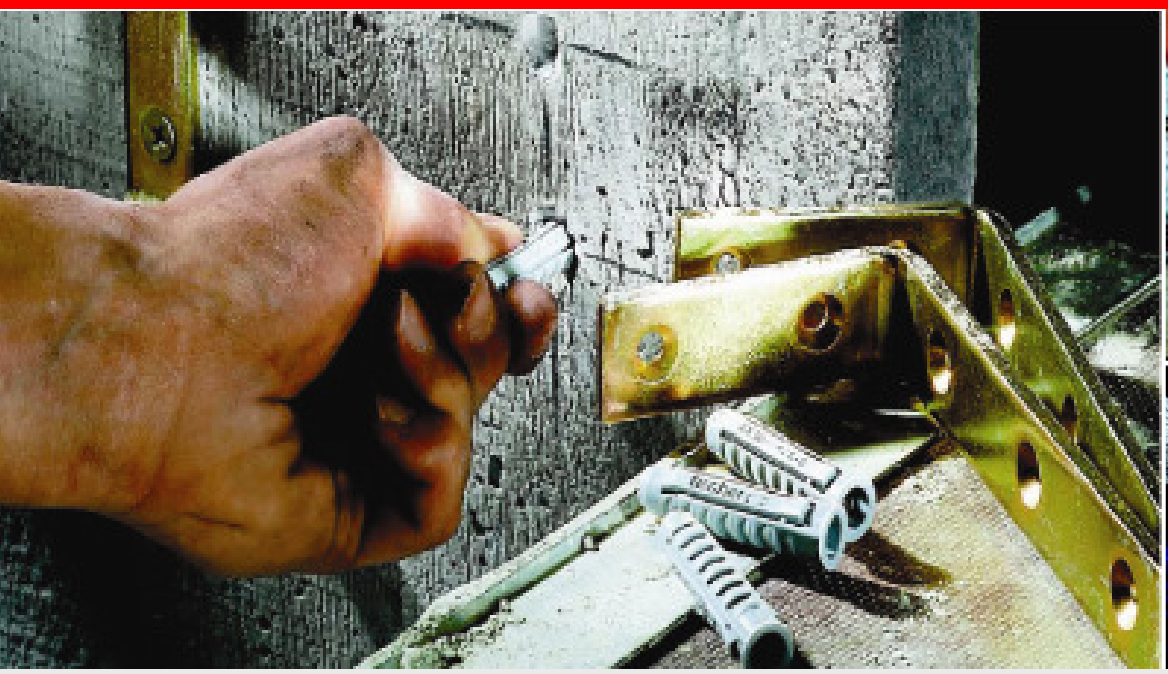
# fischer Test Report



## Fixing Tests for

Forticrete
For the Built Environment™

fischer
FIXING SYSTEMS

FORTICRETE®

FORTICRETE
INNOVATORS IN CONCRETE

Mr. David Hanrahan
Artur Fischer UK LTD
Hithercroft Road
Wallingford
Oxon
OX10 9AT

**Wednesday, April 10, 2002**

Dear Dave,

**Re: Hi-Light Concrete Block Test Report**

Thank you for the draft copy of the test report you have prepared for us. As mentioned previously we are currently updating our Design Guide and will now be able to show your company details along with the appropriate product references in our new guide.

We will show a summary of the results from the tests although the format has not yet been decided. However, we will be referring to each fixing, the ultimate pull out load and the safe working load.

We would like to take this opportunity thank you for carrying out this work for us.

Please do not hesitate to contact me at the Technical Office on Freephone 0800-262 136 if you have any further queries. Alternatively you can email me at kmoore@forticrete.com

Yours Sincerely,

Keiron Moore
**Technical Advisor – Forticrete LTD.**



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# Testing into Forticrete Hi-Light Block

## 1.1 Test Parameters

Various fixings were testing into the new Forticrete Hi-Light block. The fixings were installed and tested in individual blocks not walls. The block is manufactured using dense aggregate. The face size is 440mm x 215mm with a thickness of 140mm. The block is available in two grades of compressive strength, 7N/mm $^2$ and 10N/mm $^2$ and the 7 N/mm $^2$ Forticrete Hi-Light block was used during these tests.

The tests were carried out at:

Artur Fischer UK Ltd
Hithercroft Road
Wallingford
Oxfordshire
OX10 9AT

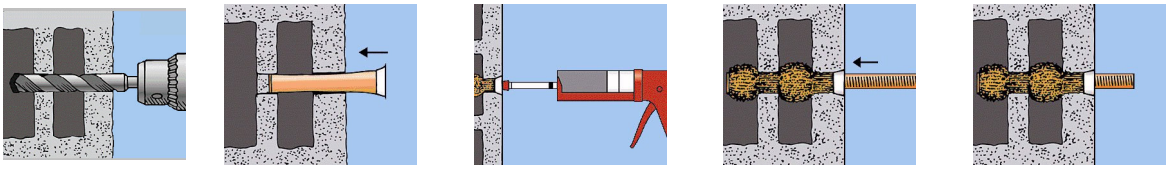
All tests were carried out using a calibrated 20kN Hydrajaws tensile tester. To conform to CFA (Construction Fixing Association) guidelines each type of fixing was tested six times.

## 2. Fixing Products tested.

2.1 fischer FIS V 360 S & FIS H-N net with steel Threaded rod

| | |
|---|---|
| Material: | Resin: Vinyl ester hybrid resin |
| Rod: | M10 Zinc plated grade 5.8 |
| Sleeve: | Plastic frame with flexible nylon netting |
| Range: | M8-M12 |

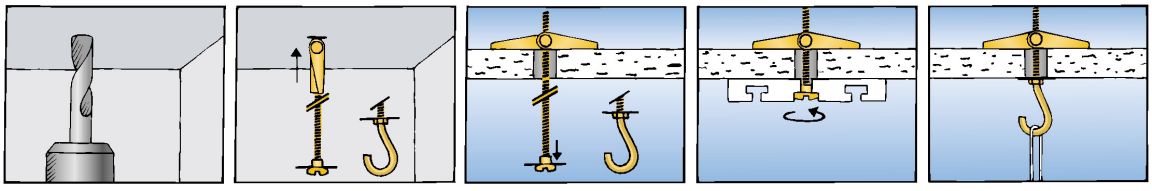

The fischer FIS V injection anchor contains a styrene-free, quick setting, high quality hybrid resin mortar, which is characterized by its universal suitability for many applications. This resin can be used on its own or in conjunction with an anchor sleeve dependent on application and substrate. When fully cured this resin produces a form type locking in hollow material and chemical bond in solid material, allowing the installation to be stress free.



2.2 fischer KD Gravity Toggle

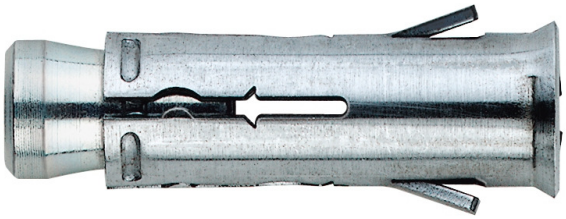
Material: Metal, zinc plated
Range: M5 – M8

The fischer KD Toggle is a versatile cavity fixing, that can be used in almost every kind of hollow substrate. It ranges from M5 to M8 and comes in varying lengths. The installation procedure is simple and produces very high loads. Smaller versions of the KD toggle come with spring loaded toggles and a selection of threaded attachments including hooks and eyelets.

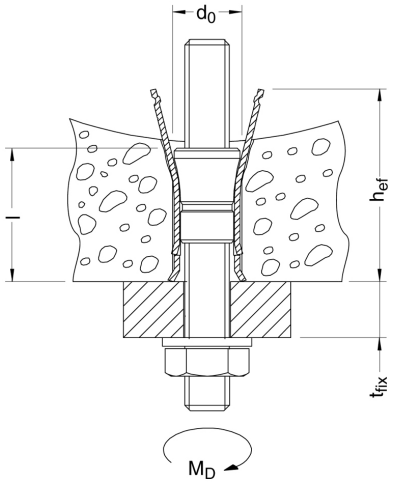


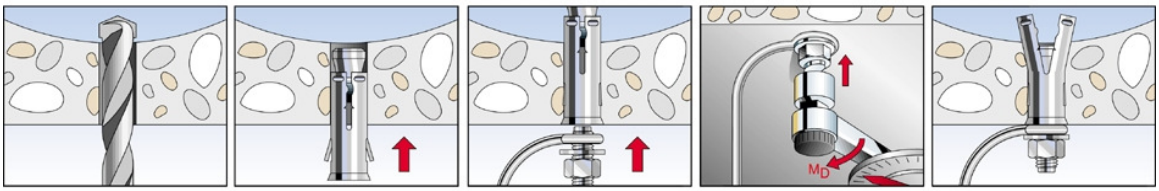
2.3 fischer FHY Expansion Anchor

Material: Metal, zinc plated or stainless steel
Range: M6 – M10



The fischer FHY expansion anchor is a revolutionary innovation from the fischer range. Designed specifically for hollow-ceiling slabs, it's cone section has a continuous internal thread, which allows the use of both bolts and threaded rods. The high expansion capacity of the anchor makes it suitable for both solid and hollow ceiling slabs, however the minimum web thickness should be greater than 25mm. The shield of the anchor is 40mm long with sections cut from the shield 21mm from the anchor collar allowing maximum expansion; it is at this point that the anchor is in contact with the concrete. The shield is divided into four segments so that the load is evenly distributed onto the walls of the hollow section. It is with these characteristics that the anchor expands creating friction or form locking depending on the substrate.

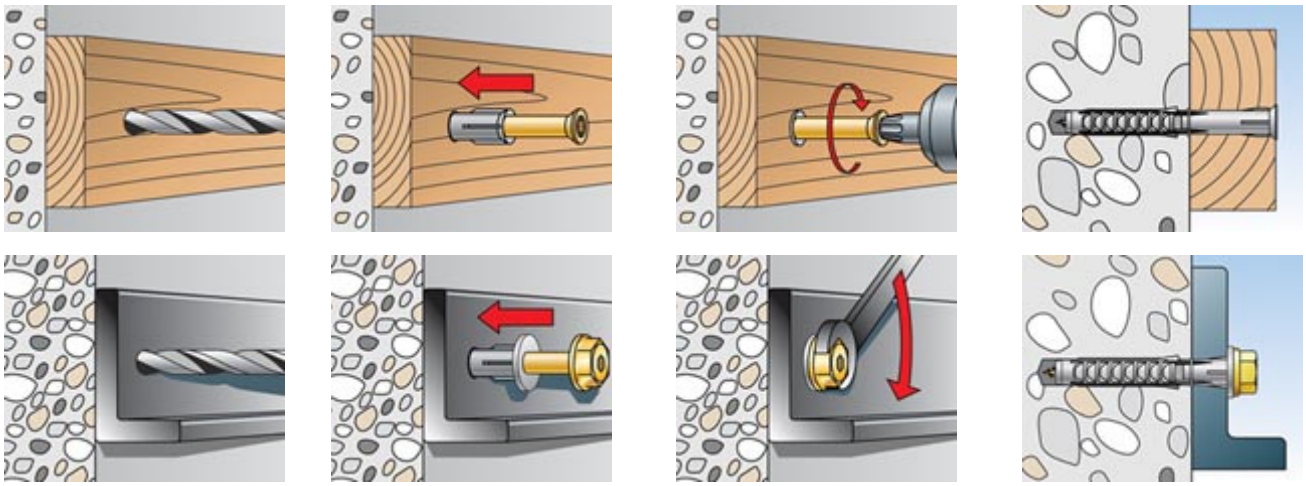


2.4 fischer SXS Frame Fixing

Material: Nylon
Range: 10mm

The SXS has a four section nylon plug expansion which form locks with the substrate. This action guarantees maximum load bearing characteristics. The area of application ranges from solid materials through to hollow or perforated materials. In addition the patented CO-NA screw provides unparalleled performance in cracked concrete due to its revolutionary design. It also provides higher bending moment resistance. This fixing also comes in a variety of different head types to suit a multitude of applications.



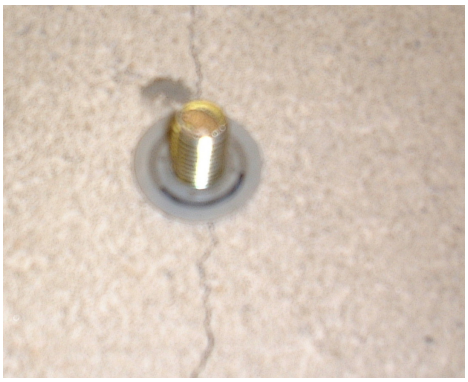
**3 Test Results**

## 3.1 fischer FIV 360 S Injection Resin

**Size Tested: M10**

| Test No | Free Edge | Axial Space | Load Achieved kN | Remarks |
|---|---|---|---|---|
| 1 | 150 | 110 | 10KN | Cone failure, Block cracked |
| 2 | 150 | 110 | 11.2kN | Cone failure, Block cracked |
| 3 | 150 | 110 | 9.5KN | Cone failure, Block cracked |
| 4 | 150 | 110 | 9.5KN | Cone failure, Block cracked |
| 5 | 150 | 110 | 12KN | Cone failure, Block cracked |
| 6 | 150 | 110 | 11KN | Cone failure, Block cracked |

Average ultimate load **=10.53kN**
Using a global safety factor of 4, safe working load in tension **=2.63kN**

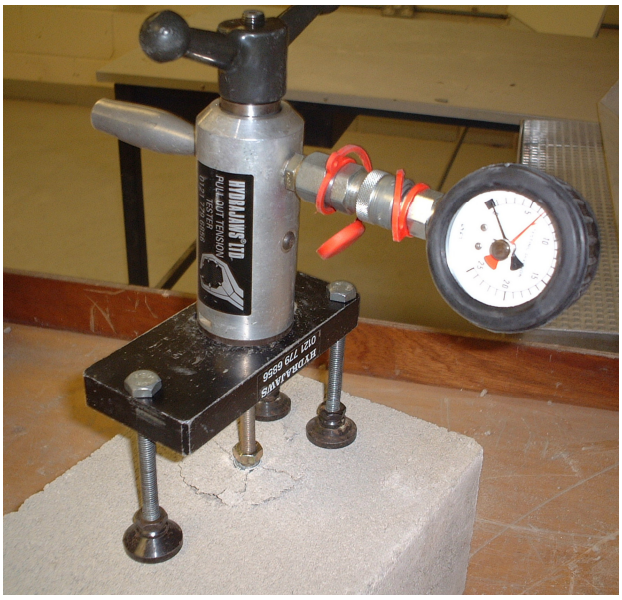


## 3.2 fischer KD 8 Gravity Toggle

**Size Tested: 8mm**

| Test No | Free Edge | Axial Space | Load Achieved kN | Remarks |
|---|---|---|---|---|
| 1 | 100 | 110 | 9.5kN | Cone failure, Block cracked |
| 2 | 210 | 110 | 10kN | Cone failure, Block cracked |
| 3 | 320 | 110 | 8kN | Cone failure, Block cracked |
| 4 | 320 | 110 | 8kN | Cone failure, Block cracked |
| 5 | 210 | 110 | 8kN | Cone failure, Block cracked |
| 6 | 100 | 110 | 9kN | Cone failure, Block cracked |

Average ultimate load **=8.75kN**
Using a global safety factor of 4, safe working load in tension **=2.1kN**



## 3.3 fischer FHY Hollow Ceiling Anchor

**Size Tested: M10**

| Test No | Free Edge | Axial Space | Load Achieved kN | Remarks |
|---|---|---|---|---|
| 1 | 100 | 110 | 8.2kN | Cone failure, Block cracked |
| 2 | 210 | 110 | 8kN | Cone failure, Block cracked |
| 3 | 320 | 110 | 7kN | Cone failure, Block cracked |
| 4 | 320 | 110 | 6kN | Cone failure, Block cracked |
| 5 | 210 | 110 | 7kN | Cone failure, Block cracked |
| 6 | 100 | 110 | 7.2kN | Cone failure, Block cracked |

Average ultimate load **=7.2kN**
Using a global safety factor of 4, safe working load in tension **=1.8kN**

## 3.4 fischer SXS Frame Fixing

**Size Tested: SXS 10X60 FUS**

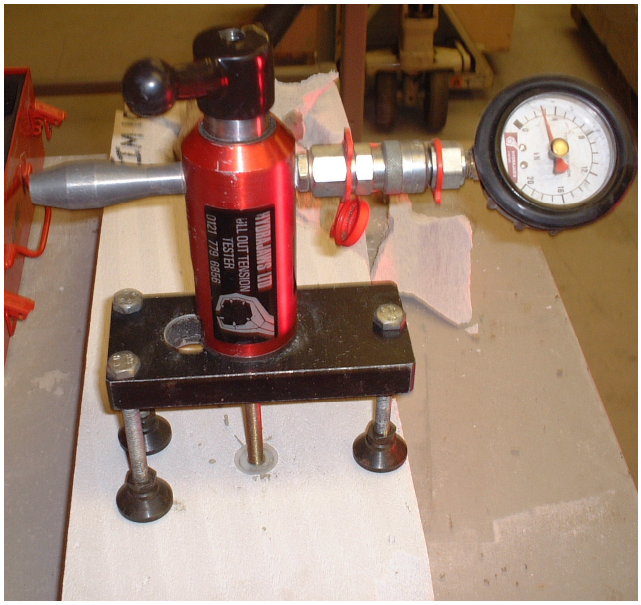
| Test No | Free Edge | Axial Space | Load Achieved kN | Remarks |
|---|---|---|---|---|
| 1 | 100 | 110 | 2kN | Tensile Slip |
| 2 | 210 | 110 | 2kN | Tensile Slip |
| 3 | 320 | 110 | 1.75kN | Tensile Slip |
| 4 | 320 | 110 | 2kN | Tensile Slip |
| 5 | 210 | 110 | 3kN | Tensile Slip |
| 6 | 100 | 110 | 1.5kN | Tensile Slip |

Average ultimate load **=2.04kN**
Using a global safety factor of 7, safe working load in tension **=0.29kN**

# 4. Results summary

The table below shows the safe working loads of all the anchors tested into **Hi-Light** a product of Forticrete Building Products.

| Product tested | Average ultimate load | Safe working load | Characteristics Axial spacing |
|---|---|---|---|
| **FIS V360 S** | **10.53** | **2.6** | **110** |
| **KD8** | **8.75** | **2.1** | **110** |
| **FHY** | **7.2** | **1.8** | **110** |
| **SXS** | **2.04** | **0.3** | **110** |



# 5 Conclusion

The variety of fixings tested means that this report provides a comprehensive guide to end-users, specifies and distributors when choosing a fixing. Choice of fixing varies due to the load required, method of installation etc. The test results for all the fixings tested show a good variation in ultimate loads.

The ultimate load failure or excessive displacement determines the failure of the fixing,

Axial spacing varies from anchor to anchor due to their expansion or form locking characteristics. Axial spacing is given in the results and should be used as a guide only. It is our opinion that for expansion anchors a characteristic axial spacing should be three times embedment depth or web thickness. This is to prevent stress interference from adjacent anchors under load.

For any further information regarding the test report please contact the fischer technical department. Tel; 01491 827 920