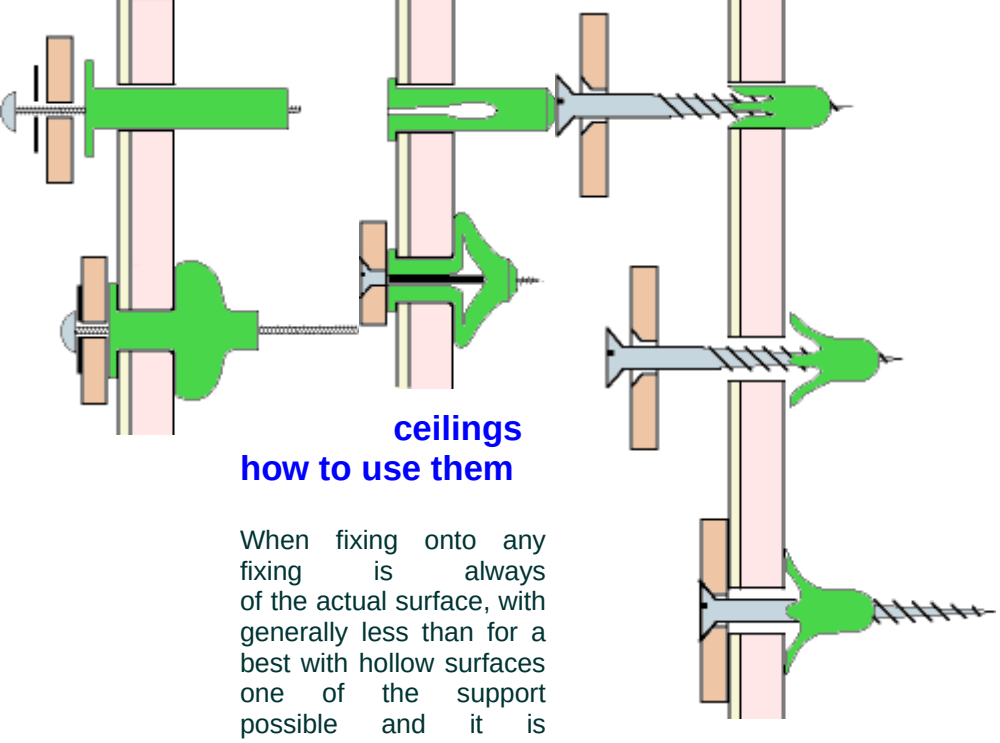


Wall fixings for hollow surfaces

Fixings for hollow structures (walls, ceilings and doors etc.) and how to use them

When fixing onto any surface the strength of the fixing is dependent upon the strength of the actual surface, with hollow surfaces this is generally less than for a solid structure. It is always best with hollow surfaces to try to locate and fix into one of the support members. This is not always possible and it is sometimes necessary to actually secure onto the covering, be it plaster board, hardboard or whatever.

When drilling relatively thin, soft materials it is not necessary or desirable to use hammer action if a power drill is used.

Before drilling into any void, check for possible concealed pipes and electric wiring.

Rubber-sleeved fixing with captured insert

As the screw is tightened into the rubber sleeve inserted through the wallboard, the sleeve is compressed against the reverse side of wall. The screw can be removed/replaced if required, the fixing will remain in place through the wall.

After the required hole is drilled, the rubber sleeve is inserted through the covering; the sleeve needs to be a fairly tight fit through the hole to ensure that it does not rotate when the screw is tightened. The screw is then inserted through the workpiece and into a tapped insert, which is moulded into the back end of the sleeve.

The sleeve has a small rim which stands proud of the outer surface, to allow the workpiece to sit flat against the surface, the back of the workpiece should be relieved around the hole.

Various sizes are available; the screws are supplied with the fitting although longer screws of the appropriate diameter/thread can be used where the workpiece is too thick for the screw supplied.

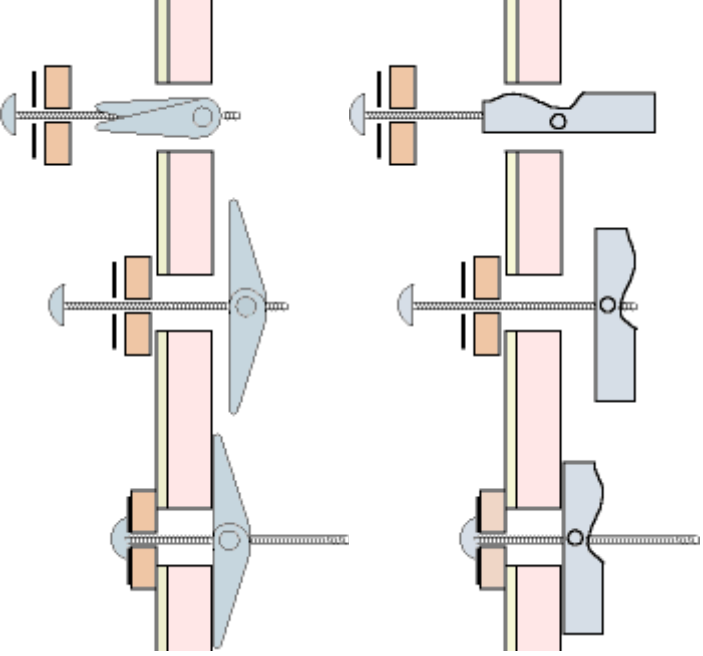
Plastic collapsible fixing

Very similar to the above fixing but using an ordinary wood screw. The fixing is used in the same manner as the above but they tend to stand up less well to repeated screw removal/replacement as the screw tends to cut a new thread each time it is inserted.

Plastic spread fixing

An inexpensive fixing which is not reusable - removal of the screw will result in the fixing dropping down the cavity.

Drill a hole just large enough to take the head of the fixing.



An ordinary wood screw of the appropriate length (at least equal to the thickness of the workpiece plus the thickness of wallboard plus the length of the fixing), is inserted through the workpiece and into the fixing by about 2 or 3 turns. The fixing is then pushed through the hole in the wallboard. As the fixing is pushed through, the 'legs' of the fixing are compressed and they spring out once the fixing is through the board. The workpiece needs to be pulled away from the front surface so that the legs of the fixings bear on the reverse side of the wall as the screw is tightened.

Various sizes are available to suit various diameters of wood screw.

Spring metal toggle fixing

These fixings tend to give a stronger anchor than the plastic types above as they spread the load over a larger area on the reverse side of wallboard. The fixing consists of two spring-loaded metal arms with a thread tapped into the hinge pivot. The two arms are held against the screw as the fixing is inserted through the pre-drilled hole and then spring out to spread the load on the reverse side of the wallboard. The fixings cannot be reused - removal of the screw will result in the fixing dropping down the cavity.

Drill a hole just large enough to allow the toggle to be pushed through with its spring-loaded arms held together.

Pass the fixing screw through the workpiece into toggle. Push the toggle through the hole until the arms spring out, pull the workpiece away from the front surface (so that the arms bear against the reverse side of the wallboard) and tighten the screw.

Various sizes are available; the screws are supplied with the fitting although longer screws of the appropriate diameter/thread can be used where the workpiece is too thick for the screw supplied.

Gravity metal toggle fixing

These fixings are similar to the spring type above except that the toggle is made in one piece which is passed through the hole and then drops down under gravity to be parallel to a vertical wallboard. These fixings can only be used when fixing to vertical surfaces. The fixings cannot be reused - removal of the screw will result in the toggle dropping down the cavity.

Drill hole just big enough to allow the toggle to be passed through when the toggle is parallel to the fixing screw.

Pass the fixing screw through the workpiece into toggle. Push the toggle through the hole until it turns within the cavity, pull the workpiece away from the front surface (so that the toggles bear against the reverse side of the wallboard) and tighten the screw.

Various sizes are available; the screws are supplied with the fitting although longer screws of the appropriate diameter/thread can be used where the workpiece is too thick for the screw supplied.

Wall fixings for solid surfaces

Fixing into solid brick, block or concrete

When you need a fixing into brick, block or concrete, you need to be confident that it will be strong enough for the application - the easiest way to be confident is to use the correct type of insert with the correct size of drill and screw.

Although often referred to as 'wall' fixings, they are equally suitable for fixing into floors or concrete beams.

Plugs for screws:

General.

All the plugs described below for use in solid surfaces are designed for use with ordinary wood screws. Each basic type of plug is available in a range of sizes to suit specific screw diameters and often for specific length of screw. To ensure maximum strength when using a particular type and size of plug, always follow the manufacturers recommendations regarding the drill size and the length/size of screw.

Generally it does not matter what material the screw is made from or the type of screw head, but when selecting the type of screw to use, think about the position and environment in which it will be used. If the screw head will be exposed, consider a brass or chrome finish, if the screw will be used in a damp area, avoid steel or other materials which will corrode.

Drilling

All the plugs detailed require a hole to be drilled in the brick, block or concrete before the plug can be used. Often on internal walls, the material will be covered with a relatively thin coating of render and/or plaster.

Before drilling into any surface, check for possible concealed pipes and electric wiring.

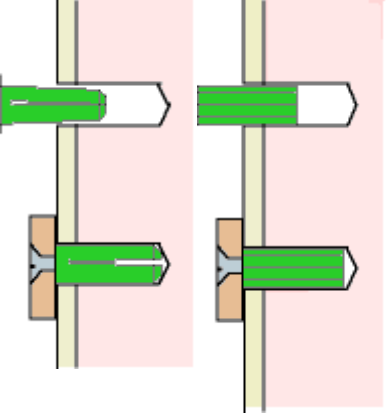
To ensure that the drill bit has a long and happy life, a tungsten-carbide masonry drill bit should be used. The effort required to drill the hole depends a lot upon the material being drilled:

Brick:

Brick is basically baked clay, and a good quality brick will be free of both internal voids and internal pieces of flint, stone or other 'non-clay' material. While the hardness of bricks will vary, they can normally be drilled accurately and cleanly. You may need to use a power drill with a hammer action on bricks that are very hard.

Block:

Block material can vary considerably from the ultra-soft lightweight/thermal blocks to the concrete block containing large pieces of very hard flint etc.



Lightweight blocks can be drilled very easily using a hand-brace or a power drill without hammer action. A risk with these blocks is that they are not very 'forgiving', a small amount of pressure in the wrong direction and the drill bit will be away where you never intended it to go.

At the other end of the block materials, is the concrete block - these can vary greatly in hardness and the cleanness of the final hole. Concrete can vary both between different areas of the same block and between blocks from different manufacturers. A drilled hole tends not to be as clean as in brick and there is always a danger that the drill bit will hit a piece of hard material causing the bit to wonder off the intended line. Even when no large pieces of hard material is encountered, the drill bit will often remove smaller pieces of grit which will unintentionally enlarge the drilled hole. A hammer action power drill is generally required.

Concrete:

Cast concrete is different from the block version in that the material is less 'grainy' with the particles more firmly bonded together. Like the block material, when drilling into cast concrete, large or small pieces of hard flint etc. may be encountered, causing the drill bit to wonder off line, prevent drilling to an increased depth or producing a ragged hole.

Most plugs need to be a push fit into the drilled hole, if the hole is undersize, hammering the plug into the hole may damage the plug and/or make it impossible to drive the screw home in the correct manner. Too large a hole may make it difficult to drive the screw home (the plug may turn in the hole as the screw is turned) or provide reduced strength when the screw has been tightened.

Plastic plugs

These are available in a variety of lengths and for a variety of screw sizes. The interior of the plugs will usually be designed so that when a screw is fully inserted the end of the plug furthest from the surface expands the greatest.

Drill hole to the same depth as the wall plug. Push the plug into the hole, insert the screw through the workpiece into the plug and tighten.

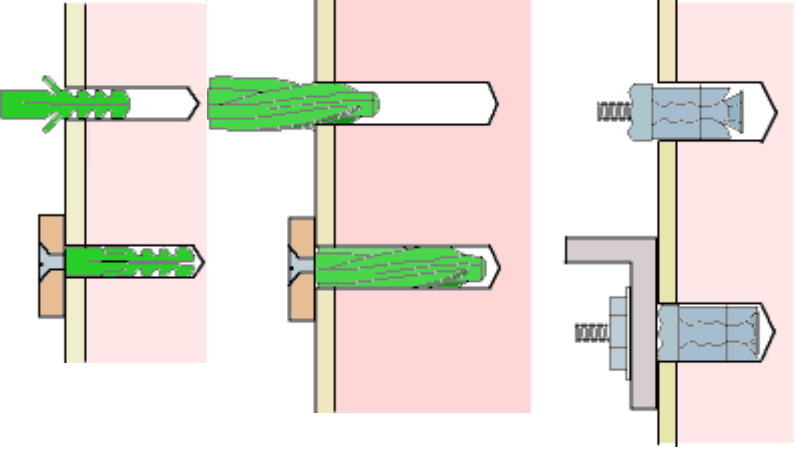
Plastic 'plug sticks'

Plug sticks are sold as lengths (12 in/300mm) of a uniform cross section along the whole length. Different diameter sticks are available for different screw sizes - the different diameters are normally made with differing material colours for easy identification. It is only necessary to cut off the appropriate length after the hole has been drilled and insert the length of stick into the hole. Although convenient, the sticks do not give as firm a fixing as the plugs because of their uniform cross-section.

Fibre plugs

Fibre plugs are often though of as old-fashioned however they still have a use today. One of their advantages over plastic is that screw can be removed/replaced a number of times without having to replace the plug. There also tend to stand up to high temperatures better than plastic. Fibre plugs are available in a number of lengths and diameter; they are of a uniform cross-section along the length so can be cut down to size if necessary. The plug should be as long as the threaded part of screw.

Drill the hole and insert the plug to just below the wall surface. Insert the screw through the workpiece and turn the screw into the plug until the plug starts to bind in the hole and then



withdraw it so that the top of the plug is in line with the surface. The plug expands to fit the hole tightly as the screw is driven home.

Ribbed barrel plugs

Ribbed barrel give a really tight fit. Each plug will take a range of screw sizes and a choice of lengths is available.

Drill hole slightly deeper than wall plug being used. Push the plug into the hole, insert the screw through the workpiece into the plug and tighten.

Soft materials, such as lightweight block

Because lightweight block is a very soft substance, special plugs are required. These plugs tend to be like ordinary wall plugs but with helical wings around the barrel. The helical wings grip the sides of hole. As the screw is tightened, the wings cut further into the block giving a very strong fixing.

Drill the hole the same diameter as the plug barrel. The overall diameter of the plug will be about twice the diameter of the barrel, and the plug will need to be hammered into the wall so that the wings cut into the sides of the hole. Slip the screw through the workpiece into the plug and tighten.

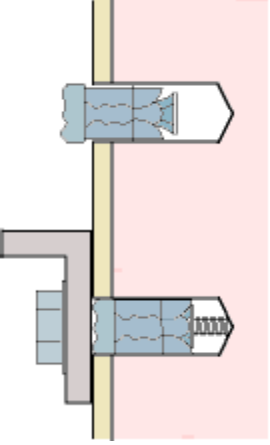
Bolts and nuts metal wall inserts

These can offer a stronger and more temperature resistance fixing than plastic or fibre plugs.

The anchoring part of the insert comprises a number of metal segments which are forced into the side of the hole by a cone which is pulled forward into the segments by the bolt or nut being tightened. Tightening the nut or bolt pulls the cone into the segments but it also tends to force the insert out of the wall if it is not held in position until the segments begin to bite into the wall of the hole. The nuts/bolts can be removed/replaced numerous times, the only risk is that the wall material may be weakened by repeated application of the securing pressure.

Projecting type have an external screw thread which projects from the insert. Different lengths of thread are available (from 12mm to over 75mm) to allow for different thicknesses of workpieces. The hole in the surface only needs to be as deep as the actual insert itself.

Having drilled the hole just large enough for the insert, push the insert into the hole, position the workpiece over the thread, put on the washer and nut. Keeping the workpiece against the surface (to ensure the insert is not pulled from the hole) tighten the nut - any excess thread may be sawn off.



Bolt type inserts incorporate a thread in the cone and a bolt is inserted from the wall surface, different lengths of bolt are available for workpieces of different thicknesses. The hole in the wall needs to be deep enough to ensure that the bolt does not bottom when it is fully tightened.

Having drilled the hole just large enough for the insert (but deep enough for the tightened bolt), push the insert just into the hole, put the bolt through a washer and the workpiece, offer up the workpiece and engage the bolt into the threaded cone at the back of the insert. Keeping the workpiece against the surface (to ensure the insert is not pulled from the hole) tighten the bolt.