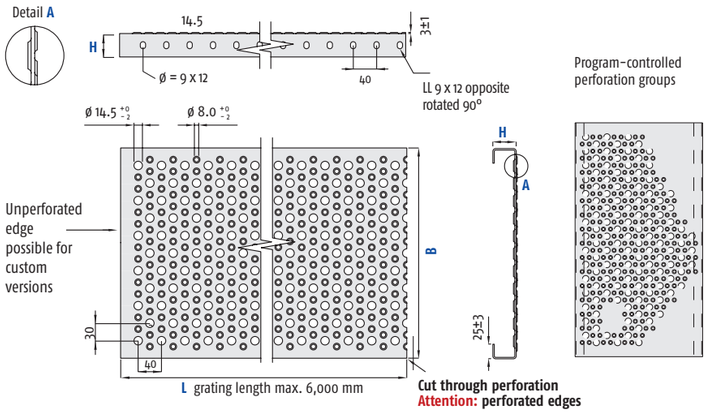
Graepel-Universal (formerly Graepel Round S)



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 DD 11 hot-dip galvanized | DX 51 D pre-galvanized Stainless steel EN AW-5754	2.0 | 2.5 | 3.0 mm 2.0 | 2.5 | 3.0 mm 2.0 | 2.5 mm 2.0 | 2.5 | 3.0 mm
Dimensions	
Lengths (L) up to Length divider	12,000 mm 40 mm
Standard grating widths[1] (B) DD 11 | DX 51 D | EN AW-5754 Stainless steel Width divider	 120 to 440 mm in steps of 30 mm 120 to 300 mm in steps of 30 mm 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
EN AW-5754 anodized	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	5.2	6.4	6.5	6.5	7.9	2.2	2.4	2.7	7.7	7.7	9.3	2.6	3.0	3.4
270	5.7	5.7	6.8	7.0	7.0	8.4	2.4	2.5	2.9	8.3	8.3	10.0	2.9	3.0	3.4
300	6.1	6.1	7.2	7.5	7.5	8.9	2.6	2.7	3.1	9.0	9.0	10.6	3.1	3.2	3.7
330	6.5	6.5	7.6	8.1	8.1	9.5	2.8	2.9	3.3	9.6	9.6	11.3	3.3	3.5	3.9
360	7.0	7.0	8.1	8.6	8.6	10.0	3.0	3.1	3.4	10.2	10.2	11.9	3.5	3.7	4.1
390	7.4	7.4	8.5	9.2	9.2	10.6	3.1	3.3	3.6	10.9	10.9	12.6	3.7	3.9	4.3
420	7.8	7.8	8.9	9.7	9.7	11.1	3.3	3.5	3.8	11.5	11.5	13.2	4.0	4.1	4.5

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

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			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]											
	H [mm]	D [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	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
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 **stainless steel**, the values in the table must be multiplied by a factor of **1.04** or for **EN AW-5754** by a factor of **0.75**.

Available at short notice from stock				L = 3,000 mm
Material	H [mm]	D [mm]	B [mm]	Order number
DD11 raw	40	2.5	120*	60 2700 0718 001
	40	2.5	180	60 2700 0283 001
	40	2.5	240	60 2700 0284 001
	40	2.5	300	60 2700 0285 001
DD11 raw with perforated stepping edge	40	2.5	300	60 2700 0285 101
	75	2.5	300	60 2700 0026 101
DD 11 hot-dip galvanized	40	2.5	120*	60 2700 0718 002
	40	2.5	180	60 2700 0283 002
	40	2.5	240	60 2700 0284 002
	40	2.5	300	60 2700 0285 002
	40	2.5	360	60 2700 0719 002
	40	2.5	420	60 2700 0556 002
	75	2.5	300	60 2700 0026 002
Aluminum EN AW-5754	40	2.0	240	60 2700 0284 003
	40	2.0	300	60 2700 0285 003
Stainless steel Material no. 1.4301	40	2.0	240	60 2700 0430 004
	40	2.0	300	60 2700 0717 004
Stainless steel Material no. 1.4404	40	2.0	240	60 2100 0430 007
	40	2.0	300	60 2100 0717 007

Available up to L = 12,000 mm
Please consider the notes concerning the perforated edges.

Order information

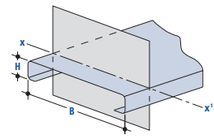
Graepel-Universal (except for DD 11 hot-dip galvanized) is available up to **a length of 12,000 mm**. Please note that grating lengths over 6,000 mm are difficult to handle and cost intensive due to their high weight.

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.

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_2 [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

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]