

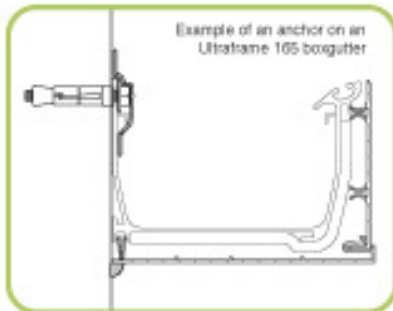


TO

Ultraframe technical support engineers Bill Kenyon and Mick Rowley look at the correct specification and installation of masonry anchors



When fixing box gutters and gallows brackets to various concrete, masonry, brick or block substrates, great care needs to be taken to select the correct anchors.



Brick, block and masonry substrates vary widely in quality, in particular their compressive strengths may vary from 2.8 to 70N/mm. To aid the kiln firing of clay bricks clay is removed by the use of a "frog" or a multitude of holes being let into the bed of the brick. This latter method provides particular problems for fixings.

Loadings on fixings

There are two kinds of loads to consider. The first is tensile load, also described as "pull-out" where a force would be required to pull a fixing out of its hole i.e. along its axis, the second is shear. This is where the force is usually at right angles to the bolt and is the amount of force which would be required to sever or shear the bolt. They both have what is called a "zone of influence" into the surrounding substrate. This can be imagined as a conical shape (see drawing) this being the area that is taking the load which is emanating at 45° from the base of the fixing to the surface of the substrate.

Clearly, increasing the embedment depth increases the anchors performance.

A reduction in the projected area (conical shape) for example by planning anchors too close together or too near to the edge of the brick, will result in reduced performance and should be avoided if possible. If it is unavoidable, appropriate reduction factors should be applied to the safe working load issued by the anchor manufacturer.

Anchor Types

There are two main types:-

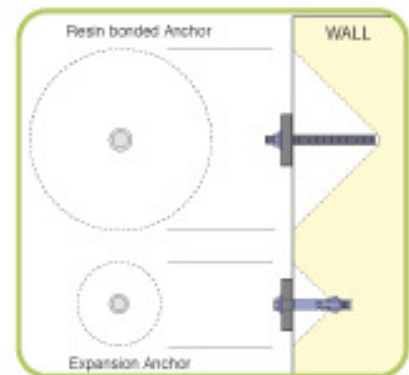
1. Torque controlled expansion anchors



A clamping force is extended through the fixture to the base material. The clamping force is proportional to the tightening torque. Tightening to the manufacturers recommended torque ensures that the clamping force is greater than the published safe working loads. Adjustable torque wrenches of the "break back" type should be used so as not to over stress the bolt material.

This type of bolt works by locally compressing the substrate with the forces deployed at the point of expansion, not over the whole length of the anchor. Clearly, if the point of expansion falls within a cavity of a brick or block, the full expansion effect may not be deployed.

2. Resin bonded anchors



These gain their operational strength through increasing the amount of surface area that the anchor touches when inserted into the pre-drilled hole. They are particularly suitable for suspect masonry substrates.

Once the hole is drilled, it is vital that dust and debris are removed with either a small wire brush or air pump. If the brick is suspected to contain holes, a small mesh sleeve is inserted prior to the injection of the two part resin. Before the resin sets a threaded rod is inserted leaving sufficient protruding to attach washers and nuts to.

Because resin bonded anchors exert no expansion forces, they are particularly suited to "weaker" substrates such as aircrete blocks.

Always consider every factor including the relevant loads. Further information can be sought from the technical support department at two of the leading anchor manufacturers.

- Rawl :0141 638 7961
- Hill :0161 886 1144

Key Points

Remember to:-

- Drill correct diameter hole, to the exact depth.
- Clean the hole thoroughly. This is important for all anchors, but critical for bonded anchors.
- Use the correct setting equipment and procedure.
- Tighten to the recommended torque.
- Wherever possible, avoid the margins of masonry and mortar joints.