 10327
Stainless steel	X5CrNi18-10 X2CrNiMo17-12-2	V2A V4A	1.4301 1.4404	DIN EN 10088-2 DIN EN 10088
Aluminum	EN AW-5754	Al Mg3	3.3535	DIN EN 485-2 DIN EN 573-3

Surface treatment
We offer the following surface treatments:

Steel
- Hot-dip galvanizing in accordance with
  DIN EN ISO 1461 in our own galvanizing plant
- Electroplating in accordance with
  DIN EN 12329
- Liquid painting (colors subject to RAL)
- Powder coating (colors subject to RAL)
- Graepel-ColorGrip: special powder coating
  with integrated anti-slip function (RAL-
  based colors)

Stainless steel
- Pickling in our own plant
- Electro-polishing in accordance with
  ISO 15730
- Glass bead blasting

Aluminum
- Pickling in our own plant
- Anodizing in accordance with DIN 17611
  (colors according to customer's specifications)

Tolerances

Tolerances for gratings in accordance with RAL-GZ 639

D1–D2*: max. 0.005 x L
L: +2 mm/ −4 mm
B: +2 mm/ −2 mm
H: +1.5 mm/ −1.5 mm
a: 0.05 x H
b: 0.05 x H
c: 0.05 x H
d: 0.015 x B
e: 0.015 x B
f: 0.004 x L
g: 0.002 x L
h: 0.002 x L
i: +8 mm/ −0 mm
k: +8 mm/ −0 mm
tu: min. 10 mm
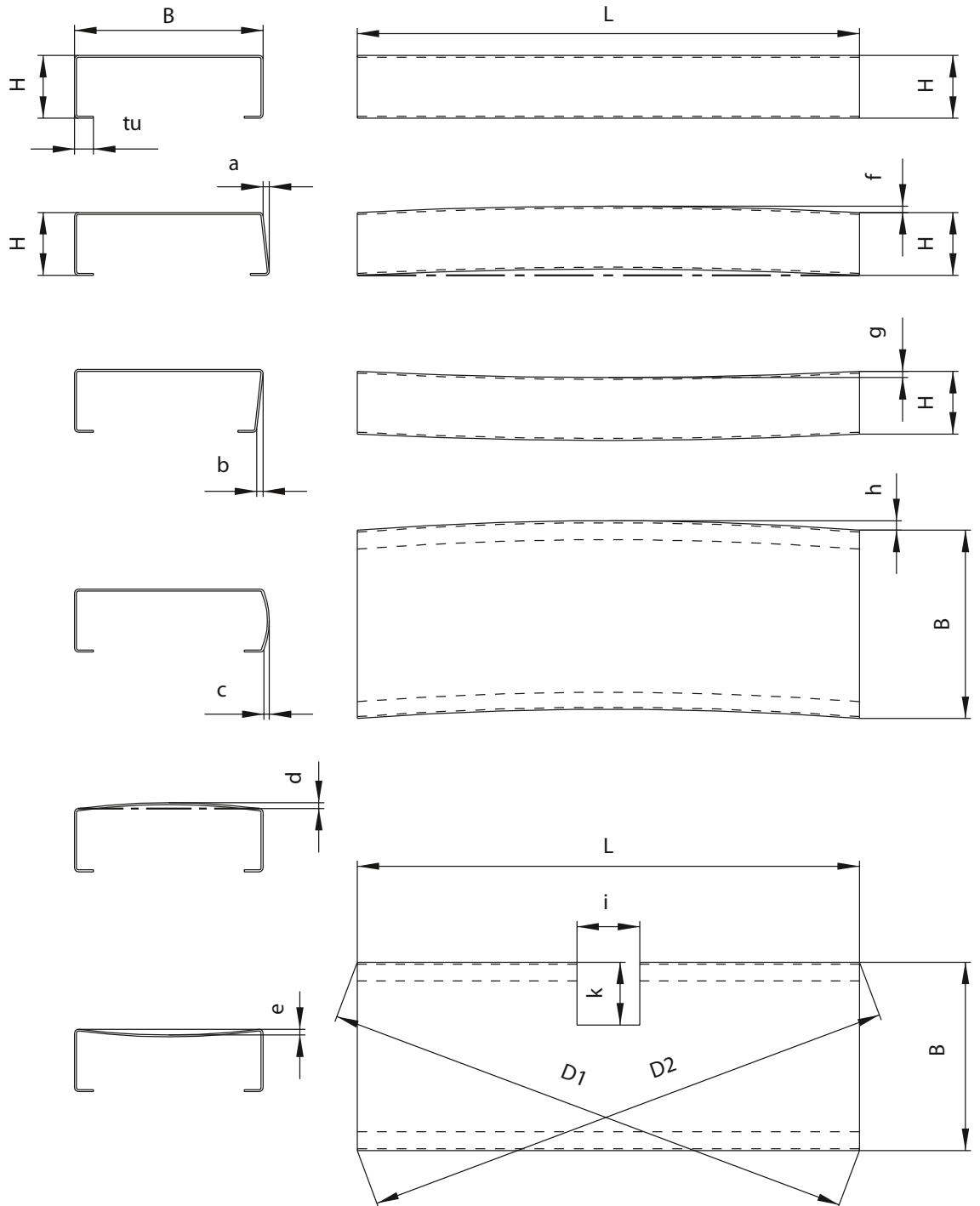
* D1–D2 = difference of the measured diagonals

Quality management

Certifications:

DIN EN ISO 9001:2008
Quality management system for the areas of:
- Manufacture of pressings and stampings
- Welded construction
- Hot-dip galvanizing

DIN EN ISO 14001:2009
Environmental management system

DIN EN ISO 50001
Energy management system

DASt Directive 022
Confirmation of the Institut für Oberflächentechnik (IfO) that the work of the in-house galvanizing shop complies with the rules of the DAST Directive 022 – Design-specific galvanizing/galvanizable designs.

Verification of suitability for welding:

DIN 18800 Part 7, Class D, manufacturer's certificate for welding of steel buildings

DIN EN 15085 Part 2, Certificate of qualification to weld rail vehicles and rail vehicle components, certification level CL1

DIN V 4113-3, Certificate of qualification to weld load-bearing structures of Aluminum, class C

DIN EN ISO 3834-2, Fusion welding of metallic materials

Certified welding company GSI SLV (quality mark)

EN 1090-2 Supporting steel members and

EN 1090-3 Supporting aluminum members

EN ISO 14122-2, gratings

EN ISO 14122-3, stairway steps

Test reports/Investigations

IFA Institute for Occupational Safety and Health of the German Social Accident Insurance
The test and certification body of the German Social Accident Insurance tests the slip resistance (R-) of the gratings and checks the displacement space (V-).

Association of property insurers (VdS)
Use of Graepel-Stabil in buildings with sprinklers protection; 21 March 1986

Det Norske Veritas
Use of Graepel Stabil in buildings with sprinklers; 09 July 1986

Total Walther, VF report 700
Tests of water distribution and activation behavior of sprinklers with Graepel gratings; April 1986

We will be happy to send you copies of the comprehensive test reports and certificates.

Graepel perforations for the public sector

Overview of Graepel perforations for the public sector

Graepel perforations for the public sector
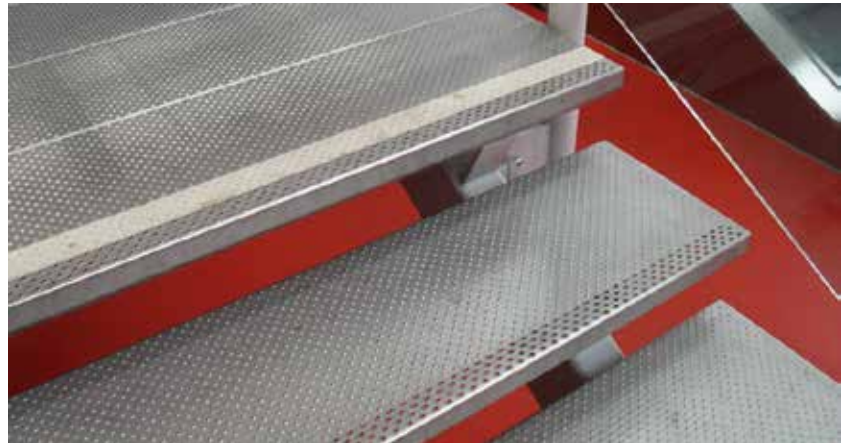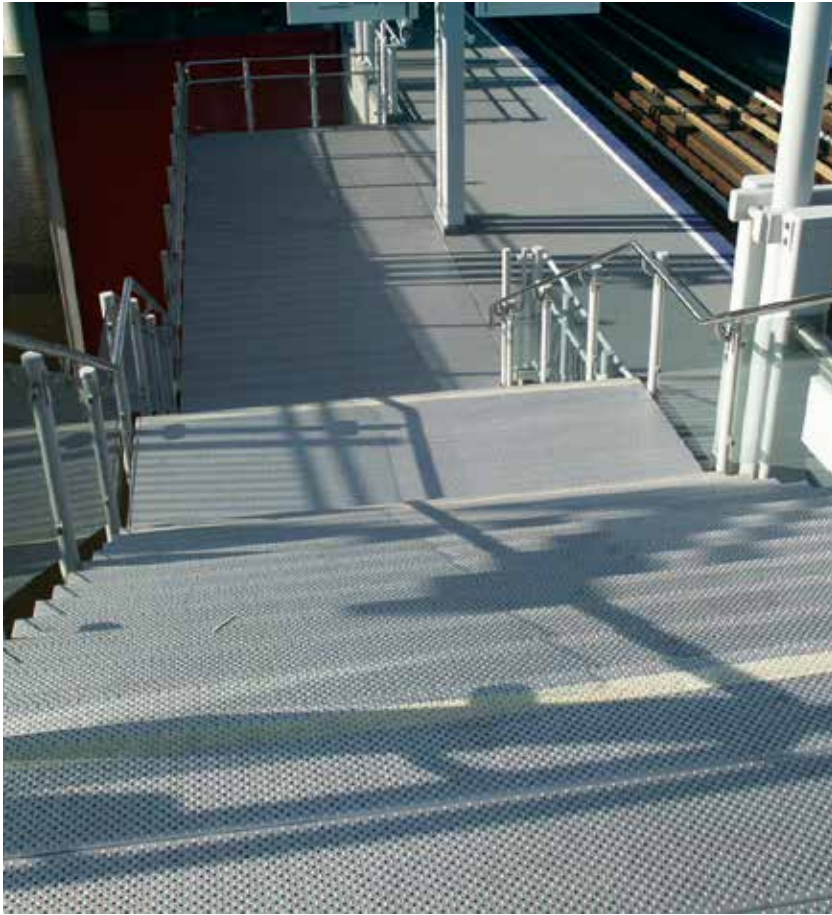
Overview of Graepel perforations for the public sector

We have grouped 7 perforations which are especially suitable for public areas – for indoor and outdoor use. The group includes 3 closed and 4 open perforations. The selection criterion is the hole size, which has a maximum diameter of 8 mm – accessible also with high heel shoes.

These Graepel gratings can also be used in the industrial sector where smaller hole sizes and consequently a smaller open area are required.

Characteristics:
- Holes with a maximum diameter of 8 mm
- Perforations extend only a few millimeters upwards
- Accessible also with finer shoes, some gratings are even suitable for barefoot walking
- Slip-resistant surface
- Lower risk of injury or abrasions
- Durable
- Easy-care
- Maintenance-free

Graepel-Perl pages 14–15
formerly Graepel Cone

The closed surface with the pearled, hemispherical upward perforations is suitable for barefoot walking and is ideal for corporate and public interiors.

Graepel-Spikes pages 16–17

Graepel-Spikes owes its name to the upwardly embossed stepped cones that are arranged in staggered rows. The closed surface is suitable for coverings in public and industrial areas.

Graepel-Rhombus pages 18–19
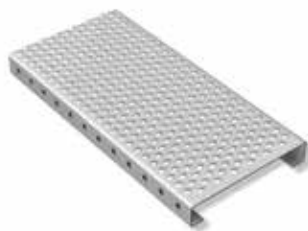
The rhombus-shaped upward perforations gave this Graepel grating its name. Due to the closed surface, Graepel-Rhombus is used in industrial and public interiors.

Graepel-Indoor pages 20–21
formerly Graepel Round A

The special surface with particularly small holes prevents small parts from dropping through. It is well suited for catwalks and stairways in public and industrial areas.

Graepel-City pages 22–23
formerly Graepel Round B

The small perforations provide a safe and also very comfortable walking surface for pedestrians. Graepel-City can be used inside as well as outside in public buildings, for stairways and catwalks.

Graepel-Garden pages 24–25
formerly Graepel Round N0 8

The surface has a mixture of cone and round perforations with a drainage effect. Graepel-Garden is good for barefoot walking and suitable for indoor and outdoor use.

Graepel-Eco page 26–27
formerly Graepel Round K

For this surface, rows in longitudinal direction alternate with embossed and debossed holes (d = 8 mm). Due to its small holes, Graepel-Eco is also suitable for use in the public sector.

Detail A

H

1.5±0.5

40

LL 9 x 12 opposite rotated 90°

Unperforated edge possible for custom versions

ø5

10

40

H

A

B

25±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges
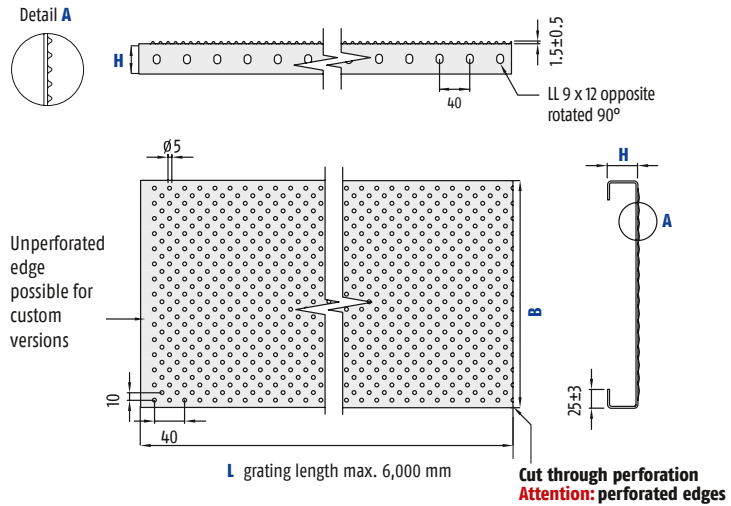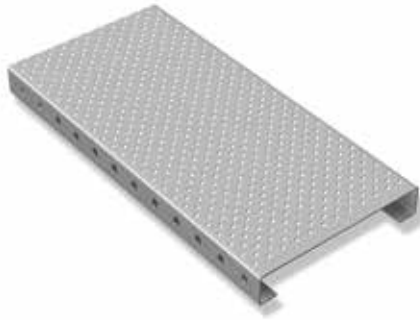
Characteristic

Graepel-Perl has a rounded, bead-shaped formation. The surface is closed. The name derives from the pearled, hemispherical upward perforations. They are arranged in staggered rows and have a diameter of 5 mm. The perforation offers a certain anti-skid effect and displacement, but no drainage. The maximum embossed field is 475 mm for program-controlled perforation groups and 625 mm for perforation groups without program control.

Application

Graepel gratings with Graepel-Perl perforation are especially suitable as covering for surfaces and platforms in public and industrial areas where closed surfaces are required. Especially recommended is the indoor use. This perforation is ideal for places where nothing should drop through and where finer (non-industrial) shoes are worn.

This perforation is even suitable for barefoot walking. The stainless steel type is suitable for use in swimming pools. Steps and ladder rungs are also available in the Graepel-Perl perforation.

Options

· This perforation is program controllable. Each bead can be left out and thus an individual embossing can be created.

· On request, Graepel-Perl can also be supplied with drain holes (d = 5 mm).

· The standard edge perforation may be omitted.

Dimensions		Graepel-Perl
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 | 3.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	40 mm
	Standard grating widths[1] (B) DD 11 | DX 51 D | Stainless steel | EN AW-57541	120 to 300 mm in steps of 10 mm
	Width divider	10 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values	
Material	Evaluation of anti-slip
DD 11 hot-dip galvanized	R 10
DX 51 D pre-galvanized	R 11
Stainless steel	R 11
EN AW-5754	R 11

Further details on the perforation on our website

Weight per meter for Graepel-Perl for material thickness D [in kg/m]

Grating width [mm]	2.0						2.5						3.0					
	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]		
	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.7	4.0	4.8	1.3	1.4	1.6	4.5	4.9	5.9	1.6	1.7	2.0	5.3	5.8	7.0	1.8	2.0	2.4
150	4.2	4.5	5.3	1.4	1.5	1.8	5.1	5.5	6.5	1.8	1.9	2.2	6.0	6.5	7.7	2.1	2.2	2.7
180	4.6	5.0	5.8	1.6	1.7	2.0	5.7	6.1	7.1	2.0	2.1	2.4	6.8	7.2	8.4	2.3	2.5	2.9
210	5.1	5.4	6.2	1.8	1.9	2.1	6.3	6.7	7.7	2.2	2.3	2.7	7.5	8.0	9.2	2.6	2.7	3.1
240	5.6	5.9	6.7	1.9	2.0	2.3	6.9	7.3	8.3	2.4	2.5	2.9	8.2	8.7	9.9	2.8	3.0	3.4
270	6.1	6.4	7.2	2.1	2.2	2.5	7.5	7.9	8.9	2.6	2.7	3.1	8.9	9.4	10.6	3.1	3.2	3.6
300	6.6	6.9	7.7	2.3	2.4	2.6	8.1	8.5	9.5	2.8	2.9	3.3	9.6	10.1	11.3	3.3	3.5	3.9
330	7.0	7.4	8.1	2.4	2.6	2.8	8.7	9.1	10.1	3.0	3.2	3.5	10.4	10.8	12.0	3.6	3.8	4.2
360	7.5	7.8	8.6	2.6	2.7	3.0	9.3	9.7	10.7	3.2	3.4	3.7	11.1	11.6	12.8	3.9	4.0	4.4
390	8.0	8.3	9.1	2.8	2.9	3.2	9.9	10.3	11.3	3.4	3.6	3.9	11.8	12.3	13.5	4.1	4.3	4.7
420	8.5	8.8	9.6	2.9	3.1	3.3	10.5	10.9	11.9	3.7	3.8	4.1	12.5	13.0	14.2	4.3	4.5	4.9
450	9.0	9.3	10.1	3.1	3.2	3.5	11.1	11.5	12.5	3.9	4.0	4.3	13.2	13.7	14.9	4.6	4.8	5.2
480	9.4	9.8	10.5	3.3	3.4	3.7	11.7	12.1	13.1	4.1	4.2	4.5	14.0	14.4	15.6	4.8	5.0	5.4

Legend * Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

■ ■ ■ = Color coding for load values of stock items

Graepel-Perl (formerly Graepel Cone)

Graepel gratings

		Uniformly distributed load				Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)							Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)						
H [mm]	D [mm]	Support length L [mm]											Support length L [mm]											
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
40	2.0	9.304	6.203	4.652	3.722	3.001	2.205	1.688	1.334	1.080	0.893	0.750	5.815	3.578	2.584	2.023	1.661	1.387	1.060	0.837	0.677	0.560	0.470
40	2.5	11.796	7.864	5.898	4.718	3.932	2.911	2.229	1.761	1.426	1.179	0.991	7.372	4.537	3.277	2.564	2.106	1.787	1.400	1.105	0.894	0.739	0.620
40	3.0	13.949	9.299	6.975	5.580	4.650	3.627	2.777	2.194	1.777	1.469	1.234	8.718	5.365	3.875	3.032	2.491	2.114	1.744	1.377	1.114	0.920	0.773
50	2.0	12.569	8.379	6.285	5.028	4.190	3.591	2.848	2.250	1.822	1.506	1.266	7.856	4.834	3.491	2.732	2.244	1.904	1.654	1.412	1.143	0.944	0.793
50	2.5	16.014	10.676	8.007	6.406	5.338	4.576	3.765	2.975	2.410	1.991	1.673	10.009	6.159	4.448	3.481	2.860	2.426	2.107	1.862	1.511	1.248	1.048
50	3.0	19.075	12.717	9.537	7.630	6.358	5.450	4.708	3.720	3.013	2.490	2.092	11.922	7.336	5.299	4.147	3.406	2.890	2.510	2.218	1.889	1.560	1.311
75	2.0	22.056	14.704	11.028	8.822	7.352	6.302	5.514	4.901	4.411	3.956	3.324	13.785	8.483	6.127	4.795	3.938	3.342	2.902	2.565	2.297	2.081	1.901
75	2.5	28.254	18.836	14.127	11.302	9.418	8.073	7.064	6.279	5.651	5.137	4.390	17.659	10.867	7.848	6.142	5.045	4.281	3.718	3.285	2.943	2.666	2.436
75	3.0	33.997	22.665	16.999	13.599	11.332	9.713	8.499	7.555	6.799	6.181	5.502	21.248	13.076	9.444	7.391	6.071	5.151	4.473	3.953	3.541	3.207	2.931
EN AW-5754																							
40	2.0	7.070	3.705	2.084	1.334	0.926	0.681	0.521	0.412	0.333	0.276	0.232	4.419	2.395	1.328	0.844	0.584	0.428	0.327	0.258	0.209	0.173	0.145
40	2.5	8.977	4.903	2.758	1.765	1.226	0.901	0.689	0.545	0.441	0.365	0.306	5.611	3.169	1.757	1.117	0.773	0.566	0.433	0.342	0.277	0.229	0.192
40	3.0	10.622	6.117	3.441	2.202	1.529	1.123	0.860	0.680	0.550	0.455	0.382	6.638	3.954	2.192	1.393	0.964	0.707	0.540	0.426	0.345	0.285	0.239
50	2.0	9.575	6.265	3.524	2.255	1.566	1.151	0.881	0.696	0.564	0.466	0.392	5.984	3.683	2.245	1.427	0.987	0.724	0.553	0.437	0.354	0.292	0.245
50	2.5	12.217	8.144	4.669	2.988	2.075	1.525	1.167	0.922	0.747	0.617	0.519	7.635	4.699	2.975	1.891	1.308	0.959	0.733	0.579	0.468	0.387	0.325
50	3.0	14.560	9.707	5.846	3.741	2.598	1.909	1.461	1.155	0.935	0.773	0.650	9.100	5.600	3.724	2.367	1.638	1.201	0.918	0.724	0.586	0.484	0.407
75	2.0	16.877	11.251	8.439	5.951	4.132	3.036	2.324	1.837	1.488	1.229	1.033	10.548	6.491	4.688	3.669	2.605	1.910	1.460	1.152	0.933	0.770	0.647
75	2.5	21.647	14.431	10.823	7.871	5.466	4.016	3.074	2.429	1.968	1.626	1.366	13.529	8.326	6.013	4.706	3.446	2.526	1.931	1.524	1.234	1.019	0.856
75	3.0	26.063	17.375	13.032	9.876	6.859	5.039	3.858	3.048	2.469	2.041	1.715	16.289	10.024	7.240	5.666	4.324	3.169	2.423	1.913	1.548	1.279	1.074
Stainless steel																							
40	2.0	10.190	6.793	5.095	4.076	3.001	2.205	1.688	1.334	1.080	0.893	0.750	6.369	3.919	2.831	2.215	1.820	1.387	1.060	0.837	0.677	0.560	0.470
40	2.5	12.919	8.613	6.460	5.168	3.962	2.911	2.229	1.761	1.426	1.179	0.991	8.075	4.969	3.589	2.809	2.307	1.831	1.400	1.105	0.894	0.739	0.620
40	3.0	15.278	10.185	7.639	6.111	4.936	3.627	2.777	2.194	1.777	1.469	1.234	9.549	5.876	4.244	3.321	2.728	2.281	1.744	1.377	1.114	0.920	0.773
50	2.0	13.766	9.177	6.883	5.506	4.589	3.719	2.848	2.250	1.822	1.506	1.266	8.604	5.295	3.824	2.993	2.458	2.086	1.788	1.412	1.143	0.944	0.793
50	2.5	17.539	11.693	8.770	7.016	5.846	4.918	3.765	2.975	2.410	1.991	1.673	10.962	6.746	4.872	3.813	3.132	2.657	2.308	1.867	1.511	1.248	1.048
50	3.0	20.891	13.928	10.446	8.357	6.964	5.969	4.708	3.720	3.013	2.490	2.092	13.057	8.035	5.803	4.542	3.731	3.165	2.749	2.334	1.889	1.560	1.311
75	2.0	24.156	16.104	12.078	9.662	8.052	6.902	6.039	5.368	4.787	3.956	3.324	15.098	9.291	6.710	5.251	4.314	3.660	3.178	2.809	2.516	2.279	2.082
75	2.5	30.945	20.630	15.473	12.378	10.315	8.842	7.736	6.877	6.189	5.224	4.390	19.341	11.902	8.596	6.727	5.526	4.689	4.072	3.598	3.223	2.919	2.668
75	3.0	37.235	24.823	18.617	14.894	12.412	10.639	9.309	8.274	7.447	6.548	5.502	23.272	14.321	10.343	8.095	6.649	5.642	4.899	4.330	3.879	3.513	3.210

Lump load

Maximum possible lump load F [in kN] (numerical values apply for DD 11)

Grating width B [mm]	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
120***	2.86	4.47	6.44
150***	1.96	3.05	4.40
180***	1.45	2.26	3.25
240	0.94	1.46	2.11
270	0.81	1.27	1.83
300	0.73	1.13	1.63

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0.74**.

Moments of inertia and section modulus
Grating cross-sections (axis X-X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	83738.15	4139.69
	2.5	110555.85	5248.44
	3.0	137733.97	6206.58
50	2.0	141251.66	5592.51
	2.5	186763.37	7125.41
	3.0	233509.75	8487.17
75	2.0	371031.28	9813.41
	2.5	489947.64	12571.54
	3.0	614101.80	15126.67

Available at short notice from stock

Material	H [mm]	D [mm]	B [mm]	L = 3,000 mm Order number	L = 6.000 mm Order number
DX 51 D pre-galvanized	40	2.0	120*	60 1800 0186 005	
	40	2.0	180*	60 1800 0187 005	
	40	2.5	240	60 1800 0188 005	60 1800 0188 605
	75	2.5	240*	60 1800 0101 005	
DD11 raw	40	2.5	180	60 1800 0771 001	
	40	2.5	240	60 1800 0772 001	
DD11 hot-dip galvanized	40	2.5	180	60 1800 0771 002	
	75	2.5	240	60 1800 0772 002	

Order information

The gratings are available up to a **length of 6,000 mm**.
Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 40 mm.
Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Detail **A**

LL 9 x 12 opposite rotated 90°

ø 10 $^{+1}_{-2}$ ø 3.5 $^{+1}_{-0.5}$

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Spikes has an upwardly formed surface. The surface is closed. The perforation owes its name to the upwardly embossed stepped cones (diameter of 10 mm at the base). They are arranged in staggered rows, extend approx. 4 mm upwards, and therefore offer a higher displacement than Graepel-Perl.
The maximum embossed field is 580 mm.

Application

They are for example used for coverings capable of being walked on, where nothing should drop through, or as cover with optically attractive surface.

Options

· This perforation is program controllable. Each stepped cone can be left out and thus an individual embossing can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Spikes
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (l)** up to	6,000 mm
	Length divider	30 mm
	Standard grating widths (B) [1]	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	120 to 300 mm in steps of 15 mm
	Width divider	15 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 10	V 10
Stainless steel	R 11	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Spikes for material thickness D [in kg/m]																		
	2.0						2.5						3.0					
Grating width	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.7	4.0	4.8	1.3	1.4	1.6	4.5	4.9	5.9	1.6	1.7	2.0	5.3	5.8	7.0	1.8	2.0	2.4
150	4.2	4.5	5.3	1.4	1.5	1.8	5.1	5.5	6.5	1.8	1.9	2.2	6.0	6.5	7.7	2.1	2.2	2.7
180	4.6	5.0	5.8	1.6	1.7	2.0	5.7	6.1	7.1	2.0	2.1	2.4	6.8	7.2	8.4	2.3	2.5	2.9
210	5.1	5.4	6.2	1.8	1.9	2.1	6.3	6.7	7.7	2.2	2.3	2.7	7.5	8.0	9.2	2.6	2.7	3.1
240	5.6	5.9	6.7	1.9	2.0	2.3	6.9	7.3	8.3	2.4	2.5	2.9	8.2	8.7	9.9	2.8	3.0	3.4
270	6.1	6.4	7.2	2.1	2.2	2.5	7.5	7.9	8.9	2.6	2.7	3.1	8.9	9.4	10.6	3.1	3.2	3.6
300	6.6	6.9	7.7	2.3	2.4	2.6	8.1	8.5	9.5	2.8	2.9	3.3	9.6	10.1	11.3	3.3	3.5	3.9

Legend
* Available only up to a length of 3,000 mm
** Values also apply for DX 51 D
*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.
▨ = Color coding for load values of stock items

■ Graepel-Spikes

<div align="right">

Graepel gratings

</div>

			Uniformly distributed load			Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)								Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)							
	H [mm]	D [mm]	\multicolumn{11}{c}{Support length L [mm]}											\multicolumn{11}{c}{Support length L [mm]}										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	40	2.0	9.304	6.203	4.652	3.722	3.001	2.205	1.688	1.334	1.080	0.893	0.750	5.815	3.578	2.584	2.023	1.661	1.387	1.060	0.837	0.677	0.560	0.470
	40	2.5	11.796	7.864	5.898	4.718	3.932	2.911	2.229	1.761	1.426	1.179	0.991	7.372	4.537	3.277	2.564	2.106	1.787	1.400	1.105	0.894	0.739	0.620
	40	3.0	13.949	9.299	6.975	5.580	4.650	3.627	2.777	2.194	1.777	1.469	1.234	8.718	5.365	3.875	3.032	2.491	2.114	1.744	1.377	1.114	0.920	0.773
	50	2.0	12.569	8.379	6.285	5.028	4.190	3.591	2.848	2.250	1.822	1.506	1.266	7.856	4.834	3.491	2.732	2.244	1.904	1.654	1.412	1.143	0.944	0.793
	50	2.5	16.014	10.676	8.007	6.406	5.338	4.576	3.765	2.975	2.410	1.991	1.673	10.009	6.159	4.448	3.481	2.860	2.426	2.107	1.862	1.511	1.248	1.048
	50	3.0	19.075	12.717	9.537	7.630	6.358	5.450	4.708	3.720	3.013	2.490	2.092	11.922	7.336	5.299	4.147	3.406	2.890	2.510	2.218	1.889	1.560	1.311
	75	2.0	22.056	14.704	11.028	8.822	7.352	6.302	5.514	4.901	4.411	3.956	3.324	13.785	8.483	6.127	4.795	3.938	3.342	2.902	2.565	2.297	2.081	1.901
	75	2.5	28.254	18.836	14.127	11.302	9.418	8.073	7.064	6.279	5.651	5.137	4.390	17.659	10.867	7.848	6.142	5.045	4.281	3.718	3.285	2.943	2.666	2.436
	75	3.0	33.997	22.665	16.999	13.599	11.332	9.713	8.499	7.555	6.799	6.181	5.502	21.248	13.076	9.444	7.391	6.071	5.151	4.473	3.953	3.541	3.207	2.931
EN AW-5754	40	2.0	7.070	3.705	2.084	1.334	0.926	0.681	0.521	0.412	0.333	0.276	0.232	4.419	2.395	1.328	0.844	0.584	0.428	0.327	0.258	0.209	0.173	0.145
	40	2.5	8.977	4.903	2.758	1.765	1.226	0.901	0.689	0.545	0.441	0.365	0.306	5.611	3.169	1.757	1.117	0.773	0.566	0.433	0.342	0.277	0.229	0.192
	40	3.0	10.622	6.117	3.441	2.202	1.529	1.123	0.860	0.680	0.550	0.455	0.382	6.638	3.954	2.192	1.393	0.964	0.707	0.540	0.426	0.345	0.285	0.239
	50	2.0	9.575	6.265	3.524	2.255	1.566	1.151	0.881	0.696	0.564	0.466	0.392	5.984	3.683	2.245	1.427	0.987	0.724	0.553	0.437	0.354	0.292	0.245
	50	2.5	12.217	8.144	4.669	2.988	2.075	1.525	1.167	0.922	0.747	0.617	0.519	7.635	4.699	2.975	1.891	1.308	0.959	0.733	0.579	0.468	0.387	0.325
	50	3.0	14.560	9.707	5.846	3.741	2.598	1.909	1.461	1.155	0.935	0.773	0.650	9.100	5.600	3.724	2.367	1.638	1.201	0.918	0.724	0.586	0.484	0.407
	75	2.0	16.877	11.251	8.439	5.951	4.132	3.036	2.324	1.837	1.488	1.229	1.033	10.548	6.491	4.688	3.669	2.605	1.910	1.460	1.152	0.933	0.770	0.647
	75	2.5	21.647	14.431	10.823	7.871	5.466	4.016	3.074	2.429	1.968	1.626	1.366	13.529	8.326	6.013	4.706	3.446	2.526	1.931	1.524	1.234	1.019	0.856
	75	3.0	26.063	17.375	13.032	9.876	6.859	5.039	3.858	3.048	2.469	2.041	1.715	16.289	10.024	7.240	5.666	4.324	3.169	2.423	1.913	1.548	1.279	1.074
Stainless steel	40	2.0	10.190	6.793	5.095	4.076	3.001	2.205	1.688	1.334	1.080	0.893	0.750	6.369	3.919	2.831	2.215	1.820	1.387	1.060	0.837	0.677	0.560	0.470
	40	2.5	12.919	8.613	6.460	5.168	3.962	2.911	2.229	1.761	1.426	1.179	0.991	8.075	4.969	3.589	2.809	2.307	1.831	1.400	1.105	0.894	0.739	0.620
	40	3.0	15.278	10.185	7.639	6.111	4.936	3.627	2.777	2.194	1.777	1.469	1.234	9.549	5.876	4.244	3.321	2.728	2.281	1.744	1.377	1.114	0.920	0.773
	50	2.0	13.766	9.177	6.883	5.506	4.589	3.719	2.848	2.250	1.822	1.506	1.266	8.604	5.295	3.824	2.993	2.458	2.086	1.788	1.412	1.143	0.944	0.793
	50	2.5	17.539	11.693	8.770	7.016	5.846	4.918	3.765	2.975	2.410	1.991	1.673	10.962	6.746	4.872	3.813	3.132	2.657	2.308	1.867	1.511	1.248	1.048
	50	3.0	20.891	13.928	10.446	8.357	6.964	5.969	4.708	3.720	3.013	2.490	2.092	13.057	8.035	5.803	4.542	3.731	3.165	2.749	2.334	1.889	1.560	1.311
	75	2.0	24.156	16.104	12.078	9.662	8.052	6.902	6.039	5.368	4.787	3.956	3.324	15.098	9.291	6.710	5.251	4.314	3.660	3.178	2.809	2.516	2.279	2.082
	75	2.5	30.945	20.630	15.473	12.378	10.315	8.842	7.736	6.877	6.189	5.224	4.390	19.341	11.902	8.596	6.727	5.526	4.689	4.072	3.598	3.223	2.919	2.668
	75	3.0	37.235	24.823	18.617	14.894	12.412	10.639	9.309	8.274	7.447	6.548	5.502	23.272	14.321	10.343	8.095	6.649	5.642	4.899	4.330	3.879	3.513	3.210

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
120***	2.86	4.47	6.44
150***	1.96	3.05	4.40
180***	1.45	2.26	3.25
210	1.13	1.76	2.54
240	0.94	1.46	2.11
270	0.81	1.27	1.83
300	0.73	1.13	1.63

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Order information

The gratings are available up to a length of **6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 30 mm.

Hot-dip galvanized gratings are hot-dip galvanized after being cut to ensure optimum corrosion protection.

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating *(shaded area)*.

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
	2.0	83738.15	4139.69
40	2.5	110555.85	5248.44
	3.0	137733.97	6206.58
	2.0	141251.66	5592.51
50	2.5	186763.37	7125.41
	3.0	233509.75	8487.17
	2.0	371031.28	9813.41
75	2.5	489947.64	12571.54
	3.0	614101.80	15126.67

■ Graepel-Rhombus

Detail **A**

H

LL 9 x 12 opposite rotated 90°

40

2 ± 0.5

14

24

17

40

Unperforated edge possible for custom versions

L grating length max. 6,000 mm

H

A

B

25 ± 3

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Rhombus has upward shaped formations. The surface is closed. It owes its name to the rhombus-shaped upward perforations which extend only a maximum of 4 mm upwards. The staggered rhombuses look like flat pyramids and have a size of 24 x 14 mm. They form a visually attractive surface since the light is reflected differently on all four sides of the rhombus. The maximum embossed field is 620 mm.

Application

Graepel-Rhombus is especially suitable as covering for surfaces and platforms in public and industrial areas where closed surfaces are required. It is especially recommended for indoor use. It is ideal for places where nothing should drop through and where finer (non-industrial) shoes are worn. Graepel-Rhombus, like Graepel-Perl, is also suitable for barefoot walking.

Options

- This perforation is program controllable. Each rhombus can be left out and thus an individual embossing can be created.

- The standard edge perforation may be omitted.

Dimensions		Graepel-Rhombus
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 | 3.0 mm
	EN AW-5754	2.0 | 2.5 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	40 mm
	Standard grating widths (B)[1]	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	120 to 300 mm in steps of 17 mm
	Width divider	17 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values	
Material	Evaluation of anti-slip
DX 51 D pre-galvanized	R 10

Further details on the perforation on our website

Weight per meter for Graepel-Rhombus for material thickness D [in kg/m]															
	2.0						2.5						3.0		
Grating width	DD 11**/ Stainless steel Height [mm]			ENAW 5754 Height [mm]			DD 11**/ Stainless steel Height [mm]			ENAW 5754 Height [mm]			DD 11**/ Stainless steel Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.7	4.0	4.8	1.3	1.4	1.6	4.5	4.9	5.9	1.6	1.7	2.0	5.3	5.8	7.0
150	4.2	4.5	5.3	1.4	1.5	1.8	5.1	5.5	6.5	1.8	1.9	2.2	6.0	6.5	7.7
180	4.6	5.0	5.8	1.6	1.7	2.0	5.7	6.1	7.1	2.0	2.1	2.4	6.8	7.2	8.4
210	5.1	5.4	6.2	1.8	1.9	2.1	6.3	6.7	7.7	2.2	2.3	2.7	7.5	8.0	9.2
240	5.6	5.9	6.7	1.9	2.0	2.3	6.9	7.3	8.3	2.4	2.5	2.9	8.2	8.7	9.9
270	6.1	6.4	7.2	2.1	2.2	2.5	7.5	7.9	8.9	2.6	2.7	3.1	8.9	9.4	10.6
300	6.6	6.9	7.7	2.3	2.4	2.6	8.1	8.5	9.5	2.8	2.9	3.3	9.6	10.1	11.3
330	7.0	7.4	8.1	2.4	2.6	2.8	8.7	9.1	10.1	3.0	3.2	3.5	10.4	10.8	12.0
360	7.5	7.8	8.6	2.6	2.7	3.0	9.3	9.7	10.7	3.2	3.4	3.7	11.1	11.6	12.8
390	8.0	8.3	9.1	2.8	2.9	3.2	9.9	10.3	11.3	3.4	3.6	3.9	11.8	12.3	13.5
420	8.5	8.8	9.6	2.9	3.1	3.3	10.5	10.9	11.9	3.7	3.8	4.1	12.5	13.0	14.2
450	9.0	9.3	10.1	3.1	3.2	3.5	11.1	11.5	12.5	3.9	4.0	4.3	13.2	13.7	14.9
480	9.4	9.8	10.5	3.3	3.4	3.7	11.7	12.1	13.1	4.1	4.2	4.5	14.0	14.4	15.6

Legend * Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

■ \| ■ \| ■ = Color coding for load values of stock items

H [mm]	D [mm]	Uniformly distributed load — Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating) Support length L [mm]											Concentrated load — Load Fq [in kN] for concentrated load (numerical values apply for single grating) Support length L [mm]										
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
40	2.0	9.304	6.203	4.652	3.722	3.001	2.205	1.688	1.334	1.080	0.893	0.750	5.815	3.578	2.584	2.023	1.661	1.387	1.060	0.837	0.677	0.560	0.470
40	2.5	11.796	7.864	5.898	4.718	3.932	2.911	2.229	1.761	1.426	1.179	0.991	7.372	4.537	3.277	2.564	2.106	1.787	1.400	1.105	0.894	0.739	0.620
40	3.0	13.949	9.299	6.975	5.580	4.650	3.627	2.777	2.194	1.777	1.469	1.234	8.718	5.365	3.875	3.032	2.491	2.114	1.744	1.377	1.114	0.920	0.773
50	2.0	12.569	8.379	6.285	5.028	4.190	3.591	2.848	2.250	1.822	1.506	1.266	7.856	4.834	3.491	2.732	2.244	1.904	1.654	1.412	1.143	0.944	0.793
50	2.5	16.014	10.676	8.007	6.406	5.338	4.576	3.765	2.975	2.410	1.991	1.673	10.009	6.159	4.448	3.481	2.860	2.426	2.107	1.862	1.511	1.248	1.048
50	3.0	19.075	12.717	9.537	7.630	6.358	5.450	4.708	3.720	3.013	2.490	2.092	11.922	7.336	5.299	4.147	3.406	2.890	2.510	2.218	1.889	1.560	1.311
75	2.0	22.056	14.704	11.028	8.822	7.352	6.302	5.514	4.901	4.411	3.956	3.324	13.785	8.483	6.127	4.795	3.938	3.342	2.902	2.565	2.297	2.081	1.901
75	2.5	28.254	18.836	14.127	11.302	9.418	8.073	7.064	6.279	5.651	5.137	4.390	17.659	10.867	7.848	6.142	5.045	4.281	3.718	3.285	2.943	2.666	2.436
75	3.0	33.997	22.665	16.999	13.599	11.332	9.713	8.499	7.555	6.799	6.181	5.502	21.248	13.076	9.444	7.391	6.071	5.151	4.473	3.953	3.541	3.207	2.931
EN AW-5754																							
40	2.0	7.070	3.705	2.084	1.334	0.926	0.681	0.521	0.412	0.333	0.276	0.232	4.419	2.395	1.328	0.844	0.584	0.428	0.327	0.258	0.209	0.173	0.145
40	2.5	8.977	4.903	2.758	1.765	1.226	0.901	0.689	0.545	0.441	0.365	0.306	5.611	3.169	1.757	1.117	0.773	0.566	0.433	0.342	0.277	0.229	0.192
40	3.0	10.622	6.117	3.441	2.202	1.529	1.123	0.860	0.680	0.550	0.455	0.382	6.638	3.954	2.192	1.393	0.964	0.707	0.540	0.426	0.345	0.285	0.239
50	2.0	9.575	6.265	3.524	2.255	1.566	1.151	0.881	0.696	0.564	0.466	0.392	5.984	3.683	2.245	1.427	0.987	0.724	0.553	0.437	0.354	0.292	0.245
50	2.5	12.217	8.144	4.669	2.988	2.075	1.525	1.167	0.922	0.747	0.617	0.519	7.635	4.699	2.975	1.891	1.308	0.959	0.733	0.579	0.468	0.387	0.325
50	3.0	14.560	9.707	5.846	3.741	2.598	1.909	1.461	1.155	0.935	0.773	0.650	9.100	5.600	3.724	2.367	1.638	1.201	0.918	0.724	0.586	0.484	0.407
75	2.0	16.877	11.251	8.439	5.951	4.132	3.036	2.324	1.837	1.488	1.229	1.033	10.548	6.491	4.688	3.669	2.605	1.910	1.460	1.152	0.933	0.770	0.647
75	2.5	21.647	14.431	10.823	7.871	5.466	4.016	3.074	2.429	1.968	1.626	1.366	13.529	8.326	6.013	4.706	3.446	2.526	1.931	1.524	1.234	1.019	0.856
75	3.0	26.063	17.375	13.032	9.876	6.859	5.039	3.858	3.048	2.469	2.041	1.715	16.289	10.024	7.240	5.666	4.324	3.169	2.423	1.913	1.548	1.279	1.074
Stainless steel																							
40	2.0	10.190	6.793	5.095	4.076	3.001	2.205	1.688	1.334	1.080	0.893	0.750	6.369	3.919	2.831	2.215	1.820	1.387	1.060	0.837	0.677	0.560	0.470
40	2.5	12.919	8.613	6.460	5.168	3.962	2.911	2.229	1.761	1.426	1.179	0.991	8.075	4.969	3.589	2.809	2.307	1.831	1.400	1.105	0.894	0.739	0.620
40	3.0	15.278	10.185	7.639	6.111	4.936	3.627	2.777	2.194	1.777	1.469	1.234	9.549	5.876	4.244	3.321	2.728	2.281	1.744	1.377	1.114	0.920	0.773
50	2.0	13.766	9.177	6.883	5.506	4.589	3.719	2.848	2.250	1.822	1.506	1.266	8.604	5.295	3.824	2.993	2.458	2.086	1.788	1.412	1.143	0.944	0.793
50	2.5	17.539	11.693	8.770	7.016	5.846	4.918	3.765	2.975	2.410	1.991	1.673	10.962	6.746	4.872	3.813	3.132	2.657	2.308	1.867	1.511	1.248	1.048
50	3.0	20.891	13.928	10.446	8.357	6.964	5.969	4.708	3.720	3.013	2.490	2.092	13.057	8.035	5.803	4.542	3.731	3.165	2.749	2.334	1.889	1.560	1.311
75	2.0	24.156	16.104	12.078	9.662	8.052	6.902	6.039	5.368	4.787	3.956	3.324	15.098	9.291	6.710	5.251	4.314	3.660	3.178	2.809	2.516	2.279	2.082
75	2.5	30.945	20.630	15.473	12.378	10.315	8.842	7.736	6.877	6.189	5.224	4.390	19.341	11.902	8.596	6.727	5.526	4.689	4.072	3.598	3.223	2.919	2.668
75	3.0	37.235	24.823	18.617	14.894	12.412	10.639	9.309	8.274	7.447	6.548	5.502	23.272	14.321	10.343	8.095	6.649	5.642	4.899	4.330	3.879	3.513	3.210

Lump load

Maximum possible lump load F [in kN] (numerical values apply for DD 11)

Grating width B [mm]	Load area 200 x 200 mm Material thickness [mm]		
	2.0	2.5	3.0
120***	2.86	4.47	6.44
150***	1.96	3.05	4.40
180***	1.45	2.26	3.25
240	0.94	1.46	2.11
270	0.81	1.27	1.83
300	0.73	1.13	1.63

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

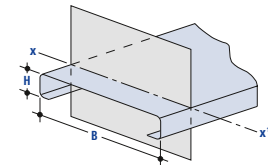For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Order information

The gratings are available **up to a length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 40 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Moments of inertia and section modulus
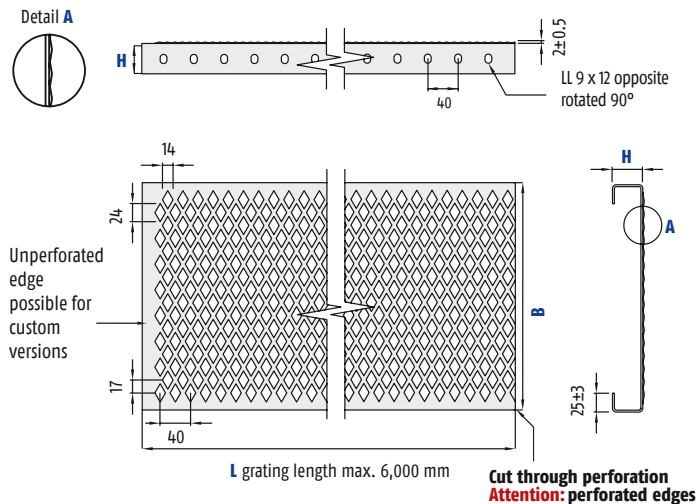
Grating cross-sections (axis X-X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	83738.15	4139.69
	2.5	110555.85	5248.44
	3.0	137733.97	6206.58
50	2.0	141251.66	5592.51
	2.5	186763.37	7125.41
	3.0	233509.75	8487.17
75	2.0	371031.28	9813.41
	2.5	489947.64	12571.54
	3.0	614101.80	15126.67

Detail **A**

H

2.5±1

LL 9 x 12 opposite rotated 90°

45

ø4.5 +1 −0.5

Unperforated edge possible for custom versions

22.5

45

B

H

A

25±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Indoor has an upward formation. The surface of Graepel-Indoor consists of small, embossed, nozzle-shaped holes (diameter of 4 mm) in staggered rows that provide a good slip resistance. This perforation has no drainage effect, but a certain displacement. If drainage is required, the Graepel-City perforation is recommended. The maximum embossed field is 458 mm.

Application

Graepel-Indoor is designed for use in the private and public sectors. The special surface with particularly small holes prevents small parts from dropping through, but provides a certain degree of ventilation. Therefore, this perforation with small holes is also suitable for areas between which pressure compensation must take place and where heat and air escape in small amounts. Graepel-Indoor can also be used in the industrial sector.

Options

· This perforation is program controllable. Each hole can be left out and thus an individual embossing can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Indoor
Material thickness	DD 11 raw	2.0 | 2.5 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	45 mm
	Standard grating widths [1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	182 to 356 mm in steps of 22.5 mm
	Width divider	22.5 mm
	Heights (H)	30 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
DX 51 D pre-galvanized	R 13	V 10
Stainless steel	R 13	V 10
EN AW-5754	R 12	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Indoor for material thickness D [in kg/m]													
	2.0						2.5						3.0		
Grating width	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			EN AW-5754 Height [mm]		
[mm]	30	50	75	30	50	75	30	50	75	30	50	75	30	50	75
182	4.2	4.9	5.7	1.5	1.7	1.9	5.3	6.1	7.1	1.8	2.1	2.4	2.2	2.5	2.9
240	5.2	5.8	6.6	1.8	2.0	2.3	6.5	7.3	8.3	2.2	2.5	2.8	2.7	3.0	3.4
298	6.1	6.8	7.6	2.1	2.3	2.6	7.7	8.5	9.5	2.6	2.9	3.3	3.2	3.5	3.9
330	6.6	7.2	8.0	2.3	2.5	2.8	8.2	9.0	10.0	2.8	3.1	3.5	3.4	3.7	4.1
356	7.1	7.7	8.5	2.4	2.6	2.9	8.8	9.6	10.6	3.0	3.3	3.7	3.6	4.0	4.4

Legend * Available only up to a length of 3,000 mm
        ** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

Graepel-Indoor (formerly Graepel Round A)

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load				Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)							Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)						
			Support length L [mm]											Support length L [mm]											
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	30	2.0	5.676	3.784	2.838	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.548	2.183	1.577	1.234	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	30	2.5	6.732	4.488	3.366	2.382	1.654	1.215	0.931	0.735	0.596	0.492	0.414	4.208	2.589	1.870	1.464	1.043	0.765	0.584	0.461	0.373	0.308	0.259
	50	2.0	11.407	7.605	5.703	4.563	3.802	3.259	2.614	2.065	1.673	1.382	1.162	7.129	4.387	3.169	2.480	2.037	1.853	1.501	1.296	1.049	0.866	0.728
	50	2.5	13.751	9.168	6.876	5.501	4.584	3.929	3.151	2.490	2.017	1.667	1.400	8.595	5.289	3.820	2.989	2.456	2.084	1.809	1.562	1.264	1.044	0.877
	75	2.0	20.283	13.522	10.141	8.113	6.761	5.795	5.071	4.507	4.057	3.671	3.084	12.677	7.801	5.634	4.409	3.622	3.073	2.669	2.358	2.113	1.913	1.749
	75	2.5	24.671	16.447	12.336	9.868	8.224	7.049	6.168	5.482	4.934	4.465	3.752	15.419	9.489	6.853	5.363	4.406	3.975	3.246	2.869	2.570	2.327	2.127
EN AW-5754	30	2.0	4.005	1.780	1.001	0.641	0.445	0.327	0.250	0.198	0.160	0.132	0.111	2.697	1.151	0.638	0.406	0.281	0.206	0.157	0.124	0.100	0.083	0.070
	30	2.5	4.751	2.111	1.188	0.760	0.528	0.388	0.297	0.235	0.190	0.157	0.132	3.199	1.365	0.757	0.481	0.333	0.244	0.186	0.147	0.119	0.098	0.083
	30	3.0	5.181	2.303	1.295	0.829	0.576	0.423	0.324	0.256	0.207	0.171	0.144	3.489	1.489	0.825	0.525	0.363	0.266	0.203	0.161	0.130	0.107	0.090
	50	2.0	8.963	5.930	3.336	2.135	1.482	1.089	0.834	0.659	0.534	0.441	0.371	5.602	3.447	2.125	1.351	0.935	0.685	0.524	0.413	0.335	0.276	0.232
	50	2.5	10.805	7.149	4.021	2.574	1.787	1.313	1.005	0.794	0.643	0.532	0.447	6.753	4.156	2.562	1.629	1.127	0.826	0.631	0.498	0.403	0.333	0.280
	50	3.0	12.064	7.986	4.492	2.875	1.997	1.467	1.123	0.887	0.719	0.594	0.499	7.540	4.640	2.862	1.819	1.259	0.923	0.705	0.557	0.451	0.372	0.313
	75	2.0	15.936	10.624	7.968	5.668	3.936	2.892	2.214	1.749	1.417	1.171	0.984	9.960	6.129	4.427	3.464	2.481	1.819	1.391	1.098	0.888	0.734	0.616
	75	2.5	19.384	12.923	9.692	6.895	4.788	3.518	2.693	2.128	1.724	1.425	1.197	12.115	7.456	5.385	4.214	3.019	2.213	1.692	1.335	1.081	0.893	0.750
	75	3.0	21.968	14.645	10.984	7.817	5.428	3.988	3.053	2.413	1.954	1.615	1.357	13.730	8.449	6.102	4.776	3.422	2.508	1.918	1.514	1.225	1.012	0.850
Stainless steel	30	2.0	6.217	4.144	3.108	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.885	2.391	1.727	1.271	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	50	2.0	12.493	8.329	6.247	4.997	4.164	3.414	2.614	2.065	1.673	1.382	1.162	7.808	4.805	3.470	2.716	2.231	1.893	1.642	1.296	1.049	0.866	0.728
	75	2.0	22.214	14.810	11.107	8.886	7.405	6.347	5.554	4.937	4.441	3.671	3.084	13.884	8.544	6.171	4.829	3.967	3.366	2.923	2.583	2.314	2.096	1.915

Lump load	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
Grating width B [mm]	Material thickness [mm]		
	2.0	2.5	3.0
182***	1.42	2.22	3.19
240	0.94	1.46	2.11
298	0.73	1.14	1.64
330	0.66	1.03	1.49
356	0.62	0.97	1.39

Note concerning lump load
The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

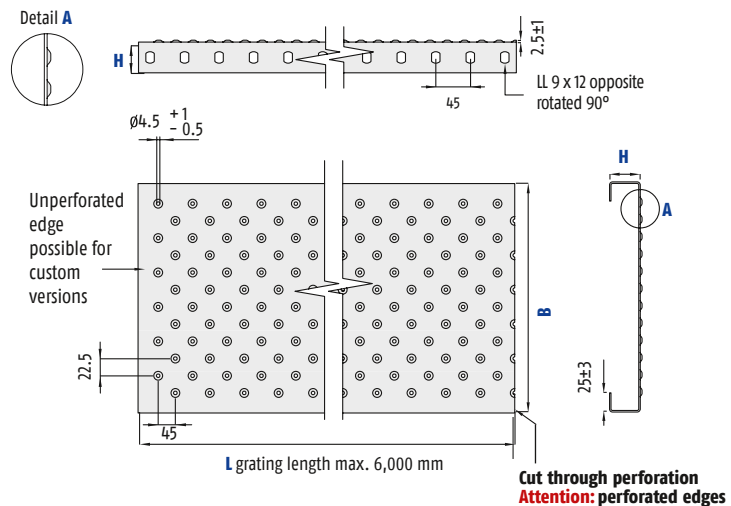**Conversion of the replacement load Fq from the table into a distributed load Q**

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X-X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating *(shaded area)*.

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
30	2.0	38918.66	2525.54
	2.5	46161.04	2995.52
	3.0	50344.74	3264.69
50	2.0	129645.30	5075.43
	2.5	156300.69	6118.51
	3.0	174605.86	6831.59
75	2.0	344236.50	9024.56
	2.5	418745.73	10977.18
	3.0	474710.43	12440.09

Detail **A**

H

2.5±1

LL 9 x 12 opposite rotated 90°

45

ø4.5 +1 −0.5   ø8 0 −2

Unperforated edge possible for custom versions

22.5

45

L grating length max. 6,000 mm

B

H

A

25±3

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-City has both upward and downward formations. The surface of Graepel-City consists of small embossed (diameter of 4.5 mm) and debossed holes (diameter of 8 mm) that are arranged in staggered rows. Graepel-City is based on Graepel-Indoor perforation and supplements it by drain holes. It provides good slip resistance and drainage effects. The open area for standard grating widths is approx. 6 %; the maximum embossed field is 460 mm.

Application

Graepel-City is designed for use in public buildings and outside facilities. This perforation provides a very safe and comfortable walking surface for pedestrians and cyclists. Water and sediments of small grain size can fall through the drain holes, but it is sufficiently opaque even on steps. If barefoot walking is required, the Graepel-Garden perforation is recommended. Graepel-City is also used in the industrial sector, e.g. in inspection pits for cars and commercial vehicles.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-City
Material thickness	DD 11 raw	2.0	2.5 mm
	DD 11 hot-dip galvanized	DX 51 D pre-galvanized	2.0	2.5 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0	2.5	3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	45 mm
	Standard grating widths¹ (B)	
	DD 11	DX 51 D	Stainless steel	EN AW-5754	182 to 356 mm in steps of 22.5 mm
	Width divider	22.5 mm
	Heights (H)	30	50	75 mm

¹ Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
Stainless steel	R 13	V 10
EN AW-5754	R 12	V 10

Further details on the perforation on our website

Weight per meter for Graepel-City for material thickness D [in kg/m]												
	2.0						2.5					3.0		
Grating width	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			EN AW-5754 Height [mm]		
[mm]	30	50	75	30	50	75	30	50	75	30	50	75	30	50	75
182	4.1	4.8	5.6	1.4	1.6	1.9	5.2	6.0	7.0	1.8	2.1	2.4	2.1	2.5	2.9
240	5.0	5.7	6.5	1.7	2.0	2.2	6.3	7.1	8.1	2.2	2.4	2.8	2.6	2.9	3.3
298	6.0	6.6	7.4	2.1	2.3	2.5	7.5	8.3	9.3	2.6	2.8	3.2	3.1	3.4	3.8
330	6.4	7.1	7.9	2.2	2.4	2.7	8.0	8.8	9.8	2.8	3.0	3.4	3.3	3.6	4.1
356	6.9	7.5	8.3	2.4	2.6	2.9	8.6	9.4	10.4	3.0	3.2	3.6	3.5	3.9	4.3

Legend   *   Available only up to a length of 3,000 mm
         **   Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

Graepel-City (formerly Graepel Round B)

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load / Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)											Concentrated load / Load Fq [in kN] for concentrated load (numerical values apply for single grating)										
			Support length L [mm]											Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	30	2.0	5.676	3.784	2.838	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.548	2.183	1.577	1.234	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	30	2.5	6.732	4.488	3.366	2.382	1.654	1.215	0.931	0.735	0.596	0.492	0.414	4.208	2.589	1.870	1.464	1.043	0.765	0.584	0.461	0.373	0.308	0.259
	50	2.0	11.407	7.605	5.703	4.563	3.802	3.259	2.614	2.065	1.673	1.382	1.162	7.129	4.387	3.169	2.480	2.037	1.853	1.501	1.296	1.049	0.866	0.728
	50	2.5	13.751	9.168	6.876	5.501	4.584	3.929	3.151	2.490	2.017	1.667	1.400	8.595	5.289	3.820	2.989	2.456	2.084	1.809	1.562	1.264	1.044	0.877
	75	2.0	20.283	13.522	10.141	8.113	6.761	5.795	5.071	4.507	4.057	3.671	3.084	12.677	7.801	5.634	4.409	3.622	3.073	2.669	2.358	2.113	1.913	1.749
	75	2.5	24.671	16.447	12.336	9.868	8.224	7.049	6.168	5.482	4.934	4.465	3.752	15.419	9.489	6.853	5.363	4.406	3.975	3.246	2.869	2.570	2.327	2.127
EN AW-5754	30	2.0	4.005	1.780	1.001	0.641	0.445	0.327	0.250	0.198	0.160	0.132	0.111	2.697	1.151	0.638	0.406	0.281	0.206	0.157	0.124	0.100	0.083	0.070
	30	2.5	4.751	2.111	1.188	0.760	0.528	0.388	0.297	0.235	0.190	0.157	0.132	3.199	1.365	0.757	0.481	0.333	0.244	0.186	0.147	0.119	0.098	0.083
	30	3.0	5.181	2.303	1.295	0.829	0.576	0.423	0.324	0.256	0.207	0.171	0.144	3.489	1.489	0.825	0.525	0.363	0.266	0.203	0.161	0.130	0.107	0.090
	50	2.0	8.963	5.930	3.336	2.135	1.482	1.089	0.834	0.659	0.534	0.441	0.371	5.602	3.447	2.125	1.351	0.935	0.685	0.524	0.413	0.335	0.276	0.232
	50	2.5	10.805	7.149	4.021	2.574	1.787	1.313	1.005	0.794	0.643	0.532	0.447	6.753	4.156	2.562	1.629	1.127	0.826	0.631	0.498	0.403	0.333	0.280
	50	3.0	12.064	7.986	4.492	2.875	1.997	1.467	1.123	0.887	0.719	0.594	0.499	7.540	4.640	2.862	1.819	1.259	0.923	0.705	0.557	0.451	0.372	0.313
	75	2.0	15.936	10.624	7.968	5.668	3.936	2.892	2.214	1.749	1.417	1.171	0.984	9.960	6.129	4.427	3.464	2.481	1.819	1.391	1.098	0.888	0.734	0.616
	75	2.5	19.384	12.923	9.692	6.895	4.788	3.518	2.693	2.128	1.724	1.425	1.197	12.115	7.456	5.385	4.214	3.019	2.213	1.692	1.335	1.081	0.893	0.750
	75	3.0	21.968	14.645	10.984	7.817	5.428	3.988	3.053	2.413	1.954	1.615	1.357	13.730	8.449	6.102	4.776	3.422	2.508	1.918	1.514	1.225	1.012	0.850
Stainless steel	30	2.0	6.217	4.144	3.108	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.885	2.391	1.727	1.271	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	50	2.0	12.493	8.329	6.247	4.997	4.164	3.414	2.614	2.065	1.673	1.382	1.162	7.808	4.805	3.470	2.716	2.231	1.893	1.642	1.296	1.049	0.866	0.728
	75	2.0	22.214	14.810	11.107	8.886	7.405	6.347	5.554	4.937	4.441	3.671	3.084	13.884	8.544	6.171	4.829	3.967	3.366	2.923	2.583	2.314	2.096	1.915

Lump load	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
Grating width B [mm]	Material thickness [mm]		
	2.0	2.5	3.0
182***	1.42	2.22	3.19
240	0.94	1.46	2.11
298	0.73	1.14	1.64
330	0.66	1.03	1.49
356	0.62	0.97	1.39

Note concerning lump load
The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
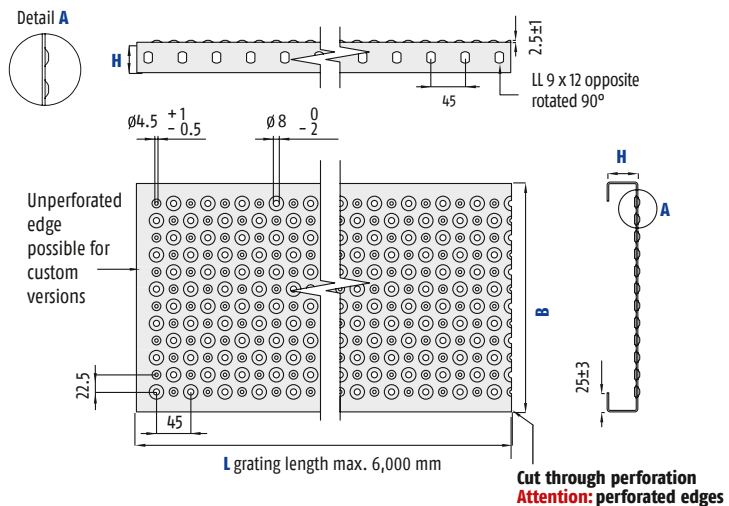Grating cross-sections (axis X-X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
30	2.0	38918.66	2525.54
	2.5	46161.04	2995.52
	3.0	50344.74	3264.69
50	2.0	129645.30	5075.43
	2.5	156300.69	6118.51
	3.0	174605.86	6831.59
75	2.0	344236.50	9024.56
	2.5	418745.73	10977.18
	3.0	474710.43	12440.09

23

Detail **A**

H | 1,5±0,5 | LL 9 x 12 opposite rotated 90°

25

ø8 +0 -2 | ø5

Unperforated edge possible for custom versions

20 | 25 | B | H | A | 25±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Garden has both upward and downward formations. The surface of Graepel-Garden consists of pearled upward embossments (diameter of 5 mm) and debossed holes (diameter of 8 mm) that are arranged in staggered rows. The open area for standard grating widths is approximately 9 %. This perforation offers a certain anti-skid effect and displacement as well as a good drainage effect. The maximum embossed field is 430 mm.

Application

The term "Graepel-Garden" refers to its possible application in the private and public sectors. This perforation is especially suitable as covering for surfaces and platforms where a certain anti-skid effect and drainage are required, e.g. at the transition from outside to inside on balconies and terraces. Graepel-Garden can also be used in the industrial sector.

As this perforation is also good for barefoot walking, the stainless steel version is suitable e.g. for use in swimming pools or as edging for basins. Steps are also available with Graepel-Garden perforation.

Options

· This perforation is program controllable.
  Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Garden
Material thickness	DD 11 raw	2.0 | 2.5 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 mm
Dimensions	Lengths (L) up to	6,000 mm
	Length divider	25 mm
	Standard grating widths [1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	120 to 440 mm in steps of 20 mm
	Width divider	20 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values

Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 10	V 10
Stainless steel	R 10	V 10
EN AW-5754	R 10	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Garden for material thickness D [in kg/m]

| Grating width [mm] | 2.0 | | | | | | 2.5 | | | | | |
| | DD 11**/ Stainless steel Height [mm] | | | EN AW-5754 Height [mm] | | | DD 11**/ stainless steel Height [mm] | | | EN AW-5754 Height [mm] | | |
	40	50	75	40	50	75	40	50	75	40	50	75
120	3.6	3.9	4.7	1.2	1.3	1.6	4.4	4.8	5.8	1.5	1.6	2.0
180	4.2	4.5	5.3	1.4	1.7	1.9	5.1	5.5	6.5	1.6	1.9	2.2
240	4.8	5.1	5.9	1.6	2.0	2.2	5.9	6.3	7.3	1.8	2.2	2.5
300	5.4	5.7	6.5	1.9	2.3	2.6	6.6	7.0	8.0	2.0	2.4	2.8

Legend | * Available only up to a length of 3,000 mm | *** For gratings smaller than 200 mm, the lump load is added to the | ■ \| ■ \| ■ \| ■ = Color coding for load
| ** Values also apply for DX 51 D | neighboring gratings corresponding to the portion of the load area. | values of stock items
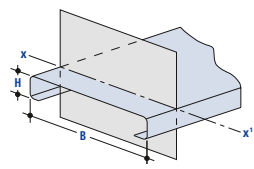
Graepel–Garden (formerly Graepel Round No8)

	H [mm]	D [mm]	Uniformly distributed load				Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)							Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)						
			Support length L [mm]											Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	40	2.0	6.581	4.388	3.291	2.633	2.194	1.762	1.349	1.066	0.863	0.714	0.600	4.113	2.531	1.828	1.431	1.175	0.997	0.847	0.669	0.541	0.447	0.376
	40	2.5	7.858	5.239	3.929	3.143	2.619	2.105	1.612	1.273	1.031	0.852	0.716	4.911	3.022	2.183	1.708	1.403	1.191	1.012	0.799	0.647	0.534	0.449
	50	2.0	9.165	6.110	4.583	3.666	3.055	2.619	2.291	1.830	1.482	1.225	1.029	5.728	3.525	2.546	1.992	1.637	1.389	1.206	1.066	0.929	0.768	0.645
	50	2.5	11.017	7.345	5.509	4.407	3.672	3.148	2.754	2.201	1.783	1.473	1.238	6.886	4.237	3.060	2.395	1.967	1.669	1.450	1.281	1.118	0.923	0.775
	75	2.0	17.007	11.338	8.503	6.803	5.669	4.859	4.252	3.779	3.401	3.092	2.794	10.629	6.541	4.724	3.697	3.037	2.577	2.238	1.978	1.772	1.604	1.466
	75	2.5	20.646	13.764	10.323	8.258	6.882	5.899	5.161	4.588	4.129	3.754	3.393	12.904	7.941	5.735	4.488	3.687	3.128	2.717	2.401	2.151	1.948	1.780
EN AW-5754	40	2.0	4.941	2.933	1.650	1.056	0.733	0.539	0.412	0.326	0.264	0.218	0.183	3.088	1.896	1.051	0.668	0.462	0.339	0.259	0.204	0.166	0.137	0.115
	40	2.5	5.892	3.500	1.968	1.260	0.875	0.643	0.492	0.389	0.315	0.260	0.219	3.682	2.262	1.254	0.797	0.552	0.404	0.309	0.244	0.197	0.163	0.137
	50	2.0	6.912	4.608	2.844	1.820	1.264	0.929	0.711	0.562	0.455	0.376	0.316	4.320	2.659	1.812	1.152	0.797	0.584	0.447	0.352	0.285	0.236	0.198
	50	2.5	8.301	5.534	3.417	2.187	1.519	1.116	0.854	0.675	0.547	0.452	0.380	5.188	3.193	2.177	1.384	0.957	0.702	0.536	0.423	0.343	0.283	0.238
	75	2.0	12.927	8.618	6.463	4.974	3.454	2.538	1.943	1.535	1.244	1.028	0.864	8.079	4.972	3.591	2.810	2.178	1.596	1.220	0.963	0.780	0.644	0.541
	75	2.5	15.682	10.455	7.841	6.037	4.192	3.080	2.358	1.863	1.509	1.247	1.048	9.801	6.032	4.356	3.409	2.643	1.937	1.481	1.169	0.946	0.782	0.656
Stainless steel	40	2.0	7.208	4.805	3.604	2.883	2.398	1.762	1.349	1.066	0.863	0.714	0.600	4.505	2.772	2.002	1.567	1.287	1.092	0.847	0.669	0.541	0.447	0.376
	40	2.5	8.607	5.738	4.303	3.443	2.865	2.105	1.612	1.273	1.031	0.852	0.716	5.379	3.310	2.391	1.871	1.537	1.304	1.012	0.799	0.647	0.534	0.449
	50	2.0	10.038	6.692	5.019	4.015	3.346	2.868	2.316	1.830	1.482	1.225	1.029	6.274	3.861	2.788	2.182	1.793	1.521	1.321	1.148	0.929	0.768	0.645
	50	2.5	12.067	8.044	6.033	4.827	4.022	3.448	2.785	2.201	1.783	1.473	1.238	7.542	4.641	3.352	2.623	2.155	1.828	1.588	1.381	1.118	0.923	0.775
	75	2.0	18.626	12.418	9.313	7.451	6.209	5.322	4.657	4.139	3.725	3.325	2.794	11.641	7.164	5.174	4.049	3.326	2.822	2.451	2.166	1.940	1.757	1.606
	75	2.5	22.612	15.075	11.306	9.045	7.537	6.461	5.653	5.025	4.522	4.038	3.393	14.132	8.697	6.281	4.916	4.038	3.426	2.975	2.629	2.355	2.133	1.949

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)	
	Load area 200 x 200 mm	
	Material thickness [mm]	
	2.0	2.5
120***	3.03	4.24
150***	1.53	2.14
240	0.99	1.39
300	0.77	1.08

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Available at short notice from stock

Material	H [mm]	D [mm]	B [mm]	L = 3,000 mm Order number	L = 6,000 mm Order number
DD11 raw	40	2.5	120*	60 3200 0031 001	
	40	2.5	180	60 3200 0032 001	60 3200 0032 601
	40	2.5	240	60 3200 0033 001	60 3200 0033 601
	40	2,5	300	60 3200 0034 001	60 3200 0034 601
DD11 hot-dip galvanized	40	2.5	120*	60 3200 0031 002	
	40	2.5	180	60 3200 0032 002	60 3200 0032 602
	40	2.5	240	60 3200 0033 002	60 3200 0033 602
	40	2.5	300	60 3200 0034 002	60 3200 0034 602
Aluminum EN AW-5754	40	2.5	240	60 3200 0033 003	60 3200 0033 603
	40	2.5	300	60 3200 0034 003	60 3200 0034 603
Stainless steel Material no. 1.4404	40	2.0	240*	60 3200 0035 007	
	40	2.0	300*	60 3200 0036 007	

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).
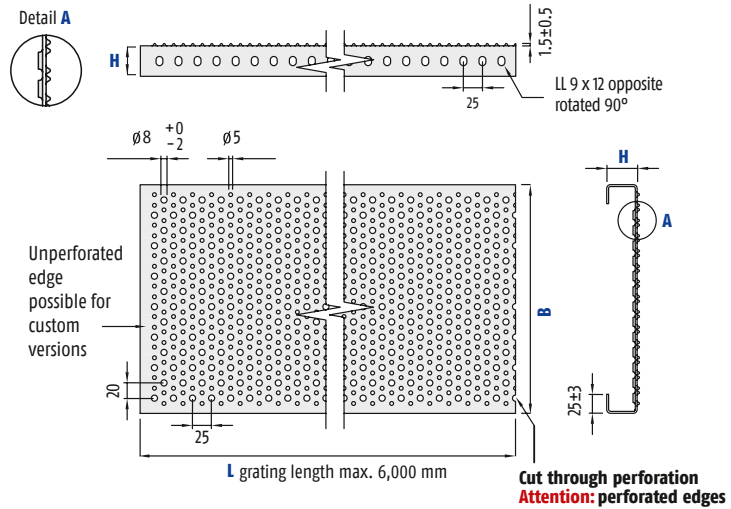
Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	66917.92	2928.32
	2.5	79936.89	3496.52
50	2.0	114875.61	4077.95
	2.5	138157.47	4902.10
75	2.0	311818.16	7566.96
	2.5	378690.44	9186.11

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Order information

The gratings are available up to **a length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 25 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Graepel-Eco (formerly Graepel-Round K)

Detail **A**

H — LL 9 x 12 opposite rotated 90°

ø 8 ₀₋₂

Unperforated edge possible for custom versions

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges
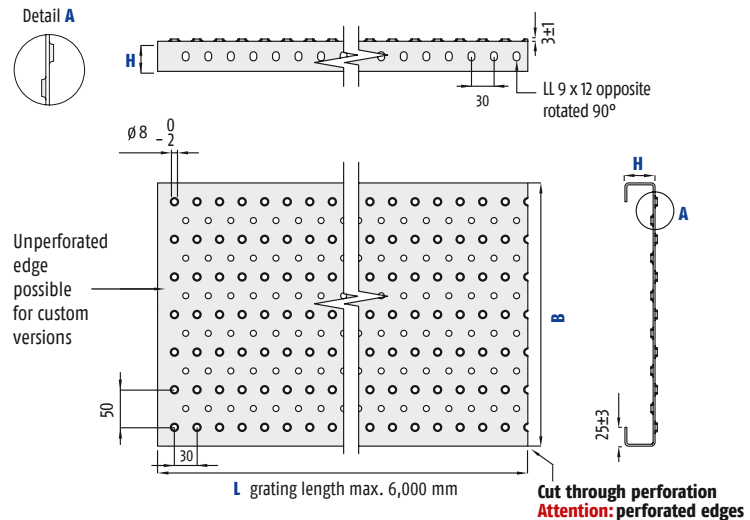
Characteristics

Graepel-Eco has a C-shaped, canted contour. For this surface, rows in longitudinal direction alternate with embossed and debossed holes (d = 8 mm). The open area for standard grating widths is approximately 6 %. Graepel-Eco offers an excellent anti-skid effect and displacement as well as some drainage effect. The maximum embossed field is 460 mm.

The 50 mm width divider by means of which metric surfacers can be fully covered with standard gratings makes this variant so economic. As a result, there is no need for fitting gratings which would otherwise have to be additionally manufactured.

Application

Thanks to the straight rows of holes, lengthways-installed Graepel-Eco makes it easy to safely guide wheels of wheelchairs, walking aids, suitcases, containers, bicycles and prams and can therefore be easily travelled on. This makes Graepel-Eco an excellent surface for escape and emergency routes, wheelchair ramps and handicap access lifting devices. On request, gratings of the Graepel-Eco variant can also be delivered with a perforated stepping edge on one side.

Options

• The standard edge perforation may be omitted.

Dimensions		Graepel-Eco
Material thickness	DD 11 raw	1.5 | 2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	1.5 | 2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 | 3.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	12,000 mm****
	Length divider	30 mm
	Standard grating widths[1] (B) DD 11 | DX 51 D | Stainless steel | EN AW-5754	100 to 300 mm in steps of 50 mm
	Width divider	50 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Eco for material thickness D [in kg/m]																		
	2.0						2.5						3.0					
Grating width [mm]	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]		
	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
150	4.0	4.3	5.1	1.4	1.5	1.7	4.9	5.3	6.3	1.7	1.8	2.2	5.7	6.2	7.4	2.0	2.1	2.6
200	4.7	5.0	5.8	1.6	1.7	2.0	5.8	6.2	7.2	2.0	2.1	2.5	6.9	7.4	8.6	2.4	2.5	2.9
250	5.5	5.8	6.6	1.9	2.0	2.3	6.8	7.2	8.2	2.3	2.5	2.8	8.0	8.5	9.7	2.8	2.9	3.3
300	6.3	6.6	7.4	2.2	2.3	2.5	7.7	8.1	9.1	2.7	2.8	3.1	9.2	9.7	10.9	3.2	3.3	3.7

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Legend
* Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.
**** Hot-dip galvanized gratings = L/max. 6,000 mm

■ = Color coding for load values of stock items

◼ Graepel-Eco (formerly Graepel-Round K)

Material		Uniformly distributed load		Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)									Concentrated load		Load Fq [in kN] for concentrated load (numerical values apply for single grating)								
	H [mm]	D [mm]	Support length L [mm]											Support length L [mm]									
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD 11, DX 51 D	40	2.0	8.491	5.660	4.245	3.396	2.830	2.084	1.595	1.260	1.021	0.844	0.709	5.307	3.266	2.358	1.846	1.516	1.286	1.002	0.791	0.640	0.529	0.444
	40	2.5	10.177	6.784	5.088	4.071	3.392	2.498	1.912	1.511	1.224	1.011	0.850	6.360	3.914	2.827	2.212	1.817	1.542	1.201	0.948	0.767	0.634	0.532
	40	3.0	11.706	7.804	5.853	4.682	3.902	2.873	2.200	1.738	1.408	1.164	0.978	7.316	4.502	3.252	2.545	2.090	1.774	1.382	1.091	0.883	0.729	0.612
	50	2.0	11.551	7.701	5.775	4.620	3.850	3.300	2.700	2.134	1.728	1.428	1.200	7.219	4.443	3.209	2.511	2.063	1.750	1.520	1.339	1.084	0.895	0.752
	50	2.5	13.931	9.287	6.965	5.572	4.644	3.980	3.257	2.574	2.085	1.723	1.448	8.707	5.358	3.870	3.028	2.488	2.111	1.833	1.615	1.307	1.080	0.907
	50	3.0	16.124	10.749	8.062	6.450	5.375	4.607	3.771	2.979	2.413	1.994	1.676	10.078	6.202	4.479	3.505	2.879	2.443	2.122	1.869	1.513	1.250	1.050
	75	2.0	20.543	13.696	10.272	8.217	6.848	5.870	5.136	4.565	4.109	3.735	3.175	12.840	7.901	5.706	4.466	3.668	3.113	2.703	2.389	2.140	1.938	1.771
	75	2.5	24.996	16.664	12.498	9.998	8.332	7.142	6.249	5.555	4.999	4.545	3.864	15.623	9.614	6.943	5.434	4.464	3.787	3.289	2.907	2.604	2.358	2.155
	75	3.0	29.192	19.461	14.596	11.677	9.731	8.341	7.298	6.487	5.838	5.308	4.513	18.245	11.228	8.109	6.346	5.213	4.423	3.841	3.394	3.041	2.754	2.517
EN AW-5754	40	2.0	6.434	3.494	1.965	1.258	0.874	0.642	0.491	0.388	0.314	0.260	0.218	4.021	2.259	1.252	0.796	0.551	0.404	0.309	0.244	0.197	0.163	0.137
	40	2.5	7.705	4.185	2.354	1.507	1.046	0.769	0.588	0.465	0.377	0.311	0.262	4.816	2.705	1.500	0.953	0.660	0.483	0.370	0.292	0.236	0.195	0.164
	40	3.0	8.854	4.810	2.705	1.731	1.202	0.883	0.676	0.534	0.433	0.358	0.301	5.534	3.109	1.724	1.096	0.758	0.556	0.425	0.335	0.271	0.224	0.188
	50	2.0	8.779	5.852	3.336	2.135	1.483	1.089	0.834	0.659	0.534	0.441	0.371	5.487	3.376	2.125	1.351	0.935	0.685	0.524	0.413	0.335	0.276	0.232
	50	2.5	10.579	7.053	4.021	2.573	1.787	1.313	1.005	0.794	0.643	0.532	0.447	6.612	4.069	2.562	1.628	1.127	0.826	0.631	0.498	0.403	0.333	0.280
	50	3.0	12.236	8.157	4.651	2.977	2.067	1.519	1.163	0.919	0.744	0.615	0.517	7.647	4.706	2.963	1.884	1.303	0.955	0.730	0.576	0.467	0.385	0.324
	75	2.0	15.694	10.463	7.847	5.676	3.941	2.896	2.217	1.752	1.419	1.173	0.985	9.809	6.036	4.359	3.412	2.485	1.821	1.392	1.099	0.890	0.735	0.617
	75	2.5	19.086	12.724	9.543	6.903	4.794	3.522	2.697	2.131	1.726	1.426	1.199	11.929	7.341	5.302	4.149	3.022	2.215	1.694	1.337	1.082	0.894	0.751
	75	3.0	22.278	14.852	11.139	8.059	5.597	4.112	3.148	2.487	2.015	1.665	1.399	13.924	8.568	6.188	4.843	3.528	2.586	1.977	1.561	1.263	1.043	0.876
Stainless steel	40	2.0	9.299	6.199	4.650	3.720	2.836	2.084	1.595	1.260	1.021	0.844	0.709	5.812	3.577	2.583	2.022	1.661	1.311	1.002	0.791	0.640	0.529	0.444
	40	2.5	11.146	7.431	5.573	4.458	3.400	2.498	1.912	1.511	1.224	1.011	0.850	6.966	4.287	3.096	2.423	1.990	1.571	1.201	0.948	0.767	0.634	0.532
	40	3.0	12.821	8.547	6.410	5.128	3.911	2.873	2.200	1.738	1.408	1.164	0.978	8.013	4.931	3.561	2.787	2.289	1.807	1.382	1.091	0.883	0.729	0.612
	50	2.0	12.651	8.434	6.326	5.060	4.217	3.527	2.700	2.134	1.728	1.428	1.200	7.907	4.866	3.514	2.750	2.259	1.917	1.665	1.339	1.084	0.895	0.752
	50	2.5	15.257	10.172	7.629	6.103	5.086	4.254	3.257	2.574	2.085	1.723	1.448	9.536	5.868	4.238	3.317	2.725	2.312	2.008	1.615	1.307	1.080	0.907
	50	3.0	17.660	11.773	8.830	7.064	5.887	4.925	3.771	2.979	2.413	1.994	1.676	11.037	6.792	4.906	3.839	3.154	2.676	2.324	1.869	1.513	1.250	1.050
	75	2.0	22.500	15.000	11.250	9.000	7.500	6.429	5.625	5.000	4.500	3.778	3.175	14.062	8.654	6.250	4.891	4.018	3.409	2.960	2.616	2.344	2.123	1.940
	75	2.5	27.377	18.251	13.688	10.951	9.126	7.822	6.844	6.084	5.475	4.598	3.864	17.110	10.529	7.605	5.951	4.889	4.148	3.602	3.183	2.852	2.583	2.360
	75	3.0	31.972	21.315	15.986	12.789	10.657	9.135	7.993	7.105	6.394	5.371	4.513	19.983	12.297	8.881	6.950	5.709	4.844	4.207	3.718	3.330	3.016	2.756

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
100***	3.24	4.76	6.73
150***	1.61	2.37	3.35
200	1.00	1.47	2.08
250	0.73	1.08	1.52
300	0.60	0.88	1.24

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus
Grating cross-sections (axis X-X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia Iₓ [mm⁴]	Minimum section modulus W₂ [mm³]
40	2.0	79131.71	3777.77
	2.5	94855.39	4528.02
	3.0	109117.91	5208.37
50	2.0	133952.05	5139.48
	2.5	161569.45	6198.33
	3.0	187034.38	7174.33
75	2.0	354345.73	9140.53
	2.5	431204.48	11121.78
	3.0	503650.99	12988.73

Available at short notice from stock

Material	H [mm]	D [mm]	B [mm]	L = 3,000 mm Order number	L = 6,000 mm Order number
DD 11 raw	40	2,5	150	60 2000 0189 001	60 2000 0189 601
	40	2,5	200	60 2000 0190 001	60 2000 0190 601
	40	2,5	250	60 2000 0183 001	60 2000 0183 601
	40	2,5	300	60 2000 0024 001	60 2000 0024 601
	75	2,5	300	60 2000 0124 001	60 2000 0124 601
DD 11 hot-dip galvanized	40	2,5	150	60 2000 0189 002	60 2000 0189 602
	40	2,5	200	60 2000 0190 002	60 2000 0190 602
	40	2,5	250	60 2000 0183 002	60 2000 0183 602
	40	2,5	300	60 2000 0024 002	60 2000 0024 602
	75	2,5	300	60 2000 0124 002	60 2000 0124 602

Order information

Graepel-Eco (except for DD 11 hot-dip galvanized) is available up to a **length of 12,000 mm.** Please note that grating lengths over 6,000 mm are difficult to handle and cost intensive due to their high weight.

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 30 mm.

Hot-dip galvanised gratings are hot-dip galvanised after sawing to ensure optimum corrosion protection.

■ Graepel perforations for the industrial sector

Overview of Graepel perforations for the industrial sector

Graepel-Universal
pages 30–31

formerly Graepel Round S

This Graepel grating is suitable for use on all surfaces and stairs. It offers an excellent anti-skid effect with adequate displacement space and a good drainage effect.

Graepel-Metric
pages 32–33
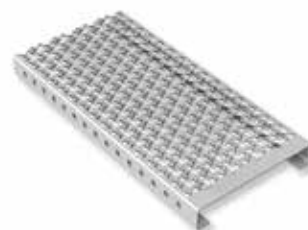
Graepel-Metric has been developed primarily for use in the industrial sector: The width divider of 25 mm allows the covering of surfaces that have a metric side length (1,000 mm, 2,000 mm, etc.) with standard gratings.

Graepel-Quattro
pages 34–35

Graepel-Quattro is a real optical alternative to Graepel perforations with mostly round holes. It is particularly suitable for vehicle covers capable of being walked on.

Graepel-Star
pages 36–37

formerly Graepel Round Z

The large perforations with a star-shaped opening gave Graepel-Star its name. Because of the enormous drainage effect and the very high slip resistance, this perforation is suitable for outdoor use.

Graepel-Stabil
pages 38–41

This Graepel grating is one of our best sellers. The name says it all: Graepel-Stabil is highly resistant and can be used for surfaces, walkways and stairs.

Graepel-Stabil Xtrem
pages 42–43

formerly Graepel Stabil S

Graepel-Stabil Xtrem offers great cost advantages in steel construction as it is extremely resistant and uncompromising in its slip resistance.

28

Graepel perforations for the industrial sector

Overview of Graepel perforations for the industrial sector

This group consists of 9 perforations that are mainly suitable for use in the industrial sector. It includes applications in machine and vehicle construction, plant manufacture, steel construction, the field of renewable energies, the sector of agricultural machinery, construction, commercial, and railway vehicles.

The criterion applied here is high slip resistance partly through large openings that are only accessible with adequate shoes. High drainage and displacement are additional properties that contribute to underfoot safety in industrial use.

Characteristics:
- High slip resistance
- Large drain holes
- Large open area
- Highly resilient
- Some perforations extend considerably upwards
- Accessible only with adequate shoes
- Maintenance-free

Graepel-Open   pages 44–45

Due to its large holes, Graepel-Open has a large open area and excellent drainage qualities that ensure a good discharge of precipitation. This perforation can be used in the industrial sector as an alternative to open mesh flooring.

Graepel-Steg   pages 46–47

Due to the high transverse stiffness and good drainage properties, Graepel-Steg is ideal for drivable covers.
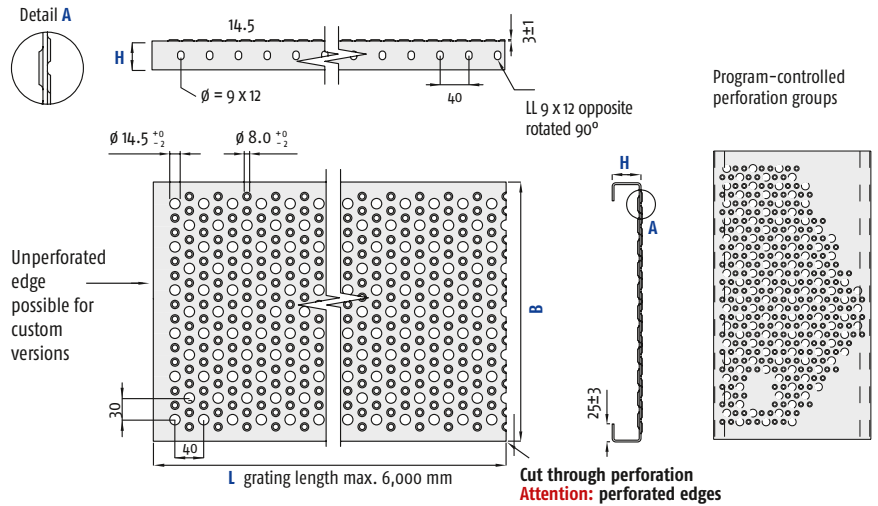
Graepel-Lightprofile   pages 48–49

Graepel-Lightprofile is essential where high dirt volumes and precipitation put underfoot safety at risk. It allows for an almost unlimited view on underlying parts or areas.

Detail **A**

14.5 3±1

H   Ø = 9 x 12   40   LL 9 x 12 opposite rotated 90º

Program-controlled perforation groups

Ø 14.5 $^{+0}_{-2}$ Ø 8.0 $^{+0}_{-2}$

Unperforated edge possible for custom versions

30   40   B   25±3

H   A

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Universal has upward and downward formations. Its surface is characterized by embossed (d = 8 mm) and debossed holes (d = 14.5 mm). The open area for standard grating widths is approximately 19 %. Graepel-Universal offers a pleasing hole pattern. This perforation has high anti-skid values as well as a large displacement space and a good drainage effect. The maximum embossed field is 440 mm.

Application

The name says it all: This universal grating is suitable for all surfaces in the industrial sector with the current requirements for drainage and slip resistance. The high load capacity brings great cost advantages in steel construction. Since this perforation allows only a limited view through the gratings, it reduces safety risks due to fear of heights. Steps are also available with Graepel-Universal perforation.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Universal
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	12,000 mm
	Length divider	40 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | EN AW-5754	120 to 460 mm in steps of 30 mm
	Stainless steel	120 to 300 mm in steps of 30 mm
	Width divider	30 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
Stainless steel	R 13	V 10
EN AW-5754	R 13	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Universal for material thickness D [in kg/m]																
Grating width	2.0			2.5						3.0						
	DD 11**/ Stainless steel Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	
120	3,5	3,8	4,6	4,3	4,7	5,7	1,5	1,6	2,0	5,1	5,6	6,8	1,8	1,9	2,3	
150	4,0	4,3	5,1	4,9	5,3	6,3	1,7	1,8	2,2	5,7	6,2	7,4	2,0	2,1	2,5	
180	4,4	4,7	5,5	5,4	5,8	6,8	1,9	2,0	2,3	6,4	6,9	8,1	2,2	2,4	2,8	
210	4,8	5,1	5,9	5,9	6,3	7,3	2,0	2,2	2,5	7,0	7,5	8,7	2,4	2,6	3,0	
240	5,2	5,5	6,4	6,5	6,9	7,9	2,2	2,4	2,7	7,7	8,8	9,3	2,6	3,0	3,4	
270	5,7	6,0	6,8	7,0	7,4	8,4	2,4	2,5	2,9	8,3	8,8	10,0	2,9	3,0	3,4	
300	6,1	6,4	7,2	7,5	7,9	8,9	2,6	2,7	3,1	9,0	9,5	10,6	3,1	3,2	3,7	
330	6,5	6,8	7,6	8,1	8,5	9,5	2,8	2,9	3,3	9,6	10,1	11,3	3,3	3,5	3,9	
360	7,0	7,3	8,1	8,6	9,0	10,0	3,0	3,1	3,4	10,2	10,7	11,9	3,5	3,7	4,1	
390	7,4	7,7	8,5	9,2	9,6	10,6	3,1	3,3	3,6	10,9	11,4	12,6	3,7	3,9	4,3	
420	7,8	8,1	8,9	9,7	10,1	11,1	3,3	3,5	3,8	11,5	12,0	13,2	4,0	4,1	4,5	

Legend * Available only up to a length of 3,000 mm   *** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.   ■ \| ■ \| ■ \| ■ = Color coding for load values of stock items
** Values also apply for DX 51 D

Graepel-Universal (formerly Graepel Round S)

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load											Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)	Concentrated load											Load Fq [in kN] for concentrated load (numerical values apply for single grating)
			Support length L [mm]												Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	40	2.0	7.128	4.752	3.564	2.851	2.376	1.860	1.424	1.125	0.911	0.753	0.633	4.455	2.742	1.980	1.550	1.273	1.080	0.894	0.706	0.571	0.472	0.396
	40	2.5	8.523	5.682	4.262	3.409	2.841	2.225	1.703	1.346	1.090	0.901	0.757	5.327	3.278	2.368	1.853	1.522	1.291	1.070	0.844	0.683	0.565	0.474
	40	3.0	9.779	6.519	4.890	3.912	3.260	2.553	1.955	1.545	1.251	1.034	0.869	6.112	3.761	2.716	2.126	1.746	1.482	1.228	0.969	0.784	0.648	0.544
	50	2.0	9.848	6.566	4.924	3.939	3.283	2.814	2.432	1.922	1.557	1.286	1.081	6.155	3.788	2.736	2.141	1.759	1.492	1.296	1.145	0.976	0.806	0.677
	50	2.5	11.852	7.901	5.926	4.741	3.951	3.386	2.928	2.314	1.874	1.549	1.301	7.408	4.558	3.292	2.577	2.116	1.796	1.559	1.378	1.175	0.970	0.815
	50	3.0	13.688	9.126	6.844	5.475	4.563	3.911	3.383	2.673	2.165	1.789	1.504	8.555	5.265	3.802	2.976	2.444	2.074	1.801	1.592	1.357	1.121	0.942
	75	2.0	18.018	12.012	9.009	7.207	6.006	5.148	4.505	4.004	3.604	3.276	2.908	11.261	6.930	5.005	3.917	3.218	2.730	2.371	2.095	1.877	1.700	1.553
	75	2.5	21.890	14.594	10.945	8.756	7.297	6.254	5.473	4.865	4.378	3.980	3.534	13.682	8.419	6.081	4.759	3.909	3.317	2.880	2.545	2.280	2.065	1.887
	75	3.0	25.525	17.017	12.763	10.210	8.508	7.293	6.381	5.672	5.105	4.641	4.122	15.953	9.817	7.090	5.549	4.558	3.867	3.359	2.968	2.659	2.408	2.200
EN AW-5754	40	2.0	5.369	3.104	1.746	1.118	0.776	0.570	0.437	0.345	0.279	0.231	0.194	3.355	2.007	1.113	0.707	0.489	0.359	0.274	0.216	0.175	0.145	0.122
	40	2.5	6.412	3.709	2.086	1.335	0.927	0.681	0.522	0.412	0.334	0.276	0.232	4.007	2.398	1.329	0.845	0.585	0.428	0.328	0.259	0.209	0.173	0.145
	40	3.0	7.348	4.252	2.392	1.531	1.063	0.781	0.598	0.472	0.383	0.316	0.266	4.592	2.748	1.524	0.969	0.670	0.491	0.376	0.296	0.240	0.198	0.166
	50	2.0	7.447	4.965	2.993	1.915	1.330	0.977	0.748	0.591	0.479	0.396	0.333	4.654	2.864	1.907	1.212	0.839	0.615	0.470	0.371	0.300	0.248	0.208
	50	2.5	8.954	5.969	3.600	2.304	1.600	1.175	0.900	0.711	0.576	0.476	0.400	5.596	3.444	2.293	1.458	1.009	0.739	0.565	0.446	0.361	0.298	0.251
	50	3.0	10.331	6.887	4.155	2.659	1.847	1.357	1.039	0.821	0.665	0.549	0.462	6.457	3.973	2.647	1.683	1.164	0.853	0.652	0.515	0.417	0.344	0.289
	75	2.0	13.718	9.145	6.859	5.184	3.600	2.645	2.025	1.600	1.296	1.071	0.900	8.574	5.276	3.811	2.982	2.269	1.664	1.272	1.004	0.813	0.671	0.564
	75	2.5	16.656	11.104	8.328	6.296	4.372	3.212	2.459	1.943	1.574	1.301	1.093	10.410	6.406	4.627	3.621	2.756	2.020	1.545	1.219	0.987	0.815	0.685
	75	3.0	19.409	12.939	9.705	7.339	5.097	3.744	2.867	2.265	1.835	1.516	1.274	12.131	7.465	5.391	4.219	3.213	2.355	1.801	1.421	1.150	0.950	0.798
Stainless steel	40	2.0	7.807	5.205	3.904	3.123	2.532	1.860	1.424	1.125	0.911	0.753	0.633	4.880	3.003	2.169	1.697	1.394	1.170	0.894	0.706	0.571	0.472	0.396
	40	2.5	9.335	6.223	4.667	3.734	3.028	2.225	1.703	1.346	1.090	0.901	0.757	5.834	3.590	2.593	2.029	1.667	1.399	1.070	0.844	0.683	0.565	0.474
	50	2.0	10.786	7.191	5.393	4.314	3.595	3.082	2.432	1.922	1.557	1.286	1.081	6.741	4.149	2.996	2.345	1.926	1.634	1.419	1.206	0.976	0.806	0.677
	50	2.5	12.981	8.654	6.490	5.192	4.327	3.709	2.928	2.314	1.874	1.549	1.301	8.113	4.993	3.606	2.822	2.318	1.967	1.708	1.452	1.175	0.970	0.815
	75	2.0	19.734	13.156	9.867	7.894	6.578	5.638	4.934	4.385	3.947	3.460	2.908	12.334	7.590	5.482	4.290	3.524	2.990	2.597	2.295	2.056	1.862	1.701
	75	2.5	23.975	15.983	11.988	9.590	7.992	6.850	5.994	5.328	4.795	4.205	3.534	14.985	9.221	6.660	5.212	4.281	3.633	3.155	2.788	2.497	2.262	2.067

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
120***	2.91	3.87	4.99
150***	1.99	2.65	3.41
180***	1.47	1.96	2.52
210	1.15	1.53	1.97
240	0.95	1.27	1.63
270	0.83	1.10	1.42
300	0.74	0.98	1.27
330	0.67	0.90	1.15
360	0.62	0.83	1.07
390	0.58	0.78	1.00
420	0.55	0.73	0.94

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus

Grating cross-sections (axis X-X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia Ix [mm4]	Minimum section modulus Wz [mm3]
40	2.0	70639.17	3171.74
	2.5	84486.70	3792.33
	3.0	96966.83	4351.14
50	2.0	120645.41	4381.89
	2.5	145244.13	5273.44
	3.0	167808.48	6090.46
75	2.0	324519.66	8017.05
	2.5	394382.04	9739.94
	3.0	460011.05	11357.16

Available at short notice from stock

Material	H [mm]	D [mm]	B [mm]	L = 3,000 mm Order number	L = 6,000 mm Order number
DD11 raw	40	2.5	120*	60 2700 0718 001	
	40	2.5	180	60 2700 0283 001	60 2700 0283 601
	40	2.5	240	60 2700 0284 001	60 2700 0284 601
	40	2.5	300	60 2700 0285 001	60 2700 0285 601
	40	2.5	360	60 2700 0719 001	60 2700 0719 601
	75	2.5	300	60 2700 0026 001	60 2700 0026 601
DD11 hot-dip galvanized	40	2.5	120*	60 2700 0718 002	
	40	2.5	180	60 2700 0283 002	60 2700 0283 602
	40	2.5	240	60 2700 0284 002	60 2700 0284 602
	40	2.5	300	60 2700 0285 002	602700 0285 602
	40	2.5	360	60 2700 0719 002	60 2700 0719 602
	75	2.5	300	60 2700 0026 002	60 2700 0026 602
Aluminum EN AW-5754	40	2.5	240	60 2700 0284 003	60 2700 0284 603
	40	2.5	300	60 2700 0285 003	60 2700 0285 603
Stainless steel Material no. 1.4301	40	2.0	240	60 2700 0430 004	60 2700 0430 604
	40	2.0	300	60 2700 0717 004	60 2700 0717 604
Stainless steel Material no. 1.4404	40	2.0	240	60 2700 0430 007	60 2700 0430 607
	40	2.0	300	60 2700 0717 007	60 2700 0717 607

Order information

Graepel-Universal (except for DD 11 hot-dip galvanized) is available up to **a length of 12,000 mm**. Please note that grating lengths over 6,000 mm are difficult to handle and cost intensive due to their high weight.

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 40 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Detail **A**

H

LL 9 x 12 opposite rotated 90°

3 ±1

30

Ø 14 $^{+1}_{-0,5}$ Ø 7 $^{+1}_{-2}$

Unperforated edge possible for custom versions

25

30

B

H

A

25 ±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Metric has upward and downward formations. Its perforation is a variant of Graepel-Universal: Hole diameters are the same (upward d = 7 mm and downward d = 14 mm), the length divider is 30 mm (40 mm with Graepel-Universal). The grating width can be realized in stages of 25 mm (30 mm with Graepel-Universal). This smaller hole spacing gives this perforation a different look, functionality, and properties. It looks light and transparent and with 32 % open area at the maximum embossed field of 475 mm, it also has a larger open area than Graepel-Universal. Graepel-Metric has high anti-skid values as well as a good drainage effect.

Application

The denomination follows the primary use in the industrial sector: Due to their width divider, gratings with Graepel-Metric perforation are especially suitable to cover surfaces that have at least one metric side length with standard gratings. Unlike other perforations, the Graepel-Metric perforation does not require special fitting gratings.

Options

· This perforation is program controllable.
  Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Metric
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	30 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	150 to 475 mm in steps of 25 mm
	Width divider	25 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
Stainless steel	R 12	V 10
EN AW-5754	R 13	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Metric for material thickness D [in kg/m]												
	2.0			2.5						3.0					
Grating width	DD 11**/ Stainless steel Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
100	3.0	3.3	4.1	3.6	4.0	5.0	1.3	1.4	1.8	4.3	4.7	6.0	1.5	1.7	2.1
125	3.3	3.6	4.4	4.0	4.4	5.4	1.4	1.6	1.9	4.7	5.2	6.4	1.7	1.8	2.2
150	3.6	3.9	4.7	4.4	4.8	5.8	1.6	1.7	2.0	5.2	5.7	6.9	1.8	2.0	2.4
175	3.9	4.2	5.0	4.8	5.2	6.2	1.7	1.8	2.2	5.7	6.2	7.3	2.0	2.2	2.6
200	4.2	4.6	5.3	5.2	5.6	6.6	1.8	2.0	2.3	6.2	6.6	7.8	2.2	2.3	2.7
225	4.5	4.9	5.7	5.6	6.0	7.0	2.0	2.1	2.5	6.7	7.1	8.3	2.3	2.5	2.9
250	4.9	5.2	6.0	6.0	6.4	7.4	2.1	2.3	2.6	7.1	7.6	8.8	2.5	2.7	3.1
275	5.2	5.5	6.3	6.4	6.8	7.8	2.3	2.4	2.7	7.6	8.1	9.3	2.7	2.8	3.2
300	5.5	5.8	6.6	6.8	7.2	8.2	2.4	2.5	2.9	8.1	8.6	9.7	2.8	3.0	3.4
325	5.8	6.2	7.0	7.2	7.6	8.6	2.5	2.7	3.0	8.6	9.0	10.2	3.0	3.2	3.6
350	6.2	6.5	7.3	7.6	8.0	9.0	2.7	2.8	3.2	9.0	9.5	10.7	3.2	3.3	3.8
375	6.5	6.8	7.6	8.0	8.4	9.4	2.8	3.0	3.3	9.5	10.0	11.2	3.3	3.5	3.9
400	6.8	7.1	7.9	8.4	8.8	9.8	3.0	3.1	3.4	10.0	10.5	11.6	3.5	3.7	4.1
425	7.1	7.4	8.2	8.8	9.2	10.2	3.1	3.2	3.6	10.5	11.0	12.1	3.7	3.8	4.3

Legend
* Available only up to a length of 3,000 mm
** Values also apply for DX 51 D
*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.
■ = Color coding for load values of stock items

Graepel-Metric

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load — Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)											Concentrated load — Load Fq [in kN] for concentrated load (numerical values apply for single grating)										
			Support length L [mm]											Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	40	2.0	6.307	4.205	3.154	2.523	2.102	1.711	1.310	1.035	0.838	0.693	0.582	3.942	2.426	1.752	1.371	1.126	0.956	0.823	0.649	0.526	0.434	0.365
	40	2.5	7.525	5.017	3.763	3.010	2.508	2.042	1.564	1.236	1.001	0.827	0.695	4.703	2.894	2.090	1.636	1.344	1.140	0.982	0.775	0.627	0.518	0.435
	40	3.0	8.615	5.743	4.307	3.336	2.872	2.399	1.791	1.415	1.146	0.947	0.796	5.384	3.313	2.393	1.873	1.538	1.305	1.125	0.888	0.719	0.594	0.499
	50	2.0	8.823	5.882	4.412	3.529	2.941	2.521	2.206	1.782	1.444	1.193	1.002	5.514	3.394	2.451	1.918	1.576	1.337	1.161	1.026	0.905	0.748	0.628
	50	2.5	10.599	7.066	5.300	4.240	3.533	3.028	2.650	2.142	1.735	1.434	1.205	6.625	4.007	2.944	2.304	1.893	1.606	1.395	1.232	1.088	0.899	0.755
	50	3.0	12.219	8.146	6.110	4.888	4.073	3.491	3.055	2.471	2.001	1.654	1.390	7.637	4.700	3.394	2.656	2.182	1.851	1.608	1.421	1.255	1.036	0.871
	75	2.0	16.501	11.000	8.250	6.600	5.500	4.714	4.125	3.667	3.300	3.000	2.735	10.313	6.346	4.583	3.587	2.947	2.500	2.171	1.919	1.719	1.557	1.422
	75	2.5	20.023	13.349	10.011	8.009	6.674	5.721	5.006	4.450	4.005	3.641	3.321	12.514	7.701	5.562	4.353	3.576	3.034	2.635	2.328	2.086	1.889	1.726
	75	3.0	23.319	15.546	11.659	9.328	7.773	6.663	5.830	5.182	4.664	4.240	3.869	14.574	8.969	6.477	5.069	4.164	3.533	3.068	2.712	2.429	2.200	2.010
EN AW-5754	40	2.0	4.727	2.844	1.600	1.024	0.711	0.522	0.400	0.316	0.256	0.212	0.178	2.954	1.818	1.019	0.648	0.448	0.329	0.251	0.198	0.160	0.133	0.111
	40	2.5	5.631	3.390	1.907	1.221	0.848	0.623	0.477	0.377	0.305	0.252	0.212	3.520	2.166	1.215	0.772	0.524	0.392	0.299	0.236	0.191	0.158	0.133
	40	3.0	6.437	3.878	2.181	1.396	0.969	0.712	0.545	0.431	0.349	0.288	0.242	4.023	2.476	1.390	0.833	0.611	0.448	0.342	0.270	0.219	0.181	8.152
	50	2.0	6.645	4.430	2.766	1.770	1.230	0.903	0.692	0.546	0.443	0.366	0.307	4.153	2.556	1.762	1.120	0.775	0.568	0.434	0.343	0.278	0.229	0.193
	50	2.5	7.974	5.316	3.322	2.126	1.476	1.085	0.830	0.656	0.531	0.439	0.369	4.984	3.067	2.116	1.345	0.931	0.685	0.522	0.412	0.333	0.275	0.231
	50	3.0	9.181	6.121	3.827	2.449	1.701	1.250	0.957	0.756	0.612	0.506	0.425	5.738	3.531	2.438	1.550	1.072	0.786	0.601	0.474	0.384	0.317	0.266
	75	2.0	12.530	8.354	6.265	4.866	3.379	2.483	1.901	1.502	1.217	1.005	0.845	7.832	4.832	3.481	2.724	2.130	1.562	1.194	0.942	0.763	0.630	0.529
	75	2.5	15.195	10.130	7.597	5.904	4.100	3.012	2.306	1.822	1.476	1.220	1.025	9.497	5.844	4.221	3.303	2.585	1.895	1.448	1.143	0.925	0.764	0.642
	75	3.0	17.683	11.789	8.841	6.874	4.773	3.507	2.685	2.122	1.718	1.420	1.193	11.052	6.801	4.912	3.844	3.009	2.206	1.686	1.331	1.077	0.890	0.747
Stainless steel	40	2.0	6.908	4.605	3.454	2.763	2.303	1.711	1.310	1.035	0.838	0.693	0.582	4.318	2.657	1.919	1.502	1.234	1.047	0.823	0.649	0.526	0.434	0.365
	40	2.5	8.242	5.495	4.121	3.297	2.747	2.042	1.564	1.236	1.001	0.827	0.695	5.151	3.170	2.289	1.792	1.472	1.249	0.982	0.775	0.627	0.518	0.435
	50	2.0	9.663	6.442	4.832	3.865	3.221	2.761	2.356	1.782	1.444	1.193	1.002	6.040	3.717	2.684	2.101	1.726	1.464	1.272	1.118	0.905	0.748	0.628
	50	2.5	11.609	7.739	5.804	4.644	3.870	3.317	2.711	2.142	1.735	1.434	1.205	7.256	4.465	3.225	2.524	2.073	1.759	1.527	1.344	1.008	0.899	0.755
	75	2.0	18.072	12.048	9.036	7.229	6.024	5.163	4.518	4.016	3.614	3.255	2.735	11.295	6.951	5.020	3.929	3.227	2.738	2.378	2.101	1.883	1.705	1.558
	75	2.5	21.930	14.620	10.965	8.772	7.310	6.266	5.482	4.873	4.386	3.952	3.321	13.706	8.435	6.092	4.767	3.916	3.323	2.885	2.550	2.284	2.069	1.890

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11) Load area 200 x 200 mm — Material thickness [mm]		
	2.0	2.5	3.0
100***	3.35	4.60	6.18
125***	2.27	3.12	4.19
150***	1.67	2.29	3.07
175	1.29	1.77	2.38
200	1.04	1.42	1.91
225	0.87	1.19	1.60
250	0.76	1.04	1.40
275	0.68	0.93	1.25
300	0.62	0.85	1.14
325	0.57	0.79	1.05
350	0.53	0.73	0.99
375	0.50	0.69	0.93
400	0.48	0.66	0.88
425	0.46	0.63	0.84

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)
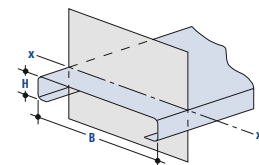
Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
40	2.0	64980.14	2806.40
	2.5	77566.06	3348.28
	3.0	88842.76	3833.05
50	2.0	111885.57	3925.79
	2.5	134483.11	4716.13
	3.0	155118.63	5436.76
75	2.0	305289.86	7341.76
	2.5	370622.81	8908.96
	3.0	431830.36	10375.55

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
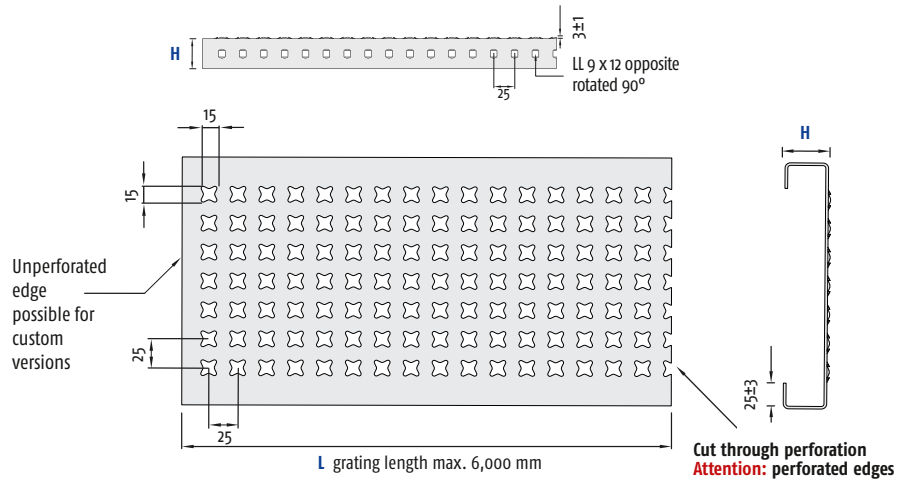B = Grating width [mm]
L = Support length [mm]

Order information

The gratings are available up to **a length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 30 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

H — LL 9 x 12 opposite rotated 90°
3±1
25

15
15
25
25

Unperforated edge possible for custom versions

H
25±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristic

Graepel-Quattro is a metal profile grating whose surface is characterized by large square openings (15 x 15 mm) with upwardly punched teeth in reticular arrangement. The perforation extends only slightly upwards. The open area is approx. 35 %. Graepel-Quattro offers displacement space, drainage and slip resistance. The maximum embossed field is 465 mm.

Application

Graepel-Quattro is particularly suitable for use as catwalks and platforms for roofed or indoor areas in the industrial sector. Moreover, it is used as a covering capable of being walked on in vehicle construction. Graepel-Quattro is also applicable as catwalk on fairground rides and carnival attractions.

Options

- This perforation is program controllable. Thus, individual embossments can be created.

- The standard edge perforation may be omitted.

Dimensions		Graepel-Quattro
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 | 3.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	25 mm
	Standard grating widths[1] **(B)**	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	100 to 500 mm in steps of 25 mm
	Width divider	25 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 12	V 10
Stainless steel	R 11	V 10
EN AW-5754	R 13	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Quattro for material thickness D [in kg/m]																	
	2.0						2.5						3.0					
Grating width	DD 11** Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
100	2.9	3.2	4.0	1.0	1.1	1.4	3.5	3.9	4.9	1.2	1.4	1.7	4.2	4.6	5.8	1.5	1.6	2.0
150	3.5	3.8	4.6	1.2	1.3	1.6	4.2	4.6	5.6	1.5	1.6	2.0	5.0	5.5	6.6	1.8	1.9	2.3
200	4.0	4.3	5.1	1.4	1.5	1.8	4.9	5.3	6.3	1.7	1.9	2.2	5.8	6.3	7.5	2.0	2.2	2.6
250	4.6	4.9	5.7	1.6	1.7	2.0	5.6	6.0	7.0	2.0	2.1	2.5	6.7	7.1	8.3	2.3	2.5	2.9
300	5.1	5.4	6.2	1.8	1.9	2.2	6.3	6.7	7.7	2.2	2.4	2.7	7.5	8.0	9.2	2.6	2.8	3.2
350	5.7	6.0	6.8	2.0	2.1	2.4	7.0	7.4	8.4	2.5	2.6	2.9	8.3	8.8	10.0	2.9	3.1	3.5
400	6.2	6.6	7.3	2.2	2.3	2.6	7.7	8.1	9.1	2.7	2.8	3.2	9.2	9.7	10.8	3.2	3.4	3.8
450	6.8	7.1	7.9	2.4	2.5	2.8	8.4	8.8	9.8	3.0	3.1	3.4	10.0	10.5	11.7	3.5	3.7	4.1
500	7.4	7.7	8.5	2.6	2.7	3.0	9.1	9.5	10.5	3.2	3.3	3.7	10.9	11.3	12.5	3.8	4.0	4.4

Legend * Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.
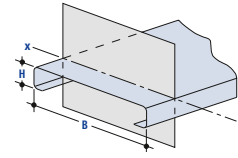
H [mm]	D [mm]	Uniformly distributed load — Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating), Support length L [mm]											Concentrated load — Load Fq [in kN] for concentrated load (numerical values apply for single grating), Support length L [mm]										
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
40	2.0	7.511	5.007	3.755	3.004	2.504	1.926	1.474	1.165	0.944	0.780	0.655	4.694	2.889	2.086	1.633	1.341	1.138	0.926	0.731	0.592	0.489	0.410
40	2.5	8.987	5.992	4.494	3.595	2.996	2.305	1.765	1.394	1.129	0.933	0.784	5.617	3.457	2.497	1.954	1.605	1.362	1.108	0.875	0.708	0.585	0.491
40	3.0	10.320	6.880	5.160	4.128	3.440	2.647	2.027	1.601	1.297	1.072	0.901	6.450	3.969	2.867	2.244	1.843	1.564	1.273	1.005	0.813	0.672	0.564
50	2.0	10.326	6.884	5.163	4.130	3.442	2.950	2.510	1.984	1.607	1.328	1.116	6.454	3.971	2.868	2.245	1.844	1.565	1.359	1.201	1.007	0.832	0.699
50	2.5	12.435	8.290	6.218	4.974	4.145	3.553	3.024	2.389	1.935	1.600	1.344	7.772	4.783	3.454	2.703	2.221	1.884	1.636	1.446	1.213	1.002	0.842
50	3.0	14.372	9.581	7.186	5.749	4.791	4.106	3.496	2.762	2.238	1.849	1.554	8.982	5.528	3.992	3.124	2.566	2.178	1.891	1.671	1.403	1.159	0.973
75	2.0	18.726	12.484	9.363	7.490	6.242	5.350	4.681	4.161	3.745	3.405	2.985	11.704	7.202	5.202	4.071	3.344	2.837	2.464	2.177	1.951	1.767	1.614
75	2.5	22.761	15.174	11.380	9.104	7.587	6.503	5.690	5.058	4.552	4.138	3.629	14.226	8.754	6.322	4.948	4.064	3.449	2.995	2.647	2.371	2.147	1.962
75	3.0	26.553	17.702	13.277	10.621	8.851	7.587	6.638	5.901	5.311	4.828	4.235	16.596	10.213	7.376	5.772	4.742	4.023	3.494	3.088	2.766	2.505	2.289
EN AW-5754																							
40	2.0	5.668	3.219	1.811	1.159	0.805	0.591	0.453	0.358	0.290	0.239	0.201	3.542	2.081	1.154	0.733	0.507	0.372	0.284	0.224	0.182	0.150	0.126
40	2.5	6.775	3.849	2.165	1.385	0.962	0.707	0.541	0.428	0.346	0.286	0.241	4.234	2.488	1.379	0.877	0.607	0.445	0.340	0.268	0.217	0.179	0.151
40	3.0	7.771	4.416	2.484	1.590	1.104	0.811	0.621	0.491	0.397	0.328	0.276	4.857	2.854	1.582	1.006	0.696	0.510	0.390	0.308	0.249	0.206	0.173
50	2.0	7.820	5.214	3.093	1.980	1.375	1.010	0.773	0.611	0.495	0.409	0.344	4.888	3.008	1.971	1.253	0.867	0.635	0.486	0.383	0.310	0.256	0.215
50	2.5	9.410	6.273	3.723	2.383	1.655	1.216	0.931	0.735	0.596	0.492	0.414	5.881	3.619	2.372	1.508	1.043	0.765	0.585	0.461	0.373	0.308	0.259
50	3.0	10.865	7.244	4.300	2.752	1.911	1.404	1.075	0.849	0.688	0.569	0.478	6.791	4.179	2.740	1.741	1.205	0.883	0.675	0.533	0.431	0.356	0.299
75	2.0	14.272	9.514	7.136	5.326	3.699	2.717	2.080	1.644	1.332	1.100	0.925	8.920	5.489	3.964	3.103	2.332	1.709	1.307	1.031	0.835	0.690	0.579
75	2.5	17.337	11.558	8.669	6.472	4.494	3.302	2.528	1.997	1.618	1.337	1.124	10.836	6.668	4.816	3.769	2.833	2.077	1.588	1.253	1.014	0.838	0.704
75	3.0	20.213	13.476	10.107	7.547	5.241	3.851	2.948	2.329	1.887	1.559	1.310	12.633	7.774	5.615	4.394	3.304	2.422	1.852	1.462	1.183	0.977	0.821
Stainless steel																							
40	2.0	8.226	4.805	4.113	3.290	2.621	1.926	1.474	1.165	0.944	0.780	0.655	5.141	3.164	2.285	1.788	1.469	1.211	0.926	0.731	0.592	0.489	0.410
40	2.5	9.843	5.738	4.922	3.937	3.137	2.305	1.765	1.394	1.129	0.933	0.784	6.152	3.786	2.734	2.140	1.758	1.450	1.108	0.875	0.708	0.585	0.491
40	3.0	11.303	6.574	5.652	4.521	3.603	2.647	2.027	1.601	1.297	1.072	0.901	7.065	4.347	3.140	2.457	2.018	1.665	1.273	1.005	0.813	0.672	0.564
50	2.0	11.309	7.539	5.655	4.524	3.770	3.231	2.510	1.984	1.607	1.328	1.116	7.068	4.350	3.141	2.459	2.019	1.714	1.488	1.245	1.007	0.832	0.699
50	2.5	13.619	9.080	6.810	5.448	4.540	3.891	3.024	2.389	1.935	1.600	1.344	8.512	5.238	3.783	2.961	2.432	2.064	1.792	1.499	1.213	1.002	0.842
50	3.0	15.741	10.494	7.870	6.296	5.247	4.497	3.496	2.762	2.238	1.849	1.554	9.838	6.054	4.372	3.422	2.811	2.385	2.071	1.733	1.403	1.159	0.973
75	2.0	20.509	13.673	10.255	8.204	6.836	5.860	5.127	4.558	4.102	3.552	2.985	12.818	7.888	5.697	4.459	3.662	3.107	2.699	2.385	2.136	1.935	1.768
75	2.5	24.929	16.619	12.464	9.971	8.310	7.122	6.232	5.540	4.986	4.319	3.629	15.580	9.588	6.925	5.419	4.452	3.777	3.280	2.899	2.597	2.352	2.149
75	3.0	29.082	19.388	14.541	11.633	9.694	8.309	7.270	6.463	5.816	5.040	4.235	18.176	11.185	8.078	6.322	5.193	4.406	3.827	3.382	3.029	2.744	2.507

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11) — Load area 200 x 200 mm, Material thickness [mm]		
	2.0	2.5	3.0
100***	1.54	2.41	3.47
150***	0.77	1.20	1.73
200	0.48	0.75	1.07
250	0.35	0.54	0.78
300	0.28	0.44	0.64
350	0.25	0.38	0.55
400	0.22	0.34	0.50
450	0.20	0.32	0.45
500	0.19	0.29	0.42

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X–X₁)
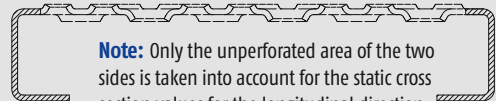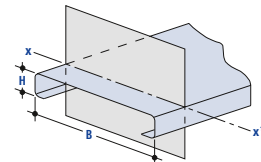
Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating *(shaded area)*.

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
40	2.0	73128.63	3341.79
	2.5	87528.25	3998.88
	3.0	100533.78	4591.95
50	2.0	124525.93	4594.34
	2.5	150007.61	5532.91
	3.0	173421.48	6394.65
75	2.0	388947.21	10176.56
	2.5	473878.60	12398.00
	3.0	554173.06	14497.85

Detail **A**

Unperforated edge possible for custom versions

L grating length max. 6,000 mm

LL 9 x 12 opposite rotated 90°

Cut through perforation
Attention: perforated edges
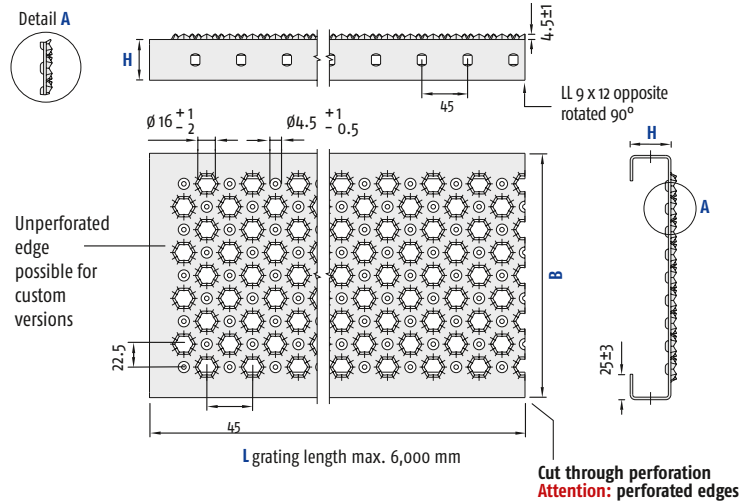
Characteristic

Graepel-Star has upward and downward formations. Its surface is characterized by embossed, star-shaped openings (d = 16 mm) and debossed holes (d = 4.5 mm). The perforation extends about 4.5 mm upwards. The open area for standard grating widths is approximately 21 %. Graepel-Star offers excellent slip resistance, a wide displacement space and a certain drainage. The maximum embossed field is 460 mm.

Application

Its look was influential in the naming of this perforation. Graepel-Star is especially suitable for use in industrial applications where lubricants put underfoot safety at risk: The serrated edges of the holes with upward-pointing tips ensure a high slip resistance. The drainage holes discharges these liquids downwards into appropriate collection trays.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Star
Material thickness	DD 11 raw	2.0 | 2.5 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	45 mm
	Standard grating widths[1] (B) DD 11 | DX 51 D | Stainless steel | EN AW-5754	182 to 356 mm in steps of 22.5 mm
	Width divider	22.5 mm
	Heights (H)	30 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 12	V 10
EN AW-5754	R 13	V 10
Aluminum powder coated	R 10	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Star for material thickness D [in kg/m]															
	2.0						2.5						3.0		
Grating width [mm]	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			EN AW-5754 Height [mm]		
	30	50	75	30	50	75	30	50	75	30	50	75	30	50	75
182	3.9	4.6	5.4	1.4	1.6	1.9	4.9	5.7	6.7	1.7	2.0	2.3	2.0	2.4	2.8
240	4.7	5.4	6.2	1.6	1.9	2.1	5.9	6.7	7.7	2.0	2.3	2.7	2.4	2.8	3.2
298	5.6	6.3	7.1	1.9	2.2	2.4	7.1	7.9	8.9	2.4	2.7	3.0	2.9	3.2	3.7
330	6.0	6.6	7.4	2.1	2.3	2.6	7.5	8.3	9.3	2.6	2.8	3.2	3.1	3.4	3.8
336	6.4	7.0	7.8	2.2	2.4	2.7	8.0	8.8	9.8	2.8	3.0	3.4	3.3	3.6	4.0

Legend   *   Available only up to a length of 3,000 mm
          **   Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

Graepel–Star (formerly Graepel Round Z)

Graepel gratings

			Uniformly distributed load			Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)								Concentrated load			Load Fq [in kN] for concentrated load (numerical values apply for single grating)							
	H [mm]	D [mm]	Support length L [mm]												Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	30	2.0	5.676	3.784	2.838	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.548	2.183	1.577	1.234	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	30	2.5	6.732	4.488	3.366	2.382	1.654	1.215	0.931	0.735	0.596	0.492	0.414	4.208	2.589	1.870	1.464	1.043	0.765	0.584	0.461	0.373	0.308	0.259
	50	2.0	11.407	7.605	5.703	4.563	3.802	3.259	2.614	2.065	1.673	1.382	1.162	7.129	4.387	3.169	2.480	2.037	1.728	1.501	1.296	1.049	0.866	0.728
	50	2.5	13.751	9.168	6.876	5.501	4.584	3.929	3.151	2.490	2.017	1.1667	1.400	8.595	5.289	3.820	2.989	2.456	2.084	1.809	1.562	1.265	1.044	0.877
	75	2.0	20.283	13.522	10.141	8.113	6.761	5.795	5.071	4.507	4.057	3.671	3.084	12.677	7.801	5.634	4.409	3.622	3.073	2.669	2.358	2.113	1.913	1.749
	75	2.5	24.671	16.447	12.336	9.868	8.224	7.049	6.168	5.482	4.934	4.465	3.752	15.419	9.489	6.853	5.363	4.406	3.738	3.246	2.869	2.570	2.327	2.127
EN AW-5754	30	2.0	4.005	1.780	1.001	0.641	0.4455	4.788	0.250	0.198	0.160	0.132	0.111	2.697	1.151	0.638	0.406	0.281	0.206	0.157	0.124	0.100	0.083	0.070
	30	2.5	4.751	2.111	1.188	0.760	0.528	0.388	0.297	0.235	0.190	0.157	0.132	3.199	1.365	0.757	0.638	0.406	0.281	0.206	0.157	0.124	0.100	0.083
	30	3.0	5.181	2.303	1.295	0.829	0.576	0.423	3.518	0.256	0.207	0.171	0.144	3.489	1.489	0.825	0.525	0.363	0.266	0.203	0.161	0.130	0.107	0.090
	50	2.0	8.963	5.930	3.336	2.135	1.482	1.089	0.834	0.659	0.534	0.441	0.371	5.602	3.447	2.125	1.351	0.935	0.685	0.524	0.413	0.335	0.276	0.232
	50	2.5	10.805	7.149	4.021	2.574	1.787	1.313	1.005	0.794	0.643	0.532	0.447	6.753	4.156	2.562	1.629	1.127	0.826	0.631	0.498	0.403	0.333	0.232
	50	3.0	12.064	7.986	4.492	2.875	1.997	1.467	1.123	0.887	0.719	0.594	0.499	7.540	4.640	2.862	1.819	1.259	0.923	0.705	0.557	0.451	0.372	0.313
	75	2.0	15.936	10.624	7.968	5.668	3.936	2.892	2.214	1.749	1.417	1.171	0.984	9.960	6.129	4.427	3.464	2.481	1.819	1.381	1.098	0.888	0.734	0.616
	75	2.5	19.384	12.923	9.692	6.895	4.788	3.518	2.693	2.128	1.724	1.425	1.197	12.115	7.456	5.385	4.214	3.019	2.213	1.692	1.335	1.081	0.893	0.750
	75	3.0	21.968	14.645	10.984	7.817	5.428	3.988	3.053	2.413	1.954	1.615	1.357	13.730	8.449	6.102	4.776	3.442	2.508	1.918	1.514	1.225	1.012	0.850
Stainless steel	30	2.0	6.217	4.144	3.108	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.885	2.391	1.727	1.271	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	50	2.0	12.493	8.329	6.247	4.997	4.164	3.414	2.614	2.065	1.673	1.382	1.162	7.808	4.805	3.470	2.716	2.231	1.893	1.642	1.296	1.049	0.866	0.728
	75	2.0	22.214	14.810	11.107	8.886	7.405	6.347	5.554	4.937	4.441	3.671	3.084	13.884	8.544	6.171	4.829	3.967	3.366	2.923	2.583	2.314	2.096	1.915

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
182***	1.89	2.49	3.18
240	1.25	1.65	2.10
298	0.97	1.28	1.63
330	0.88	1.16	1.48
356	0.82	1.09	1.38

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
- Q = Distributed load for a grating [kN/m²]
- Fq = Replacement load from table with reference to the support width [kN]
- B = Grating width [mm]
- L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
30	2.0	38918.66	2525.54
	2.5	46161.04	2995.52
	3.0	50344.74	3264.69
50	2.0	129645.30	5075.43
	2.5	156300.69	6118.51
	3.0	174605.86	6831.59
75	2.0	344236.50	9024.56
	2.5	418745.50	9024.56
	3.0	474710.43	12440.09

Detail **A**

A

H

9,5±1

LL 9 x 12 opposite rotated 90°

30

Program-controlled perforation groups

14

45

Unperforated edge possible for custom versions

60

B

H

25±3

30

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges
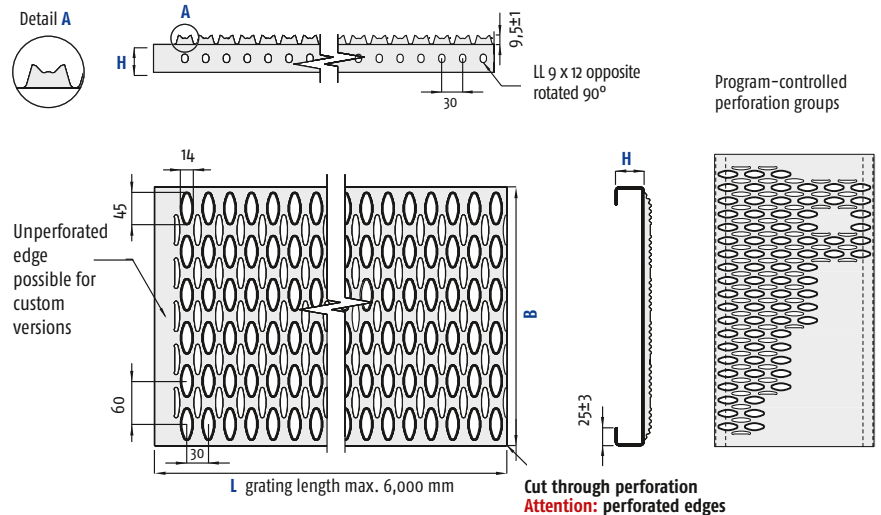
Characteristic

Graepel-Stabil has upward formations. Its surface is characterized by 45 mm long, raised holes in olive shape with serrated edges. The profile height is 9 mm, the open area amounts to approx. 50 %. Despite its wide displacement space and an enormous drainage effect, this perforation has a 15-mm barrier. (A ball ≥ 15 mm will not drop through.) Graepel-Stabil has been certified the highest slip resistance class.

Due to the large embossment height, Graepel-Stabil has a high transverse stiffness of the grating surface which makes embossed field widths of up to 886 mm possible.

Application

This perforation is universally used as safety grating on surfaces, walkways and platforms. It is designed for outdoor applications as its slip resistance is little affected by snow and slush. The use of Graepel-Stabil is advisable in the field of renewable energies as well as in the onshore and offshore sectors. Steps and ladder rungs are also available with Graepel-Stabil perforation.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· An embossed field of up to 886 mm is possible.

· The standard edge perforation may be omitted.

· Beveled skirting board possible.

Dimensions		Graepel-Stabil
Material thickness	DD 11 raw DD 11 hot-dip galvanized Stainless steel EN AW-5754	1.5 | 2.0 | 2.5 | 3.0 mm 1.5 | 2.0 | 2.5 | 3.0 mm 1.5 | 2.0 | 2.5 mm 2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to Length divider **Standard grating widths [1] (B)** DD 11 | DX 51 D | Stainless steel | EN AW-5754 Width divider [1] **Heights (H)**	12,000 mm*** 30 mm 120 to 900 mm in steps of 60 mm 60 mm 40 | 50 | 75 mm

[1] **Grating length and width:** please order standard dimensions which are **divisible by the dividers mentioned** in each case.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
DX 51 D pre-galvanized	R 13	V 10
Stainless steel	R 13	V 10
EN AW-5754	R 13	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Stabil for material thickness D [in kg/m]												
Grating width	2.0			2.5						3.0					
	DD 11**/ Stainless steel Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.4	3.7	4.5	4.2	4.6	5.6	1.4	1.6	1.9	4.9	5.4	6.6	1.7	1.8	2.3
180	4.2	4.5	5.3	5.1	5.5	6.5	1.8	1.9	2.2	6.1	6.6	7.8	2.1	2.3	2.7
240	5.0	5.3	6.1	6.1	6.5	7.5	2.1	2.2	2.6	7.3	7.7	8.9	2.5	2.7	3.1
300	5.8	6.1	6.9	7.1	7.5	8.5	2.4	2.6	2.9	8.4	8.9	10.1	2.9	3.1	3.5
360	6.5	6.9	7.7	8.1	8.5	9.5	2.8	2.9	3.3	9.6	10.1	11.3	3.3	3.5	3.9
420	7.3	7.7	8.5	9.1	9.5	10.5	3.1	3.3	3.6	10.8	11.3	12.5	3.7	3.9	4.3
480	8.1	8.4	9.2	10.1	10.5	11.5	3.5	3.6	3.9	12.0	12.5	13.7	4.1	4.3	4.7

Legend   * **Grating length and width:** please order standard dimensions which are divisible by the dividers mentioned in each case.

** Values also apply for DX 51 D
*** Hot-dip galvanized gratings = L /max. 6,000 mm

■ Graepel-Stabil

Graepel gratings

		Uniformly distributed load		Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)										Concentrated load		Load Fq [in kN] for concentrated load (numerical values apply for single grating)									
H [mm]	D [mm]	Support length L [mm]											Support length L [mm]											
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
40	2.0	4.794	3.196	2.397	1.918	1.598	1.370	1.074	0.849	0.688	0.568	0.477	2.997	1.844	1.332	1.042	0.856	0.726	0.631	0.533	0.431	0.356	0.299
40	2.5	5.684	3.789	2.842	2.274	1.895	1.624	1.275	1.007	0.816	0.674	0.567	3.552	2.186	1.579	1.236	1.015	0.861	0.748	0.632	0.512	0.423	0.355
40	3.0	6.463	4.309	3.232	2.585	2.154	1.847	1.451	1.147	0.929	0.768	0.645	4.040	2.486	1.795	1.405	1.154	0.979	0.850	0.719	0.582	0.481	0.404
50	2.0	6.937	4.625	3.469	2.775	2.312	1.982	1.734	1.498	1.213	1.003	0.843	4.336	2.668	1.927	1.508	1.239	1.051	0.913	0.807	0.723	0.628	0.528
50	2.5	8.293	5.528	4.146	3.317	2.764	2.369	2.073	1.793	1.452	1.200	1.008	5.183	3.189	2.304	1.803	1.481	1.256	1.091	0.964	0.864	0.752	0.632
50	3.0	9.511	6.340	4.755	3.804	3.170	2.717	2.378	2.058	1.667	1.378	1.158	5.944	3.658	2.642	2.068	1.698	1.441	1.251	1.106	0.991	0.863	0.725
75	2.0	13.713	9.142	6.856	5.485	4.571	3.918	3.428	3.047	2.743	2.493	2.285	8.571	5.274	3.809	2.981	2.449	2.078	1.804	1.595	1.428	1.294	1.182
75	2.5	16.591	11.060	8.295	6.636	5.530	4.740	4.148	3.687	3.318	3.016	2.765	10.369	6.381	4.609	3.607	2.963	2.514	2.183	1.929	1.728	1.565	1.430
75	3.0	19.263	12.842	9.631	7.705	6.421	5.504	4.816	4.281	3.853	3.502	3.210	12.039	7.409	5.351	4.188	3.440	2.919	2.535	2.240	2.007	1.817	1.661
EN AW-5754																							
40	2.0	3.543	2.304	1.296	0.830	0.576	0.423	0.324	0.256	0.207	0.171	0.144	2.214	1.363	0.826	0.525	0.363	0.266	0.204	0.161	0.130	0.107	0.090
40	2.5	4.191	2.729	1.535	0.982	0.682	0.501	0.384	0.303	0.246	0.203	0.171	2.619	1.612	0.978	0.622	0.430	0.315	0.241	0.190	0.154	0.127	0.107
40	3.0	4.754	3.099	1.743	1.116	0.775	0.569	0.436	0.344	0.279	0.231	0.194	2.971	1.829	1.111	0.706	0.488	0.358	0.274	0.216	0.175	0.144	0.121
50	2.0	5.169	3.446	2.304	1.475	1.024	0.752	0.576	0.455	0.369	0.305	0.256	3.231	1.988	1.436	0.933	0.646	0.473	0.362	0.286	0.231	0.191	0.160
50	2.5	6.169	4.113	2.753	1.762	1.224	0.899	0.688	0.544	0.440	0.364	0.306	3.856	2.373	1.714	1.115	0.771	0.565	0.432	0.341	0.276	0.228	0.192
50	3.0	7.063	4.709	3.155	2.019	1.402	1.030	0.789	0.623	0.505	0.417	0.351	4.414	2.717	1.962	1.278	0.884	0.648	0.495	0.391	0.317	0.261	0.220
75	2.0	10.349	6.899	5.175	4.140	2.941	2.161	1.654	1.307	1.059	0.875	0.735	6.468	3.980	2.875	2.250	1.848	1.359	1.039	0.820	0.664	0.548	0.460
75	2.5	12.509	8.339	6.255	5.004	3.557	2.614	2.001	1.581	1.281	1.058	0.889	7.818	4.811	3.475	2.719	2.234	1.644	1.257	0.992	0.803	0.663	0.557
75	3.0	14.509	9.673	7.255	5.804	4.129	3.034	2.323	1.835	1.487	1.229	1.032	9.068	5.580	4.030	3.154	2.591	1.908	1.459	1.152	0.932	0.770	0.647
Stainless steel																							
40	2.0	5.251	3.501	2.626	2.100	1.750	1.403	1.074	0.849	0.688	0.568	0.477	3.282	2.020	1.459	1.142	0.938	0.796	0.675	0.533	0.431	0.356	0.299
40	2.5	6.225	4.150	3.113	2.490	2.075	1.665	1.275	1.007	0.816	0.674	0.567	3.891	2.394	1.729	1.353	1.112	0.943	0.801	0.632	0.512	0.423	0.355
50	2.0	7.598	5.065	3.799	3.039	2.533	2.171	1.896	1.498	1.213	1.003	0.843	4.749	2.922	2.111	1.652	1.357	1.151	1.000	0.883	0.761	0.628	0.528
50	2.5	9.082	6.055	4.541	3.633	3.027	2.595	2.269	1.793	1.452	1.200	1.008	5.677	3.493	2.523	1.974	1.622	1.376	1.195	1.056	0.910	0.752	0.632
75	2.0	15.019	10.013	6.008	5.006	4.291	3.755	3.338	3.779	3.004	2.731	2.393	9.387	5.776	4.172	3.265	2.682	2.276	1.976	1.746	1.564	1.417	1.295
75	2.5	18.171	12.114	9.085	7.268	5.192	4.543	5.601	4.038	3.634	3.304	2.898	11.357	6.989	5.047	3.950	3.245	2.753	2.391	2.113	1.893	1.714	1.566

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
240	1,93	2,48	3,13
300	1,89	2,45	2,99
360	1,84	2,42	2,86
420	1,77	2,35	2,73
480	1,70	2,28	2,60
540	1,62	2,18	2,47
600	1,53	2,07	2,34

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	53285.69	2133.24
	2.5	63235.29	2528.98
	3.0	71984.66	2875.85
50	2.0	94048.85	3086.61
	2.5	112537.08	3689.74
	3.0	129197.16	4231.67
75	2.0	267091.69	6101.38
	2.5	323383.88	7381.86
	3.0	375747.85	8570.70

■ | ■ | ■ | ■ = Color coding for load values of the stock items

Available at short notice from stock				L = 3,000 mm	L = 6.000 mm
Material	H [mm]	D [mm]	B [mm]	Order number	Order number
DD11 raw	40	2,0	120	60 2100 0071 001	
	40	2,0	180	60 2100 0185 001	60 2100 0185 601
	40	2,0	240	60 2100 0300 001	60 2100 0300 601
	40	2,0	300	60 2100 3062 001	60 2100 3062 601
	40	2,0	360	60 2100 3063 001	60 2100 3063 601
	40	2,0	420	60 2100 3064 001	60 2100 3064 601
	40	2,0	480	60 2100 3065 001	60 2100 3065 601
	40	2,5	120*	60 2100 3066 001	
	40	2,5	180	60 2100 3067 001	60 2100 3067 601
	40	2,5	240	60 2100 3068 001	60 2100 3068 601
	40	2,5	300	60 2100 3069 001	60 2100 3069 601
	40	2,5	360	60 2100 3070 001	60 2100 3070 601
	40	2,5	420	60 2100 3071 001	60 2100 3071 601
	40	2,5	480	60 2100 3072 001	60 2100 3072 601
	50	2,5	120	60 2100 3080 001	
	50	2,5	180	60 2100 3081 001	60 21003081 601
	50	2,5	240	60 2100 3082 001	60 21003082 601
	50	2,5	300	60 2100 3083 001	60 21003083 601
	50	2,5	360	60 2100 3084 001	60 21003084 601
	50	2,5	420	60 2100 3085 001	60 21003085 601
	50	2,5	480	60 2100 3086 001	60 21003086 601
	75	2,5	120	60 2100 1044 001	
	75	2,5	180	60 2100 1043 001	60 2100 1043 601
	75	2,5	240	60 2100 1033 001	60 2100 1033 601
	75	2,5	300	60 2100 1040 001	60 2100 1040 601
	75	2,5	360	60 2100 1042 001	60 2100 1042 601
	75	2,5	420	60 2100 3257 001	60 2100 3257 601
	75	2,5	480	60 2100 3036 001	60 2100 3036 601
DD11 hot-dip galvanized	40	2.0	120*	60 2100 0071 002	
	40	2.0	180	60 2100 0185 002	6 0210 0185 602
	40	2.0	240	60 2100 0300 002	60 2100 0300 602
	40	2.0	300	60 2100 3062 002	60 2100 3062 602
	40	2.0	360	60 2100 3063 002	60 2100 3063 602
	40	2.0	420	60 2100 3064 002	60 2100 3064 602
	40	2.0	480	60 2100 3065 002	60 2100 3065 602
	40	2.5	120*	60 2100 3066 002	
	40	2.5	180	60 2100 3067 002	60 2100 3067 602
	40	2.5	240	60 2100 3068 002	60 2100 3068 602
	40	2.5	300	60 2100 3069 002	60 2100 3069 602
	40	2.5	360	60 2100 3070 002	60 2100 3070 602
	40	2.5	420	60 2100 3071 002	60 2100 3071 602
	40	2.5	480	60 2100 3072 002	60 2100 3072 602
	50	2.5	120*	60 2100 3080 002	
	50	2.5	180	60 2100 3081 002	60 2100 3081 602
	50	2.5	240	60 2100 3082 002	60 2100 3082 602
	50	2.5	300	60 2100 3083 002	60 2100 3083 602
	50	2.5	360	60 2100 3084 002	60 2100 3084 602
	50	2.5	420	60 2100 3085 002	60 2100 3085 602
	50	2.5	480	60 2100 3086 002	60 2100 3086 602
	75	2.5	120*	60 2100 1044 002	
	75	2.5	180	60 2100 1043 002	60 2100 1043 602
	75	2.5	240	60 2100 1033 002	60 2100 1033 602
	75	2.5	300	60 2100 1040 002	60 2100 1040 602
	75	2.5	360	60 2100 1042 002	60 2100 1042 602
	75	2.5	420	60 2100 3257 002	60 2100 3257 602
	75	2.5	480	60 2100 3036 002	60 2100 3036 602

Skirting board grating

Available at short notice from stock					L = 6,000 mm
Material	H1 [mm]	H2 [mm]	D [mm]	B [mm]	Order number
Aluminum EN AW-5754	50	100	2.5	400	60 2100 2532 003
	65	121	2.5	400	60 2100 1971 003

Standard version: Graepel-Stabil
Other perforations on request.
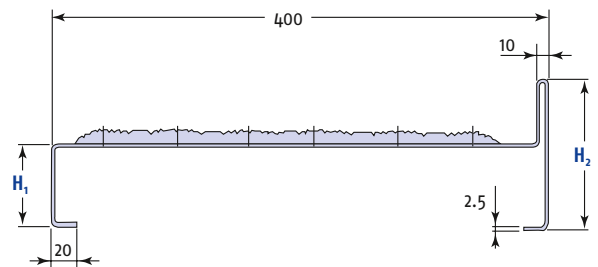
Order information

Graepel-Stabil (except for DD 11 hot-dip galvanized) is available up to **a length of 12,000 mm**. Please note that grating lengths over 6,000 mm are difficult to handle and cost intensive due to their high weight.

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 30 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Available at short notice from stock				L = 3,000 mm	L = 6.000 mm
	H [mm]	D [mm]	B [mm]	Order number	Order number
Aluminium EN AW-5754	40	2,5	180	60 2100 3067 003	60 2100 3067 603
	40	2,5	240	60 2100 3068 003	60 2100 3068 603
	40	2,5	300	60 2100 3069 003	60 2100 3069 603
	40	2,5	400**	60 2100 3206 003	60 2100 3206 603
	50	2,5	300	60 2100 3083 003	60 2100 3083 603
	50	2,5	400**	60 2100 3047 003	60 2100 3047 603
	75	2,5	120*	60 2100 0044 003	
	75	2,5	300	60 2100 1040 003	60 2100 1040 603
	75	2,5	420	60 2100 3257 003	60 2100 3257 603
	75	2,5	480	60 2100 3036 003	60 2100 3036 603
Stainless steel Material no. 1.4301	40	2,0	120*	60 2101 2952 004	
	40	2,0	180	60 2100 0185 004	60 2100 0185 607
	40	2,0	240	60 2100 0300 004	60 2100 0300 604
	40	2,0	300	60 2100 3062 004	602100 3062 604
Stainless steel Material no. 1.4404	40	2,0	120*	60 2100 2952 007	
	40	2,0	180	60 2100 0185 007	60 2100 0185 607
	40	2,0	240	60 2100 0300 007	60 2100 0300 607
	40	2,0	300	60 2100 3062 007	60 2100 3062 607

Legend

* Available only up to a length of 3,000 mm
** Perforation group width 360 mm

= Color coding for load values of the stock items

Detail **A**

H

LL 11 x 15 opposite rotated 90°

17±3

50

Program-controlled perforation groups

30

75

100

Unperforated edge possible for custom versions

50

L grating length max. 6,000 mm

H

B

25±3

Considering length divider of 50 mm, cut through perforation
Attention: perforated edges
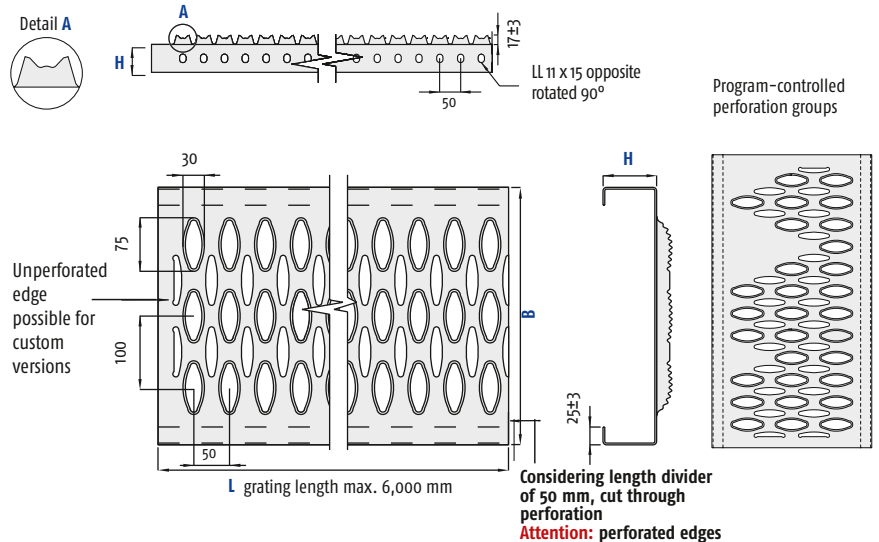
Characteristic

Graepel-Stabil Xtrem has upward formations. The perforation is an enlarged version of Graepel-Stabil. Its surface has 70 mm long, raised holes in olive shape with serrated edges. The profile height is 17 mm. With approx. 43 %, the open area is a bit smaller than the one of Graepel-Stabil. Graepel-Stabil Xtrem is highly resistant. The perforation has a high anti-skid effect and drainage as well as a large displacement space. Thanks to an excellent level of rigidity, large grating widths are possible without additional support. Embossed field widths of up to 776 mm are possible.

Application

Graepel-Stabil Xtrem is recommended for onshore and offshore use in places characterized by extreme weather and environmental conditions. It provides for underfoot safety even in the case of precipitation, sediments, oils, grease, or lubricants. Graepel-Stabil Xtrem can be used in catwalks, over sluices, fish farms, landing docks, maintenance platforms of cableways or wind power plants, or as inspection areas on oil platforms.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Stabil Xtrem
Material thickness	DD 11 raw	2.5 | 3.0 | 3.5 mm
	DD 11 hot-dip galvanized	2.5 | 3.0 | 3.5 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider[1]	50 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	300 to 800 mm in steps of 100 mm
	Width divider[1]	100 mm
	Heights (H)	50 | 75 | 100 mm

[1] **Grating length and width:** please order standard dimensions which are **divisible by the dividers mentioned** in each case.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 12	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Stabil Xtrem for material thickness D [in kg/m]															
	2.0			2.5						3.0						3.5		
Grating width	Stainless steel Height [mm]			DD 11 Height [mm]			EN AW-5754 Height [mm]			DD 11 Height [mm]			EN AW-5754 Height [mm]			DD 11 Height [mm]		
[mm]	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100	50	75	100
300	6.2	7.0	7.8	7.7	8.7	9.7	2.6	3.0	3.3	9.1	10.3	11.5	3.1	3.6	4.0	10.5	11.9	13.3
400	7.6	8.4	9.2	9.4	10.4	11.4	3.2	3.6	3.9	11.1	12.3	13.5	3.8	4.2	4.7	12.9	14.3	15.7
500	8.9	9.7	10.5	11.0	12.0	13.0	3.8	4.1	4.5	13.1	14.3	15.5	4.5	4.9	5.3	15.2	16.6	18.0
600	10.3	11.1	11.9	12.7	13.7	14.7	4.4	4.7	5.1	15.2	16.4	17.6	5.2	5.6	6.0	17.6	19.0	20.4
700	11.6	12.4	13.2	14.4	15.4	16.4	5.0	5.3	5.6	17.2	18.4	19.6	5.9	6.3	6.7	20.0	21.4	22.8
800	12.9	13.7	14.5	16.1	17.1	18.1	5.5	5.9	6.2	19.2	20.4	21.6	6.6	7.0	7.4	22.3	23.7	25.1

Legend　　*　Available only up to a length of 3,000 mm　　*** The profiling is disproportionate and not to scale.　　■ \| ■ = Color coding for load values of stock items

**　　　　　　**　　** Values also apply for DX 51 D

■ Graepel–Stabil Xtrem (formerly Graepel Stabil S)

		Uniformly distributed load				Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)							Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)						
H [mm]	D [mm]	Support length L [mm]											Support length L [mm]										
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
50	2.5	10.885	7.257	5.443	4.354	3.628	3.110	2.673	2.112	1.711	1.414	1.188	6.803	4.187	3.024	2.366	1.944	1.649	1.432	1.266	1.073	0.886	0.744
50	3.0	12.544	8.363	6.272	5.018	4.181	3.584	3.083	2.436	1.973	1.631	1.370	7.840	4.825	3.484	2.727	2.240	1.901	1.651	1.459	1.237	1.022	0.858
50	3.5	13.406	8.937	6.703	5.362	4.469	3.830	3.306	2.612	2.116	1.749	1.469	8.379	5.156	3.724	2.914	2.394	2.031	1.764	1.559	1.327	1.096	0.920
75	2.5	20.650	13.767	10.325	8.260	6.883	5.900	5.162	4.589	4.130	3.755	3.284	12.906	7.942	5.736	4.489	3.687	3.129	2.717	2.401	2.151	1.948	1.780
75	3.0	24.044	16.029	12.022	9.617	8.015	6.870	6.011	5.343	4.809	4.372	3.826	15.027	9.248	6.679	5.227	4.294	3.643	3.164	2.796	2.505	2.268	2.073
75	3.5	26.227	17.485	13.114	10.491	8.742	7.493	6.557	5.828	5.245	4.769	4.183	16.392	10.087	7.285	5.702	4.683	3.974	3.451	3.050	2.732	2.474	2.261
100	2.5	32.956	21.970	16.478	13.182	10.985	9.416	8.239	7.323	6.591	5.992	5.493	20.597	12.675	9.154	7.164	5.885	4.993	4.336	3.832	3.433	3.109	2.841
100	3.0	38.595	25.730	19.297	15.438	12.865	11.027	9.649	8.577	7.719	7.017	6.432	24.122	14.844	10.721	8.390	6.892	5.848	5.078	4.488	4.020	3.641	3.327
100	3.5	42.022	28.014	21.011	16.809	14.007	12.006	10.505	9.338	8.404	7.640	7.004	26.630	16.388	11.836	9.263	7.609	6.456	5.606	4.954	4.438	4.020	3.673
EN AW-5754																							
50	2.5	7.810	5.207	3.273	2.095	1.455	1.069	0.818	0.647	0.524	0.433	0.364	4.881	3.004	2.085	1.326	0.917	0.672	0.514	0.406	0.328	0.271	0.228
50	3.0	8.990	5.993	3.770	2.413	1.675	1.231	0.942	0.745	0.603	0.498	0.419	5.618	3.458	2.402	1.527	1.056	0.774	0.592	0.467	0.378	0.312	0.262
75	2.5	14.951	9.967	3.770	5.836	4.053	2.978	2.280	1.801	1.459	1.206	1.013	9.344	5.750	4.153	3.693	2.555	1.873	1.432	1.130	0.915	0.756	0.635
75	3.0	17.395	11.597	8.697	6.794	4.718	3.466	2.654	2.097	1.698	1.404	1.179	10.872	6.690	4.832	4.299	2.974	2.180	1.667	1.316	1.065	0.880	0.739
100	2.5	23.996	15.997	19.134	12.245	8.504	6.248	4.783	3.779	3.061	2.530	2.126	14.997	9.229	6.665	5.216	4.285	3.636	3.004	2.371	1.919	1.585	1.332
100	3.0	28.087	18.725	22.404	14.339	9.957	7.316	5.601	4.426	3.585	2.963	2.489	17.554	10.803	7.802	6.106	5.016	4.256	3.518	2.777	2.247	1.856	1.559
Stainless steel																							
50	2.0	9.476	6.317	4.738	3.790	3.159	2.707	2.225	1.424	0.524	1.177	0.989	5.923	3.645	2.632	2.060	1.692	1.436	1.247	1.102	0.893	0.737	0.619
75	2.0	17.795	11.863	8.897	7.118	5.932	5.084	4.449	3.954	3.559	3.220	2.706	11.122	6.844	4.943	3.868	3.178	2.696	2.341	2.069	1.854	1.679	1.534
75	2.0	28.237	18.825	14.119	11.295	9.412	8.068	7.059	6.275	5.647	5.134	4.706	17.648	10.860	7.844	6.138	5.042	4.278	3.715	3.283	2.941	2.664	2.434
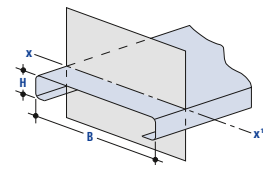
Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.5	3.0	3.5
300	4,35	5,47	6,80
400	3,84	4,73	5,80
500	3,21	4,07	4,90
600	2,64	3,47	4,13
700	2,12	2,93	3,48
800	1,66	2,47	2,95

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Maximum possible lump load F [in kN]

Grating without surface profile	Grating with round perforation***	Safety grating Graepel–Stabil Xtrem***
0.22 kN	0.45 kN	2.64 kN

Example: Grating width 600 mm, material thickness 2.5 mm, load area 200 x 200 mm, material DD 11 (StW 22)

Ten times the lump load-bearing capacity than e.g. gratings with round perforations

The safety grating Graepel–Stabil Xtrem obtains its load-bearing capacity from the strong surface profiling which has a height of 20 mm. Depending on grating width (B), material thickness (D), load area (a1 x a2) and material, a factor of 10 and higher may result.

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)
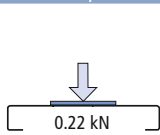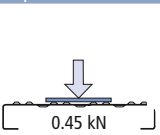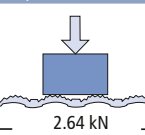
Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (*shaded area*).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
50	2.0	110363.15	3849.67
	2.5	132611.75	4623.0
	3.0	152910.47	5327.56
	3.5	163997.66	5693.80
75	2.0	301979.87	7229.12
	2.5	366531.70	8770.33
	3.0	426976.13	10211.75
	3.5	466797.08	11139.13
100	2.0	626881.88	11471.31
	2.5	765162.16	13996.76
	3.0	896419.21	16391.89
	3.5	981264.23	17847.26

Available at short notice from stock — L = 3,000 mm

Material	H [mm]	D [mm]	B [mm]	Order number
DD11 raw	75	2,5	400	60 1901 1148 001
	75	2,5	500	60 1901 1149 001
	75	3.0	600	60 1901 1150 001
	75	3.0	800	60 1901 1151 001
DD11 hot-dip galvanized	75	2.5	400	60 1901 1148 002
	75	2.5	500	60 1901 1149 002
	75	3.0	600	60 1901 1150 002
	75	3.0	800	60 1901 1151 002

Order information

Graepel–Stabil Xtrem is available up to **a length of 6,000 mm**. Please note that grating lengths over 3,000 mm are difficult to handle and cost intensive due to their high weight.
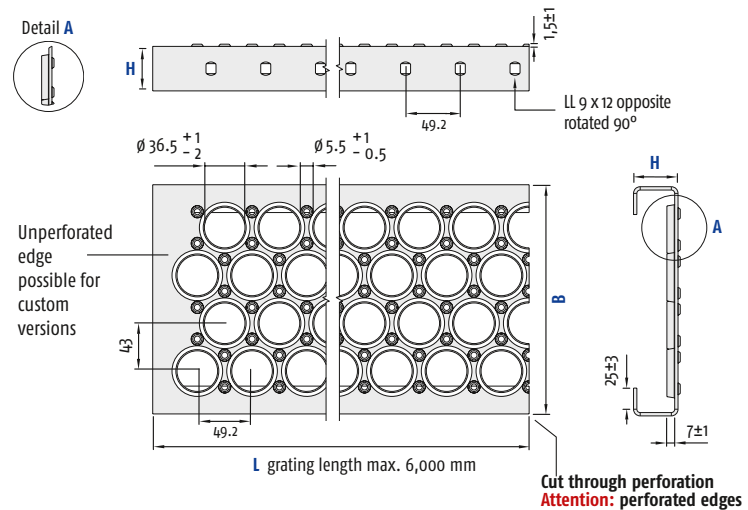
Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 50 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Detail **A**

Ø 36.5 +1 −2   Ø 5.5 +1 −0.5

1,5±1

LL 9 x 12 opposite rotated 90º

49.2

Unperforated edge possible for custom versions

43

49.2

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

H   A

25±3

7±1

Characteristic

Graepel-Open has upward and downward formations. Its surface is dominated by large, debossed holes (d = approx. 36.5 mm) that are surrounded by small embossed holes (d = 5.5 mm). The perforation extends only slightly upwards. The open area for standard grating widths is approximately 50 %. Graepel-Open offers an extremely wide displacement space and excellent drainage; a certain slip resistance is also provided. The maximum embossed field is 810 mm.

Application

Graepel-Open perforation has been designed for catwalks on containers and cars. The large open area ensures a good discharge of precipitation. Slip resistance ensures underfoot safety for the people on service and inspection platforms. Graepel-Open can be used as an alternative to open mesh flooring and provides additional slip resistance.

Options

· The standard edge perforation may be omitted.

· This perforation is program controllable. Thus, individual hole patterns can be created.

	Dimensions	Graepel-Open
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	49.2 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	120 to 850 mm in steps of 43 mm
	Width divider	43 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Open for material thickness D [in kg/m]																		
Gra-ting width [mm]	2.0						2.5						3.0					
	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			DD11** Height [mm]			EN AW-5754 Height [mm]		
	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.2	3.6	4.3	1.1	1.3	1.5	4.0	4.4	5.3	1.4	1.5	1.9	4.7	5.1	6.3	1.6	1.8	2.2
250	4.7	5.0	5.8	1.6	1.8	2.0	5.8	6.1	7.1	2.0	2.2	2.5	6.8	7.3	8.5	2.4	2.6	3.0
300	5.2	5.6	6.3	1.8	2.0	2.2	6.5	6.9	7.9	2.3	2.4	2.5	6.8	7.3	8.5	2.7	2.9	3.3
350	5.8	6.1	6.9	2.0	2.2	2.4	7.2	7.6	8.6	2.5	2.7	3.0	8.6	9.0	10.2	3.0	3.2	3.6
400	6.4	6.7	7.5	2.2	2.4	2.6	7.9	8.3	9.3	2.8	2.9	3.3	9.4	9.9	11.1	3.3	3.5	3.9
500	7.6	7.9	8.7	2.7	2.8	3.0	9.4	9.8	10.8	3.3	3.4	3.8	11.2	11.6	12.8	3.9	4.1	4.5
600	8.5	8.8	9.6	3.0	3.1	3.4	10.6	11.0	11.9	3.7	3.8	4.2	12.6	13.1	14.2	4.4	4.6	5.0
700	9.7	10.0	10.8	3.4	3.5	3.8	12.0	12.4	13.4	4.2	4.4	4.7	14.3	14.8	16.0	5.0	5.2	5.6
850	11.4	11.7	12.5	4.0	4.1	4.4	14.2	14.6	15.6	5.0	5.1	5.5	16.9	17.4	18.6	5.9	6.1	6.5

Legend   *   Available only up to a length of 3,000 mm   *** For gratings smaller than 200 mm, the lump load is added to the
**   Values also apply for DX 51 D   neighboring gratings corresponding to the portion of the load area.

■ Graepel-Open

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load / Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating) — Support length L [mm]											Concentrated load / Load Fq [in kN] for concentrated load (numerical values apply for single grating) — Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	40	2.0	7.538	5.025	3.769	3.015	2.513	1.930	1.478	1.168	0.946	0.782	0.657	4.711	2.899	2.094	1.639	1.346	1.142	0.928	0.733	0.593	0.490	0.411
	40	2.5	9.021	6.014	4.510	3.608	3.007	2.310	1.769	1.398	1.132	0.936	0.786	5.638	3.469	2.506	1.961	1.611	1.367	1.111	0.877	0.710	0.586	0.492
	40	3.0	10.359	6.906	5.179	4.144	3.453	2.654	2.032	1.605	1.300	1.075	0.903	6.474	3.984	2.877	2.252	1.850	1.570	1.276	1.007	0.815	0.673	0.566
	50	2.0	10.360	6.907	5.180	4.144	3.453	2.960	2.516	1.988	1.610	1.331	1.118	6.475	3.985	2.878	2.252	1.850	1.570	1.636	1.205	1.010	0.834	0.700
	50	2.5	12.477	8.318	6.238	4.991	4.159	3.565	3.031	2.395	1.940	1.603	1.347	7.798	4.799	3.466	2.712	2.228	1.890	1.642	1.451	1.216	1.005	0.844
	50	3.0	14.421	9.614	7.210	5.768	4.807	4.120	3.504	2.769	2.243	1.853	1.557	9.013	5.546	4.006	3.135	2.575	2.185	1.897	1.677	1.406	1.161	0.975
	75	2.0	18.776	12.518	9.388	7.511	6.259	5.365	4.694	4.173	3.755	3.414	2.990	11.735	7.222	5.216	4.082	3.353	2.845	2.471	2.183	1.957	1.771	1.619
	75	2.5	22.823	15.215	11.412	9.129	7.408	6.521	5.706	5.072	4.565	4.150	3.636	14.264	8.778	6.340	4.962	4.076	3.458	3.003	2.654	2.377	2.153	1.968
	75	3.0	26.627	17.751	13.313	10.651	8.876	7.608	6.657	5.917	5.325	4.841	4.243	16.642	10.241	7.396	5.788	4.755	4.034	3.508	3.096	2.774	2.512	2.295
EN AW-5754	40	2.0	5.689	3.227	1.815	1.161	0.807	0.593	0.454	0.359	0.290	0.240	0.202	3.556	2.086	1.156	0.735	0.509	0.373	0.285	0.225	0.182	0.150	0.126
	40	2.5	6.801	3.858	2.170	1.389	0.965	0.709	0.543	0.429	0.347	0.287	0.241	4.250	2.494	1.383	0.879	0.608	0.446	0.341	0.269	0.218	0.180	0.151
	40	3.0	7.801	4.427	2.490	1.594	1.107	0.813	0.623	0.492	0.398	0.329	0.277	4.876	2.862	1.587	1.008	0.698	0.511	0.391	0.309	0.250	0.206	0.173
	50	2.0	7.847	5.231	3.100	1.984	1.378	1.012	0.775	0.612	0.496	0.410	0.344	4.904	3.018	1.975	1.255	0.879	0.637	0.487	0.384	0.311	0.257	0.216
	50	2.5	9.442	6.295	3.731	2.388	1.658	1.218	0.933	0.737	0.597	0.493	0.415	5.901	3.632	2.377	1.511	1.045	0.766	0.586	0.462	0.374	0.309	0.260
	50	3.0	10.903	7.269	4.310	2.759	1.916	1.407	1.078	0.851	0.690	0.570	0.479	6.815	4.194	2.746	1.746	1.208	0.885	0.677	0.534	0.432	0.347	0.300
	75	2.0	14.311	9.541	7.156	5.336	3.706	2.722	2.084	1.647	1.334	1.102	0.926	8.945	5.504	3.975	3.111	2.336	1.712	1.309	1.003	0.836	0.691	0.580
	75	2.5	17.386	11.590	8.693	6.484	4.503	3.308	2.533	2.001	1.621	1.340	1.126	10.866	6.687	4.829	3.779	2.839	2.081	1.591	1.256	1.016	0.839	0.705
	75	3.0	20.271	13.514	10.135	7.562	5.251	3.858	2.954	2.334	1.891	1.562	1.313	12.669	7.796	5.631	4.407	3.311	2.427	1.855	1.464	1.185	0.979	0.822
Stainless steel	40	2.0	8.256	5.504	4.128	3.302	2.627	1.930	1.478	1.168	0.946	0.782	0.657	5.160	3.175	2.293	1.795	1.474	1.214	0.928	0.733	0.593	0.490	0.411
	50	2.0	11.346	7.564	5.637	4.539	3.782	3.242	2.516	1.988	1.610	1.331	1.118	7.092	4.364	3.152	2.467	2.026	1.719	1.493	1.247	1.010	0.834	0.700
	75	2.0	20.565	13.710	10.282	8.226	6.855	5.876	5.141	4.570	4.113	3.559	2.990	12.853	7.909	5.712	4.471	3.672	3.116	2.706	2.391	2.142	1.940	1.773
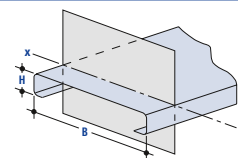
Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11) — Load area 200 x 200 mm — Material thickness [mm]		
	2.0	2.5	3.0
120**	5.37	6.37	8.60
150**	1.67	1.98	2.67
300	1.36	1.61	2.18
350	1.18	1.40	1.88
400	1.05	1.25	1.69
500	0.90	1.07	1.44
600	0.81	0.96	1.29
700	0.75	0.89	1.20
850	0.69	0.81	1.10

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating *(shaded area)*.

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	73302.97	3353.93
	2.5	87741.20	4013.61
	3.0	100783.43	4609.12
50	2.0	124798.32	4609.50
	2.5	150341.90	5551.43
	3.0	173815.29	6416.36
75	2.0	333747.58	8354.35
	2.5	405778.33	10154.90
	3.0	473521.84	11847.21

Detail **A**

14.5 · 3±1 · H · LL 9 x 12 opposite rotated 90°

62.5

Ø 14.5 · 18

50 · 62.5

Unperforated edge possible for custom versions

H · A · 25±3 · 16 · B

L grating length max. 6,000 mm

Considering length divider of 62.5 mm, cut through perforation
Attention: perforated edges
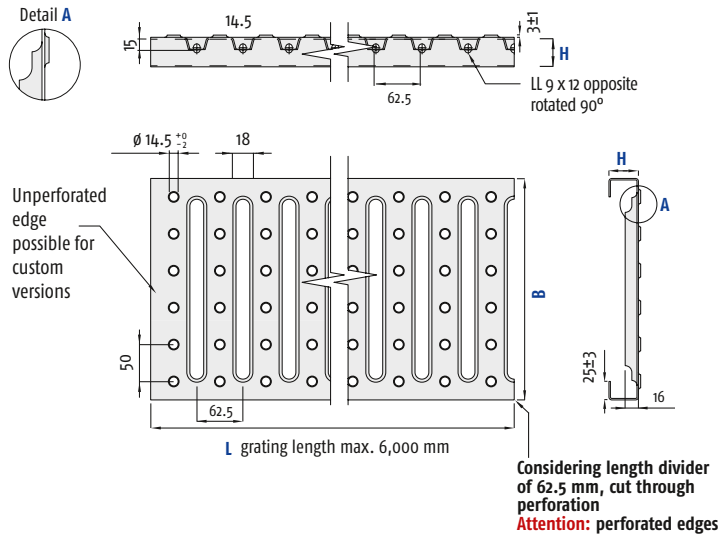
Characteristic

Graepel-Steg has upward and downward formations. Its surface is characterized by an embossed round perforation (d = 14.5 mm) and debossed elongated holes for reinforcing the transverse stiffness. The perforation extends only a maximum of 4 mm upwards. The 16-mm-high profiles in lateral grating direction permit high lump loads. The open area is approx. 28 %. Despite its wide displacement space and a high drainage effect, a ball of ≥ 16 mm will not drop through the gratings. Graepel-Steg has a high slip resistance. The maximum embossed field is 270 mm.

Application

Due to the high transverse stiffness of the grating surface, Graepel-Steg permits high lump loads on larger grating widths. For example, gutters on driving surfaces can be covered. The gratings are also suitable for areas that are traveled by dollies. Moreover, Graepel-Steg has already been used as design element for cladding facades. It is also conceivable to use this perforation for enclosures and covers.

Options

· The standard edge perforation may be omitted.

· An embossed field of 420 mm is possible by special perforation.

Dimensions		Graepel-Steg
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0 | 2.5 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider[1]	62.5 mm
	Standard grating widths[1] (B) DD 11 | DX 51 D | Stainless steel | EN AW-5754	150 to 300 mm in steps of 50 mm
	Width divider[1]	50 mm
	Heights (H)	30 | 40 | 50 | 75 | 100 mm

[1] **Grating length and width:** please order standard dimensions which are **divisible by the dividers mentioned** in each case.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 12	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Steg for material thickness D [in kg/m]

Grating width [mm]	2.0										2.5										3.0				
	DD 11**/ Stainless steel Height [mm]					EN AW-5754 Height [mm]					DD 11** Height [mm]					EN AW-5754 Height [mm]					DD 11** Height [mm]				
	30	40	50	75	100	30	40	50	75	100	30	40	50	75	100	30	40	50	75	100	30	40	50	75	100
150	3.7	4.1	4.4	5.2	6.0	1.3	1.4	1.5	1.8	2.1	4.6	5.0	5.4	6.4	7.4	1.6	1.7	1.9	2.2	2.5	5.4	5.9	6.4	7.6	8.8
200	4.5	4.8	5.2	6.0	6.8	1.6	1.7	1.8	2.1	2.3	5.6	6.0	6.4	7.4	8.4	1.9	2.1	2.2	2.5	2.9	6.6	7.1	7.5	8.7	9.9
250	5.3	5.6	5.9	6.7	7.5	1.8	1.9	2.0	2.3	2.6	6.5	6.9	7.3	8.3	9.3	2.3	2.4	2.5	2.9	3.2	7.8	8.2	8.7	9.9	11.1
300	6.1	6.4	6.7	7.5	8.3	2.1	2.2	2.3	2.6	2.9	7.5	7.9	8.3	9.3	10.3	2.6	2.7	2.9	3.2	3.5	8.9	9.4	9.9	11.1	12.3

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Legend
*   Available only up to a length of 3,000 mm
** Values also apply for DX 51 D
*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.
◼ = Color coding for load values of stock items

■ Graepel-Steg

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load — Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating) — Support length L [mm]											Concentrated load — Load Fq [in kN] for concentrated load (numerical values apply for single grating) — Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D	30	2.0	5.086	3.390	2.543	1.929	1.339	0.984	0.753	0.595	0.482	0.398	0.335	3.179	1.956	1.413	1.106	0.844	0.619	0.473	0.373	0.302	0.250	0.210
	30	2.5	6.026	4.017	3.013	2.285	1.587	1.166	0.893	0.705	0.571	0.472	0.397	3.766	2.318	1.674	1.310	1.000	0.733	0.561	0.443	0.358	0.296	0.248
	30	3.0	6.851	4.567	3.425	2.598	1.804	1.326	1.015	0.802	0.650	0.537	0.451	4.282	2.635	1.903	1.489	1.137	0.834	0.637	0.503	0.407	0.336	0.283
	40	2.0	7.606	5.071	3.803	3.042	2.535	1.942	1.487	1.175	0.951	0.786	0.661	4.754	2.925	2.113	1.653	1.358	1.152	0.934	0.737	0.596	0.493	0.414
	40	2.5	9.103	6.069	4.552	3.641	3.034	2.324	1.780	1.406	1.139	0.941	0.791	5.690	3.501	2.529	1.979	1.626	1.379	1.118	0.882	0.714	0.590	0.495
	40	3.0	10.455	6.970	5.228	4.182	3.485	2.670	2.044	1.615	1.308	1.081	0.909	6.535	4.021	2.904	2.273	1.867	1.584	1.284	1.013	0.820	0.678	0.569
	50	2.0	10.445	6.963	5.223	4.178	3.482	2.984	2.530	1.999	1.619	1.338	1.124	6.528	4.017	2.901	2.271	1.865	1.583	1.374	1.215	1.015	0.838	0.704
	50	2.5	12.581	8.387	6.290	5.032	4.194	3.595	3.048	2.408	1.951	1.612	1.355	7.863	4.839	3.495	2.735	2.247	1.906	1.655	1.463	1.223	1.010	0.848
	50	3.0	14.543	9.695	7.271	5.817	4.848	4.155	3.524	2.784	2.255	1.864	1.566	9.089	5.593	4.040	3.161	2.597	2.203	1.914	1.691	1.414	1.168	0.981
	75	2.0	18.903	12.602	9.451	7.561	6.301	5.401	4.726	4.201	3.781	3.437	3.004	11.814	7.270	5.251	4.109	3.375	2.864	2.487	2.198	1.969	1.783	1.630
	75	2.5	22.978	15.319	11.489	9.191	7.659	6.565	5.744	5.106	4.596	4.178	3.653	14.362	8.838	6.383	4.995	4.103	3.482	3.023	2.672	2.394	2.168	1.981
	75	3.0	26.810	17.873	13.405	10.724	8.937	7.660	6.702	5.957	5.362	4.875	4.263	16.756	10.312	7.447	5.828	4.787	4.062	3.528	3.117	2.793	2.529	2.311
	100	2.0	29.273	19.516	14.637	11.709	9.758	8.364	7.318	6.505	5.855	5.322	4.879	18.296	11.259	8.132	6.364	5.227	4.435	3.852	3.404	3.049	2.762	2.524
	100	2.5	35.770	23.846	17.885	14.308	11.923	10.220	8.942	7.949	7.154	6.504	5.962	22.356	13.758	9.936	7.776	6.387	5.420	4.707	4.159	3.726	3.374	3.084
	100	3.0	41.952	27.968	20.976	16.781	13.984	11.986	10.488	9.323	8.390	7.628	6.992	26.220	16.135	11.653	9.120	6.356	2.203	5.520	4.878	4.370	3.958	3.617
EN AW-5754	30	2.0	3.687	1.638	0.922	0.590	0.410	0.301	0.230	0.182	0.147	0.122	0.102	2.388	1.059	0.587	0.373	0.258	0.189	0.145	0.114	0.092	0.076	0.064
	30	2.5	4.362	1.939	1.091	0.698	0.485	0.356	0.273	0.215	0.174	0.144	0.121	2.826	1.253	0.695	0.442	0.306	0.224	0.171	0.135	0.109	0.090	0.076
	40	2.0	5.742	3.247	1.826	1.169	0.812	0.596	0.457	0.361	0.292	0.241	0.203	3.589	2.099	1.164	0.740	0.512	0.375	0.287	0.226	0.183	0.151	0.127
	40	2.5	6.865	3.883	2.184	1.398	0.971	0.713	0.546	0.431	0.349	0.289	0.243	4.291	2.510	1.391	0.884	0.612	0.449	0.343	0.271	0.219	0.181	0.152
	50	2.0	7.914	5.276	3.118	1.995	1.386	1.018	0.779	0.616	0.499	0.412	0.346	4.946	3.044	1.986	1.263	0.873	0.640	0.490	0.386	0.313	0.258	0.217
	50	2.5	9.524	6.349	3.753	2.402	1.668	1.225	0.938	0.741	0.600	0.496	0.417	5.952	3.663	2.391	1.520	1.052	0.771	0.589	0.465	0.376	0.311	0.261
	75	2.0	14.410	9.607	7.205	5.361	3.723	2.735	2.094	1.655	1.340	1.108	0.931	9.006	5.542	4.003	3.133	2.347	1.720	1.315	1.038	0.840	0.694	0.583
	75	2.5	17.507	11.671	8.754	6.515	4.524	3.324	2.545	2.011	1.629	1.346	1.131	10.942	6.734	4.863	3.806	2.852	2.091	1.598	1.262	1.021	0.843	0.708
	100	2.0	22.409	14.939	11.205	8.964	7.470	5.610	4.295	3.394	2.749	2.272	1.909	14.006	8.619	6.225	4.872	4.002	3.395	2.698	2.129	1.724	1.424	1.196
	100	2.5	27.371	18.247	13.685	10.948	9.124	6.854	5.247	4.146	3.358	2.776	2.332	17.107	10.527	7.603	5.950	4.888	4.147	3.296	2.601	2.106	1.739	1.461
Stainless steel	30	2.0	5.570	3.713	2.785	1.929	1.339	0.984	0.753	0.595	0.482	0.398	0.335	3.481	2.142	1.547	1.211	0.844	0.619	0.473	0.373	0.302	0.250	0.210
	30	2.5	6.600	4.400	3.300	2.285	1.587	1.166	0.893	0.705	0.571	0.472	0.397	4.125	2.538	1.833	1.435	1.000	0.733	0.561	0.443	0.358	0.296	0.248
	40	2.0	8.330	5.554	4.165	3.332	2.643	1.942	1.487	1.175	0.951	0.786	0.661	5.207	3.204	2.314	1.811	1.488	1.221	0.934	0.737	0.596	0.493	0.414
	40	2.5	9.970	6.647	4.985	3.988	3.164	2.324	1.780	1.406	1.139	0.941	0.791	6.231	3.835	2.770	2.167	1.780	1.462	1.118	0.882	0.714	0.590	0.495
	50	2.0	11.440	7.627	5.720	4.576	3.813	3.269	2.530	1.999	1.619	1.338	1.124	7.150	4.400	3.178	2.487	2.043	1.733	1.505	1.254	1.015	0.838	0.704
	50	2.5	13.779	9.186	6.889	5.512	4.593	3.937	3.048	2.408	1.951	1.612	1.355	8.612	5.300	3.827	2.995	2.461	2.088	1.813	1.511	1.223	1.010	0.848
	75	2.0	20.703	13.802	10.351	8.281	6.901	5.915	5.176	4.601	4.141	3.575	3.004	12.939	7.963	5.751	4.501	3.697	3.137	2.724	2.407	2.157	1.953	1.785
	75	2.5	25.167	16.778	12.583	10.067	8.389	7.191	6.292	5.593	5.033	4.347	3.653	15.729	9.680	6.991	5.471	4.494	3.813	3.311	2.926	2.622	2.374	2.170
	100	2.0	32.061	21.374	16.031	12.825	10.687	9.160	8.015	7.125	6.412	5.829	5.344	20.038	12.331	8.906	6.970	5.725	4.858	4.219	3.728	3.340	3.025	2.764
	100	2.5	39.176	26.117	19.588	15.670	13.059	11.193	9.794	8.706	7.835	7.123	6.529	24.485	15.068	10.882	8.517	6.996	5.936	5.155	4.555	4.081	3.696	3.377

Lump load

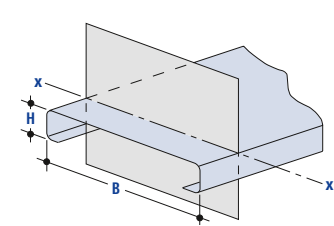| Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11) — Load area 200 x 200 mm — Material thickness [mm]		
	2.0	2.5	3.0
150***	11.83	13.29	17.25
200	7.36	8.27	10.74
250	5.38	6.04	7.85
300	4.39	4.93	6.40

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus
Grating cross-sections (axis X-X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (*shaded area*).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
30	2.0	37368.16	2262.79
	2.5	44277.60	2681.12
	3.0	50340.04	3048.14
40	2.0	73736.86	3384.26
	2.5	88271.11	4050.45
	3.0	101404.63	4652.05
50	2.0	125476.56	4647.41
	2.5	151174.21	5597.72
	3.0	174795.74	6470.61
75	2.0	335261.55	8410.55
	2.5	407647.73	10224.02
	3.0	475737.70	11928.84
100	2.0	685013.10	13024.94
	2.5	837181.92	15915.32
	3.0	982075.48	18666.27

Order information

The gratings are available up to **a length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 62.5 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Detail **A**

Characteristic

Graepel-Lightprofile has a unique cut and rotated formation. Its surface is characterized by almost vertical bars with serrated edges which allow for an almost unlimited view through the grating. Depending on the grating width, the open area is between 74 and 80 %, thus reaching the highest value of all Graepel perforations.
Graepel-Lightprofile offers an extreme drainage effect, excellent slip resistance and displacement as well as a high transverse stiffness. The maximum embossed field is 370 mm.

Application

Graepel-Lightprofile is essential in machine and plant manufacture wherever precipitation or high dirt volumes put underfoot safety at risk. They are used as walking surfaces on crushers and agricultural machines, as coverings capable of being walked on for bunkers and pits with cohesive loose goods such as grains or ground particles. Also as walkways in areas with extreme precipitation, e.g. for ski lifts, and wherever it is extremely windy, for instance on crane arms etc. Platforms made of Graepel-Lightprofile ensure underfoot safety for maintenance purposes without obstructing visibility to the work area. As an alternative to open mesh flooring, Graepel-Lightprofile provides wider support widths and additional slip resistance with a similar open surface.

Options

• The standard edge perforation may be omitted.

Dimensions		Graepel-Lightprofile
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.5 | 3.0 mm
	EN AW-5754	2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	30 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	200 to 400 mm in steps of 50 mm 200 | 250 mm
	Width divider	50 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
Stainless steel	R 13	V 10
EN AW-5754	R 13	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Lightprofile for material thickness D [in kg/m]																
	2.0			2.5							3.0						
Grating width [mm]	DD 11** Height [mm]			DD 11**/ Stainless steel Height [mm]				EN AW-5754 Height [mm]			DD 11**/ Stainless steel Height [mm]				EN AW-5754 Height [mm]		
	40	50	75	30	40	50	75	40	50	75	30	40	50	75	40	50	75
200	3.5	4.2	4.6	4.3	4.3	5.1	6.1	1.5	1.8	2.1	5.1	5.1	6.1	7.2	1.8	2.1	2.5
250	4.1	4.8	5.6	5.1	5.1	5.9	6.9	1.8	2.1	2.4	6.0	6.0	7.0	8.1	2.1	2.4	2.9
300	4.7	5.4	6.2	5.9	5.9	6.6	7.6	–	–	–	6.9	6.9	7.9	9.1	–	–	–
350	5.4	6.0	6.8	6.6	6.6	7.4	8.4	–	–	–	7.8	7.8	9.8	10.0	–	–	–
400	6.0	6.6	7.4	7.3	7.4	8.2	9.1	–	–	–	8.8	8.6	9.7	10.9	–	–	–

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Legend
* Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

= Color coding for load values of stock items

■ Graepel-Lightprofile

Graepel gratings

		Uniformly distributed load			Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)									Concentrated load			Load Fq [in kN] for concentrated load (numerical values apply for single grating)							
H [mm]	D [mm]	Support length L [mm]												Support length L [mm]										
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD11, DX 51 D																							
30	2.0	4.095	2.731	2.048	1.423	0.988	0.726	0.556	0.493	0.356	0.294	0.247	2.560	1.575	1.138	0.890	0.623	0.457	0.346	0.276	0.223	0.184	0.155
30	2.5	4.823	3.215	2.411	1.676	1.164	0.855	0.655	0.517	0.419	0.346	0.291	3.014	1.855	1.340	1.048	0.734	0.538	0.411	0.324	0.263	0.217	0.182
30	3.0	5.448	3.632	2.724	1.893	1.314	0.966	0.739	0.584	0.473	0.391	0.329	3.405	2.095	1.513	1.184	0.829	0.607	0.464	0.367	0.297	0.245	0.206
40	2.0	6.198	4.132	3.099	2.479	1.991	1.463	1.120	0.885	0.717	0.593	0.498	3.874	2.384	1.722	1.347	1.107	0.920	0.704	0.555	0.449	0.371	0.312
40	2.5	7.379	4.919	3.690	2.952	2.371	1.742	1.334	1.054	0.854	0.705	0.593	4.612	2.838	2.050	1.604	1.318	1.096	0.838	0.661	0.535	0.442	0.371
40	3.0	8.429	5.619	4.215	3.372	2.709	1.990	1.524	1.204	0.975	0.806	0.667	5.268	3.242	2.341	1.832	1.505	1.252	0.957	0.755	0.611	0.505	0.424
50	2.0	8.603	5.735	4.301	3.441	2.868	2.458	1.942	1.534	1.243	1.027	0.863	5.377	3.309	2.390	1.870	1.536	1.303	1.132	0.963	0.779	0.644	0.541
50	2.5	10.315	6.877	5.157	4.126	3.438	2.947	2.328	1.840	1.490	1.231	1.035	6.447	3.967	2.865	2.242	1.842	1.563	1.357	1.154	0.934	0.772	0.648
50	3.0	11.868	7.912	5.934	4.474	3.956	3.391	2.679	2.117	1.714	1.417	1.191	7.417	4.564	3.297	2.580	2.119	1.798	1.562	1.328	1.075	0.888	0.746
75	2.0	15.931	10.621	7.965	6.372	5.310	4.552	3.983	3.540	3.186	2.848	2.393	9.957	6.127	4.425	3.463	2.845	2.414	2.096	1.852	1.659	1.503	1.373
75	2.5	19.302	12.868	9.650	7.721	6.434	5.515	4.826	4.289	3.860	3.451	2.900	12.064	7.424	5.362	4.196	3.447	2.925	2.540	2.244	2.011	1.821	1.664
75	3.0	22.444	14.962	11.222	8.977	7.481	6.413	5.611	4.988	4.489	4.013	3.372	14.028	8.632	6.235	4.879	4.008	3.401	2.953	2.610	2.338	2.117	1.935
EN AW-5754																							
30	2.5	3.149	1.400	0.787	0.504	0.350	0.257	0.197	0.156	0.126	0.104	0.087	2.121	0.925	0.502	0.319	0.221	0.162	0.124	0.098	0.079	0.065	0.055
30	3.0	3.549	1.577	0.887	0.568	0.394	0.290	0.222	0.175	0.142	0.117	0.097	2.390	1.020	0.565	0.359	0.249	0.182	0.139	0.110	0.089	0.074	0.062
40	2.5	5.503	2.872	1.616	1.034	0.718	0.528	0.404	0.319	0.259	0.214	0.180	3.439	1.857	1.029	0.654	0.453	0.332	0.254	0.200	0.162	0.134	0.112
40	3.0	6.275	3.276	1.843	0.179	0.819	0.602	0.461	0.364	0.295	0.434	0.205	3.922	2.118	1.174	0.746	0.516	0.378	0.289	0.228	0.185	0.135	0.128
50	2.5	7.735	5.041	2.836	1.815	1.260	0.926	0.709	0.560	0.454	0.375	0.315	4.833	2.974	1.807	1.148	0.795	0.582	0.445	0.351	0.284	0.235	0.197
50	3.0	8.885	5.792	3.258	2.085	1.448	1.064	0.815	0.644	0.521	0.431	0.362	5.553	3.417	2.076	1.320	0.913	0.669	0.512	0.404	0.327	0.270	0.227
75	2.5	14.605	9.737	7.303	5.133	3.564	2.619	2.005	1.584	1.283	1.060	0.891	9.128	5.617	4.057	3.175	2.247	1.647	1.259	0.994	0.805	0.665	0.558
75	3.0	16.986	11.312	8.484	5.963	4.141	3.042	2.329	1.841	1.491	1.232	1.035	10.605	6.526	4.713	3.689	2.611	1.914	1.463	1.155	0.935	0.772	0.648
Stainless steel																							
30	2.0	4.486	2.991	2.224	1.423	0.688	0.726	0.556	0.439	0.356	0.294	0.247	2.804	1.725	1.246	0.900	0.623	0.457	0.349	0.276	0.223	0.184	0.155
30	2.5	5.282	3.521	2.618	1.676	1.164	0.855	0.655	0.517	0.419	0.346	0.291	3.301	2.032	1.467	1.060	0.734	0.538	0.411	0.324	0.263	0.217	0.182
30	3.0	5.966	3.978	2.958	1.893	1.314	0.966	0.739	0.584	0.473	0.391	0.329	3.729	2.295	1.657	1.198	0.829	0.607	0.464	0.367	0.297	0.245	0.206
40	2.0	6.788	4.526	3.394	2.713	1.991	1.463	1.120	0.885	0.717	0.593	0.498	4.234	2.611	1.886	1.476	0.212	0.920	0.704	0.555	0.449	0.371	0.312
40	2.5	8.082	5.388	4.041	3.233	2.371	1.742	1.334	1.054	0.854	0.705	0.593	5.051	3.108	2.245	1.757	1.443	1.096	0.838	0.661	0.535	0.442	0.371
40	3.0	9.232	6.155	4.616	3.369	2.709	1.990	1.524	1.204	0.975	0.806	0.677	5.770	3.551	2.564	2.007	1.649	1.252	0.957	0.755	0.611	0.504	0.424
50	2.0	9.422	6.281	4.711	3.769	3.141	2.536	1.942	1.534	1.234	1.027	0.863	5.889	3.624	2.617	2.048	1.683	1.428	1.220	0.963	0.779	0.644	0.541
50	2.5	11.297	7.531	5.649	4.519	3.766	3.041	2.328	1.840	1.490	1.231	1.035	7.061	4.345	3.138	2.456	2.017	1.712	1.462	1.154	0.934	0.772	0.648
50	3.0	12.998	8.665	6.499	5.199	4.333	3.499	2.679	2.117	1.714	1.462	1.191	8.124	4.999	3.610	2.826	2.321	1.969	1.682	1.328	1.075	0.888	0.745
75	2.0	17.448	11.632	8.724	6.979	5.816	4.985	4.362	3.877	3.447	2.848	2.393	10.905	6.711	4.847	3.793	3.116	2.644	2.296	2.029	1.818	1.646	1.499
75	2.5	21.140	14.094	10.570	8.456	7.047	6.040	5.285	4.698	4.176	3.451	2.900	13.213	8.131	5.872	4.596	3.775	3.203	2.782	2.458	2.202	1.994	1.816
75	3.0	24.582	16.388	12.291	9.833	8.194	7.023	6.145	5.463	4.856	4.013	3.372	15.364	9.455	6.828	5.344	4.390	3.752	3.234	2.858	2.561	2.319	2.112

Available at short notice from stock

Material	H [mm]	D [mm]	B [mm]	L = 3,000 mm Order number	L = 6,000 mm Order number
DD11 raw	30	2,5	200	60 4900 0024 001	60 4900 0024 601
	30	2,5	250	60 4900 0025 001	60 4900 0025 601
	30	2,5	300	60 4900 0026 001	60 4900 0026 601
	30	2,5	350	60 4900 0027 001	60 4900 0027 601
	30	2,5	400	60 4900 0028 001	60 4900 0028 601
	40	2.5	200	60 4900 0029 001	60 4900 0029 601
	40	2.5	250	60 4900 0030 001	60 4900 0030 601
	40	2.5	300	60 4900 0031 001	60 4900 0031 601
	40	2.5	350	60 4900 0032 001	60 4900 0032 601
	40	2.5	400	60 4900 0033 001	60 4900 0033 601
DD 11 hot-dip galvanized	30	2.5	200	60 4900 0024 002	60 4900 0024 602
	30	2.5	250	60 4900 0025 002	60 4900 0025 602
	30	2.5	300	60 4900 0026 002	60 4900 0026 602
	30	2.5	350	60 4900 0027 002	60 4900 0027 602
	30	2.5	400	60 4900 0028 002	60 4900 0028 602
	40	2.5	200	60 4900 0029 002	60 4900 0029 602
	40	2.5	250	60 4900 0030 002	60 4900 0030 602
	40	2.5	300	60 4900 0031 002	60 4900 0031 602
	40	2.5	350	60 4900 0032 002	60 4900 0032 602
	40	2.5	400	60 4900 0033 002	60 4900 0033 602
Aluminum EN AW-5754	40	2.5	200	60 4900 0029 003	60 4900 0029 603
	40	2.5	250	60 4900 0030 003	60 4900 0030 603
Stainless steel Material no. 1.4404	40	2.0	200*	60 4900 0043 007	
	40	2.0	250*	60 4900 0047 007	

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.
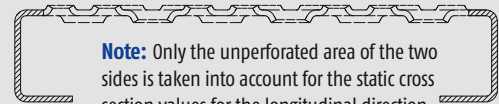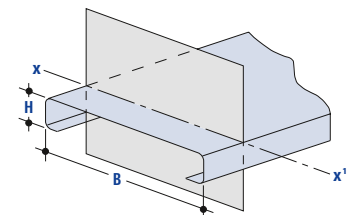
Order information

The gratings are available up to **a length of 6,000 mm**. Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 30 mm. Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
200	6.345	7.932	9.518
250	4.230	5.288	6.345
300	3.173	3.966	4.749
350	2.538	3.173	3.807
400	2.115	2.644	3.173

Moments of inertia and section modulus
Grating cross-sections (axis X-X1)

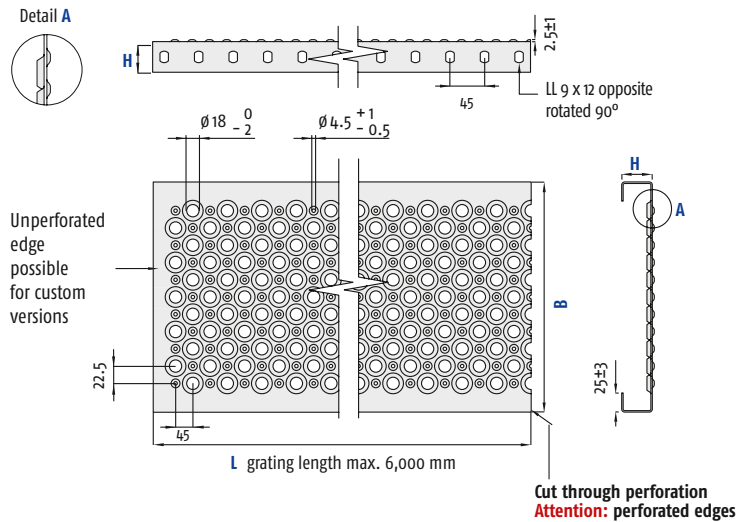| Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
30	2.0	27574	1822
30	2.5	32468	2146
30	3.0	36676	2424
40	2.0	55566	2758
40	2.5	66157	3283
40	3.0	75575	3750
50	2.0	96315	3828
50	2.5	115488	4589
50	3.0	132879	5280
75	2.0	267121	7088
75	2.5	323656	8588
75	3.0	376355	9986

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating *(shaded area)*.

■ Special perforations

Overview of special perforations

Special perforations with slip resistance (selection)

Naming rule:
Graepel-Special [hole Ø upward]–[hole Ø downward]
e.g. Graepel-Special 4–18
4 = hole Ø upward
18 = hole Ø downward

(P stands for Perl -> hemispherical upward perforation
Exception: Graepel-Rubber-Stud)

These special perforations provide for slip resistance and drainage.
The only exception is Graepel-Rubber-Stud. Its closed surface does not allow any drainage.
Due to their hole size, these special gratings are primarily suitable for individual projects in the industrial sector.

More perforations on request.

Graepel-Special P-12

formerly Graepel Round N12

Graepel-Special P-12 is a mixture of pearled upward embossments (4 mm) and debossed holes (d = 12 mm) that are arranged in staggered rows.

Graepel-Special 14-14

formerly Graepel Round

The surface of Graepel-Special 14-14 has embossed and debossed holes of the same size (d = 14 mm) with more embossed holes that offer excellent slip resistance

Graepel-Special 4-18

formerly Graepel Round F

The surface has embossed (d = 4 mm) and debossed (d = 18 mm) holes that are arranged in staggered rows. Graepel-Special 4-18 is especially suited as indoor walking surface.

Graepel-Rubber-Stud

Rubber studs, which are driven into the holes, make sure that this special perforation for interiors can be walked on almost silently.

■ Special perforations

Overview of special perforations

In addition to the popular perforations for public and industrial use, Graepel offers numerous special perforations which are intended for the special applications of our customers. These are mainly Graepel gratings with slip resistance, but also some without anti-slip upward embossment, namely the Graepel-Glide perforations.

They reflect the diversity, flexibility and know-how contained in our perforations.

Since those special gratings are used for individual purposes, they have no meaningful names, but their names follow a naming rule.

Special perforations without slip resistance (selection)

Naming rule:
Graepel-Glide [hole Ø downward]
e.g. Graepel-Glide 15
15 = hole Ø downward

Graepel-Glide special perforations have a flat surface with downward drainage in different hole sizes. That is why they are particularly suitable wherever containers are moved with wheels or objects slide down inclined surfaces. They can be used just like perforated sheets: as sieves, shelves, or trays in drying systems. Graepel-Glide perforations are also suitable for housings and facade cladding. They allow an exchange of air and thereby provide optimal sun protection. Here, we present a selection of these special perforations.

More perforations on request.

Graepel-Glide 4
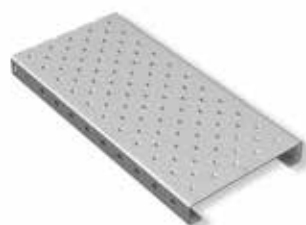
Graepel-Glide 4 has an almost flat surface with very small drainage holes (d = 4 mm) in staggered rows.

Graepel-Glide 15

The surface of Graepel-Glide 15 has debossed holes (d = 15 mm) that are arranged in staggered rows.

Graepel-Glide 12

The surface of Graepel-Glide 12 has debossed holes (d = 12 mm) that are arranged in staggered rows.

Graepel-Glide 18
formerly Graepel Round C

Due to the very large drainage holes (d = 18 mm) in staggered rows, this perforation also offers a large open area.

⚠ Technical data for Graepel Special perforations without slip resistance only on request.

Detail **A**

Unperforated edge possible for custom versions

LL 9 x 12 opposite rotated 90°

Ø12 +0 −2   Ø 5

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges
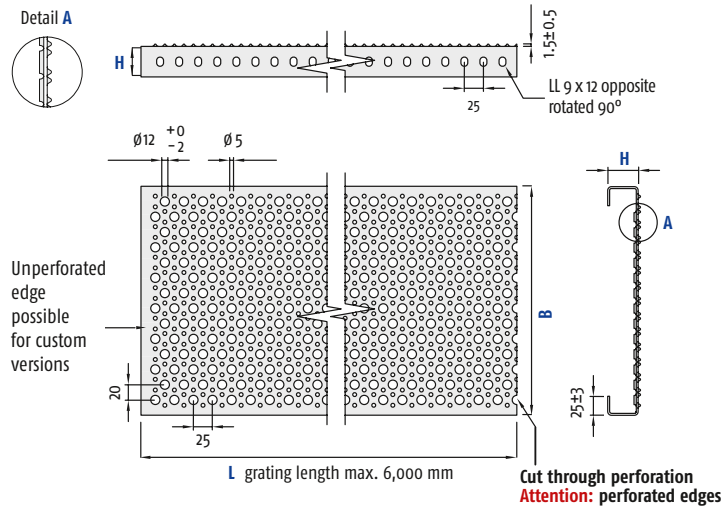
Characteristics

Graepel-Special P-12 has a C-shaped, canted contour. The surface of Graepel-Special P-12 is a mixture of pearled upward embossments (diameter of 5 mm) and debossed holes (diameter of 12 mm) that are arranged in staggered rows. The open area for standard grating widths is approximately 21 %. This perforation offers a certain anti-skid effect and displacement as well as a good drainage effect. The maximum embossed field is 430 mm.

Application

This special perforation is suitable for walking surfaces in indoor and outdoor areas. It is easily drivable even with small wheels. Graepel-Special P-12 can also be used as covering for gutters or as edging for basins.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Special P-12
Material thickness	DD 11 raw	2.0 | 2.5 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	25 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	120 to 440 mm in steps of 20 mm
	Width divider	20 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 10	V 10
Stainless steel	R 11	V 10
EN AW-5754	R 11	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Special P-12 for material thickness D [in kg/m]												
		2.0						2.5				
Grating width	DD 11**/Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/Stainless steel Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75
120	3.6	3.9	4.7	1.1	1.2	1.5	4.4	4.8	5.8	1.5	1.6	2.0
180	4.2	4.5	5.3	1.4	1.5	1.8	5.1	5.5	6.5	1.6	1.9	2.2
240	4.8	5.1	5.9	1.6	1.7	2.0	5.9	6.3	7.3	1.8	2.2	2.5
300	5.4	5.7	6.5	1.9	2.0	2.3	6.6	7.0	8.0	2.0	2.4	2.8

Legend   *   Available only up to a length of 3,000 mm
          **   Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

= Color coding for load values of stock items

	H [mm]	D [mm]	Uniformly distributed load / Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating) — Support length L [mm]											Concentrated load / Load Fq [in kN] for concentrated load (numerical values apply for single grating) — Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD 11, DX 51 D	40	2.0	6.581	4.388	3.291	2.633	2.194	1.762	1.349	1.066	0.863	0.714	0.600	4.113	2.531	1.828	1.431	1.175	0.997	0.847	0.669	0.541	0.447	0.376
	40	2.5	7.858	5.239	3.929	3.143	2.619	2.105	1.612	1.273	1.031	0.852	0.716	4.911	3.022	2.183	1.708	1.403	1.191	1.012	0.799	0.647	0.534	0.449
	50	2.0	9.165	6.110	4.583	3.666	3.055	2.619	2.291	1.830	1.482	1.225	1.029	5.728	3.525	2.546	1.992	1.637	1.389	1.206	1.066	0.929	0.768	0.645
	50	2.5	11.017	7.345	5.509	4.407	3.672	3.148	2.754	2.201	1.783	1.473	1.238	6.886	4.237	3.060	2.395	1.967	1.669	1.450	1.281	1.118	0.923	0.775
	75	2.0	17.007	11.338	8.503	6.803	5.669	4.859	4.252	3.779	3.401	3.092	2.794	10.629	6.541	4.724	3.697	3.037	2.577	2.238	1.978	1.772	1.604	1.466
	75	2.5	20.646	13.764	10.323	8.258	6.882	5.899	5.161	4.588	4.129	3.754	3.393	12.904	7.941	5.735	4.488	3.687	3.128	2.717	2.401	2.151	1.948	1.780
EN AW-5754	40	2.0	4.941	2.933	1.650	1.056	0.733	0.539	0.412	0.326	0.264	0.218	0.183	3.088	1.896	1.051	0.668	0.462	0.339	0.259	0.204	0.166	0.137	0.115
	40	2.5	5.892	3.500	1.968	1.260	0.875	0.643	0.492	0.389	0.315	0.260	0.219	3.682	2.262	1.254	0.797	0.552	0.404	0.309	0.244	0.197	0.163	0.137
	50	2.0	6.912	4.608	2.844	1.820	1.264	0.929	0.711	0.562	0.455	0.376	0.316	4.320	2.659	1.812	1.152	0.797	0.584	0.447	0.352	0.285	0.236	0.198
	50	2.5	8.301	5.534	3.417	2.187	1.519	1.116	0.854	0.675	0.547	0.452	0.380	5.188	3.193	2.177	1.384	0.957	0.702	0.536	0.423	0.343	0.283	0.238
	75	2.0	12.927	8.618	6.463	4.974	3.454	2.538	1.943	1.535	1.244	1.028	0.864	8.079	4.972	3.591	2.810	2.178	1.596	1.220	0.963	0.780	0.644	0.541
	75	2.5	15.682	10.455	7.841	6.037	4.192	3.080	2.358	1.863	1.509	1.247	1.048	9.801	6.032	4.356	3.409	2.643	1.937	1.481	1.169	0.946	0.782	0.656
Stainless steel	40	2.0	7.208	4.805	3.604	2.883	2.398	1.762	1.349	1.066	0.863	0.714	0.600	4.505	2.772	2.002	1.567	1.287	1.092	0.847	0.669	0.541	0.447	0.376
	40	2.5	8.607	5.738	4.303	3.443	2.865	2.105	1.612	1.273	1.031	0.852	0.716	5.379	3.310	2.391	1.871	1.537	1.304	1.012	0.799	0.647	0.534	0.449
	50	2.0	10.038	6.692	5.019	4.015	3.346	2.868	2.316	1.830	1.482	1.225	1.029	6.274	3.861	2.788	2.182	1.793	1.521	1.321	1.148	0.929	0.768	0.645
	50	2.5	12.067	8.044	6.033	4.827	4.022	3.448	2.785	2.201	1.783	1.473	1.238	7.542	4.641	3.352	2.623	2.155	1.828	1.588	1.381	1.118	0.923	0.775
	75	2.0	18.626	12.418	9.313	7.451	6.209	5.322	4.657	4.139	3.725	3.325	2.794	11.641	7.164	5.174	4.049	3.326	2.822	2.451	2.166	1.940	1.757	1.606
	75	2.5	22.612	15.075	11.306	9.045	7.537	6.461	5.653	5.025	4.522	4.038	3.393	14.132	8.697	6.281	4.916	4.038	3.426	2.975	2.629	2.355	2.133	1.949

Lump load — Maximum possible lump load F [in kN] (numerical values apply for DD 11)

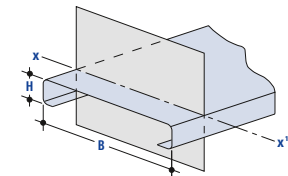| Grating width B [mm]	Load area 200 x 200 mm — Material thickness [mm]		
	2.0	2.5	3.0
120***	3.03	4.24	5.17
150***	1.53	2.14	2.61
240	0.99	1.39	1.69
300	0.77	1.08	1.31

Note concerning lump load
The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X-X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_z [mm³]
40	2.0	66917.92	2928.32
	2.5	79936.89	3496.52
50	2.0	114875.61	4077.95
	2.5	138157.47	4902.10
75	2.0	311818.16	7566.96
	2.5	378690.44	9186.11

Detail **A**

H .... 3±1

60

LL 9 x 12 opposite rotated 90°

Ø 14.5 $_{-2}^{0}$

Unperforated edge possible for custom versions

50

60

H

A

B

25±3

L grating length max. 6,000 mm

Cut through perforation
Attention: perforated edges

Characteristics

Graepel-Special 14-14 has a C-shaped, canted contour. The surface has embossed and debossed holes of the same size (d = 14.5 mm) with more embossed holes that offer excellent slip resistance. The open area for standard grating widths is approximately 20 %. Graepel-Special 14-14 offers an excellent anti-skid effect and displacement as well as a good drainage effect. The maximum embossed field is 540 mm.

Application

This special perforation is mainly used in the industrial and commercial sector. It is frequently used for pre-assembled parts, such as scaffolding planks or treads and ladder rungs for industrial vehicles.

Options

· The standard edge perforation may be omitted.

Dimensions		Graepel-Special 14-14
Material thickness	DD 11 raw	2.0 | 2.5 mm[1]
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 mm
Dimensions	Lengths (L) up to	6,000 mm
	Length divider	60 mm
	Standard grating widths[1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	150 to 300 mm in steps of 50 mm
	Width divider	50 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Special 14-14 for material thickness D [in kg/m]													
Gra-ting width	2.0						2.5						3.0		
	DD 11**/Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11**/Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD11** Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
150	3.7	4.0	4.8	1.3	1.4	1.7	4.6	5.0	6.0	1.6	1.7	2.1	5.4	5.9	7.0
200	4.5	4.8	5.6	1.6	1.7	1.9	5.5	5.9	6.9	1.9	2.0	2.4	6.6	7.0	8.2
250	5.3	5.6	6.4	1.8	1.9	2.2	6.5	6.9	7.9	2.2	2.4	2.7	7.7	8.2	9.4
300	6.1	6.3	7.1	2.0	2.2	2.5	7.4	7.8	8.8	2.6	2.7	3.0	8.8	9.3	10.5

Legend
* Available only up to a length of 3,000 mm
** Values also apply for DX 51 D

*** For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

Special perforations

H [mm]	D [mm]	Uniformly distributed load / Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating) — Support length L [mm]											Concentrated load / Load Fq [in kN] for concentrated load (numerical values apply for single grating) — Support length L [mm]										
		500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD 11, DX 51 D																							
40	2.0	7.606	5.071	3.803	3.042	2.535	1.942	1.487	1.175	0.951	0.786	0.661	4.754	2.925	2.113	1.653	1.358	1.152	0.934	0.737	0.596	0.493	0.414
40	2.5	9.103	6.069	4.552	3.641	3.034	2.324	1.780	1.406	1.139	0.941	0.791	5.690	3.501	2.529	1.979	1.626	1.379	1.118	0.882	0.714	0.590	0.495
50	2.0	10.445	6.963	5.223	4.178	3.482	2.984	2.530	1.999	1.619	1.338	1.124	6.528	4.017	2.901	2.271	1.865	1.583	1.374	1.215	1.015	0.838	0.704
50	2.5	12.581	8.387	6.290	5.032	4.194	3.595	3.048	2.408	1.951	1.612	1.355	7.863	4.839	3.495	2.735	2.247	1.906	1.655	1.463	1.223	1.010	0.848
75	2.0	18.903	12.602	9.451	7.561	6.301	5.401	4.726	4.201	3.781	3.437	3.004	11.814	7.270	5.251	4.109	3.375	2.864	2.487	2.198	1.969	1.783	1.630
75	2.5	22.978	15.319	11.489	9.191	7.659	6.565	5.745	5.106	4.596	4.178	3.653	14.362	8.838	6.383	4.995	4.103	3.482	3.023	2.672	2.394	2.168	1.981
EN AW-5754																							
40	2.0	5.742	3.247	1.826	1.169	0.812	0.596	0.457	0.292	0.911	0.241	0.203	3.589	2.099	1.164	0.740	0.512	0.375	0.287	0.226	0.183	0.151	0.127
40	2.5	6.865	3.883	2.184	1.398	0.971	0.713	0.546	0.431	0.349	0.289	0.243	4.291	2.510	1.391	0.884	0.612	0.449	0.343	0.271	0.219	0.181	0.152
50	2.0	7.914	5.276	3.118	1.995	1.386	1.018	0.779	0.616	0.499	0.412	0.346	4.946	3.044	1.986	1.263	0.873	0.640	0.490	0.386	0.313	0.258	0.217
50	2.5	9.524	6.349	3.753	2.402	1.668	1.225	0.938	0.741	0.600	0.496	0.417	5.952	3.663	2.391	1.520	1.052	0.771	0.589	0.465	0.376	0.311	0.261
75	2.0	14.410	9.607	7.205	5.361	3.723	2.735	2.094	1.655	1.340	1.108	0.931	9.006	5.542	4.003	3.133	2.347	1.720	1.315	1.038	0.840	0.694	0.583
75	2.5	17.507	11.671	8.754	6.515	4.524	3.324	2.545	2.011	1.629	1.346	1.131	10.942	6.734	4.863	3.806	2.852	2.091	3.1.598	1.262	1.021	0.843	0.708
Stainless steel																							
40	2.0	8.330	5.554	4.165	3.332	2.643	1.942	1.487	1.175	0.951	0.786	0.661	5.207	3.204	2.314	1.811	1.488	1.221	0.934	0.737	0.596	0.493	0.414
40	2.5	9.970	6.647	4.985	3.988	3.164	2.324	1.780	1.406	1.139	0.941	0.791	6.231	3.835	2.770	2.167	1.780	1.462	1.118	0.882	0.714	0.590	0.495
50	2.0	11.440	7.627	5.720	4.576	3.813	3.269	2.530	1.999	1.619	1.338	1.124	7.150	4.400	3.178	2.487	2.043	1.733	1.505	1.254	1.015	0.838	0.704
50	2.5	13.779	9.186	6.889	5.512	4.593	3.937	3.048	2.408	1.951	1.612	1.355	8.612	5.300	3.827	2.995	2.461	2.088	1.813	1.511	1.223	1.010	0.848
75	2.0	20.703	13.802	10.351	8.281	6.901	5.915	5.176	4.601	4.141	3.575	3.004	12.939	7.963	5.751	4.501	3.697	3.137	2.724	2.407	2.157	1.953	1.785
75	2.5	25.167	16.778	12.583	10.067	8.389	7.191	6.292	5.593	5.033	4.347	3.653	15.729	9.680	6.991	5.471	4.494	3.813	3.311	2.926	2.622	2.374	2.170

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11) — Load area 200 x 200 mm — Material thickness [mm]	
	2.0	2.5
150***	1.48	2.06
200***	0.92	1.28
250***	0.67	0.94
300	0.55	0.77

Note concerning lump load
The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Order information
The gratings are available up to a **length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 60 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
40	2.0	73736.86	3384.26
	2.5	88271.11	4050.45
50	2.0	125476.56	4647.41
	2.5	151174.21	5597.72
75	2.0	335261.55	8410.55
	2.5	407647.73	10224.02

Detail **A**

H

LL 9 x 12 opposite rotated 90º

45

2.5±1

Ø 18 $_{-2}^{0}$

Ø 4.5 $_{-0.5}^{+1}$

Unperforated edge possible for custom versions

22.5

45

L grating length max. 6,000 mm

B

H

A

25±3

Cut through perforation
Attention: perforated edges

Characteristics

Graepel-Special 4-18 has a C-shaped, canted contour. The surface has embossed (d = 4.5 mm) and debossed (d = 18 mm) holes that are arranged in staggered rows. The open area for standard grating widths is approximately 21 %. Graepel-Special 4-18 has high anti-skid values as well as a large displacement space and a good drainage effect. The maximum embossed field is 460 mm.

Application

This special perforation is suitable for very different purposes, e.g. as indoor walking surfaces in industrial plants. As facade cladding, it provides light transmission and good ventilation while protecting against excessive sunlight.

Options

· This perforation is program controllable. Thus, individual embossments can be created.

· The standard edge perforation may be omitted.

Dimensions		Graepel-Special 4-18
Material thickness	DD 11 raw	2.0 | 2.5 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 mm
	Stainless steel	2.0 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	45 mm
	Standard grating widths¹ (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	182 to 356 mm in steps of 22.5 mm
	Width divider	22.5 mm
	Heights (H)	30 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 11	V 10
Stainless steel	R 12	V 10
EN AW-5754	R 12	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Special 4-18 for material thickness D [in kg/m]															
	2.0						2.5						3.0		
	DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]			EN AW-5754 Height [mm]		
Grating width [mm]	30	50	75	30	50	75	30	50	75	30	50	75	30	50	75
182	3.9	4.6	5.4	1.4	1.6	1.9	4.9	5.7	6.7	1.7	2.0	2.3	2.0	2.4	2.8
240	4.7	5.4	6.2	1.6	1.9	2.1	5.9	6.7	7.7	2.0	2.3	2.7	2.4	2.8	3.2
298	5.6	6.3	7.1	1.9	2.2	2.4	7.1	7.9	8.9	2.4	2.7	3.0	2.9	3.2	3.8
330	6.0	6.6	7.4	2.1	2.3	2.6	7.5	8.3	9.3	2.6	2.8	3.2	3.1	3.4	3.8
356	6.4	7.0	7.8	2.2	2.4	2.7	8.0	8.8	9.8	2.8	3.0	3.4	3.3	3.6	4.0

	H [mm]	D [mm]	Uniformly distributed load				Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)							Concentrated load				Load Fq [in kN] for concentrated load (numerical values apply for single grating)						
			Support length L [mm]											Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD 11, DX 51 D	30	2.0	5.676	3.784	2.838	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.548	2.183	1.577	1.234	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	30	2.5	6.732	4.488	3.366	2.382	1.654	1.215	0.931	0.735	0.596	0.492	0.414	4.208	2.589	1.870	1.464	1.043	0.765	0.584	0.461	0.373	0.308	0.259
	50	2.0	11.407	7.605	5.703	4.563	3.802	3.259	2.614	2.065	1.673	1.382	1.162	7.129	4.387	3.169	2.480	2.037	1.853	1.501	1.296	1.049	0.866	0.728
	50	2.5	13.751	9.168	6.876	5.501	4.584	3.929	3.151	2.490	2.017	1.667	1.400	8.595	5.289	3.820	2.989	2.456	2.084	1.809	1.562	1.264	1.044	0.877
	75	2.0	20.283	13.522	10.141	8.113	6.761	5.795	5.071	4.507	4.057	3.671	3.084	12.677	7.801	5.634	4.409	3.622	3.073	2.669	2.358	2.113	1.913	1.749
	75	2.5	24.671	16.447	12.336	9.868	8.224	7.049	6.168	5.482	4.934	4.465	3.752	15.419	9.489	6.853	5.363	4.406	3.975	3.246	2.869	2.570	2.327	2.127
EN AW-5754	30	2.0	4.005	1.780	1.001	0.641	0.445	0.327	0.250	0.198	0.160	0.132	0.111	2.697	1.151	0.638	0.406	0.281	0.206	0.157	0.124	0.100	0.083	0.070
	30	2.5	4.751	2.111	1.188	0.760	0.528	0.388	0.297	0.235	0.190	0.157	0.132	3.199	1.365	0.757	0.481	0.333	0.244	0.186	0.147	0.119	0.098	0.083
	30	3.0	5.181	2.303	1.295	0.829	0.576	0.423	0.324	0.256	0.207	0.171	0.144	3.489	1.489	0.825	0.525	0.363	0.266	0.203	0.161	0.130	0.107	0.090
	50	2.0	8.963	5.930	3.336	2.135	1.482	1.089	0.834	0.659	0.534	0.441	0.371	5.602	3.447	2.125	1.351	0.935	0.685	0.524	0.413	0.335	0.276	0.232
	50	2.5	10.805	7.149	4.021	2.574	1.787	1.313	1.005	0.794	0.643	0.532	0.447	6.753	4.156	2.562	1.629	1.127	0.826	0.631	0.498	0.403	0.333	0.280
	50	3.0	12.064	7.986	4.492	2.875	1.997	1.467	1.123	0.887	0.719	0.594	0.499	7.540	4.640	2.862	1.819	1.259	0.923	0.705	0.557	0.451	0.372	0.313
	75	2.0	15.936	10.624	7.968	5.668	3.936	2.892	2.214	1.749	1.417	1.171	0.984	9.960	6.129	4.427	3.464	2.481	1.819	1.391	1.098	0.888	0.734	0.616
	75	2.5	19.384	12.923	9.692	6.895	4.788	3.518	2.693	2.128	1.724	1.425	1.197	12.115	7.456	5.385	4.214	3.019	2.213	1.692	1.335	1.081	0.893	0.750
	75	3.0	21.968	14.645	10.984	7.817	5.428	3.988	3.053	2.413	1.954	1.615	1.357	13.730	8.449	6.102	4.776	3.422	2.508	1.918	1.514	1.225	1.012	0.850
Stainless steel	40	2.0	6.217	4.144	3.108	2.009	1.395	1.025	0.785	0.620	0.502	0.415	0.349	3.885	2.391	1.727	1.271	0.879	0.645	0.493	0.389	0.315	0.260	0.218
	50	2.0	12.493	8.329	6.247	4.997	4.164	3.414	2.614	2.065	1.673	1.382	1.162	7.808	4.805	3.470	2.716	2.231	1.893	1.642	1.296	1.049	0.866	0.728
	75	2.0	22.214	14.810	11.107	8.886	7.405	6.347	5.554	4.937	4.441	3.671	3.084	13.884	8.544	6.171	4.829	3.967	3.366	2.923	2.583	2.314	2.096	1.915

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
182***	1.89	2.49	3.18
240	1.25	1.65	2.10
298	0.97	1.28	1.63
330	0.88	1.16	1.48
356	0.82	1.09	1.38

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Moments of inertia and section modulus
Grating cross-sections (axis X–X1)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
30	2.0	38918.66	2525.54
	2.5	46161.04	2995.52
	3.0	50344.74	3264.69
50	2.0	129645.30	5075.43
	2.5	156300.69	6118.51
	3.0	174605.86	6831.59
75	2.0	344236.50	9024.56
	2.5	418745.73	10977.18
	3.0	474710.43	12440.09

Detail **A**

H ... 4±0.5

40

LL 9 x 12 opposite rotated 90°

Ø26

Unperforated edge possible for custom versions

30

40

L grating length max. 6,000 mm

B

H

A

25±3

Cut through perforation
Attention: perforated edges

Characteristics

The surface of this grating is dominated by rubber studs. These are available in red and/or black and are supplied loose. They have to be driven into the debossed holes by the customer. The rubber studs ensure a good anti-skid effect and displacement, and they reduce running noise. The maximum embossed field is 480 mm.

Application

This "noise killer" has been designed for indoor use in the industrial sector. Due to its optical sophistication, architects have also discovered it for modern building projects and used it as covering for stairways and walkways in interior finishes but also as design element for cladding facades.

Options

· The standard edge perforation may be omitted.

Dimensions		Graepel-Rubber-Stud
Material thickness	DD 11 raw	2.0 | 2.5 | 3.0 mm
	DD 11 hot-dip galvanized | DX 51 D pre-galvanized	2.0 | 2.5 | 3.0 mm
	Stainless steel	2.0 | 2.5 mm
	EN AW-5754	2.0 | 2.5 | 3.0 mm
Dimensions	**Lengths (L)** up to	6,000 mm
	Length divider	40 mm
	Standard grating widths [1] (B)	
	DD 11 | DX 51 D | Stainless steel | EN AW-5754	100 to 300 mm in steps of 30 mm
	Width divider	30 mm
	Heights (H)	40 | 50 | 75 mm

[1] Other dimensions on request.

Anti-slip values		
Material	Evaluation of anti-slip	Displacement
DD 11 hot-dip galvanized	R 9	V 10

Further details on the perforation on our website

Weight per meter for Graepel-Rubber-Stud for material thickness D [in kg/m]													
	2,0			2,5						3,0				
Grating width	DD 11**/ Stainless steel Height [mm]			DD 11**/ Stainless steel Height [mm]			EN AW-5754 Height [mm]			DD 11** Height [mm]			EN AW-5754 Height [mm]		
[mm]	40	50	75	40	50	75	40	50	75	40	50	75	40	50	75
120	3.5	3.8	4.6	4.5	4.7	5.7	1.6	1.6	1.9	5.3	5.5	6.7	1.9	1.9	2.3
150	3.9	4.3	5.1	5.1	5.2	6.2	1.8	1.8	2.1	6.0	6.2	7.4	2.1	2.1	2.5
180	4.4	4.7	5.5	5.6	5.8	6.8	2.0	2.0	2.3	6.6	6.9	8.1	2.3	2.4	2.8
210	4.9	5.2	6.0	6.2	6.4	7.4	2.2	2.2	2.5	7.3	7.6	8.8	2.6	2.6	3.0
240	5.3	5.7	6.5	6.7	7.0	8.0	2.4	2.4	2.7	7.9	8.3	9.5	2.8	2.9	3.3
270	5.8	6.1	6.9	7.3	7.6	8.6	2.6	2.6	2.9	8.6	9.0	10.2	3.0	3.1	3.5
300	6.3	6.6	7.4	7.8	8.2	9.2	2.8	2.8	3.1	9.2	9.7	10.9	3.3	3.3	3.7

Legend   *   Available only up to a length of 3,000 mm
     **   Values also apply for DX 51 D

***   For gratings smaller than 200 mm, the lump load is added to the neighboring gratings corresponding to the portion of the load area.

◼ = Color coding for load values of stock items

58

Graepel-Rubber-Stud

Graepel gratings

	H [mm]	D [mm]	Uniformly distributed load — Replacement load Fq [in kN] for uniformly distributed load (numerical values apply for single grating)											Concentrated load — Load Fq [in kN] for concentrated load (numerical values apply for single grating)										
			Support length L [mm]											Support length L [mm]										
			500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000
DD 11, DX 51 D	40	2.0	9.033	6.022	4.517	3.613	2.947	2.165	1.658	1.310	1.061	0.877	0.737	5.646	3.474	2.509	1.964	1.613	1.362	1.041	0.822	0.665	0.550	0.462
	40	2.5	10.835	7.223	5.417	4.334	3.535	2.597	1.989	1.571	1.273	1.052	0.991	6.772	4.167	3.010	2.355	1.935	1.634	1.249	0.986	0.798	0.659	0.554
	40	3.0	12.472	8.314	6.236	4.989	4.070	2.990	2.289	1.809	1.465	1.211	1.017	7.795	4.797	3.464	2.711	2.227	1.881	1.438	1.135	0.919	0.759	0.637
	50	2.0	12.230	8.153	6.115	4.892	4.077	3.494	2.800	2.212	1.792	1.481	1.244	7.644	4.704	3.397	2.659	2.184	1.853	1.609	1.388	1.123	0.928	0.779
	50	2.5	14.759	9.839	7.380	5.904	4.920	4.217	3.379	2.670	2.162	1.787	1.502	9.224	5.677	4.100	3.208	2.636	2.236	1.942	1.675	1.356	1.120	0.941
	50	3.0	17.094	11.396	8.547	6.838	5.698	4.884	3.914	3.092	2.505	2.070	1.739	10.684	6.575	4.748	3.716	3.053	2.590	2.249	1.940	1.570	1.297	1.089
	75	2.0	21.552	14.368	10.776	8.621	7.184	6.158	5.388	4.789	4.310	3.898	3.275	13.470	8.289	5.987	4.685	3.849	3.265	2.836	2.506	2.245	2.033	1.858
	75	2.5	26.236	17.491	13.118	10.494	8.745	7.496	6.559	5.830	5.247	4.746	3.988	16.397	10.091	7.288	5.703	4.685	3.975	3.452	3.051	2.733	2.475	2.262
	75	3.0	30.655	20.437	15.328	12.262	10.218	8.759	7.664	6.812	6.131	5.545	4.660	19.160	11.791	8.515	6.664	5.474	4.645	4.034	3.565	3.193	2.892	2.643
EN AW-5754	40	2.0	6.858	3.637	2.046	1.309	0.909	0.668	0.511	0.404	0.327	0.270	0.227	4.286	2.351	1.303	0.828	0.573	0.420	0.321	0.254	0.205	0.169	0.142
	40	2.5	8.219	4.358	2.452	1.569	1.090	0.801	0.613	0.484	0.392	0.324	0.272	5.137	2.818	1.562	0.993	0.687	0.566	0.385	0.304	0.246	0.203	0.171
	40	3.0	9.453	5.013	2.820	1.805	1.253	0.921	0.705	0.557	0.451	0.373	0.313	5.908	3.240	1.796	1.142	0.790	0.579	0.443	0.349	0.283	0.234	0.196
	50	2.0	9.310	6.156	3.463	2.216	1.539	1.131	0.866	0.684	0.554	0.458	0.385	5.819	3.581	2.206	1.402	0.970	0.711	0.544	0.429	0.347	0.287	0.241
	50	2.5	11.227	7.425	4.176	2.673	1.856	1.364	1.044	0.825	0.668	0.617	0.464	7.017	4.318	2.661	1.691	1.170	0.858	0.656	0.518	0.419	0.346	0.291
	50	3.0	12.994	8.594	4.834	3.094	2.148	1.578	1.208	0.955	0.773	0.639	0.537	8.121	4.998	3.080	1.958	1.354	0.993	0.759	0.599	0.485	0.401	0.336
	75	2.0	16.483	10.989	8.241	5.861	4.070	2.990	2.289	1.809	1.465	1.211	1.017	10.302	6.340	4.579	3.583	2.566	1.881	1.438	1.135	0.919	0.759	0.637
	75	2.5	20.056	13.371	10.028	7.131	4.952	3.639	2.786	2.201	1.783	1.473	1.238	12.535	7.714	5.571	4.360	3.122	2.289	1.750	1.381	1.118	0.923	0.776
	75	3.0	23.423	15.615	11.711	8.329	5.784	4.250	3.254	2.571	2.082	1.721	1.446	14.639	9.009	6.506	5.092	3.646	2.673	2.043	1.613	1.306	1.078	0.906
Stainless steel	40	2.0	9.893	6.596	4.947	3.957	2.947	2.165	1.658	1.310	1.061	0.877	0.737	6.183	3.805	2.748	2.151	1.767	1.362	1.041	0.822	0.665	0.550	0.462
	40	2.5	11.866	7.911	5.933	4.747	3.535	2.597	1.989	1.571	1.273	1.052	0.884	7.417	4.564	3.296	2.580	2.119	1.634	1.249	0.986	0.798	0.659	0.554
	50	2.0	13.395	8.930	6.697	5.358	4.465	3.657	2.800	2.212	1.792	1.481	1.244	8.372	5.152	3.721	2.912	2.392	2.030	1.758	1.388	1.123	0.928	0.779
	50	2.5	16.165	10.776	8.082	6.466	5.388	4.413	3.379	2.670	2.162	1.787	1.502	10.103	6.217	4.490	3.514	2.887	2.449	2.122	1.675	1.356	1.120	0.941
	75	2.0	23.604	15.736	11.802	9.442	7.868	6.744	5.901	5.245	4.717	3.898	3.275	14.753	9.079	6.557	5.251	4.215	3.576	3.106	2.745	2.459	2.227	2.035
	75	2.5	28.735	19.156	14.367	11.494	9.578	8.210	7.184	6.385	5.742	4.746	3.988	17.959	11.052	7.982	6.727	5.131	4.354	3.781	3.341	2.993	2.711	2.477

Lump load

Grating width B [mm]	Maximum possible lump load F [in kN] (numerical values apply for DD 11)		
	Load area 200 x 200 mm		
	Material thickness [mm]		
	2.0	2.5	3.0
120***	2.86	4.47	6.44
150***	1.96	3.05	4.40
180***	1.45	2.26	3.25
210	1.13	1.76	2.54
240	0.94	1.46	2.11
270	0.81	1.27	1.83
300	0.73	1.13	1.63

Note concerning lump load

The values are calculated for gratings which are supported over their whole length. For a given span width, the values stated in this lump load table must not exceed those given in the concentrated load table.

For **EN AW-5754**, the values in the table must be multiplied by a factor of **0,74**.

Moments of inertia and section modulus
Grating cross-sections (axis X–X₁)

Note: Only the unperforated area of the two sides is taken into account for the static cross section values for the longitudinal direction of the grating (shaded area).

Bend height H [mm]	Material thickness D [mm]	Moment of inertia I_x [mm⁴]	Minimum section modulus W_2 [mm³]
40	2.0	82239.96	4019.19
	2.5	98645.20	4820.76
	3.0	113553.07	5549.10
50	2.0	138871.16	5441.63
	2.5	167598.04	6566.91
	3.0	194126.33	7605.92
75	2.0	365564.25	9589.22
	2.5	445045.48	11673.44
	3.0	520043.63	13639.82

Conversion of the replacement load Fq from the table into a distributed load Q

$$Q = \frac{10^6 \times F_q}{B \times L}$$

with:
Q = Distributed load for a grating [kN/m²]
Fq = Replacement load from table with reference to the support width [kN]
B = Grating width [mm]
L = Support length [mm]

Order information
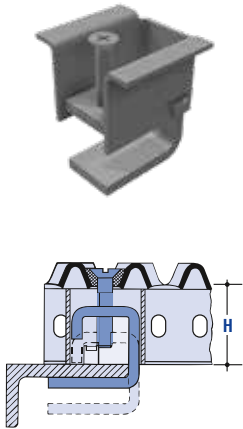
The gratings are available up to a **length of 6,000 mm.**

Upon request, the gratings are cut to length. Please specify the required length when ordering. Please take account of the length divider of 40 mm.

Hot-dip galvanized gratings are hot-dip galvanized after sawing to ensure optimum corrosion protection.

Rubber studs (red or black) are supplied loose. When ordering, please specify color.

	Function		Products	Application principle	Application	Versions
1	Connection of gratings with each other	At the front edges	Lengthwise connector	All gratings		Heights: 40, 50, 75, 100 mm
		At the long sides	Via edge perforation (standard) or connector plate	Connector plate allows mounting from above		Heights: 40, 50, 75 mm
2	Fastening of gratings to a beam	With a vertical bar	Claw and spacer	**Open gratings:** Screwing from above with special connection disk **Closed gratings:** Drilling and screwing from above or use mounting plate from below	• Metal olive for Stabil and Stabil Xtrem • Without disk for Garden and Eco • Metal disk M8 for all other round perforations • Metal clip for Steg and Lightprofile	For all standard grating heights
		With a horizontal flange	C-clip or mounting plate or spot drilling of the beam and spacer	**Open gratings:** Screwing from above with special connection disk **Closed gratings:** Drilling and screwing from above **All gratings:** Mounting plate from below		For all standard grating heights
3	Fastening of gratings on the face side to a beam / plate or the like		Compensating angle	All gratings except Steg		Heights: 40 and 75 mm, diff. widths
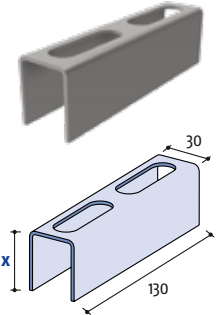
C-Clip – for detachable connections (not suitable for Graepel-Steg and Graepel-Lightprofile)

Description	Suitable for	Disk	Order number H = 40 mm	Order number H = 50 mm	Order number H = 75 mm	Order number H = 100 mm
There are different C-clip sets for different perforations and heights of Graepel gratings. They consist of a main body, a movable tongue and a bolt (M8 countersunk, cross recess). It is supplemented by different disks for different Graepel gratings. **Heights:** 40 mm, 50 mm, 75 mm **Material:** DD 11 hot-dip galvanized, stainless steel 1.4301	Graepel-Special P-12	D=8.4	60 8700 0092 002 - 004	60 8700 0093 002 - 004	60 8700 0094 002 - 004	–
	Graepel-Glide 18 Graepel-Special 4-18 Graepel-Universal	Round	60 8700 0097 002 - 004	60 8700 0098 002 - 004	60 8700 0099 002 - 004	–
	Graepel-Eco Graepel-Rhombus Graepel-Perl Graepel-Indoor Graepel-Star	Without	60 8700 0100 002 - 004	60 8700 0101 002 - 004	60 8700 0102 002 - 004	–
	Graepel-City Graepel-Garden	Without	60 8700 0103 002 - 004	60 8700 0104 002 - 004	60 8700 0105 002 - 004	–
	Graepel-Special 14-14	Round	60 8700 0106 002 - 004	60 8700 0107 002 - 004	60 8700 0108 002 - 004	–
	Graepel-Stabil	Olive	60 8700 0109 002 - 004	60 8700 0110 002 - 004	60 8700 0111 002 - 004	–
	Graepel-Stabil Xtrem	Olive-S	–	60 8700 0112 002 - 004	60 8700 0113 002 - 004	60 8700 0114 002
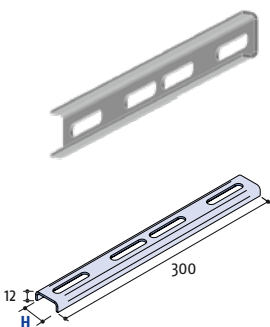
The final digit 002 of the order number signifies the material DD 11 hot-dip galvanized, 004 stands for stainless steel 1.4301.
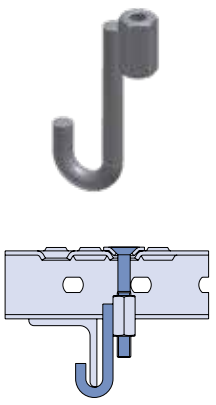
Bolts – for our fastening technology

	Bolt type	Order number Electrogalvanized	Order number Stainless steel 1.4301
	Countersunk bolt M8 x 35 DIN 965	00 3010 2201 008	00 3010 2208 004
	Countersunk bolt M8 x 45 DIN 965	00 3010 2315 008	00 3010 2315 004
	Countersunk bolt M8 x 70 DIN 965	00 3010 2225 008	00 3010 2225 004
	Hexagon bolt M8 x 16 DIN 933	00 3010 0003 001	00 3010 0003 007
	Hexagon bolt M8 x 20 DIN 933	00 3010 5100 001	00 3010 5100 004
	Hexagon nut M8 DIN 985	00 3010 0000 001	00 3010 0010 001

Disks and olives

		Description	Suitable for	Order number
Disk for round perforations		d = 24 mm with countersunk hole for bolt M8 **Material:** Stainless steel 1.4301 (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Universal Graepel–Special 14–14 Graepel–Special 4–18 Graepel–Glide 18	60 8700 0028 004
Disk Steg		With countersunk hole for bolt M8 **Material:** Stainless steel 1.4301 (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Steg Graepel–Lightprofile	60 8700 0090 004
Olive for Graepel-Stabil		With countersunk hole for bolt M8 **Material:** Stainless steel 1.4301 (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Stabil	60 8700 0089 004
Olive for Graepel-Stabil with countersunk hole		With countersunk hole for bolt M8 **Material:** Cast steel, electrogalvanized (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Stabil	60 8700 0400 008
Olive for Graepel-Stabil		With countersunk hole for bolt M8 **Material:** Plastic (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Stabil	60 8700 0366 016
Olive for Graepel-Stabil Xtrem		With countersunk hole for bolt M8 **Material:** Steel, hot-dip galvanized (Bolts are not supplied. Upon request we provide suitable bolts.)	Graepel–Stabil Xtrem	60 8700 0063 002

The disks can also be ordered individually (without C–clip). Upon request we provide suitable bolts.

Illustrations not to scale.

Fastening technology

Spacer

	Description	Suitable for	x for grating height [mm]	Order number Steel, pre-galvanized	Order number Stainless steel 1.4301
	Graepel gratings are screwed from above through the spacer into the substructure. Upon request we provide suitable disks and bolts.	Suitable for all Graepel gratings except Graepel-Lightprofile*	40 mm	60 8000 0013 005	60 8000 0013 004
			50 mm	60 8000 0020 005	60 8000 0020 004
			75 mm	60 8000 0005 005	60 8000 0005 004
			100 mm	60 8000 0008 005	–

Lengthwise connector

	Description	Suitable for	H [mm]	Order number Steel, hot-dip galvanized
	Lengthwise connectors allow the end-to-end connection of gratings lengthwise on the inside without drilling into the substructure.	Universally applicable for all Graepel gratings	33 mm for 40 mm	60 8000 0025 002
			43 mm for 50 mm	60 8000 0026 002
			68 mm for 75 mm	60 8000 0027 002
			93 mm for 100 mm	60 8000 0028 002

Claw – base unit: M8

	Description	Suitable for	Order number Steel, electrogalvanized
	The claw can be used from a minimum height of 60 mm between the top edge of the grating and the bottom edge of the substructure. It is screwed through the grating and hooked under the construction. Note: Standard delivery without disks and bolts! Disks and bolts needed!	Universally applicable for all Graepel gratings	60 8700 0091 008

Legend * Graepel-Rhombus, Graepel-Perl and Graepel-Indoor must be provided with additional countersunk holes. Illustrations not to scale.

Clamp fastening for Lightprofile grating

	Description	Suitable for	H [mm]	Order number Stainless steel 1.4301
	The clamp fastening consists of a clamp, spacer, Steg disk and a bolt (M8 countersunk, cross recess) with square nut.	Graepel-Lightprofile	30 mm	60 8700 0075 004
			40 mm	60 8700 0077 004
			50 mm	60 8700 0078 004
			75 mm	60 8700 0079 004

Mounting plate

	Description	Suitable for	H [mm]	Order number Steel, hot-dip galvanized	Order number Stainless steel 1.4301
	The clamp fastening creates a detachable connection without drilling into the substructure. **Please note:** The mounting plate is supplied including mounting material.	Universally applicable for all Graepel gratings (not suitable for Graepel-Steg)	40 mm	60 8700 0122 002	60 8700 0033 004
			50 mm	60 8700 0123 002	60 8700 0034 004
			75 mm	60 8700 0124 002	60 8700 0035 004

Compensating angle

	Description	Suitable for	A [mm]	N [mm]	Grating width B [mm]	Grating height H [mm]	Order number Stainless steel 1.4301
	It compensates dimensional fluctuations in the grating length up to 30 mm. Moreover, it can be used to connect gratings on the face side or to close them and thus turn them into a simple step. **Dimensions:** ■ for grating height 40 mm: flat steel 35 x 3 mm ■ for grating height 75 mm: flat steel 60 x 5 mm **Note:** Standard delivery angle with 4 screws!	Universally applicable for all Graepel gratings (not suitable for Graepel-Steg)	115	60	120	40	60 3100 3050 004
			145	90	150	40	60 3100 0477 004
			175	90	180	40	60 3100 3051 004
			195	90	200	40	60 3100 0478 004
			235	120	240	40	60 3100 3052 004
			235	120	240	75	60 3100 3057 004
			245	130	250	40	60 3100 0086 004
			245	130	250	75	60 3100 3058 004
			295	180	300	40	60 3100 3053 004
			295	180	300	75	60 3100 3059 004
			355	240	360	40	60 3100 3054 004
			415	300	420	40	60 3100 3055 004
			475	360	480	40	60 3100 3056 004

Graepel ladder rungs

Graepel ladder rungs are designed with ultimate safety in mind. In different standard designs, they ensure underfoot safety and secure grip – even under extreme working conditions.

Depending on the type of perforation, they are offered in different dimensions and shapes (with and without cutout as well as with and without perforated edge).
If desired, they are supplied in

customer-specific lengths. Fully welded ladders with or without back protection are also available on request.

Other dimensions on request
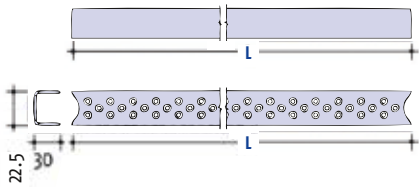
Graepel-40-Lightprofile

Graepel-30-Round6

Graepel-22-Round4 (formerly Graepel-L0/4)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11	2.0	30	22.5	308	60 1600 0014 001
raw	2.0	30	22.5	2,000	60 1600 0015 001
Stainless steel Material no. 1.4404	2.0	30	22.5	2,000	60 1600 0015 007
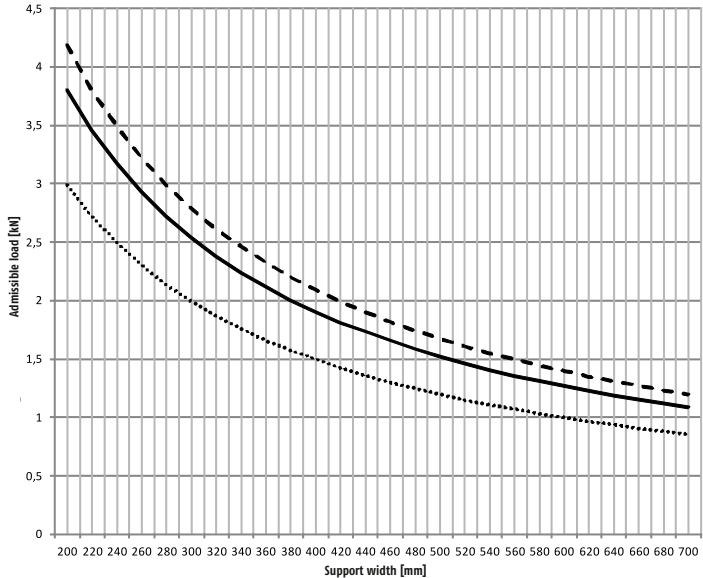
Perforation diameter: 4 mm

Division 10 mm, standard staggered

Fixed size 308 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

Stock length 2,000 mm without cutout

Load diagram Graepel-22-Round4

DD 11
EN AW 5754
A2

Admissible load [kN]

Support width [mm]

Graepel ladder rungs

Graepel-22-Round8 (formerly Graepel-LO/8)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11	2.0	30	22.5	306	60 1600 0161 001
raw	2.0	30	22.5	1,950	60 1600 0163 001
Stainless steel Material no. 1.4404	2.0	30	22.5	1,950	60 1600 0163 007
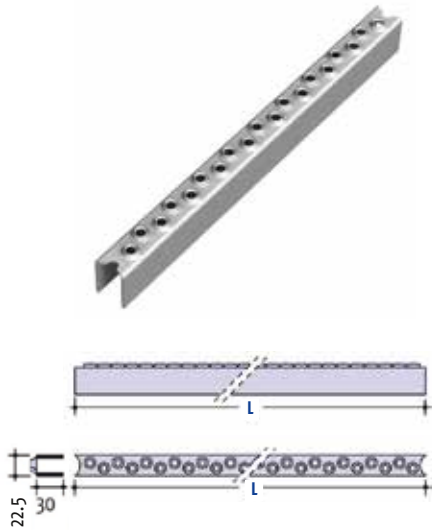
Perforation diameter: 8 mm

Division 15 mm, standard staggered

Fixed size 306 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

Stock length 1,950 mm without cutout

Complies with DIN EN ISO 14122

Load diagram Graepel-22-Round8

Legend: DD 11, EN AW 5754, A2

Axes: Admissible load [kN] vs Support width [mm]
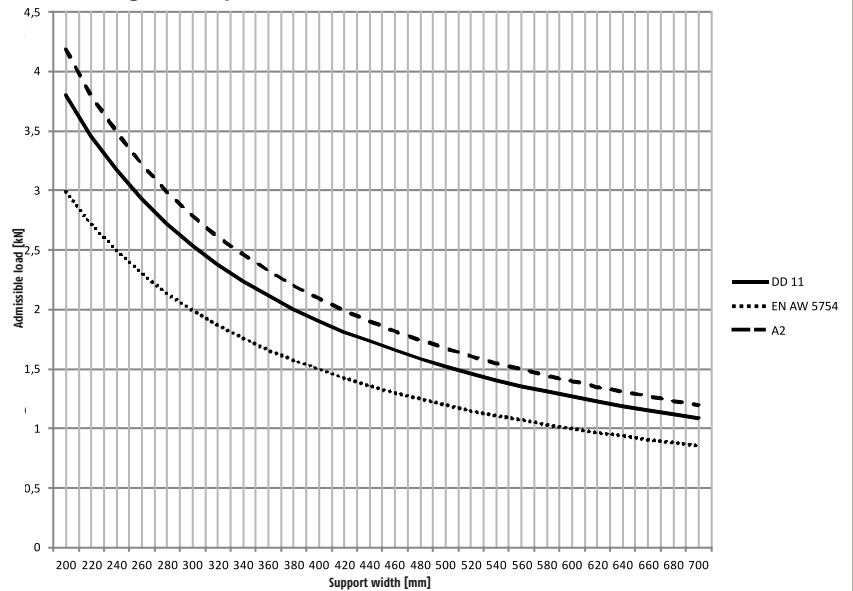
Graepel-30-Round6 (formerly Graepel-LO/6)
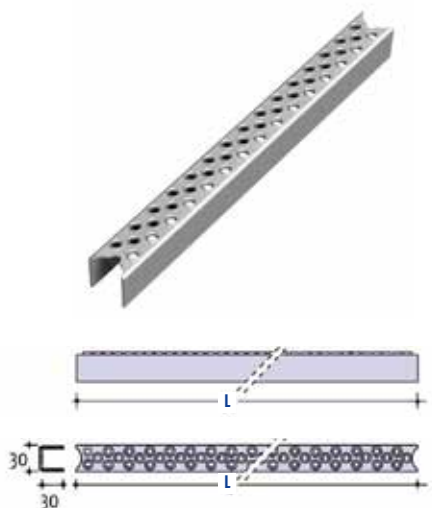
Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11	2.0	30	30	318	60 1600 0103 001
raw	2.0	30	30	2,000	60 1600 0106 001
Stainless steel Material no. 1.4404	2.0	30	30	2,000	60 1600 0106 007
Aluminum EN AW-5754	2.0	30	30	2,000	60 1600 0106 003

Perforation diameter: 6 mm

Division 21 mm, standard staggered

Fixed size 318 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

Stock length 2,000 mm without cutouts

Complies with DIN EN ISO 14122

Load diagram Graepel-30-Round6

Legend: DD 11, EN AW 5754, A2

Axes: Admissible load [kN] vs Support width [mm]
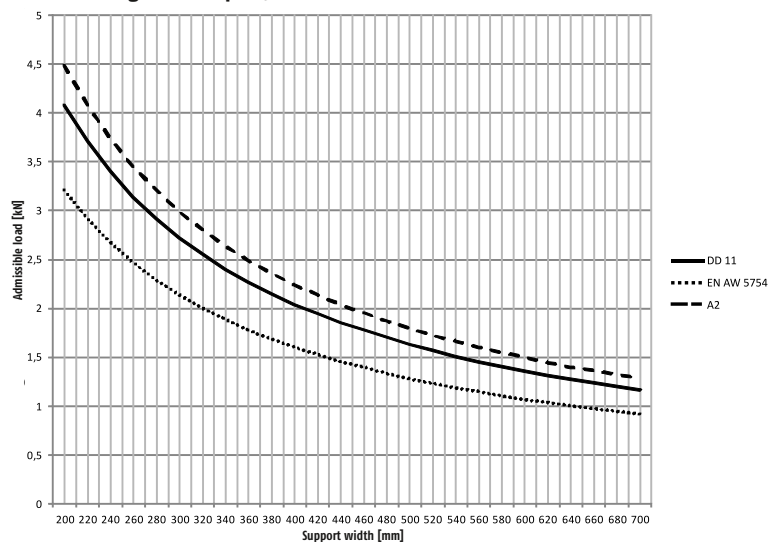
Graepel-30-Round 6 with inner edges   (formerly Graepel-LO/6K)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11 raw	2.0	26	30	318	60 1600 0094 001
	2.0	26	30	2,000	60 1600 0105 001
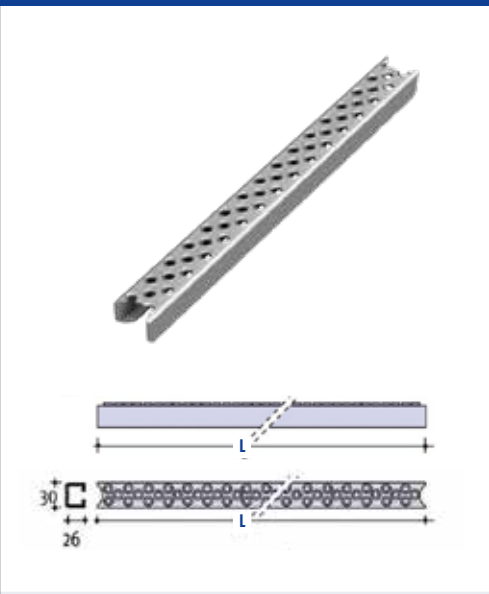
Perforation diameter: 6 mm

Division 21 mm, standard staggered

Inner edges of 8 mm on both sides

Fixed size 318 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

Stock length 2,000 mm without cutout

Complies with DIN EN ISO 14122

Load diagram Graepel-30-Round 6 with inner edges

Admissible load [kN] vs Support width [mm]

Legend: DD 11, EN AW 5754, A2
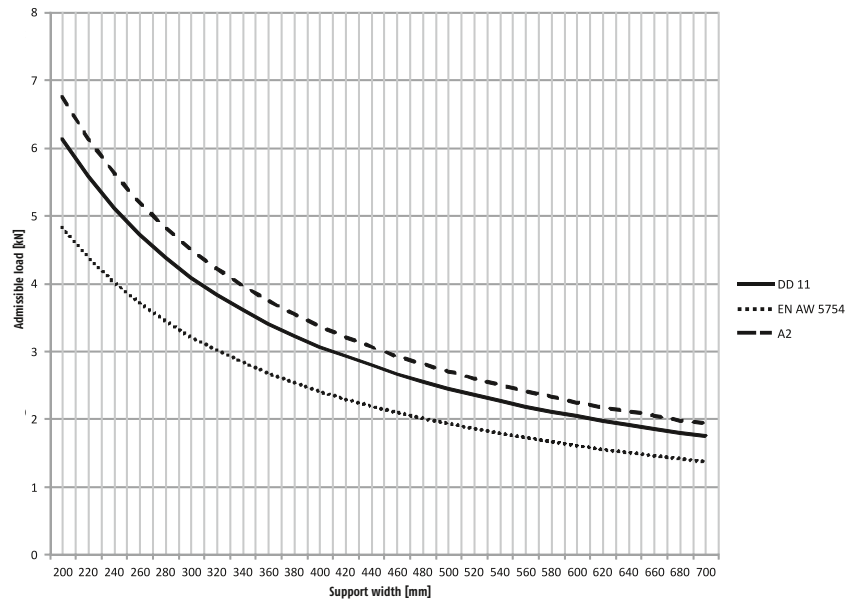
Graepel-30-Round 6 with unperforated edge   (formerly Graepel-LO/6U)
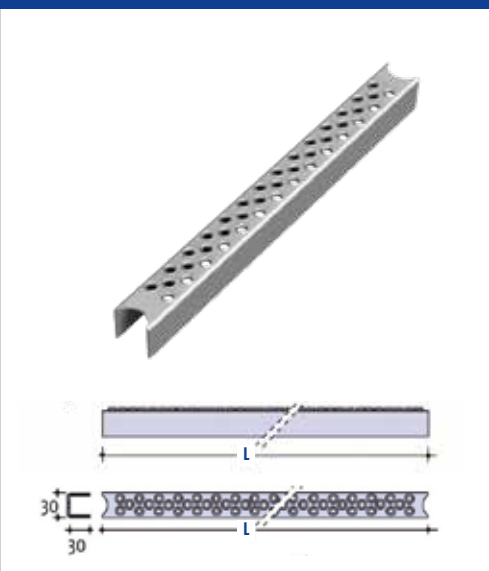
Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11 raw	2,0	30	30	318	60 1600 0103 101
Stainless steel Material no. 1.4404	2.0	30	30	318	60 1600 0103 107
Aluminum EN AW-5754	2.0	30	30	318	60 1600 0103 103

Perforation diameter: 6 mm

Division 21 mm, standard staggered

Fixed size 318 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

With unperforated edge

Complies with DIN EN ISO 14122

Load diagram Graepel-30-Round 6 with unperforated edge

Admissible load [kN] vs Support width [mm]

Legend: DD 11, EN AW 5754, A2
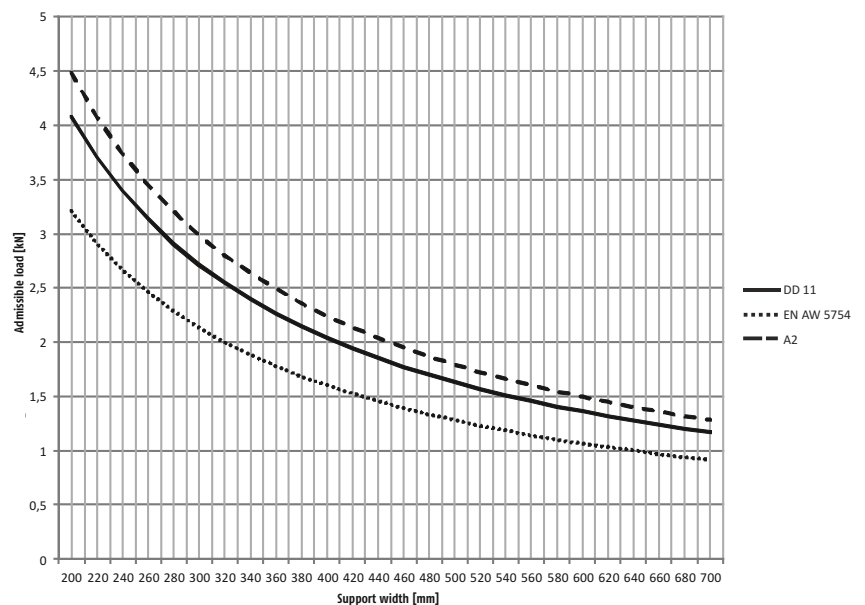
◼ Graepel ladder rungs

Graepel-30-Grip   (formerly Graepel-L0/Grip)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DC 01 raw	2.0	36	30	1,920	60 1600 0726 001
Aluminum EN AW-5754	2.0	36	30	1,920	60 1600 0726 003
Stainless steel Material no. 1.4404	2.0	36	30	1,920	60 1600 0726 007

30
36
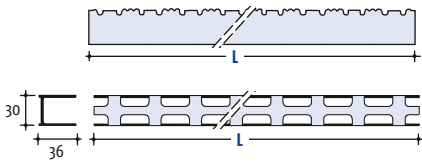
Especially slip-resistant due to the serrated stepping edge

Suitable for several tube diameters and support widths

Weldable to tubes without cutout (just bend the center bar down)

Complies with DIN EN ISO 18799-1

Load diagram Graepel-30-Grip

Admissible load [kN] / Support width [mm]
— DD 11
···· EN AW 5754
-- A2
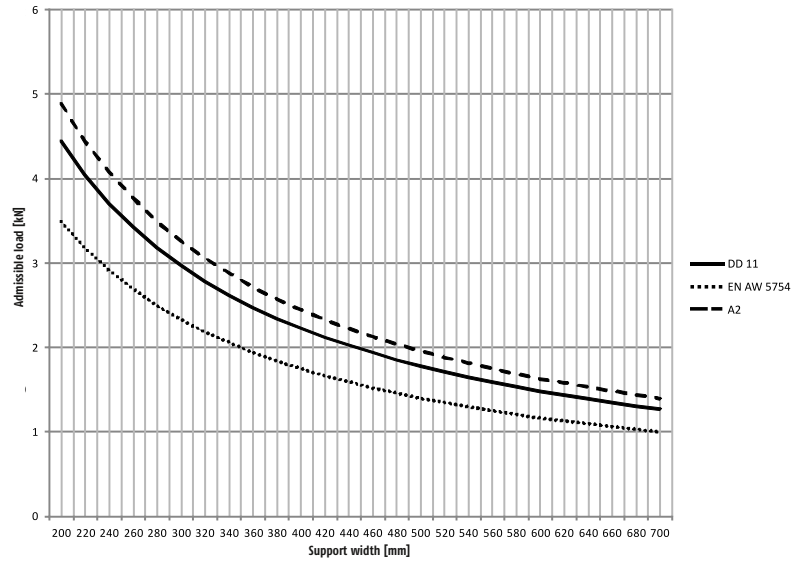
Graepel-35-Metric   (formerly Graepel-L0/30)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11 raw	2.0	30	35	325	60 1600 0124 001

35
30
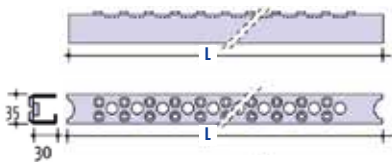
Perforation as for Graepel-Metric

Inner edge of 8 mm on one side

Fixed size 325 mm (with cutout for clearance between ladder bars 300 mm)

Tube Ø 27 mm

Complies with DIN EN ISO 18799-1

Load diagram for Graepel-35-Metric

Admissible load [kN] / Support width [mm]
— DD 11
···· EN AW 5754
-- A2

Graepel ladder rungs
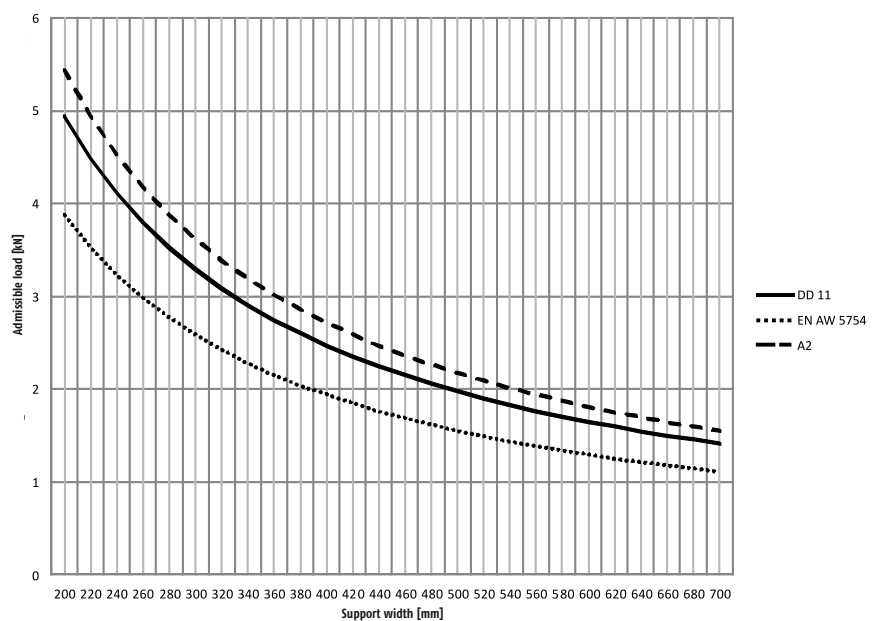
Graepel-40-Lightprofile (formerly Graepel-LO/Steg)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DC 01 roh	2.0	36	40	2,000	60 1600 1776 001
Stainless steel W.-Nr. 1.4404	2.0	36	40	2,000	60 1600 1776 007
Aluminum EN AW-5754	2.0	36	40	2,000	60 1600 1776 003

40

36
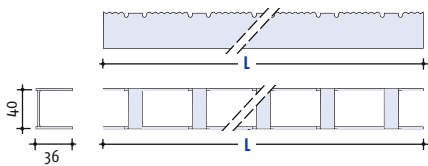
Slip-resistant stepping edge

Extreme drainage

Suitable for several tube diameters and support widths

Weldable to tubes without cutout

Complies with DIN EN ISO 18799-1

Load diagram Graepel-40-Lightprofile

Admissible load [kN] vs Support width [mm]

- DD 11
- EN AW 5754
- A2
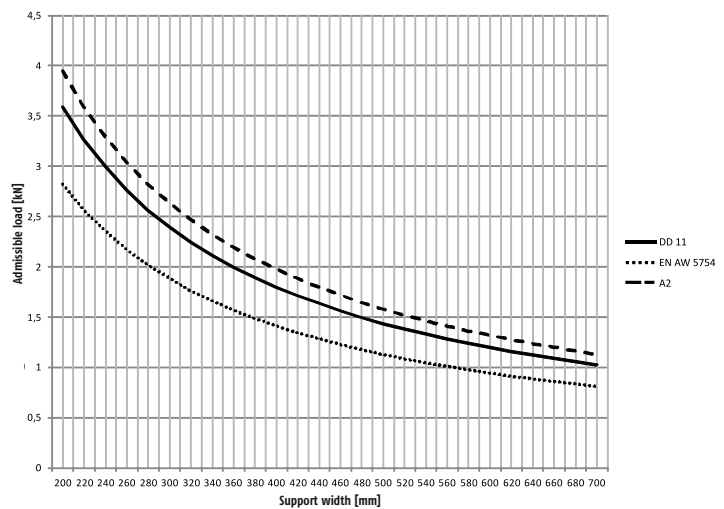
Graepel-55-Metric (formerly Graepel-LO/RS)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11 raw	2.0	30	55	500	60 1600 0225 001
	2.0	30	55	1,980	60 1600 0251 001
Stainless steel Material no. 1.4404	2.0	30	55	495	60 1600 0225 007
	2.0	30	55	1,980	60 1600 0253 007
Aluminum EN AW-5754	2.0	30	55	1,980	60 1600 0252 003

55

30
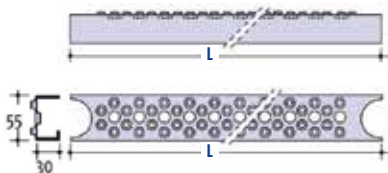
Perforation as for Graepel-Metric

Inner edge of 12 mm on one side

Fixed size 495 mm (with cutout for clearance between ladder bars [1.5" tube] 452 mm)

For 500 mm bar central clearance

Stock length 1,980 mm without cutout

Complies with DIN EN ISO 18799-1

Load diagram Graepel-55-Metric

Admissible load [kN] vs Support width [mm]

- DD 11
- EN AW 5754
- A2
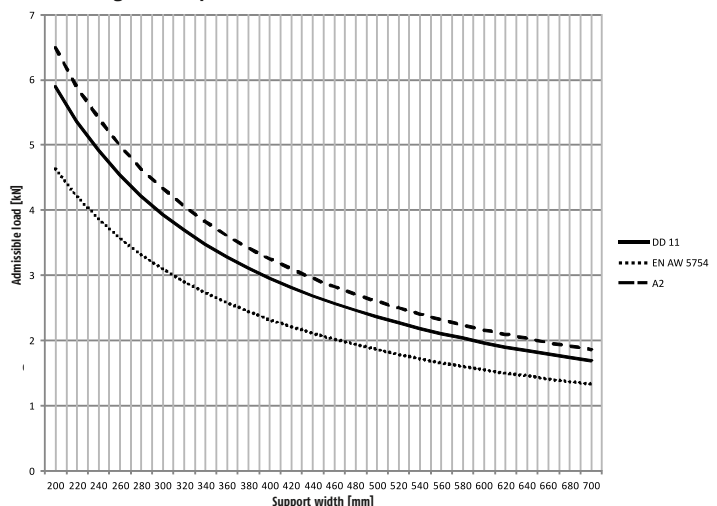
Graepel ladder rungs

Graepel-60-Stabil (formerly Graepel-LO/GS)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
DD 11 raw	2.0	30	60	500	60 1600 0016 001
Stainless steel Material no. 1.4404	2.0	30	60	500	60 1600 0016 007

Load diagram Graepel-60-Stabil

Legend: DD 11, EN AW 5754, A2

Axes: Admissible load [kN] vs Support width [mm]
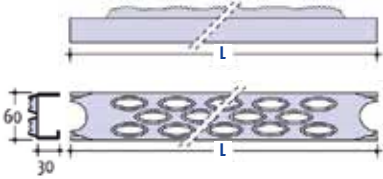
Perforation as for Graepel-Stabil

Inner edge of 7 mm on one side

Fixed size 500 mm (with cutout for clearance between ladder bars [1.5" tube] 452 mm)

For 500 mm bar central clearance

Complies with DIN EN ISO 18799-1
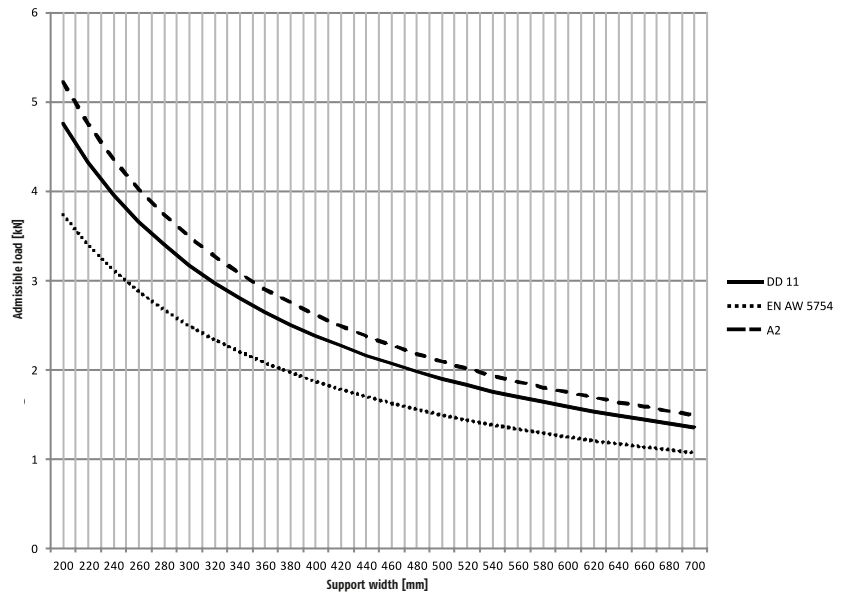
Graepel-64-Perl (formerly Graepel-LO/K)

Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
Stainless steel Material no. 1.4404	2.0	30	64	470	60 1600 0078 007
	2.0	30	64	2,000	60 1600 0216 007

Load diagram Graepel-64-Perl

Legend: DD 11, EN AW 5754, A2

Axes: Admissible load [kN] vs Support width [mm]
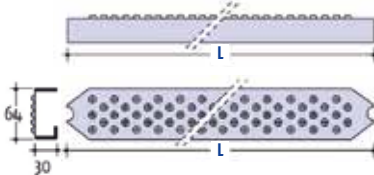
Perforation as for Graepel-Perl

Closed surface, inner edge of 12 mm on one side

Fixed size 471 mm (with cutout for clearance between ladder bars 450 mm)

Tube Ø 30 mm

Complies with DIN EN ISO 18799-1
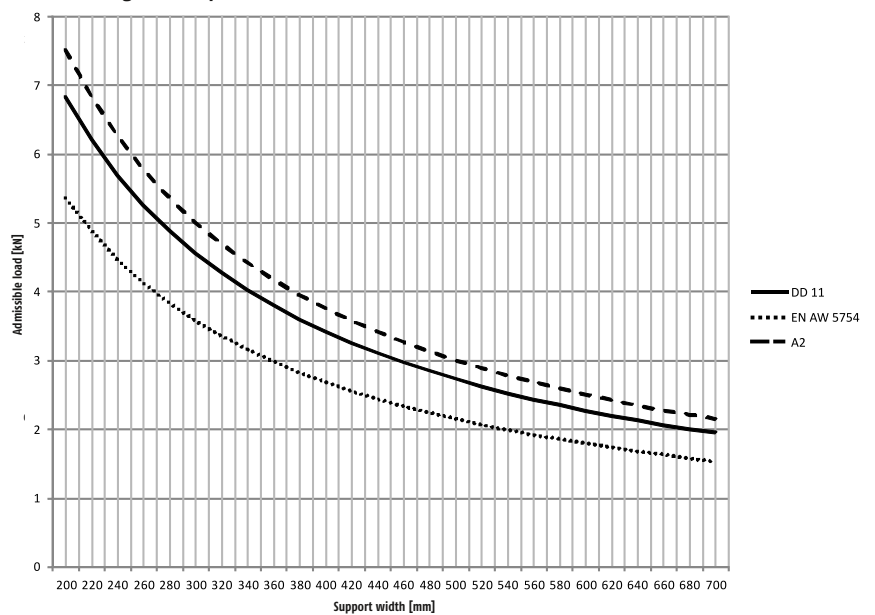
Graepel stairway steps

Straight stairway steps

Depending on the application in the public and industrial sectors, stairway steps are available with different perforations. All steps comply with EN ISO 14122–3. They feature welded front edges and lateral fixing holes. All steps shown may be produced in two standard types (see below) except for Graepel–Stabil. Only standard type 70 is available from stock in the dimensions to

which an order number is given. Moreover, a special type, the architect's step Graepel–Perl with perforated stepping edge is available. All steps in stock are designed for 5 kN/m² uniformly distributed load and 1.5 kN over 200 x 200 mm concentrated load. Steps with other perforations on request.

⚠ Steps with higher load capacities are also available on request.

Standard types
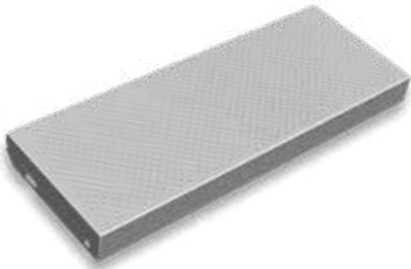
Standard type 70 (can replace grid steps) standard dimensions				
D* [mm]	H1/H2* [mm]	B* [mm]	L* [mm]	N [mm]
2.0/2.5	40/70	240	600–1,000	120
2.0/2.5	40/70	270	600–1,000	150
2.0/2.5	40/70	300	600–1,000	180

* Other dimensions on request.

Standard type flat	(particularly compact and lighter weight) standard dimensions			
D* [mm]	H* [mm]	B* [mm]	L* [mm]	N [mm]
2.0/2.5	50	240	600–1,000	127
2.0/2.5	50	270	600–1,000	157
2.0/2.5	50	300	600–1,000	187

* Other dimensions on request.

Stairway steps with hole diameters up to 8 mm

Graepel–Perl · (formerly Graepel Cone)

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number (standard type 70)
DD 11 hot-dip galvanized	2.5	40/70	240	800	120	60 2800 0733 002
	2.5	40/70	240	1,000	120	60 2800 0735 002
	2.5	40/70	270	1,000	150	60 2800 0511 002
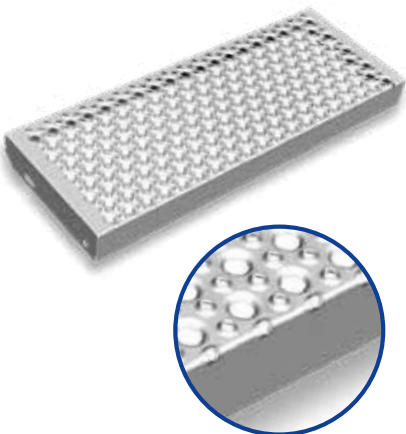
Graepel–Garden · (formerly Graepel Round No8)

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number (standard type 70)
DD 11 hot-dip galvanized	2.0	40/70	240	800	120	60 2800 2642 002
	2.0	40/70	270	800	150	60 2800 2492 002
	2.0	40/70	300	800	180	60 2800 2644 002
	2.0	40/70	240	1,000	120	60 2800 2643 002
	2.0	40/70	270	1,000	150	60 2800 2493 002
	2.0	40/70	300	1,000	180	60 2800 2494 002

■ Graepel stairway steps

Graepel-Indoor	(formerly Graepel Round A)	Graepel-City	(formerly Graepel Round B)

Non-stock items. Dimensions on request.

Non-stock items. Dimensions on request.

Graepel-Eco (formerly Graepel-Round K)

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number (standard type 70)
DD 11 hot-dip galvanized	2.5	40/70	240	800	120	60 2800 0745 002
	2.5	40/70	240	1,000	120	60 2800 0746 002
	2.5	40/70	270	1,000	150	60 2800 0497 002

Stairway steps with hole diameter more than 8 mm

Graepel-Universal (with perforated stepping edge) (formerly Graepel Round S)

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number (standard type 70)
DD 11 hot-dip galvanized	2.0	40/70	240	600	120	60 2800 0712 102
	2.0	40/70	270	600	150	60 2800 0719 102
	2.0	40/70	240	700	120	60 2800 0713 102
	2.0	40/70	270	700	150	60 2800 0720 102
	2.0	40/70	240	800	120	60 2800 0714 102
	2.0	40/70	270	800	150	60 2800 0721 102
	2.0	40/70	300	800	180	60 2800 0728 102
	2.0	40/70	240	900	120	60 2800 0715 102
	2.0	40/70	300	900	180	60 2800 0729 102
	2.0	40/70	240	1,000	120	60 2800 0716 102
	2.0	40/70	270	1,000	150	60 2800 0723 102
	2.0	40/70	300	1,000	180	60 2800 0730 102
	2.0	40/70	240	1,100	120	60 2800 0717 102
	2.0	40/70	300	1,100	180	60 2800 0731 102
	2.0	40/70	240	1,200	120	60 2800 0718 102
	2.0	40/70	270	1,200	150	60 2800 0725 102
	2.0	40/70	300	1,200	180	60 2800 0732 102
	2.5	40/70	300	1,250	180	60 2800 2238 102
	3.0	50/75	300	1,500	180	60 2800 2599 102
Stainless steel Material no. 1.4404 pickled	2.0	40/70	270	1,000	150	60 2800 0723 127

Graepel-Stabil

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number (standard type 70)
DD 11 hot-dip galvanized	2.0	40/62	240	600	120	60 2800 0700 002
	2.0	40/62	270	600	150	60 2800 0704 002
	2.0	40/62	300	600	180	60 2800 0708 002
	2.0	40/62	240	800	120	60 2800 0701 002
	2.0	40/62	270	800	150	60 2800 0705 002
	2.0	40/62	300	800	180	60 2800 0709 002
	2.0	40/62	240	1,000	120	60 2800 0702 002
	2.0	40/62	270	1,000	150	60 2800 0706 002
	2.0	40/62	300	1,000	180	60 2800 0710 002
	2.0	40/62	240	1,200	120	60 2800 0703 002
	2.0	40/62	270	1,200	150	60 2800 0707 002
	2.0	40/62	300	1,200	180	60 2800 0711 002
Stainless steel Material no. 1.4404 pickled	2.0	40/62	240	800	120	60 2800 0701 027

Standard types

Standard type 70 (can replace grid steps) standard dimensions				
D* [mm]	H1/H2* [mm]	B* [mm]	L* [mm]	N [mm]
2.0/2.5	40/70	240	600–1,000	120
2.0/2.5	40/70	270	600–1,000	150
2.0/2.5	40/70	300	600–1,000	180

* Other dimensions on request.

Standard type flat	(particularly compact and lighter weight) standard dimensions			
D* [mm]	H* [mm]	B* [mm]	L* [mm]	N [mm]
2.0/2.5	50	240	600–1,000	127
2.0/2.5	50	270	600–1,000	157
2.0/2.5	50	300	600–1,000	187

* Other dimensions on request.

Stairway steps: special perforations

Graepel-Rubber-Stud
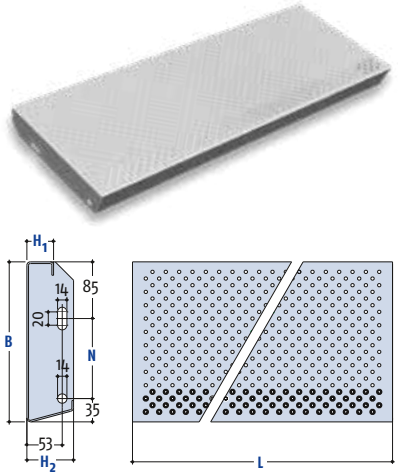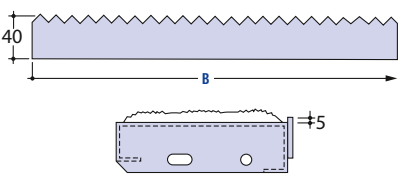
Non-stock items. Dimensions on request.

◼ Graepel stairway steps

Graepel-Special 4-18	(formerly Graepel-Round F)	Graepel-Special Mix	(formerly Graepel-Round Mix)

Non-stock items. Dimensions on request.

Non-stock items. Dimensions on request.

Special type: Architects step

Graepel-Perl with perforated stepping edge   (formerly Graepel Cone with perforated stepping edge)

Material	D [mm]	H1/H2 [mm]	B [mm]	L [mm]	N [mm]	Order number
Stainless steel Material no. 1.4404	2.5	40/70	300	1,000	180	60 2800 2585 030
	2.5	40/70	300	1,200	180	60 2800 2586 030

Graepel Anti-slip edge

Material	D [mm]	H [mm]	Order number
DD 11 hot-dip galvanized	2.0	40	60 1700 0003 002
Aluminum EN AW-5754	2.5	40	60 1700 0003 003

Graepel Anti-slip edge

The anti-slip edge teeth help avoid slipping off the front edge of the step.
It also increases the slip resistance at the front edge of the grating (especially for stairway steps). These anti-slip edges are delivered separately, i.e. in fixed lengths matching the stairway steps or as standard lengths of 2,000 mm for subsequent fastening (screws, rivets or welding). Prefabricated stairs with anti-slip edges on request.

Ladder rungs and steps

73

Graepel spiral stairway steps

Spiral stairway steps with stair pillar

These steps are fitted with a welded-on cylinder for mounting on a central pillar. The step pin and bolt are also supplied. When ordering, please state dimensions "S" (rise dimension). The perforation or embossing is always parallel to the stepping edge.

Spiral stairway steps with stair pillar are prefabricated in stock. After your order, stair pillar and step pin are cut to length according to your individual rise dimension that is required at site.

Connecting pillar with cap and bolt as well as exit and landing platform on request.

Complete kit for spiral stairways on request. Please ask for our spiral stairway brochure.

Other perforations or embossments on request.

With stair pillar
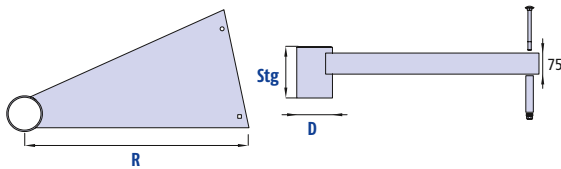
Graepel step dimensions for different radii:

Stairway radius 800 mm
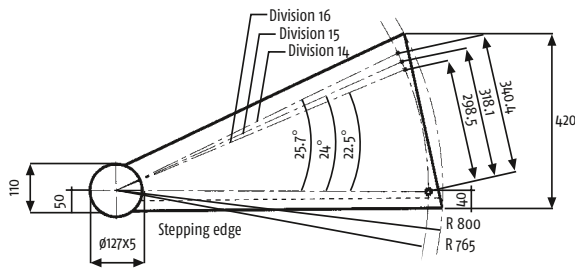
Stairway radius 900 mm
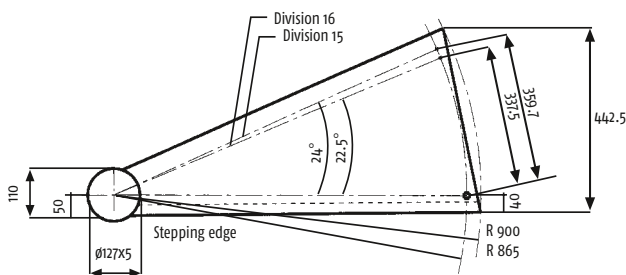
Stairway radius	Usable walking width	Number of steps/ winding	Tread
800	707	14	258
	707	15	241
	707	16	226
900	805	15	270
	805	16	253
1000	889	14	322
	889	15	301
	889	16	282
	889	18	251
1200	1.098	18	300
	1.098	20	270
	1.098	22	240

Stairway radius 1,000 mm
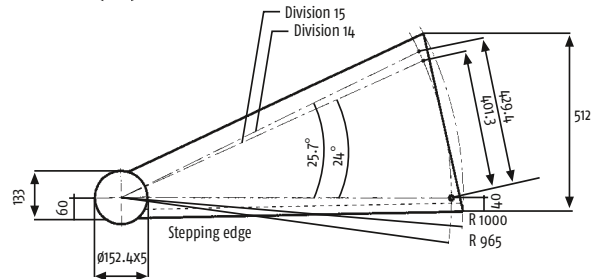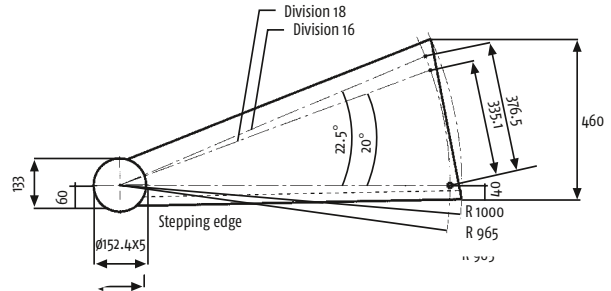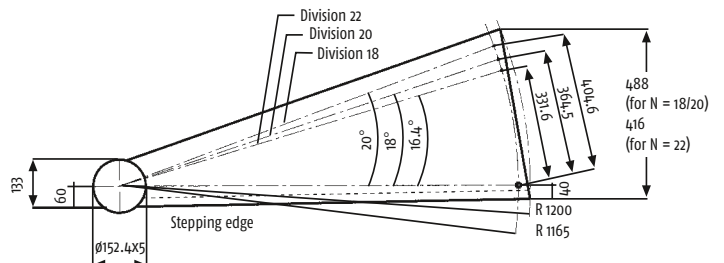
All steps in stock are designed for 5 kN/m² uniformly distributed load and 1.5 kN over 200 x 200 mm concentrated load. The steps shown are for left-handed stairways (right hand = mirror image).

The complete spiral stairway steps program can be found in our spiral stairway catalogue.

Stairway radius 1,200 mm

Graepel spiral stairway steps

Graepel–Garden
(formerly Graepel Round No8)

The step shown is left-hand

Material	Stairway radius R in mm	Tube Ø D in mm		Outside–ø central tube Z in mm	Number of steps/ winding N	Order number for step type	
		Outside	Inside			Right hand	Left hand
DD 11 hot–dip galvanized DIN EN ISO 1461 Material thickness: 3.0 mm	800	127.0	117.0	114.3	14	50 2900 5531 002	50 2900 5521 002
	800	127.0	117.0	114.3	15	50 2900 5477 002	50 2900 5479 002
	800	127.0	117.0	114.3	16	50 2900 5459 002	50 2900 5461 002
	900	127.0	117.0	114.3	15	50 2900 5467 002	50 2900 5486 002
	900	127.0	117.0	114.3	16	50 2900 5469 002	50 2900 5467 002
	1,000	152.4	142.4	139.7	14	50 2900 5529 002	50 2900 5519 002
	1,000	152.4	142.4	139.7	15	50 2900 5527 002	50 2900 5517 002
	1,000	152.4	142.4	139.7	16	50 2900 5465 002	50 2900 5463 002
	1,000	152.4	142.4	139.7	18	50 2900 5473 002	50 2900 5471 002
	1,200	152.4	142.4	139.7	18	50 2900 5525 002	50 2900 5515 002
	1,200	152.4	142.4	139.7	20	50 2900 5490 002	50 2900 5488 002
	1,200	152.4	142.4	139.7	22	50 2900 5523 002	50 2900 5513 002

Graepel–Universal
(formerly Graepel Round S)

The step shown is left-hand

Material	Stairway radius R in mm	Tube Ø D in mm		Outside–ø central tube Z in mm	Number of steps/ winding N	Order number for step type	
		Outside	Inside			Right hand	Left hand
DD 11 hot–dip galvanized DIN EN ISO 1461 Material thickness: 3.0 mm	800	127.0	117.0	114.3	14	50 2900 5294 102	50 2900 5292 102
	800	127.0	117.0	114.3	15	50 2900 5298 102	50 2900 5296 102
	800	127.0	117.0	114.3	16	50 2900 5302 102	50 2900 5300 102
	900	127.0	117.0	114.3	15	50 2900 5306 102	50 2900 5304 102
	900	127.0	117.0	114.3	16	50 2900 5310102	50 2900 5308 102
	1,000	152.4	142.4	139.7	14	50 2900 5314 102	50 2900 5312 102
	1,000	152.4	142.4	139.7	15	50 2900 5318 102	50 2900 5316 102
	1,000	152.4	142.4	139.7	16	50 2900 5322 102	50 2900 5320 102
	1,000	152.4	142.4	139.7	18	50 2900 5326 102	50 2900 5324 102
	1,200	152.4	142.4	139.7	18	50 2900 5330 102	50 2900 5328 102
	1,200	152.4	142.4	139.7	20	50 2900 5334 102	50 2900 5332 102
	1,200	152.4	142.4	139.7	22	50 2900 5338 102	50 2900 5336 102

Graepel spiral stairway steps

Graepel–Stabil

The step shown is left–hand

Material	Stairway radius R in mm	Tube Ø D in mm		Outside-ø central tube Z in mm	Number of steps/ winding N	Order number for step type	
		Outside	Inside			Right hand	Left hand
DD 11 hot-dip galvanized DIN EN ISO 1461 Material thickness: 3 mm	800	127.0	117.0	114.3	14	50 2900 5342 002	50 2900 5340 002
	800	127.0	117.0	114.3	15	50 2900 5346 002	50 2900 5344 002
	800	127.0	117.0	114.3	16	50 2900 5350 002	50 2900 5348 002
	900	127.0	117.0	114.3	15	50 2900 5354 002	50 2900 5352 002
	900	127.0	117.0	114.3	16	50 2900 5358 002	50 2900 5356 002
	1,000	152.4	142.4	139.7	14	50 2900 5362 002	50 2900 5360 002
	1,000	152.4	142.4	139.7	15	50 2900 5366 002	50 2900 5364 002
	1,000	152.4	142.4	139.7	16	50 2900 5370 002	50 2900 5368 002
	1,000	152.4	142.4	139.7	18	50 2900 5374 002	50 2900 5372 002
	1,200	152.4	142.4	139.7	18	50 2900 5378 002	50 2900 5376 002
	1,200	152.4	142.4	139.7	20	50 2900 5382 002	50 2900 5380 002
	1,200	152.4	142.4	139.7	22	50 2900 5386 002	50 2900 5384 002

Graepel–Rubber–Stud

The step shown is left–hand
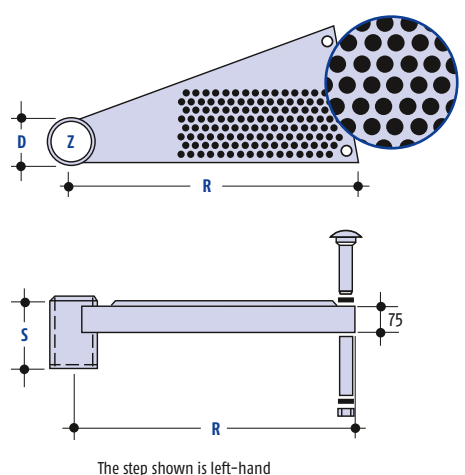
DD 11 hot-dip galvanized DIN EN ISO 1461

Material thickness: 3 mm

(Rubber studs red/black are supplied loose. When ordering, please specify color!)

Non-stock items.
Dimensions on request.

Graepel spiral stairway steps

For welding
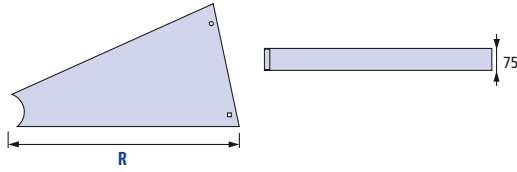
Connecting pillar with cap and bolt as well as exit and landing platforms on request.

These stairway steps can be welded on site to a central pipe or a stair pillar. Delivery of steel type "raw." The perforations or embossments are always parallel to the step edge. The corners are not welded.

Material	Stairway radius R in mm	Tube Ø D in mm		Outside-ø central tube Z in mm	Number of steps/ winding N
		Outside	Inside		
D11 raw. hot-dip galvanized Material thickness: 2.5 mm	800	127,0	117,0	114,3	14,15,16
	900	127,0	117,0	114,3	15,16
	1.000	152,4	142,4	139,7	14,15,16,18
	1.200	152,4	142,4	139,7	18,20,22

Graepel-Garden   (formerly Graepel Round No8)
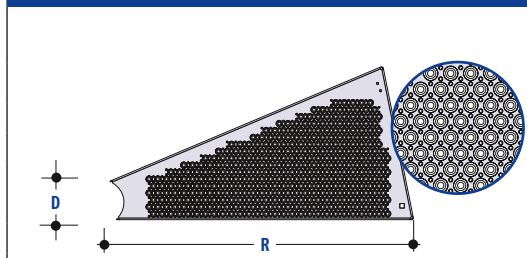
Material	Stairway radius R in mm	Tube Ø D in mm	Number of steps/ winding N	Bestellnummer für Stufentyp	
				Right hand	Left hand
DD 11 raw Material thickness: 3 mm	800	127,0	14	50 2900 5530 001	50 2900 5520 001
	800	127,0	15	50 2900 5478 001	50 2900 5480 001
	800	127,0	16	50 2900 5460 001	50 2900 5462 001
	900	127,0	15	50 2900 5532 001	50 2900 5487 001
	900	127,0	16	50 2900 5470 001	50 2900 5468 001
	1.000	152,4	14	50 2900 5528 001	50 2900 5518 001
	1.000	152,4	15	50 2900 5526 001	50 2900 5516 001
	1.000	152,4	16	50 2900 5466 001	50 2900 5464 001
	1.000	152,4	18	50 2900 5474 001	50 2900 5472 001
	1.200	152,4	18	50 2900 5524 001	50 2900 5514 001
	1.200	152,4	20	50 2900 5491 001	50 2900 5489 001
	1.200	152,4	22	50 2900 5522 001	50 2900 5512 001

Graepel–Universal (with perforated stepping edge)   (formerly Graepel Round S)
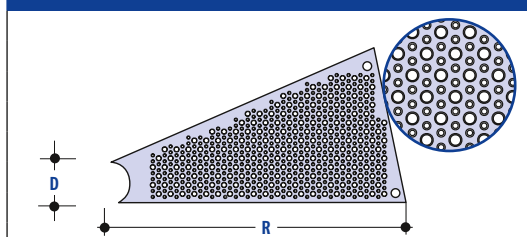
Material	Stairway radius R in mm	Tube Ø D in mm	Number of steps/ winding N	Right hand	Left hand
DD 11 roh Material thickness: 3 mm	800	127,0	14	50 2900 5295 101	50 2900 5293 101
	800	127,0	15	50 2900 5299 101	50 2900 5297 101
	800	127,0	16	50 2900 5303 101	50 2900 5301 101
	900	127,0	14	50 2900 5534 101	50 2900 5537 101
	900	127,0	15	50 2900 5307 101	50 2900 5305 101
	900	127,0	16	50 2900 5311 101	50 2900 5309 101
	1.000	152,4	14	50 2900 5315 101	50 2900 5313 101
	1.000	152,4	15	50 2900 5319 101	50 2900 5317 101
	1.000	152,4	16	50 2900 5323 101	50 2900 5321 101
	1.000	152,4	18	50 2900 5327 101	50 2900 5325 101
	1.200	152,4	18	50 2900 5331 101	50 2900 5329 101
	1.200	152,4	22	50 2900 5335 101	50 2900 5333 101
	1.200	152,4	20	50 2900 5339 101	50 2900 5337 101

Graepel–Stabil
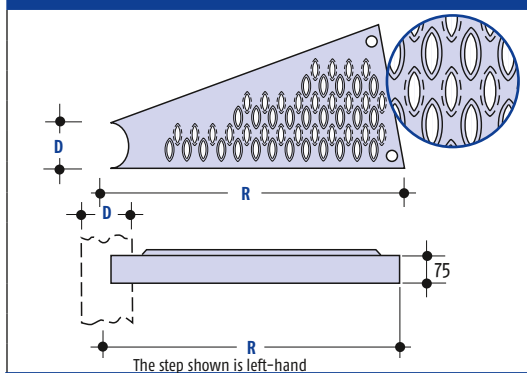
Material	Stairway radius R in mm	Tube Ø D in mm	Number of steps/ winding N	Right hand	Left hand
DD 11 roh Material thickness: 3 mm	800	127,0	14	50 2900 5343 001	50 2900 5341 001
	800	127,0	15	50 2900 5347 001	50 2900 5345 001
	800	127,0	16	50 2900 5351 001	50 2900 5349 001
	900	127,0	15	50 2900 5355 001	50 2900 5353 001
	900	127,0	16	50 2900 5359 001	50 2900 5357 001
	1.000	152,4	14	50 2900 5363 001	50 2900 5361 001
	1.000	152,4	15	50 2900 5367 001	50 2900 5365 001
	1.000	152,4	16	50 2900 5371 001	50 2900 5369 001
	1.000	152,4	18	50 2900 5375 001	50 2900 5373 001
	1.200	152,4	18	50 2900 5379 001	50 2900 5377 001
	1.200	152,4	20	50 2900 5383 001	50 2900 5381 001
	1.200	152,4	22	50 2900 5387 001	50 2900 5385 001

The step shown is left-hand

Graepel-Rubber-Stud
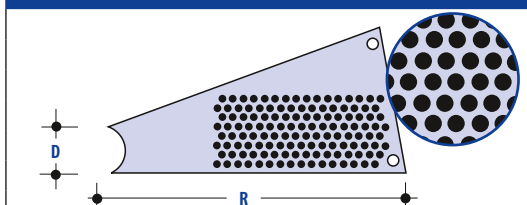
Material	
DD 11 roh Material thickness: 3 mm	Non-stock items. Dimensions on request.

The side view is valid for all versions.

Graepel flooring sheet

Flooring sheets

With these removable flooring sheets, uneven grounds and ways are made temporarily or permanently accessible even with heavy vehicles.

Flooring sheet

Material	L [mm]	Order number
S 355 MC* hot-dip galvanized DIN ISO EN 1461	3,040	60 2400 0002 002
	1,520	60 2400 0003 002
Aluminum EN AW–5754	3,040	60 2400 0002 003
	1,520	60 2400 0003 003

* S 355 MC complies with QSTE 380

Indispensable: Graepel flooring sheets are standard equipment in many off-road vehicles

Gardening and landscaping firms also use Graepel flooring sheets for the temporary attachment to surfaces

Graepel movable stairways

Movable stairways

During construction phases, stairway elements to overcome differences in height are often missing. As a temporary solution to this problem, Graepel offers different movable stair systems. While the construction stairway was designed for the rapid deployment with short assembly and disassembly times, our aluminum stairway and the mobile stairway are adjustable in heights and pitches. Slip resistance and drainage effect provide for the required underfoot safety with every movable stairway.

Construction stairway
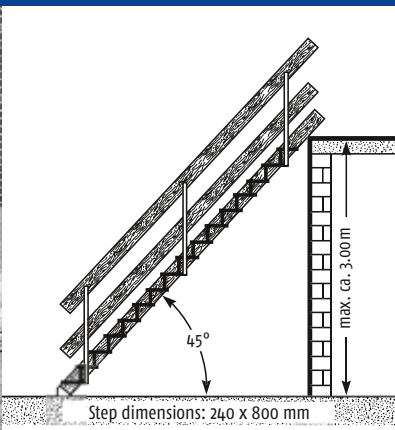
A stairway package consists of 15 steps with automated rise height, step dimension B = 250, L = 800 mm, material EN AW-5754 and six slip-in railing posts.
Accessories: two ground brackets

You need on site:
- two-by-fours 80 x 140 mm
- Four planks 25 x 140 mm
- Mounting bolts

Construction stairway

Step dimensions: 240 x 800 mm
45°
max. ca. 3.00 m

Product	Material	Order number
Stairway package	Aluminum EN AW-5754	60 0800 0060 003
Ground bracket (2 pieces)	DD 11 hot-dip galvanized	60 0800 0261 002

■ Graepel stairways

Aluminum stairway - standard version*

- Flexible in height and rise
- Complete stairway assembly kit made of aluminum (EN AW-5457)
- 15 steps (perforation: Graepel-Universal)
- Overcomes a max. height of 3,000 m
- Designed for up to 1.5 kN concentrated load / 3.5 kN uniformly distributed load

- Step width of 800 mm
- Passage width of 900 mm (between railings)
- Clear opening dimensions for stairwell: at least 1,060 mm

The elongated holes allow you to modify the rise of the stairway up to a flat surface.

Order number
60 0800 1485 003

* Other perforations and stairway lengths are available on request.

Mobile stairway

We offer 3 different standard designs:
- Steps with Graepel-Universal perforation, hot-dip galvanized steel
- Step width: 900 mm, width including railings: 1,170 mm
- Allows for a transformation as a platform which can be used as a catwalk.

- Designed for up to 1.5 kN concentrated load / 3.5 kN/m² uniformly distributed load
- Standard railing for a gradient angle between 0° and 37°
- If the gradient angle is steeper, the base rail must be removed.

	Number of steps	H min. [mm]	H max. [mm]	Weight [kg]	Order number
A	15	0	2,800*	429.4	60 0800 4315 002
B	11	0	2,050	319.3	60 0800 4319 002
C	6	0	1,110	186	60 0800 4321 002

*only up to 3.0 kN/m² uniformly distributed loads when used as catwalk
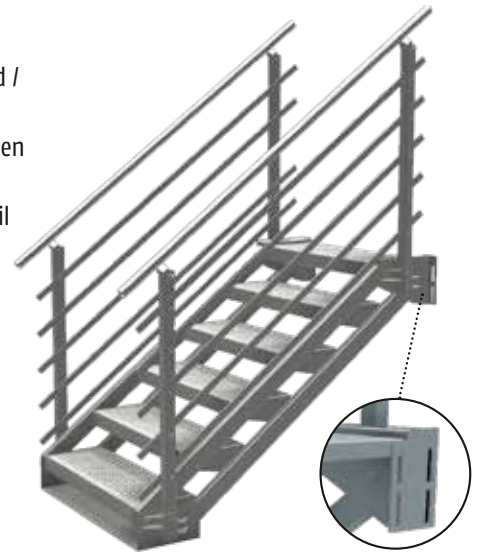
Graepel trench bridge

The practical design allows for:
- Trouble-free stacking and transportation
- Easy folding of the railing
- Good handling
- Longevity, no maintenance
- Material: aluminum, raw (ENAW 5457)

- Load capacity: 350 kg/m²
- Railing load: 0.5 kN/m

By default, the trench bridges are delivered with Graepel-Special 8-8 perforation. Other perforations are available on request.
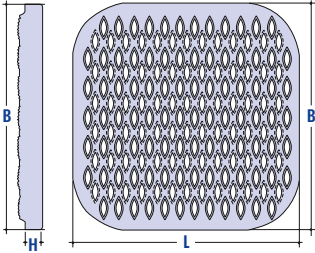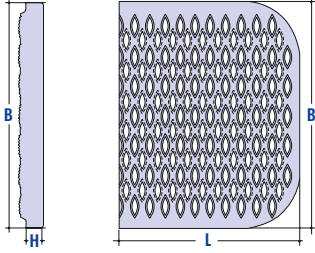
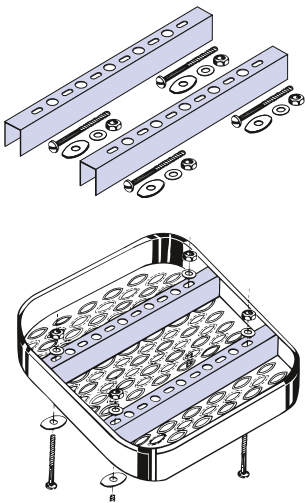| dimensions	weight/piece [kg]	Order number
1.000 x 1.500 mm	approx. 32	60 0800 0162 003
1.000 x 2.000 mm	approx. 39	60 0800 0221 003
1.000 x 4.000 mm	approx. 102	60 0800 0325 003

■ Graepel treads / folding steps
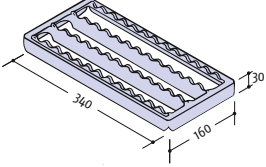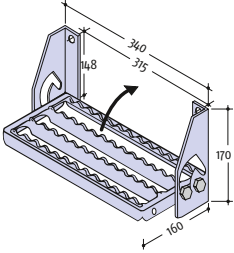
AUF/1 and AUF/2

Universal treads with high slip resistance;
Perforation as with Graepel–Stabil; direct
bolting or welding, but assembly also possible
with reinforced U profiles.

Tread AUF/1 and AUF/2

Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
AUF/1 Graepel–Stabil	**DC 04** raw	2.5	35	450	450	60 1300 3062 001
AUF/1 Graepel–Stabil	**DC 04** hot-dip galvanized DIN ISO EN 1461	2.5	35	450	450	60 1300 3062 002
AUF/2 Graepel–Stabil	**DC 04** raw	2.5	35	450	365	60 1300 3064 001
AUF/2 Graepel–Stabil	**DC 04** hot-dip galvanized DIN ISO EN 1461	2.5	35	450	365	60 1300 3064 002

Fastening elements for AUF/1 and AUF/2

U profile

Type	Material		Order number
U profile for AUF/1 and AUF/2	**DD11** hot-dip galvanized DIN ISO EN 1461	1 set, including ■ 2 perforated U profiles ■ 4 olives with countersunk hole ■ 4 countersunk bolts M 8x65 mm with nuts ■ 4 disks	60 8000 3066 002

Graepel treads / folding steps
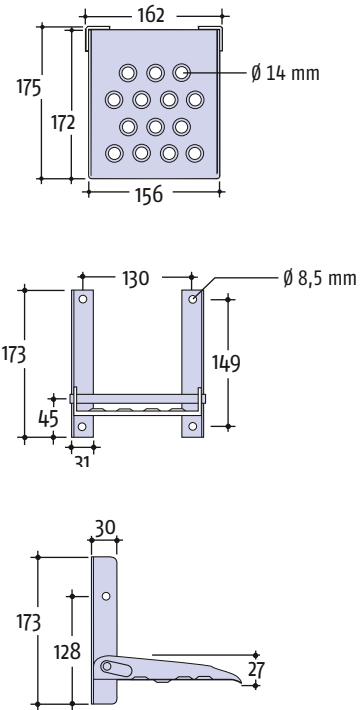
Tread AUF/3, folding step KLAPP/3

AUF/3 (Antislip)

KLAPP/3 (Antislip)

Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
AUF/3	DC 04 raw	2.5	30	160	340	60 1100 0023 001
		2.5	30	160	280	60 1100 0024 001
	DC 04 hot-dip galvanized DIN ISO EN 1461	2.5	30	160	340	60 1100 0023 002
		2.5	30	160	280	60 1100 0024 002
KLAPP/3	DC 04 hot-dip galvanized DIN ISO EN 1461	2.5	172/30	160 + 7	340 + 34	60 1100 0251 002

Folding step KLAPP/1

The classic, all-purpose folding step.

Folding step KLAPP/1

Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
KLAPP/1	DC 01 electrogalvanized	2.5	173/27	172 + 3	156 + 6	60 1200 0049 008

Graepel treads / folding steps

AUF/9, AUF/10, AUF/11, AUF/12, AUF/13, AUF/14

These treads have been developed for agricultural and construction machinery.

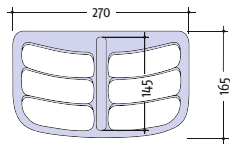They are also used in the industrial vehicle sector and other industries.

The anti-slip property is achieved by the serrated surface.
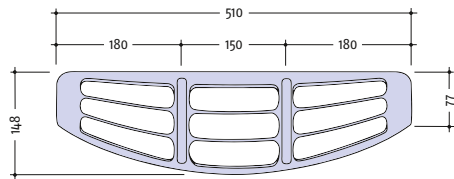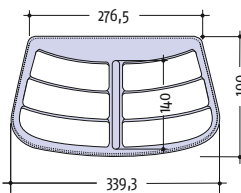
Tread AUF/9 and AUF/10

AUF/9 (Antislip)
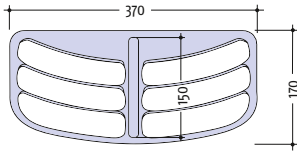
AUF/10 (Antislip)

Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
AUF/9	DC 04 raw	3.0	30	170	370	60 1100 0025 001
	DC 04 hot-dip galvanized	3.0	30	170	370	60 1100 0025 002
AUF/10	DC 04 raw	3.0	30	165	270	60 1100 0026 001
	DC 04 hot-dip galvanized	3.0	30	165	270	60 1100 0026 002

Tread AUF/11 and AUF/12

AUF/11 (Antislip)

AUF/12 (Antislip)

Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
AUF/11	DC 04 raw	2.5	30	148	510	60 1100 0008 001
	DC 04 hot-dip galvanized	2.5	30	148	510	60 1100 0008 002
AUF/12	DC 04 raw	2.0	30	276,5/ 339,3	190	60 1100 0232 001
	DC 04 hot-dip galvanized	2.0	30	267,5/ 339,3	190	60 1100 0232 002

Tread AUF/13 and AUF/14

AUF/13 (Antislip)
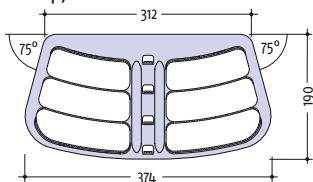
AUF/14 (Antislip)
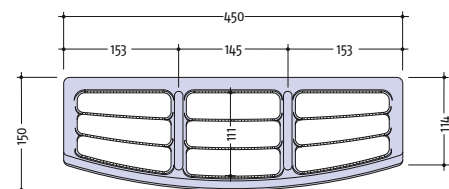
Type	Material	D [mm]	H [mm]	B [mm]	L [mm]	Order number
AUF/13	DC 04 raw	2.0	26	190	374	60 1100 0234 001
	DC 04 hot-dip galvanized	2.0	26	190	374	60 1100 0234 002
AUF/14	DC 04 raw	2.5	45/60	150	450	60 1100 0235 001
	DC 04 hot-dip galvanized	2.5	45/60	150	450	60 1100 0235 002

Other products

Inquiry

Date:	Copy form, fill it out and fax it to **+49 39386 27-180**

Graepel®

Your contact details

Company / customer ID: _____

Trade name: _____

Street, no.: _____

Zip code, city: _____

Phone: _____

Fax: _____

VAT-ID: _____

Contact: _____

First, last name: _____

Position: _____

Phone extension: _____

Fax extension: _____

Mobile: _____

Personal e-mail: _____

Product

☐ Graepel gratings   ☐ Ladder rungs   ☐ Stairway steps   ☐ Spiral stairway steps

Type / perforation (e.g. Stabil, Universal, Perl etc.): _____

Material: ☐ DD11 (steel STW22)   ☐ EN AW (aluminum)   ☐ 1.4301 (V2A)   ☐ 1.4404 (V4A)

Surface: ☐ raw   ☐ hot-dip galvanized   ☐ pre-galvanized   ☐ anodized   ☐ pickled

Material thickness *	Height*	Width*	Length*	Quantity*

(* Specify dimensions in mm)

Load specifications / slip resistance

Concentrated / lump load: _____ kN/m²   Distributed load: _____ kN/m²

Support width: _____ kN/m²   Required slip resistance (R9–R13): _____

Other important information:

_____

_____

Ordering of stock items

Order number: _____

Graepel®

| Date: | _____ | Copy form, fill it out and fax it to **+49 39386 27–180** |

Your contact details

Customer

First, last name: _____

Trade name: _____

Street, no.: _____

Zip code, city: _____

Phone: _____

Fax: _____

E-mail: _____

Internal details of the customer

_____

_____

_____

_____

_____

_____

Please supply us with the following products according to your terms and conditions (available on www.Graepel.de).

No.	Order number	Product name	Thickness x height x width x length	Material	Surface	Quantity	Price per unit	Desired date
Ex-ample	6021003069002	Grating Graepel-Stabil	2.5 x 40 x 300 x 3000	DD 11	hot-dip galvanized	25		CW 50
1								
1								
3								
4								
5								
6								
7								

Graepel Seehausen GmbH & Co. KG

Waldemar–Estel–Straße 7
39615 Seehausen (Altmark)
Germany

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Fax +49 39386 27–180
www.graepel.de
gs.info@graepel.de

VAT–ID: DE139531884
Stendal Local Court, Commercial Register Number HRA 4112
CEO: Felix Graepel, Andreas Klatschow

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