SHIELDJOINT®
SEALANT-FREE JOINT SYSTEM...

Patent pending GB 1120320.5

TECHNICAL DATA SHEET:
TDS 002 - REV1

OVERVIEW

SHIELDJOINT is an innovative, patent pending, leave-in-place joint system designed specifically to meet the demanding needs of today's industrial concrete floors. **SHIELDJOINT** surpasses the requirements of TR34 3rd Edition. **SHIELDJOINT** is a 'sealant-free joint system'.

SHIELDJOINT offers superior performance through innovative design.

SLAB PANEL EDGE SHIELDING

NO IMPACT ACROSS THE JOINT! NO JOINT SEALING REQUIRED!

Traditional joint systems feature two straight steel edges which are anchored in to the edges of the slab panels and basically armour the slab panel edges. As the slab panels shrink during the curing process, a gap occurs between the adjacent slab panels. This gap should be filled with a suitable joint sealer at building handover, after a further 12 months and whenever necessary thereafter, throughout the life of the building, in order to maintain an adequate sealed joint. Joint sealing is costly and sealed joints must be maintained for them to be effective. Mechanical handling equipment (MHE) such as forklifts traverse this gap and an impact load is generated between the armoured edges and the forklift wheels, even if sealant is in place. These impact loads are absorbed by the slab and the MHE, invariably leading to expensive floor repairs with associated facility downtime and higher MHE maintenance costs. **SHIELDJOINT** comprises 'asymmetric top plates' fitted to 'opposing asymmetric support angles'. This patent pending innovation provides a 'sealed joint' at all times, so no sealant is required, ever. **SHIELDJOINT** therefore eliminates costly joint sealant, reduces expensive facility down time otherwise required for joint sealant repairs or ongoing re-sealing, and improves pest control by virtue of a 'sealed joint'. **SHIELDJOINT's** 'asymmetric top plates' feature a specific trapezoidal split line, designed with a wave-length suitable for the narrowest of MHE wheel widths such that even when the joint has achieved 30mm maximum perpendicular joint opening, the MHE wheel is always in contact with both halves of the top plates. This design virtually eliminates impact loads as the joint is traversed. **SHIELDJOINT** therefore significantly reduces floor repairs throughout the life of the building, reduces expensive facility down time otherwise required for floor joint repairs and significantly reduces MHE maintenance costs resulting from impact loads. **SHIELDJOINT** negates the need for joint sealant and virtually eliminates any impact loads!

DOWEL DESIGN

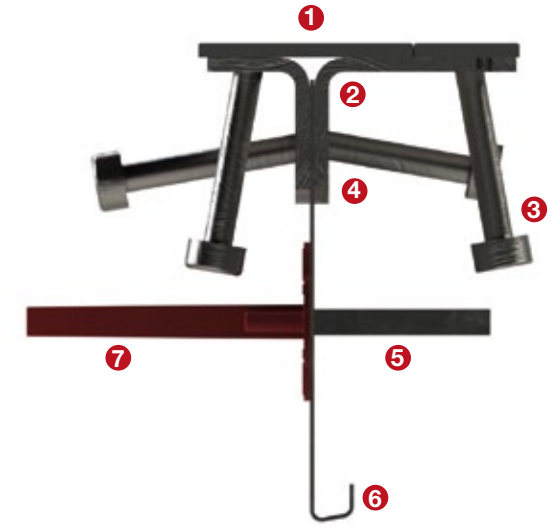
SHIELDJOINT leads the way with a unique and revolutionary 'asymmetrical dowel'. Other traditional joint systems have an inherent design weakness such that the dowel is positioned centrally across the joint when the joint is closed. From the moment the joint opens, dowel engagement on the free side reduces, thus moving away from a condition of equal dowel engagement on both sides of the joint. Ultimately, with large joint openings there is a risk of the dowel becoming totally disengaged on the free side, the complete loss of load transfer across the joint and a failed floor. **SHIELDJOINT** works differently. As the joint opens, **SHIELDJOINT** moves towards a condition of equal dowel engagement. Even at a maximum joint opening of 30mm, each side of the joint has a class leading 60mm of dowel engagement. **SHIELDJOINT** dowels are made from a high grade S355 steel (355N/mm^2 yield strength).

Traditional Joint

SHIELDJOINT

SLEEVE DESIGN

The sleeve's purpose is to form a barrier between the steel dowel and the concrete and allow the concrete to release in two horizontal planes (parallel and perpendicular to the joint) on the free side of the joint. Vertical displacement between adjacent slab panels is undesirable as this can lead to a reduction in floor and joint life. **SHIELDJOINT** sleeves are designed to facilitate up to ± 20mm of parallel movement along the joint before the joint opens up. Other joint systems allow zero parallel movement between slab panels (i.e. along dock levellers) and can cause slab lock-up. **SHIELDJOINT** can be specified with factory pre-set top plates to cater for even greater parallel movement – **SHIELDJOINT DL**. The long term performance of a concrete floor is highly dependent upon the quality and performance of the joint system.



1. 5mm thick steel x 110mm wide x 1950mm long asymmetric top plates with trapezoidal split line.
2. 5mm thick steel asymmetric support angles.
3. Diameter 10mm x 100mm long, shear studs for anchorage into concrete.
4. Frangible fastening system temporarily holding steel support and top plates in place during concrete casting.
5. Unique asymmetric dowel, high grade 355N/mm^2 steel for superior load transfer and maximum 30mm joint openings. Available in 8mm or 12mm thickness at 650mm centres.
6. Cold rolled steel plate.
7. High density plastic sleeve for release of dowel in concrete, with ± 20mm parallel movement along joint and 30mm movement perpendicular to joint.

Other Features:

- Overlapping, joint-to-joint, joining arrangement with simple fastening system.
- Full range of intersections and precision height adjustment using **SHIELDFIX** Jack.
- Also available in stainless steel.

Specify the best...

SHIELDJOINT - THE NAME SAYS IT ALL

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LOAD TRANSFER

The ultimate load transfer is the theoretical maximum load transfer that can be experienced by a floor joint up to the point at which either the concrete or dowel starts to fail. It is necessary to determine the ultimate load transfer for each slab design in order to ensure the required maximum working load will not exceed the ultimate load.

In most situations, at the point of ultimate load, the concrete would typically fail before the dowel. The concrete may fail in two ways; bursting or bearing (which is far less likely). Bursting (a tensile failure of the concrete) is where the dowel breaks out of the slab and the concrete is ruptured. Bearing is where the concrete fails due to compression under the surface of the dowel when loaded. Failure of the dowel can be in three forms; bending, shear or combined bending and shear. Bending is where the dowel becomes overloaded and bends, beyond it's elastic limit, across the joint. Shear is where the dowel fails to carry the load across the joint and starts to shear at the joint. Combined bending and shear, as it's name suggests, is a combination of both failure modes.

The ultimate load transfer across a floor joint is dependent upon a number of factors; the shape and size of the dowel, the strength of the dowel materials, the concrete strength, the size of the joint opening etc.

Theoretical ultimate load transfer (kN/m) across a 20mm joint opening
(In accordance with TR34 3rd edition)

Slab thickness			150mm	175mm	200mm	225mm	250mm	275mm	300mm
Dowel Details	8mm dowel @ 650mm centres	Reinforcement Details: Re3 = 0	47.9	61.8	77.4	94.7	100.7	91.1	91.7
		Re3 = 0.8	82.7	106.7	114.0	114.0	114.0	114.0	114.0
	12mm dowel @ 650mm centres	Re3 = 0.8	N/R	N/R	133.6	161.5	170.0	153.0	154.8

Note: Re3 is the reinforcement enhancement factor for steel fibres taken from manufacturers literature.

It is possible to theoretically calculate the ultimate load at the joint using the methods set out in TR34 3rd Edition. The table above summarises the limit of load transfer for various slab thickness where 32N/mm^2 cylindrical strength concrete has been used and a long term joint opening of 20mm is anticipated.

Isedio Limited can assist with determining the ultimate load transfer for any given slab design.

SHIELDJOINT is available with either 8mm thick dowels or 12mm thick dowels at 650mm (3 dowels per 2m joint) centres. The 12mm dowel can transfer a higher load but is only required on thicker slabs with heavy dosages of steel fibre reinforcement.

! Please note that the engineer responsible for the floor slab design must check that the required maximum working load transfer across the joint does not exceed the ultimate load transfer capacity.

Individual SHIELDJOINT weights (approx kg/joint)

	SHIELD SIZE (mm)						
Dowels	**150**	**175**	**200**	**225**	**250**	**275**	**300**
3 x 8mm	31.8	32.4	33.0	33.6	34.2	34.7	35.3
3 x 12mm	33.9	34.5	35.1	37.5	36.3	36.8	37.5

SHIELDJOINT quantities per pallet

SHIELDJOINT SIZE (mm)						
150	**175**	**200**	**225**	**250**	**275**	**300**
30	30	24	24	18	18	12

Complete pallet weights (approx kg/full pallet)

	SHIELDJOINT SIZE (mm)						
Dowels	**150**	**175**	**200**	**225**	**250**	**275**	**300**
3 x 8mm	989	1007	827	841	650	659	458
3 x 12mm	1052	1070	877	891	688	697	485

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