

**Euro Accessories Ltd**

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**Test Report on Euro Accessories Pin Anchors June 2017.**

Customer: Elite Precast Concrete

Product Type: 5.0t x 180mm Pin Anchors and 2.5t x 170mm Pin Anchors

Test Description: Validate the performance characteristics of Pin Anchors and surrounding concrete.

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**Introduction:**

We were invited by Elite Precast Concrete to test the performance of our Pin Anchors in 750kg Duo Blocks and 2365kg Legato Blocks. Our objective was to verify that the safe working load of our anchors was based on a safety factor of at least three and that the chosen anchors were suitable for handling the block itself and would allow for an element of dynamic loading that could reasonably be encountered when handling the blocks in the works or on site.

**Procedure:**

In order to carry out the tests one of each type of block was manufactured without the male interlocking lugs, this enabled us to place the Euro Accessories Test Rig directly on top of unit without interference. The Pin Anchors were cast into the units in their usual position in the centre of the top face of the units the Pin Anchors used were as follows:

1200mm x 600mm x 450mm Duo Block	weight 750kg	1 off 2.5t x 170mm Pin Anchor
1600mm x 800mm x 800mm Legato Block	weight 2365kg	1 off 5.0t x 180mm Pin Anchor

To ensure the test blocks were treated in a manner similar to standard items supplied, they were demoulded and handled in the same way as any other manufactured block and were positioned using the Pin Anchors after being trafficked across the production and storage area using the Pin Anchors. In order to test under a worst case scenario the tests were carried out immediately after striking the moulds with a concrete compressive strength in the region of 18-20 N/mm<sup>2</sup>.

To verify the capacity of the pins and the ability of the concrete blocks to withstand the loads transferred into them via the pins four test loads were applied these are as follows:

50% SWL

100% SWL

200% SWL

300% SWL

Each load was applied for a period of five minutes to replicate a typical handling period. To verify the status of the pin after each test the depth of the pin head below the surface of the concrete was

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measured before any tests were carried out, this depth was checked after each test to identify any permanent set, any elongation of the pin would indicate the pins had been loaded beyond their point of elasticity and had become plastic in their nature. The blocks were inspected for signs of cracking during these tests to verify the concrete was performing favourably. A drop in the final load reading was anticipated in each test due to material creep under load, the initial 50% SWL test was likely to have a significant drop as the test rig settled down on softer surface imperfections on the blocks.

The results of our tests are in the following table.

Elite Precast Concrete Tests													
Pin Type	SWL (tonnes)	Original Anchor Head Depth (mm)	Block Size (mm)	Unit Weight (tonnes)	After 5 mins at Percentage of SWL Load Cell Reading (tonnes)/Elongation of Pin (mm)								Concrete Strength
					50%		100%		200%		300%		
2.5t x 170	2.5	11.5	1200 x 600 x 450	0.75	1.04	0	2.33	0	4.75	0	6.77	0	C20
5.0t x 180	5.0	16.0	1600 x 800 x 800	2.37	2.42	0	5.00	0	10.03	0	14.64	1	C20

Pin was loose in block when test started, no movement in pin after final test.

**Conclusion:**

Euro Accessories can confirm that the Pin Anchors utilised in the Elite Precast Duo Blocks and Legato Blocks are satisfactory to withstand a dynamic load of factor two being induced on the blocks, this load will not take the load applied to the anchor beyond the rated safe working load. In addition we can verify that the Euro Accessories Pin Anchors achieve a safety factor  $\geq 3$  which is in turn  $\geq 6$  times the dead weight of the respective blocs. The lifting slings should always be in a position perpendicular to the top surface of the unit and must never be angled away from the vertical axis of the Pin Anchor.

**Advisory Notes:**

Euro Accessories always advise installers and users of our lifting products to pay particular attention to the handling conditions under which they are used and to consider the effects of terrain and type of lifting equipment used. Lack of consideration to these important factors can result in extremely high loads that could result in failure in use with potentially catastrophic consequences. We also advise that units must never be dragged with the lifting pins and precautions should be taken to ensure that a vacuum between the blocks and the substrate does not occur as significant loads will be transferred into the lifting pins whilst trying to release blocks that have become embedded in soft or wet ground conditions.

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Euro Accessories Test Rig (Note Legato Block minus male lugs)



Legato Block at 50% loading of 5.0t Pin Anchor



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Legato Block at 100% loading 5.0t Pin Anchor.



Legato Block at 200% SWL 5.0t Pin Anchor.



Legato Block at 300% SWL 5.0t Pin Anchor.



Checking depth of Pin Anchor Head.



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Euro Test Rig on 750kg Duo Block



50% Load reading on Duo Block 2.5t Pin Anchor



100% load on Duo Block 2.5t Pin Anchor



200% load on Duo Block 2.5t Pin Anchor



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300% load on Duo Block 2.5t Pin Anchor



Checking depth of 2.5t Pin Anchor



2.5t Pin tested to breaking point in Duo Block showing peak load at 9.3t and clear evidence of the elongation of the pin.



End of Report