FIS

FINISHES & INTERIORS SECTOR

BEST PRACTICE GUIDE

MAINTENANCE AND ACCESS INTO SUSPENDED CEILINGS

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FOREWORD 1

This Best Practice Guide to Maintenance and Access into Suspended Ceilings has been produced by FIS as a guide for building owners, facility managers and building services engineers who need to access the ceiling void.

Suspended ceilings are installed in all aspects of commercial buildings and some residential accommodation in common parts. Their main function is to provide a clear membrane to hide services, and provide acoustic performance and in some instances fire protection.

Recent surveys indicated that up to 20% of ceiling tiles in a building are replaced annually because of damage caused by maintenance engineers removing tiles to access the void. Of even greater concern is that some ceiling collapses are caused by hangers being compromised by trades when carrying out modifications or installing equipment in the void.

This guide is aimed at reducing waste from damage caused to tiles and hangers by inappropriate access into the void above a suspended ceiling and preventing accidents occurring from any damage that may be caused.

This guide is not intended as a definitive technical manual, as the manufacturers' recommendations must always be followed. FIS encourages all its members to follow the principles set out in this guide.

INTRODUCTION 2

The correct maintenance and the methods used for accessing the voids above ceilings are essential to retain the appearance, function (performance) and structural stability of the ceiling.

Adopting the good practices for maintenance of suspended ceiling systems, as described in this guide and as recommended by the manufacturers of the ceiling systems, will help to prolong the life of the ceiling system.

Good practices for maintenance will also help reduce waste by retaining systems in place without the need for replacement due to damage caused by misuse.

This guide assumes that the ceiling is correctly installed originally. For further information regarding suspended ceiling installation refer to:

- FIS Best Practice Guide - installation of suspended ceilings
- FIS Best Practice Guide - selection and installation of top fixings for suspended ceilings
  www.thefis.org/publications/best-practice-guides/

2.1 SCOPE

This best practice guide covers the maintenance of all forms of suspended ceilings.

It is aimed at facilities managers, building services engineers and property owners who have a need to access the void between the suspended ceiling and the structural slab, or to maintain the appearance and performance of a suspended ceiling.

This guide will help identify the type of ceiling installed, give guidance on the correct method of accessing the void, give clear guidance on how to maintain the appearance of the ceiling without compromising the performance and how to dispose of the material at end of life with the minimum impact on the environment.

It also briefly touches on health and safety, specialists tools and performance considerations.

IDENTIFICATION OF THE CEILING 3

Suspended ceilings fall into seven distinct types:

1. MF plasterboard
2. Exposed grid
3. Concealed grid
4. Walk on ceilings
5. Rafts and islands
6. Linear/strip
7. Stretch (which are perimeter supported)

For further information refer to the FIS Best Practice Guide installation of suspended ceilings:
www.thefis.org/publications/best-practice-guides/

Before accessing or maintaining any ceiling it is important to understand what type of ceiling is installed. Referencing the Operation and Maintenance Manual (O&M) is always the best starting point as this should identify what ceiling types are installed throughout the building.

3.1 MF PLASTERBOARD CEILINGS

MF ceilings are generally constructed from plasterboard but may also be made from other materials. They are screw fixed into metal furring channels (MF) or other metal channel systems, suspended from a primary grid, which is then suspended from the structural soffit **(see figure 1)**. They tend to be monolithic in nature and painted, however it is possible that they may have an exposed vee joint. Perforated plasterboards may be used for acoustic purposes **(see figure 2)**. MF ceilings can be constructed with single or multiple layers of board and may also include insulation on top of the board within the cavity.

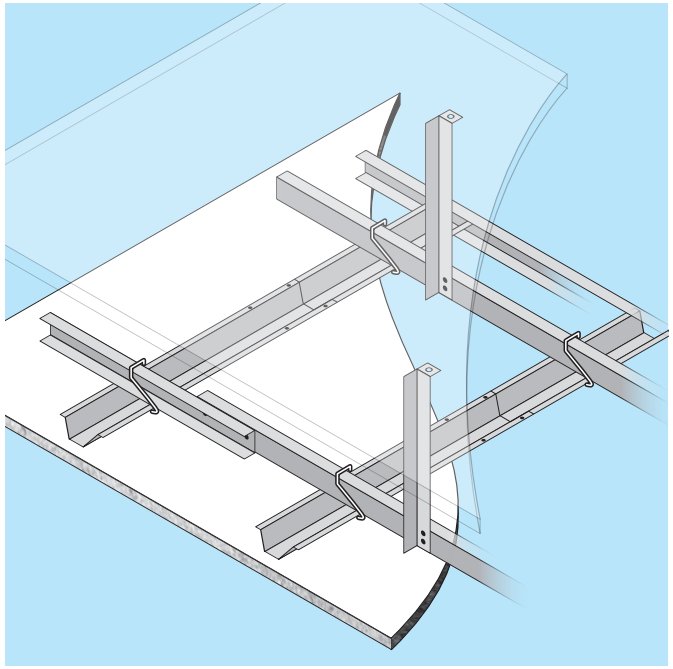


Figure 1

MF ceilings can be flat, curved, and/or stepped and can incorporate light troughs and bulkheads. However, the principles of construction for MF ceilings are fundamentally the same as for flat ceilings. If in doubt, the simplest way to identify the ceiling type is through access panels (if installed). Where there is no access panels into the ceiling void there are other clues which may identify the ceiling type.

If light fittings and grilles are flush with the plasterboard finish then there is likely to be a void above the ceiling which could indicate an MF ceiling. Removal of light fittings can also be a good way to see the board edges and therefore identify the ceiling type, however in some buildings and in some residential properties it is possible that the plasterboard could be fixed directly into timber joists.

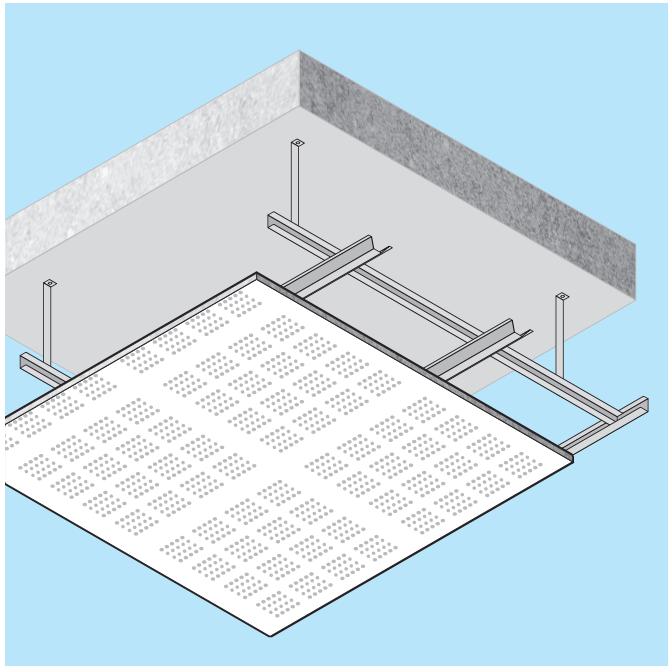


Figure 2: MF perforated plasterboard ceiling

If the light fittings, electrical cables etc are surface mounted, then the monolithic surface could be an alternative type such as a plastered concrete slab. It is also possible that a monolithic ceiling can be constructed from plaster on expanded metal lath (EML). The construction would be visible when viewed from above.

It is important to determine any additional performance

requirements for the ceiling, as it may not just be for aesthetic reasons. It is possible that the ceiling is required to provide a fire or acoustic performance and this should be established at an early stage before any works are carried out to the ceiling. If this information is not available in the O&M manuals, and there are any concerns as to the required performance of the ceiling, then the advice of an expert should be sought.

There are other non-gypsum based boards that can be used as part of an MF ceiling system however these tend to be specified for fire rated ceilings or profiled/curved ceilings eg calcium silicate boards. It should be noted that the metal systems used to support the boarding may not have been manufactured by the plasterboard manufacturer.

3.2 EXPOSED GRID

As the name implies these ceilings are easily identified by the fact that the grid work supporting the tiles is exposed. This is what gives these ceilings their grid type appearance. The grids tend to be white, though they are available in a wide range of colours and the tiles are made of varying materials which are described below under the relevant sections.

The exposed grid system is suspended from the soffits using pre-tensioned suspension wire, rigid angle, rigid hangers and threaded rod. There are four main types of exposed grid systems:

1. Tee section **(see figures 3 and 4)**
2. Linear slotted tees **(see figures 5 and 6)**
3. 'C' profile main runner **(see figure 7)**
4. Bandraster section **(see figure 8)**

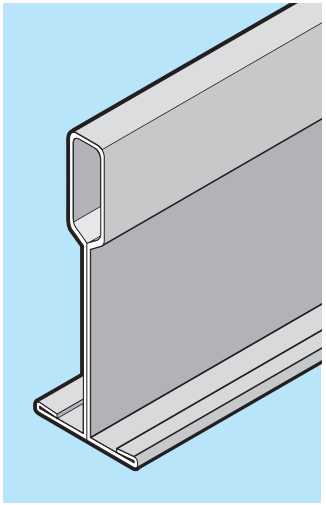


Figure 3: tee section with a flat base of 15mm

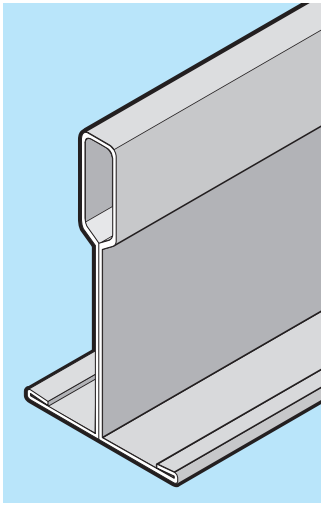


Figure 4: tee section with a flat base of 24mm

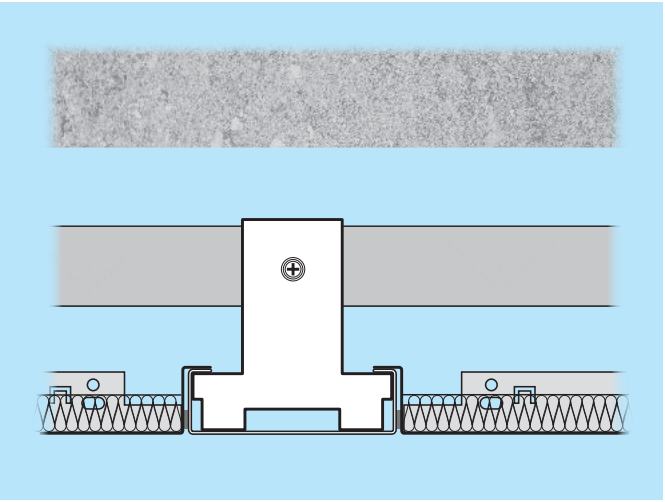


Figure 7: a 'C' profile main runner / cross runner sections

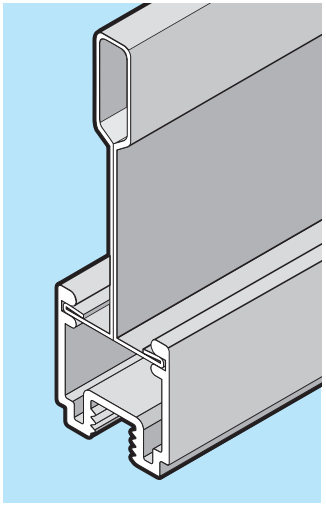


Figure 5: linear threaded base

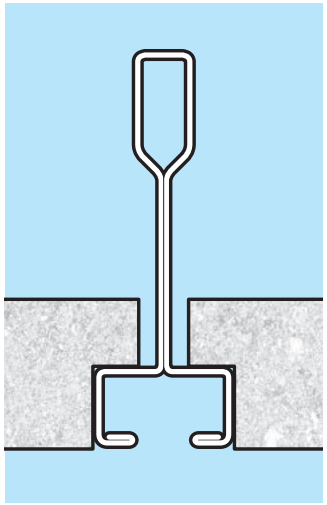


Figure 6: linear slotted base

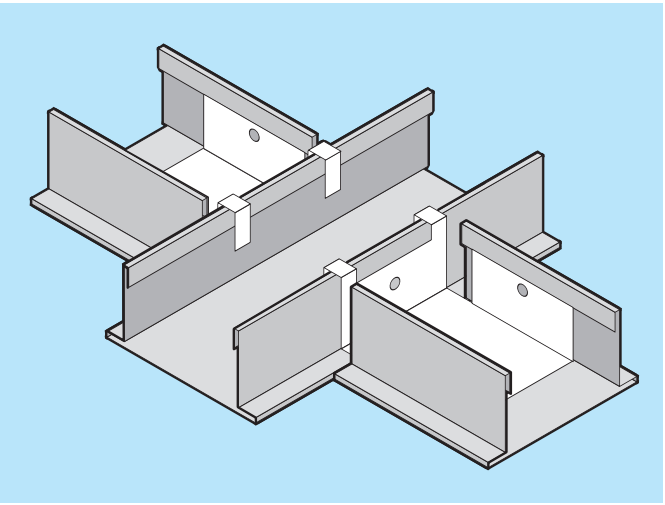


Figure 8: a bandraster section with widths of 50-150mm

Tiles in an exposed grid system can be made from a number of different materials the main types being mineral wool, metal, gypsum plasterboard and coated tiles in wash down areas. These are described below.

3.2.1 Mineral wool

These tiles come in varying sizes, colours and surface textures. They can be damaged if they are mishandled or removed by untrained operatives. The tiles can be square cut and sit on the grid or rebated (tegular) so they drop below the grid **(see figure 9)**.

Mineral wool tiles are made from a number of materials and can be supplied in low medium or high density tiles. Common module sizes are 600 x 600mm and 1200 x 600mm. The ceiling tiles are made slightly smaller to allow them to fit between the grid members. Perimeter tiles will often be cut to suit the size and shape of the room.

Mineral wool tiles can provide acoustic and fire performance. It is important that the effect of maintenance on the performance is considered when work is undertaken.

There are numerous manufacturers of mineral wool ceiling tiles supplying the UK market.

3.2.2 Metal

This type of ceiling tile is manufactured from steel or aluminium and is supplied in plain (imperforate) or with perforation patterns to the face of the tile. When perforated this can be up to the edge of the tile or a plain border can be introduced **(see figure 10)**.

This type of tile is generally powder coated to a specified colour and finish. The ceiling tiles can be tegular where they sit down lower than the ceiling grid, joggled tegular where they are flush with the grid giving a smoother semi-monolithic appearance or flush where they bear onto the back of the grid. The principles of tegular and joggled tegular are similar; it is the relationship between the face of the tile and the grid which differs.

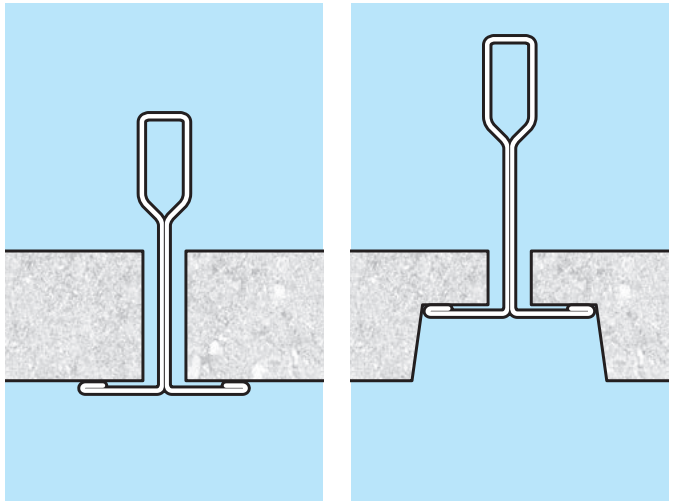


Figure 9: flush and tegular

Figure 10

Linear slotted base incorporate a continuous 6mm thread in the grid-work to allow for the installation of partitioning along the length of the grid **(see figure 5)**.

Acoustic pads are generally fitted to the rear of a perforated tile for increased acoustic performance. These will be either a black tissue fitted to the rear of the tile or a black tissue and stone wool / mineral wool pad finished with a rear aluminium face for absorption or plasterboard, mineral fibre or steel plate for sound insulation.

At the interface of the perimeter trim the tiles may have to be cut to fit the room layout and may be wedged into the trims to maintain their shape (see section on access).

There are numerous manufacturers of metal ceiling tiles supplying the UK market.

3.2.3 Gypsum

These tiles come in varying sizes, colours and surface textures. They can be damaged if they are mishandled or removed by untrained operatives. The tiles can be square cut and sit on the grid or rebated (tegular) so they drop below the grid. Common module sizes are 600 x 600mm and 1200 x 600mm. The ceiling tiles are made slightly smaller to allow them to fit between the grid members . Perimeter tiles will often be cut to suit the size and shape of the room.

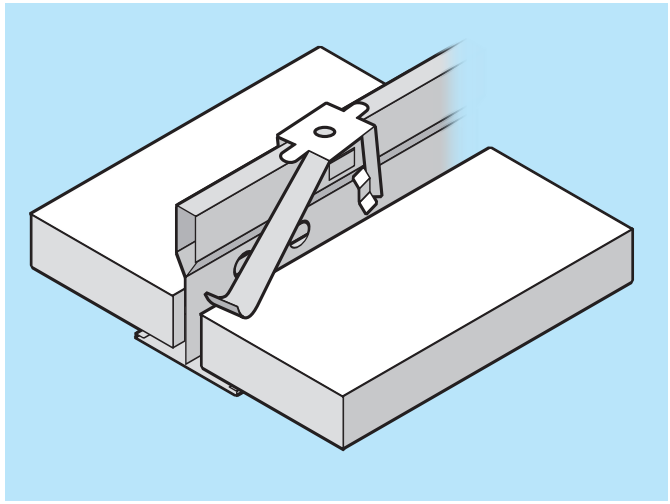


Figure 11: locking hold down clip

Gypsum tiles can provide acoustic and fire performance. It is important that the effect of maintenance on the performance is considered when work is undertaken. There are numerous manufacturers of gypsum ceiling tiles supplying the UK market.

The principle of the installation of this type of ceiling is similar to mineral wool tiles. However, the plasterboard ceiling tiles may be flush or tegular installation within the grid. Gypsum ceiling tiles can be plain or perforated. Some are manufactured with specialist facings to allow them to be washed or wiped down.

3.2.4 Restrained, sealed and held down tiles

There are situations where the ceiling tiles are required to be restrained, where this function is not performed by the ceiling grid work, eg a clip in ceiling tile. These ceilings can be similar to a non-restrained ceiling, with the exception that the tiles can be either held in place with a retaining clip **(see figure 11)** or stuck in place using a mastic (silicone) sealing the tile to the grid work. Typical examples of where this restraint may be required are:

- In hygienic areas
- To resist +/- pressure loads
- Security
- Impact resistance
- Fire resistance

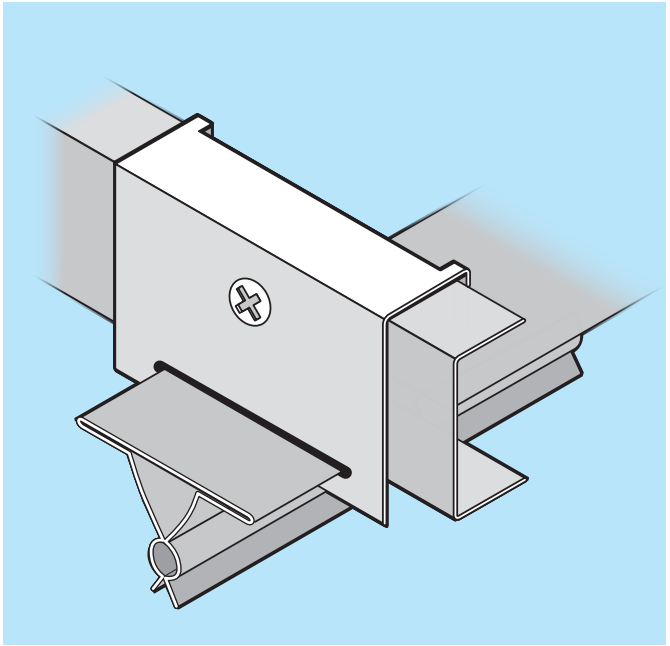


Figure 12: spring tee

3.3 Concealed grid

With this type of ceiling, the grid work supporting the tiles or membrane is concealed and only the ceiling tiles are visible. There are a variety of systems that are available. The tiles or membranes can be metal, mineral wool, gypsum, calcium silicate, stone wool and glass wool. Some of these systems are not accessible without damaging a tile **(see figures 12 to 17 starting below)**.

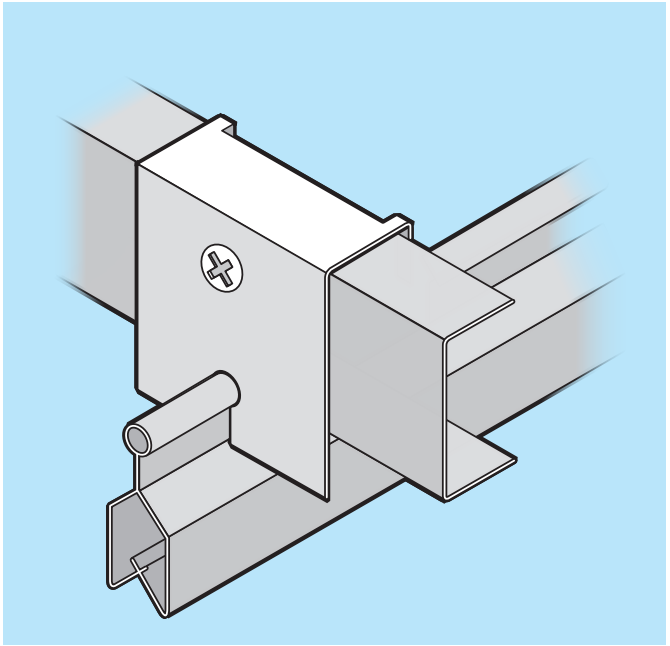


Figure 13: omega bar

3.3.1 Mineral wool and gypsum

With this ceiling type the grid work supporting the tiles is concealed and only the tiles are visible **(see figure 14)**. This type of ceiling employs a method of interlocking panels into each other and the grid with the use of small strips of metal called 'splines'. Normally, these type of ceilings will have a 'key panel' (usually in the corner) which can be removed, allowing for the other panels to be slid out of the grid (a series of metal channels called 'Z bars') one by one, until eventually removing the desired panel.

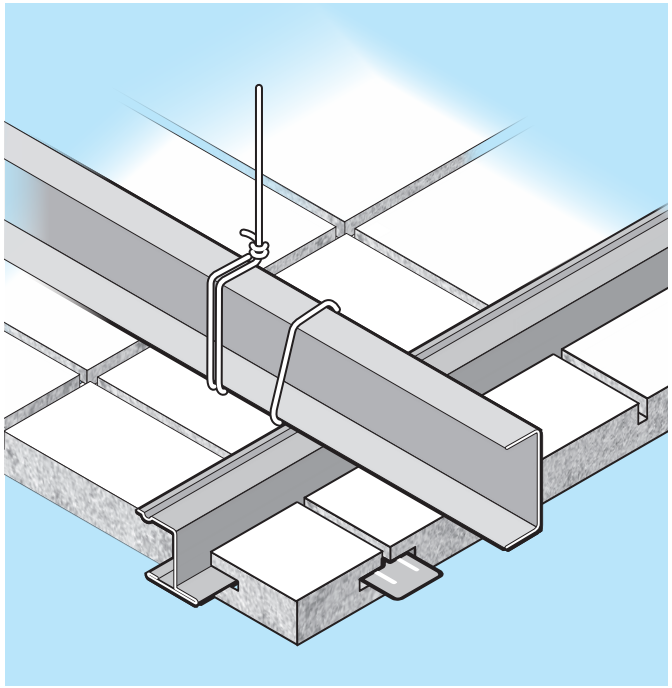


Figure 14: zed

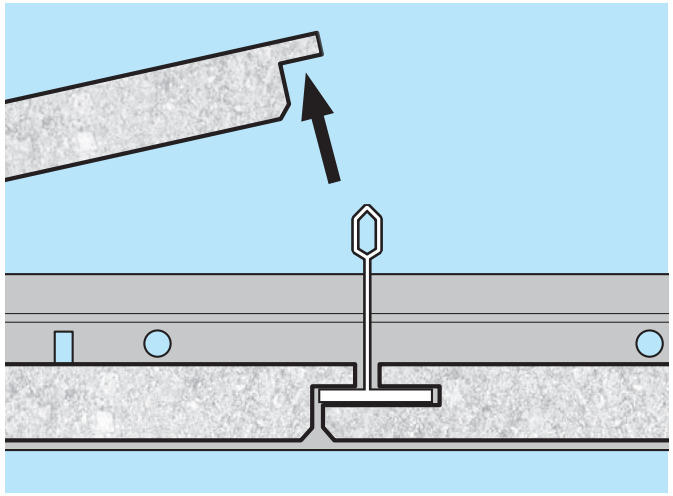


Figure 15: demountable tee

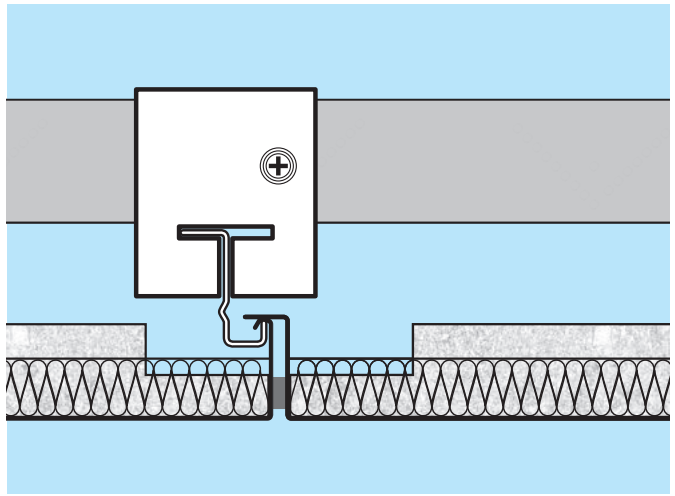


Figure 16: hook on

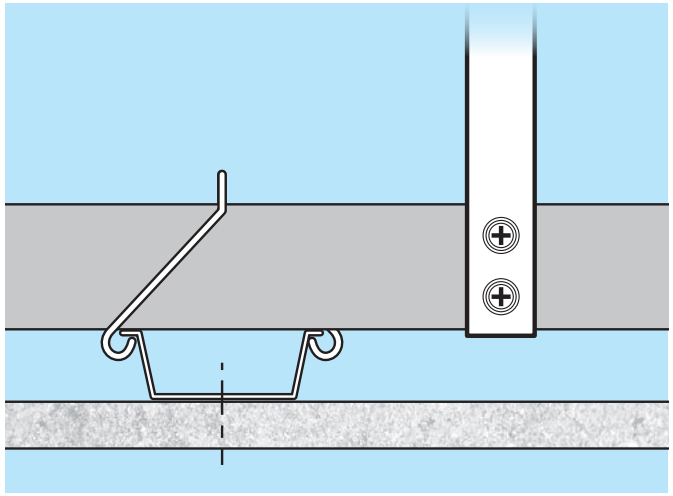


Figure 17: metal furring

3.3.2 Metal (including linear systems)

The metal tiles can be either clipped into, hooked over or held in place with torsion springs into the supporting grid work. There are two types of clip-in tile systems, one is fully downward accessible and the other can hinge and slide **(see figure 18)**. Hook over systems are hooked on to a 'J' bar and torsion spring systems employ and spring which holds the tile to the grid work.

Strip ceilings are made up from linear strips which are clipped to the suspension system. These ceilings comprise lower linear ceiling sections which are clipped to a simple grid system. Because of the open nature of the systems, they allow air to pass through easily **(see figure 19)**.

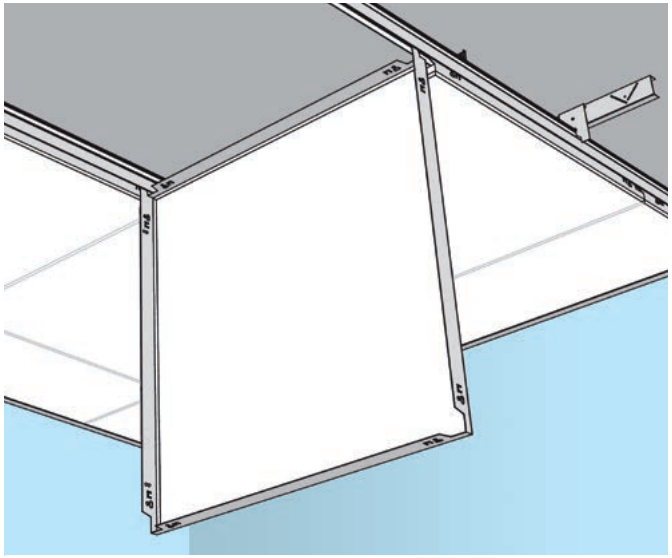


Figure 18: clip in ceiling tile

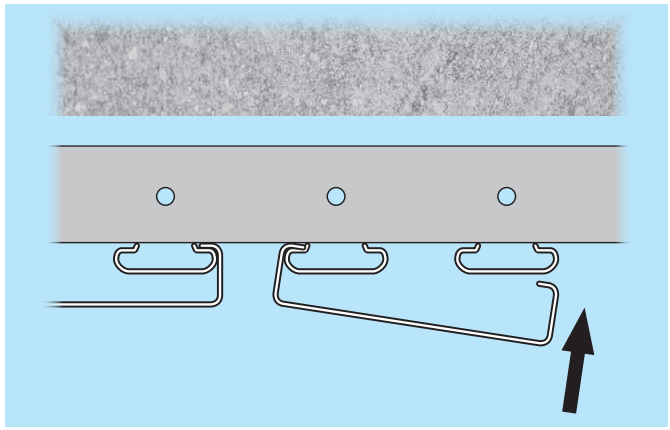


Figure 19: linear strip

3.4 SEMI-CONCEALED OR PARTIALLY EXPOSED GRID CEILINGS

Some systems are a mixture of concealed and exposed grid, where part of the supporting framework can be seen from the underside of the ceiling. Sometimes the tile forms the two long supporting edges while some have additional sections that form part of the system **(see figure 20)**.

The tiles and panels can be manufactured from mineral wool, stonewool, gypsum, metal and timber.

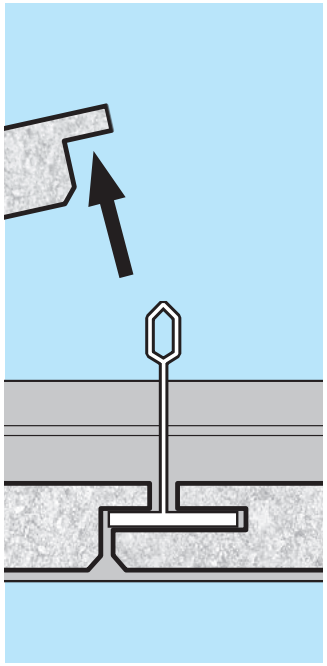


Figure 20: semi concealed grid

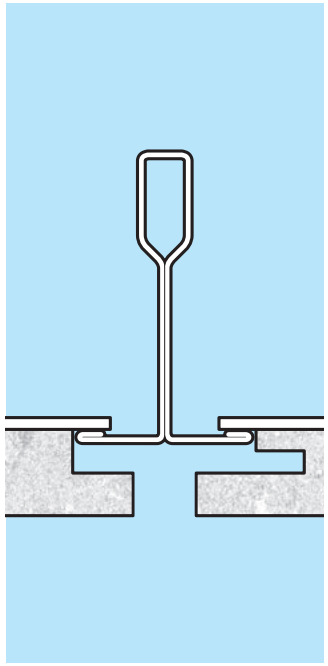


Figure 21: partially exposed grid

3.5 STRETCH CEILINGS

A stretch ceiling or tensioned ceiling is a suspended ceiling system which generally is made from a lightweight stretched fabric membrane or a fabric in tension which is secured into a perimeter profile. This type of ceiling is not suspended from above and its support/suspension is via the perimeter channels. Services will be independently supported and will be trimmed around to support the fabric of the ceiling. Identification is simple, when you push gently on the ceiling it will flex as would be expected.

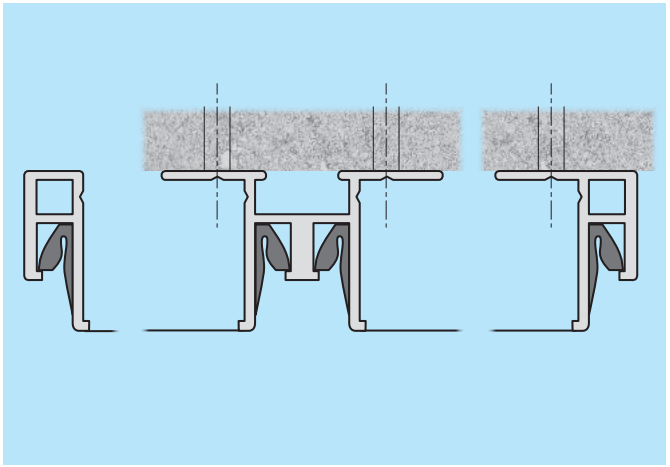


Figure 22: stretch

3.6 WALK ON CEILINGS

As the name implies, these ceilings are designed to be accessed from above allowing full access to the services. They are often installed in specialist areas where access from below is not possible due to the sensitive nature of the operations in the rooms.

This type of ceiling should be identified in the O&M manual due to the nature of the services integration. From below walk on ceilings appear as a standard metal ceiling **(see figure 23)**.

On no account should any attempt be made to walk or crawl on a ceiling until it has been established that it has been designed to do so.

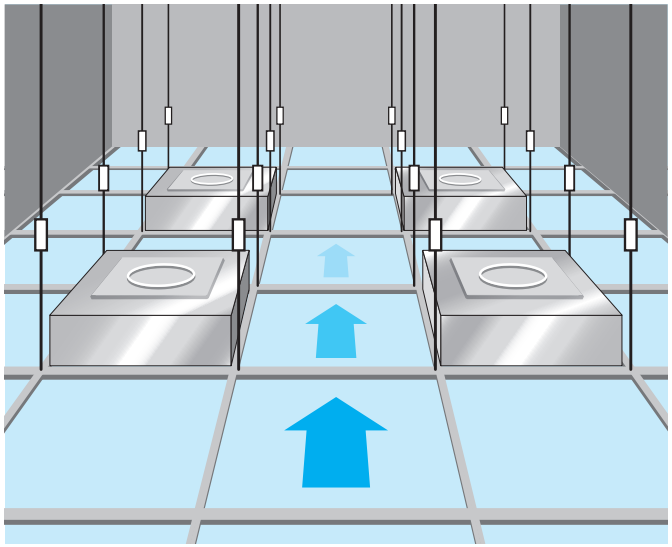


Figure 23: walk on ceiling

3.7 CHILLED CEILINGS

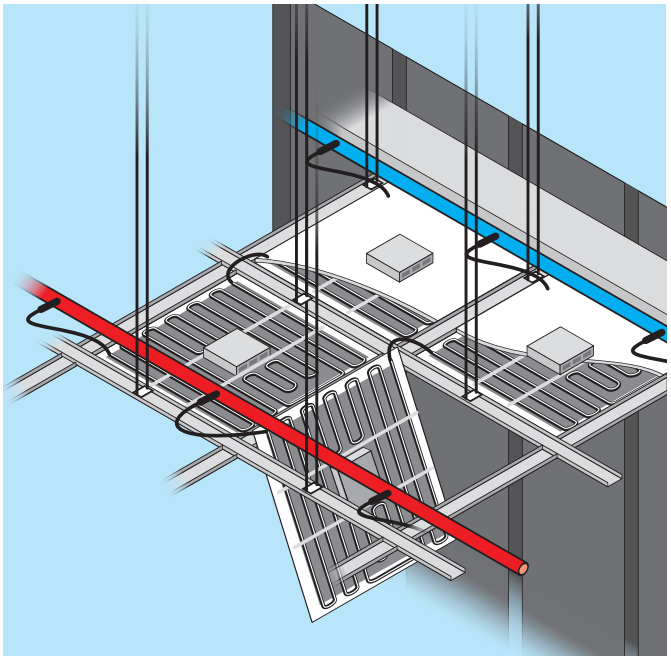


Figure 24: chilled ceiling

Chilled ceilings are an alternative to traditional air conditioning incorporating water fed copper elements to the rear of the ceiling. This type of ceiling should be identified in the O&M manual due to the nature of the services integration. From below chilled ceilings appear indistinguishable from standard ceilings **(see figure 24)**.

3.8 WOODEN CEILINGS

Wooden ceilings are one of many specialist ceiling types. They are made from solid wood or veneered panels and any specialist recommendations for access into this type of ceiling should be obtained from the O&M manual.

If there is any doubt the O&M manual/drawings and specifications or specialist contractor/manufacturer should be consulted to identify the ceiling before attempting to access the void.

It is essential that once the type of ceiling is identified that the correct methods are used and understood when gaining access to the void. The typical accessibility available is shown in **figure 25**.

	Lift and tilt	Hinge down	Downward demount	Screw fixed
Metal	✓	✓*	✓*	
Mineral wool	✓		✓	
Rock wool	✓		✓	
Glass wool	✓		✓	
Gypsum	✓	✓	✓	✓
Open cell	✓			

* Some with use of an accessible tool

Figure 25

There are variations from one manufacturer to the other for the installation, and access of their ceiling systems and if there is any doubt, the advice of a suitably qualified ceiling installer should be obtained.

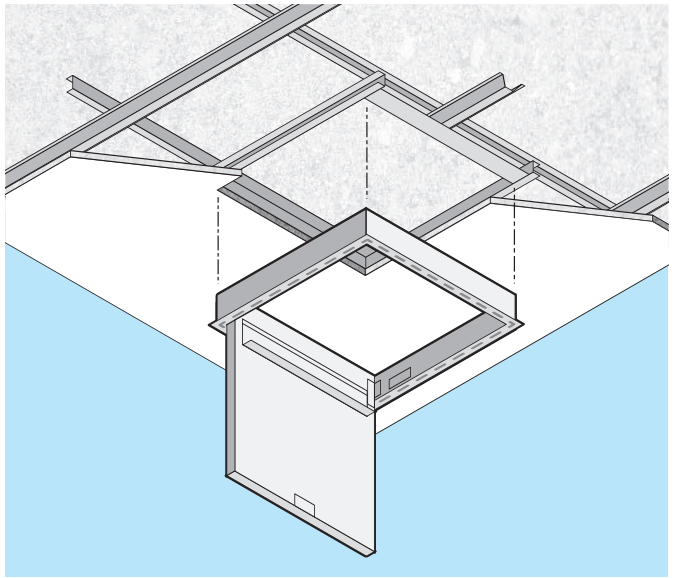
4.1 MF CEILINGS ACCESS

If there are no access panels in the ceiling, service fittings such as lights and grilles could be removed to gain access. Before attempting this method of access guidance should be sought from the M & E maintenance contractor to comply with any health and safety issues.

As a last resort or in the event of emergency access being required above the ceiling eg if there is a water leak, it may be necessary to cut out an access hole through the plasterboard. It will be necessary to locate the MF channels, which is best done using a metal detector. Once identified the plasterboard can be cut using a plasterboard pad saw. A single layer of boarding will be relatively easy to cut however multiple layers of boarding will be more difficult.

Repairs to the ceiling should be strictly in accordance with the relevant manufacturer's recommendations and details of this can be obtained via the relevant company's website.

Figure 26: access panel



4.1.1 Access panels

Access into a plasterboard ceiling can be via access panels **(see figure 26)**. There are varying types of access panels and they are generally made from metal with either metal doors or plasterboard faced metal doors. They can be supplied with an exposed picture frame surround or a beaded frame for plastering/jointing within plasterboard ceilings or a recessed door tray within an exposed grid ceiling.

Some access panels are key operated (budget locks) and some use push up and release mechanisms. With the push up and release type of panels, it is not always apparent which side the hinges are on. There may be clues such as wear or dirty marks left where the panels have been previously opened, on the side which needs to be pushed up. Access panels which are key operated can easily be identified.

To ensure the ceilings are not marked or damaged the wearing of clean cotton gloves is recommended. It is also worth bearing in mind that access panels may be fitted with safety mechanisms to prevent them from falling. These could be in the form of chains, cables or the actual hinge down mechanism. Care should be taken when opening panels as sometimes the safety mechanisms are not re-attached when the panels have been previously opened.

If access panels are installed within a fire rated ceiling, these should also have the same fire rating as the ceiling. This should be noted on the back face of the panel. The manufacturer of the access panels will generally place a sticker on the back of the panel with details such as the type, performance and manufacturer.

4.2 Exposed grid access

Where the grid is exposed the tiles will generally be easily removed by simply pushing the tiles upwards. However, care should be taken as the tiles often snag on the suspension hangers. It is also possible that cables and ducts could be lying on the back of the tiles. For these reasons gently pushing up of the tiles and checking above the tiles before removing is recommended. Once the initial tile is removed access and views above the ceiling will make additional removal of tiles easier.

4.2.1 Mineral wool and gypsum

These tiles can be damaged and care should be taken when removing. To prevent marking from dirty or greasy hands clean cotton gloves should be worn.

Never place the tiles above the ceiling after removal as this could cause damage, although in very tight ceiling voids removal of the tiles may not be possible. Where this is the case some protection should be laid on the back of the ceiling to lay the removed tile onto.

If the void allows the tile to be removed then the process for removal is to push the tile upwards with one edge being higher than the other ie the tile is pushed up at an angle. Once the tile is clear of the grid it will need to be rotated 45 degrees **(see figure 27)**, the tile will now simply drop out of the grid work. The tile should be stored flat in a safe area to avoid damage. The process should be repeated for further tiles to be removed. The location and orientation of where the tile is removed should also be noted particularly if the tiles are cut to size at perimeters.

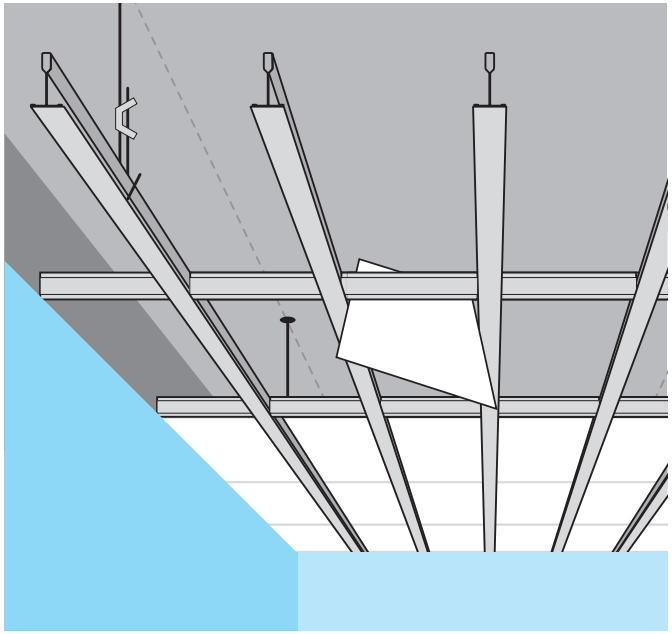


Figure 27: removing a tile from a lay in grid

4.2.2 Metal

There are similarities in how to access the void in metal and mineral wool exposed grid ceilings. The metal tiles are robust however they could be scratched on the hangers and grid above the ceiling when being removed. The method of removal of the tiles is as per the mineral wool tiles in section 4.2.1.

Where a bandraster system is installed, **(see figure 8)**, the ceiling tiles are removed by pushing the tile upwards and tilting to a slight angle to allow the tile to be downwardly demounted and removed from the grid.

There may be pads inserted into the back of the tiles and these need to be inserted into the back of the tiles with the correct orientation. There will usually be a black tissue face which should be face down into the tile and a silver foil face which should be uppermost. Pads can be used to provide acoustic and thermal insulation above the ceiling membrane.

4.2.3 Restrained, sealed and held down tiles

Some restrained ceilings require a destructive method of access whilst others can be accessed using a 'key' tile. Once the 'key' tile is removed the adjacent tiles can be removed progressively. The original ceiling installer should identify on a drawing the tile which needs to be removed for access.

Once access is gained into the ceiling, the clips on the back of the adjacent tiles will be visible and can be detached to allow removal of the tiles. Retaining clips generally locate into/over the grid work and can be unclipped as described by the relevant manufacturer. There are also clips that are removable from below without demounting the system.

The number of clips to hold down the tiles will be stipulated by the manufacturer of the system but generally more clips for high pressure cleaning and less clips for manual cleaning.

There are alternatives to using hold down clips and some manufacturers use silicone sealants to fix the tiles to the grid work. This should be apparent from close inspection. Should access be required to the void a sharp knife should be used along the tile joints to break the silicone seal. The tile can then be removed using a vacuum lifter or a blade extractor tool. When tiles are replaced the silicone seal must also be replaced.

4.3 CONCEALED GRID

Access into a concealed grid system is generally more difficult as the type of concealed grid must be known. By following simple rules it should be possible to successfully access these ceilings and reference to the O&M manual should be made and this should describe full access procedures.

4.3.1 Mineral wool and gypsum

Always wear cotton gloves when handling mineral wool tiles. The tiles will generally have a large groove on one side of the tile and a lip on the opposite face **(see figure 28)**. All tiles should be installed in the same orientation so that there is good alignment and for ease of removal. Removal of these tiles is carried out by pushing upwards on the edge of the tile with the lip. The tee bar can be removed to allow the next tile to be removed.

Where metal angle hangers have been used as opposed to wire or rod hangers, removal of the tiles can be more difficult if the tile snags the suspension.

4.3.2 Steel including linear systems

Accessing the void will vary from system to system depending on the concealed metal ceiling type installed.

Clip in and hinge down

The hinge and slide system allows greater flexibility and large areas for access into the ceiling, without having to fully remove the ceiling tiles. The ceiling tiles are manufactured from steel and are supplied in plain or perforated patterns to the face of the tile. When perforated this can be up to the edge of the tile or a plain border can be introduced. This type of tile is generally powder coated to a specified colour and gloss factor. It is possible to have specialist coatings applied for ceilings in areas of high humidity such as commercial kitchens and laboratories. The tiles can be manufactured in various sizes.

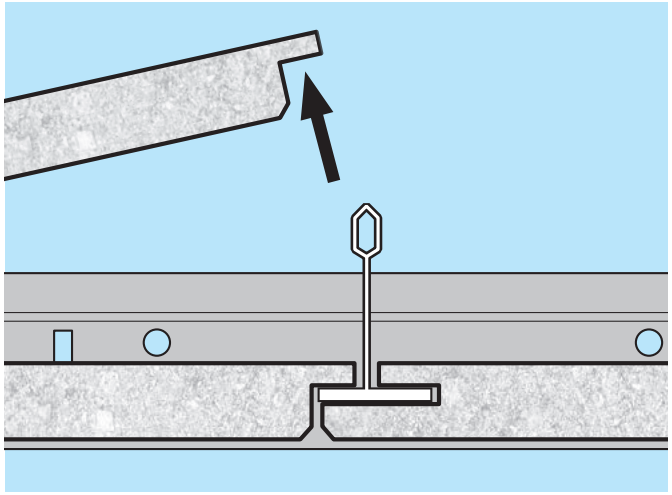


Figure 28: demountable tee

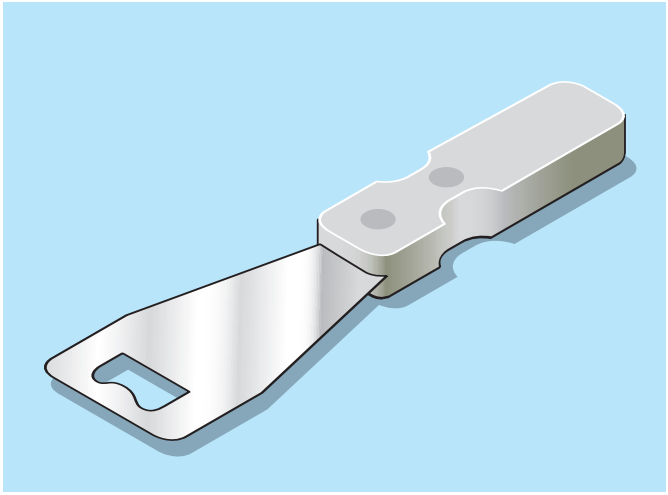


Figure 29: blade extraction tool

The method of removing clip in and hinge down tiles should be made using a blade extractor tool as follows:

1. Before removal of a metal ceiling tile it is important to establish the direction of the ceiling support grid components. The tiles will be clipped into a spring tee or omega bar **(see figures 12 and 13)**.
2. This will be relatively easy for rectangular tiles where the tee bar usually runs along the shorter edge. For square tiles the spring tee will more often than not run lengthways down the room.
3. Some manufacturers punch small hole patterns on the side of the tiles and this can assist in identification, especially for hinge down tiles where it is important to extract the correct edge of the tile.
4. Insert the blade extractor **(see figure 29)** at a slight angle between the tile joints approximately 50mm from the corner of the tile. The hook of the tile extractor should be facing the tile to be removed.
5. Push the blade of the tool slowly but firmly until it touches the top of the spring tee section. Once the tool has touched the top of the tee move it to the vertical position.

6 As the hook slips over the top of the tile there should be a slight click heard or felt.
7 Move the handle downwards at an angle and the tile should start to unclip from the tee section.
8 The tile is manufactured with either a 'pip' or 'pip and stop' in the side and by pulling down about 5mm this will release the pip from the tee.
9 This process should be repeated on the opposite corner.
10 Small tiles can be removed by a single person however with larger tiles it may be necessary to carry out the operation with two people. A risk assessment should be carried out to establish this.
11 With a full clip in system all four corners of the tiles will need to be released from the tee however with a hinge down system only two sides are released from the grid and the tile is left in a hinge down position and can slide along the length of the spring tee.
12 Replacement of tiles. Ensure that the removed 'clip in' ceiling tile is the correct orientation and that the pip and stops are located into the spring tees.
13 Push the tiles into the spring tees gently pushing upwards until the tile is bearing into the tee bar and the click of the pip can be heard/felt.
14 Clean cotton gloves should be worn to avoid finger marks on the tiles.
15 Screw drivers or tools other than the specified extracting tools should never be used as these can damage the edge of the tiles and grid.
16 Be extra careful when removing steel tiles next to glazed and plastered walls, as the edges of the tiles are sharp and can easily damage adjacent surfaces.

Hook on system

Initially check which edges of the ceiling tiles are the lay on and which are hook on, by gently pushing the ceiling tile edge upwards. If the ceiling tile edge is easy to push upwards it will be the lay on edge, if there is resistance it will be the hook on edge, because the adjacent ceiling tile edge is bearing on top of it **(see figure 16)**. To remove a ceiling tile, the adjacent tile should be gently pushed upwards enough to allow the hook over edge to be removed, pushed up and moved away from the grid work. This will allow the tile to be downward demounted. It may be advisable for two people to remove tiles: one to lift the adjacent tile and one to remove the tile.

Where this type of ceiling system is installed as a single row of ceiling tiles eg in a corridor installation, it will only be necessary to push the tile upwards and move it away from the hook over section of the 'J' bar allowing the tile to be downward demounted.

Linear grid

Linear strip ceilings are removed by unclipping the linear strip from the carrier section.

Torsion spring

The removal of tiles which are held into the grid work using torsion springs **(see figure 30)** can be carried out using a blade extractor tool to pull the tile away from the supporting grid work. In some installations there are gaps between the tiles and it may be possible to pull the tile downwards using the tile edge. The torsion spring will keep the ceiling tile secured to the grid work. It must be compressed to allow it to pass through the slots/holes in the grid work.

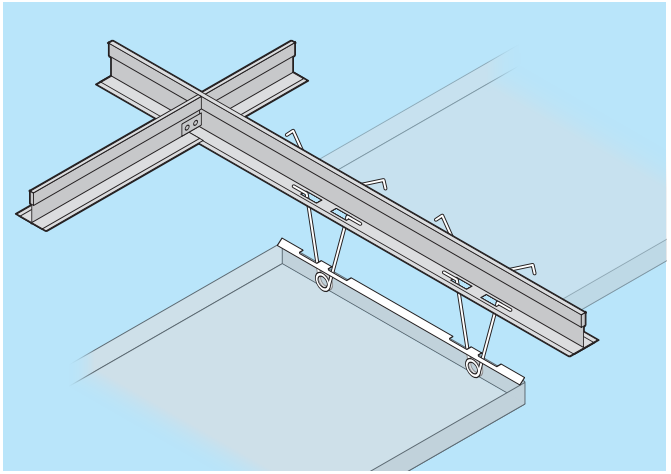


Figure 30: torsion spring

4.4 SEMI-CONCEALED GRID

Access into this type of ceiling will be similar to exposed grid ceiling system. Where the grid is only exposed in one direction only two sides of the ceiling tile bear onto the exposed grid work, the other two sides are butted together with a demountable tee or L section providing the support to these edges of the tile.

Ease of removal of the ceiling tiles will depend on the concealed grid tile edge profile. Some ceiling tile edge profiles will allow individual tiles to be removed by simply pushing upwards and sliding away from the rebated edge of the tile, whilst others require additional tiles to be removed **(see figure 15** illustrating edge profile allowing individual removal of tiles).

MAINTENANCE BY MATERIAL NOT TYPE 5

After the installation of any ceiling it is important to ensure it is correctly maintained to make certain it retains the original performance and appearance. Maintenance should not be carried out until a full evaluation of its impact has been done. It is imperative that hangers are not removed, adapted, deformed or replaced with inadequate materials and methods. If adaption is required this should only be carried out by a suitably qualified contractor. A list of contractors is available on the FIS website **www.thefis.org/services/members-directory-contractor**

Often there will be alterations to office spaces which may result in damage to ceilings, for example when partitions are relocated and have been screw fixed into the grid work, the removed screws will have caused damage to the ceiling membrane, grid or both.

Ceilings are normally installed by fully trained specialists who are familiar with the correct procedures to remove and replace ceiling tiles. There is evidence however from site visits carried out by FIS advisory service consultants that ceilings are being damaged by untrained staff, removing tiles to gain access to the service void above. This is causing unnecessary waste that can be avoided. Source: FIS Report 014 Mineral Wool Ceiling Tiles: A Resource Efficiency Action Plan June 2012. Download a copy from: **www.thefis.org/assets/Uploads/Mineral-Wool-Ceiling-Tiles-A-Resource-Efficiency-Action-Plan.pdf**

It may be necessary to alter the ceiling to facilitate the removal or replacement of equipment above the ceiling. It is very important that when this work is carried out that the same grid work is used in order to maintain the performance of the ceiling. It is not advisable to mix components from various manufacturers as they are unlikely to fit well together. This could result in an unsafe installation and possible non-compliance. Any alteration of the grid work and hangers should only be carried out by a suitably competent person.

5.1 MF CEILINGS

The maintenance of MF ceilings will generally only require repainting to maintain the standard of decoration. It is possible that the ceiling boarding may become damaged and this can be categorised into minor damage and major damage. It is imperative that the ceiling's performance is fully understood prior to any repairs being carried out - for example, is the ceiling fire rated or acoustically rated?

Minor damage

Minor damage would typically be shallow indents. To rectify lightly sand the damaged area to remove any burrs and fill with plasterboard filler. Once the filler has fully set the surface should be lightly sanded.

Where the ceiling is a tape and jointed finish the application of a drywall primer is recommend to prepare the surface for decoration. In areas of high humidity the application of a drywall sealer should also be considered.

If the damage is major, the plasterboard core should be checked to ensure that it is not damaged as impact can cause the core of the board to shatter even if the paper face is not damaged. If the core is intact then repairing as described above should be adequate.

Major damage

Where there are deep indents resulting from impact, damaged core/broken edges to the boarding and this occurs on non-performance ceilings, the damaged section of boarding can be removed by cutting out. The exposed edges of the boards should be sealed with a suitable PVA sealer and the resulting hole can be filled with a stiff mix of jointing filler. Paper taping over the repair will reduce the risk of cracking.

For more major damage the damaged boarding should be cut out back to the framing members. MF channels and additional members may be required to re-support the edges perpendicular to the main channels.

On multiple boarded fire and/or acoustic rated ceilings, the boarding between the layers will need to be staggered in accordance with the manufacturer's recommendations to maintain the ceilings performance. The boarding, which must be the same thickness and type as that removed should be screw fixed to the MF framework using the correct length and type of screws. Plasterboard comes in 9.5mm, 12.5mm, 15mm and 19mm thicknesses and there are several types which could be installed. If the boarding is non-gypsum based thicknesses and types will vary.

Once the repair is complete it should be finished using the recommended jointing process. Major damage repairs should only be undertaken by an experienced drylining/ ceiling contractor.

5.2 EXPOSED GRID/AND CONCEALED GRID

There are companies who offer an onsite cleaning service using their own mix and choice of cleaning methods. Where these methods are employed, it is recommended that a trial operation is first carried out so that the result and overall effect can be assessed. It is best in this case to conduct such a test in a non-critical area of the building.

5.2.1 Mineral wool

First remove surface dust from the ceiling using a soft brush. Pencil marks, smudges etc may be removed with an ordinary art gum eraser. An alternative method of cleaning is with a moist cloth or sponge dampened in water containing mild soap or diluted detergent (pH value 8-11) 1:100 concentration. The sponge should contain as little water as possible. After washing, the soapy film should be wiped off with a cloth or sponge lightly dampened in clean water. Abrasive cleaners must not be used.

5.2.2 Metal

Dust should be removed from the painted surface by wiping with a clean soft cloth. Any stubborn marks can be removed with a mild household detergent in warm water. The use of abrasive cleaners or scrubbing of any of the painted surfaces should be avoided. Metal ceilings are unaffected by moisture and can be made damp with no adverse results, as long as the paint surface is not damaged.

5.2.3 Gypsum plasterboard

Plasterboard should not be cleaned with a damp cloth unless it is sealed or coated. Generally dusting of the surface will be sufficient. Repairs can be carried out as per MF ceilings and the tiles can be re-decorated.

5.2.4 Restrained, sealed and held down tiles

This type of ceiling is designed to be washed down and the manufacturer's recommendations should be adopted.

High pressure cleaning/power washing (clip down tiles only)

Generally the need for high pressure cleaning is limited to a very small number of specialised applications. This is due to the fact that if not done in a very controlled way, this method can actually spread fungi and bacteria around a ceiling rather than removing them.

This method must be adopted with care and it is recommended that a small trial area should be initially attempted.

The following precautions should be observed to avoid damage to the tiles:

1 Tiles must be clipped down using a minimum of two clips for 600mm dimensions and three clips for 1200mm.
2 Apply a coating of cleaning foam.
3 Flush off with clean water.
4 The water pressure must not exceed 65 bars.
5 The distance of the nozzle must not be closer than 300mm from the ceiling face and the angle of application should be 45 degrees.
6 The application pattern of the water from the nozzle should be fan shaped.
7 The cutting mode must not be used.
8 The maximum water temperature should be 40°C
9 The water flow limited to 6-8 litres per minute.

In hygienic areas, only permitted cleaning detergents should be used and the the water/detergent mixture should be pH 7-12. Although water penetrates into the product and around its edges, after one-two days the water should evaporate. The prevailing temperature and ventilation in the ceiling void are important factors in minimising this time.

5.3 STRETCH CEILINGS

Maintenance of stretch ceilings, including repairs, should only be carried out by suitably trained operatives.

It is possible to clean stretch ceilings and advice should be obtained from the relevant manufacturer who will advise on the methods and products that should be used.

5.4 HANGERS

It is not necessary to carry out regular maintenance of hangers, however if hangers are moved, cut or adapted this can be catastrophic, and may lead to a ceiling collapse.

Any adaptations to hangers (and associated grid work) should only be carried out by suitably trained operatives.

6.1 MF PLASTERBOARD CEILINGS

Plasterboard is a highly sustainable product and can be 100% recycled. The plasterboard manufacturers are all members of the GPDA Gypsum Products Development Association (GPDA) and they have all invested directly and through third parties to provide the mechanisms for plasterboard waste to be delivered to processing stations.

There is no simple way to take down plasterboard ceilings as the screws securing the boarding to the MF framework are all concealed by the plaster/jointing/ decorated finish. Once the outer layer of boarding is removed, which could be done by levering the boarding off the MF framework, any subsequent layers can be unscrewed as the screws will be visible.

All of the support grid work, which is galvanised can also be recycled and should be disposed of as scrap metal at a recycling plant.

6.2 MINERAL WOOL

Mineral wool tiles are recyclable, however it is estimated that millions of square metres of mineral wool tiles are sent to landfill each year, which not only represents a significant loss of valuable resources but is also a waste of the energy and materials that went into them. This is mainly due to the relatively low value of the material and the perceived low cost of landfill as compared to the cost of correctly identifying and segregating the tiles for recycling.

Waste from mineral wool ceiling tiles is generated in three waste streams:

- Redundant materials from strip out
- Waste created during the installation process
- Damage caused by incorrect removal of tiles

CEILINGS SUSTAINABILITY PARTNERSHIP
Improving sustainability in the ceilings sector

An industry group has been established to address the issue of recycling called the Ceilings Sustainability Partnership (CSP).

It has established a number of routes to recycling, including closed loop schemes where tiles are recycled back into tiles.

Details of what can be done to recycle tiles from a site can be found on the FIS website:
www.thefis.org/assets/Uploads/Technical-Library/Annex1.pdf

6.3 METAL TILES AND GRID WORK

Metal ceilings and associated products are manufactured from steel and aluminium. Steel is the world's most recycled product, it has a residual value at the end of life and there is no landfill costs associated with its disposal as there is a well established infrastructure for scrap steel recycling.

Ceiling tiles manufactured from steel offer many environmental credentials. Throughout the manufacturing process waste is minimised and recycled. Steel contains at least 20% recycled content as standard but is 100% recyclable at end of life.

Scrap steel is an essential part of the production process and accounts for up to 60% of the raw material used in structural steel. The scrap steel can be used in the manufacturing of any steel product; as a result there is a genuine demand for recovered steel, which allows the recycling loop be closed.

CONTRACTING SUPPORT ADMINISTRATION 7

7.1 SUSTAINABILITY

All construction projects over a certain value will have a sustainability / carbon footprint agenda which will have to be embraced by all specialist contractors to share in the process.

As a best practice principle, all specialist contractors should have an ongoing carbon footprint reduction programme, which can then become applicable on all projects.

This will include the disposal of all materials from the strip out, and offcuts from the installation. Materials may be selected to comply with systems that are designed to measure the environmental impact of the fit out such as BREEAM, LEED or Ska and in more specialist areas DREAM and CEEQUAL **(see page 21)**.

7.2 HEALTH AND SAFETY

To conform to the Health & Safety at Work Act 1974 the specialist contractor and main contractor must provide a method statement and risk assessment of the work that has to be undertaken on each project. All members of the construction team have a duty of care to their site colleagues.

Working to agreed programmes and to formalised method statements can contribute to site safety. Identifying hazards and assessing potential risks should cover the working environment, the work to be done, the tools and equipment to be used and the materials to be installed.

Guidance can be sought from the 'FIS Health & Safety Handbook' and also the 'FIS Site Guide for Suspended Ceilings', which has particular reference to working at height.

7.3 PESTS IN VOID SPACES

Voids such as those in ceilings and walls have a lot to offer pests. Pests can be warm, undisturbed and often gain access to another part of the property for food and water. Pests are often at their most dangerous when you don't know they are there. Knowing the signs can help avoid pests and the risks of damage, disease and injury due to unexpected discovery.

Rodents

Rats and mice regularly nest and hide in roof and ceiling voids. Common rats leave droppings that average 12mm in length, house mouse droppings are 3-7mm. Rodents bring the risk of disease from droppings and urine. There is an associated risk of electrocution due to rodents gnawing through cables.

Be aware that external rat activity is often linked to buildings. If rodents are a potential issue the work area should be inspected by a professional pest controller. Remember, squirrels are rodents and are just as likely to gnaw cables, pipes and joists as rats and mice.

Wasps

Wasps build a new nest of paper mulch every year, often in wall and ceiling voids and roof spaces. By the end of summer the nest can be the size of a small fridge and contain 5,000 plus wasps. Disturbing such a nest can be very dangerous as wasps can emit an attack pheromone which makes the colony aggressive. Staff who are stung may go into anaphylactic shock. If a nest is discovered, work should be stopped and a professional pest controller contacted. Often nests are disused but should be inspected by a professional.

Birds

Bird species such as pigeons are serious pests in voids and lofts. Working in an area where pigeons have been nesting can be damaging to health as a number of diseases and infections are associated with the debris and detritus left by pigeons.

Certain species can be killed and removed under special licence by pest professionals, and debris treated with specialist disinfectants to render it safe. Pigeon debris is quite obvious, and will often contain a number of biting pest insects along with bacteria. Always wear PPE and RPE if working near bird debris - ideally it should be cleared by a specialist before work begins.

For competent and suitably insured pest control support contact the British Pest Control Association:
www.bpca.org.uk

7.4 OPERATION AND MAINTENANCE (O&M) MANUAL

The O&M manual is left with the main contractor who in turn makes it available to the client.

Typically this includes:

- Products installed
- 'As built' drawings
- Manufacturers' product information, including source of replacement material, and advice on cleaning, maintenance, repair and disposal of materials for recycling at end of life
- Acoustic and fire performance details
- Details of any special elements to the project
- Advice on removal and replacement of tiles
- Relevant COSHH data

REFERENCES 8

BREEAM

BREEAM is an environmental assessment method and rating system for buildings. Launched in 1990, it sets the standard for best practice in sustainable building design, construction and operation and has become one of the most comprehensive and widely recognised measures of a building's environmental performance.

A BREEAM assessment uses recognised measures of performance, which are set against established benchmarks, to evaluate a building's specification, design, construction and use. The measures used represent a broad range of categories and criteria from energy to ecology. They include aspects related to energy and water use, the internal environment (health and wellbeing), pollution, transport, materials, waste, ecology and management processes.

www.breeam.org

LEED

Leadership in Energy and Environmental Design (LEED) is a third party certification programme for buildings. It is a nationally accepted organisation for design, operation and construction of high performance green buildings. This ensures the buildings are environmentally compatible, provide a healthy work environment and are profitable.

LEED New Construction buildings are awarded points for sustainability for things like energy efficient lighting, low flow plumbing fixtures and collection of water. Recycled construction materials and energy efficient appliances also impact the point rating system.

www.leed.net

Ska

Lead and owned by the Royal Institution of Chartered Surveyors (RICS) the Ska Rating is an assessment method, benchmark and standard for non-domestic fit outs. It helps landlords and tenants assess fit out projects against a set of sustainability good practice criteria.

Ska Offices is used on fit out projects large and small, both refurbishment and new build, and it scores environmental good practice irrespective of the base building. The offices scheme consists of 109 individual good practice measures covering Energy and CO_2 Emissions, Waste, Water, Materials, Pollution, Wellbeing and Transport.

Ska Rating for Retail is suitable for fit-out projects of any size in existing or new buildings and for one-off projects or multi-store roll out programmes including:

- Food retail
- Non-food retail
- Retail banks
- Restaurants.

This guidance is freely available along with an online assessment tool, which can be used informally or for formal certification using an RICS Ska Rating Accredited Assessor. Assessments can be carried out at three stages: design, handover and occupancy.

FIS is a Ska development partner.

www.rics.org/ska

DREAM

DREAM is an online environmental assessment tool, developed by Defence Estates (Property Directorate) and supported by IT Consultants RED C, for new building and refurbishment projects on DIO (Defence Infrastructure Organisation).

www.dreamassess.com

CEEQUAL

CEEQUAL is the sustainability assessment, rating and awards scheme for civil engineering. It can be used for the assessment of all types of civil engineering, infrastructure, landscaping and public realm projects and contracts. It uses rigorous evidence based assessment criteria and external verification to provide a result that can be made public and used in publicity. In addition, an important benefit for clients and society is Integration of the question set in the development of projects and contracts because this can very positively influence design and construction management and often leads to significantly better outcomes than would otherwise have been the case.

www.ceequal.com

ACKNOWLEDGEMENTS 9

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FINISHES & INTERIORS SECTOR

FIS has grown over the past 50 years to become the leading trade association for the interiors fit out sector of the construction industry. FIS represents companies involved in the manufacture, supply and installation of all aspects of interior fit outs and refurbishment.

FIS members operate in retail and commercial offices, the public sector, banks and building societies, hotels and leisure, airports, hospitals, and so on. Most work nationally and an increasing number operate in Europe and beyond.

Quality and integrity lie at the heart of FIS's philosophy - each member is expected to act with the utmost integrity, and to exercise the highest standards of business practice and workmanship. At the same time, the Association seeks to continually raise, maintain and ensure the perpetuation of standards in order to remain a source of quality membership.

fIS membership is not automatic and applicants are subject to strict vetting procedures on application, as well as ongoing vetting. In the case of contractors, this includes inspection of recent contracts to assess workmanship standards.

www.thefis.org

WRAP works with businesses, local authorities, communities and individuals to help them reap the benefits of reducing waste, developing sustainable products and using resources in a more efficient way. Established as a not-for-profit company in 2000, WRAP is backed by all four governments across the UK and the EU.

WRAP's approach to resource efficiency in the build environment drives financial savings while prioritising energy, waste, water and carbon reductions. For more information visit **www.wrap.org.uk/construction**

FINISHES & INTERIORS SECTOR

BEST PRACTICE GUIDE
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