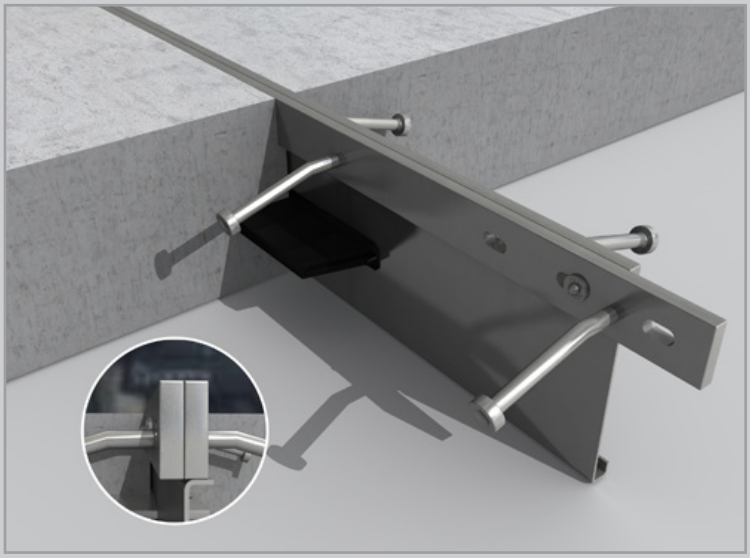
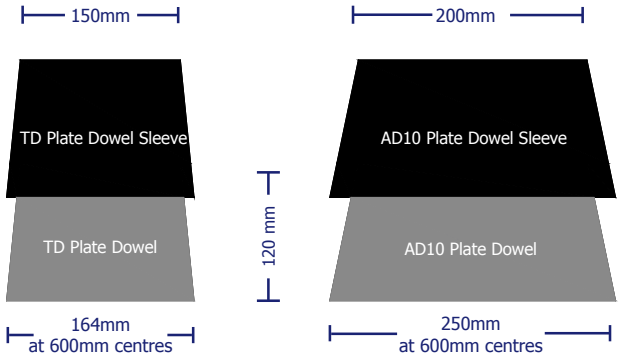
AlphaJoint® *classic* 4010

PERMABAN® Floor Solutions

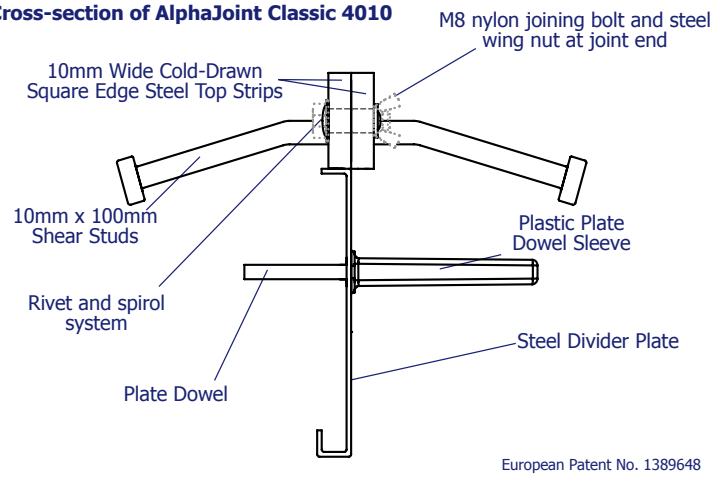
DATASHEET ISSUE 2.1 03/09/2010



Trapezoidal Plate Dowel Systems



Cross-section of AlphaJoint Classic 4010



European Patent No. 1389648

APPLICATION:

- **For heavy-duty applications on jointed and jointless, steel fibre or mesh reinforced ground bearing slabs or bar reinforced suspended floor slabs on piles.**
- **At 30mm joint opening, 45mm of the dowel remains embedded in concrete on the free movement side so larger joint openings may be accommodated.**

We recommend that load transfer is calculated by an engineer.

FEATURES:

- 'Leave in place' steel formwork system with 2 x 10mm wide cold drawn square edge steel strips mounted on a steel divider plate.
- High tensile steel (min 410N/mm^2) trapezoidal plate dowels at 600mm centres provides load transfer across the joint.
- 10mm Ø x 100mm long shear studs induction welded to the 10mm wide steel top strips.
- Unique split spirol dowel and frangible fastening system.
- Simple end to end lapped connection.
- Installation by AlphaFix, AlphaFoot or pins.
- Prefabricated 4-way intersections, T-junctions and corner units.
- Available with Permaflex 'T-Tape' system pre-installed.
- Single piece, high density polypropylene sleeve to ensure optimised load transfer whilst limiting vertical movement.

BENEFITS:

- The 10mm wide steel top strips provide heavy duty armoured arris protection that significantly reduces joint maintenance when compared to other joint types.
- Load transfer by high tensile trapezoidal plate dowel is superior to round dowels and allows 2 - way lateral movement that limits vertical movement between adjacent slabs (four times less than any other joint tested).
- Shear studs firmly anchor the top strips into the slab and resist any rotation of the strips from wheel impact.
- Split spirol dowel ensures top strips are level and rivets shear as concrete contracts.
- Lapped end bolted connection speeds up accurate installation and eliminates site welding.
- Re-usable AlphaFix installer facilitates very accurate floor levels to be achieved by a simple micro height adjustable levelling system.
- All vulnerable floor joint intersections are properly armoured by prefabricated sections.
- Permaflex 'T'Tape' system opens with the joint and can be filled with Permaflex Impregnation Sealant.

Concrete Society · ACIFC · BSI ISO 9001 FM 532835 · SED Awards for Excellence Concrete Innovation Winner · Construct-A-Slab

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The load transfer from one concrete panel to the adjacent panel has traditionally been by the use of round steel dowels across the joint. Round dowels do not allow lateral movement which was not generally appreciated as required until the development of plate dowels that allowed lateral movement and also provided a better load transfer efficiency.

When the 'Ultimate Load' (see table 1) is reached, failure of the dowel or concrete will occur. The failure mode of the dowel will be either by shear or bending or a combination of the two. However, it is more likely that the concrete will fail due to bearing or bursting.

A number of factors determine the Ultimate Load. These factors are concrete strength, joint opening, slab depth, the improvement to the concrete flexural strength provided by reinforcement (steel mesh or steel fibre) at the area of the joint (the Re3 factor), geometry of the dowel, dowel steel strength at yield, thickness of the dowel, the amount of embedment of the dowel in the concrete and the dowel centres. Some of these factors are fixed by the product design, such as the factors relating to the dowel i.e. dowel geometry, dowel centres and dowel steel strength. However, the other factors outlined above will vary with the slab design and will influence the Ultimate Load.

Table 1 indicates the theoretical calculated Ultimate Load per metre for typical slab thicknesses for un-reinforced and concrete reinforced with steel fibres to achieve Re3=0.8. Table 1 considers the Ultimate load on the dowel in bending and also on the concrete slab in bursting.

For extra heavily loaded joints in excess of the loads in Table 1, additional reinforcement can be incorporated into the joint at extra cost.

For slabs suspended on piles, each slab must be designed taking into account the ultimate load transfer capacity of the joint. As a general rule of thumb, where the distance between the applied concentrated load and the joint exceeds 1 metre and the working load does not exceed either a 'back-to-back' rack leg load of 60kN/leg or a single concentrated load of 300kN, the joint load transfer capacity is unlikely to be exceeded.

It should be noted that the AD10 dowel provides superior bending resistance when compared to the TD dowel range but the Ultimate Load at the joint can be governed by the strength of the concrete at this location. As such, bursting forces should be considered.

It is necessary for each application that an engineer determines from the load acting on the slab what the load transfer requirement will be at the joint. It is also necessary to ensure that the load transfer requirement at the joint is within the Ultimate Load capability of the concrete and dowel system at the joint position.

Please note that the figures shown in Table 1 relate to one specific set of slab factors only. We strongly recommend that for each slab design the engineer determines the load transfer requirement at the joint based on the loads on the slab and Permaban can recommend consulting engineering practices to assist with this. The engineer should also determine the Ultimate Load capability for the concrete and dowel system at the joint and Permaban can provide assistance with this.

Please note - all information found throughout this datacard is approximate. Permaban reserves the right to make changes to this datacard at any time. For details, please contact Permaban.

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Table 1: Theoretical calculated ultimate loads at failure of dowel or concrete

(For typical slabs, 40N/mm2 concrete and 20mm joint opening)

		Unreinforced Slab		Steel Fibre Reinforced Slab	
Slab Depth (mm)	Dowel Type	Bursting (kN/m)	Bending (kN/m)	Bursting (kN/m)	Bending (kN/m)
150	TD6	50.50	80.83	87.17	80.83
	TD8	50.50	143.50	87.17	143.50
	AD10	54.17	328.00	93.50	328.00
200	TD6	82.00	80.83	141.67	80.83
	TD8	82.00	143.50	141.67	143.50
	AD10	63.17	328.00	108.83	328.00
250	TD6	81.00	80.83	136.50	80.83
	TD8	81.00	143.50	136.50	143.50
	AD10	74.33	328.00	125.50	328.00
300	TD6	87.33	80.83	147.50	80.83
	TD8	87.33	143.50	147.50	143.50
	AD10	83.67	328.00	141.17	328.00
350	TD6	94.00	80.83	160.00	80.83
	TD8	94.00	143.50	160.00	143.50
	AD10	91.33	328.00	155.50	328.00

Ultimate load (kN/m) is shown in red.

Table 1 shows the load at failure in busting (failure of the concrete) and bending (failure of the dowel) for a joint opening of 20mm - larger joint openings can be accommodated. For more detailed analysis please contact Permaban.

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Manufacturing Tolerances:

Length ±2.0mm

Height ±1mm

Straightness ±0.5mm/600mm

Quality Control:

We certify that our products are manufactured to conform to the joint armouring and load transfer requirements as detailed in British Standard 8204 Part 2 (ref. 'BS 8204-2:2003') and Concrete Society Technical Report 34 (3rd edition). We also certify that the products detailed are manufactured in strict accordance with Permaban Limited's quality management system which is accredited with ISO9001:2000.

Dimensions of AlphaJoint Classic 4010

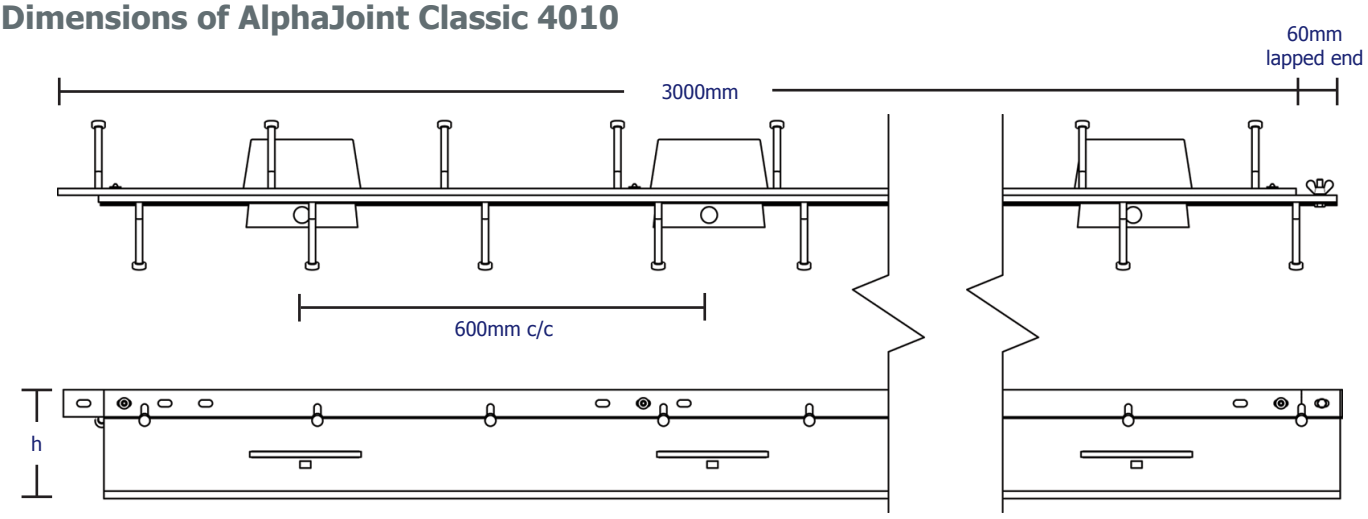

Table 2: Dimensions and height of AlphaJoint Classic 4010

(Typical length values. Weight values shown are for joints with TD8 dowels and are approximate. Please contact Permaban for more information.)

Nominal Slab Depth (mm)	Rail Size, h (mm)	Dowel Size (mm)	Dowel Centres (mm)	Length (mm)	Single Joint Weight (kg)	Joints per bundle	Pallet weight (kg)
150	120	164 x 120 x 8 Trapeziod	600	3000	33.12	30	1078.60
170	140				34.07	30	1107.10
190	160				35.02	28	1065.56
210	180				35.97	28	1092.16

Table 3: Materials

Component	Material
4010 Top Strip	BS 070M20
Divider Plate	BS EN 1030:1999 DC01
Shear Stud	S275JR or equivalent
Dowel	BS EN 10025-2:2004 S275JRG2
Dowel Sleeve	HDPP

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