



Wi SLOT BLOCK

REPORT ON THE TESTING OF HILTI FIXINGS & ANCHORS



17th November 2014
Rev – A (18/10/19)

Wembley Innovation Ltd
38A Fourth Way
Wembley
Middlesex
HA9 0LH

Introduction

The Wi Slot Block is increasingly being adopted on large commercial and infrastructure projects, as part of the Wi System of reinforced concrete blockwork. As many of these walls are located in service areas, or form the structural backing for cladding systems, significant loading may need to be borne by the walls, secured by structural anchors fixed into the blockwork. These types of anchors will invariably be specified as resin anchors. However, for non-structural loads, expansion bolts and conventional plugs and screws may be used.

Aims of Test Programme

The aim of this test programme was to determine pull-out loads and design capacities for various types of fixings and anchors. The tests recorded within this report are related to Hilti products. Similar tests have been undertaken with products from other manufacturers in order to provide potential users of the Slot Block the assurance they require that the block is capable of supporting typical project loads associated with blockwork construction.

Slot Block

The Wi Slot Block is a patented concrete block, currently manufactured under licence as a medium-dense paint grade block with a density of 1450 kg/m³. It is manufactured to the standard UK format size of 215mm high x 440mm long x 100, 140, 190 or 215mm wide. It has a unique arrangement of 6-9 full-depth slots within its construction, depending on its width. These slots serve to increase the mortar to block bond, through superior mortar interlock. They also reduce the weight of the blocks, enabling them to be adopted as full-size units, where other traditional blocks would have to be used a “midi” blocks, resulting from manual handling guideline restrictions due to their excessive unit weights.



The Standard Range Of Wi Slot Blocks

Test Methodology

The primary aim of the testing was to obtain reliable pull-out values for various types of fixings and anchors located within the slots, as these are perceived as the weakest portion of the block for the location of fixings and anchors. The tests were undertaken on the face and side of the blocks to address normal site fixing requirements and assess any capacity differences between the two.

All the recorded tests were completed on 7th October 2014 at Wembley Innovation's research facilities. The internal temperature varied between 18-20°C.

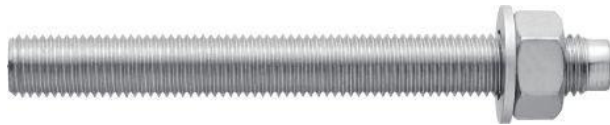
The samples were drilled and the prepared by Ioan Grigorescu of Wembley Innovation, who is an experienced operative familiar with the laying of Slot Blocks and the installation of the type of Hilti fixings and anchors used in the tests. Idrees Omerdeen, Hilti Project Manager and Liam Clear, Wembley Innovation's Managing Director, carried out the tests using the Hydrajaws Test meter. Tony Sagoo, Wembley Innovation's Head of Engineering, supervised the testing and recorded the results.

The pull-out tests were undertaken using a calibrated 25kN Hydrajaws test meter, which is specifically designed to carry out such tests. The tests were all undertaken on standard 7.3 N/mm² strength 140mm Slot Blocks. For the resin anchors, the drilled holes were blown out using a pump and then brushed-out – this procedure was then repeated a further three times prior to the fixing being installed. Resin-bonded fixings were allowed to cure for 24 hours before being tested. The holes for the mechanical fixings were blown out and brushed once before being tested.

Fixings & Anchors Tested

The following products were tested:

- **HIT HY70 + HIT SC/S + HIT – V5.8/M10/M12** – This is an established anchor system combining resin, studs and sleeves, which can be installed primarily in cellular or porous sub-strates. The purpose of the sleeve is to centralise the stud and “contain” the resin to mitigate excess loss of resin within voids.



HIT – V5.8 Stud



HIT HY70 Resin



HIT – SC Composite Sleeve

- **HUS – H8** – This is essentially a screw bolt, which is driven-in by using an impact wrench into a pilot hole.



- **HRD – H M10 x 100** – This is a frame fixing consisting of a Hex head screw and polyamide plug, which is used to fix into a variety of materials.



Test Observations and Discussions

HIT HY70 + HIT SC + HIT – V5.8/M10/M12

Anchors installed in face of block

Tests were carried out using M10 studs, located in 16mm diameter and 18mm diameter composite plastic sleeves, fixed horizontally through the faces of the blocks into the slots. Additional tests involved M12 studs and 22mm diameter sleeves.

The results from all three sets of tests were relatively consistent and generally reached the limit of the test meter at 25kN, without failure, or any noticeable slippage. The results from the M10 studs in the 16mm and 18mm sleeves gave the same mean result of 24.4kN. The M12 anchors reached a slightly higher mean value of 24.7kN. All test results are attached in Appendix A.

Anchors installed in side of block

A similar set of three tests, using the anchor sizes noted above, were carried out to the sides of blocks, to assess whether there is any difference in capacity between the face or the side.

Due to the lack of available “side” faces to the test walls, four tests had to be carried out into loose blocks (i.e. not built within the test walls). Two of the tests were also completed in blocks that were in the top courses of the walls. Both of these scenarios led to noticeably lower test results due to the lack of “containment” of the blocks, which led to an associated reduction in the calculated allowable load values. Accordingly, it is considered that the “side” test results are somewhat conservative.

HUS-H M8 Screw anchor

This is a relatively new Hilti anchor used in concrete and masonry sub-strates, which is simply screwed into a pilot hole using a battery powered impact wrench. This was notably the quickest method of installation of any anchor in the test programme.

Five tests were carried out through the faces of blocks, into the slots, with an effective embedment of 32mm, which is the shell thickness. A further five tests were carried out through the sides of the blocks, with an embedment depth of 95mm – this length penetrated into the second “web”, as well as the outer shell. As might be expected, slightly higher pull-out results were obtained through the side of the block, compared to the face, due to the greater effective embedment depth.

HRD – H M10 x 100

Again, five tests were carried out through the faces and five through the sides of the blocks. Consistent results were obtained for both sets, with slightly higher values gained from the “side” tests.

Recommended Safe Working Loads

In order to provide guidance for potential installers of anchors within Slot Block walls, the following recommended safe working loads are given for initial consideration. As with all anchor design, each case may need to be assessed uniquely, depending on the variable factors and how critical failure of the anchor would be.

The allowable loads have been calculated using three different estimators by Hilti:

1. $NR_{u,m} (1 - K \cdot v) / 3$ (where γ is the standard deviation) which is the standard way of deriving results from ultimate tests as used in ETAG testing etc. (used where there is a definable set of deviation results)
2. Mean value/5 which comes from BS8539
3. Lowest value/4 which also comes from BS8539

The “allowable” load selected comes from the lowest value of the three methods, if all are used. This value may need to be re-assessed and perhaps amended if the design case is deemed to be critical, or the substrate is likely to be variable due to prevailing site conditions. It is also worth noting that most load cases may well be in shear, although initial selection of anchor loads invariably defaults to pull-out values, which are much easier to determine by site tests.

HY70 + SC + HIT V

| Test no. | Diameter (mm) | SC sleeve Size (mm) | Face (slot)/ Side | Allowable Load (kN) |
|----------|---------------|---------------------|-------------------|---------------------|
| 1 | M10 | 16 x 85 | Face | 4.88 |
| 2 | M10 | 18 x 85 | Face | 4.88 |
| 3 | M12 | 22 x 85 | Face | 4.94 |
| 4 | M10 | 16 x 85 | Side | 3.25 |
| 5 | M10 | 18 x 85 | Side | 2.75 * |
| 6 | M12 | 22 x 85 | Side | 2.60 * |

* Note: result affected by “loose block” sample



HUS-H8

| Test no. | Diameter (mm) | Length (mm) | Face (slot)/ Side | Allowable Load (kN) |
|----------|---------------|-------------|-------------------|---------------------|
| 7 | M8 | 75 | Face | 1.04 |
| 8 | M8 | 120 | Side | 1.40 |



HRD - H

| Test no. | Diameter (mm) | Length (mm) | Face (slot)/ Side | Allowable Load (kN) |
|----------|---------------|-------------|-------------------|---------------------|
| 9 | M8 | 100 | Face | 0.80 |
| 10 | M8 | 100 | Side | 1.06 |




Conclusions

From the testing undertaken and reported herein, it would be reasonable to conclude that all the tested anchors performed satisfactorily and can therefore be considered as suitable for use in the Wi Slot Block.

A range of fixings were tested in order to reflect current site practice. As might have been expected, the resin anchors performed very well, with results generally reaching the limit of the test meter at 25.0kN. This suggests that the ultimate load capacity for this anchor is beyond this test-restricted value. The resin anchors tested in the side of the block gave slightly lower results than those tested in the face. However, the side tests required the use of loose blocks, which tended to split, due to the lack of containment, compared to the built wall.

The results from the HUS and HRD fixings were relatively similar and consistent. In both cases higher capacities were obtained through the side of the block, due to additional anchorage length into the first web of the block.

The allowable capacities given in this report should be used for guidance purposes – they are not to be taken as definitive achievable results, as every anchor installation scenario should be reviewed individually. Design loads relating to installed anchors should be tested to proof loading on site, in accordance with recognised procedures, such as the Construction Fixings Association Guidance Notes, with assistance from the fixings' manufacturer and Wembley Innovation, if necessary.



Eur Ing **Tony Sagoo** BSc (Hons) MBA CEng MICE

Head of Engineering

Disclaimer for Loads, Recommendations and Use of Anchors/Fixings

The results contained in this report are factual results obtained from tests carried out at Wembley Innovation in conjunction with Hilti. They were not carried out under laboratory conditions or to any specific test standard. Therefore, any Safe Working Loads should be regarded as initial guideline values only, to be verified by pre-installation trial tests and/or site proof tests.


It is the responsibility of the specifier, designer and installer to satisfy themselves as to the suitability and performance of any anchor/fixing to reflect field conditions, substrates, application requirements, environmental factors and edge distances.

Design and validation of anchors and fixings should follow the guidelines issued by the Construction Fixings Association (CFA <https://www.the-cfa.co.uk/>).





Additional advice can be sought from Hilti and Wembley Innovation for specific requirements.



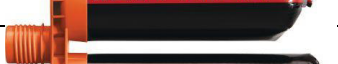



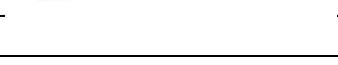
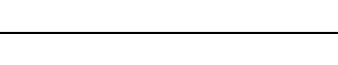
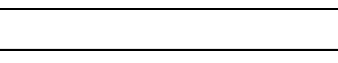








APPENDIX A – TEST RESULTS





Wi Slot Block – Testing of Hilti Fixings & Anchors

| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HIT HY70 | | | | | | | |
| | HIT V 10 Dia x 115 | | | | | | | |
| | HIT SC 16 Dia x 85 | | | | | | | |
| 1 |  | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
| 2 | | 140 | Slot | Face | 85 | | 24.5 | End of test |
| 3 | | 140 | Slot | Face | 85 | | 22.5 | Cone failure |
| 4 | | 140 | Slot | Face | 85 | | 24.5 | Cone failure |
| 5 | | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
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|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HIT HY70 | | | | | | | |
| | HIT V 10 Dia x 115 | | | | | | | |
| | HIT SC 18 Dia x 85 | | | | | | | |
| 1 |  | 140 | Slot | Face | 85 | | >25.0 | End of test meter range |
| 2 | | 140 | Slot | Face | 85 | | >25.0 | End of test meter range |
| 3 |  | 140 | Slot | Face | 85 | | 24.0 | Cone failure |
| 4 | | 140 | Slot | Face | 85 | | 25.0 | End of test meter range |
| 5 |  | 140 | Slot | Face | 85 | | 23.0 | Cone failure |
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| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HIT HY70 | | | | | | | |
| | HIT V 12 Dia x 120 | | | | | | | |
| | HIT SC 22 Dia x 85 | | | | | | | |
| 1 |  | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
| 2 |  | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
| 3 |  | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
| 4 |  | 140 | Slot | Face | 85 | | >25.0 | End of meter range |
| 5 |  | 140 | Slot | Face | 85 | | 23.5 | Slight cone cracking |
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| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|------------------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HIT HY70 | | | | | | | |
| | HIT V 10 Dia x 115 | | | | | | | |
| | HIT SC 18 Dia x 85 | | | | | | | |
| 1 |  | 140 | | Side | 85 | | 13.0 | Cracking to face - Note: Top block |
| 2 | | 140 | | Side | 85 | | 16.0 | Cracking to face |
| 3 |  | 140 | | Side | 85 | | 16.0 | Cracking to face |
| 4 | | 140 | | Side | 85 | | 12.5 | Note: Loose block |
| 5 |  | 140 | | Side | 85 | | 13.0 | Note: Loose block |
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|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|-------------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HIT HY70 | | | | | | | |
| | HIT V 12 Dia x 120 | | | | | | | |
| | HIT SC 22 Dia x 85 | | | | | | | |
| 1 |  | 140 | | Side | 85 | | 18.0 | Split block - Note: Top block |
| 2 | | 140 | | Side | 85 | | 20.5 | Split block |
| 3 | | 140 | | Side | 85 | | 20.0 | Split block |
| 4 | | 140 | | Side | 85 | | 18.0 | Split block |
| 5 | | 140 | | Side | 85 | | 13.0 | Note: Loose Block |
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Wi Slot Block – Testing of Hilti Fixings & Anchors

| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HUS -H 8 x 75 | | | | | | | |
| | | | | | | | | |
| 1 |  | 140 | Slot | Face | 55 | 6.0 | 6.0 | Cone failure |
| 2 | | 140 | Slot | Face | 55 | 5.0 | 5.0 | Pullout |
| 3 | | 140 | Slot | Face | 55 | 5.0 | 5.0 | Pullout |
| 4 | | 140 | Slot | Face | 55 | 5.5 | 5.5 | Pullout |
| 5 | | 140 | Slot | Face | 55 | 4.5 | 4.5 | Cone failure |
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Wi Slot Block – Testing of Hilti Fixings & Anchors

| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HRD-H M10 x 100 | | | | | | | |
| | | | | | | | | |
| 1 |  | 140 | Slot | Face | 80 | 4.0 | 4.0 | Pullout |
| 2 | | 140 | Slot | Face | 80 | 4.0 | 4.0 | Pullout |
| 3 | | 140 | Slot | Face | 80 | 4.0 | 4.0 | Pullout |
| 4 | | 140 | Slot | Face | 80 | 4.0 | 4.0 | Pullout |
| 5 | | 140 | Slot | Face | 80 | 4.0 | 4.0 | Pullout |
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Wi Slot Block – Testing of Hilti Fixings & Anchors

| SLOT BLOCK HILTI FIXINGS TEST RESULTS | | | | | | | | 7th October 2014 |
|---------------------------------------|---|------------|------------|-----------|-------|-----------------|---------------|----------------------------|
| Test No. | Fixing Type | Block size | Solid/Slot | Face/side | Depth | 1st Move't (kN) | Ult Load (kN) | Mode of failure / Comments |
| | HRD-H M10 x 100 | | | | | | | |
| | | | | | | | | |
| 1 |  | 140 | | Side | 80 | 6.0 | 6.0 | Pullout |
| 2 | | 140 | | Side | 80 | 5.0 | 5.0 | Pullout |
| 3 | | 140 | | Side | 80 | 5.0 | 5.0 | Pullout |
| 4 | | 140 | | Side | 80 | 5.5 | 5.0 | Pullout |
| 5 | | 140 | | Side | 80 | 5.5 | 5.5 | Pullout |
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APPENDIX B

HILTI TEST REPORTS & LOAD CAPACITY ASSESSMENTS



Test Report No: IO-07102014-01

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation for Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-01

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Tucker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

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Hilti (Gt. Britain) Limited
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Manchester | M17 1BY
T 0800 886 100 | **F** 0800 886 200
Landline | 0161 886 1000
www.hilti.co.uk

Registered in London 479786

SITE TEST REPORT

Test Report Ref. No: IO-07102014-01

Client/Customer to provide details to allow completion of Section "A" in full

Section "A" (Note 1)

Test requested by

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact
 Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : _____ (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Face of the Block | | |
|-------------------------------------|---|---|---|
| | 1. HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 2. HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 3. HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 |
| Hole dia. (mm) | 16 | 18 | 22 |
| Hole Depth (mm) | 95 | 95 | 95 |
| Applied Torque (Nm) | N/A | N/A | N/A |
| Edge distance (mm) (Note 5) | N/A | N/A | N/A |
| Anchor spacing (mm) (Note 5) | 440 | 440 | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known | Not known | Not Known |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (°C) : 20 Recommended curing time (mins/hrs) : 45 mins
Elapsed time when tested (mins/hrs/days) : 3 days

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 16mm /18mm/22mm
Setting machine used: N/A Setting tool; Dispenser
Cleaning equipment used: Blow out pump , cleaning brush

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.

2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.

4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.

5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.

6. To be calculated in accordance with relevant published Hilti Technical data.

7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk

8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.

9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".

10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.

11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"
Hilti personnel to complete Section "B" in full

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
 Ref. No. Site test report No. IO-07102014-01

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
(Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|--|--------------------|------------------|--------------------------------|--------------------|-----------|----------------------|-------------------------|
| 1 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 2 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 3 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 24.5 | Tensile | Cone Failure | |
| 4 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 22.5 | Tensile | Cone Failure | |
| 5 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 1 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of test meter range |

| | | | | | | | | | |
|---|------------------------------|--|----|----|--------------------------------|-------|---------|----------------------|-------------------------|
| 2 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of test meter range |
| 3 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 24.0 | Tensile | Cone Failure | |
| 4 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 5 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 23.0 | Tensile | Cone Failure | |
| | | | | | | | | | |
| 1 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 2 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 3 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 4 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 5 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 23.5 | Tensile | Cone Failure | |

Additional Notes / Sketch / photographs as appropriate: (Note 8)



Test Report No: IO-07102014-02

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation Ltd for Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-02

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Tucker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

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Landline | 0161 886 1000
www.hilti.co.uk

Registered in London 479786

SITE TEST REPORT

Test Report Ref. No: IO-07102014-02

Client/Customer to provide details to allow completion of Section "A" in full

Section "A" (Note 1)

Test requested by

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact

Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : _____ (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Side of the Block | | |
|-------------------------------------|---|---|---|
| | 1. HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 2. HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 3. HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 |
| Hole dia. (mm) | 16 | 18 | 22 |
| Hole Depth (mm) | 95 | 95 | 95 |
| Applied Torque (Nm) | N/A | N/A | N/A |
| Edge distance (mm) (Note 5) | N/A | N/A | N/A |
| Anchor spacing (mm) (Note 5) | 440 | 440 | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known | Not known | Not Known |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (°C) : 20 Recommended curing time (mins/hrs) : 45 mins
Elapsed time when tested (mins/hrs/days) : 3 days

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 16mm /18mm/22mm
Setting machine used: N/A Setting tool; Dispenser
Cleaning equipment used: Blow out pump , cleaning brush

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.
2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.
4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.
5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.
6. To be calculated in accordance with relevant published Hilti Technical data.
7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk
8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.
9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".
10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.
11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"
Hilti personnel to complete Section "B" in full

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
 Ref. No. Site test report No. IO-07102014-02

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
 (Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|--|--------------------|------------------|--------------------------------|--------------------|-----------|----------------------|-------------------------|
| 1 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 16.0 | Tensile | Splitting | |
| 2 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 19.0 | Tensile | Splitting | |
| 3 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 25.0 | Tensile | No failures observed | End of test meter range |
| 4 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 20.0 | Tensile | Splitting | |
| 5 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 13.0 | Tensile | Splitting | Loose block |
| 1 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 13 | Tensile | Splitting | |

| | | | | | | | | | |
|---|------------------------------|--|----|----|--------------------------------|------|---------|-----------|-------------|
| 2 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 16 | Tensile | Splitting | |
| 3 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 16 | Tensile | Splitting | |
| 4 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 12.6 | Tensile | Splitting | Loose Block |
| 5 | Side of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 13 | Tensile | Splitting | Loose block |
| | | | | | | | | | |
| 1 | Side of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 18.0 | Tensile | Splitting | |
| 2 | Side of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 20.5 | Tensile | Splitting | |
| 3 | Side of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 20.0 | Tensile | Splitting | |
| 4 | Side of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 18.0 | Tensile | Splitting | |
| 5 | Side of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 13.0 | Tensile | Splitting | Loose block |

Additional Notes / Sketch / photographs as appropriate: (Note 8)



Test Report No: IO-07102014-03

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation Ltd for Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-03

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Tucker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

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www.hilti.co.uk

Registered in London 479786

SITE TEST REPORT

Test Report Ref. No: IO-07102014-03

Client/Customer to provide details to allow completion of Section "A" in full

Section "A" (Note 1)

Test requested by

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact

Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : _____ (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Face of the Block | | |
|-------------------------------------|---|--|--|
| | 1. HUS-H 8 x 75 | | |
| Hole dia. (mm) | 8 | | |
| Hole Depth (mm) | 55 | | |
| Applied Torque (Nm) | N/A | | |
| Edge distance (mm) (Note 5) | N/A | | |
| Anchor spacing (mm) (Note 5) | 209 | | |
| Design Load of Fixing (kN) (Note 6) | Not known | | |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (^oC) : N/A Recommended curing time (mins/hrs) : N/A
Elapsed time when tested (mins/hrs/days) : N/A

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 8mm
Setting machine used: N/A Setting tool; Impact Screw Driver SI 100
Cleaning equipment used: Blow out pump

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.
2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.
4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.
5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.
6. To be calculated in accordance with relevant published Hilti Technical data.
7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk
8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.
9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".
10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.
11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"

Hilti personnel to complete Section "B" in full

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
Ref. No. Site test report No. IO-07102014-03

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
(Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|---------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Face of the Block-Into Slots | HUS-H 8 x 75 | 8 | 55 | 6.0 | 6.0 | Tensile | Cone failure | |
| 2 | Face of the Block-Into Slots | HUS-H 8 x 75 | 8 | 55 | 5.0 | 5.0 | Tensile | Pull-out | |
| 3 | Face of the Block-Into Slots | HUS-H 8 x 75 | 8 | 55 | 5.0 | 5.0 | Tensile | Pull-out | |
| 4 | Face of the Block-Into Slots | HUS-H 8 x 75 | 8 | 55 | 5.5 | 5.5 | Tensile | Pull-out | |
| 5 | Face of the Block-Into Slots | HUS-H 8 x 75 | 8 | 55 | 4.5 | 4.5 | Tensile | Cone failure | |

Additional Notes / Sketch / photographs as appropriate: (Note 8)



Test Report No: IO-07102014-04

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation Ltd for Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-04

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Tucker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

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www.hilti.co.uk

Registered in London 479786

SITE TEST REPORT

Test Report Ref. No: IO-07102014-04

Client/Customer to provide details to allow completion of Section "A" in full**Section "A" (Note 1)****Test requested by**

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact

Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Side of the Block | | |
|-------------------------------------|---|--|--|
| | 1. HUS-H 8 x 120 | | |
| Hole dia. (mm) | 8 | | |
| Hole Depth (mm) | 95 | | |
| Applied Torque (Nm) | N/A | | |
| Edge distance (mm) (Note 5) | N/A | | |
| Anchor spacing (mm) (Note 5) | 209 | | |
| Design Load of Fixing (kN) (Note 6) | Not known | | |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (°C) : N/A Recommended curing time (mins/hrs) : N/A
Elapsed time when tested (mins/hrs/days) : N/A

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 8mm
Setting machine used: N/A Setting tool; Impact Screw Driver SI 100
Cleaning equipment used: Blow out pump

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.
2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.
4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.
5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.
6. To be calculated in accordance with relevant published Hilti Technical data.
7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk
8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.
9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".
10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.
11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"**Hilti personnel to complete Section "B" in full**

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
Ref. No. Site test report No. IO-07102014-04

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
(Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|---------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Side of the Block-Into Slots | HUS-H 8 x 75 | 8 | 95 | 13.0 | 13.0 | Tensile | Pull-out | |
| 2 | Side of the Block-Into Slots | HUS-H 8 x 75 | 8 | 95 | 5.5 | 5.6 | Tensile | Pull-out | |
| 3 | Side of the Block-Into Slots | HUS-H 8 x 75 | 8 | 95 | 10.0 | 10.6 | Tensile | Pull-out | |
| 4 | Side of the Block-Into Slots | HUS-H 8 x 75 | 8 | 95 | 6.0 | 8.6 | Tensile | Pull-out | |
| 5 | Side of the Block-Into Slots | HUS-H 8 x 75 | 8 | 95 | 6.0 | 6.0 | Tensile | Pull-out | |

Additional Notes / Sketch / photographs as appropriate: (Note 8)



Test Report No: IO-07102014-05

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation Ltd for Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-05

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Tucker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

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1 Trafford Wharf Road | Trafford Park
Manchester | M17 1BY
T 0800 886 100 | **F** 0800 886 200
Landline | 0161 886 1000
www.hilti.co.uk

Registered in London 479786

SITE TEST REPORT

Test Report Ref. No: IO-07102014-05

Client/Customer to provide details to allow completion of Section "A" in full

Section "A" (Note 1)

Test requested by

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact

Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : _____ (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Face of the Block |
|-------------------------------------|---|
| | 1. HRD-H M10 x 100 |
| Hole dia. (mm) | 10 |
| Hole Depth (mm) | 80 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 209 |
| Design Load of Fixing (kN) (Note 6) | Not known |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (°C) : N/A Recommended curing time (mins/hrs) : N/A
Elapsed time when tested (mins/hrs/days) : N/A

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 10mm
Setting machine used: Screw Driver Setting tool; Hammer
Cleaning equipment used: N/A

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.
2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.
4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.
5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.
6. To be calculated in accordance with relevant published Hilti Technical data.
7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk
8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.
9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".
10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.
11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"**Hilti personnel to complete Section "B" in full**

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
Ref. No. Site test report No. IO-07102014-05

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
(Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|-----------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Face of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 4.0 | 4.0 | Tensile | Pull-out | |
| 2 | Face of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 4.0 | 4.0 | Tensile | Pull-out | |
| 3 | Face of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 4.0 | 4.0 | Tensile | Pull-out | |
| 4 | Face of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 4.0 | 4.0 | Tensile | Pull-out | |
| 5 | Face of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 4.0 | 4.0 | Tensile | Pull-out | |

Additional Notes / Sketch / photographs as appropriate: (Note 8)

Test Report No: IO-07102014-06

15.10.2014
Mr Liam Clear
Wembley Innovation
38A Fourth Way
Wembley
HA9 0LH

Site testing at Wembley Innovation Ltd for 140mm Slotted Blocks

Following our recent site testing at the above project, we have pleasure in enclosing our test report, reference number Site test report No. IO-07102014-06

The report should be read in conjunction with any of the relevant explanatory notes provided at the end of Page 3.

We hope that this information is to your satisfaction, but should you require further technical data on this or any of our other fixing systems, please contact our Technical Advisory Service on 0800 886 100 or by email at Gbtas@Hilti.com.

Tested By
Idrees Omerdeen & Gary Ticker

Approved by

For and on behalf of Hilti (Gt Britain) Ltd.

IMPORTANT NOTICE

It is the users responsibility to use the data given in the light of conditions on site and taking account of the intended use of the products concerned.

Whilst Hilti (GB) Ltd. can give general guidance and advice, the nature of Hilti products means that the ultimate responsibility for selecting the right product for particular applications must lie with the customer.

SITE TEST REPORT

Test Report Ref. No: IO-07102014-06

Client/Customer to provide details to allow completion of Section "A" in full

Section "A" (Note 1)

Test requested by

Company : Wembley Innovation
 Account No: 38A Fourth Way
 Address: Wembley
HA9 0LH

Contact

Name: Liam Clear
 Tel: 0208-459-8880
 Fax: _____
 Email: liam@pyramidbuildersltd.co.uk

Site Address: Wembley Innovation
38A Fourth Way
Wembley
 Site Number: HA9 0LH

Contact: Tony Sagoo
 Tel: 0208-459-8880
 Fax: _____
 Email: tony@wembleyinnovation.co.uk

(To be) Witnessed by:

Company: Wembley Innovation

Contact

Name: Tony Sagoo & Liam Clear

Application details:

Intended use of fixing : Various
 Test Mode (Tensile/Shear) : Tensile
 Type of Test:- (Proof load/Ultimate Load) : Ultimate Load (Note 2).
 Displacement measurements required : _____ (Note 3).
 Test load required (kN) : Ultimate load (Note 4).

| • Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|----------------------------------|----------------|---|----------------|
| Concrete | | | |
| Brickwork | | | |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |
| Steel | | | |
| Other:- | | | |

| • Fixing Details:- | Fixing Type to be Tested on the Side of the Block | | |
|-------------------------------------|---|--|--|
| | 1. HRD-H M10 x 100 | | |
| Hole dia. (mm) | 10 | | |
| Hole Depth (mm) | 80 | | |
| Applied Torque (Nm) | N/A | | |
| Edge distance (mm) (Note 5) | N/A | | |
| Anchor spacing (mm) (Note 5) | 209 | | |
| Design Load of Fixing (kN) (Note 6) | Not known | | |

SITE TEST REQUEST / REPORT - Section "A" Cont'd

Specification to be tested to :- CFA Site test procedure/BS5080/Or other: CFA (Note 7)
Exceptions : N/A (Note 8)
Test Date: 07.10.2014
Installed by: Customer (Note 9) Company: Wembley Innovation

Details for Resin anchors only :

Hole cleaning: Brush and blow in accordance with manufacturer's instructions Yes.
Temperature when set (^oC) : N/A Recommended curing time (mins/hrs) : N/A
Elapsed time when tested (mins/hrs/days) : N/A

Details for DX (Powder Actuated) 7 GX (Gas system) Fixings only :

Tool used : N/A Fixing type : N/A
Power level : N/A Cartridge Colour : N/A
Additional equipment: _____

Installation Equipment:

Drilling machine used : Rotary Hammer Drill bit : 10mm
Setting machine used: Screw driver Setting tool; Hammer
Cleaning equipment used: N/A

Explanatory Notes :

The clients attention is drawn to the fact that whilst the results of the tests are accurate for the individual fixings tested, due to the inevitable variability of site conditions and fixing performance, the results obtained can only provide a guide to the performance in other locations. This report does not, therefore, constitute an endorsement of the suitability of the product tested for the application concerned. It is also important to remember that selecting the right product for your application depends on a whole range of factors including 'on site' conditions that only you know.

Hilti can provide you with general information from the limited data, which we are given, but almost invariably we have to make assumptions. Only you can identify every relevant factor. You are, therefore, solely responsible for checking that the data supplied to us on which this communication is based is correct and that the assumptions we have made to supplement that data are suitable for your purposes. We accept no responsibility whatsoever for our advice where your data is incorrect or where the assumptions made are unsuitable.

1. It is the responsibility of the person/contractor requesting the test to provide safe access to the positions of the anchors to be tested and electrical power if requested.

2. A proof load is suitable for checking the quality of the installation, that a fixing functions correctly and that the base material can withstand the applied loads. It gives no information about the safety factors for the system. The minimum number of fixings for proof load testing is three (3).

Ultimate load tests will enable a 'Recommended Load' to be calculated for the fixing but will cause damage to the

structure. The minimum number of fixings for ultimate load testing is five (5).

3. Displacement measurements increase the information obtained from the test but significantly increase the testing time and costs.

4. For a Proof Load the test load required should be specified by the person responsible for the design following consideration of the applied loads and the fixing capacity.

5. If edge distances and/or anchor spacing are less than the Critical values stated in the Hilti Fastening Technology Manual details should be given here.

6. To be calculated in accordance with relevant published Hilti Technical data.

7. C.F.A. (Construction Fixings Association) Guidance Note on Site Testing is available from The CFA website www.fixingscfa.co.uk

8. When a test specification is nominated, any non-compliance with that specification must be recorded here and a sketch may be included at the end of the results table.

9. Clearly identify both the person who installed the fixings and who carried out the test. If either are unknown then report "as found".

10. The Mark V / HAT 28 test meter has a gauge number whereas the DPG and the Hydraulic equipment have serial numbers.

11. The location reported here should give adequate detail to enable the precise structural component tested to be identified. This should also identify the position of the fixing within the structural member and references to grid lines.

SITE TEST REQUEST REPORT - Section "B"**Hilti personnel to complete Section "B" in full**

Note: This page must be read in conjunction with details and 'Explanatory Notes' on page 2 of this test report
Ref. No. Site test report No. IO-07102014-06

Test equipment used: MkV, DPG or Hydraulic :- Model 2000 Hydrajaws – Equivalent to Hilti MkV
(Note 10) Serial No.(DPG, Hydraulic) :- N/A
 Gauge No. (Mk V) :- N/A
 Max. load capacity (kN) :- 25 kN Smallest scale division (kN):- 0.2
 Next calibration due date :- 24/06/15 Calibrated by :- HYDRAJAWS

Torque wrench: Serial No. :- N/A
 Range (Nm) :- N/A
 Next calibration due date :- N/A Calibrated by :- N/A

Test carried out by :- Idrees Omerdeen Test date:- 07.10.14 Territory:-
Gary Tucker
 (Note 9)

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|------------------------------|-----------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Side of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 6.0 | 6.0 | Tensile | Pull-out | |
| 2 | Side of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.0 | 5.0 | Tensile | Pull-out | |
| 3 | Side of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.0 | 5.0 | Tensile | Pull-out | |
| 4 | Side of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.5 | 5.0 | Tensile | Pull-out | |
| 5 | Side of the Block-Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.5 | 5.5 | Tensile | Pull-out | |

Additional Notes / Sketch / photographs as appropriate: (Note 8)

IO-07102014-01

| | |
|-------------------------------------|---|
| • Fixing Details:- | Fixing Type to be Tested on the Face of the Block |
| | 1. HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 |
| Hole dia. (mm) | 16 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|-----------------------|------------------|--------------------------------|-----------------------|-----------|----------------------|--------------------|
| 1 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 2 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 3 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 24.5 | Tensile | Cone Failure | |
| 4 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 22.5 | Tensile | Cone Failure | |
| 5 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

Mean >24.4
 Std deviation n.a
 k= 3.40
 Working load from characteristic n.a.
 Mean/5 >4.88
 Lowest/4 5.63

| | |
|---|---|
| • Fixing Details:- | 2. HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 |
| Hole dia. (mm) | 18 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|-----------------------|---------------------|--------------------------------|--------------------------|-----------|----------------------|-------------------------|
| 1 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of test meter range |
| 2 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of test meter range |
| 3 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 24 | Tensile | Cone Failure | |
| 4 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 5 | Face of the block-into slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 23 | Tensile | Cone Failure | |

Allowable load from BS 8539 Annex B.2.3.2
Allowable load from BS 8539 Annex B.2.3.2

Mean >24.4
Std deviation n.a
k= 3.40
Working load from n.a.
characteristic
Mean/5 >4.88
Lowest/4 5.75

| | |
|---|---|
| • Fixing Details:- | 3. HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 |
| Hole dia. (mm) | 22 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 440 |
| Design Load of Fixing (kN) (Note 6) | Not Known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|-----------------------|---------------------|--------------------------------|-----------------------|-----------|----------------------|--------------------|
| 1 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | | End of meter range |
| 2 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 3 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 4 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | >25.0 | Tensile | No Failures observed | End of meter range |
| 5 | Face of the block-into slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 23.5 | Tensile | Cone Failure | |

Allowable load from BS 8539 Annex B.2.3.2
Allowable load from BS 8539 Annex B.2.3.2

Mean >24.7
Std deviation n.a
k= 3.40
Working load from characteristic n.a.
Mean/5 >4.94
Lowest/4 5.88

IO-07102014-02

| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|-------------------------|----------------|---|----------------|
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| | |
|-------------------------------------|--|
| • Fixing Details:- | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 |
| Hole dia. (mm) | 16 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|--------------------|------------------|--------------------------------|--------------------|-----------|----------------------|-------------------------|
| 1 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 16 | tensile | Splitting | |
| 2 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 19 | tensile | Splitting | |
| 3 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 25 | tensile | No failures observed | End of test meter range |
| 4 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 20 | tensile | Splitting | |
| 5 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 16 x 85 | 16 | 95 | No Movement under applied Load | 13 | tensile | Splitting | Loose block |

| | | | |
|---|----------------------------------|--------|---------------------------|
| | Mean | >18.60 | |
| | Std deviation | N.A | |
| | k= | 3.40 | |
| | Working load from characteristic | N.A | |
| Allowable load from BS 8539 Annex B.2.3.2 | Mean/5 | >3.72 | |
| Allowable load from BS 8539 Annex B.2.3.2 | Lowest/4 | 3.25 | Influenced by loose brick |

| | | | |
|--------------------------------|----------------|---|----------------|
| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| | |
|-------------------------------------|--|
| Fixing Details:- | . HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 |
| Hole dia. (mm) | 18 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 440 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|-----------------------|---------------------|--------------------------------|-----------------------|-----------|-----------------|-------------|
| 1 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 13 | tensile | Splitting | |
| 2 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 16 | tensile | Splitting | |
| 3 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 16 | tensile | Splitting | |
| 4 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 12.6 | tensile | Splitting | Loose Block |
| 5 | Side of the Block- Into Slots | HY70 with M10 x 115 HIT-V and HIT-SC 18 x 85 | 18 | 95 | No Movement under applied Load | 13 | tensile | Splitting | Loose Block |

Mean 14.12
 Std deviation 1.72
 k= 3.40
 Working load from characteristic 2.75
 Mean/5 2.82
 Lowest/4 3.15

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

| | | | |
|--------------------------------|----------------|---|----------------|
| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| | | | |
|-------------------------------------|--|--|--|
| Fixing Details:- | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | | |
| Hole dia. (mm) | 22 | | |
| Hole Depth (mm) | 95 | | |
| Applied Torque (Nm) | N/A | | |
| Edge distance (mm) (Note 5) | N/A | | |
| Anchor spacing (mm) (Note 5) | 440 | | |
| Design Load of Fixing (kN) (Note 6) | Not Known | | |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|--|-----------------------|---------------------|--------------------------------|-----------------------|-----------|-----------------|-------------|
| 1 | Side of the Block- Into Slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 18 | tensile | Splitting | |
| 2 | Side of the Block- Into Slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 20.5 | tensile | Splitting | |
| 3 | Side of the Block- Into Slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 20 | tensile | Splitting | |
| 4 | Side of the Block- Into Slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 18 | tensile | Splitting | |
| 5 | Side of the Block- Into Slots | HY70 with M12 x 120 HIT-V and HIT-SC 22 x 85 | 22 | 95 | No Movement under applied Load | 13 | tensile | Splitting | Loose Block |

Mean 17.90
 Std deviation 2.97
 k= 3.40
 Working load from characteristic 2.60
 Mean/5 3.58
 Lowest/4 3.25

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

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| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|-------------------------|----------------|---|----------------|
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| • Fixing Details:- | 1. HUS-H 8 x 75 |
|-------------------------------------|-----------------|
| Hole dia. (mm) | 8 |
| Hole Depth (mm) | 55 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 209 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|---------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Face of the Block- Into Slots | HUS-H 8 x 75 | 8 | 55 | 6 | 6 | tensile | Cone failure | |
| 2 | Face of the Block- Into Slots | HUS-H 8 x 75 | 8 | 55 | 5 | 5 | tensile | Pull-out | |
| 3 | Face of the Block- Into Slots | HUS-H 8 x 75 | 8 | 55 | 5 | 5 | tensile | Pull-out | |
| 4 | Face of the Block- Into Slots | HUS-H 8 x 75 | 8 | 55 | 5.5 | 5.5 | tensile | Pull-out | |
| 5 | Face of the Block- Into Slots | HUS-H 8 x 75 | 8 | 55 | 4.5 | 4.5 | tensile | Cone failure | |

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

Mean 5.20
 Std deviation 0.57
 k= 3.40
 Working load from characteristic 1.09
 Mean/5 1.04
 Lowest/4 1.13

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| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|-------------------------|----------------|---|----------------|
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| • Fixing Details:- | 1. HUS-H 8 x 120 |
|-------------------------------------|------------------|
| Hole dia. (mm) | 8 |
| Hole Depth (mm) | 95 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 209 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|---------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Side of the Block- Into Slots | HUS-H 8 x 75 | 8 | 95 | 13 | 13 | tensile | Pull-out | |
| 2 | Side of the Block- Into Slots | HUS-H 8 x 75 | 8 | 95 | 5.5 | 5.6 | tensile | Pull-out | |
| 3 | Side of the Block- Into Slots | HUS-H 8 x 75 | 8 | 95 | 10 | 10.6 | tensile | Pull-out | |
| 4 | Side of the Block- Into Slots | HUS-H 8 x 75 | 8 | 95 | 6 | 8.6 | tensile | Pull-out | |
| 5 | Side of the Block- Into Slots | HUS-H 8 x 75 | 8 | 95 | 6 | 6 | tensile | Pull-out | |

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

| | | |
|-----------------------|-------|--|
| Mean | 8.76 | |
| Std deviation | 3.12 | |
| k= | 3.40 | |
| Working load from | -0.62 | |
| characteristic Mean/5 | 1.75 | Results influenced by high values influencing the standard deviation |
| Lowest/4 | 1.40 | |

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| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|-------------------------|----------------|---|----------------|
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| • Fixing Details:- | 1. HRD-H M10 x 100 |
|-------------------------------------|--------------------|
| Hole dia. (mm) | 10 |
| Hole Depth (mm) | 80 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 209 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|-----------------|--------------------|------------------|--------------------------|--------------------|-----------|-----------------|----------|
| 1 | Face of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 4 | 4 | tensile | Pull-out | |
| 2 | Face of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 4 | 4 | tensile | Pull-out | |
| 3 | Face of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 4 | 4 | tensile | Pull-out | |
| 4 | Face of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 4 | 4 | tensile | Pull-out | |
| 5 | Face of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 4 | 4 | tensile | Pull-out | |

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2

Mean 4.00
 Std deviation 0.00
 k= 3.40
 Working load from characteristic 1.33
 Mean/5 0.80
 Lowest/4 1.00

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| Base material Details : | Thickness (mm) | Nominal Strength / Grade (N/mm ²) | Solid / Hollow |
|-------------------------|----------------|---|----------------|
| Blockwork | 140mm | 7.3 N/mm ² | Slotted |

| • Fixing Details:- | 1. HRD-H M10 x 100 |
|-------------------------------------|--------------------|
| Hole dia. (mm) | 10 |
| Hole Depth (mm) | 80 |
| Applied Torque (Nm) | N/A |
| Edge distance (mm) (Note 5) | N/A |
| Anchor spacing (mm) (Note 5) | 209 |
| Design Load of Fixing (kN) (Note 6) | Not known |

| Test no. | Location of test (Note 11) | Fixing tested | Drill bit dia (mm) | Embed depth (mm) | 1 st Movement | Ultimate Load (kN) | Test Mode | Mode of Failure | Comments |
|----------|-------------------------------|-----------------|-----------------------|---------------------|--------------------------|-----------------------|-----------|-----------------|----------|
| 1 | Side of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 6 | 6 | tensile | Pull-out | |
| 2 | Side of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 5 | 5 | tensile | Pull-out | |
| 3 | Side of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 5 | 5 | tensile | Pull-out | |
| 4 | Side of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.5 | 5 | tensile | Pull-out | |
| 5 | Side of the Block- Into Slots | HRD-H M10 x 100 | 10 | 80 | 5.5 | 5.5 | tensile | Pull-out | |

Mean 5.30
 Std deviation 0.45
 k= 3.40
 Working load from characteristic 1.26
 Mean/5 1.06
 Lowest/4 1.25

Allowable load from BS 8539 Annex B.2.3.2
 Allowable load from BS 8539 Annex B.2.3.2