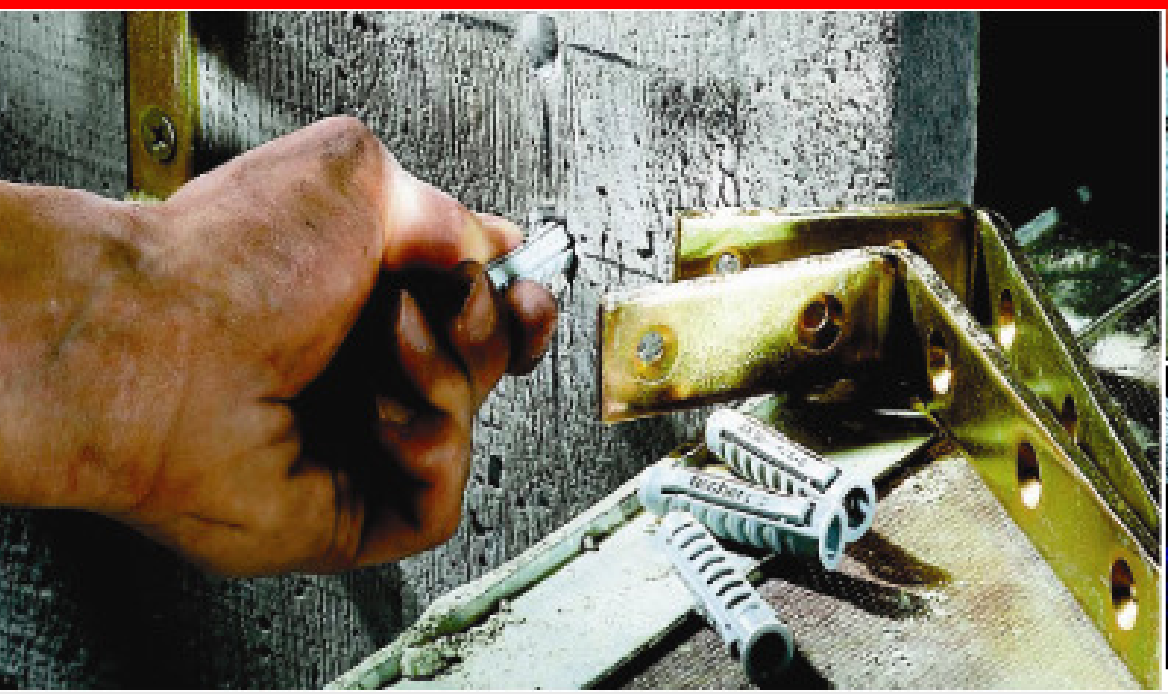
fischer Test Report



Acheson Glover (formally Finlay) Hollow Core Floors

Acheson GLOVER
THE ACHESON & GLOVER GROUP

fischer
FIXING SYSTEMS

FINLAY
CONCRETE PRODUCTS

Date : 28th October 2002

Ref : TJB/Test1/5478

Direct Fax : 01749 675185
Email : tim.butler@finlayconcrete.com

Arther Fisher (UK) Limited
Hithercroft Road
Wallington
Oxfordshire
OX10 9AT

F A O Dave Hanrahan

Re: Test Report of 16th September 2002 - Precast Hollowcore.

We confirm that the tests as detailed in your document titled 'Fixing test report for Finlay Concrete', were carried out in our yard at Wells in Somerset.

The tests were carried out on the soffit of a standard 150mm deep x 1200mm wide slab, and the results as detailed are a true record of those tests preformed by your operatives.

We are satisfied that the results obtained are suitable for use with our range of Prestressed Hollowcore slabs, including 200mm; 250mm; 320mm deep units, and our range of 155mm and 205mm deep sound slabs products.

Therefore, we can recommend that the fixings described in your report are suitable for use with our products mentioned above, up to the safe working loads stated.

Location of fixings within our units is dependent upon the type selected; our technical department can provide profile details for each slab type to assist in the correct installation on site.

Should you require any further information please do not hesitate to contact the writer.

Yours faithfully
For and on behalf of

T J Butler
Sales Manager

QSRMC

Finlay Concrete Products
Tor Hill
Wells
Somerset
BA5 3NT

T: 01749 675757 F: 01749 677750
info@finlayconcrete.com
www.finlayconcrete.com

Readymix A member of the Readymix Group

John Finlay (Concrete Pipes) Ltd Reg. No. N.I. 6391
Registered Address: RMC House, Upper Dunmurry Lane, Belfast, BT17 0AJ
VAT Registration No. GB 222 8284 72

Testing On Finlay Hollow Core Units

1. Contents

2. Test Parameters

3. Fixing Products Tested

3.1 fischer Plug SX
3.2 fischer Nylon M Unit
3.3 fischer KD8 Gravity Toggle
3.4 FIS V 360S and FIS H N net with Steel Threaded Rod
3.5 fischer FFS Self Tapping Screw
3.6 fischer FHY Expansion Anchor

4. Test Results

4.1fischer Plug SX
4.2 fischer Nylon M Unit
4.3 fischer KD8 Gravity Toggle
4.4 FIS V 360S and FIS H N net with Steel Threaded Rod
4.5 fischer FFS Self Tapping Screw
4.6 fischer FHY Expansion Anchor

5. Results Summary

2 Test Parameters

fischer Fixings have been working alongside Finlay Concrete Products to discover what type of fixing and what kind of load would be suitable for Finlay Hollow Core Units. The units are manufactured in six basic depths, from 150 to 500mm. Each Hollow Core Unit is cast on steel moulds producing a “fair faced soffit”.

The design of the units is in accordance with BS8110 and the 28 day cube strength of the concrete is in excess of 50m/mm^2.

fischer introduced six fixings ranging from lightweight to heavy-duty fixings, the fixing range from the simplest lightweight SX nylon plug to a more complex heavy-duty resin anchor. All the fixings were tested in the centre of the preformed circular voids, where the web thickness was at its minimum being just 30mm.

The test results for all the fixings tested show a good variation in ultimate loads. This allows the engineer/architect/end user to have a broad range of anchor to choose from depending on both function and load performance.

The tests were carried out at:

Finlay Concrete Products
Tor Hill
Wells
Somerset
BA5 3NT

All tests were carried out using a Hydrajaws calibrated tensile tester with 0-5KN and 0-20KN gauge, in conjunction with a 150mm load spreading bridge and M8 and M12 open ended test adapters.
To conform to CFA (Construction Fixing Association) guidelines each fixing was tested six times.

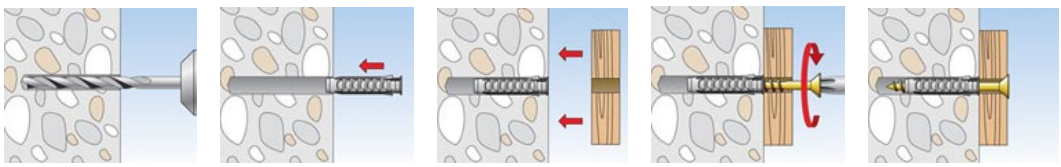
3. Fixing Products Tested

3.1 fischer Plug SX

Material: Nylon (polyamide 6) Metal screw grade 5.8

Range: SX4 to SX16

The fischer SX plug has four fold 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 perforated materials.

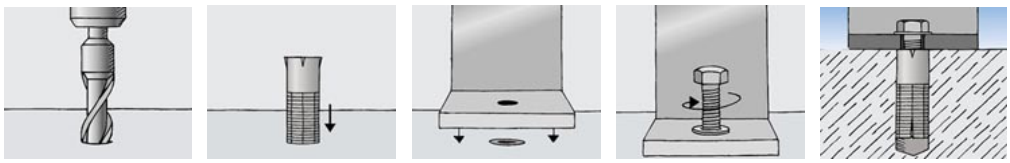


3.2 fischer Nylon M Unit

Material: Glass reinforced nylon (polyamide 6) with brass cone

Range: M5 – M16

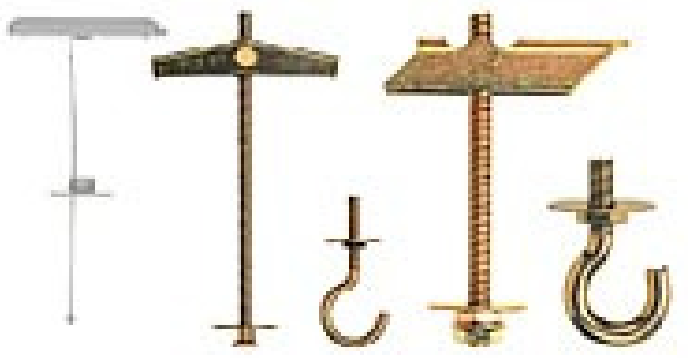
The fischer M Unit is a glass reinforced nylon expansion anchor with an integral internally threaded brass cone. The M Unit expands like a conventional ‘wall bolt’, but due to the walls of the M Unit being reinforced nylon the expansion forces are less aggressive preventing the substrate from crushing during installation. The glass reinforced nylon also reduces noise caused by vibration of pipes for Mechanical & Electrical applications.



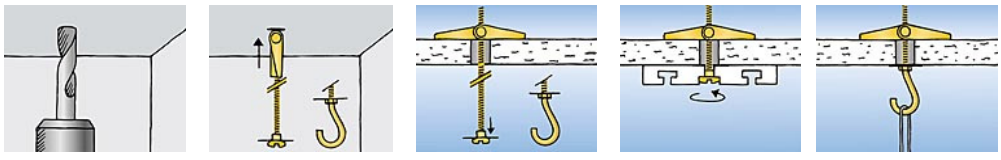
3.3 fischer KD 8 Gravity Toggle

Material: Steel, zinc plated and passivated

Range: M3-M8



The fischer KD Toggle is a versatile cavity fixing. This fixing can be used in most kinds of substrates providing it has a cavity. Available from M3 to M8 in various lengths. It is made from mild steel and is zinc plated and passivated. The installation procedure is simple and produces very high loads. Smaller versions of the KD toggle come with a spring loaded toggle, fixing and a selection of threaded attachments from hooks to eyelets.

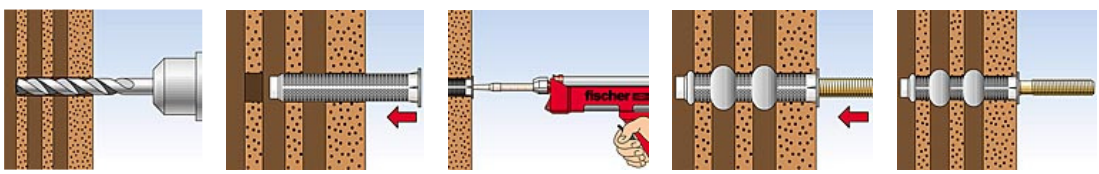


3.4 FIS V 360 S and FIS H N net with steel Threaded rod

Material: Resin: Vinyl Ester
Stud: M10 Zinc plated grade 5.8
Sleeve: FISH N - plastic frame with flexible nylon netting

Range: M8 – M30

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 solo 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 friction type locking in solid material, allowing the application to be a stress free fixing.



3.5 fischer FFS Self Tapping Screw

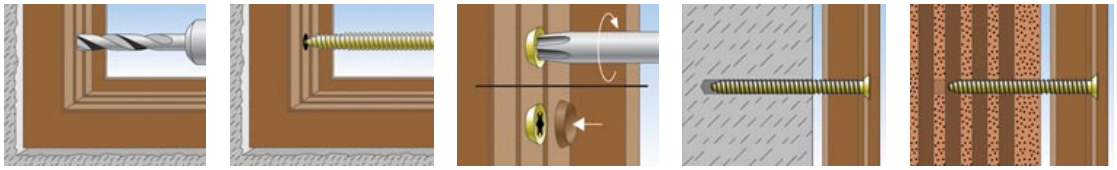
Material: Steel, zinc plated and passivated.

Range: 7.5 mm Diameter (various lengths available)

The fischer FFS allows a stress free 'through fixing' into most substrates. A pre-drilled 6mm hole is required into the concrete; the FFS is then driven into the concrete with ease using the T30 drive. This is due to the tapered lead-in thread which has a smooth hardened screw surface and narrow thread pitch. The minimum embedment into concrete is 20mm, which is perfect when fixing into pre-cast Hollow Core Units as the web thickness is 30mm.

The FFS has many advantages over other fixings:

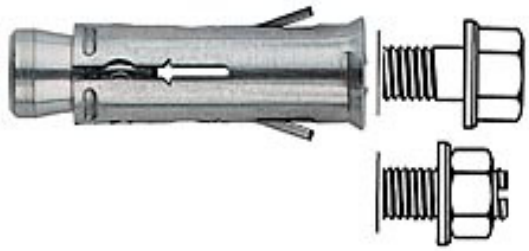
Drill hole diameter is only 6mm
Installation using a machine with torx 30 bit is very quick
Can be loaded immediately
Through fixing, easy for numerous fixing points i.e. battens or insulation
Cover caps available for aesthetic finish



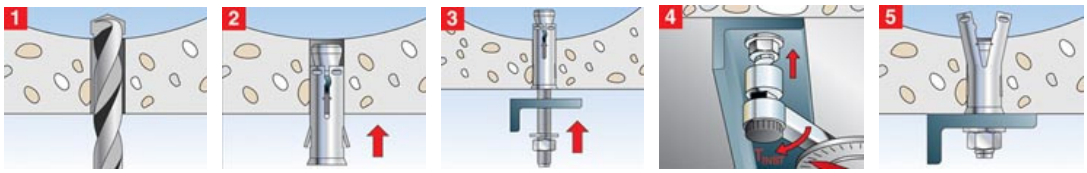
3.6 fischer FHY Expansion Anchor

Material: Steel, Zinc plated or stainless steel

Range: M6 – M10



The fischer FHY is designed specifically for hollow-ceiling slabs. The taper section has a continuous internal thread which permits use with both bolts and threaded rod. The high expansion capacity of the anchor makes it suitable for both solid and hollow-ceiling slabs with a thickness 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 where 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 and form locking.



4. Test Results

4.1 SX10 with 7mm safety screw

Material: Glass reinforced nylon (polyamide 6)
Metal screw grade 5.8

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30mm	150mm	3.50KN	Tensile Slip
2	30mm	150mm	2.50KN	Tensile Slip
3	30mm	150mm	2.75KN	Tensile Slip
4	30mm	150mm	2.50KN	Tensile Slip
5	30mm	150mm	2.75KN	Tensile Slip
6	30mm	150mm	4.0KN	Tensile Slip

Average ultimate load =3KN
Using a global safety factor of 7, safe working load in tension =0.43KN

4.2 Nylon M Unit M10

Material: Glass reinforced nylon (polyamide 6)
With brass cone

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30mm	150mm	11.0KN	Tensile Slip
2	30mm	150mm	10.0KN	Concrete Failure
3	30mm	150mm	11.25KN	Tensile Slip
4	30mm	150mm	13.0KN	Tensile Slip
5	30mm	150mm	12.0KN	Tensile Slip
6	30mm	150mm	11.25KN	Tensile Slip

Average ultimate load =11.4KN
Using a global safety factor of 7, safe working load in tension =1.63KN

4.3 KD8 Gravity Toggle

Material: Steel, Zinc plated yellow passivated

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30	150	9.75	Tensile Slip
2	30	150	9.25	Tensile Slip
3	30	150	9.0	Tensile Slip
4	30	150	8.5	Tensile Slip
5	30	150	9.0	Tensile Slip
6	30	150	8.25	Tensile Slip

Average ultimate load =8.95KN
Using a global safety factor of 4, safe working load in tension =2.24KN

4.4 FIS V 360S & FIS H N net with steel Threaded rod

Material: Resin: Vinyl Ester hybrid resin
Rod: Steel M10 Zinc plated grade 5.8
Sleeve: Plastic frame with flexible nylon netting

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30mm	200mm	22.0KN	Resin Failure
2	30mm	200mm	18.0KN	Resin Failure
3	30mm	200mm	20.0KN	Cone Failure
4	30mm	200mm	21.0KN	Concrete Failure
5	30mm	200mm	25.0KN	Resin Failure
6	30mm	200mm	24.0KN	Resin Failure

Average ultimate load =21.6KN
Using a global safety factor of 4, safe working load in tension =5.42KN

4.5 FFS Self Tapping Screw

Material: Metal zinc plated, yellow passivated to 5 microns

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30mm	150mm	4.75KN	Tensile Slip
2	30mm	150mm	5.0KN	Concrete Cone Failure
3	30mm	150mm	7.5KN	Concrete Cone Failure
4	30mm	150mm	5.5KN	Slip
5	30mm	150mm	11.0KN	Concrete Failure
6	30mm	150mm	11.25KN	Concrete Failure

Average ultimate load =7.5KN
Using a global safety factor of 4, safe working load in tension =1.88KN

4.6 FHY Expansion Anchor

Material: Metal, bright zinc plated or stainless steel

Test No	Anchoring Depth	Axial Spacing	Load Achieved KN	Remarks
1	30mm	150mm	15.25KN	Fixing Failure
2	30mm	150mm	12.0KN	Concrete Failure
3	30mm	150mm	13.5KN	Concrete Failure
4	30mm	150mm	15.0KN	Concrete Failure
5	30mm	150mm	16.0KN	Concrete Failure
6	30mm	150mm	17.75KN	Concrete Failure

Average ultimate load =14.91KN
Using a global safety factor of 4, safe working load in tension =3.72KN

5. Results Summary

The table below shows the average Ultimate and Safe working loads of all the anchors tested into Finlay Hollow Core Units.

The Finlay Hollow Core Units has a concrete web thickness of 30mm and a minimum compressive strength of 50 N/mm^2

Product tested	Average ultimate load	Safe working	Characteristics axial spacing	Remarks
SX Plug Nylon plug with safety screw	3KN	0.43KN	150mm	Quick easy A good light weight fixing.
M Unit Nylon expansion anchor	11.4KN	1.63KM	150mm	Medium weight fixing. Good load performance ideal for pipe installation.
KD8 Gravity Toggle	8.95KN	2.24KN	150mm	Quite difficult to set.
FISV 360S and FIP with Steel Threaded Rod	21.6KN	5.42KN	200mm	Heavy duty fixing – will achieve high loads.
FFS Self Tapping Screw	7.5KN	1.88KN	150mm	Lightweight to medium weight Quick and easy but effective.
FHY Metal Expansion Anchor	14.91KN	3.72	150mm	This fixing is specially designed for hollow core unit and performs very well.