



HENGELHOEF CONCRETE JOINTS

Hengelhoefstraat 158, Poort Genk 0420, Belgium
tel +32-89.32.39.80, fax +32-89.32.39.88
Email: info@hcjoints.be

THE JOINT IS THE FLOOR

- ✓ Shock - and vibration free forklift wheel crossings
- ✓ Operators experience a no joint feeling and a high level of comfort
- ✓ Best load transfer system ever thanks to the exceptional efficient connection without use of outdated dowel technology
- ✓ Proven high satisfactory test results in most extreme conditions
- ✓ Worldwide references
- ✓ Unique patented technology
- ✓ Free "design check" and stability verification for optimization of your project
- ✓ Easy to install with the new click system.



COSINUS SLIDE® JOINT

THE JOINT IS THE FLOOR, THE FLOOR IS THE JOINT

PERFECTION IN
DYNAMIC & STATIC
LOAD TRANSFER CONTROL



Optimize your concrete industrial floor with the

COSINUS SLIDE® JOINT

The only and unique joint with
"double slide effect"
for point loads and wheels

THE FLOOR IS THE JOINT

- ✓ The table shows the load transfer capacity in [kN/m] of the Cosinus Slide® Joint at ULS for plain concrete and a joint opening of 15 mm. The values are based on the following formula which is derived from laboratory testing results in accordance with EN 1990 (EC0).

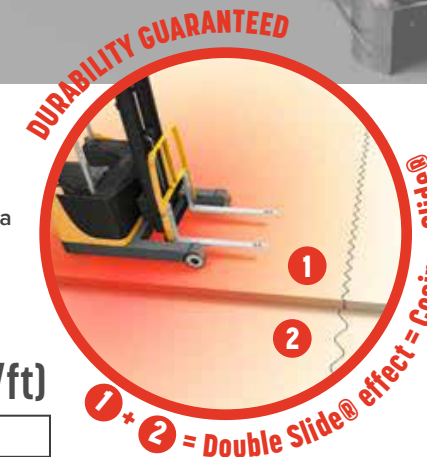
$$V_{Rd,c} = 0,0525 / \gamma_c \cdot k^{3/2} \cdot f_{ck}^{1/2} \cdot 0,80 \cdot h / 1,4 \text{ [kN/m]}$$

with: $\gamma_c = 1,50$ [-]; $k = 1 + (200 / d)^{0,5} \leq 2,0$; $d = h - 60\text{mm}$

Cosinus Slide® - load transfer capacity in [kN/m] (kips/ft)

| Slab height h [mm] (inch) | unreinforced (plain) concrete | | |
|------------------------------|-------------------------------|-------------------|-------------------|
| | C25/30 (3600 PSI) | C30/37 (4350 PSI) | C35/45 (5000 PSI) |
| 160 (6 3/8) | 45,3 (3,1) | 49,6 (3,4) | 53,5 (3,7) |
| 170 (6 3/4) | 48,1 (3,3) | 52,7 (3,6) | 56,9 (3,9) |
| 180 (7 1/8) | 50,9 (3,5) | 55,8 (3,8) | 60,2 (4,1) |
| 190 (7 1/2) | 53,7 (3,7) | 58,9 (4,0) | 63,6 (4,4) |
| 200 (7 1/2) | 56,6 (3,9) | 62 (4,2) | 66,9 (4,6) |
| 210 (8 1/4) | 59,4 (4,1) | 65,1 (4,5) | 70,3 (4,8) |
| 220 (8 5/8) | 62,2 (4,3) | 68,2 (4,7) | 73,6 (5,0) |
| 230 (9) | 65,1 (4,5) | 71,3 (4,9) | 77,0 (5,3) |
| 240 (9 1/2) | 67,9 (4,7) | 74,4 (5,1) | 80,3 (5,5) |
| 250 (9 7/8) | 70,7 (4,8) | 77,5 (5,3) | 83,7 (5,7) |
| 260 (10 1/4) | 73,5 (5,0) | 80,6 (5,5) | 87,0 (6,0) |
| 270 (10 5/8) | 75,0 (5,1) | 82,1 (5,6) | 88,7 (6,1) |
| 280 (11) | 76,4 (5,2) | 83,7 (5,7) | 90,5 (6,2) |
| 290 (11 3/8) | 77,9 (5,3) | 85,3 (5,8) | 92,2 (6,3) |
| 300 (11 3/4) | 79,4 (5,4) | 86,9 (6,0) | 93,9 (6,4) |

- ✓ The table only provides the material capacity in combination with unreinforced concrete at ULS (safety: $\gamma = 1,5$). This table does not replace the necessary design check. The design check is available for each project upon request.



The Cosinus Slide® joint enhances the basic principles a designer has to comply with: securing the ongoing usability and the stability of the floor.

Stability verification

Second "Slide" effect

Thanks to the typical geometry of the Cosinus Slide® joint, a second Sinus shape is created in the middle floor which enables the sliding effect of loads throughout the floor. Because of this, load transfer is not realized by the joint but by the floor itself which is much more efficient than the traditional obsolete dowel technology. Each sinus corrugation on top is opposed by a second Sinus corrugation underneath. (That's why we call it Cosinus) These staggered arranged sinus corrugated steel plates shape small vertical reinforced concrete consoles over each other. The load bearing of these columns determines the load bearing capacity of the complete floor. Those unique and exceptional characteristics permits in some cases an optimization of your floor.

*Stability calculation and optimization design check test results on request.



Ongoing usability of the floor

First "Slide" effect

Thanks to the Sinus upper side The Cosinus Slide® joint satisfies the requirements of floor usability such as shock- and vibration free joint crossings regardless the speed of forklifts.

This feature generates extended advantages in the field of:

- ✓ Environment
- ✓ Healthcare and well-being at work
- ✓ Durability of the floor
- ✓ Enhanced profitability of operators and cost savings

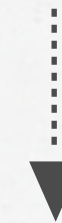


Theory -----> Practice

The European standard EN 1991-1-1 takes for granted wheel loads of 13kN until 85kN.

The standard also assumes wheel contact surface of 20 x 20 cm which represents pneumatic tyres. The contact pressures and the corresponding shock impact of this type of tyres on a linear profile is minor or even negligible

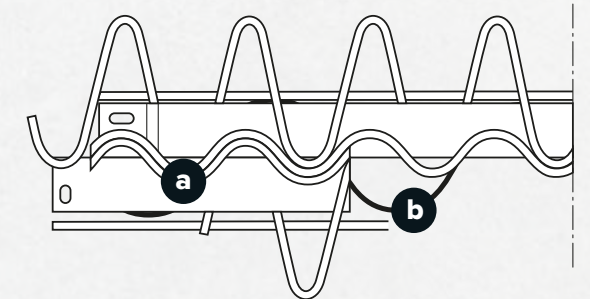
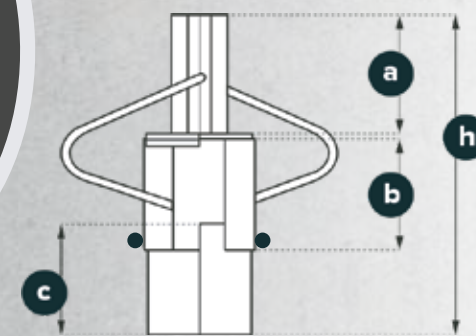
However, in reality small hard synthetic wheels (vulkollan, polyamide) are used which are not included in the European standard EN 1991-1-1. These types of tyres causes heavy shock impacts on linear profiles which will damage the floor, the joint and the forklifts. The tendency to increase speed of forklift traffic makes it even worse.



Solution

The sinus form of the Cosinus Slide® joint and the concrete ensures continuous support for passing forklift wheels which enables vibration- and shock free crossings.

In combination with the unique load bearing capacity of the joint and floor smooth and noiseless load transfers are created.



| Profile | Slab thickness | Sinus | Cosinus | Adjustable steel plate | Length | Weight per length | Weight per meter | Quantity per pallet |
|------------|----------------|-------|---------|------------------------|--------|-------------------|------------------|---------------------|
| mm | h | a | b | c | mm | kg | kg | qty |
| 115/150x5 | 115-150 | 60 | 50 | 50 | 2600 | 30,99 | 11,92 | 56 |
| 160/215x5* | 160-215 | 80 | 75 | 75 | 2600 | 39,42 | 15,16 | 48 |
| 205/300x5* | 205-300 | 80 | 120 | 120 | 2600 | 45,76 | 17,60 | 28 |

* both profiles are suitable for floor slabs from 205-215 mm height