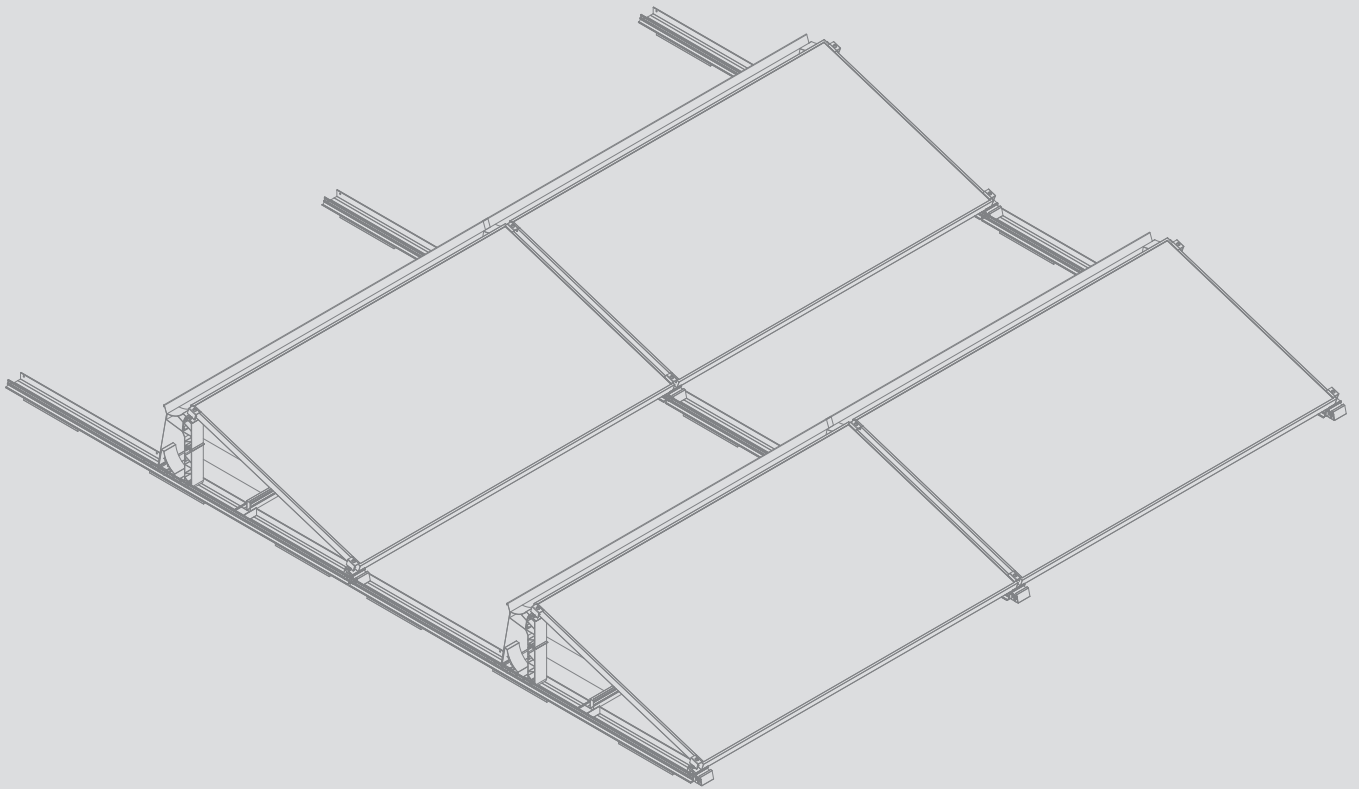
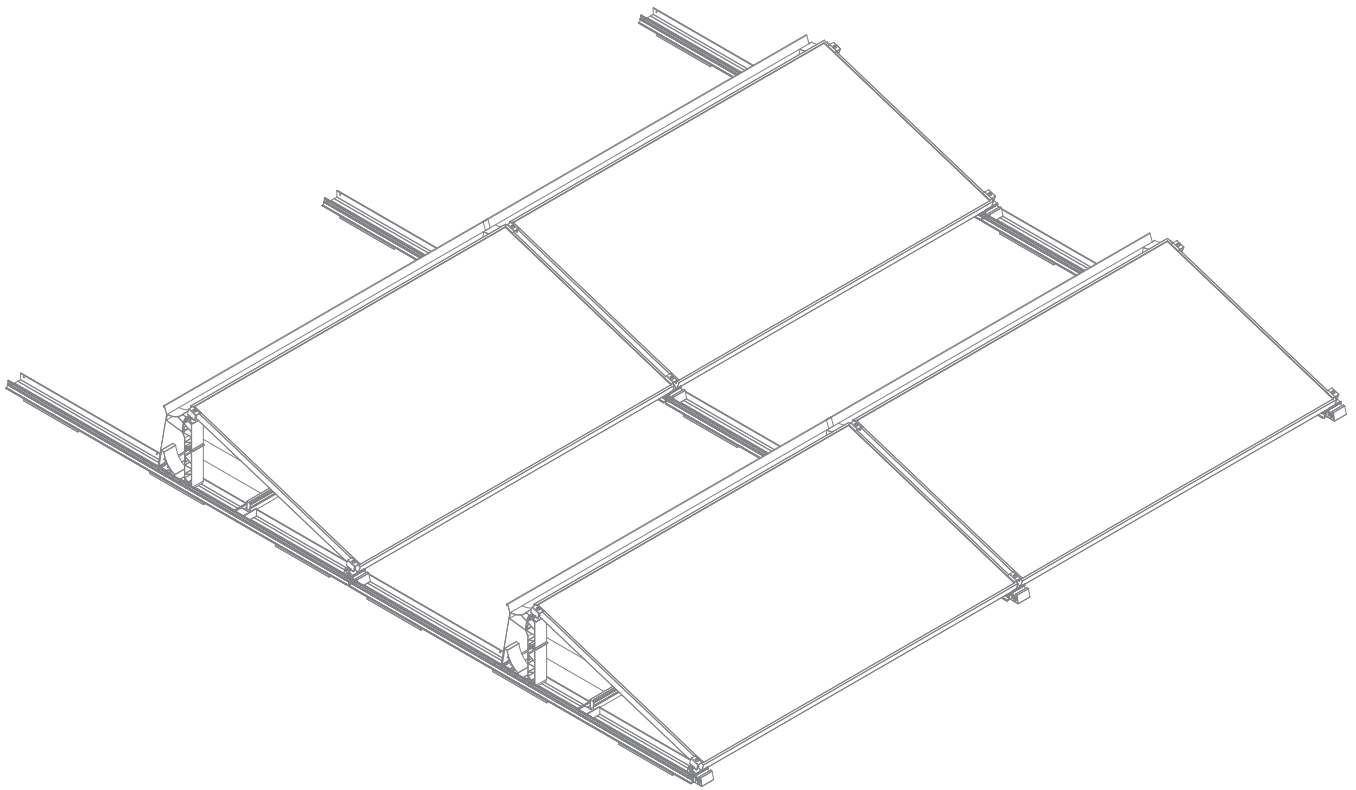


Renusol *FS Pro* 18-S

EN | Installation Instructions



Renusol FS Pro 18-S



EN | Usage

Mounting system for the installation of framed PV modules on flat roofs with a roof inclination of up to 5° without roof penetration.

Pre-installation considerations

The Renusol FS Pro is weighted with additional ballast (pavement slabs, etc.) to withstand wind loads. The required weight of the ballast depends on the building's height, location, the nature of the roof cover and wind loads.

The specified coefficient of friction in the calculation must be adhered to. This must be determined and documented on-site by a professional before installation at the customer's location. The coefficient of friction is a component for determining ballast and depends on local conditions.

Guidelines for the required ballast can be calculated according to Eurocode 1 (EN 1991).

For the Renusol FS Pro 18-S mounting system, the modules are fastened at the corner of the short module side. It is necessary to check whether the clamping area specified by the module manufacturer is adhered to and that the permissible module loads are not exceeded.

Drainage holes in PV module frames must be kept clear and must not be covered by the mounting system. The roof surface must be free of snow, ice, and dirt for installation. Consider the applicable regulations, state of the art and current occupational safety guidelines during installation.

A prerequisite for intended use is always a suitable substrate that can withstand the forces (weight, wind and snow loads) applied. The water drainage of the flat roof and its direction must be considered.

The roof surface must be suitable for placing building protection mats. The compatibility between building protection mats and roof foil must be checked in advance.

Wind Assessments

Suction and pressure coefficients have been determined through wind tunnel tests.

Relevant Documents

"General Installation, Maintenance, and Mounting Instructions, "Warranty Conditions, and Disclaimer."

These documents are available at www.renusol.com

Warranty

Renusol's warranty is valid only when using the original Renusol FS Pro complete system in accordance with the warranty conditions. For statutory warranty/liability, please refer to Renusol's general terms and conditions.

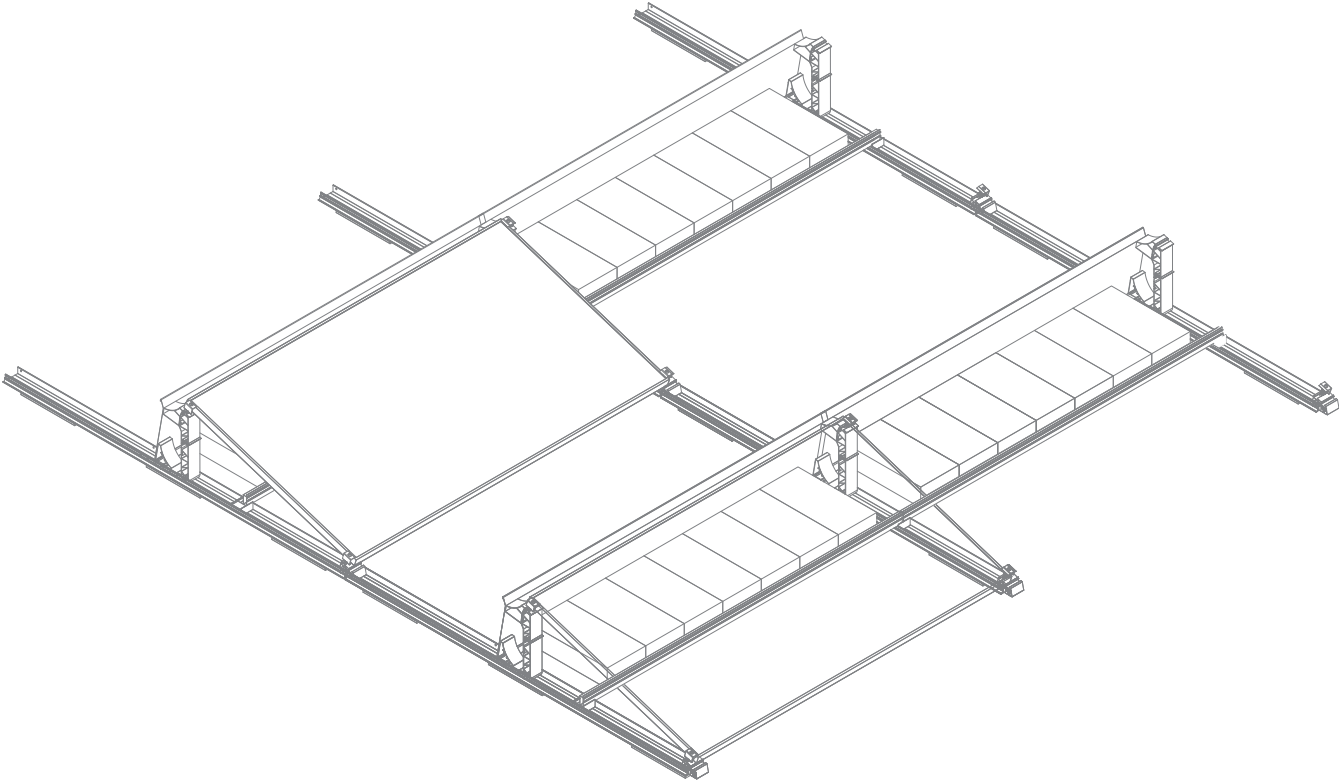
Tests/certificates

The system was tested in the setup of a specific 2x1 module configuration according to MCS 012 Issue 3.0 standard at a PV module surface of 5,4 m².

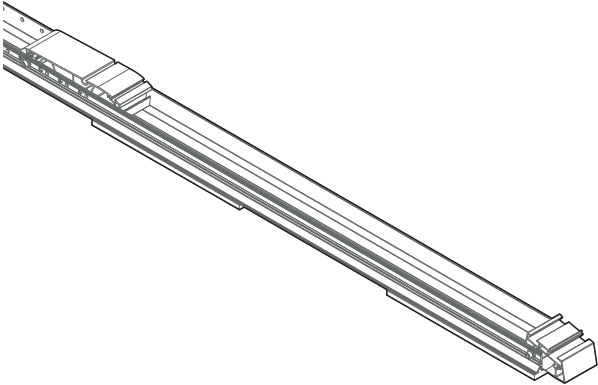
Permissible wind uplift values for this configuration and other relevant clauses can be found in Annex MCS 012 certification on page 21-22.

www.renusol.com

Renusol FS Pro 18-S Component Overview

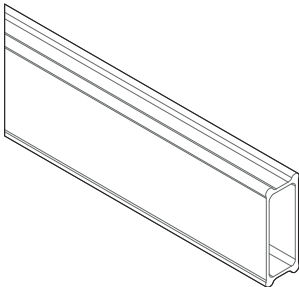


R520221
FS Pro 18-S Base rail 1900 (Set)

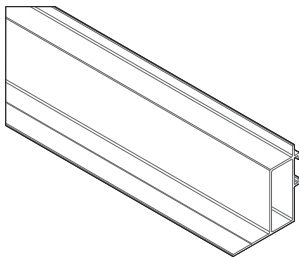


Ballast Rail

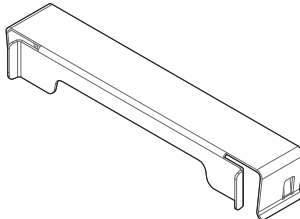
R500251
FS Pro Ballast profile connector



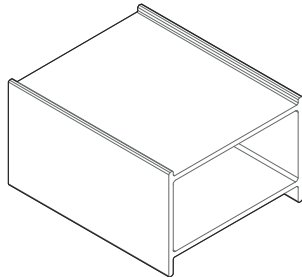
R500250
FS Pro Ballast profile 1900



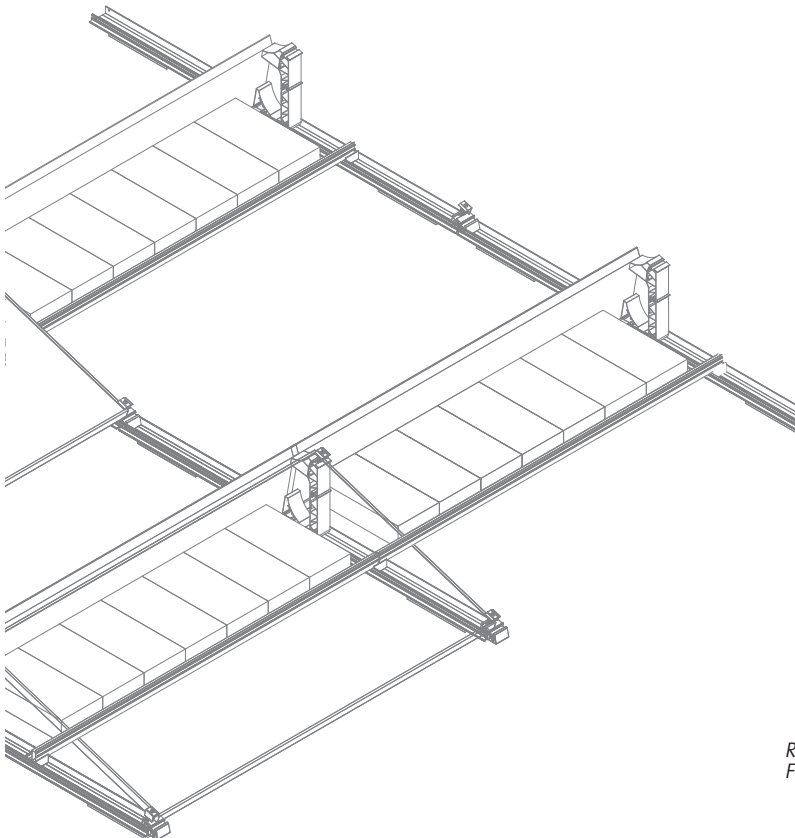
R500253
FS Pro Securing clip ballast support



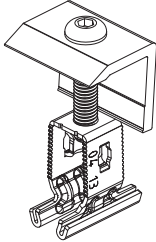
R500252
FS Pro Ballast profile support



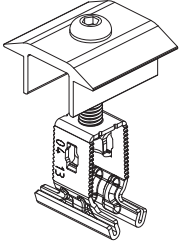
Renusol FS Pro 18-S Component Overview



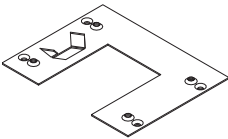
R420081 / R420081-BE
End clamp+
End clamp black+



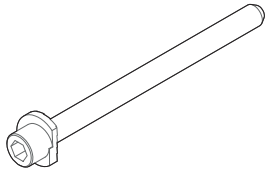
R420082 / R420082-BE
Middle clamp+
Middle clamp black+



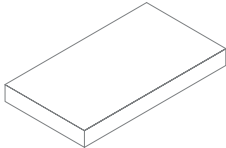
R900268 (optional)
P-Clip Potential equalization



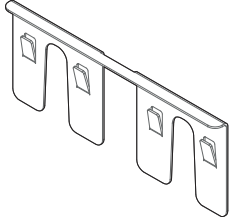
R500227
FS Pro Securing bolt



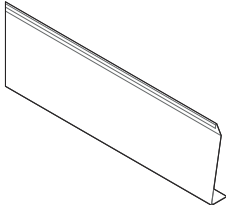
R500272
FS Pro Roof protection pad 55



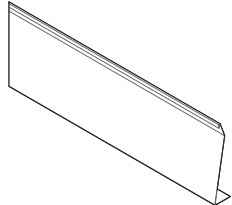
R500260
FS Pro Potential equalisation clip S



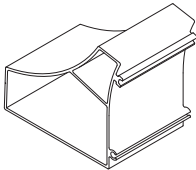
R500242
FS Pro 18-S Streamliner 1900



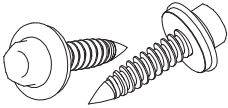
R500237
FS Pro 18-S Streamliner 2300



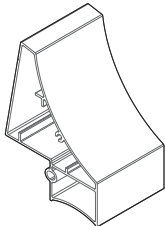
R500243
FS Pro 18-S Streamliner support



R900229 (optional)
Self Drilling Screw 4,8x19 A2



R500241
FS Pro Streamliner bracket



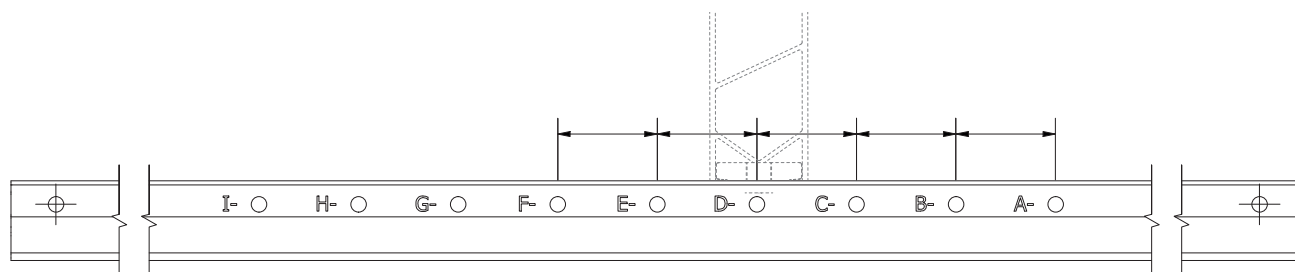
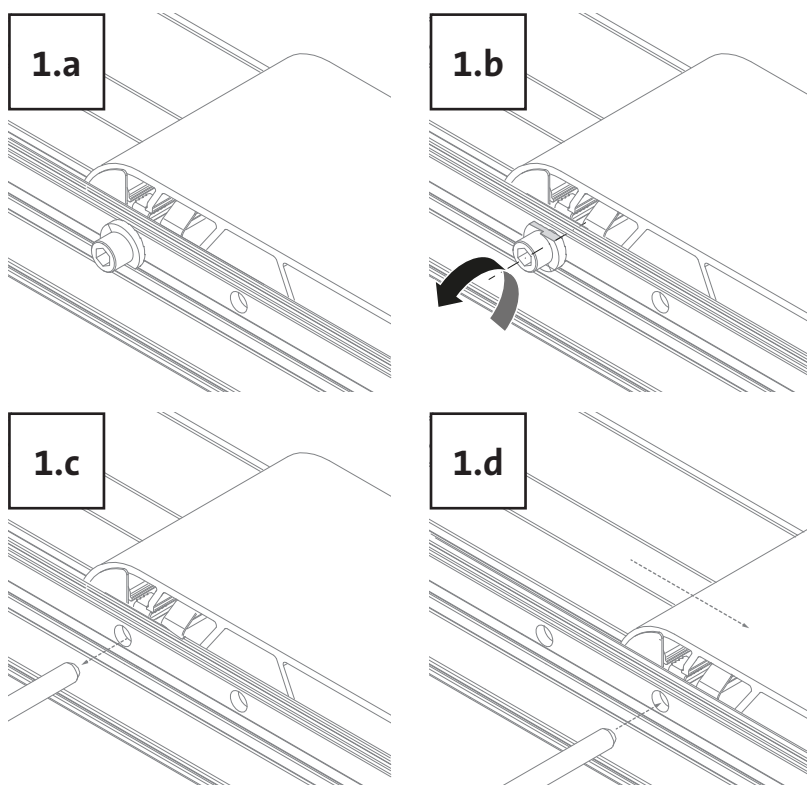
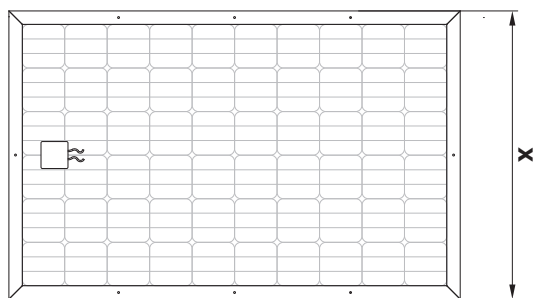
Preparation / Preface

EN | Usage

The ridge support is pre-assembled for modules with a width between 990-1030 mm.

If your module dimensions differ, please relocate the ridge support as shown in steps 1a-d.

The support is to be repositioned horizontally.

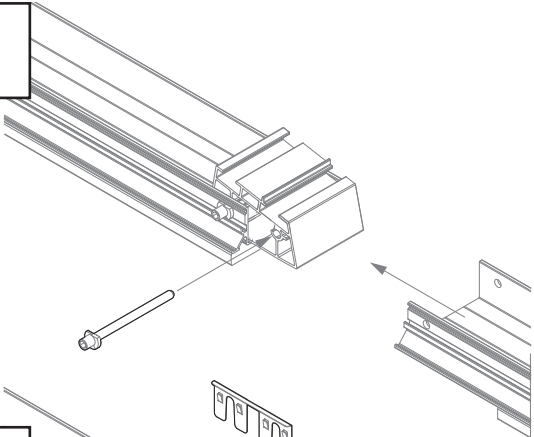


Module width	Ridge support
990-1030 mm	A
1030-1070 mm	B
1070-1110 mm	C
1110-1150 mm	D
1150-1190 mm	E
1190-1230 mm	F

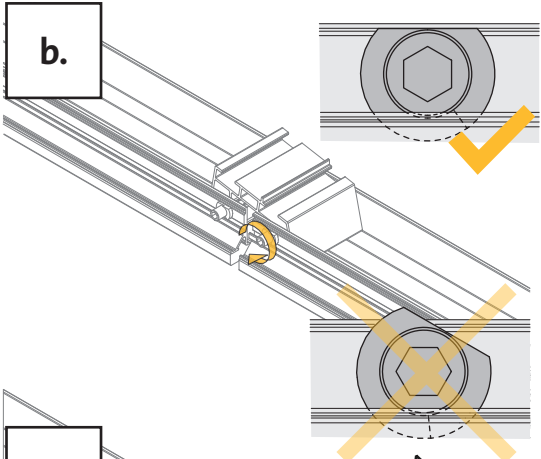
2.

Rail Connection

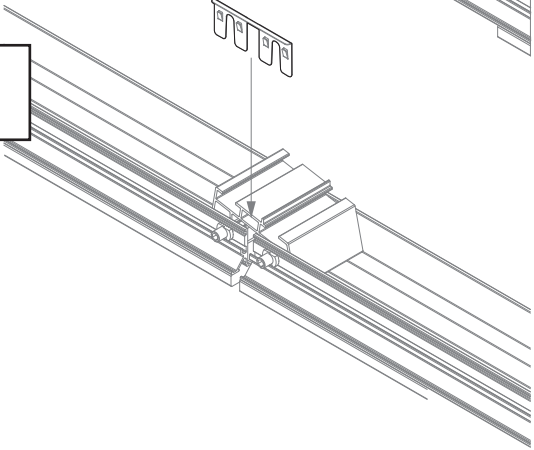
a.



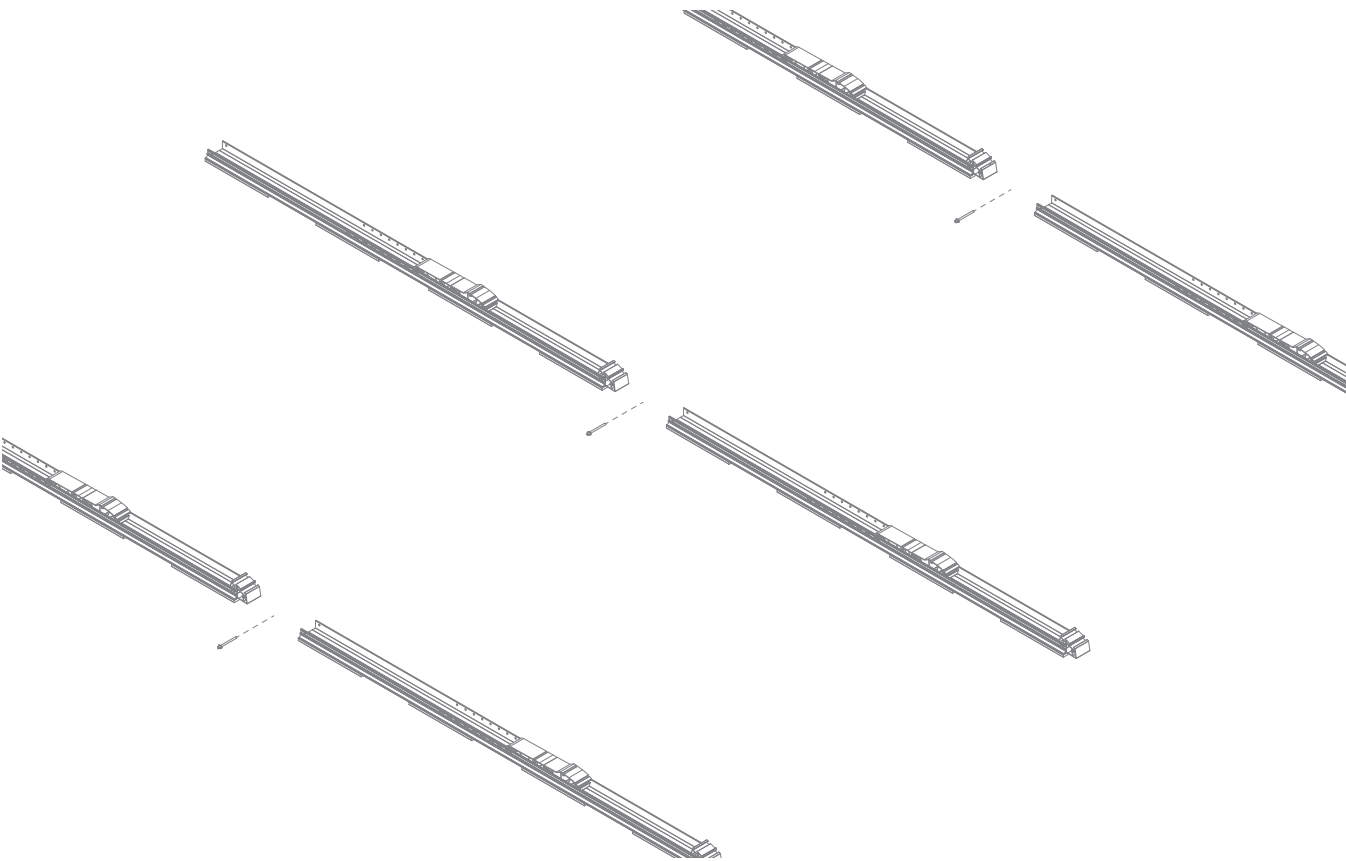
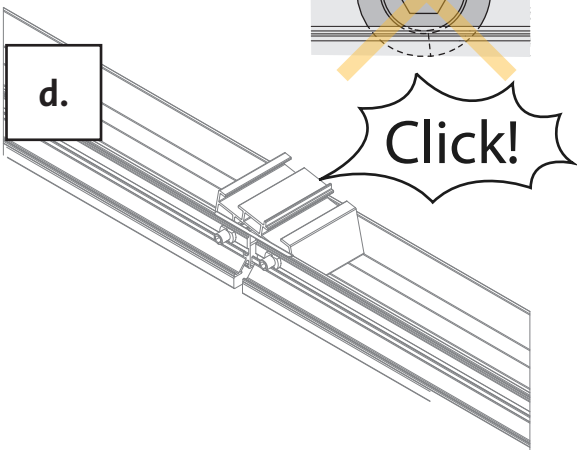
b.



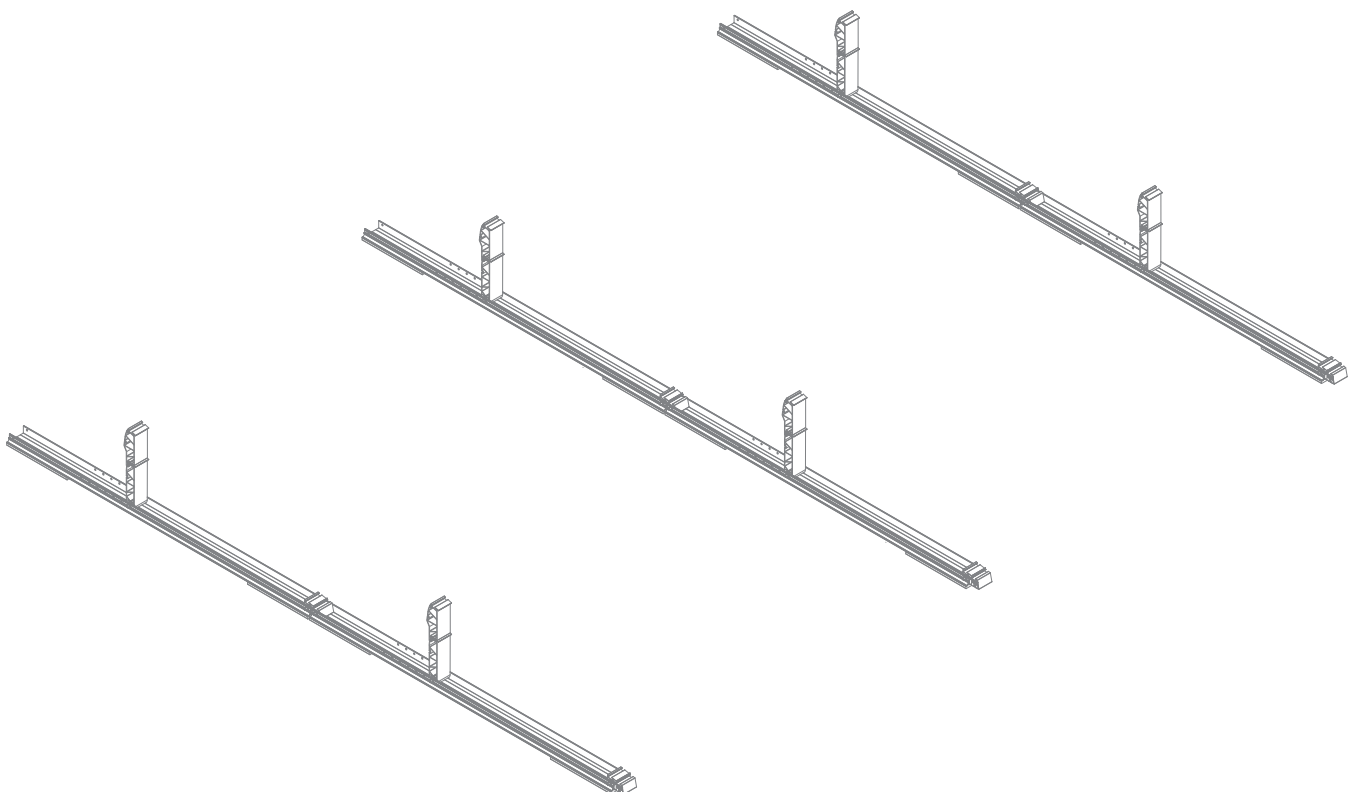
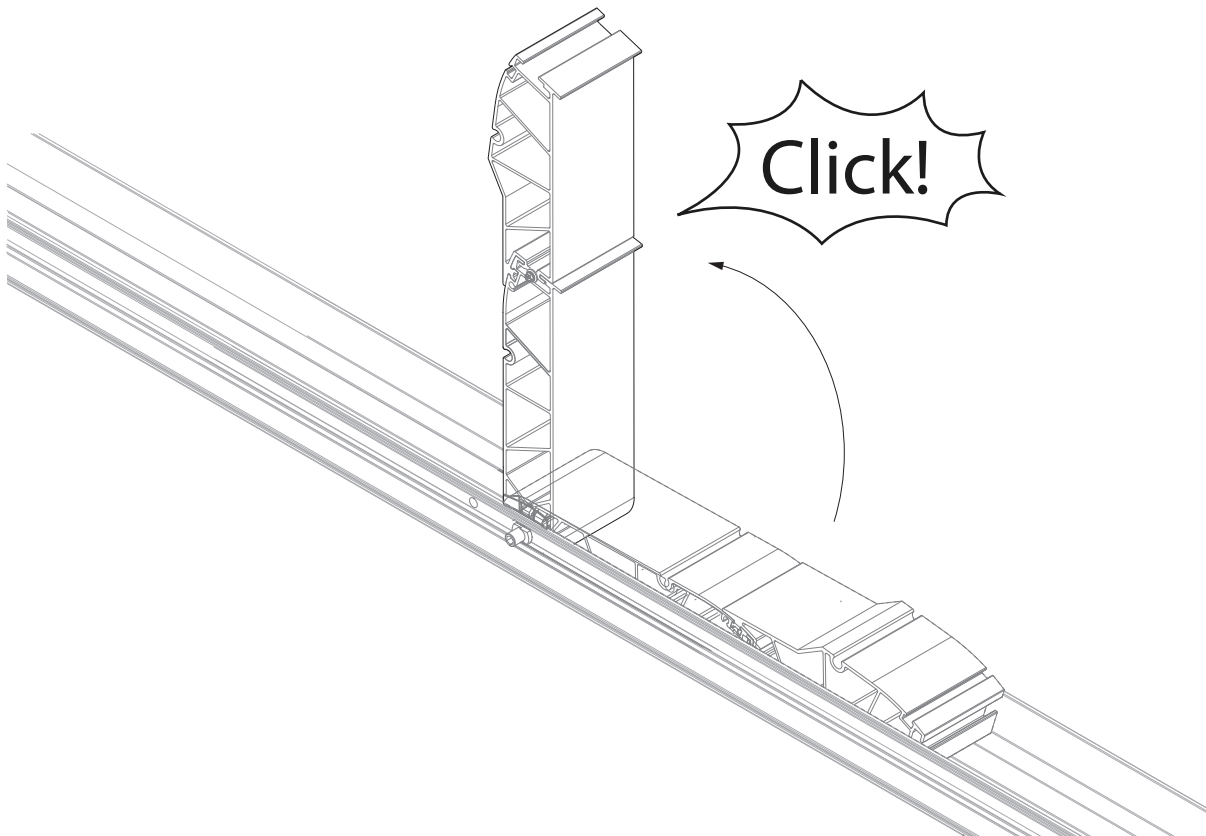
c.



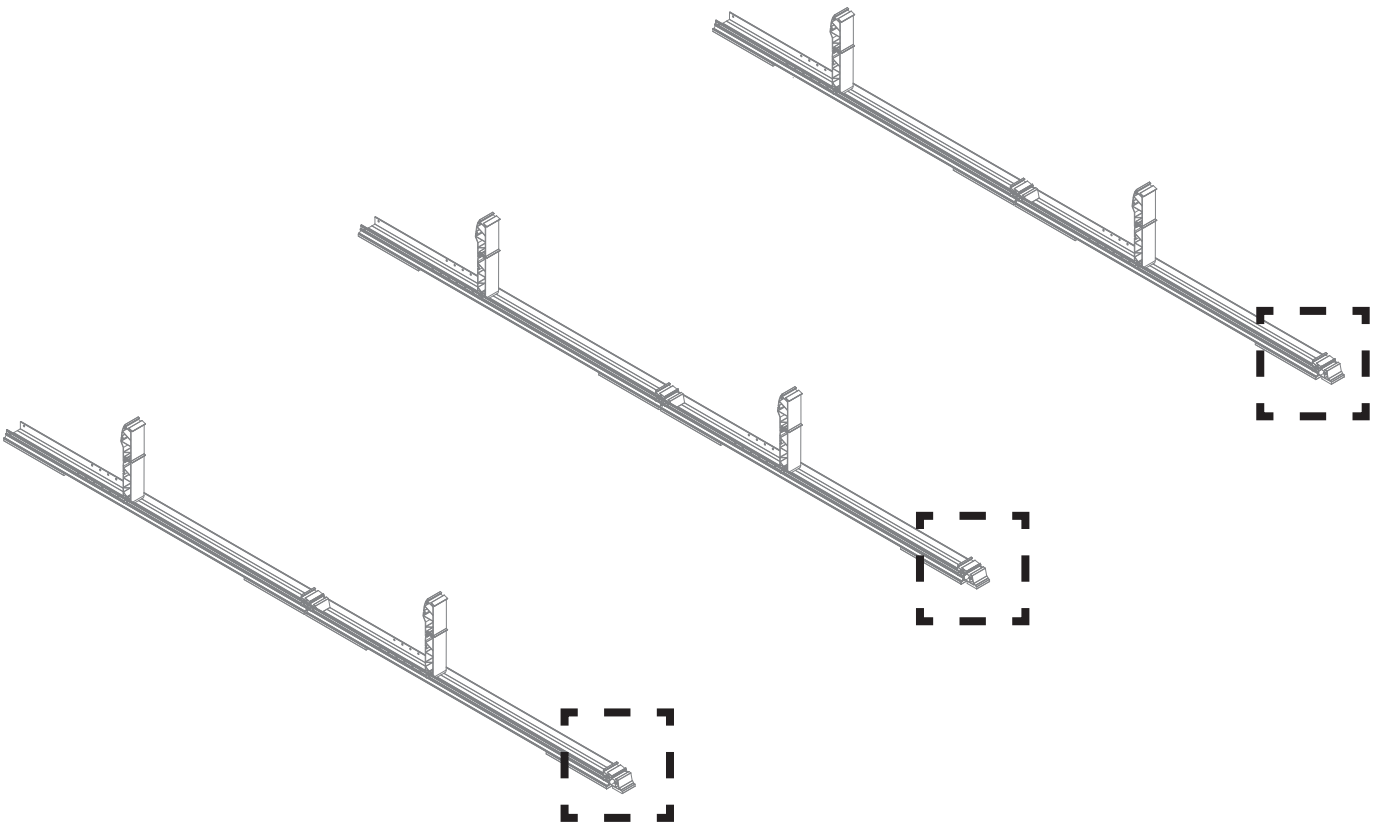
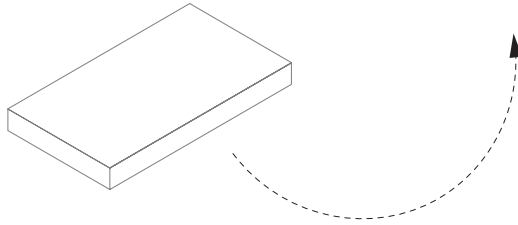
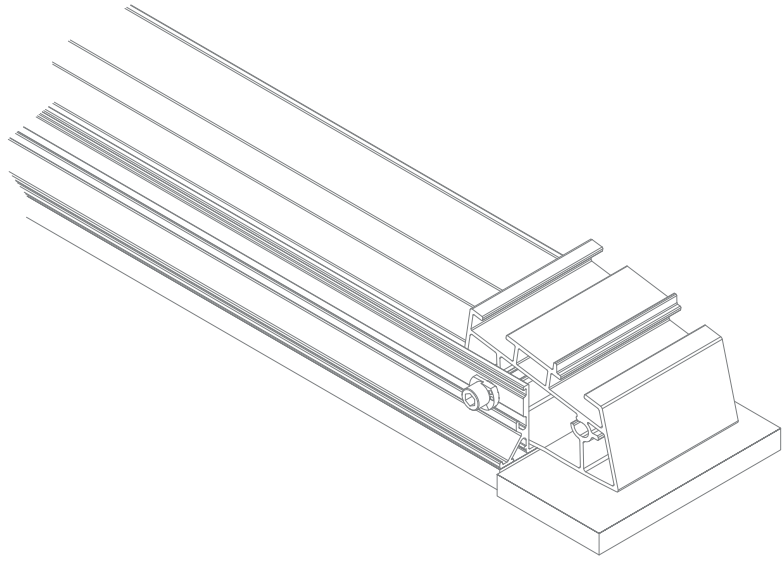
d.



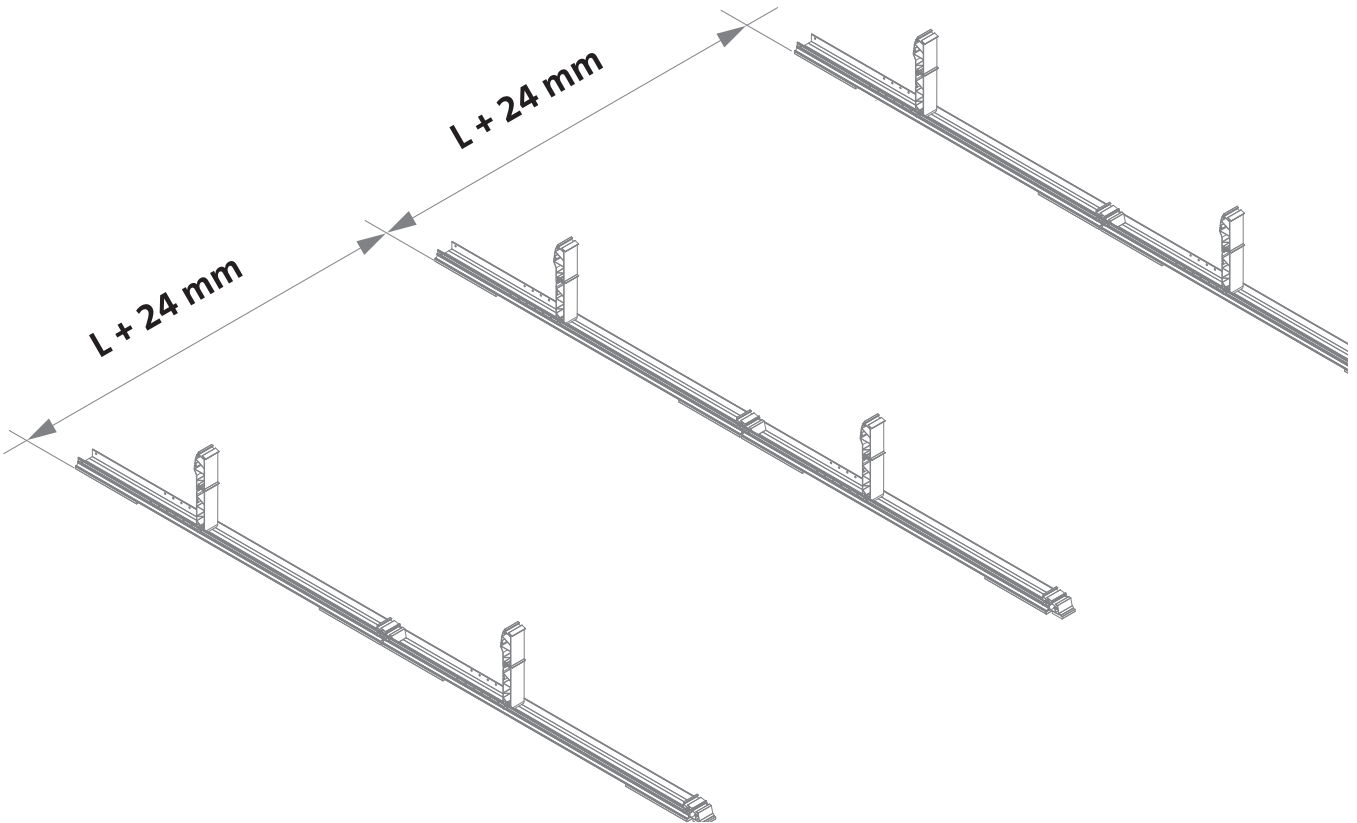
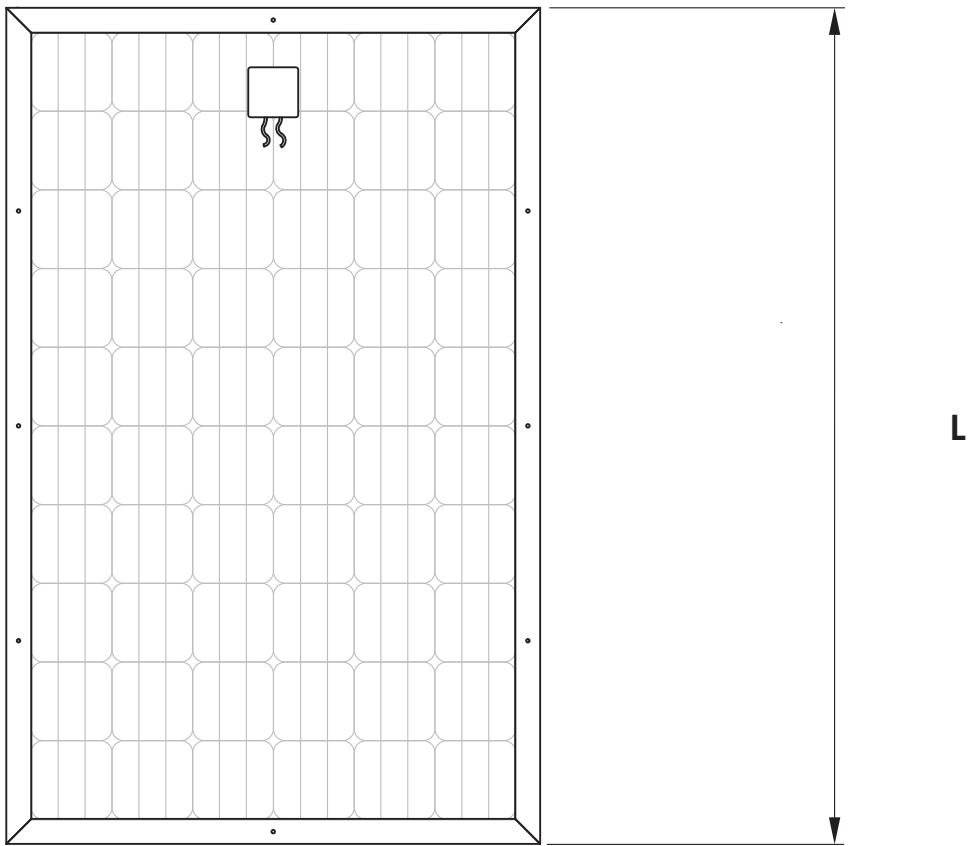
3.



4.



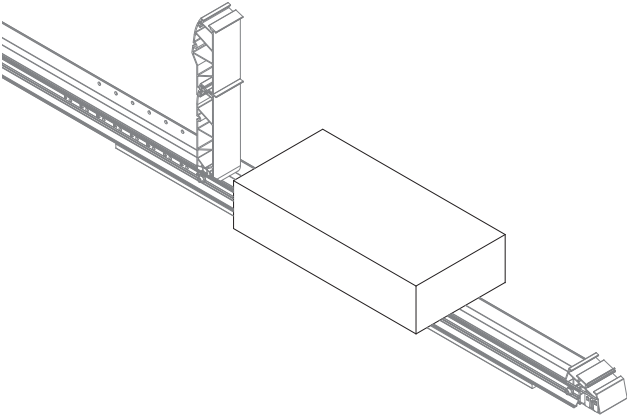
5.



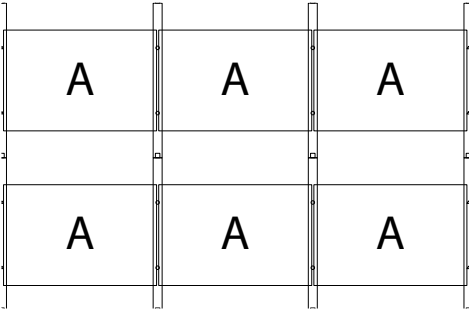
6.

Various ballasting options are possible (see project report)

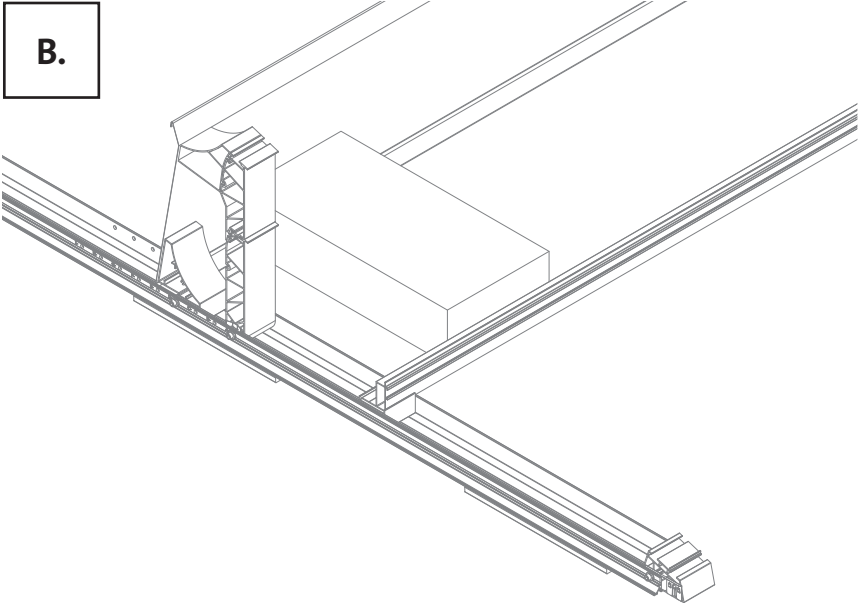
A.



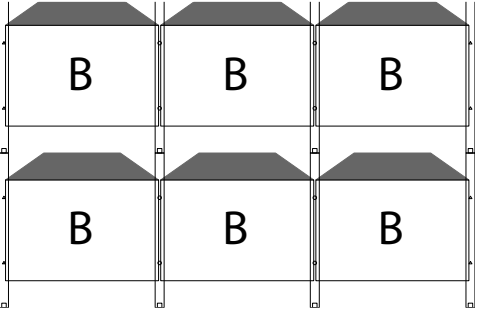
Ballasting Option A



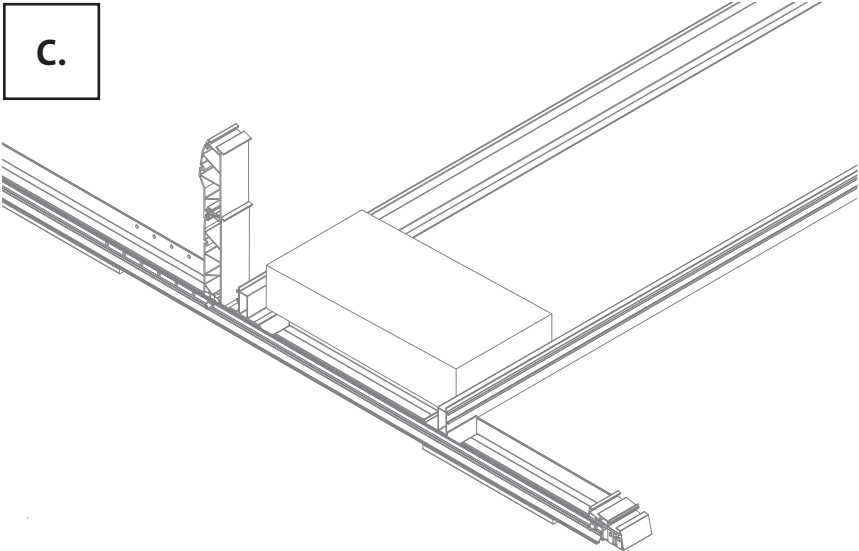
B.



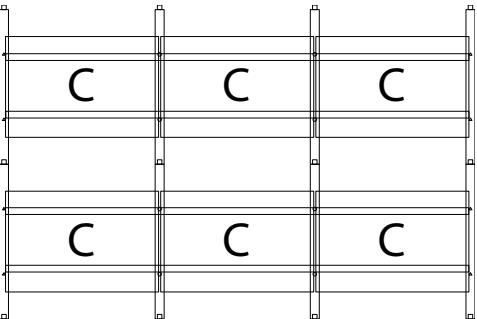
Ballasting Option B



C.

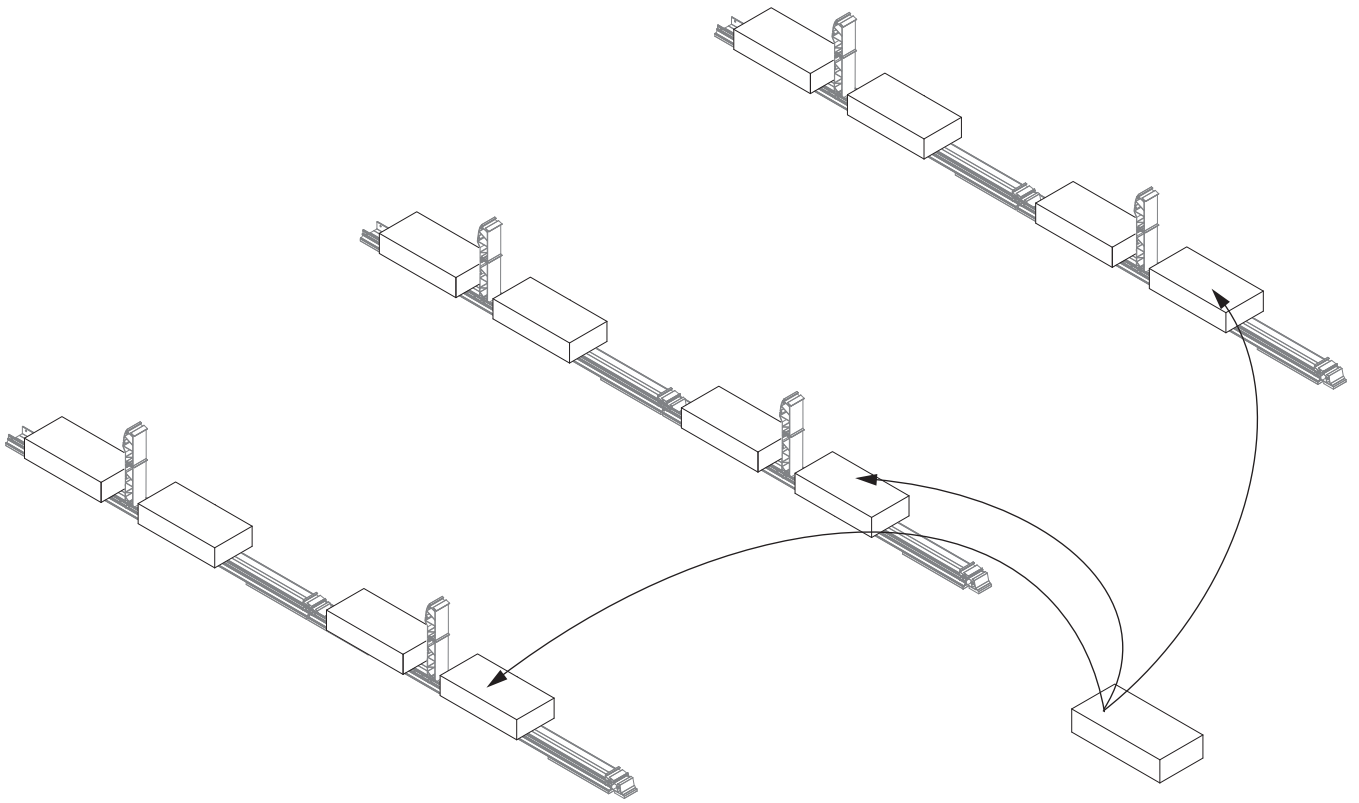


Ballasting Option C



6A.

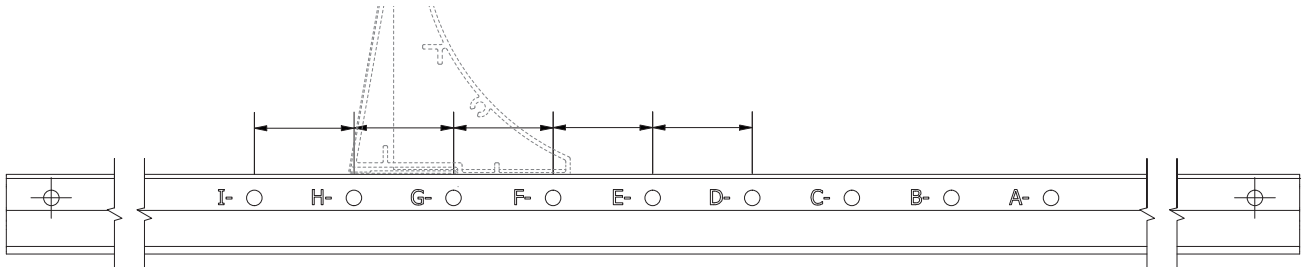
Ballasting Option A (see project report)



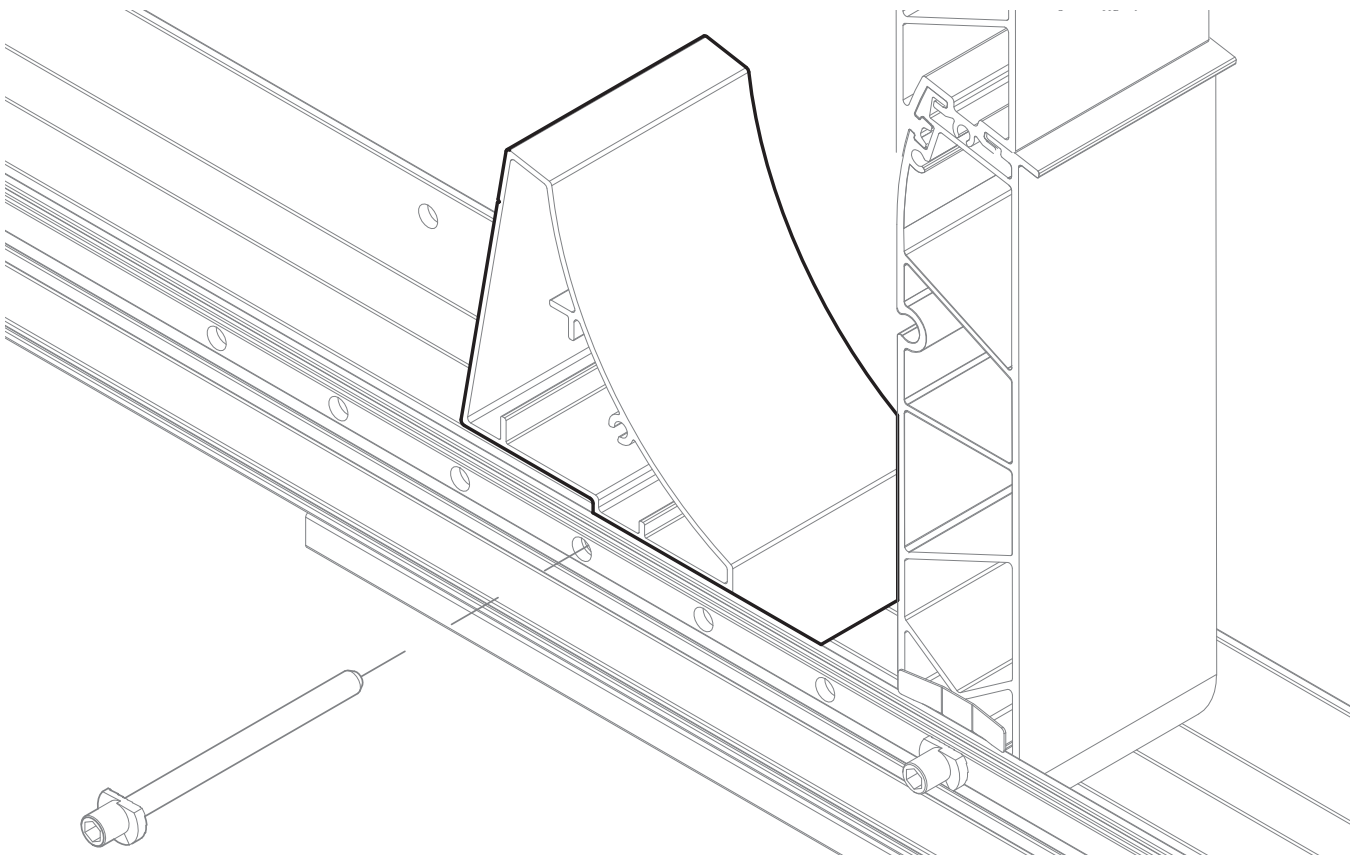
6B.

Ballasting Option B (see project report)

B.1



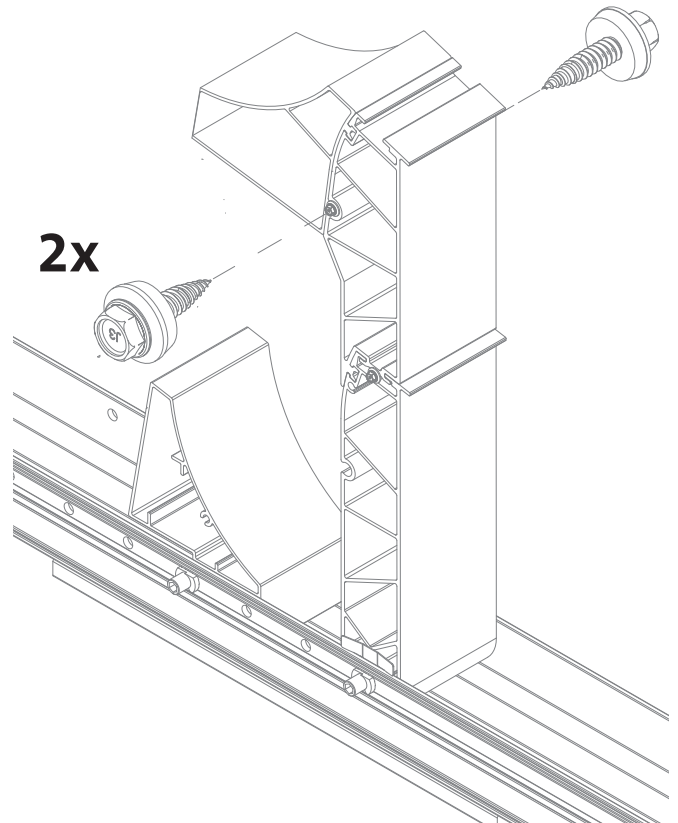
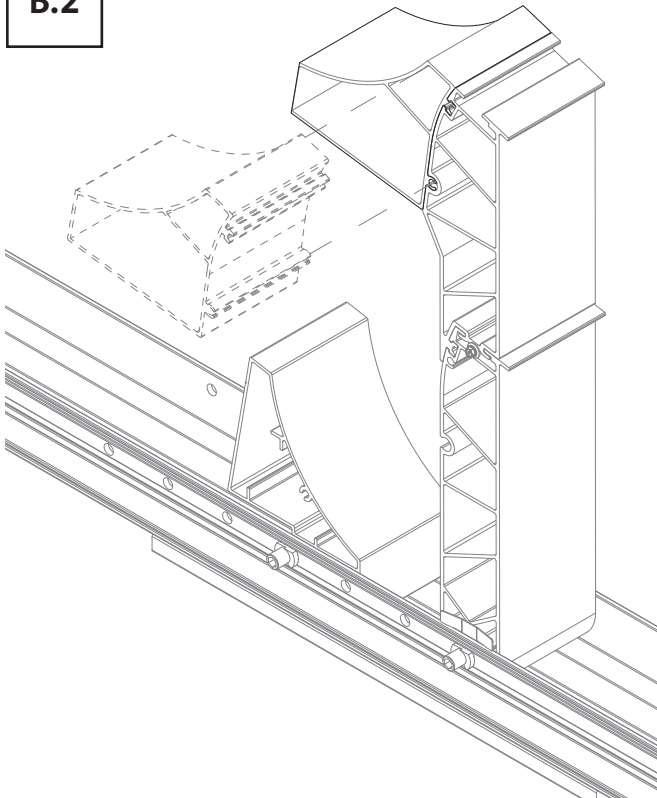
Module width	Streamliner bracket (2 holes distance)
990-1030 mm	D
1030-1070 mm	E
1070-1110 mm	F
1110-1150 mm	G
1150-1190 mm	H
1190-1230 mm	I



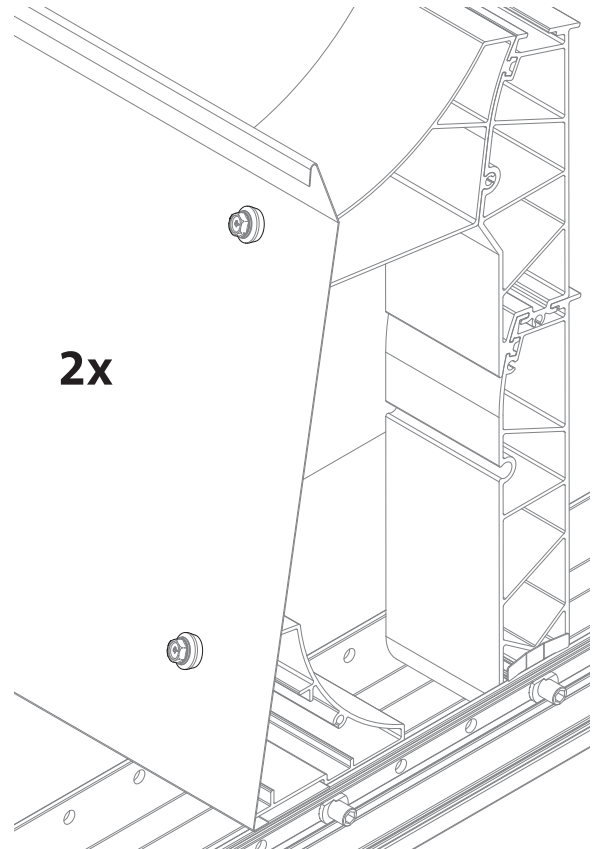
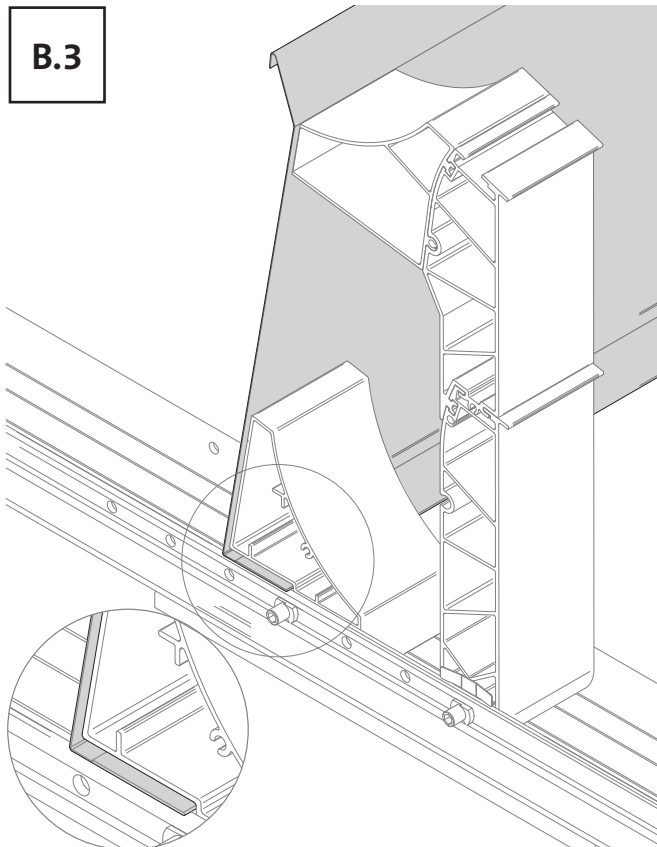
6B.

Ballasting Option B (see project report)

B.2



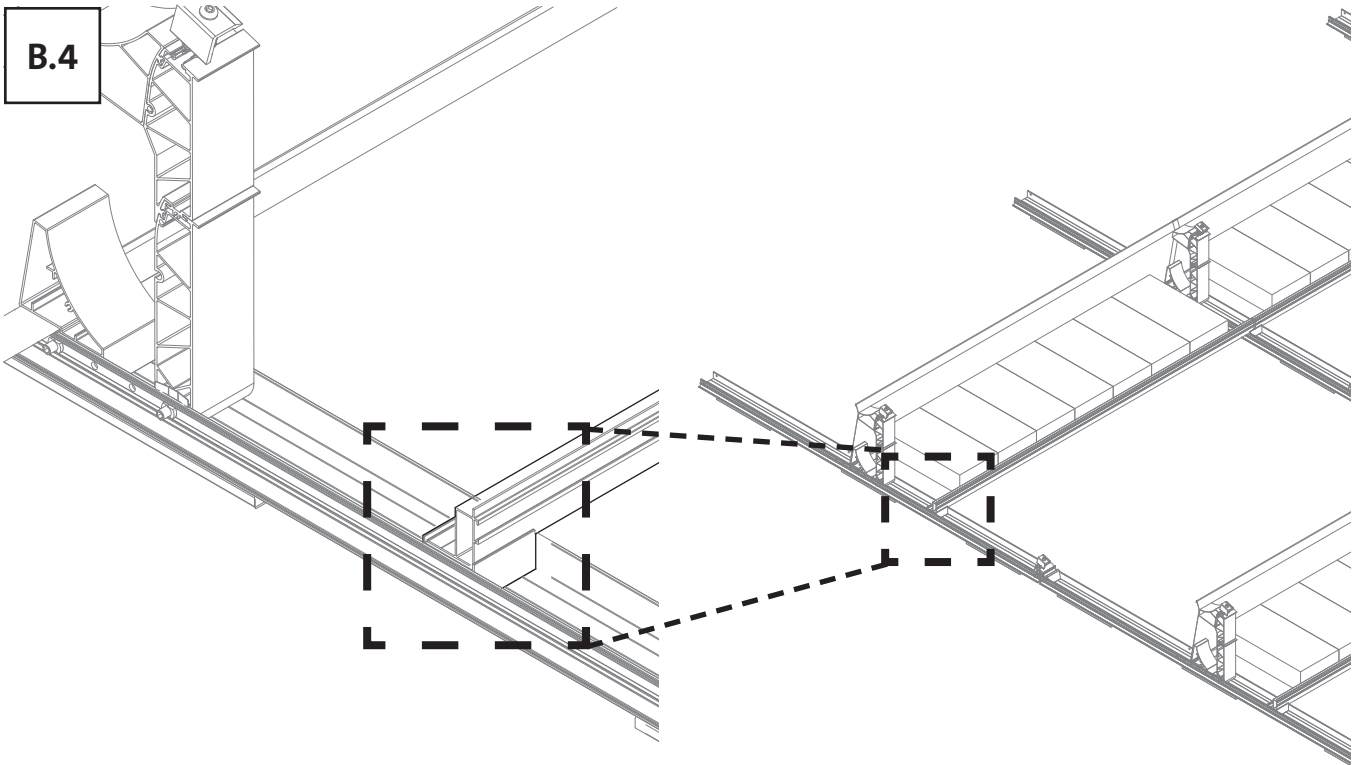
B.3



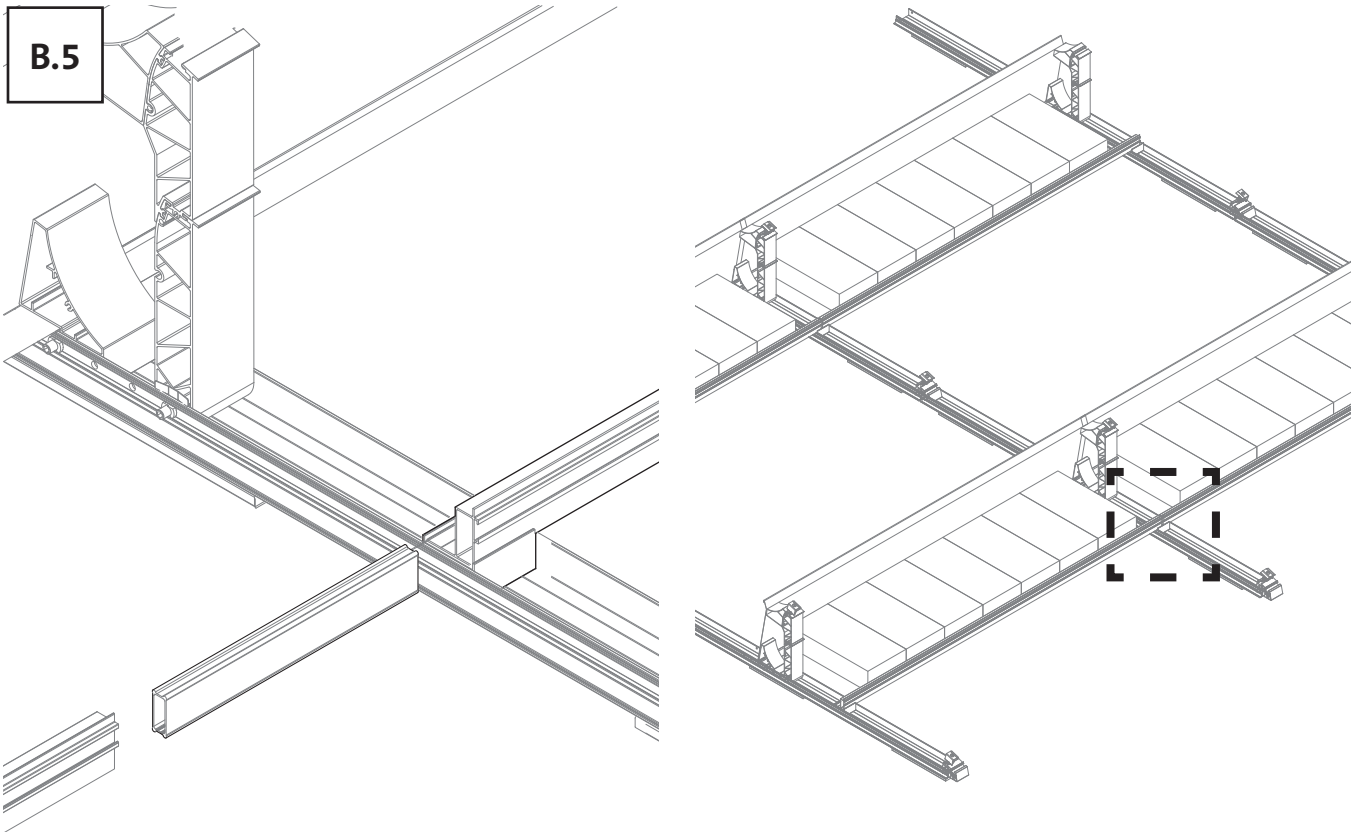
6B.

Ballasting Option B (see project report)

B.4



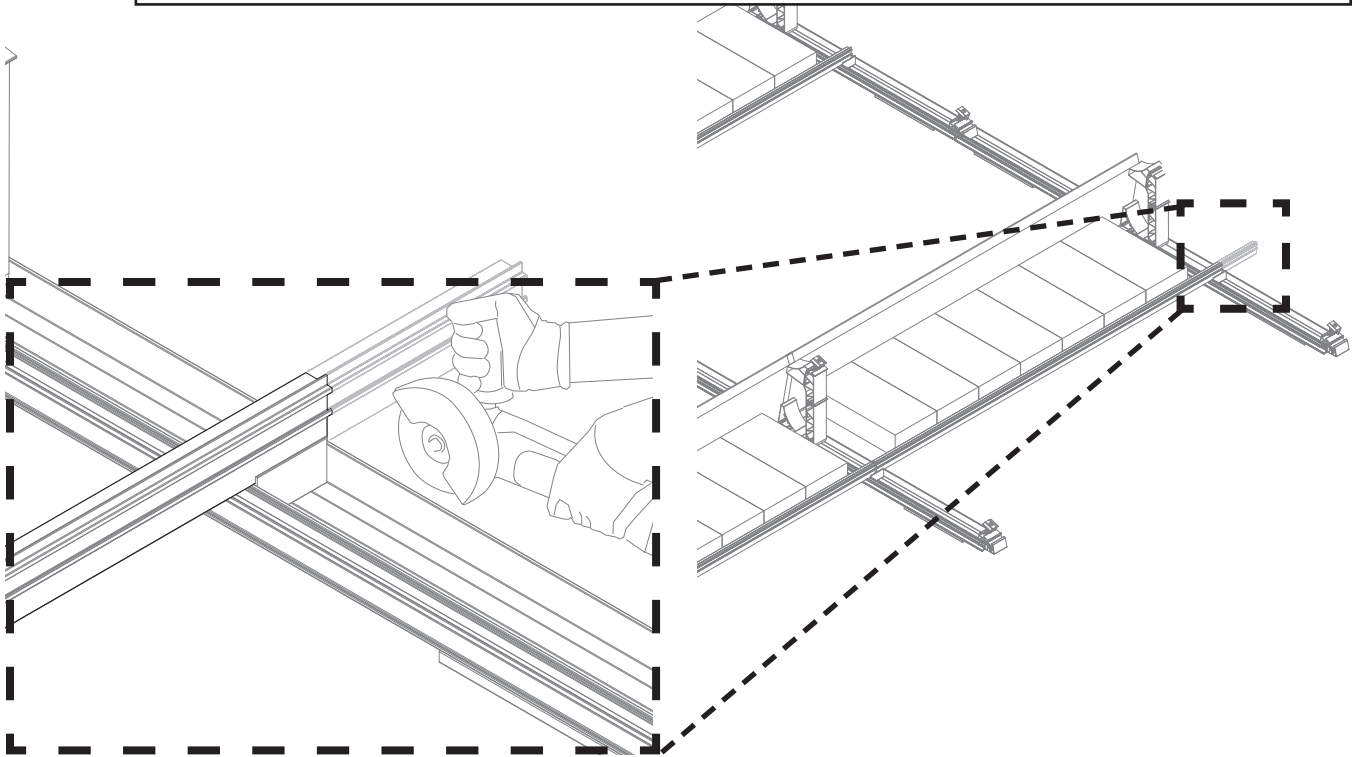
B.5



6B.

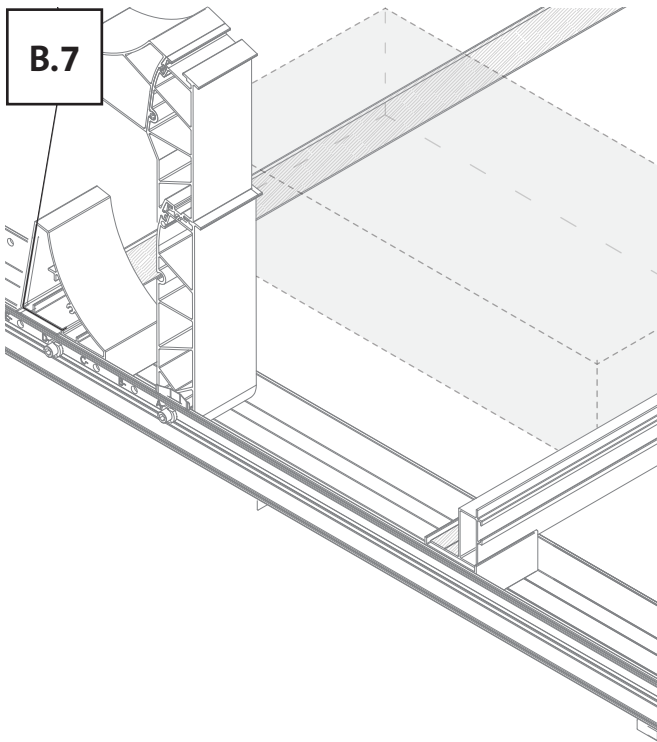
Ballasting Option B (see project report)

Please do not cut on the roof membrane!

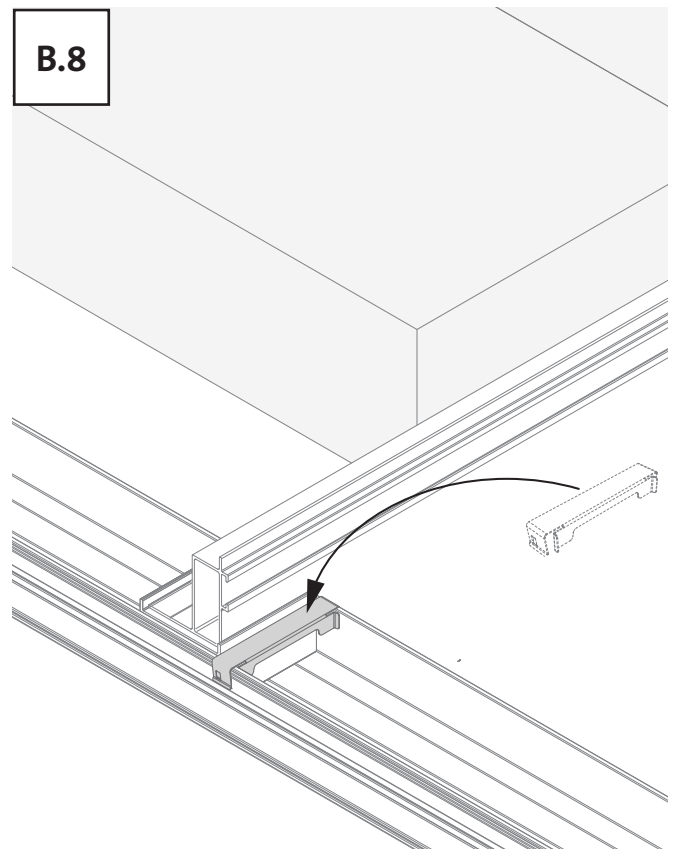


B.6

B.7



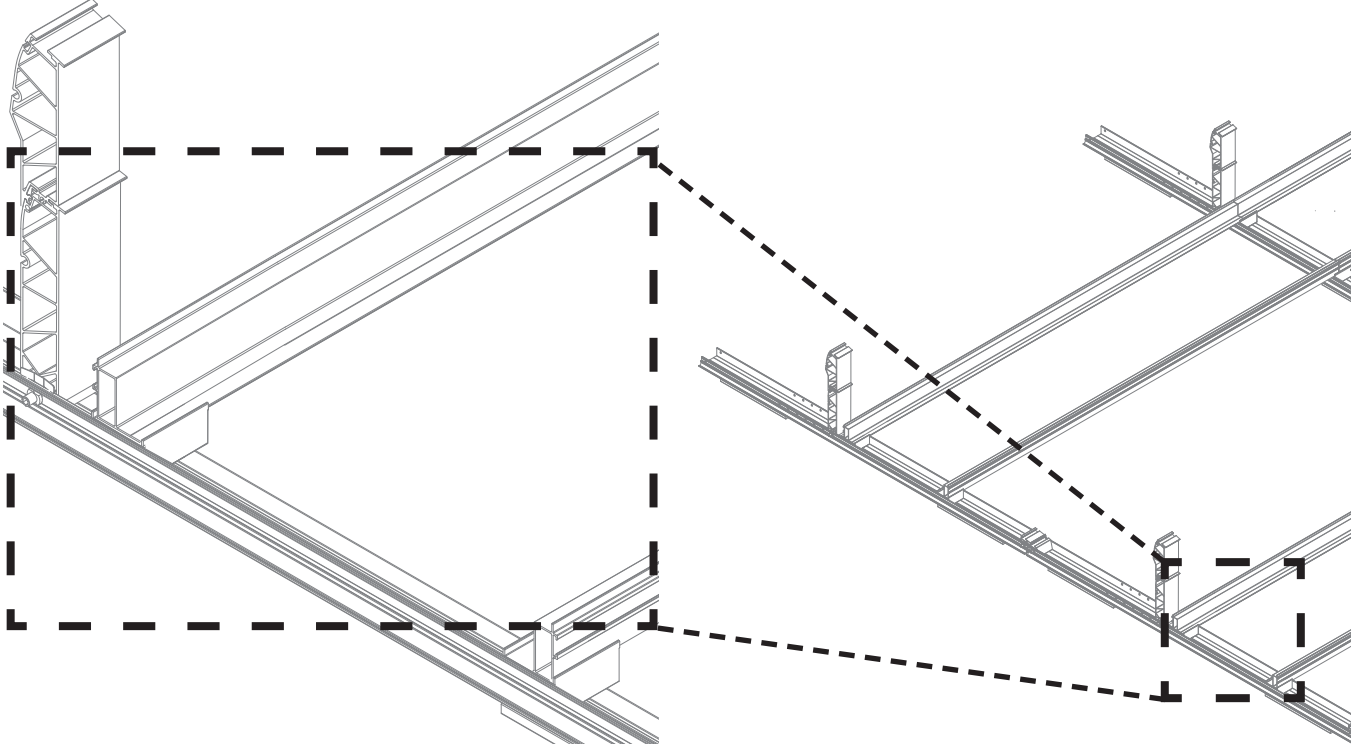
B.8



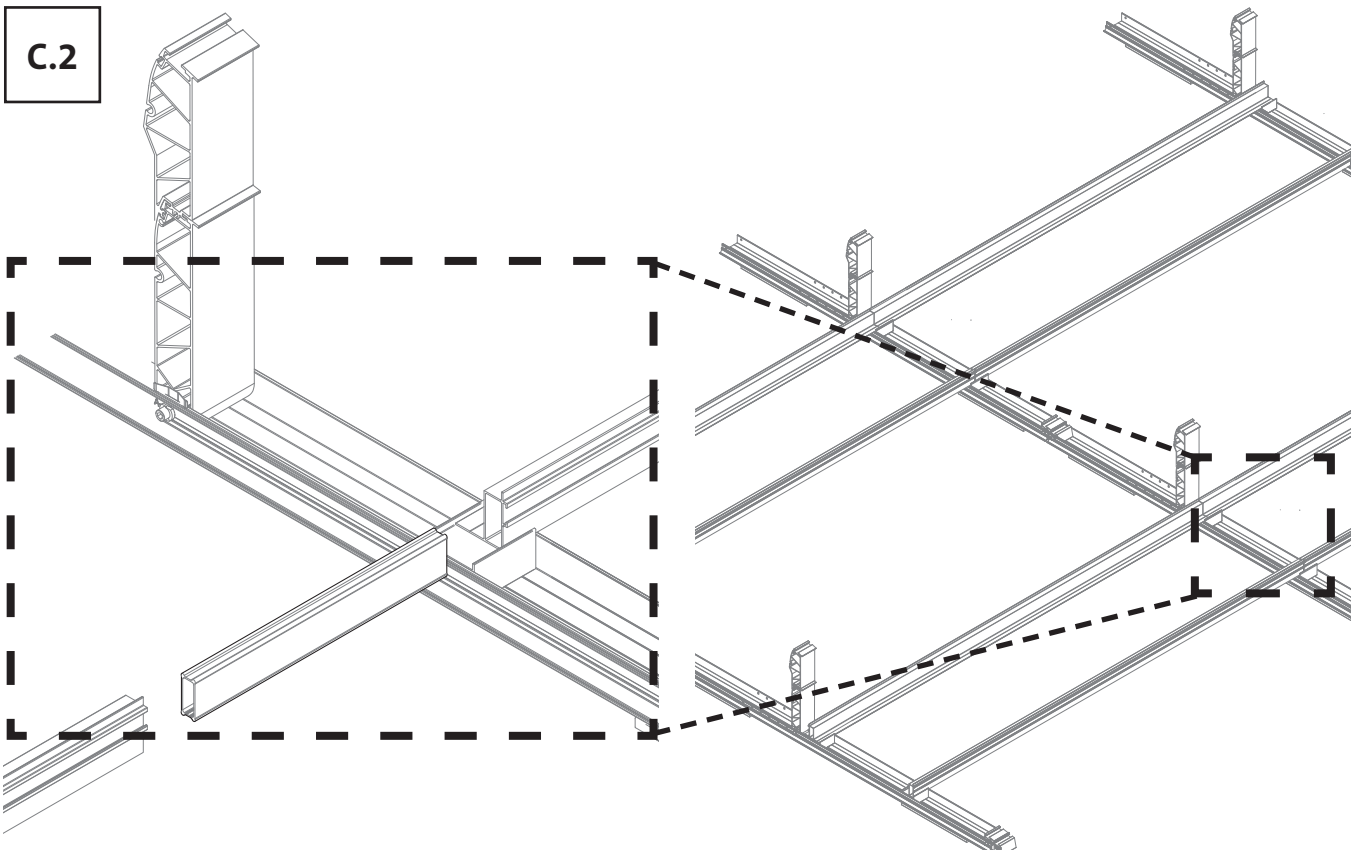
6C.

Ballasting Option C (see project report)

C.1



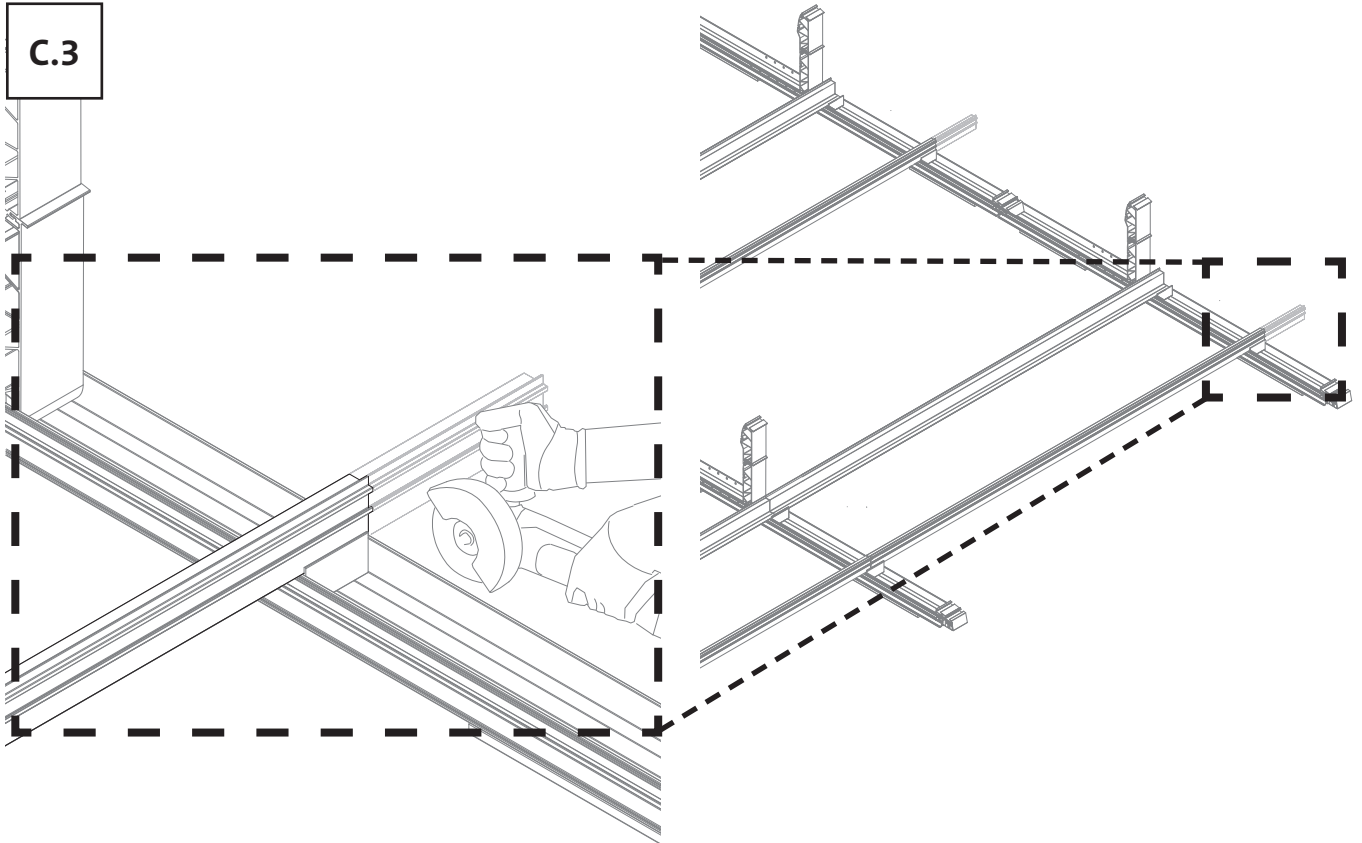
C.2



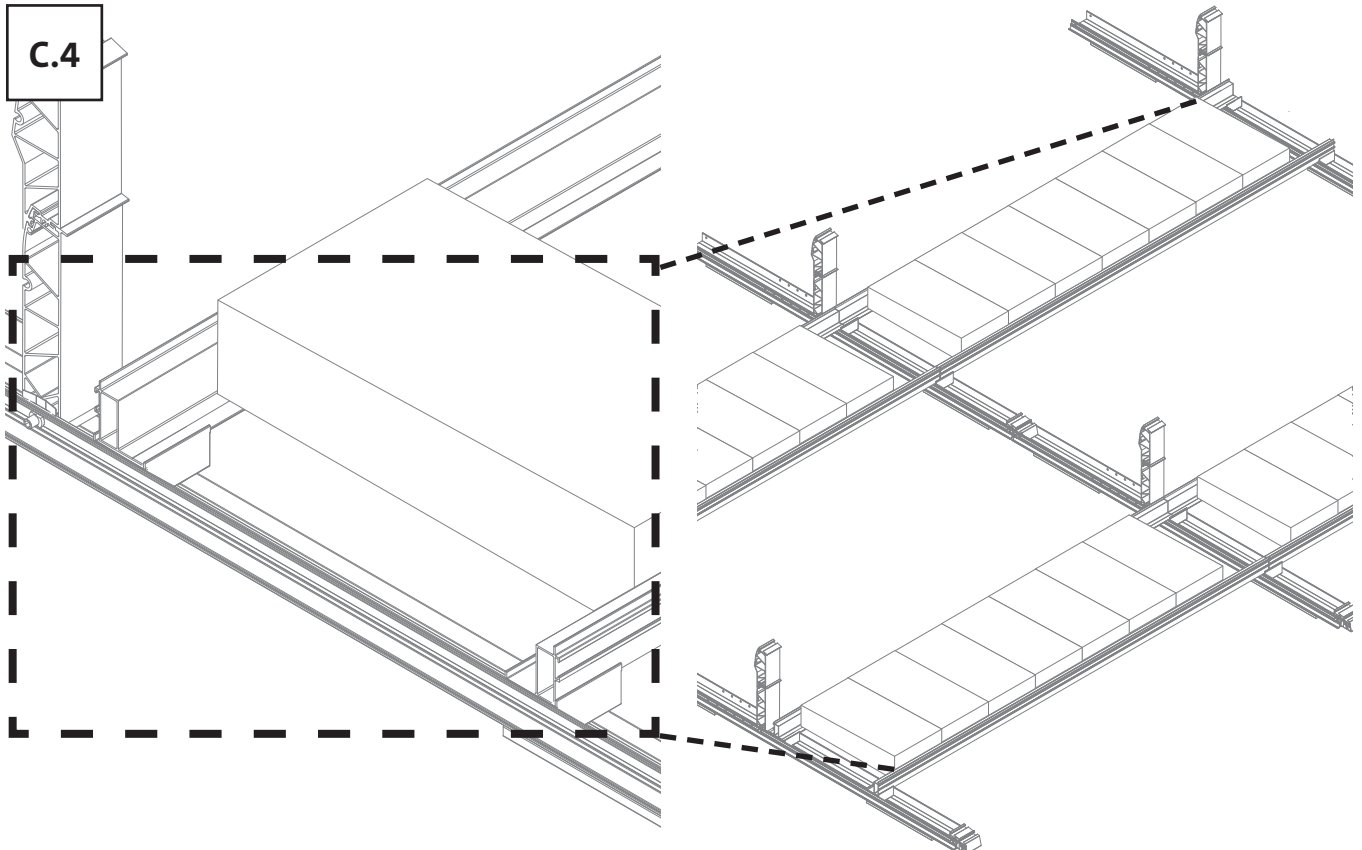
6C.

Ballasting Option C (see project report)

C.3



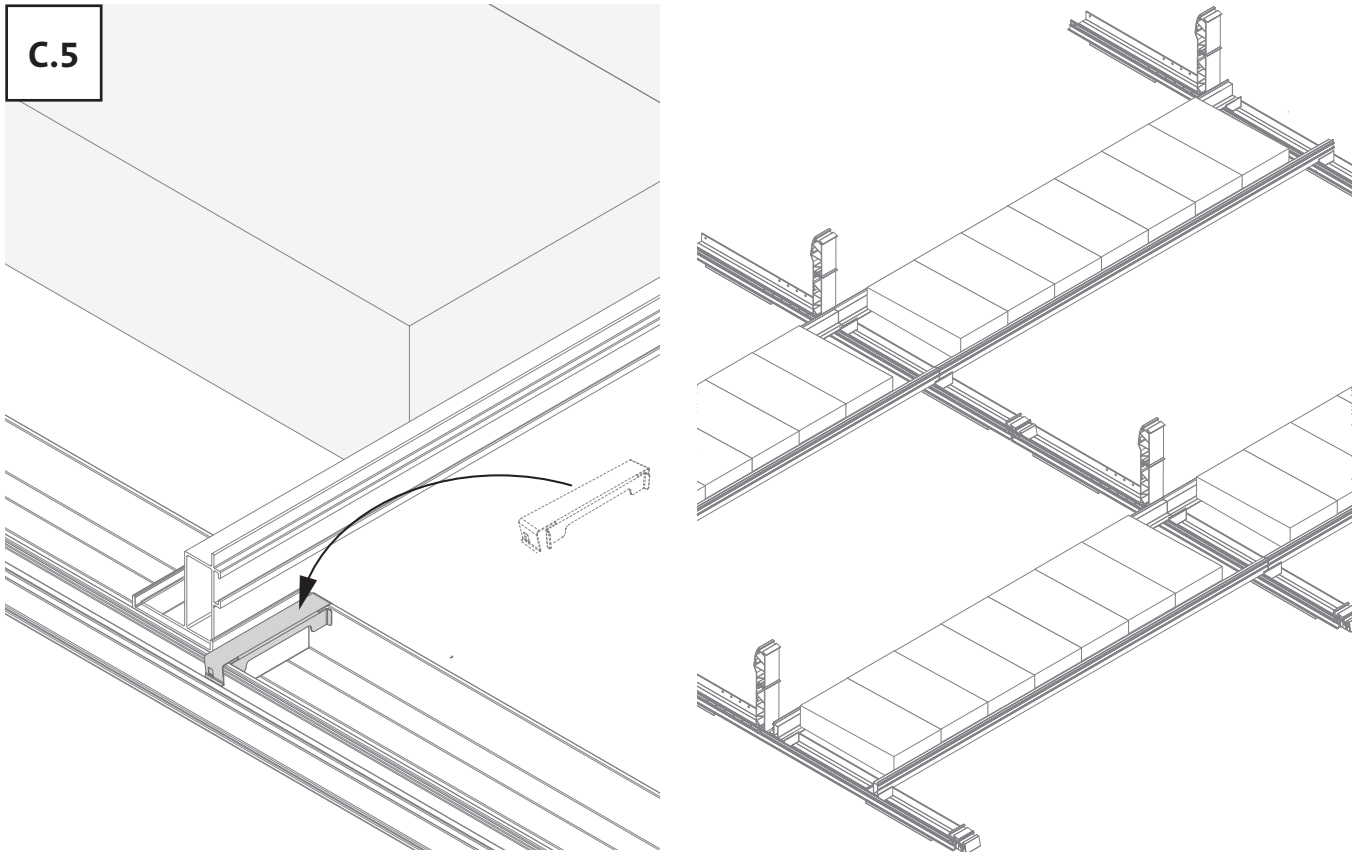
C.4



6B.

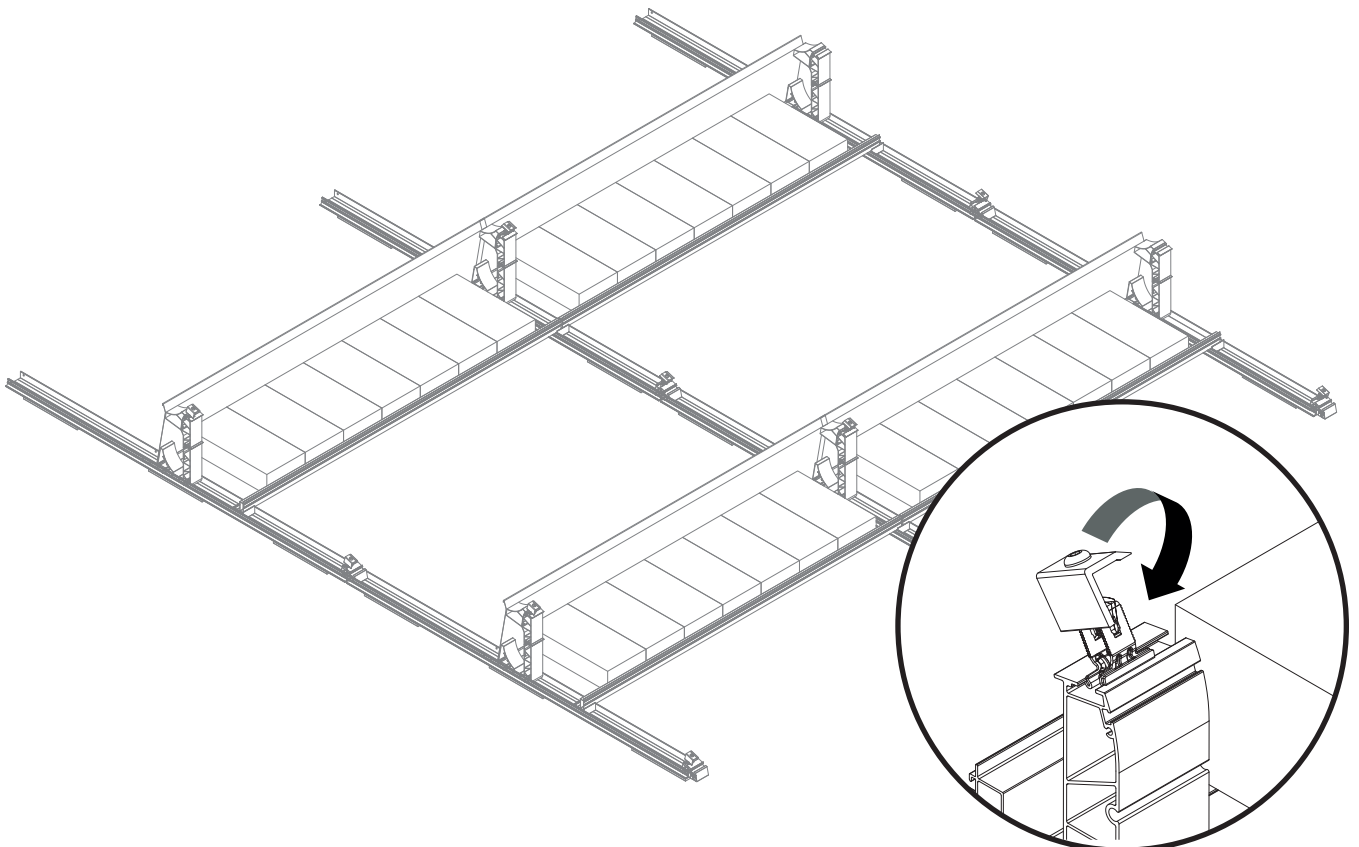
Ballasting Option C (see project report)

C.5

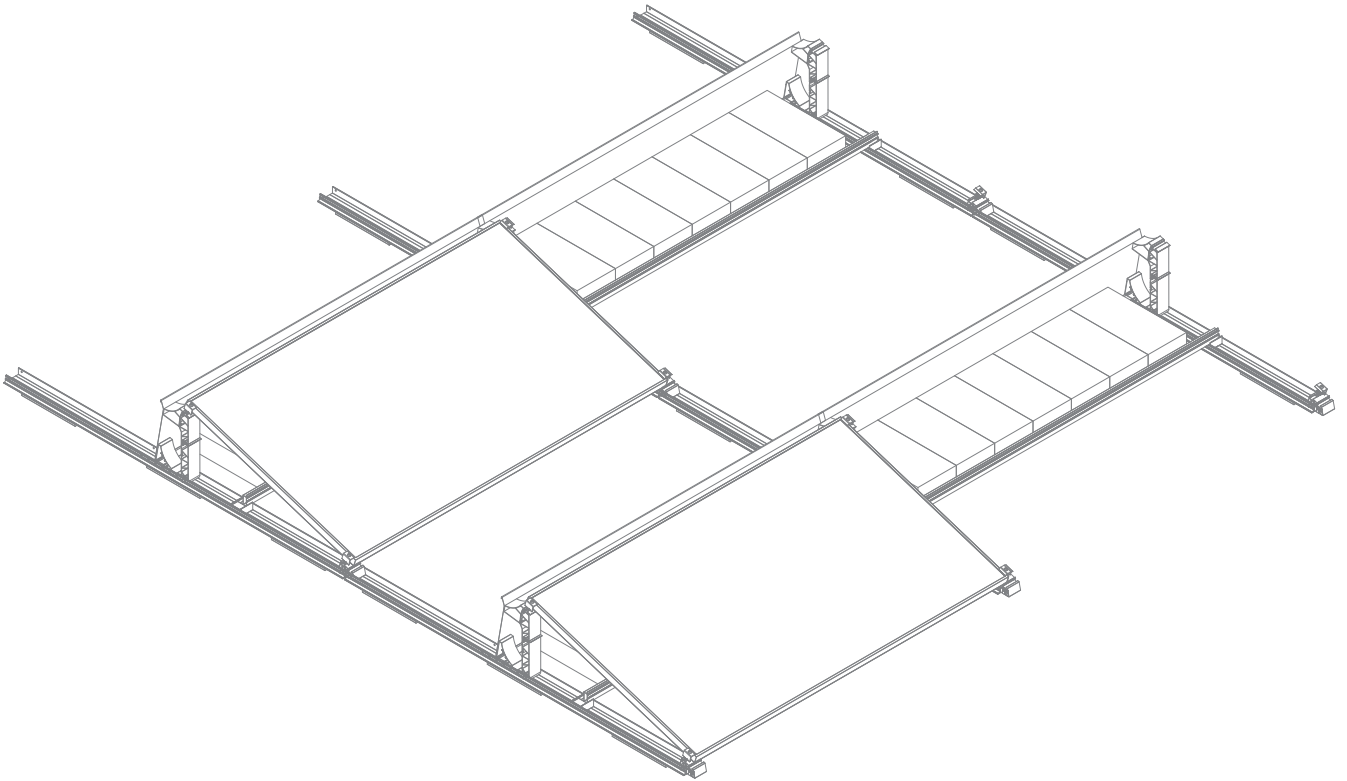


7.

Depending on the installation variant, the following graphics may vary slightly.

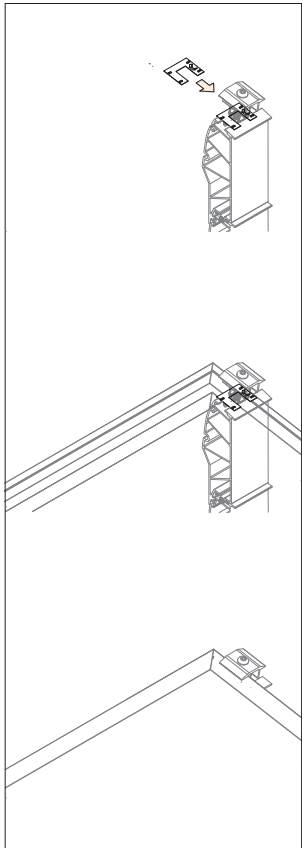
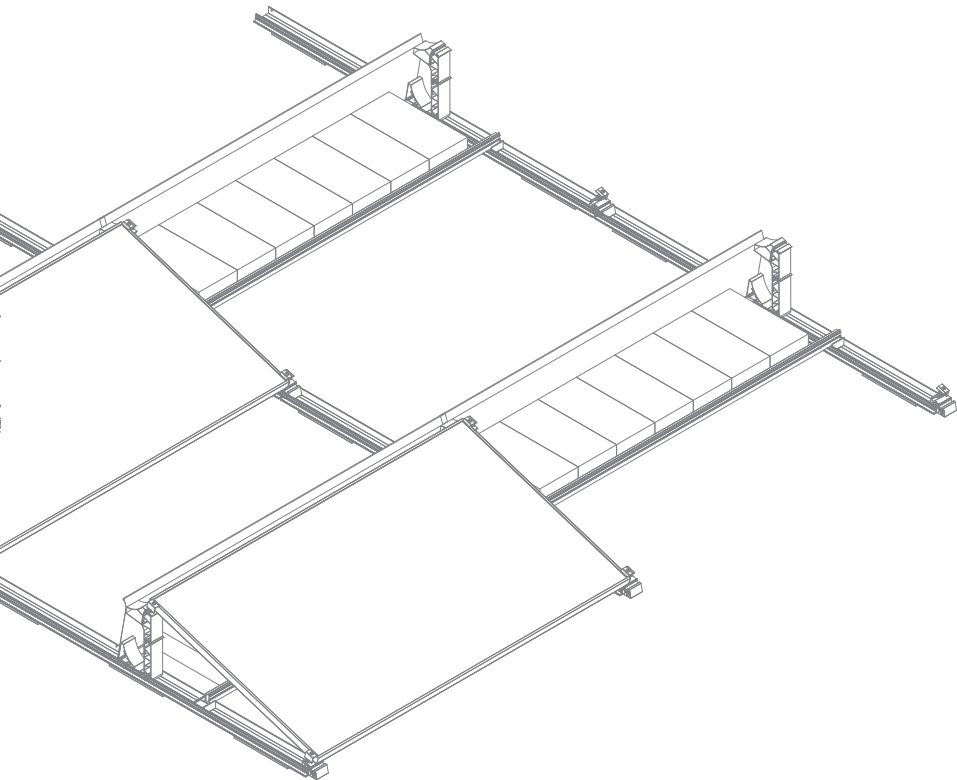


8.

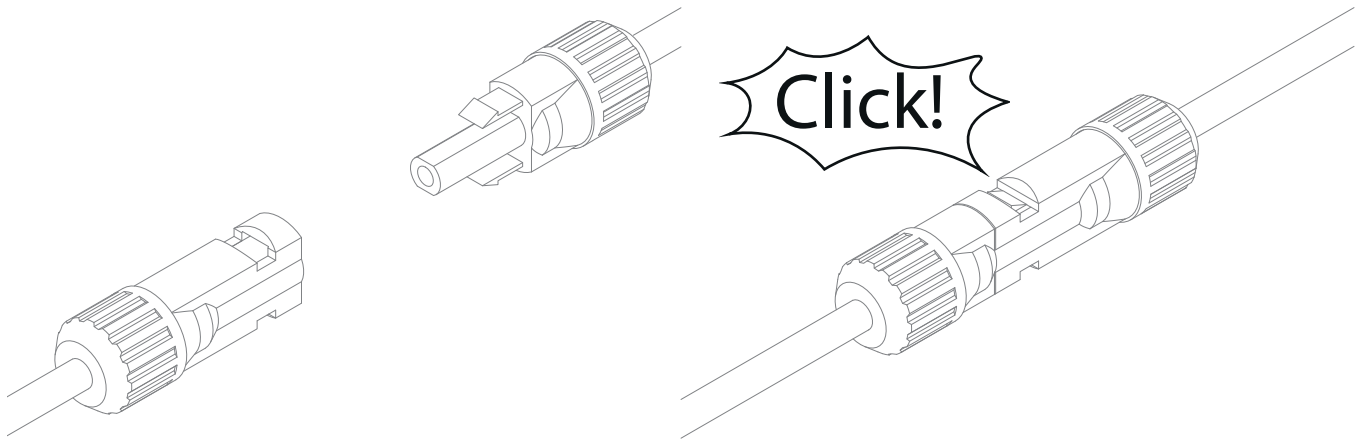


9.

Potential equalisation (optional) - Article number R900268

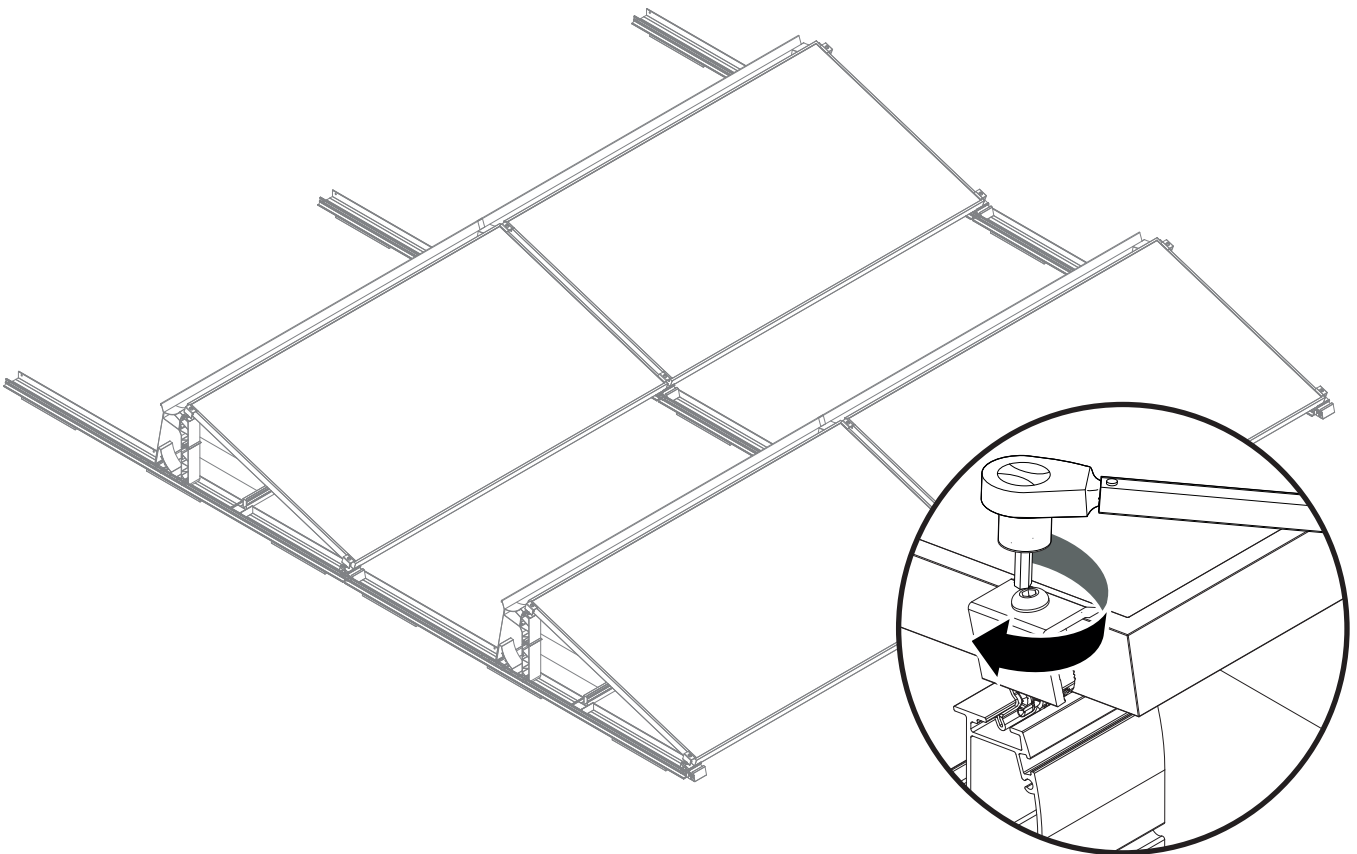


10.



11.

10 Nm 



FS Pro 18-S			
Product name	Product Model name	Maximum Design Wind Uplift Resistance (kPa for full system)	Partial (safety) factor(s)
FS Pro 18-S	REN_FSPRO_07	0.5	1.00

Product name certificated	
FS Pro 18-S	
Product Model name certificated	
REN_FSPRO_07	
System component	
Part number	
End clamp+ (black)	R420081-BE
Middle clamp+ (black)	R420082-BE
End clamp+	R420081
Middle clamp+	R420082
RS1	R420080
RS1 (black)	R420080-BE
RS Pro (black)	R420025-B
RS Pro	R420025
End clamp+ 50mm (black)	R420028-BE
Middle clamp+ 50mm (black)	R420029-BE
End clamp+ 50mm	R420028
Middle clamp+ 50mm	R420029
FS Pro End clamp LS	R520283
FS Pro 18-S Base rail 1900 (Set)	R520221
FS Pro Ridge support	R500230
FS Pro 18-S Ridge support adapter	R500233
FS Pro Securing clip ridge support	R500228
FS Pro Eave support 18-S	R500234
FS Pro Ballast profile 1900	R500250
FS Pro Ballast profile connector	R500251
FS Pro Ballast profile support	R500252
FS Pro Securing clip ballast support	R500253
FS Pro Roof protection pad 55	R500272
FS Pro Roof protection pad 300	R500270
FS Pro Streamliner 18-S 1900	R500242
FS Pro Streamliner 18-S 2300	R500237
FS Pro Streamliner bracket	R500241
FS Pro 18-S Streamliner support	R500243
FS Pro 18 Streamliner adapter LS	R500266
Self Drilling Screw 4,8x19 A2	R900229
FS Pro Potential equalisation clip S	R500260
FS Pro Cable tray 450	R500262

Determination of the coefficient of friction (static friction coefficient)

The coefficient of friction is a very important parameter for the stability of flat roof photovoltaic systems. It influences the amount of ballast required.

A friction coefficient of 0.3 can be assumed as the standard value. If on-site tests are carried out to determine the friction coefficient, deviating values are permissible.

These tests must be carried out in accordance with the MIS 3002 standard or the "Protocol for determining the coefficient of static friction"

https://www.renusal.com/files/content/Downloads/Pruefprotokoll_Haftreibungskoeffizient/DE_Renusol_Bestimmung_Haftreibungskoeffizient.pdf

and must be documented.

Determination of the required ballast

Numerous parameters are taken into account when calculating the required ballast, such as wind pressure, building shape and height, module dimensions, module angle of attack, pressure coefficients, coefficient of static friction, geometry of the module field and connected surfaces, and others.

The pressure coefficients for Renusol mounting systems were determined in extensive wind tunnel tests at two renowned institutes. These are I.F.I Institut für Industrieaerodynamik GmbH, Aachen, Germany, and Ruscheweyh Consult GmbH, Würselen, Germany.

Specific pressure coefficients and wind tunnel test results are available from Renusol Europe GmbH on request.

We recommend using our PV-Configurator 3.0 planning software to calculate the ballast required for a specific project:

<https://www.pv-configurator.com/login>

This enables a verifiable static calculation and precise determination of the ballast values, taking into account all the parameters listed above and wind tunnel tests.

Alternatively, the approach according to BRE 489 can also be selected. We would like to point out that the calculation according to BRE 489 leads to different results, as mounting systems were considered generically there. Naturally, this does not include the exact values from Renusol-specific wind tunnel tests.

If you have any questions, please contact our technical team at ts@renusal.com at any time.

- DE | Abbildungen und Texte entsprechen dem aktuellen technischen Stand bei Drucklegung, Änderungen vorbehalten.
- GB | The images and texts in these instructions relate to the latest technology at the time of printing, subject to modifications.
- FR | Les illustrations et textes sont conformes à l'état de la technique au moment de mise sous presse. Sous toutes réserves de modifications.
- IT | Figure e testi corrispondono allo stato più attuale della tecnica al momento dell'ordine di stampa. Con riserva di modifiche.
- ES | Las imágenes y los textos se corresponden al estado actual de la técnica en el momento de la impresión, reservado el derecho a las modificaciones.
- NL | Afbeeldingen en teksten voldoen aan de actuele stand van de techniek op het moment van ter perse gaan. Wijzigingen voorbehouden.
- DK | Afbildninger og tekster overholder den tekniske stand ved trykning, der tages forbehold for ændringer.
- SE | Bilder och texter motsvarar den nuvarande tekniska tillstånd vid tidpunkten för tryckning, med förbehåll för ändringar.
- CZ | Vyobrazení a texty odpovídají aktuálnímu technickému stavu při odevzdání do tisku. Změny vyhrazeny.
- PL | Ilustracje i teksty odpowiadają stanowi techniki aktualnemu w chwili oddania instrukcji do druku. Zastrzega się prawo do zmian.
- LT | Spausdinami paveikslėliai ir tekstas atitinka naujausią technikos lygį. Pasilieka me teisę į pakeitimus.
- HU | Az ábrák és a szövegek a nyomtatás időpontjában rendelkezésünkre álló legfrissebb műszaki ismereteknek felelnek meg; a módosítások jogát fenntartjuk.

Renusol Europe GmbH

Piccoloministr. 2

51063 Köln

Deutschland

Telefon: +49 221 788707-0

E-Mail: info@renusol.com

www.renusol.com