HENGELHOEF CONCRETE JOINTS NV/SA

HC-Delta SINUS SLIDE®

Technical DataSheet
July '12

FEATURES AND APPLICATION

HC-Delta SINUS SLIDE® **construction and dilatation joint** is composed of two continuous symmetrical profiles made from SJ235JRG2 steel with a thickness of 5mm. When it is put together, a steel plate of 70 x 10mm is inserted between these two profiles. On the top of this joint are sinusoidal profiles welded.

To provide good anchoring in concrete, those profile have got on both sides 2 rows of anchor bolts ø10 and 125 mm long welded on. Bottom rows are welded to the straight bottom dividing profiles with 200 mm distance. Top row is welded to the top SINUS profiles with 243 mm distance. Anchor bolts are slightly angled positioned.

The profiles are connected with wing bolts and plastic nuts - these should not be removed after installation.

When installing at the yard, the steel plate, which protrudes by 15 mm, is inserted into the previous profile, to achieve a perfect join.

The profile is manufactured in standard lengths of 2,997m and is available in heights of between 105 and 300mm. We supply customised solutions from 300 mm upwards.

Due to continuous form of steel plate 70 x 10mm, these profiles prevent stress concentrations during the load transfer. **Compared with discontinuous profiles, this means a higher load transfer can be achieved.**

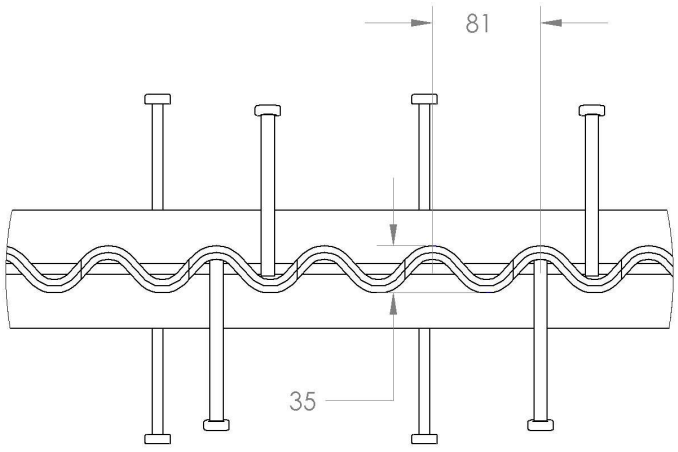
Dividing plate situated at the bottom of joint is a moving steel plate to fill up the opening between the joint and the ground. Minimum 10 mm has to stay in the joint and the rest can be used for fill up. As the levelling of the underground is sometimes rough or unequal this dividing steel plate give some flexibility.

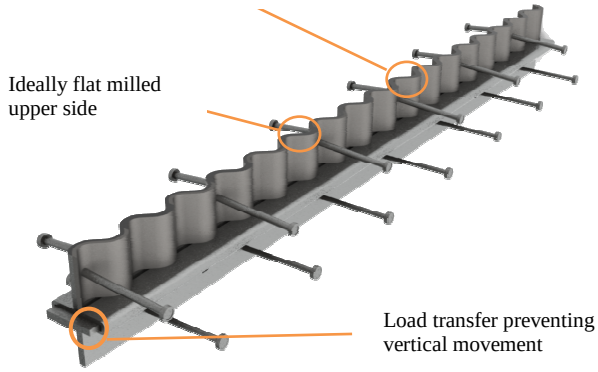
The **patented pending sinus top surface** in 5-mm thick steel provides continuous support for passing wheels, regardless of the direction, size and shape of the wheel, from fitting the joint up to it's maximum recommended opening of 20 mm.

Neutralisation of the stroke impact of the wheels provides forklift truck drivers with unprecedented comfort. A **100% smoothly load transfer without shocks and vibrations** is achieved, considerably reducing the risk of damage to the floor, the material handling equipment and the goods being transported. This sinus top side is highly recommended for heavily and intensely loaded aisle ways and other places in the floor that are subjected to intensive forklift truck traffic**.**

With the *HC-Delta SINUS SLIDE®* joint a 100% JOINT FREE industrial floor can be realised as the floor is experienced as if there are no joints at all.

The ***HC-Delta SINUS SLIDE®*** joint is used as a **construction joint** for applications on jointed, joint free, steel fibre or mesh reinforced ground bearing and suspended floor slabs on piles, bar or steel fibre reinforced.. It is particularly suitable for **heavy industry** and **high loads applications**, where users are looking for low maintenance joints.





BENEFITS

FREE HORIZONTAL MOVEMENT of the industrial floor. When drying the poured concrete, the inevitable shrinkage is compensated by the horizontal expansion of the ***HC-Delta SINUS SLIDE®*** dilatation joint. This prevents cracks caused by the drying process. This cracking also occurs if the floor has been cut too late, which is superfluous when fitting an expansion joint.

PREVENTING VERTICAL MOVEMENT The minuscule tolerance between the profiles and the connection with the 70 x 10mm steel plate prevents any vertical movement between the various parts of the floor. The steel profiles also ensure the elastic behaviour of the joint.

LOAD TRANSFER The ***HC-Delta SINUS SLIDE®*** dilatation joint realises a transfer of loads from one part of the floor to another in forklift truck traffic. The floor is therefore subjected to less wear, the risk of damage is reduced and the life of the industrial floor is considerably lengthened. This load transfer is 100% smoothly and shock- and vibration free with the sinus model.

EDGE PROTECTION The 5-mm thick steel profiles and, in particular, the sinus model provide maximum edge protection. This considerably reduces the risk of the edges of the floor parts crumbling.

CONCRETE FORMWORK The ***HC-Delta SINUS SLIDE®*** profiles are fitted according to a layout plan with limited dimensions separating the various floor parts. The areas can then be poured and finished according to the day's schedule.

EASY TO FIT The ***HC-Delta SINUS SLIDE®*** dilatation joint is fairly easy and quick to fit in accordance with the fitting instructions described in the design guide.

SHOCK AND VIBRATION FREE TRANSFER The sinus model guarantees a shock- and vibration free transition between two floor parts up to a maximum opening of 20mm. Even with forklift trucks with extremely small wheels and regardless the direction, the passing on a sinus joint is experienced as no joint in the floor.

DETAILES

MATERIAL: hot rolled steel, S235JRG2

SINUS PROFIL: 2 x 5mm, sinus forming process: cold forming process

STEEL PLATE (LOAD TRANSFERING): 70mm x 10mm

ANCHOR BOLTS: ø10, 125mm long, every 200mm on bottom, every 243mm on top

MAXIMUM JOINT OPENING: 20mm

LENGTH OF ONE PIECE : 2,997m

VARIANCE IN STRAIGHTNESS OF HORIZONTAL SURFACE: 2mm/3m

VARIANCE IN STRAIGHTNESS OF VERTICAL SURFACE: 3mm/3m

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100% VIBRATION AND SHOCK FREE

Test report 8-2034,01 of Sirris*concerning evaluation of whole body vibrations when passing concrete joints with material handling equipment has given the next general relevant conclusions.

- When passing the ***HC-Delta SINUS SLIDE***® joints with the tested trucks (material handling) no measurable increase in vibration levels are detectable.
- As no increase in vibration level is detectable, passing of the ***HC-Delta SINUS SLIDE***® will never lead to a violation of European Directive 2002/44/EC.
- The peak vibration levels when passing the straight joint were very high in some cases. (>5 g or 50m/s²). These levels are measured on rubber of the standing platform! Therefore we believe that the vibration levels on the load itself are even much higher. This may cause to damage to the load and increase wear and tear on the 'load handling equipment'.

**Sirris is the collective centre of the Belgian Technological industry. www.sirris.be*

LOAD TANSFER

The ***HC-Delta SINUS SLIDE***® Joints have been tested in the University of Ghent at the Magnel Laboratory. (Report n°2005/616). It proved the ability to transfer very high loads. Different depths of joints have been tested up to the concrete rupture.

Teoretical calculation in accordance with TR34

JOINT HIGHT [mm]	CONCRETE HEIGHT [mm]	CALCULATED MAXIMUM LOAD per meter, plain concrete 40N/mm² [kN/m]
105	120	95
120	140	103
140	160	116
160	180	128
180	200	140
200	220	152
220	240	163
240	260	174
260	280	185
280	300	195
300	320	206

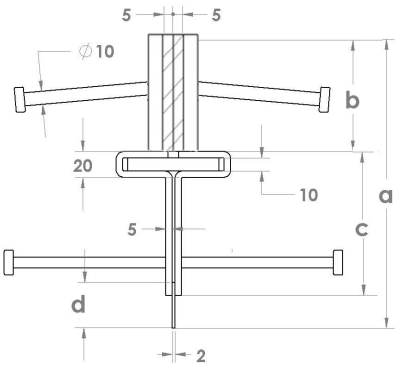
** Test setup with 20mm joint opening*

PACKING

Nominal height [mm]	105	120	130	140	150	160	180	200	220	240	260	280	300
single joint weight [kg]	60,96	65,29	68,19	71,66	72,14	76,00	77,20	82,03	82,75	93,36	94,80	95,28	96,23
joint per pallet [pcs]	25	23	22	21	20	19	18	18	17	16	16	16	16
nett pallet weight [kg]	1524	1502	1500	1505	1443	1444	1390	1477	1407	1494	1517	1524	1540
brut pallet weight [kg]	1560	1538	1536	1541	1479	1480	1426	1513	1443	1530	1553	1560	1576

Pallets dimension: 100 x 100 x 300cm, Single pallet weight (without load) : 36kg

NAME	a – nominal joint height [mm]	floor thickness [mm]	b – top, SINUS profile height [mm]	c – delta profile height [mm]	d – additional dividing plate [mm]	min. & max joint height [mm]	compatible with
HC-Delta SINUS SLIDE® 105	105	110-120	35	70	/	105 – 105	
HC-Delta SINUS SLIDE® 120	120	130-140	50	70	/	120 – 120	
HC-Delta SINUS SLIDE® 130	130	140-150	60	70	/	130 – 130	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 140	140	150-170	60	80	30	140 – 170	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 150	150	150-180	60	80	40	140 – 180	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 160	160	160-180	75	80	30	140 – 180	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 180	180	185-200	75	80	55	155 – 200	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 200	200	205-220	90	80	65	170 – 225	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 220	220	225-240	90	80	80	170 – 240	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 240	240	245-260	116	95	75	211 – 276	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 260	260	265-280	116	95	95	211 – 296	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 280	280	285-300	116	95	105	211 – 306	HC-Delta HC-Delta +
HC-Delta SINUS SLIDE® 300	300	305-320	116	95	125	211 – 326	HC-Delta HC-Delta +

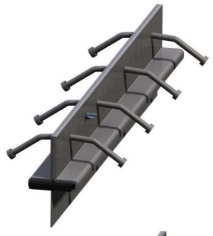


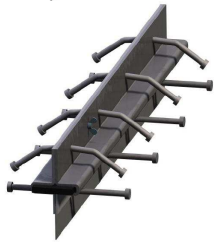
b + c = steel profile without dividing plate
= min. joint height

HC-Delta range

Sinusoidal dilatation joint ***HC-Delta SINUS SLIDE***® is compatible with straight dilatation joint HC-Delta and HC-Delta+.

HC-Delta has got one row of anchor bolts on both sides and **HC-Delta+** has got two rows of anchor bolts on both sides.





SHORT INSTALLATION INSTRUCTION

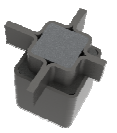
1. Stretch a piece of string across the place where the profiles are to be installed.
2. Lay out the joints along this string.
3. Place the first joint parallel with the string.
4. Raise them to the right height with wedges or using height adjustment (see accessories).
5. Drive or drill pickets vertically into the ground along the end of the anchors, two on each side of the end of the profile. If required, a further picket also can be placed in the middle.
6. Check the height of the profile with a laser and check that it is parallel to the string.
7. Check the flatness of the profile across the width all along the length.
8. Weld the pickets to the profile. If welding is not permitted at the yard, then there are special adjustment feet available.
9. Slide the following profile with the 15-mm protruding plate into the first profile. As the 70 x 10 plate is inserted by 15mm, the beginning of this profile is automatically at the right height.
10. Adjust the end of the second profile to the right height with wedges or by using the height adjustment.
11. Repeat this step from point 5 up to an intersection, wall or column.

For intersections (crossings)

1. Place the intersection (crossing t or X) in the place indicated on the layout plan.
2. Measure the distance between the last joint fitted and the intersection. Cut a new piece of joint to the right length with a grinding disc.
3. Insert the length of joint cut to measure according to the method described above.
4. Then adjust the intersection to the right level and weld it to the joint.

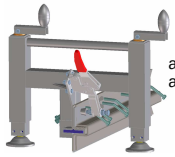
ACCESSORIES

Intersections are available in all dimensions in relation to the profile used.



4 way section

"T" section



assembly aid

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