Sinus Armour Joint Profile

SG 62

DEWMARK®
expansion joint systems

A unique corrugated armored joint profile used in the pouring of industrial floors.

The visible part of the profile is corrugated in the form of a sinus-wave profile, which allows for shock-free passage of machinery on any type of wheel, including steel wheels.

A distinctive feature is that the profile is corrugated to its full height, which ensures that the entire slab of concrete is poured evenly without breaks.
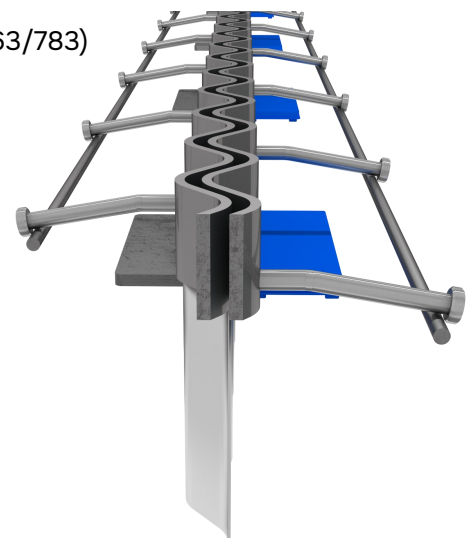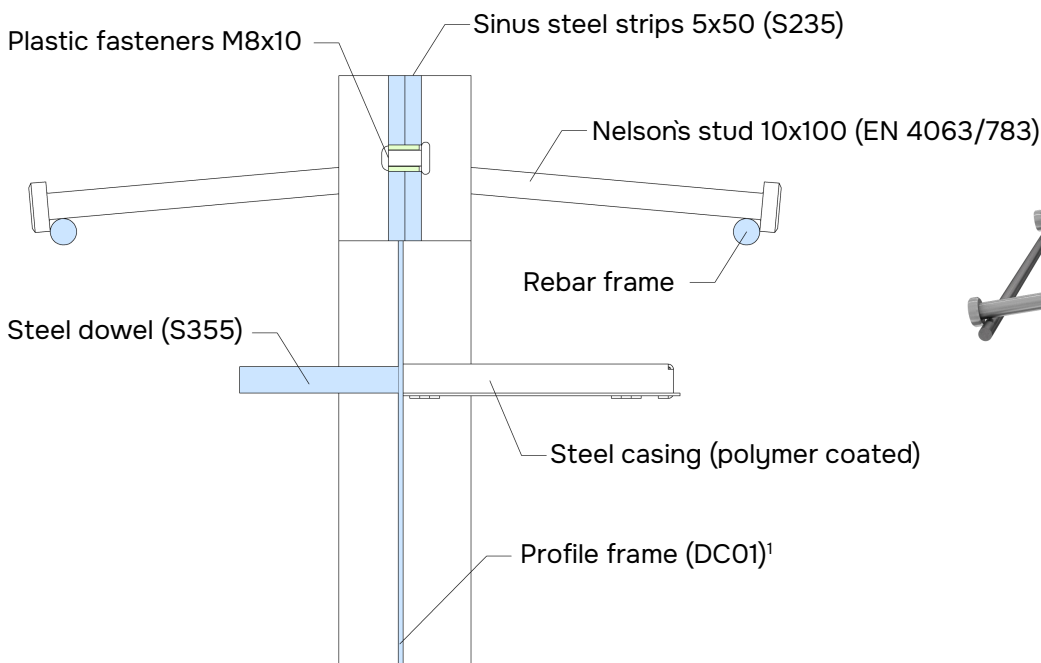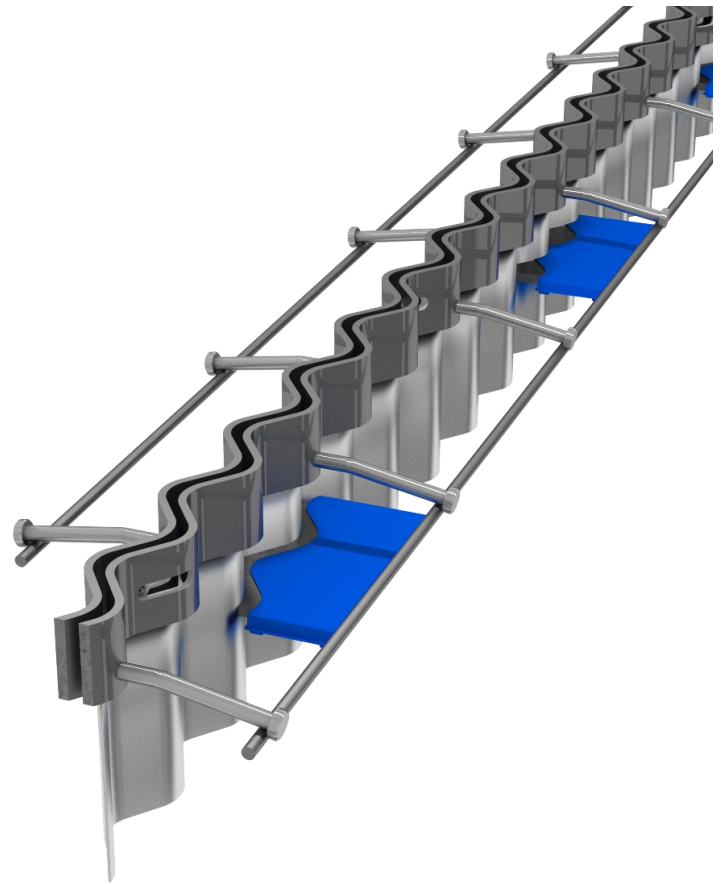
The load transfer system in the form of special dowels with sliding steel casing is based on Concrete Society Technical Report 34 version 4, section 6.5

The profile is manufactured in accordance with EN 1090-2 and complies with all international standards.
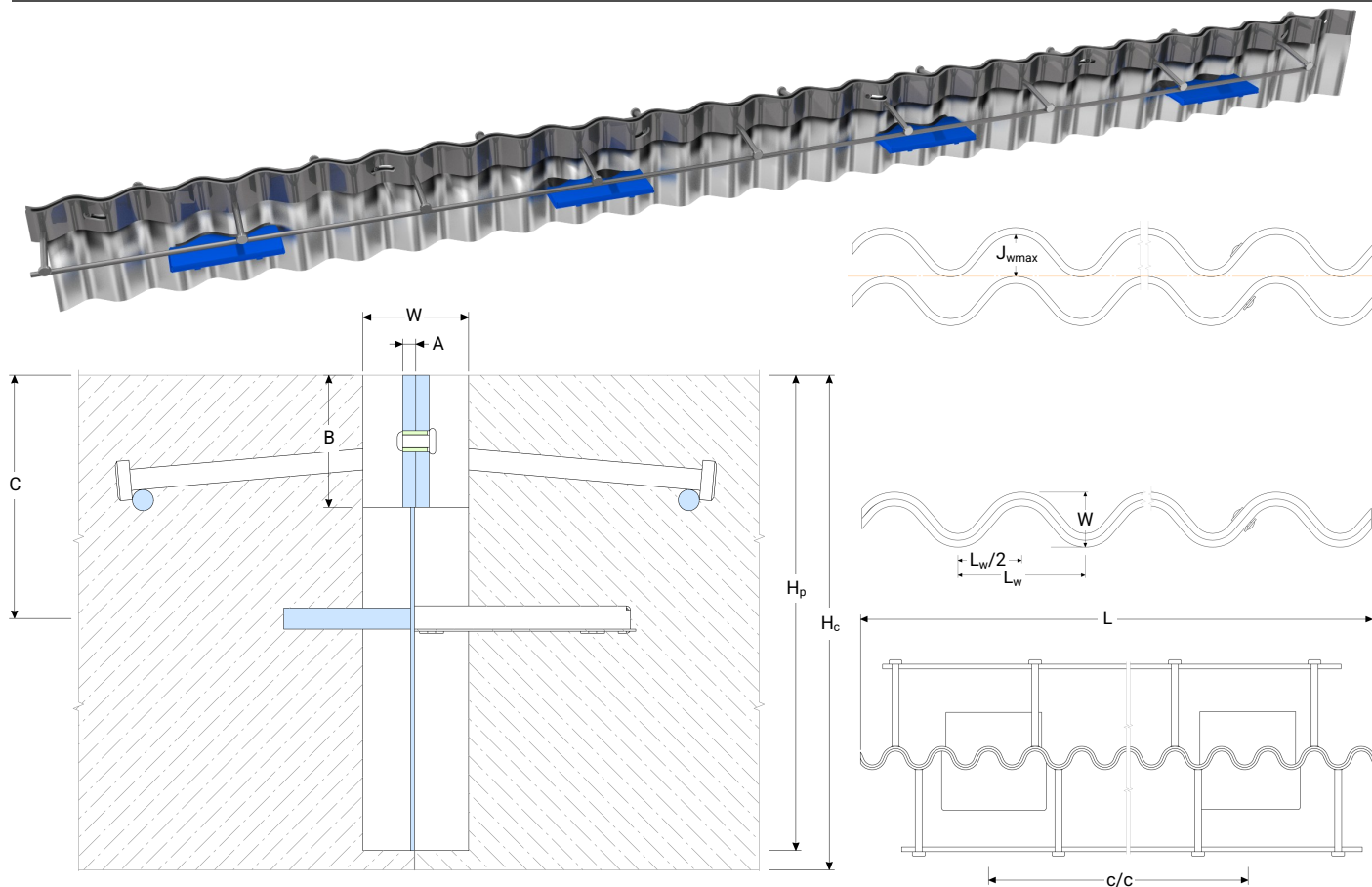
The studs are welded using arc stud welding technology in strict compliance with EN 4063 (process 783).

The profile is suitable for all types of industrial floors and loads from light cars to the rigid steel wheels of heavy forklifts.

The size of the support plates allows for a shock-less joint opening of up to 30 (40[1]) mm.

Plastic fasteners M8x10

Sinus steel strips 5x50 (S235)

Nelson's stud 10x100 (EN 4063/783)

Rebar frame

Steel dowel (S355)

Steel casing (polymer coated)

Profile frame (DC01)[1]

PROFILE SIZES

| Profile	Dowel type	Profile height, H_p (mm)	Slab thickness, H_c (mm)	Visible width, W (mm)	Strip size, AxB (mm)	Wave-length, L_w (mm)	Maximum opening, J_{wmax} (mm)	Dowel depth, C (mm)	Spacing, c/c (mm)	Length, L (mm)
SG 62/90	5 | 6 | 8 | 10	90	100-110	40	5x50	93 (±0,5)	30 (40)[1]	50	575 (±15)	2300
SG 62/110	5 | 6 | 8 | 10	110	115-130	40	5x50	93 (±0,5)	30 (40)[1]	55	575 (±15)	2300
SG 62/130	5 | 6 | 8 | 10	130	135-150	40	5x50	93 (±0,5)	30 (40)[1]	65	575 (±15)	2300
SG 62/150	5 | 6 | 8 | 10	150	155-160	40	5x50	93 (±0,5)	30 (40)[1]	80	575 (±15)	2300
SG 62/160	5 | 6 | 8 | 10	160	165-180	40	5x50	93 (±0,5)	30 (40)[1]	80	575 (±15)	2300
SG 62/180	5 | 6 | 8 | 10	180	185-210	40	5x50	93 (±0,5)	30 (40)[1]	90	575 (±15)	2300
SG 62/210	5 | 6 | 8 | 10	210	215-240	40	5x50	93 (±0,5)	30 (40)[1]	105	575 (±15)	2300
SG 62/240	5 | 6 | 8 | 10	240	245-275	40	5x50	93 (±0,5)	30 (40)[1]	120	575 (±15)	2300
SG 62/280	5 | 6 | 8 | 10	280	285-300	40	5x50	93 (±0,5)	30 (40)[1]	140	575 (±15)	2300

[1] The maximum joint opening (J_{wmax}) for impact-free passage of wheeled vehicles is 30 mm (40 mm is the total maximum opening for the dowel).

FABRICATION TOLERANCES

Length	+15 mm	Height	±1 mm	Straightness	±1 mm/m	Twistability	<0,5⁰/m

DOWEL SIZES

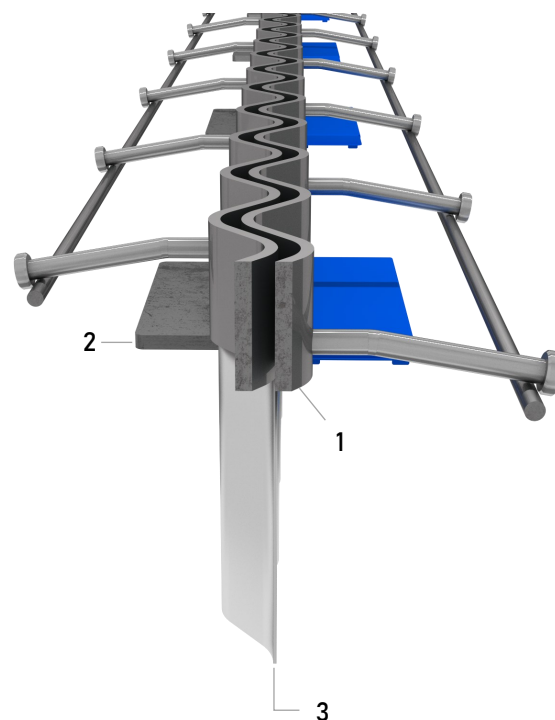| Type	Length, L_d (mm)	Width, W_d (mm)	Thick, T_d (mm)	Casing color
5	150	120	5	Green
6	150	130	6	Blue
8	150	130	8	Orange
10	150	140	10	Red
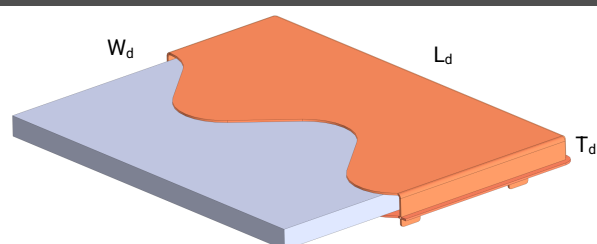
COMPONENT MANUFACTURING OPTIONS AND DESCRIPTION

The profile consists of three parts:

1 - 10x100 steel strips with welded studs (S235 construction steel).

2 - Load distribution dowel with sliding cover (S355 construction steel).
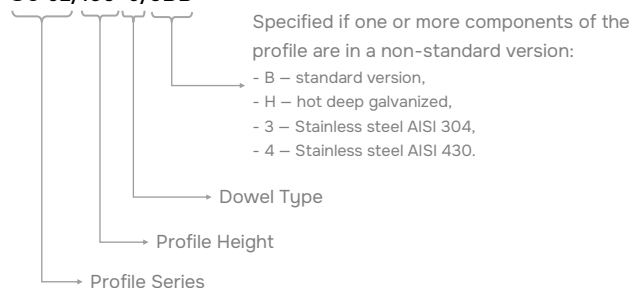
3 - Profile frame (Steel DC01).

The profile as a whole and each component individually can be made of

Component	Standard version (B)	AISI 304-1.4301 (3)	AISI 430-1.4016 (4)	HDG-EN 1461 (H)
1	S235	yes	yes	
2	S355	yes	yes	yes (full)
3	DC01	yes	yes	

DESCRIPTION (example)

SG 62/180-5/3BB

Specified if one or more components of the profile are in a non-standard version:
- B — standard version,
- H — hot deep galvanized,
- 3 — Stainless steel AISI 304,
- 4 — Stainless steel AISI 430.

→ Dowel Type

→ Profile Height

→ Profile Series
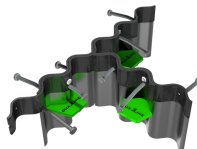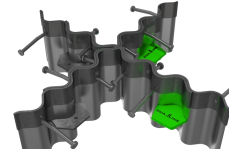
EXECUTION OPTION
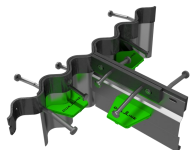
L – connector (SG 62/L)
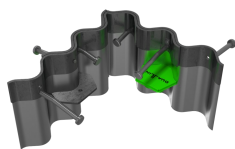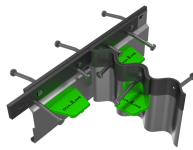
T – connector (SG 62/T)

X – connector (SG 62/X)

T – connector 62-61 (SG 62-61/T)

T – connector 61-62 (SG 61-62/T)

Straight-to-sinus transition (SG 61-62/TR)

PACKAGE DIMENSIONS

Profile	Profile weight (dowel type — kg/pcs)[2]		Dimensions of package (LxWxH)	Pieces per package (dowel type — kg/pcs)[2]		Weight of package (dowel type — kg/pack)[2]		Total profiles in pack (dowel type — l.m./pack)[2]	
	6	8		6	8	6	8	6	8
SG 62/90	17,3	19,3	2300x1200x2000	106	106	1958,66	2161,83	243,80	243,80
SG 62/110	18,0	19,9	2300x1200x2000	90	90	1741,50	1914,00	207,00	207,00
SG 62/130	18,7	20,6	2300x1200x2100	88	88	1764,50	1933,17	202,40	202,40
SG 62/150	19,4	21,3	2300x1200x2250	80	80	1668,67	1822,00	184,00	184,00
SG 62/160	19,8	21,7	2300x1200x2250	80	80	1707,07	1860,40	184,00	184,00
SG 62/180	20,3	22,2	2300x1200x2250	72	72	1582,80	1720,80	165,60	165,60
SG 62/210	21,0	23,0	2300x1200x2250	72	72	1698,00	1836,00	165,60	165,60
SG 62/240	21,6	23,5	2300x1200x2250	56	56	1327,50	1434,83	128,80	128,80
SG 62/280	22,8	24,7	2300x1200x2250	48	48	1214,80	1306,80	110,40	110,40

[1] For type 5 and 10 dowels, request data.

DESIGN OF PERMISSIBLE LOADS

The use of dowels is a development of the evolution of Dewmark profiles used as expansion joints. Due to the quick-detachable casings, adjacent to the dowel body, and the increase in the contact area of the dowel and concrete, it was possible to increase the load-bearing capacity of the floor.

The dowels carry and transfer the load between two adjacent sections of the concrete floor, that is, the equipment with the "P" load moves along the finished floor without causing stress in the concrete slab.

A concrete slab usually has only about 50% of its bearing capacity at the edges, so the dowels support the slab at the edges and help to support and transfer weight from one slab to another, allowing the slabs to flex slightly, gently transferring the load along its surface.

The calculation of the bearing capacity of the dowels is given in the British methodological guidelines **TR34, version 4, clause 6.5 and Appendix D**.

Standard dowels are made of steel S355 with yield strength $\sigma_{0.2}$=355 MPa and have the following dimensions:

| TYPE	Length, L_d (mm)	Width, W_d (mm)	Thick, T_d (mm)	Spacing, c/c (mm)	Casing color
5	150	130	5	575 (±15)	Green
6	150	130	6	575 (±15)	Blue
7	150	130	8	575 (±15)	Orange
8	150	140	10	575 (±15)	Red

Bending (Pmax plate) and shear (Psh plate) single dowel for concrete C32/40 According to TR34 ver.4 point 6.5

| Dowel type	Joint opening, mm	Shear force, $P_{sh\,plate}$, kN	Bending force, $P_{max\,plate}$, kN
5	10	150,03	48,07
5	15	150,03	37,58
5	20	150,03	30,44
6	10	180,03	63,12
6	15	180,03	50,77
6	20	180,03	41,89
8	10	240,04	94,73
8	15	240,04	79,51
8	20	240,04	67,69
8	25	240,04	58,46
8	30	240,04	51,18
10	10	300,05	127,44
10	15	300,05	110,22
10	20	300,05	96,13
10	25	300,05	84,61
10	30	300,05	75,17

The number of Dowels involved and the total load absorbed are directly dependent on:
- the substrate on which the slab is poured,
- the thickness of the slab,
- the class of concrete.

Dewmark can make calculations based on the technical data provided by the customer. To do this, please fill in the questionnaire in appendix 1 and send it to info@dewmark-joint.com.
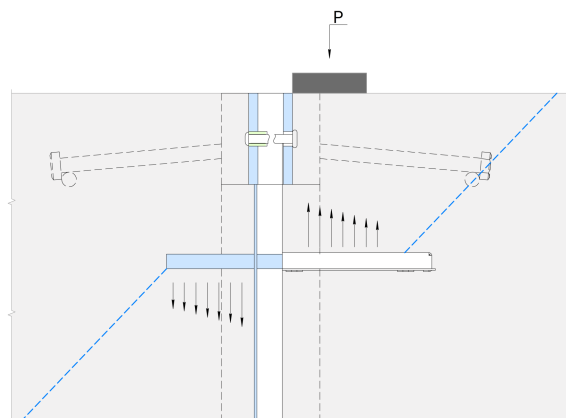
By changing the geometry of concrete support on the dowel from straight to wavy, it was possible to increase the design values for loads by 20% when using a standard dowel.

Dimensions of dowel
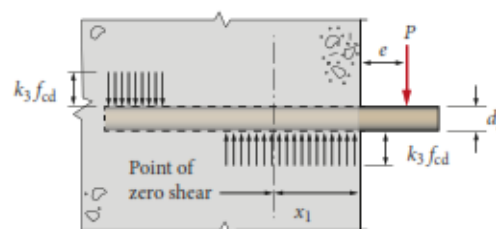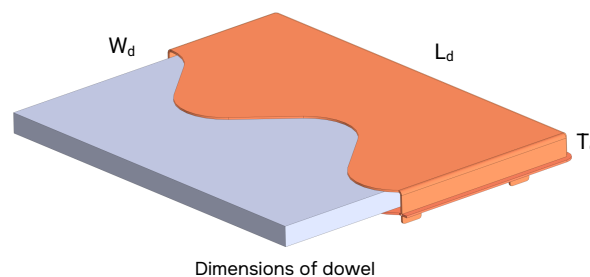
External and internal forces affecting the dowel

The shear force on the dowel is determined by the formula:

$P_{sh\,plate} = A \times 0.9 \times 0.6 \times P_y$

Bearing / bending load on the dowel:

$P_{max\,plate} = 0.5[(b_1^2+c_1^2)^{0.5}-b_1]$

Where:

A — cross-sectional area of the dowel

P_y — yield strength of steel

b_1 = $2ek_3\ f_{cd}\ P_b$

c_1 = $2k_3 f_{cd}\ P_b^2 t_p^2 f_{yd}$

e — distance of application of load from concrete surface; with a symmetrical arrangement, this is equivalent to half the opening of the joint.

k_3 = 3 (const)

f_{cd} — concrete strength (cylinder)= f_{ck} /y_c

P_b — dowel width

t_p — dowel thickness

DESIGN OF PERMISSIBLE LOADS

Calculated ultimate loads at failure (bending) of the dowel or concrete penetration.
In accordance with TR34 ver.4 clause 6.5.

Concrete 32/40, the slab is not reinforced.

Joint opening, mm	Slab thick, mm	60/SinOP-5 (S355)	60/SinOP-6 (S355)	60/SinOP-8 (S355)	60/SinOP-10 (S355)
		Dowel bending, kN/m	Dowel bending, kN/m	Dowel bending, kN/m	Dowel bending, kN/m
0	150	139,92	167,90	223,87	279,84
	175	157,07	188,48	251,30	314,14
	200	173,62	208,33	277,78	347,23
	250	205,24	246,29	328,39	410,48
5	150	105,66	132,74	187,57	242,84
	175	118,61	149,02	210,55	272,60
	200	131,10	164,71	232,74	301,32
	250	154,98	194,71	275,14	356,21
10	150	81,36	106,20	157,98	211,31
	175	91,33	119,21	177,34	237,22
	200	100,96	131,77	196,02	262,20
	250	119,34	155,77	231,73	309,97
15	150	64,52	86,60	134,29	184,81
	175	72,43	97,22	150,76	207,47
	200	80,05	107,46	166,63	229,32
	250	94,64	127,04	196,99	271,09
20	150	52,73	72,16	115,48	162,72
	175	59,20	81,00	129,62	182,66
	200	65,42	89,53	143,28	201,90
	250	77,35	105,84	169,38	238,68
25	150	44,24	61,34	100,50	144,35
	175	49,67	68,87	112,82	162,04
	200	54,90	77,32	124,70	179,10
	250	64,91	89,99	147,42	211,73

The table shows the load for an unreinforced concrete slab C32/40 resulting in bending of the base plate (failure)
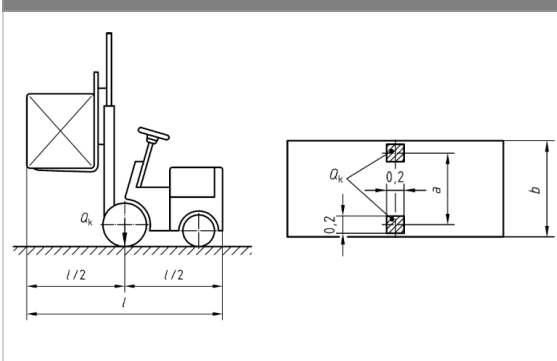The data are calculated for different joint opening values assuming that the backing plate is in the middle of the slab. To calculate other data values, please contact us (info@dewmark-joint.com).

Calculation request

We use a calculation program in accordance with TR 34 to determine the thickness and size of the dowels and the number of support plates required to support the design loads. On request, we can make a design calculation for you or check whether the calculations made for the projects you are working on comply with the standard we use to optimize the design of our profiles.
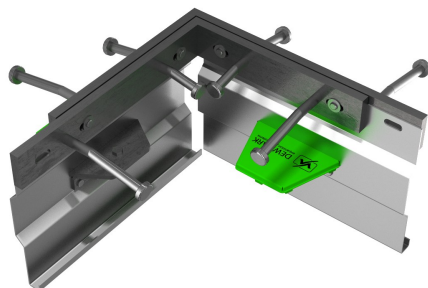To do this, please fill out ANNEX 1 and send it to info@dewmark-joint.com.

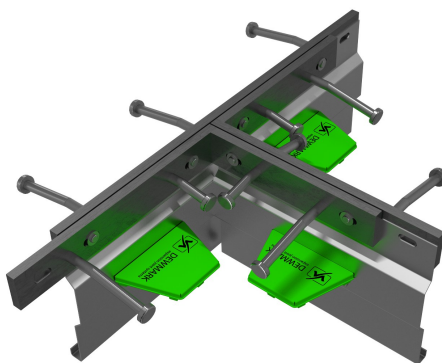## Forklift type according to DIN 1055-3

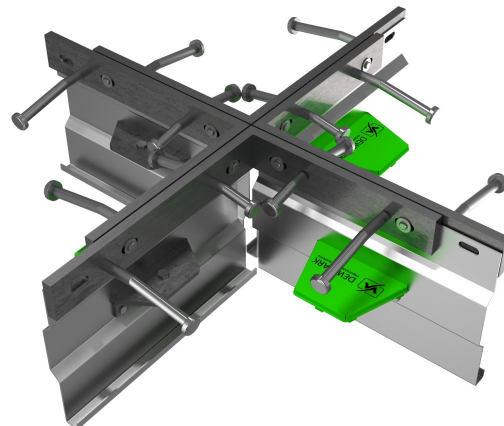| Type	Max weight, kN	Payload kN	Axle load (without impact loads), $2 \times Q_k$ kN	Wheel load (without impact loads), Q_k kN
G1	31	10	26	12,5
G2	46	15	40	15
G3	69	25	63	31,5
G4	100	40	90	45
G5	150	60	140	70
G6	190	80	170	85

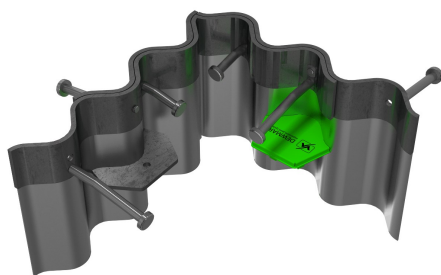## ACCESSORIES AND COMPONENTS

L-connector profile SG 61

T-connector profile SG 61
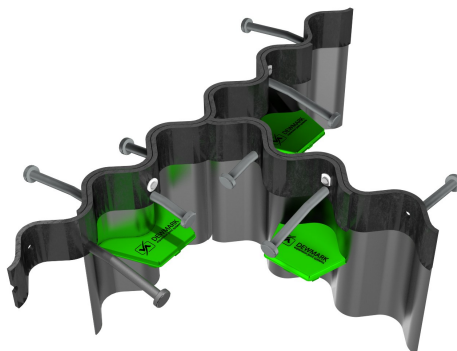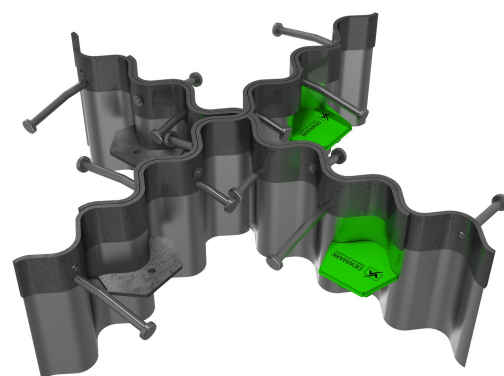
X-connector profile SG 61

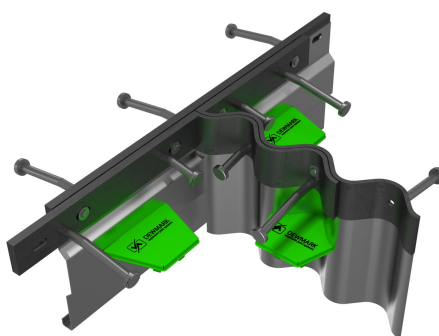L-connector profile SG 62

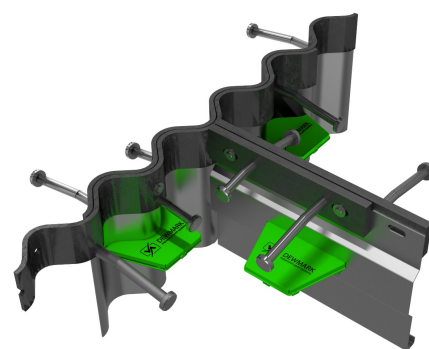T-connector profile SG 62

X-connector profile SG 62

Direct transition from profile SG 61 to profile SG 62
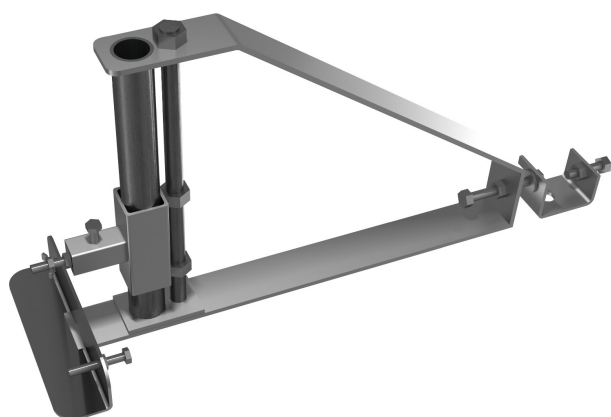
T-connector between SG 61 and SG 62

T-connector between SG 62 and SG 61

Mounting element for fixing and installing Dewmark Concrete profiles:
- **Holder 300** (for profiles up to 300 mm height)
- **Holder 400** (for profiles up to 400 mm height)

PHOTOS