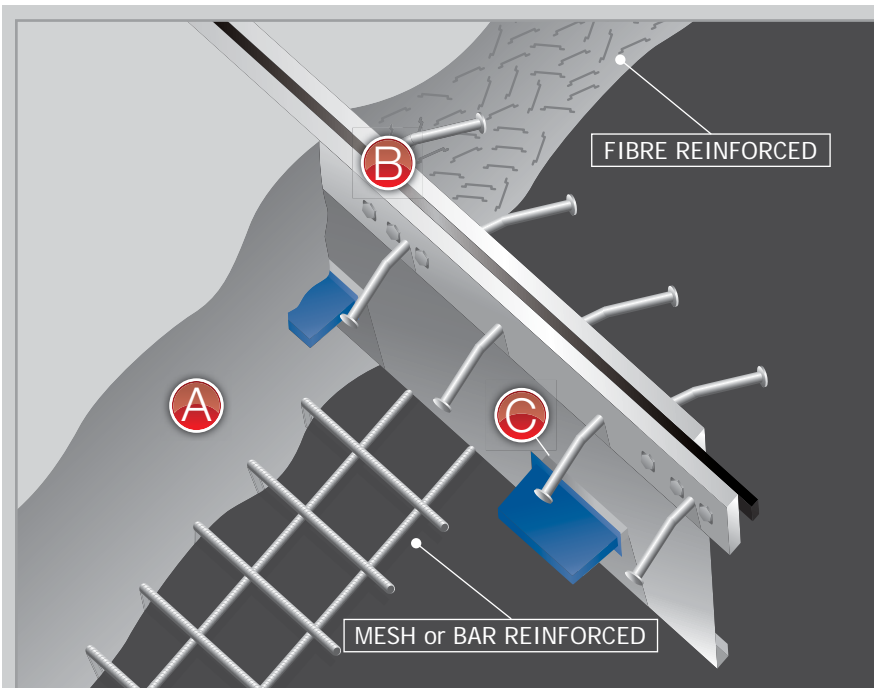


AlphaJoint 4010 AD10

DATASHEET ISSUE 1.3
11 JANUARY 2009



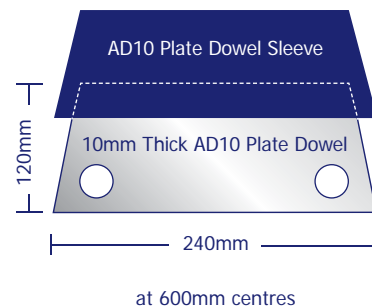
A: Slab Depth **B: AlphaJoint 4010 to suit**
Standard heights available

210 - 240mm	AD10 - 200
235 - 265mm	AD10 - 225
260 - 290mm	AD10 - 250
285 - 315mm	AD10 - 275
310 - 340mm	AD10 - 300



For slab depths less than 210mm please refer to the AlphaJoint 4010 GD8 datasheet. For slab depths greater than 340mm please contact Permaban.

C: AD10 Plate Dowel



APPLICATION:

- For heavy-duty applications on jointed, jointless, steel fibre, mesh or bar reinforced suspended floor slabs on piles.
- Designed and tested for joint openings up to 20mm.
- At 20mm opening 50mm of the dowel remains embedded in concrete on the free movement side so larger joint openings may be accommodated.



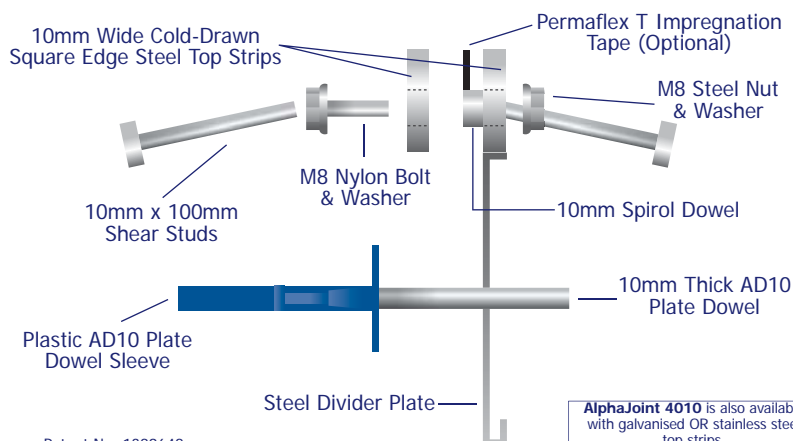
We recommend that load transfer is calculated for all slabs by the engineer.

FEATURES:

- 'Leave-in-place' steel formwork system with 2 x 10mm wide cold drawn square edge steel strips mounted on a steel divider plate.
- 10mm thick AD10 Plate Dowels and Sleeves at 600mm centres provides load transfer across the joint.
- 10mm diameter x 100mm long shear studs induction welded to the 10mm wide steel strips.
- Unique split spiro dowel and frangible fastening system.
- Simple end to end lapped connection.
- Installation by AlphaFix, AlphaFoot or pins
- Pre-fabricated 4way intersections, T junctions and corner units.
- Available with Permaflex T Tape System pre-installed.

BENEFITS:

- The 10mm wide steel strips provide heavy duty joint edge (arris) armoured protection which significantly reduces the joint maintenance requirement compared to other joint types.
- Joint load transfer by AD10 Plate Dowel is superior to round dowels and allows 2 way lateral movement, negligible vertical movement between adjacent slabs (4 times less than any other joint tested) and 4 times greater joint stiffness at 20mm joint opening.
- Shear studs firmly anchor the steel strips into the concrete and resist rotation of the strip from wheel impact.
- Split spiro dowels maintain accurate level of strips and fasteners shear as the concrete contracts.
- Lapped end bolted connection speeds up accurate installation and eliminates site welding.
- Re-useable AlphaFix installer facilitates very accurate floor levels to be achieved with the simple micro height adjustable levelling system. AlphaFoot is also re-useable
- All vulnerable floor joint intersections are properly armoured by pre-fabricated sections.
- Permaflex T Tape System opens as the joint opens and can be filled with Permaflex Impregnation Sealant.



European Patent No. 1389648

AlphaJoint 4010 is also available with galvanised OR stainless steel top strips.



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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 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 (see table 1) 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 the 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 influence the Ultimate Load. The table below indicates the theoretical calculated Ultimate Load per dowel, concrete limit and Ultimate Load per metre for typical slab thicknesses reinforced with steel fibres to achieve Re3=0.8. For extra heavily loaded joints in excess of the loads in Table 1 on suspended slabs additional reinforcement can be incorporated into the joint at extra cost. There is no benefit in using an AD10 dowel compared to a GD8 on an unreinforced floor unless the slab thickness is above 250mm or the joint opening is greater than 20mm - the recommended max. for the GD8 dowel. It should be noted that the AD10

dowel provides superior dowel capability compared to the GD8 dowel but the ultimate load at the joint maybe governed by the strength of the concrete at the joint.

Physical ultimate load tests on a 200mm thick concrete slab reinforced with 40kg/m³ steel fibre, unsupported under the AlphaJoint AD10 showed no failure at the joint but a shear failure within the concrete at a load in excess of 175kN.

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 is necessary for each application that the engineer determines from the loads 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.

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

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

	Slab Thickness (mm)	Dowel Centres (mm)	ULTIMATE LOAD per DOWEL (kN)					ULTIMATE LOAD per METRE at joint (kN/m)		
			Dowel Limit			Concrete Limit				
			Shear	Bending	Combined Shear & Bending	Bearing	Bursting			
			Load transfer values for the AD10 plate dowel @ 600mm CRS & 20mm joint opening							20mm round dowel @300mm centres
Steel fibre reinforced concrete at approx 40kg/m ³ (Re3 Factor = 0.8)	225	600	250.9	116.2	111.2	136.3	70.6	117.7	75.7	
	250	600	250.9	116.2	111.2	136.3	75.8	126.4	75.7	
	275	600	250.9	116.2	111.2	136.3	80.9	134.8	75.7	
	300	600	250.9	116.2	111.2	136.3	85.0	141.7	75.7	
	350	600	250.9	116.2	111.2	136.3	93.5	155.8	75.7	

Table 2: Joint Weights & Pack Sizes (approx.)

AD10	200	225	250	275	300
Joints per bundle	21	17	17	17	13
Single 3m joint weight (kg)	40.2	41.4	42.6	43.8	44.9
Total bundle weight (kg)	922	782	802	822	662



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