

# Vertical Reinforcing – Fixing Kits

The inherent flexibility of the Interbloc™ system allows for our modular structures to be reinforced in a variety of ways. This provides engineers with the ability to choose a reinforcing option which best fits the circumstances of a particular job. These guidelines provide information on the use of reinforcing bars to provide vertical reinforcement on an Interbloc™ wall. For more information on other types of reinforcing please refer to the relevant technical guideline.

## 1. Vertical Reinforcing Using Fixing Kits

‘Fixing kits’ is an Interbloc™ term used to describe the combined reinforcing rod, nuts, washes, holes, and epoxy.

The use of reinforcing bars in mortarless interlocking block wall structures provides resistance to the overturning forces created by surcharges. The Interbloc™ system is primarily a gravity based system, vertical reinforcing bars are one option to increase the structural integrity of a wall.

### 1.1 Composition of Fixing Kits

#### 1.1.1 Threaded Reinforcing Bar

Interbloc™ uses threaded reinforcing bar for vertical reinforcement. The thread allows the bar to be tied at the top of the wall joining the wall to the foundation and creating one homogenous structure.

The use of threaded bar allows the wall to be expanded vertically through the use of couplers. Changes in capacity over the structures life time should be taken into account when specifying reinforcing bar.

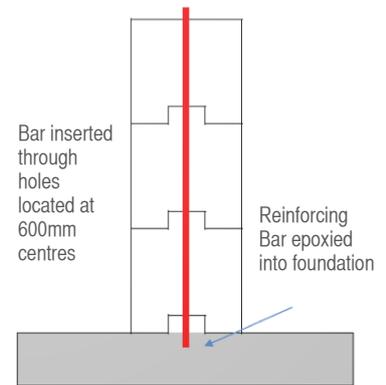
#### Threaded Bar Guide/Wall Height

Interbloc™ prefers Reidbar™ as a supplier of threaded bar.

#### Reidbar™ Specifications

Product Code	Grade	Nom Thread Pitch (mm)	Characteristic Values					Mass (kg/m)	Nom Area Sq (mm)	Min Hole Dia. to pass bar
			Min Yield Stress (Mpa)	Min Yield Strength (kN)	Min Ultimate Strength (kN)	Max Ultimate Strength (kN)	Min Shear (.62 min ult) (kN)			
RB12	500E	8	500	56.5	65.0	79.0	40.3	0.88	113	15
RBA16	500E	9	500	100.6	115.6	140.8	71.7	1.58	201	20
RB20	500E	10	500	157.0	180.6	219.9	112.0	2.47	314	24
RB25	500E	12.9	500	245.5	282.3	343.7	175.0	3.85	491	29
RB32	500E	16.4	500	402.0	462.3	562.9	286.6	6.31	804	38

Source: Reid Construction Systems 2007



## 1.1.2 Nuts and Washes

Nuts are used to fasten the wall once constructed. As the centre holes of the block are 60mm in diameter the washer spreads the load of the nut, especially when using smaller size bar.

The nut and washer supplier should be the same as the supplier of the threaded bar.

### Reidbar™ Nut Specifications

Product Code	Length (mm)	Char. Strength (kN)	Weight (kg)	Nominal Hex Size A/ Flats mm +/-	Nominal Hex Size A/ Corners +/-
RB12NH	40	>79	0.13	25	25
RBA16NH	45	>140.8	0.18	30	34
RB20NH	50	>219.9	0.28	36	42
RB25NH	65	>343.7	0.55	46	53
RB32NH	82	>562.9	0.96	55	63.5

## 1.1.3 Epoxy

It is preferable to epoxy the threaded bar in to the concrete foundation, after the foundation has cured. Provided the correct materials are used and the correct installation procedure is followed, the epoxy will be as strong as if the bar was cast into the concrete foundation.

Interbloc™ recommends the use of Hilti HIT-RE 500 Injection Adhesive for projects requiring a long curing time, or Hilti Hit-HY 200 for projects requiring a short curing time. Ultimately it is the responsibility of the design engineer to specify the appropriate chemical adhesive.

## 1.2 Installation Procedure

To ensure the structural integrity of an Interbloc™ structure with vertical reinforcing, it is vital to follow the correct process. Deviation from this procedure may result in structural failure. It is ultimately the responsibility of the installer to ensure the process is followed correctly.

### 1.2.1 Prepping and Drilling

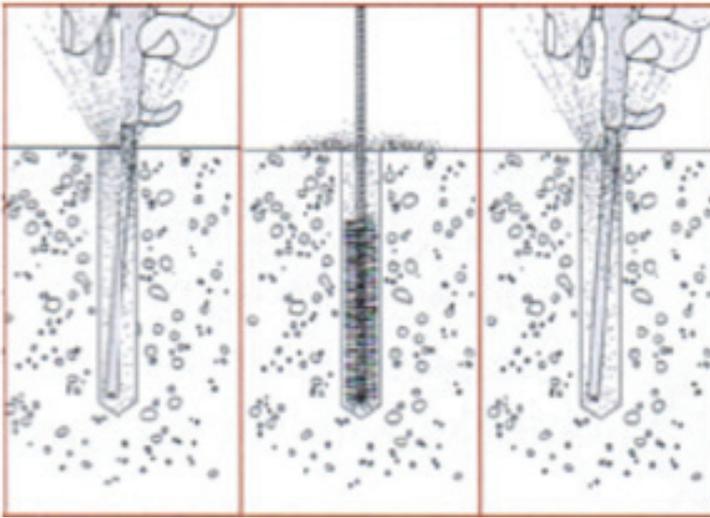
1.2.1.1 Mark out the locations of the holes to be drilled using a chalk string. The holes should be a minimum of 300mm from the nearest edge of the foundation. 603mm is the minimum separation distances between holes along the wall. This is to allow for the creep in the blocks.

Spacing of Vertical Reinforcing				
	@600mm Centres	@1200mm Centres	@1800mm Centres	@2400mm Centres
<b>Distance between Holes</b>	603mm	1206mm	1809mm	2412mm

If the building a wall longer requiring more than 20 holes, at the 21st hole recalibrate your measuring tool to ensure accuracy.

1.1.1.2 Use a diamond tipped drill or other appropriate drill piece. Drill holes in the concrete at the marked points along the centre line, and to the correct diameter and depth for the size of rod specified to be used.

	Anchor Size (mm)				
	12	16	20	25	32
<b>Drill Bit Diameter (mm)</b>	16	20	25	32	40
<b>Typical Embedded Depth (mm)</b>	110	125	170	210	300
<b>Base Material Thickness (mm)</b>	145	165	220	275	380
<b>Filling Volume (ml)</b>	13-20	19-29	40-64	70-96	162



**Core drill bits are required for holes 25mm and larger.**

1.1.1.3 Clean out holes with a brush, and blow then blow out with pressurised air. Wet cored holes must be flushed with water to remove all slurry. All dust and debris **MUST** be removed from holes after drilling to ensure optimum adhesion.

## 1.2.2 Epoxy and Starter Bars

1.2.2.1 Take specified epoxy adhesive and load into cartridge dispenser. You will require a long adapter nozzle. Insert the nozzle into the hole and fill with the required amount of epoxy.

Note: Every supplier will have a proprietary cartridge dispenser for their epoxy cartridges. These are not supplied as part of the fixing kit.

Some epoxy suppliers stock electronic dispenser guns which can be pre-set to dispense a define measurement of epoxy. The use of this dispenser can significantly increase accuracy, and reduce wastage.

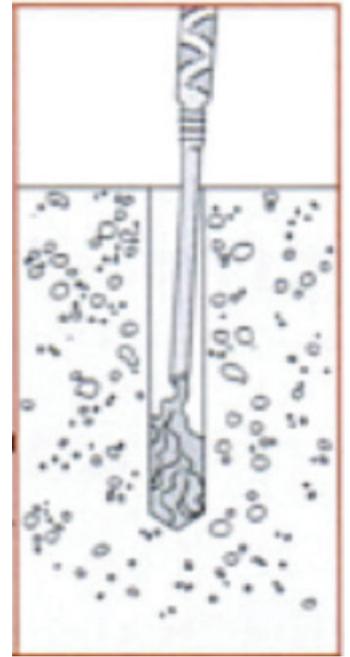
Often epoxy cartridges mix the chemical adhesive in the nozzle. A uniform colour of the epoxy in the nozzle indicates mixing has occurred.

1.2.2.2 Insert the start rod into the hole slowly with a twisting motion. This ensures the product fills all the voids and crevices and uniformly coats the rod.

HY – 200 has a curing time of 30minutes.

Hit-500 has a curing time of 12 hours.

Attach a coupler to the end of the starter bar before moving to the next hole. The thread should be at least 80% engaged with the coupler maximum thread depth to ensure the full breaking strength of the couple is achieved.



	Anchor Size (mm)				
	12	16	20	25	32
Starter Bar Length (mm)	560	575	620	660	750

Starter rods a short lengths of rebar epoxied into the foundation before the construction of the wall commences. This ensures the structural integrity of the rod and allows for testing before construction of the wall. Starter bars should protrude from the foundation a minimum of 450mm.

Safety Note: Starter bars should have high visibility safety protective caps inserted on end of the protruding starter bar.

## 1.2.3 Wall Construction

1.2.3.1 Proceed to build the wall, being careful not to knock the bars excessively as the bottom layer is being lowered over the starting bar.

Ensure there is a gap of 3mm between each block.

1.2.3.2 Once the wall is completed, insert the remaining length of rebar through the blocks from the top of the wall. Thread the bar into the coupler located on the top of the starter bar. Screw the bar into the coupler.

## Rebar Length

	Wall Height (mm)					
	1200	1800	2400	3000	3600	4200
Length of Rebar (excluding starter rod)	850	1450	2050	2650	3250	3850

*Assumes 100mm excess rod at top of wall.*

Once the rebar has been at least 80% engaged on the coupler, fit the washer and nut at the top of the wall. Tighten nut to supplier's specification.

Reids™ recommend using a wrench with a minimum length of 300mm to ensure the bar is fully engaged with both the couple, and the nut.

It is normal for the blocks to settle over time, as such the nut should be tightened at the four week and eight week mark post installation.

### 1.2.4 Testing

All starter bars should be tested to ensure an adequate adhesive bond has formed.

An initial 'pull' test should be undertaken by the project supervisor. This is done by pulling on the starter bar once the epoxied has had time to fully cure. If the bar moves, more sophisticated testing should be undertaken.

If stress tests need to be under taken, most suppliers of epoxy are available, with field engineers, to visit site and undertake appropriate testing. This should be conducted under the supervision of the design engineer.