



Highfix Support System Application Guide

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Introduction

The Highfix Support System, has been specifically designed for roof top mounting of installations such as PV arrays, ventilation outlets, walkways or ducting trays. The unique weatherproof central mounting location is complemented with fixing details that suit a multitude of steel deck profiles as well as fastening solutions for timber and concrete substrates. The Highfix Support System can be installed on flat roof applications with a choice of direct fixation or thermally broken sleeve and fastener.

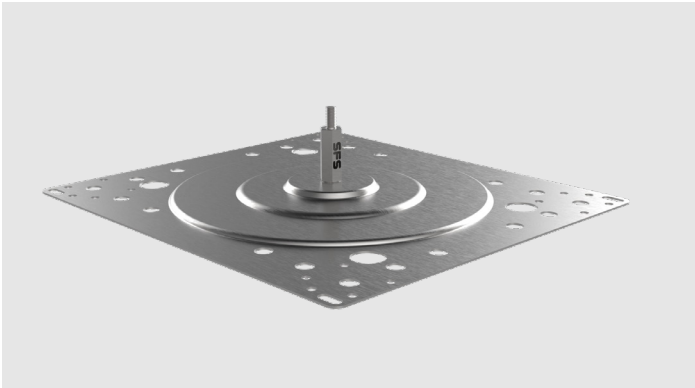
For the installation of the SFS Highfix Support System, you will need one of either of A or B and one of C, D or E for your application:

No.	Product Description	Product No.	Product Code	
A	Mill finish baseplate for bituminous or liquid applied applications.	1665988	FP-BP-MH	
B	Coated baseplate for single ply PVC applications.	1665989	FP-BP-MH-PVC	
C	Highfix 30mm	1754851	FP-HF-03	
D	Highfix 50mm	1670502	FP-HF-05	
E	Highfix 100mm	1800904	FP-HF-100	



Fixing Methods

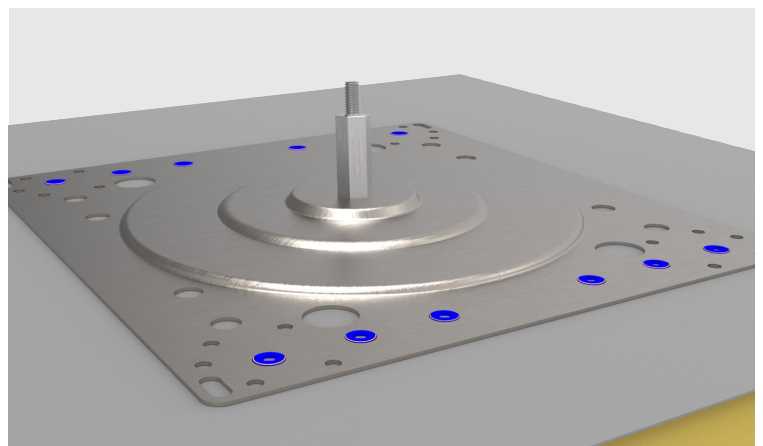
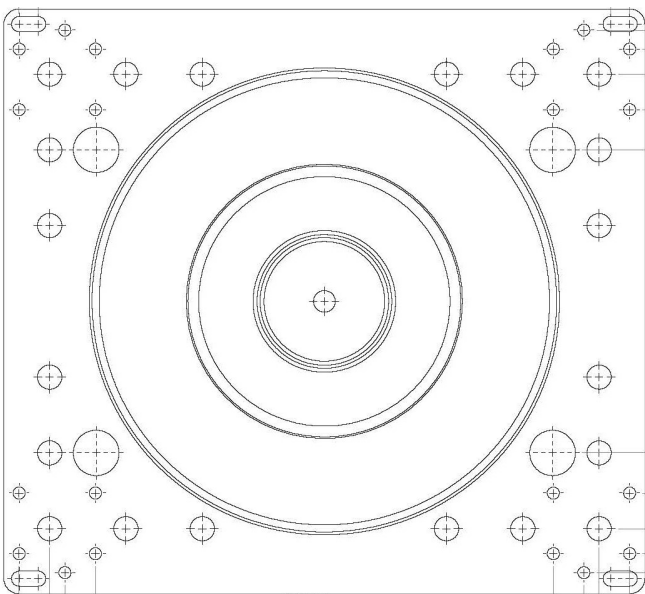
The SFS Highfix Support can be fitted to roof structures using a baseplate and fixing method suitable for the roof type. Once the roof type is known, a baseplate and fixing method can be selected.



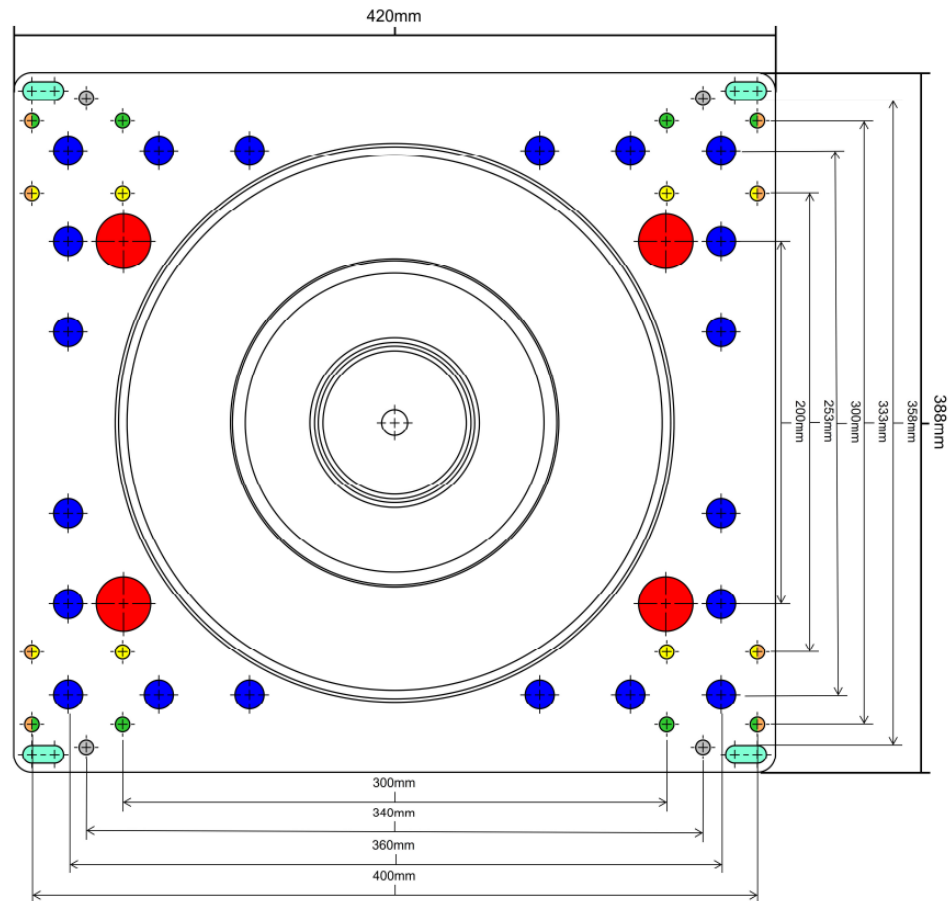
SFS baseplates have a central raised dome, complete with a welded M10 female boss, into which the Highfix is securely attached. This weld is completely weather tight. Baseplates to be used on metal roofing applications come complete with pads on the underside to seal the baseplate to the roof sheet crown.

Each baseplate, depending on application, will be fixed with either a specified number of rivets for trapezoidal roof sheets, stainless steel gravity toggles, studding and resin, sleeves and fasteners and concrete screws for flat roofs. Baseplates are also available PVC coated to aid a direct weld of a suitable membrane roof covering if suitable.

Baseplate Example



Multi-Use Baseplate



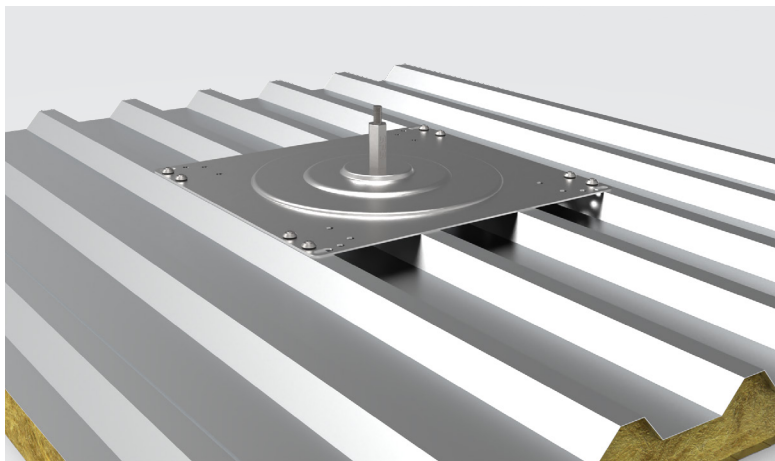
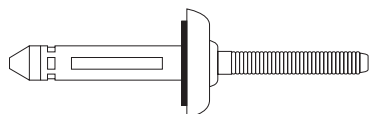
- **Red:** 4x30 mm (240x300 mm) holes for gravity toggles with toggle cups- 4 required into 0.7 mm metal and 18 mm ply & OSB decks.
- **Blue:** 10x16 mm holes for sleeve and stainless steel fastener into 0.7 mm metal, concrete, and timber decks. Please consult SFS for fixing numbers and details.
- **Green:** 8x8 mm rivet holes for 333 mm sheet crown centres
- **Orange:** 8x8 mm rivet holes for 400 mm sheet crown centres
- **Yellow:** 8x8 mm rivet holes for 300 mm sheet crown centres

Trapezoidal Sheet Types

Composite Panel

> 0.5 mm outer sheet thickness

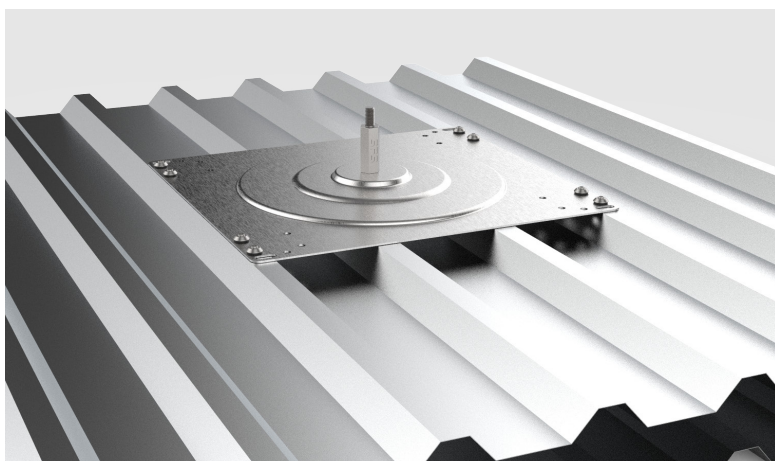
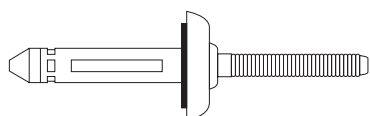
Fixed with 7.7 mm BULB-TITE® rivets

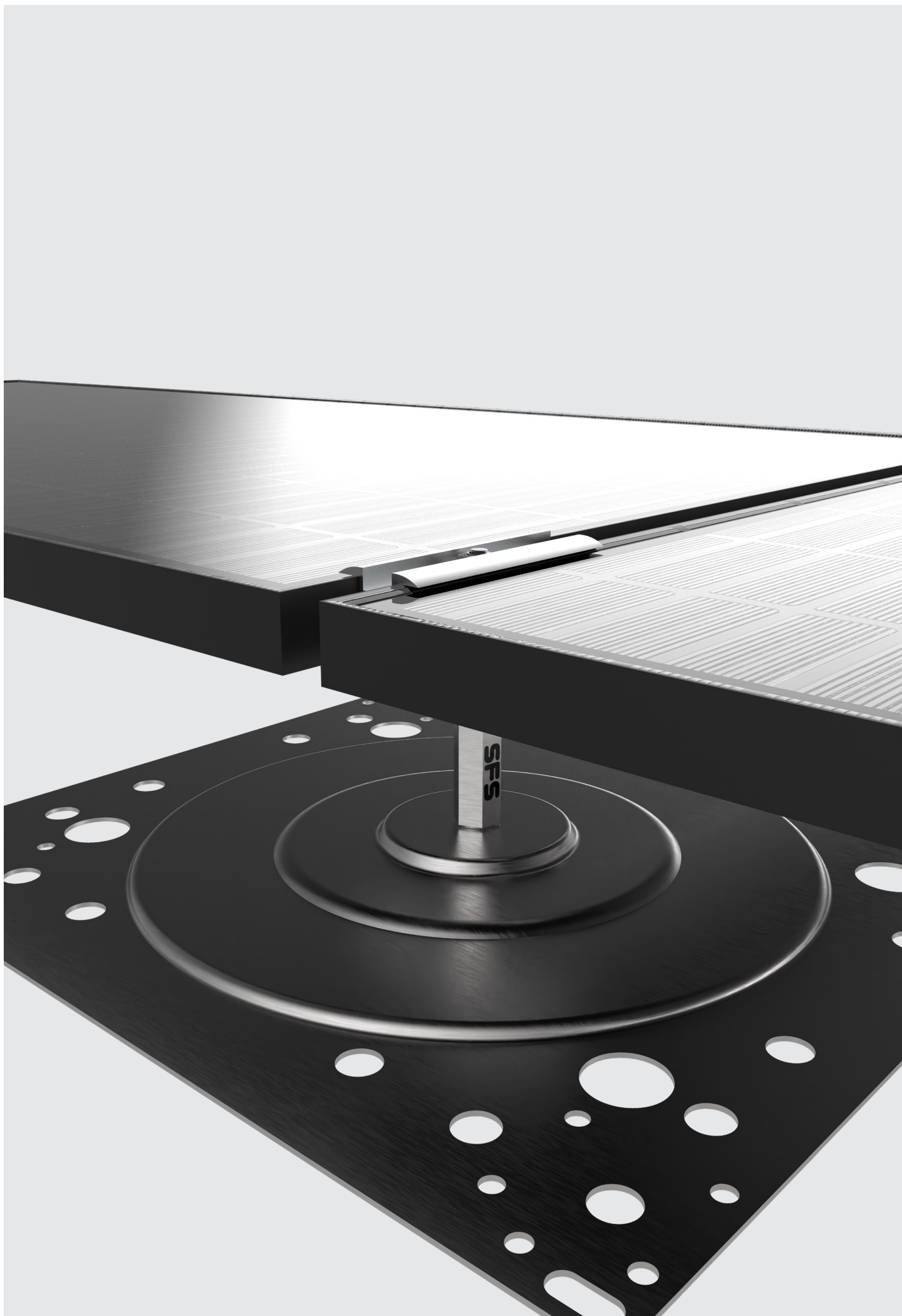


Twin Skin BUOS

> 0.7 mm sheet thickness

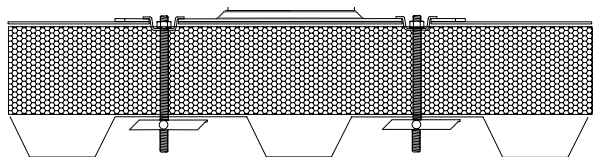
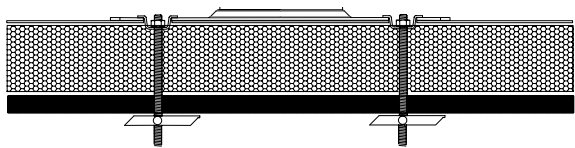
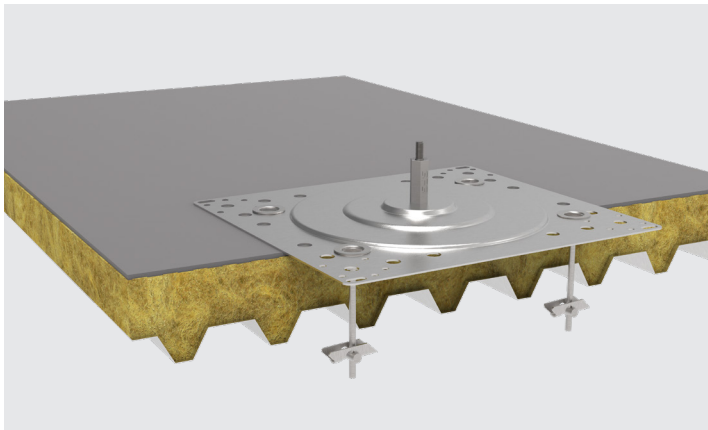
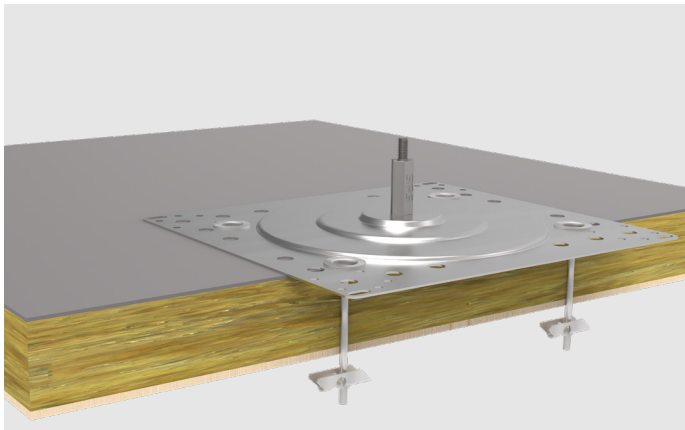
Fixed with 7.7 mm BULB-TITE® rivets



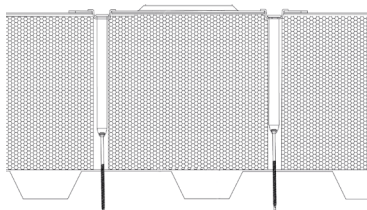
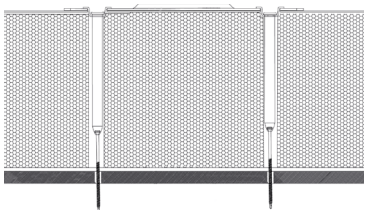
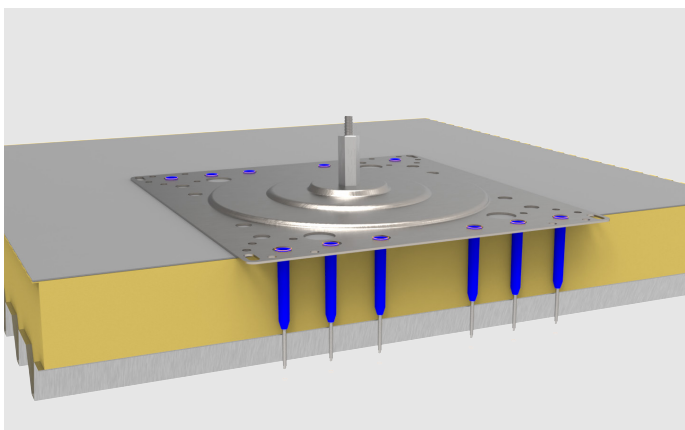
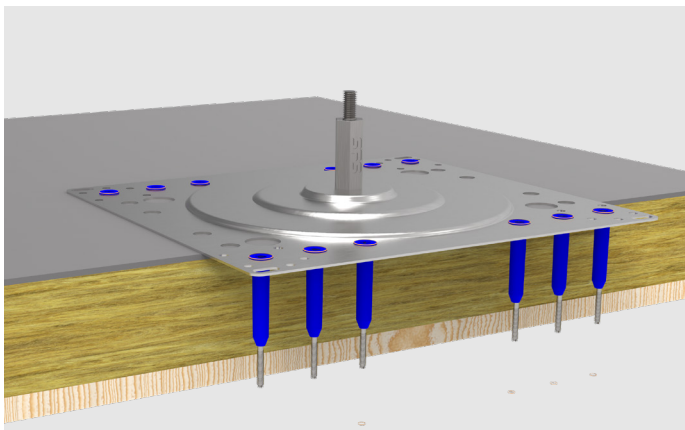


Flat Roof Types

18 mm Ply/OSB Board & 0.7 mm Metal Deck
Gravity toggles



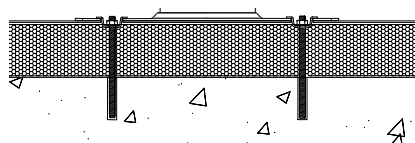
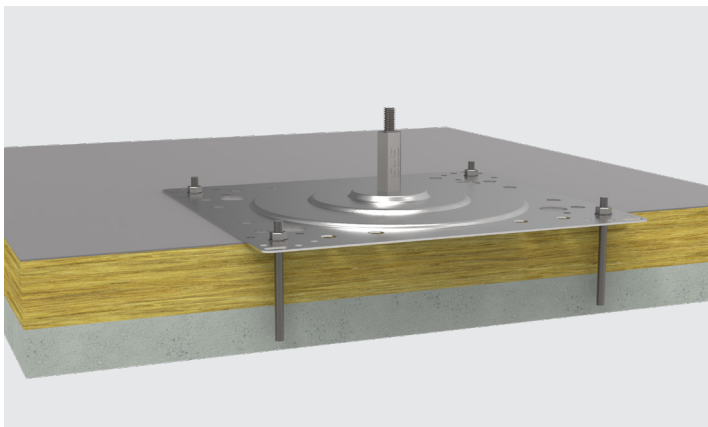
18 mm Ply & 0.7 mm Metal Deck
Typical sleeve and fastener installation. Please consult SFS for fixing numbers and details.



Flat Roof Types

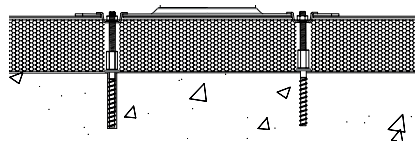
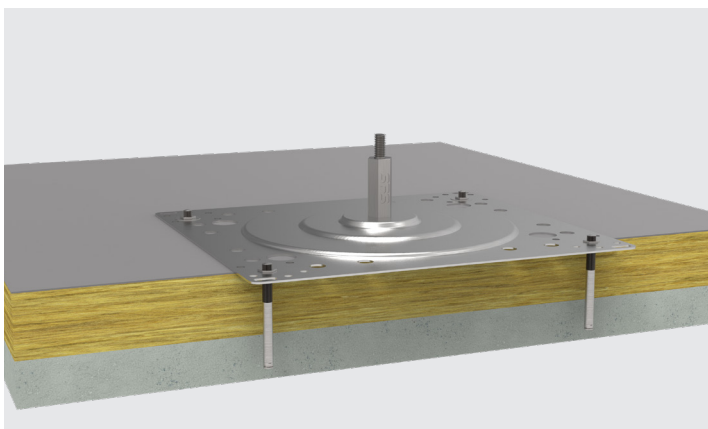
Concrete Deck

Typical stainless studs and resin



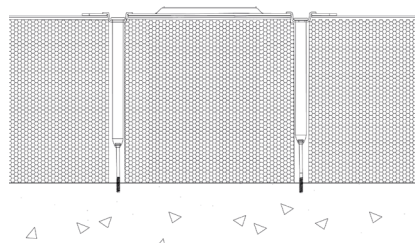
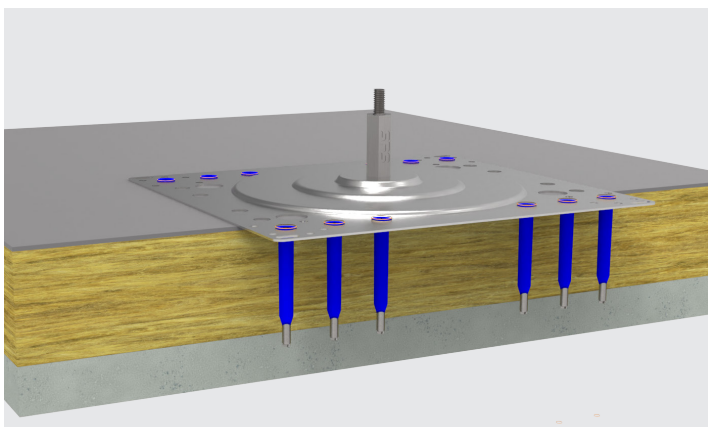
Concrete Deck

Concrete screws



Concrete Deck

Typical sleeve and fastener installation. Please consult SFS for fixing numbers and details.



Installation

All installations of the SFS baseplate and Highfix should be carried out by trained personnel. If the installation is required in a place where working at height is required, then the personnel must seek advice or be trained accordingly.

Tool List

Installing an SFS Highfix requires nothing more than standard tools that an experienced roofer would carry. The following are the typical examples, although they are not limited to.

General

- Cordless drill
- 19 mm spanner/wrench
- 19 mm extended socket with wrench
- Marker pen
- Tape measure
- Knife

Trapezoidal Roof Sheet Installation

- 8 mm HSS drill bits
- Gesipa PowerBird battery riveter/HN-2 long arm riveter c/w small jaws and nosepiece

Flat Roof Toggle Installation to Metal/Ply Decks

- 25 mm auger bit
- 25 mm bi-metal hole saws
- Arbour
- Arbour extension bar long enough to penetrate roof build up and deck
- 13 mm hex socket driver for drill

Flat Roof Stud and Resin Installation to Concrete Decks

- SDS Hammer drill to suit build-up depth
- 25 mm auger bit
- SDS masonry drill bit long enough to penetrate roof build up, screed, and embedment in deck.
- Wire brush
- Blow pump
- Resin applicator gun
- Hack saw/cutting disc/grinder
- File

- Hydrajaws pull test meter and plywood board/spreader plate for distributing load

Flat Roof Stainless Steel Fastener and Sleeve to Metal and Ply Decks

- Tx extended drive bar

Flat Roof Fastener and Sleeve to Concrete Decks

- SDS Hammer drill
- ZVK-STOP drill bit
- ZAK extension bar
- Tx extended drive bar

Flat Roof Concrete Screw to Concrete Decks

- SDS Hammer drill
- 25 mm auger bit
- SDS masonry drill bit long enough to penetrate roof build up, screed, and embedment in deck.
- ZA1/4 M6 300/750 Drive Bar
- T25 M6 Drive Bit
- Hack saw/cutting disc/grinder
- File
- Hydrajaws pull test meter and plywood board/spreader plate for distributing load

Installation Consideration

When used on membrane covered flat roof constructions, it is considered that the Highfix support and associated baseplate, is fixed through the roofing membrane and insulation into the substrate or deck. All figures quoted in this document exclude any beneficial effect from weathering the baseplate to the membrane field sheet.,

These figures assume that all respective fixing holes are utilised when the product is installed to the roof. For the avoidance of doubt a qualified structural engineer should be consulted to confirm the supporting structure has the capacity to support the design loads likely to be encountered.

If there is doubt about the suitability of the substrate or deck, e.g. on a construction site, a pull-out test should be performed to verify the performance of the fastener (see ETAG 006 Annex C). The use of insulation materials containing substances which can affect the performance of the sleeves or fasteners must be avoided.

Tensile Load as (T^L) for Direct Fixings

Values given below are based on the Guardian BS 6.1, LBS 6.0 and ACS 6.1 fasteners as per European Technical Approval, ETA-08/285 and allow a safety factor of three (factored) on the combined mean axial pull-out value of the fixings. Values are given for all decks where 12 no. fixings are recommended.

Tensile Load Values

	Unfactored Per Fixing (kN)	Factored Per Installation (kN)
Guardian BS 6.1 into steel sheet 0,70mm	1,78	7,12
Guardian BS 6.1 into steel sheet 0,75mm	1,98	7,92
Guardian BS 6.1 into steel sheet 1,00mm	2,77	11,08
Guardian LBS 6.0 to 18 mm OSB/3 ⁽¹⁾	1,40	5,60
Guardian ACS 6.1 to C25-C30 concrete ⁽²⁾	4,28	17,12
Guardian LBS 6.0 to 23mm softwood Class G4-2	2,00	8,00

⁽¹⁾ OSB/3 according to EN 300
⁽²⁾ See ETA-08/285 clause 2 regarding hole diameter and drill depth

Tensile Load as (T^L) for Thermally Broken Fixings

Values given below are based on the Guardian BS 6.1, LBS 6.0, ACS 6.1 fasteners used in conjunction with the GWT Polyamide sleeve as per European Technical Approval, ETA-08/285 and allow a safety factor of three (factored) on the combined mean axial pull-out value of the GWT polyamide sleeve. Values are given for all decks where 12 no. fixings are recommended.

Tensile Load Values

	Unfactored Per Fixing (kN)	Factored Per Installation (kN)
Fixing into all substrate materials ⁽³⁾	3,17	12,68

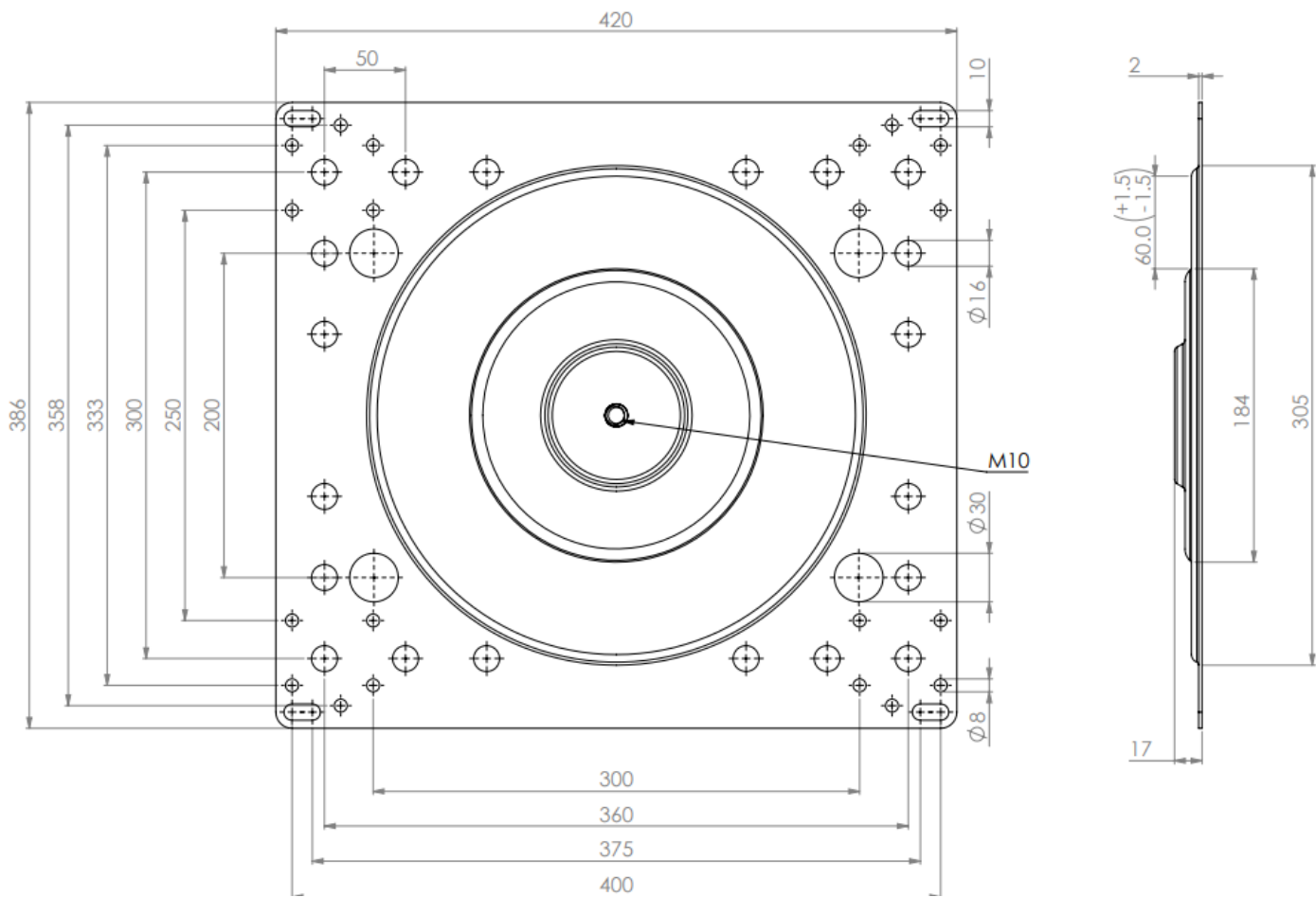
⁽³⁾ See ETA-08/285 Table 6: Pullover test of washer

Installation Consideration

Product Range

Product Code	Description	L	KL	Material No.
FP-BP-MU-PVC	For use on PVC membranes, with SFS lifeline and Highfix Support components.	-	-	1665989
FP-BH-MH	For use with SFS lifeline and Highfix Support components.	-	-	1665988
FP-HF-03	Highfix Support 30mm. All threads are M10 x 1.5 and dimension across the flats 19mm.	85	40	1743816
FP-HF-05	Highfix Support 50mm. All threads are M10 x 1.5 and dimension across the flats 19mm.	85	20	1670502
FP-HF-100	Highfix Support 100mm. All threads are M10 x 1.5 and dimension across the flats 19mm.	85	20	1800904

Typical Product Dimensions



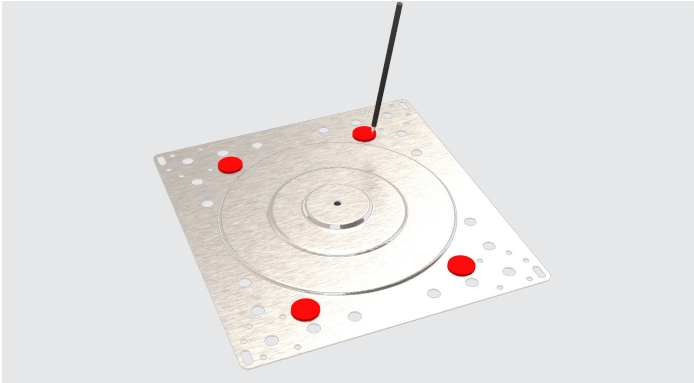
All materials 304 (A2) stainless steel

Installation

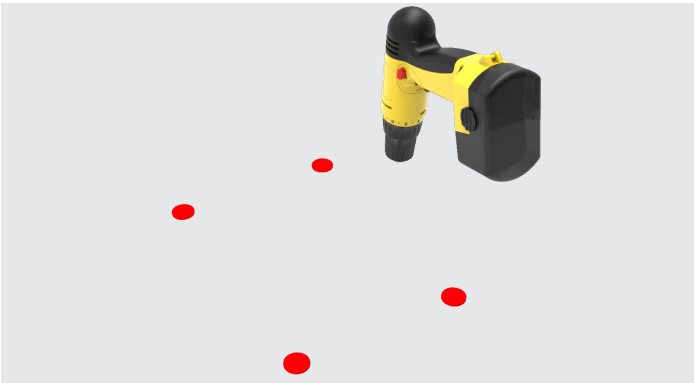
Flat Roof Gravity Toggle to Metal and Ply/OSB Decks

Note: For unknown substrate material & thickness, test the substrate with Pull-Test Device.

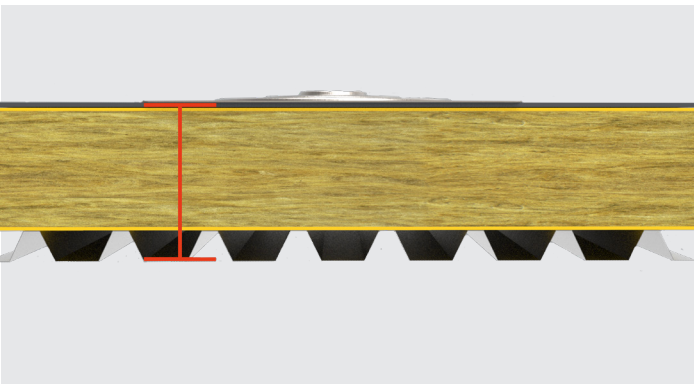
1. Ascertain location of baseplate on membrane and mark 4 no. toggle fixing positions.



2. Using a 25 mm diameter hole saw suitable for the deck construction, drill through the insulation and deck in all four locations. Ensure all four fixing holes have been drilled through the total roof build up and are clear, clearing any debris away.



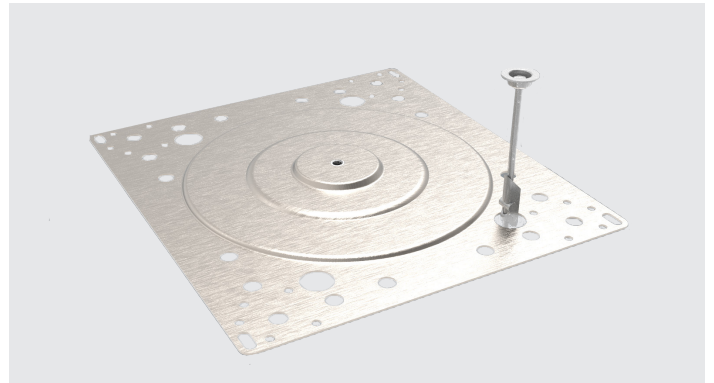
3. Measure the depth of the roof build up and ensure you have the correct toggle length. Toggles require an additional **80 mm** in length to deploy fully.



4. Wind enough thread through the toggle barrel so that the toggle catches when deployed, re-set the toggle parallel to the toggle stud.



5. Insert toggle with care through baseplate and drilled hole in roof, ensuring the toggle doesn't deploy until it has cleared the deck. Using toggle tubes prevents early deployment within the roof build up.



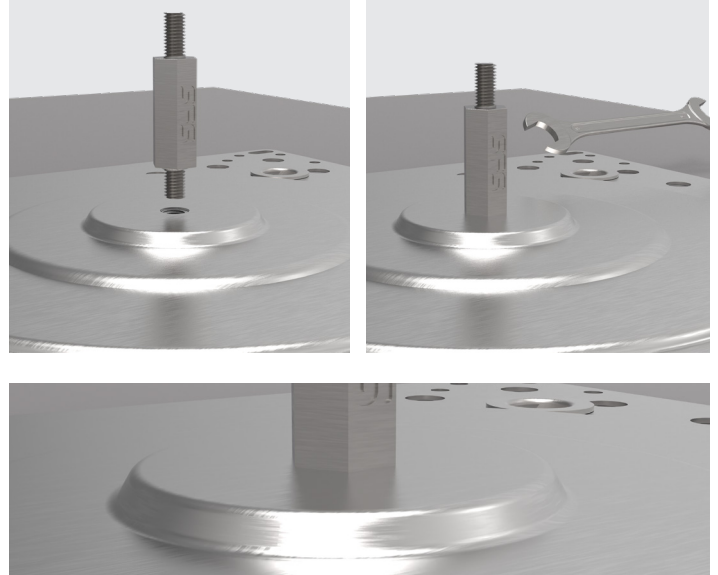
6. Once the toggle has dropped through the roof construction the toggle will deploy, this can be aided by shaking the post and stud slightly. When fully deployed, pull the toggle upwards so that it is tight against the deck, this will confirm the toggle is deployed or not. Repeating steps from 4 to 6 for the remaining toggles.



10. Once all four toggles have been deployed, pull, and hold the toggle whilst driving the nut with a battery powered drill and 13 mm hex driver until the plate is pulled tightly to the membrane.



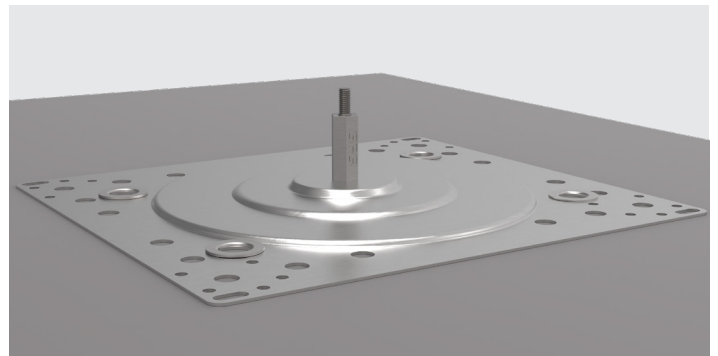
12. Turn Highfix lower body onto female boss in baseplate by hand firstly then to the desired tightness with the 19mm spanner until Highfix is seated correctly.



11. This will lock the toggle fully as shown. Repeat until all four toggles are tightened down slightly depressing the baseplate into the membrane.



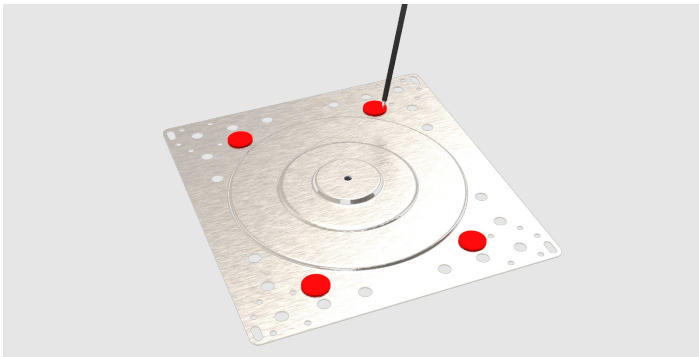
13. Installation is complete and is ready for use.



Flat Roof Stud and Resin to Concrete Decks

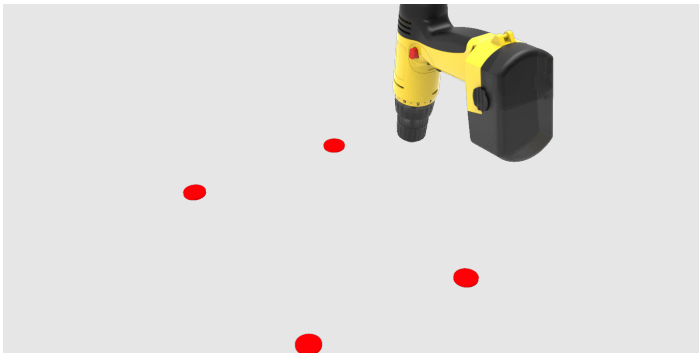
Note: For unknown substrate material & thickness, test the substrate with pull-test device.

1. Ascertain location of baseplate on membrane and mark 4 no. fixing positions.

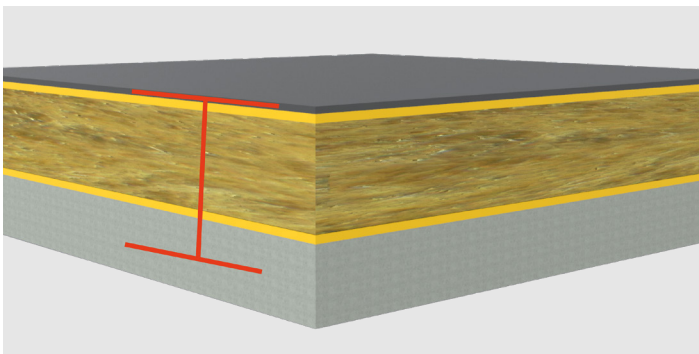


2. Using a hole saw or auger bit, drill through the insulation in all four locations.

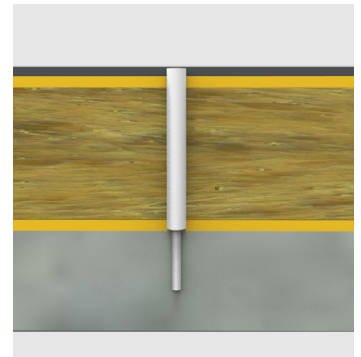
3. Ensure all four fixing holes have been drilled through the insulation and are clear, clearing any debris away.



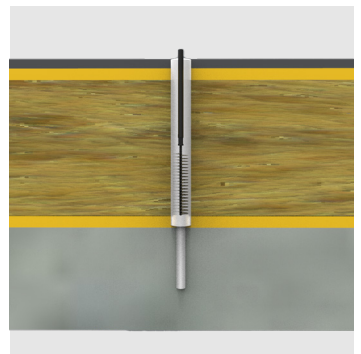
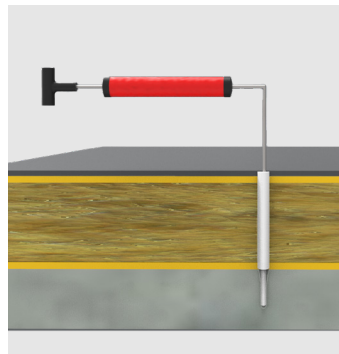
4. Ensure you have the correct stud length for the total build up depth, embedment into the substrate and enough protruding from the opening to fit a nut and washer.



5. Using a SDS masonry drill and specified diameter drill bit, drill 4 no. holes into the concrete deck to give the required fixing embedment. If screed is present above concrete deck, remove this first using a larger drill diameter ensuring correct fixing embedment is in concrete substrate ONLY.

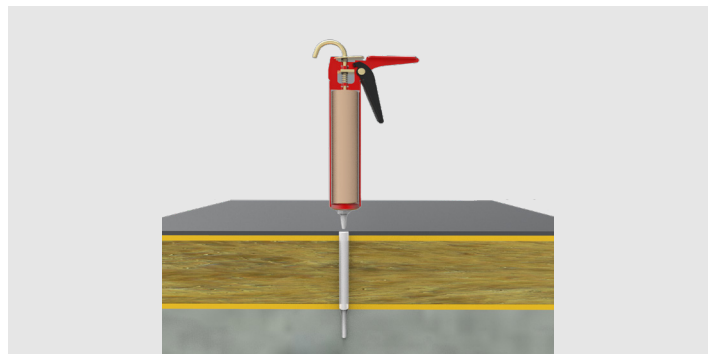


6. Using a wire brush and blow pump remove all debris remaining in each of the four holes.

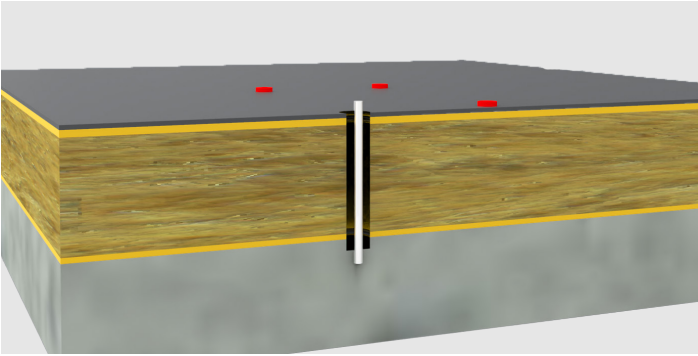


7. Prepare Fischer Vinylester resin tube, nozzle, and gun ready for application. Extrude enough resin through the tube on a test area ensuring the 2 chemical parts are correctly mixed.

8. Once the resin is prepared squeeze resin through hole into substrate, slowly retracting the nozzle as the hole fills until 2/3 full. Do this for all four fixing locations.

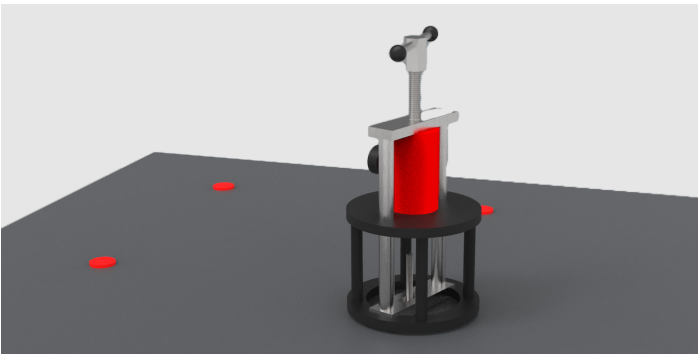


9. Before resin begins to cure insert studding gently into the hole turning the stud as you push it into the resin until the stud is fully inserted. Do this for all four fixings.

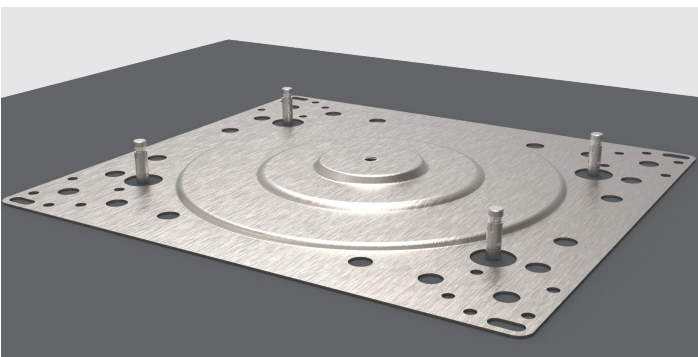


10. Allow for resin to cure based on temperature/conditions on site. See tube for indicative curing and setting times.

11. Once cured test a minimum of one in four fixings with a pull test metre to 6kN using a spreader plate if required.

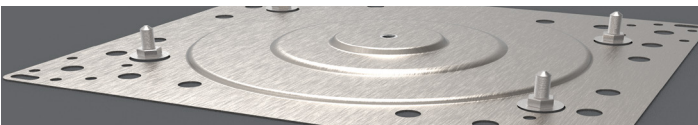


12. Drop baseplate into position over protruding studs.

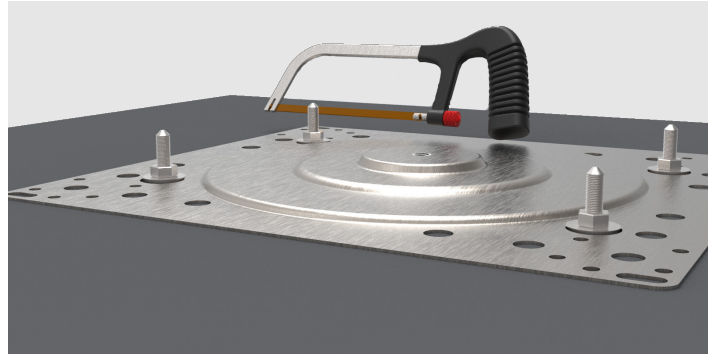


13. Place toggle cups over protruding studs above baseplate for each of the four studs per post.

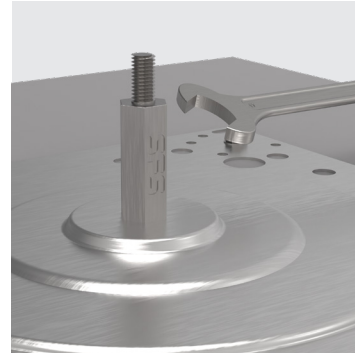
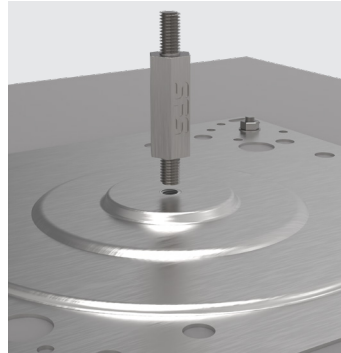
14. Add the nut to each fixing and tighten until baseplate depresses into the membrane slightly.



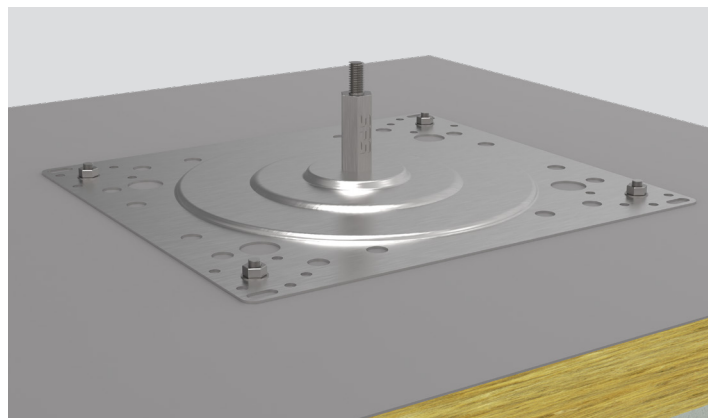
15. Cut off any excess studding and file down until smooth to avoid penetration through roof membrane, once laid.



16. Turn Highfix lower body onto female boss in baseplate by hand firstly then to the desired tightness with the 19mm spanner until Highfix is seated correctly.



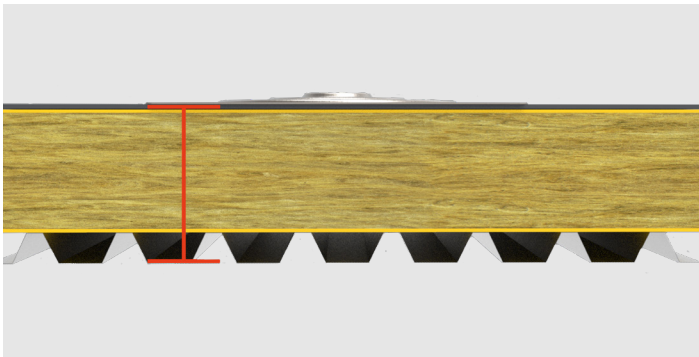
17. Installation is complete and is ready for use.



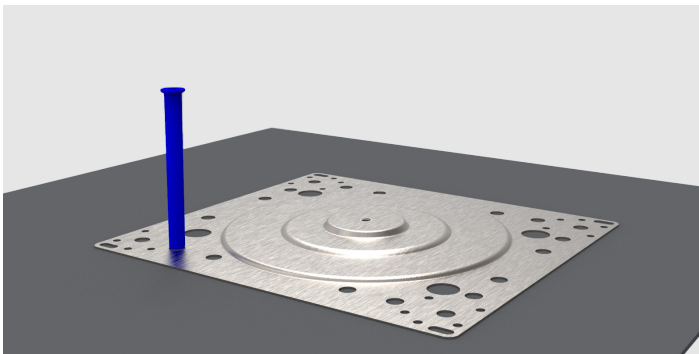
Flat Roof Sleeve and Stainless Steel Fastener to Metal and Ply 18 mm Decks

Note: For unknown substrate material & thickness, test the substrate with pull-test device.

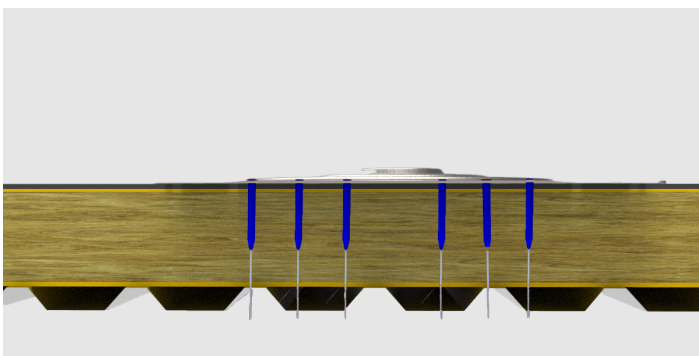
1. Ascertain location of baseplate picking up the crown or trough of the deck based on the fixing length supplied.



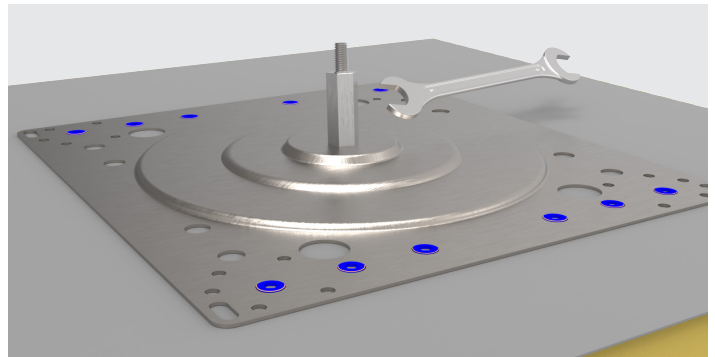
2. Push screws fully into Sleeves, through the plate and into the insulation.



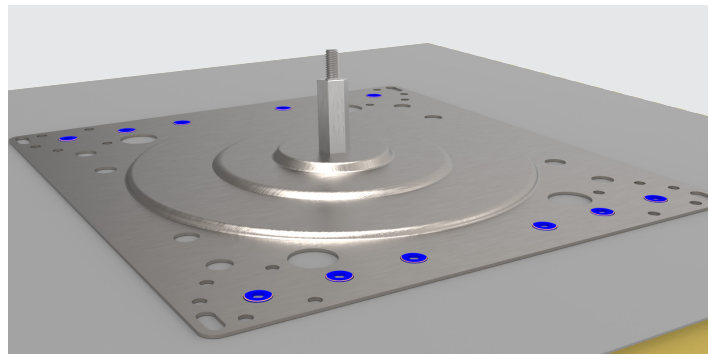
3. Take drill fitted with extended drive bar and T25 bit and fix all required number of fasteners through insulation build up and deck, securing firmly. **Do not overdrive.**



4. Turn Highfix lower body onto female boss in baseplate by hand firstly then to the desired tightness with the 19mm spanner until Highfix is seated correctly.



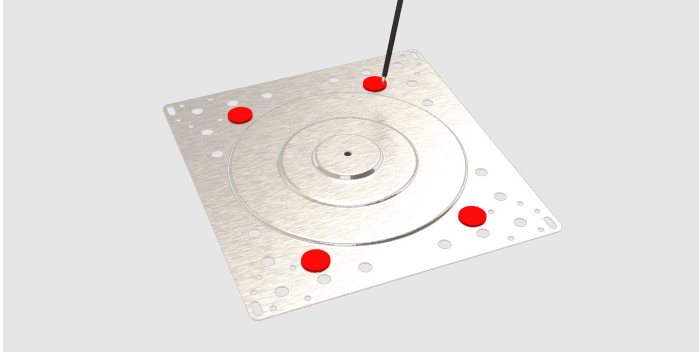
5. Installation is complete and is ready for use.



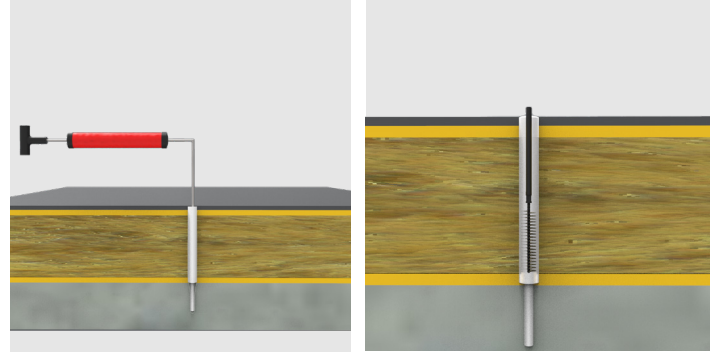
Concrete Screw to Concrete Decks

Note: For unknown substrate material & thickness, test the substrate with pull-test device.

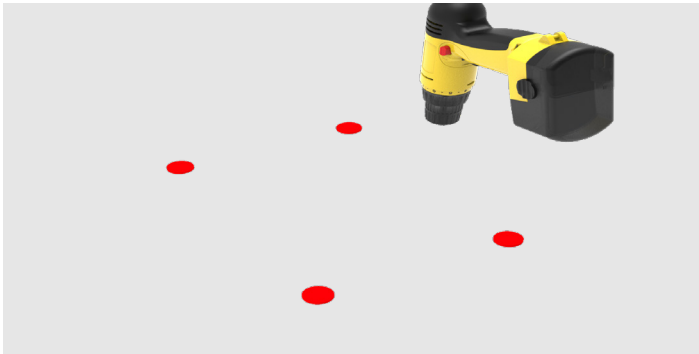
1. Ascertain location of baseplate on membrane and mark 4 no. fixing positions.



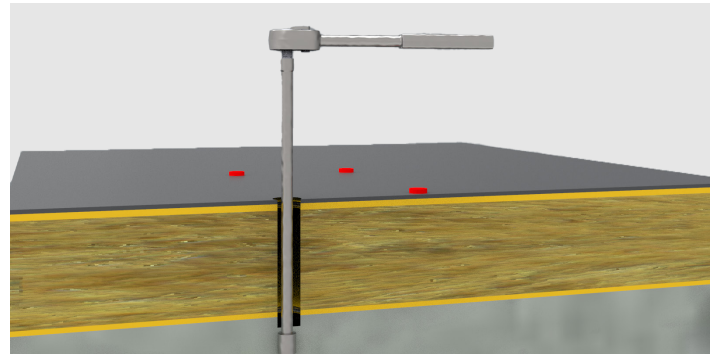
5. Using a wire brush and blow pump remove all debris remaining in each of the 4 holes.



2. Using a 14 mm diameter hole saw or auger bit, drill through the insulation in 4 locations.

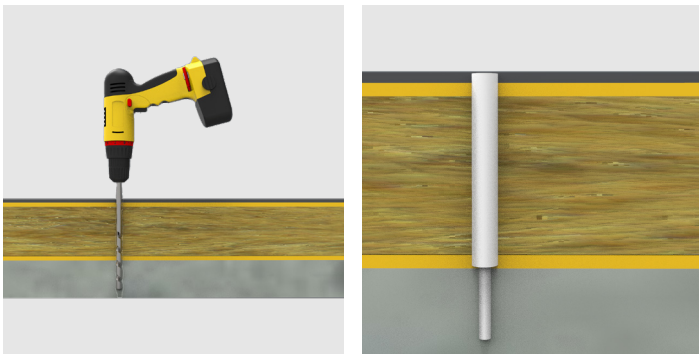


6. Using socket and extended drive bar fasten each of the screws into the concrete deck.

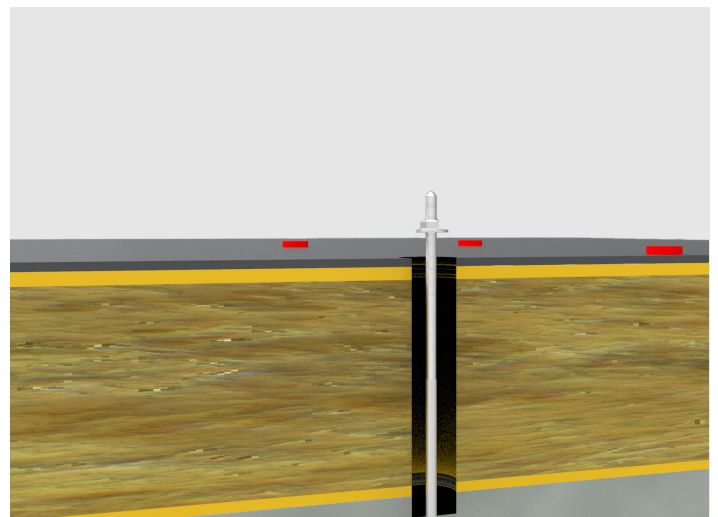


3. After removing insulation in all fixing holes clear any remaining debris away.

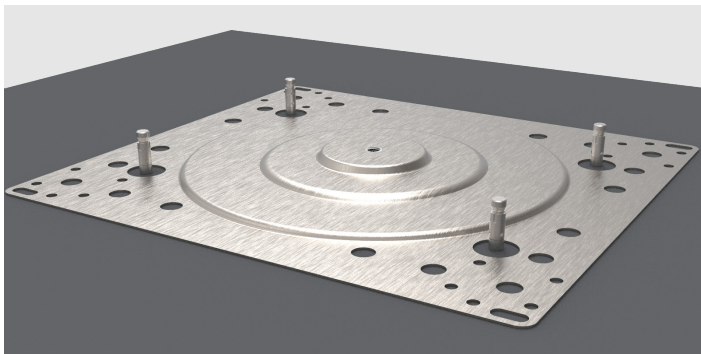
4. Using a SDS masonry drill of specified diameter, drill 4 no. holes into the concrete deck to give the required fixing embedment. If screed is present above concrete deck, remove this first using a larger drill diameter ensuring correct fixing embedment is in concrete substrate **only**.



7. Turn studding into screw head of each fixing ensuring the correct stud length is used to allow enough to protrude from the opening to fit a nut and washer.

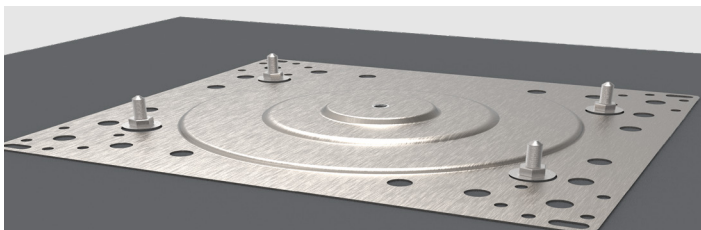


8. Drop baseplate into position over protruding studs.

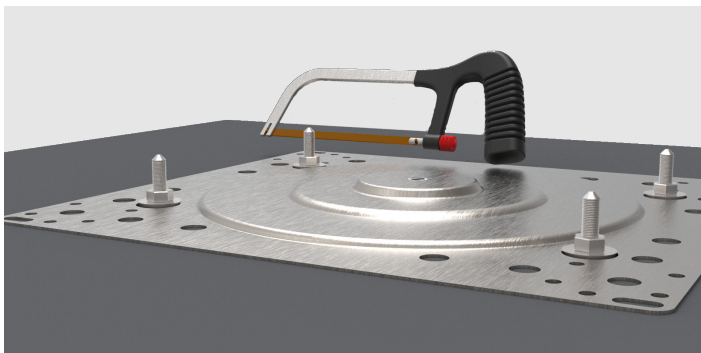


9. Place toggle cups over protruding studs above baseplate for each of the 4 studs per post.

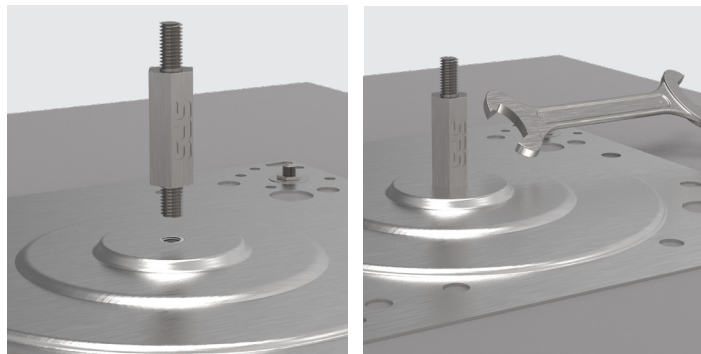
10. Add the nut to each fixing and tighten until baseplate depresses into the membrane slightly.



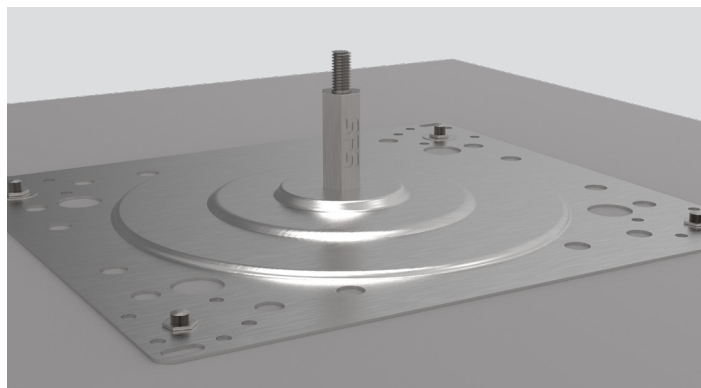
11. Cut off any excess studding and file down until smooth to avoid penetration through roof membrane.



12. Turn Highfix lower body onto female boss in baseplate by hand firstly then to the desired tightness with the 19mm spanner until Highfix is seated correctly.

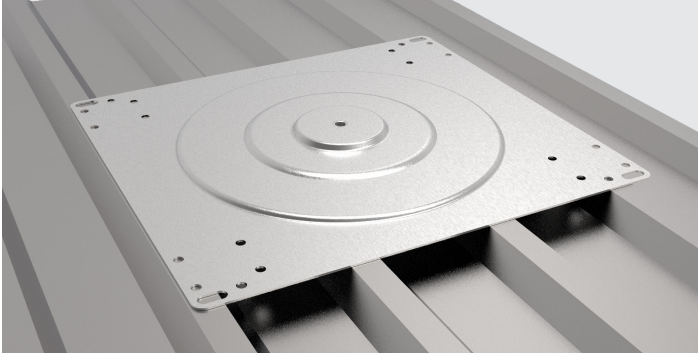


13. Installation is complete and is ready for use.



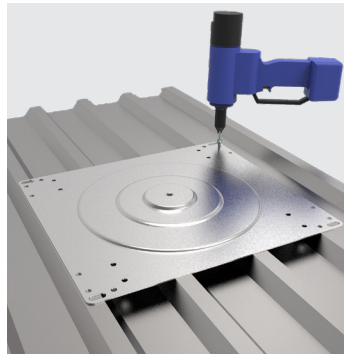
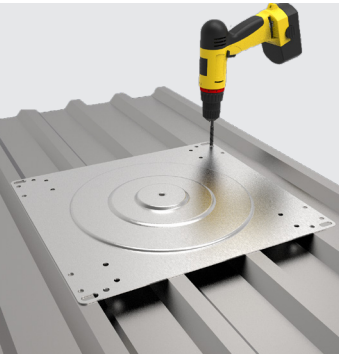
Trapezoidal Roof Sheets

1. Ascertain location of baseplate, ensuring the plate is positioned so that the correct fixing holes sit centrally to the crown centres of the sheet. Ensure roof sheet is properly cleaned prior to installation.

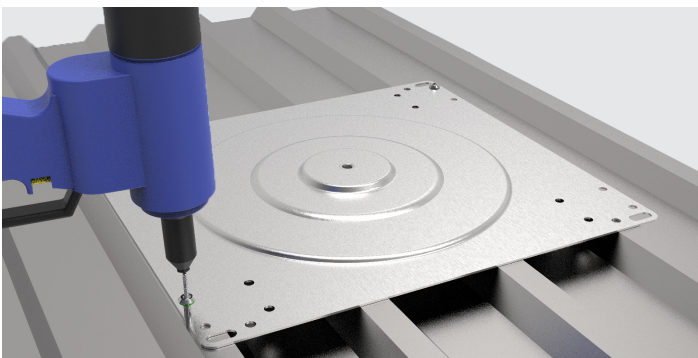


2. Once positioned drill first hole in corner of baseplate using a 8mm drill bit.

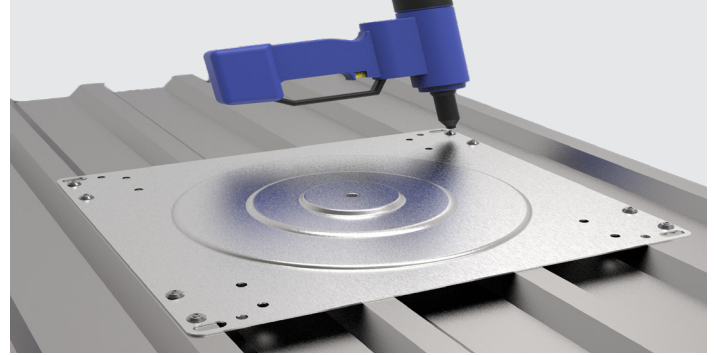
3. Insert rivet into drilled hole and using a PowerBird riveter pull the rivet fully ensuring the rivet mandrel is fully removed.



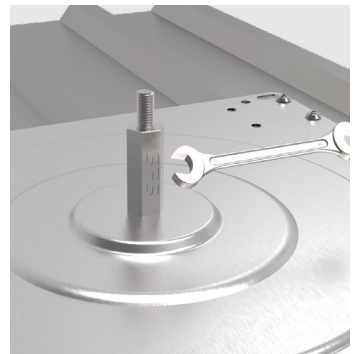
4. Drill and rivet the opposite corner.



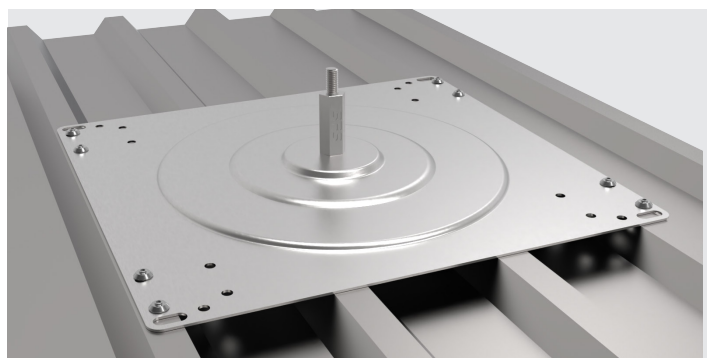
5. Repeat steps 2–4 on remaining fixing holes as per roof sheet specification and fixing number.

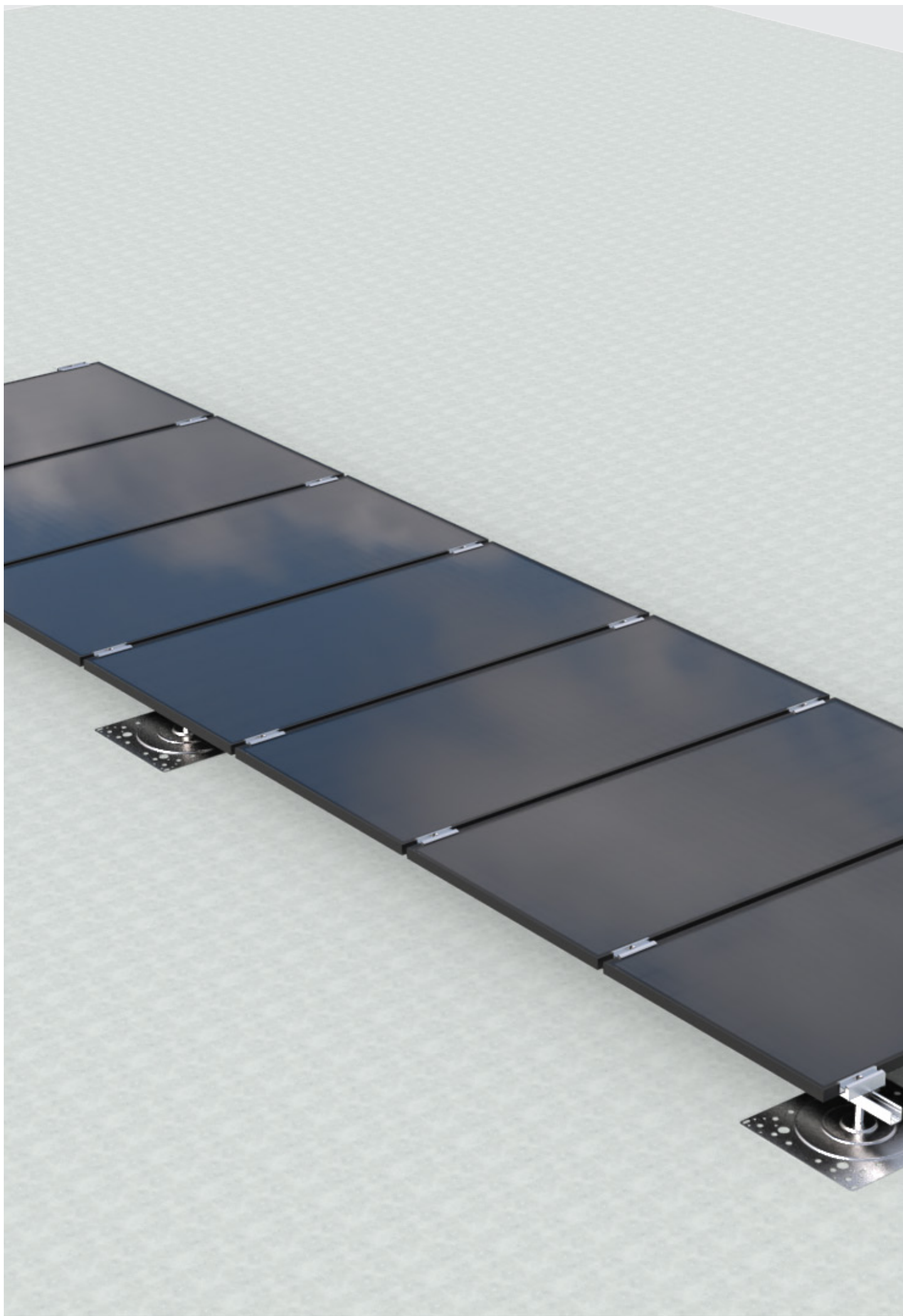


6. Turn Highfix lower body onto female boss in baseplate by hand firstly then to the desired tightness with the 19mm spanner until Highfix is seated correctly.



7. Installation is complete and is ready for use.





Roofer & Weathering

Weathering of a bituminous, single ply PVC or liquid applied membrane should be dealt with by a competent person. SFS take no liability for the effectiveness of the installation. The following should act as a guide and where needed, official guidance should be sorted by the OEM.

For all membrane types, the surface of the baseplate should be thoroughly cleaned prior to the installation of the SFS Highfix.

Bituminous

Typically for the bituminous membrane, the installer will require the use of a gas cylinder with blowtorch and suitable roller to press the molten patch into position.

Single Ply PVC

Typically for the single ply PVC membrane, the installer will require the use of a heat gun and suitable roller to hot air weld the patch into position.

Liquid Applied

Where liquid applied membranes are used, the installer must adhere to the OEM's installation methods at all times.

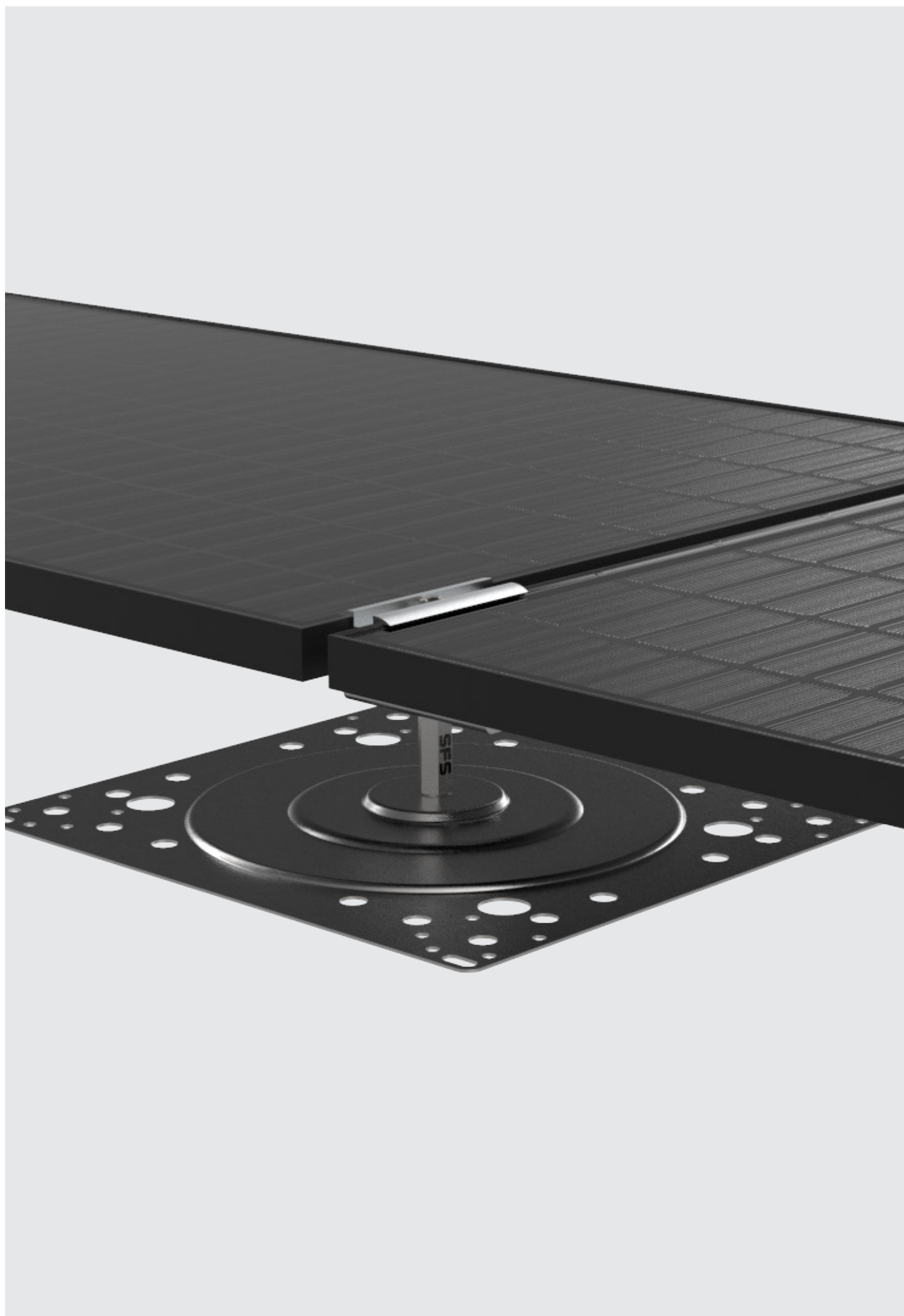
Other Membranes

For membranes such as EPDM, TPO & FPO there is currently not a direct welding option to the baseplate available, therefore consultation with the OEM should be sorted prior to installation.

System Limitations

The structure to which systems are to be installed should be sufficiently strong to withstand the loadings for which the system is designed. If there is any doubt as to the structure's ability to withstand such loadings, then the system should not be installed without appropriate testing on the substrate.

Periodic examination and re-certification of the installation should be made at intervals of no greater than 12 months from the date of last inspection. For details on the inspection of the life line please refer to any 3rd party supplied literature.





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All information is non-binding and without guarantee. Before using the products, all specifications and calculations must be checked by a suitably qualified person and local regulations must be observed. This document is subject to revision. We reserve the right to make technical changes.
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