



## Resin Bonding by Injection

### DESCRIPTION

Resin Bonding or Crack Injection is a technique used to re-establish the structural integrity of fractured brickwork and masonry.

Cracking in structural walls is generally as a result of a build up of stress caused by differential settlement and sometimes thermal or lateral thrust problems. The crack reduces the brickworks' ability to redistribute stresses throughout the panel and structure and unless treated will always be a point of weakness. The technique of injecting a resin into the fracture should, if done correctly, rebond the two sides of the crack without the need for costly and disruptive breakout and re-building of the brickwork in the locality of the crack. This saves considerable time and money, and in older property in particular potential unsightly repair scars from brick replacement.

### TECHNIQUE

The simplest, most straight forward and versatile method of injecting a grout into a fracture is to drill holes directly into the line of the fracture either along the mortar joint or into the brick or stone block using an 8mm to 10mm diameter masonry drill bit. Generally a spacing of 75mm between holes will be adequate for even grout penetration. The depth of hole should be approximately 75% of the wall or leaf thickness.



With a toothed chisel carefully cut back the mortar along the line of the cracking removing it to a depth of at least 20mm.

Using a length of plastic tube (less than 10mm diameter) attached to a vacuum carefully and methodically remove the dust and debris from the drill holes and fractures.

To reduce the risk of visual damage to the face of the masonry the grout must be prevented from running down the brickwork during the injection process. This can easily be achieved using a thixotropic grout which once injected will remain within the brickwork. The grout should either be in ready filled cartridges or mixed and loaded into a cartridge gun. The nozzle of the gun will taper to less than 10mm diameter and be able to be firmly pressed into each injection hole. The resin should be dispersed under sufficient pressure to force it into the back of the hole and along the fracture in both directions. The grout will only need to travel half the distance between the holes to fully penetrate the fracture. By taking each hole in turn the crack will be re-bonded.

Any surplus should be removed before re-pointing in colour matched mortar.

### Types of Grout

There are three grouts available on the market for resin bonding. Epoxy, Polyester and Cementitious. All should be thixotropic for this type of injection.

**Epoxy** is probably the most common and widely used in the subsidence repair market. It is generally low odour, has a practical pot life of one to two hours and will set in approximately four hours. It is moisture tolerant and will therefore bond to damp substrates.

**Polyester** grout is generally used in situations where rapid set times are required and the volumes used are low. The substrate should be dry as polyesters generally do not bond to damp surfaces. **Note** - in larger volumes polyesters shrink as they cure.



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**Cementitious** grouts have been developed to have good flow characteristics whilst being thixotropic and are polymer modified to increase adhesion and strengthen the mix. They are shrink compensated and therefore ideal for larger cracks and voids. The substrate should be washed with clean water prior to the application.

#### ADVANTAGES AND DISADVANTAGES

The main advantages of resin bonding by injection are:

- Low impact and disturbance to the brickwork.
- A rapid, relatively low tech and cost effective method.
- Seals the fracture preventing water ingress.
- Combined with masonry reinforcement this technique for a potent strengthening technique.

Disadvantages of this system include:

- Needs to be done correctly to be structurally effective.
- Cannot be used in near zero or sub-zero temperatures.
- Cannot distribute stresses any more effectively than standard bonded brickwork.

#### HEALTH AND SAFETY

Issues to be considered when resin bonding.

- Dust infiltration from the drilling.
- Working at height.
- COSHH issues of handling the chemicals.
- Electrical shock from power tools and cables.
- Location of all pipework and cables within the walls.

For detailed Health and Safety information, see ASUCplus 'Guidelines on safe and efficient underpinning and mini-piling operations'

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