

1. Introduction

EQUITONE may be face fixed to a metal supporting frame using the EQUITONE UNI-rivet. The rivets have colour matched heads to match the panel. Aluminium rivets can only be used with aluminium supporting frames. Stainless steel rivets can be used with, aluminium, galvanised or stainless steel supporting frames. The thermal expansion and contraction is many times greater for the metal supporting frame than for EQUITONE. Therefore, a fixing system that accommodates the movement of the metal is highly recommended. Failure to do so could result in causing cracking in the panels.

Area of Application

This Guidance Note gives recommendation for rivet fixing EQUITONE [tectiva], EQUITONE [linea], EQUITONE [natura], EQUITONE [pictura], EQUITONE [textura], EQUITONE [materia] and EQUITONE [lunara] to a vertical facade.

For sloping facades please contact your local EQUITONE Technical Support.

2. Design Advice

The following advice must be followed:

- EQUITONE Aluminium or Stainless Steel UNI-Rivets must be used
- All holes to be 11mm diameter
- 2 STOP fixing points per panel positioned as shown in this Note
- All otherfixing points to be GO points
- No panel is to span over an aluminium support frame joint
- Respect the material when storing, handling and installing

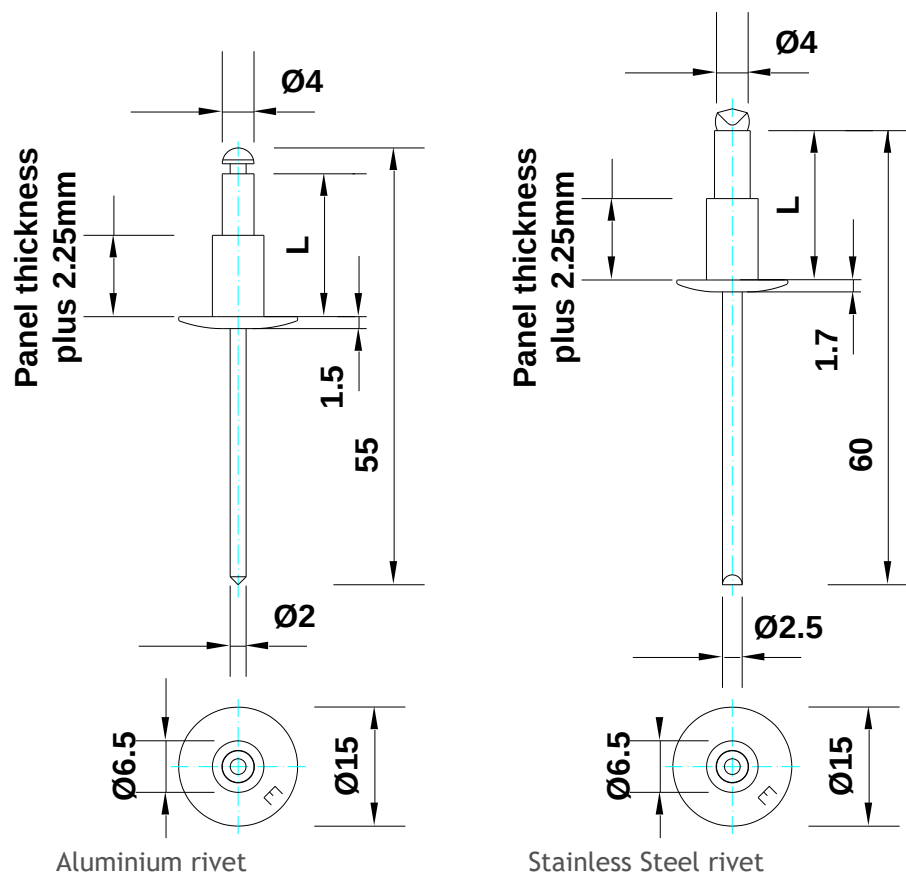
3. EQUITONE UNI-Rivet

With its unique design the EQUITONE UNI-rivet fixing system provides EQUITONE with 3-way movement to ensure minimum strain is placed on the panel when fixing to metal supporting frames.



Board thickness	Sleeve length	Aluminium UNI-rivet	Stainless Steel UNI-rivet
8 mm	10.25	4x18 K15 AlMg5	4x18 K15 A2 4x20 K15 A2
10 mm	12.25	4x20 K15 AlMg5	4x20 K15 A2
12 mm	14.25	4x25 K15 AlMg5	4x22 K15 A2 4x24 K15 A2

It is possible for example to use 12mm rivets with a 10mm board if the framing is thicker or thicker flashings have been used. The green/red sleeve will need to be changed to suit the panel thickness. These rivets will very likely be MTO material and subject to an increased delivery time, for confirmation contact your local technical department.



Grip Range of Rivets

8mm Panel

Rivet Type	Suitable for Support Frame Thickness
4x18 K15 AlMg5 Aluminium rivet	1.7mm to 3mm
4x18 K15 A2 (304) Stainless Steel rivet	1.7mm to 3.5mm
4x20 K15 A2 (304) Stainless Steel rivet	3.5mm to 5.5mm

10mm Panel

Rivet Type	Suitable for Support Frame Thickness
4x20 K15 AlMg5 Aluminium rivet	1.7mm to 3mm
4x20 K15 A2 (304) Stainless Steel rivet	1.7mm to 3.5mm
4x22 K15 A2 (304) Stainless Steel rivet	3.5mm to 5.5mm
4x24 K15 A2 (304) Stainless Steel rivet	5.5mm to 7.5mm

12mm Panel

Rivet Type	Suitable for Support Frame Thickness
4x25 K15 AlMg5 Aluminium rivet	1.7mm to 4mm
4x22 K15 A2 (304) Stainless Steel rivet	1.7mm to 3.5mm

Rivet Centres

Many factors influence the design when considering the rivet position. Factors such as:

- Height of Building - Normally the higher the panels are on the façade, the greater the number of rivets. However some country's calculation methods will treat a façade the same using the highest value only.
- Panel Layout - The rivet centres commonly differ between vertical and horizontal orientated panels.
- Thickness of Panel - Thicker panels provide higher resistance values and in some circumstances can result in greater rivet centres.
- Wind Loading - The factor which influences the number of rivets per panel the most is the wind load the panel is expected to be subjected to.
- Site Location - The buildings location will play a major factor in determining the number of fixings. Is the building in an urban or rural setting, close to the sea or at altitude.
- Panel position on the façade - Certain zones on façade such as the corners can require closer rivet centres.

Most regions around the world have their own unique standard for structural calculations and these need to be adhered to. In Europe all calculations have been based on Eurocode guidance. However each country has its own unique annex to the code. This may affect the calculations.

Fixing centres table

8mm Panels with vertical support frame.



Max design - Wind load kN/m ² ; kPa	Max Horizontal Fixing centres	Max Fixing centre along frame
1,67	600 mm	600 mm
1,92	600 mm	500 mm
2,48	600 mm	400 mm
3,66	400 mm	500 mm
4,73	400 mm	400 mm
4,86	400 mm	375 mm
5,86	300 mm	400 mm



Max design - Wind load kN/m ² ; kPa	Max Horizontal Fixing centres	Max Fixing centre along frame
1,72	600 mm	600 mm
2,17	500 mm	600 mm
2,62	600 mm	400 mm
2,70	600 mm	300 mm
4,60	400 mm	400 mm
3,79	500 mm	300 mm
5,73	400 mm	300 mm

EQUITONE Uni-Rivet

Application Guide fixing to metal support frames all materials

TECHNICAL
NOTE:
E-10/01/en/v2

Please note that the information given is for guidance only and should be confirmed by the project engineer. The dimensions given below relate to full size panels.

A material safety factor of 2 has been used for the values.

All calculations of the wind-load must be determinate in addition to these values according to local national regulations. For example, the safety factor according Euro Code for variable wind loads is ($\gamma_Q=1,5$).

Values are given for 2 mm Aluminium support frame to EN AW 6063 using the EQUITONE UNI-rivet. The anchoring distance for the wall angle brackets must be less than 900 mm.

Position for Corner UNI-rivet

From the horizontal edges of the panel the dimension is 70 mm -> 100 mm.
From the side edges of the panel the dimension is 30 mm -> 100 mm.

Placing the corner rivets 80 mm from the horizontal edge 30 mm from the vertical edges visually is the best location.

The centres for the rest of the fixings are determined based on the engineers wind load calculations.

Holes in the Panel

The panel must be pre-drilled with an 11 mm diameter size hole. The EQUITONE fibre cement drill bit must be used. Accurately mark the hole positions on the face of the panel. Please note that it helps to use a coloured pencil to mark a grey tone panel as a grey pencil mark can cause confusion. Drill one panel at a time face side up.

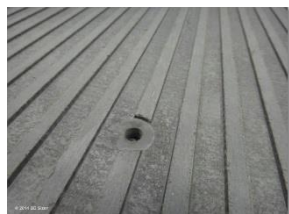
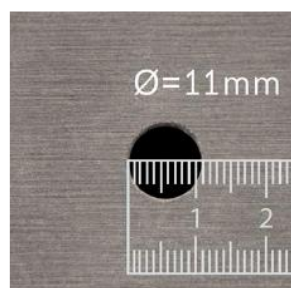
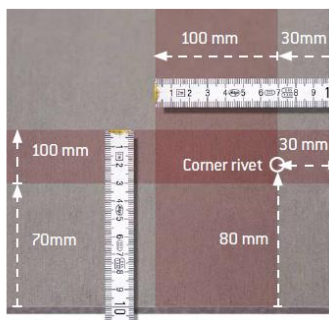
From an aesthetic point of view when drilling the EQUITONE [linea] it is recommended to align the fixing points with the ribs of the panel. Doing so, the head of the UNI-rivets are the least visible. This will result in a wider metal support rail of up to 140 mm being used behind the vertical joints.

Pre-drill the panel with an 11 mm diameter size hole using the EQUITONE drill bit.

Each panel has two STOP points.

The two STOP points are formed by using the **RED** rivet sleeves to fill the oversized hole.

No **RED** sleeve is used for the GO holes.



EQUITONE UNI-Rivet with sleeve

EQUITONE UNI-Rivet - STOP Point

Selection of STOP Point UNI-Rivets

The selection of STOP points is critical. The general principles are:

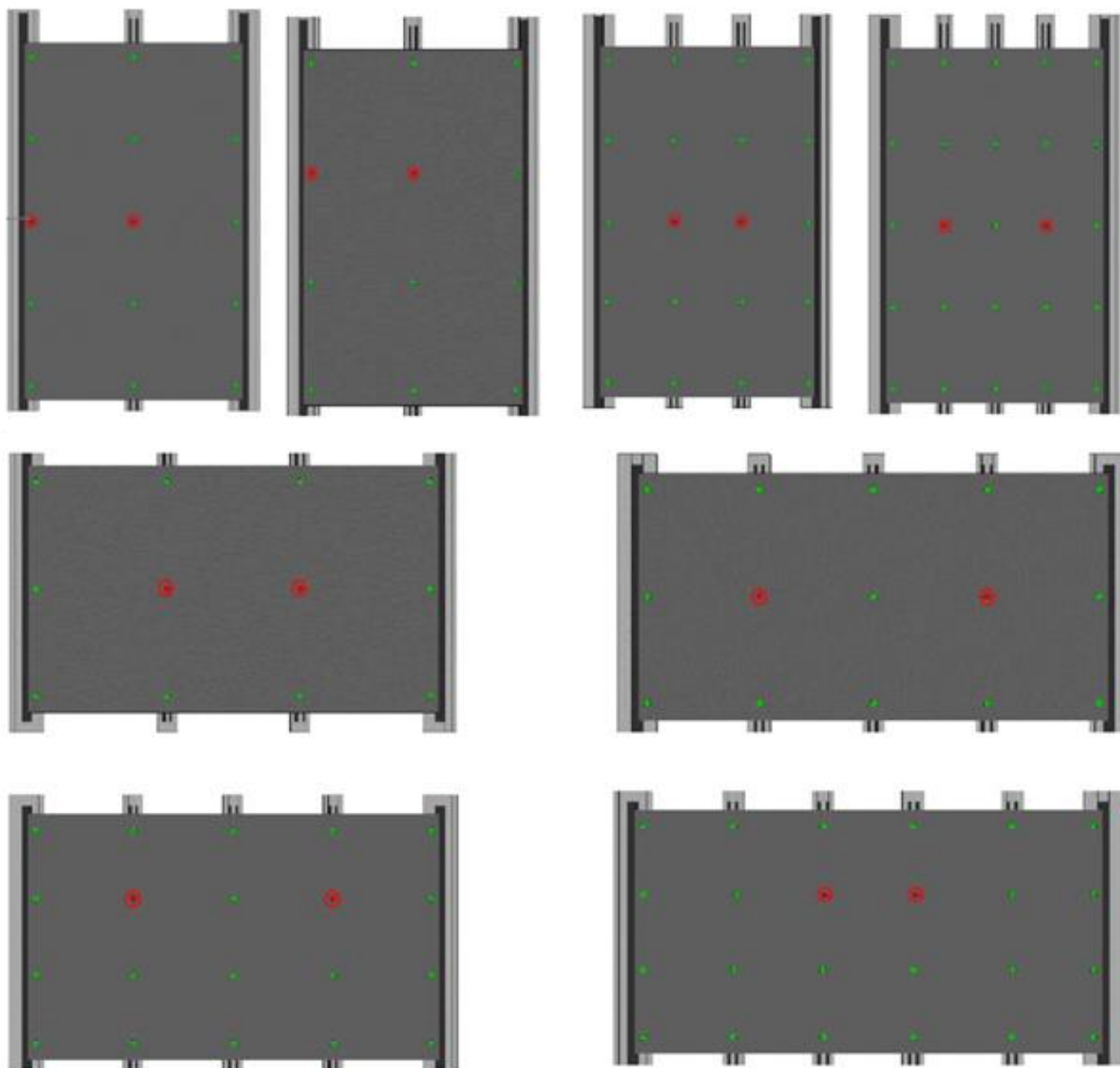
2 STOP points per panel, the rest are GO points.

STOP points are fixed on adjacent supporting rails.

One STOP point is located in the middle and the second STOP point can be either to the left or the right of the centre STOP point.

It is very important that whichever option is chosen that the location of STOP points on all panels are the same.

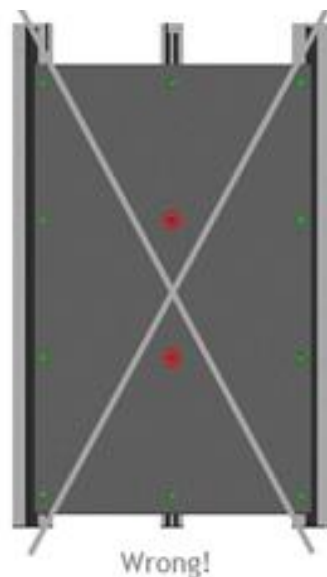
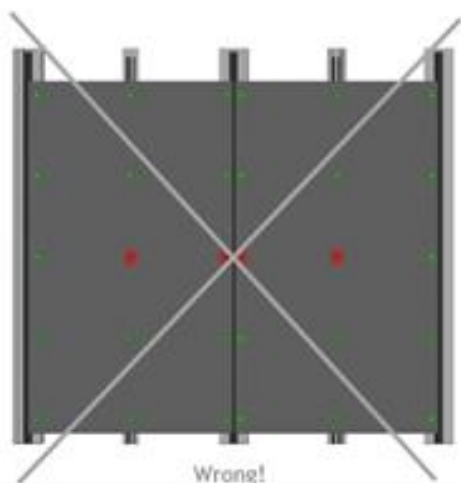
STOP points are located as close as possible to the central area of the panel



Do Not

At no time, should the STOP points be aligned with two adjacent STOP points on the same vertical rail see page 6.

The STOP points must not be aligned with two adjacent STOP points on the same supporting frame profile see page 6.



When narrow EQUITONE panels are used with only 2 lines of fixings it is important that there is a vertical break in the support frame, so the panels are not locked together. This means using two L profiles instead of a T profile. Depending on the panel arrangement and site conditions this could mean a separation at every join or a separation at 3.0m centres. Also note that the maximum panel width is 600mm. Please contact your local EQUITONE Technical Support.

Foam Tape



Foam tape is applied to the face of the framing system to allow for movement of the material and to prevent rattling. It allows metal fillings from drilling of the rail to drop away and prevents condensation lines from the framing from occurring on the front of the panel during cold weather. When conditions are unfavourable, such as very cold or wet weather, it is advisable to either apply the tape onto the profiles indoors and then fix the profiles, or alternatively, warm/dry the profiles. The foam tape should be trimmed at horizontal panels joints so that it is not visible once installed.



Drawing showing the foam tape.

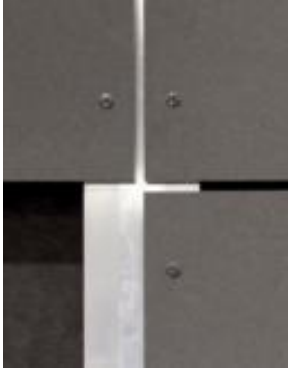


4. Joints Between the Panels

Joint Width

A 10mm joint is recommended.

The minimum permissible joint is 8 mm while the maximum would be 12 mm.



Joints

Vertical joints are backed with a continuous T rail. With standard aluminium rails the grey or silver colour can be prominent especially when used with dark coloured panels. To eliminate this, the best solution is to use black coated rails.

Horizontal joints can be either left open or baffled with a horizontal joint profile.

The supporting frame is also visible with open horizontal joints as well as insulation and the supporting wall, they may need to be covered with a black lining type material especially at ground level.



To baffle the horizontal joint, an aluminium joint profile is inserted behind the panels. By using a baffle the majority of water is prevented from entering the cavity. Before final fixing of the lowest UNI-rivets the profile is slid up under the panel. When the UNI-rivet is fixed, the profile is held in place.

Aesthetically, it is best not to continue the profile across the vertical joints but to cut it approximately 4mm narrower than the width of the panel, leaving the profile 2mm shorter at each side. To prevent the joint profile moving sideways and showing at the vertical joints, cut and bend the top or bottom edge of the profile at both sides of one of the vertical support rails.

In some buildings it is advisable to have baffled joints, such as the low areas of Public or Educational Buildings. The baffles will prevent debris from being deposited behind the panels. In the case of nurseries, the baffles will prevent small fingers from getting stuck in the joints.

When a building is of lightweight construction, some countries have a regulation that insists that the joints should be baffled to reduce moisture ingress.

5. Air Space Cavity

Cavity Width

The minimum cavity width air space should be 20 mm direct behind the panel. However this depends on the height of the cavity, local driving rain index and local regulations.



20 mm

Tolerances

Allow for a tolerance of 20 mm when designing a cavity. Building irregularities, especially uneven backing walls, insulation holders and the supporting frame must never compromise the width of the cavity.

Ventilation

A through flow of air is achieved by utilising the stack-effect, in which a current of air enters at the base of the cladding and exits at the top. As well as cavities being ventilated at the top and bottom of the façade, it is also important that air is allowed to enter and exit under and over openings such as windows. These openings need to be protected against entry of birds and vermin into the cavity space. Failure to protect from these creatures will cause damage to the insulation, cavity space and even the backing wall. This is normally achieved by fitting a perforated profile. It is important that the perforations are sized correctly to allow air in and out while stopping entry of small creatures.

6. Metal Supporting Frame

The guidelines for the construction of a ventilated aluminium and galvanized supporting structure can be found in the EQUITONE Application Guides for the respective support framing systems.

All parts of the aluminium supporting frame are made of a high quality aluminium alloy to EN AW 6063. Please refer to local regulations for the level and quality of galvanised coating required for the framing elements. In some countries a guideline a level of 275 g/m² is advised.

Maximum buckle under the influence of strain: SPAN/300 with a maximum of 4mm

The most common arrangement for the panel's support is onto metal vertical rails. Vertical rails ensure that the air flow in the cavity space is not disrupted and that there is free drainage of any moisture.

While fixing EQUITONE panels to a horizontal support frame can be done, the designer needs to consider that

- a) Any moisture running down the back of the panel may become trapped and will rest on the horizontal rail. This may cause the profile to deteriorate over time or cause temporary staining to the panel.
- b) The cavity between the insulation and the panel will be wider to accommodate the horizontal profile. A double support frame system may be needed to form the cavity.
- c) The air in the cavity will not be as smooth flowing.

Where possible all structural connections should be facing "down-and-out" to minimise the risk of moisture travelling along them back towards the wall.

7. Panel Preparation



Storage

Store flat on a pallet in dry conditions, clear of the ground and not more than 5 stacks high. Panels are to be ventilated to prevent staining.

Panels delivered to site to be installed immediately or unloaded into a suitable protected storage area.

Stack the panel's front face-to-front face or rear surface-to-rear surface.

Handling



Always lift panels off each other, never slide. Carry the panels on their back edge. Protect the face from scratching or damage.

Use soft bearers (carpet, foam, etc) to rest the panel edge on to protect them.

Use clean textile gloves when handling the panels to help prevent finger print staining and eliminate cleaning time.

Always leave the factory inserted protective foil between the panels when re-stacking.

On-Site Panel Fabrication

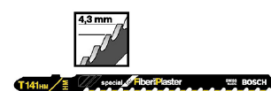
Where possible, off-site pre-cutting is preferred.



Use the EQUITONE fibre cement drill bits. Drill panel face up. Clean off all dust. Use a solid workbench indoors. Drill 1 panel at a time.



Use only EQUITONE saw blades to cut the panels on site. Cut Panels face down. Clean off all dust. Use a solid workbench indoors. Cut 1 panel at a time.



Use a Bosch T141HM jigsaw blade. Turn off pendulum function. Cut face down. Clean off all dust.



Edge Treatment
Sand the edges of panels after cutting using 80-grit sandpaper.



Remove all dust with a soft micro-fibre cloth, soft brush or compressed air duster gun.

For cutting on site, make sure a vacuum system is used to remove all cutting dust. Ensure good health and safety practice is enforced using correct personnel protective equipment for all operatives. For additional information refer to EQUITONE guide for installers.

8. Edge treatment procedure - Luko.

With clear coated EQUITONE panels, [natura], [natura]pro, moisture ingress at the panel edges can become apparent as edge efflorescence or develop a darker shade in wet weather. This effect will disappear over time and stop occurring. The length of time depends on seasonal weather conditions. To help prevent this phenomenon from occurring, the edges of all coated panels should be impregnated with Luko edge sealant after cutting.

Edge treatment procedure - [natura] and [natura]pro



After sanding the edges of the panel remove all dust from the edges.



Apply the Luko between +5 °C and 25 °C.
Treat one panel at a time.



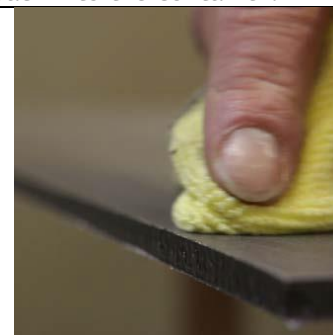
Simply pour only enough Luko into the clean tray that can be used within 30 mins.
Do not pour any leftover Luko back into the container.



Use the sponge applicator by dipping into the liquid and removing any excess.
Do not move the applicator over the surface of the panel as any drips will be seen and cannot be removed once dried.



Starting at one side of the panel, angle the applicator away from the face of the panel.
Simply run the applicator along the edge.
Ensure full coverage of the edge.
Repeat process if necessary.



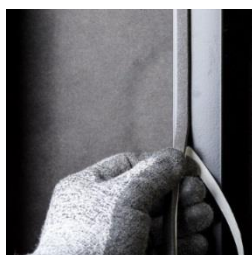
Immediately wipe away any excess that appears on the panel surface. Failure to do so will result in stain that cannot be removed.
Use a different colour cloth or recyclable paper towels - Do not use micro fibre cloth that was used to remove the dust.

9. Installation Procedure

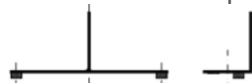
A sequence of placing the EQUITONE panels on the facade must be put in place to ensure the risk of damage to the panels is minimised.

Care and attention is required should other trades (painting, or rendering) need to follow on after the panel is fitted. The panels must then be protected.

Experience has shown that the best sequence in placing the EQUITONE panels is to commence at the top of the façade and work downwards.



Place the foam tape onto the vertical rails. Ensure the tape is continuous. On each "T" rail place the tape on each side behind the 2 panels.



Position the pre-drilled panel on a support rail and against the supporting frame, adjust to correct line and clamp into place.

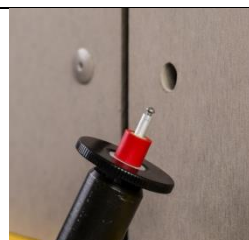


Starting with the **RED STOP** points, insert the EQUITONE 4.1mm centralising tool into the holes and drill through support frame profiles. Remove any debris.



Rivet Setting Tool

This accessory fits onto the end of the rivet fixing tool and ensures the rivet is positioned perpendicular to the panel and prevents damaging the panel surface.



RED STOP POINTS - (Fixed Points)
Place the EQUITONE UNI-rivet into its **RED** rivet sleeve collar (hole reducer) and place into rivet gun. Insert into predrilled hole and pop the rivet. The rivet must lie flat on the facade panel.
Fix **STOP** points first then proceed with the **GO** points.



GREEN GO POINTS - (Sliding Points)
Continue with the **GO** points, insert the 4.1mm centralising tool into the holes and drill through support frame profiles. Remove any debris.
Insert only the EQUITONE UNI-rivet into the rivet gun and place into the predrilled hole and pop the rivet. The rivet must lie flat on the facade panel.

10. Tools



Centralising Tool

This tool fits into a drill and is used to drill the hole in the supporting frame for the rivet. This hole must be placed centrally with the larger hole in the panel. The drill bits can be replaced and adjusted to suit the supporting frame thickness.



Rivet Setting Tool

A rivet setting tool which fits to the end of the rivet gun can be used and this helps to prevent scratching the rivet head and the panel during the fixing process and it ensures the correct placement of the rivet perpendicular to the frame and panel.



EQUITONE [linea] LT Milling Tool

To ensure the head of the UNI-rivet sits flat on the [linea] the ribs at the location of the UNI-rivets have to be removed. This accessory has been designed to mill the high ridges or ribs of the [linea] panel and drill the 11 mm diameter hole in one operation. The tool is fully adjustable to stop over-milling. The debris is allowed to escape via holes in the side.

11. Other Considerations

Use of different materials

When using different materials in combination or close proximity to each other care should be exercised to ensure compatibility. Water run-off from fibre cement is alkaline. Therefore it is not recommended to allow this water to drain freely from fibre cement panels over glass or non-coated metals.

If windows and facades run on the same level, water flow from the façade onto normal glass is best avoided. For specific glass types, please contact your local glass producer.

Marine Environment

In severe marine type environments, the use of uncoated aluminium supporting frames will need to be substituted with a suitable coated aluminium or stainless steel support frame.

Aluminium and Concrete

All uncoated aluminium components in direct contact with cement surfaces such as fresh concrete walls shall always be isolated with protective pads.

12. Additional Information

Additional information or other application guides can be found on the website or can be obtained from local support. Information about external suppliers can also be downloaded from the local websites.

Disclaimer

The information in this Material Information Sheet is correct at time issuing. However, due to our committed program of continuous material and system development we reserve the right to amend or alter the information contained therein without prior notice. Please contact your local EQUITONE Sales Organization to ensure you have the most current version.

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