

SFS

NVELOPE[®] **Thermal** **Solutions**

Optimised solutions, superior performance

Optimised solutions

superior performance

SFS Thermal Solutions

To create the ideal thermal design for your project, you need to consider a number of key areas including: fire safety, thermal performance and heat loss, type and sustainability of materials, physical constraints, location and budget.

To get the ideal thermal solution for your project that balances all these key areas can be tricky. However, SFS Thermal Solutions makes this process much easier, operating across the wide range of NVELOPE® rainscreen subframe systems and utilises the proven technology of Project Builder Thermal to enable any project to be optimised for performance and budget. Whether a lower or a higher thermal performance is required our Thermal Solutions has the ability to fine tune your project requirements.

Utilising our UK patented technology SFS have been able to create a high performing solution that guards against thermal degradation due to compression of the thermal pad, ensuring no loss in thermal performance. This combined with the bracket material choice of Aluminium or Stainless Steel ensures that a full range of tailored solutions can be created for any project.

Benefits

- 4 ranges across many NVELOPE® Rainscreen sub-frame systems
- Range includes Aluminium and Stainless steel brackets
- Non-compressible thermal pad reduces thermal performance gap
- Thermal insulation bonded to the bracket to save on installation time
- Good to exceptional thermal performance
- Part of Project Builder software

Fire Safety

All our NVELOPE® aluminium and stainless steel brackets are defined as Euroclass A1 Non Combustible EC Directive – 94/611/EC. The insulant used within our Thermal pad has an A2 Non Combustible Euroclassification.

Material

Aluminium brackets are manufactured from extruded 6005A T6 alloys conforming to EN 573-3 material and EN 755 production standards providing exceptional strength and durability and ideal for good thermal performance.

The Stainless Steel brackets utilises the superior 316 grade of material which provides increased resistance to localised corrosion such as in marine or polluted environments. The stainless steel brackets also provide superior thermal performance.

The Thermal options incorporate the addition of thermal insulant in the form of a bonded non-compressible insulating pad to enable exceptional thermal performance to be achieved.

Approvals



Thermal performance and heat loss

High thermal performance of the built environment is a vital component of meeting our carbon reductions targets. To meet these thermal performance criterias, ventilated rainscreen cladding facades utilise a method of an external façade material coupled with external/internal insulation layers. A ventilated layer behind the chosen façade material ensures the risk of condensation is minimized as well as dissipating solar gain on the building.

The NVELOPE® rainscreen support brackets, primary fixings, rails and carriers are an integral part of the Rainscreen Cladding build up and their impact on heat loss in the construction, plays a key role.

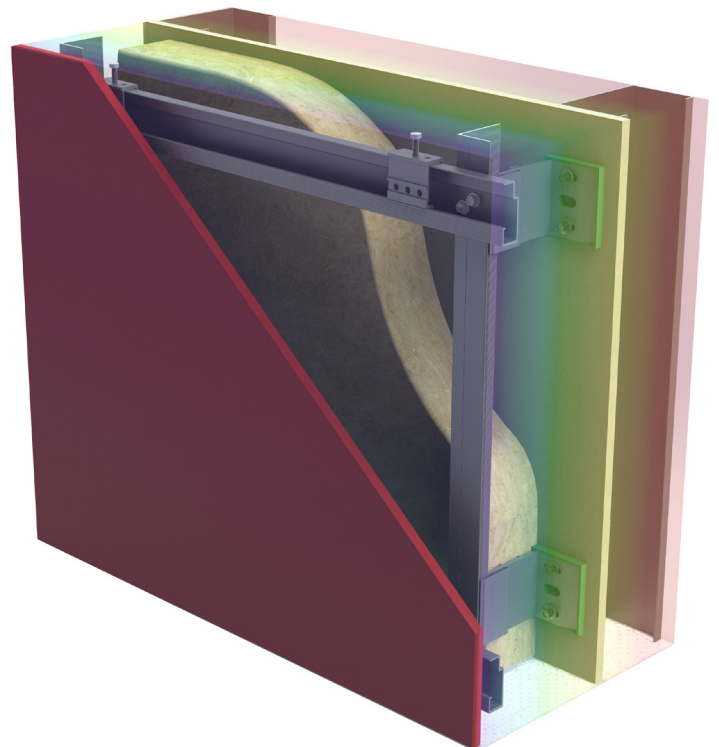
By calculating the U value (Thermal transmittance W/m^2K) in a buildings construction it enables an understanding of the implications this thermal performance has when aiming to meet current building regulations.

As dwellings become better insulated, the importance of thermal bridging has increased. In very well insulated dwellings, the effect that thermal bridging can have on the overall thermal performance of a dwelling can be significant. Recent research undertaken has shown that thermal bridging can **be responsible for up to 30% of a dwelling's heat loss.** (Source BRE)

Thermal bridges within a façade, often called a cold bridge, is an area of a wall which has a significantly higher heat transfer than the surrounding materials. This is typically where there is either a break in the insulation, less insulation or the insulation is penetrated by an element with a higher thermal conductivity. This can result in additional heat loss at these points.

As more stringent legislation and energy awareness lead to increased insulation levels in walls, roofs and floors, heat losses due to thermal bridging become increasingly important.

SFS can assist the specifier or thermal engineer to understand the effects caused by our elements in the buildup in respect of heat loss and U-values by undertaking thermal calculations on the intended façade rainscreen construction.



Fire safety and UK building regulations

Certain components are exempt from a ban imposed on combustible components used in building facades, in accordance with section B4 of the Building Regulations 2010. This includes thermal break materials where the inclusion of the materials is necessary to meet the thermal bridging requirements of Part L of the Building Regulations.

Thermal performance improvements within the façade of a building are often achieved via the addition of plastic or polymer composites incorporated within or used in conjunction with certain thermal break components with rainscreen framing.

However in most circumstances polymer substrates provide a poor level of fire performance.

It is possible however to specify thermal bridge components which meet the minimum non-combustible rating of A2 and therefore allowing the specifier to avoid unnecessary exemptions whilst meeting Part L requirements. You can achieve this by using NVELOPE® product range as detailed below:

- All SFS NVELOPE® Aluminium brackets and carrier rails components are Euroclass A1 rated (included anodising treatment) in accordance with EC Directive 96_603_EC.
- The “green” polymer isolators are exempt from the aforementioned ban as they can be categorised as necessary to meet the thermal bridging requirements and have been further assessed by the British Board of Agrément as unlikely to significantly affect the overall fire performance.
- SFS NVELOPE® Stainless Steel brackets components are non-combustible.
- The NVELOPE® Thermal Pad insulant component is A2-S1-D0 rated.



Durability and sustainability of materials

Durability

When considering what products to use in the construction of rainscreen facades and subframe systems material choice and durability are important factors. Indeed material choice can also affect the effectiveness of the thermal design of systems.

Stainless steel

Should not suffer from any corrosion however; it will do so under certain circumstances. The presence of salt laden air from our maritime climate and chlorides within rainwater as well as the contribution from de-icing salts can result in the corrosion of steel in many applications.

Stainless Steel grade 304 is a widely used general purpose grade where good corrosion resistance is required.

The NVELOPE® Stainless Steel brackets utilises the superior 316 grade of material which provides increased resistance to localised corrosion such as in marine and polluted environments.

Aluminium

Our aluminium may be afforded additional corrosion resistance via the addition of anodisation process for profiles whilst continuing to maintain a Euroclass A1 fire rating.

Sustainability

Sustainability is a key factor in the design of any building or dwelling. Identifying the right materials from a manufacturer with a credible supply chain and responsible sourcing backed by accredited processes and procurement systems is important.

Responsible Sourcing

SFS NVELOPE® operates a responsible sourcing policy where Aluminium used can be 100% recyclable. We only uses a high grade of aluminium (6005) which is predominately re-melted extrusion materials. To supplement the recycled material some virgin material is used. This policy ensures that our manufacturing process to minimise CO₂ emissions to a level of 0.35–0.5 Kg of CO₂ per kilo of produced aluminium profile.

We can effectively trace aluminium extrusion back to source material via our supply chain's management systems.

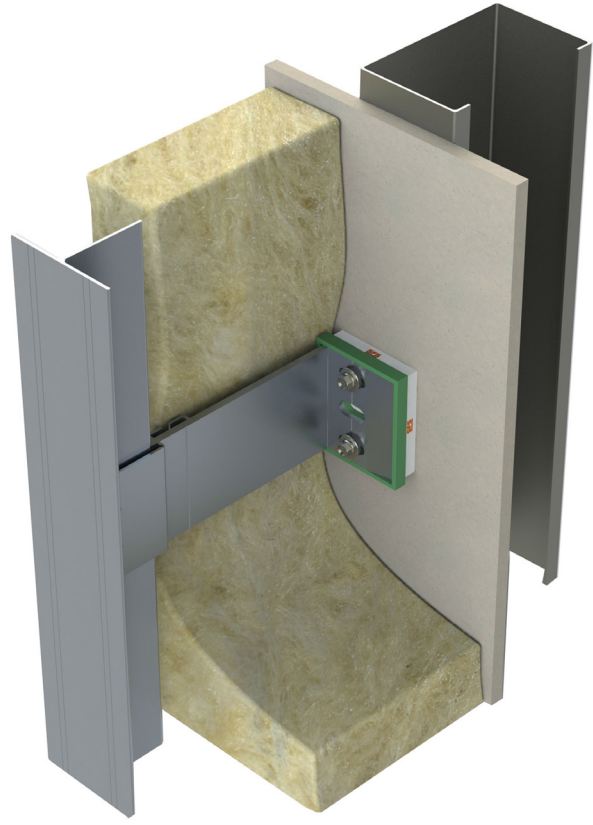
Using NVELOPE® Thermal Solution Ranges

NVELOPE® VB / HB →



NVELOPE® VB / HB aluminium brackets are supplied with a green plastic “isolator” which offers a degree of thermal benefit. However its principal function is to eliminate any potential of galvanic corrosion between masonry and aluminium substrates.

NVELOPE® VB / HB + Thermal →



Whilst strong and easy to install aluminium is very thermally conductive e.g $> 200 \text{ W/mk}$. Therefore the thermal point loss affects can be significant when aluminium brackets are utilised depending on the combination of various elements within the rainscreen build-up.

The NVELOPE® VB / HB + Thermal range includes an insulation pad at the base of the bracket. This dramatically improves the thermal performance of the rainscreen build-up.

NVELOPE® NVS →

For greater performance SFS have recently introduced a complete range of stainless steel brackets to complement our vertical aluminium ranges. Our stainless steel range is made from superior 316 grade which exhibits far greater resistance to localised corrosion in marine and in contact with atmospheric pollution found in most built up environments. Stainless steel will demonstrate a much improved increase in thermal performance. Typically stainless steel of approximately 16 W/m/K. This represents a 12 × thermal improvement over and above aluminium. Additionally stainless steel brackets have no requirement to utilise an isolator to alleviate galvanic corrosion.

NVELOPE® NVS + Thermal →

For optimum thermal performance NVELOPE® NVS + Thermal is the ideal choice. It offers the combined benefits of high thermal performance with high corrosion resistance for coastal environments. Where rainscreen build up designs prescribe demanding thermal solutions, this option could offer the ideal high performance answer!

System overview

The NVELOPE® range is made up of brackets and rails in various configurations to suit your application. All systems are available in Aluminium, and all systems can be supplied with the insulation

pad for enhanced thermal performance. Most systems are also available with stainless steel brackets (as indicated below) to improve thermal capabilities even further.

NV1

The NVELOPE® back frame – vertical cladding applications.



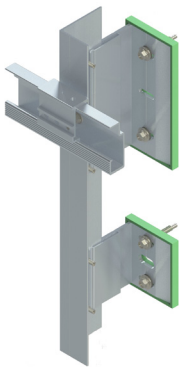
NV2

Suitable for concealed fix cladding applications – structural bond (i.e. Sika Sikatack Panel System.)



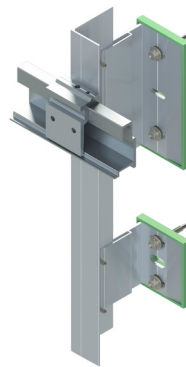
NV3

The NVELOPE® system for concealed fix/mechanically fixed applications.



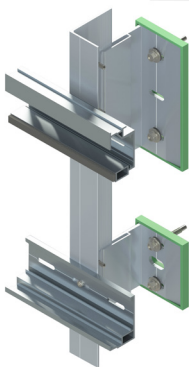
NV4 (ts200)

The NVELOPE® system for concealed fix/mechanically fixed applications – vertical cladding applications.



NV5 (ts300)

The NVELOPE® system for concealed fix applications – vertical cladding applications (trespa meteon HPL only).



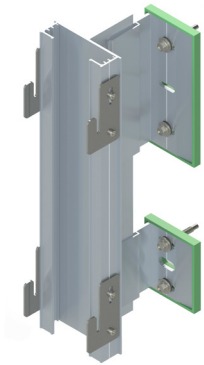
NV6

The NVELOPE® system for supporting a timber batten – vertical cladding applications (to support vertical and/or horizontal cladding elements).



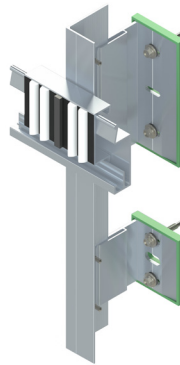
NV7

The NVELOPE® system for secret fix cassette (ACM/ zinc/aluminium) – vertical cladding applications.



NV8

The NVELOPE® system for concealed fix/mechanically fixed and structurally bonded applications.



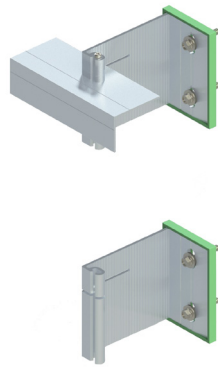
NVF2F

The NVELOPE® back frame – vertical floor to floor cladding applications.



NH3

The NVELOPE® system used to support horizontal elements.



Better values

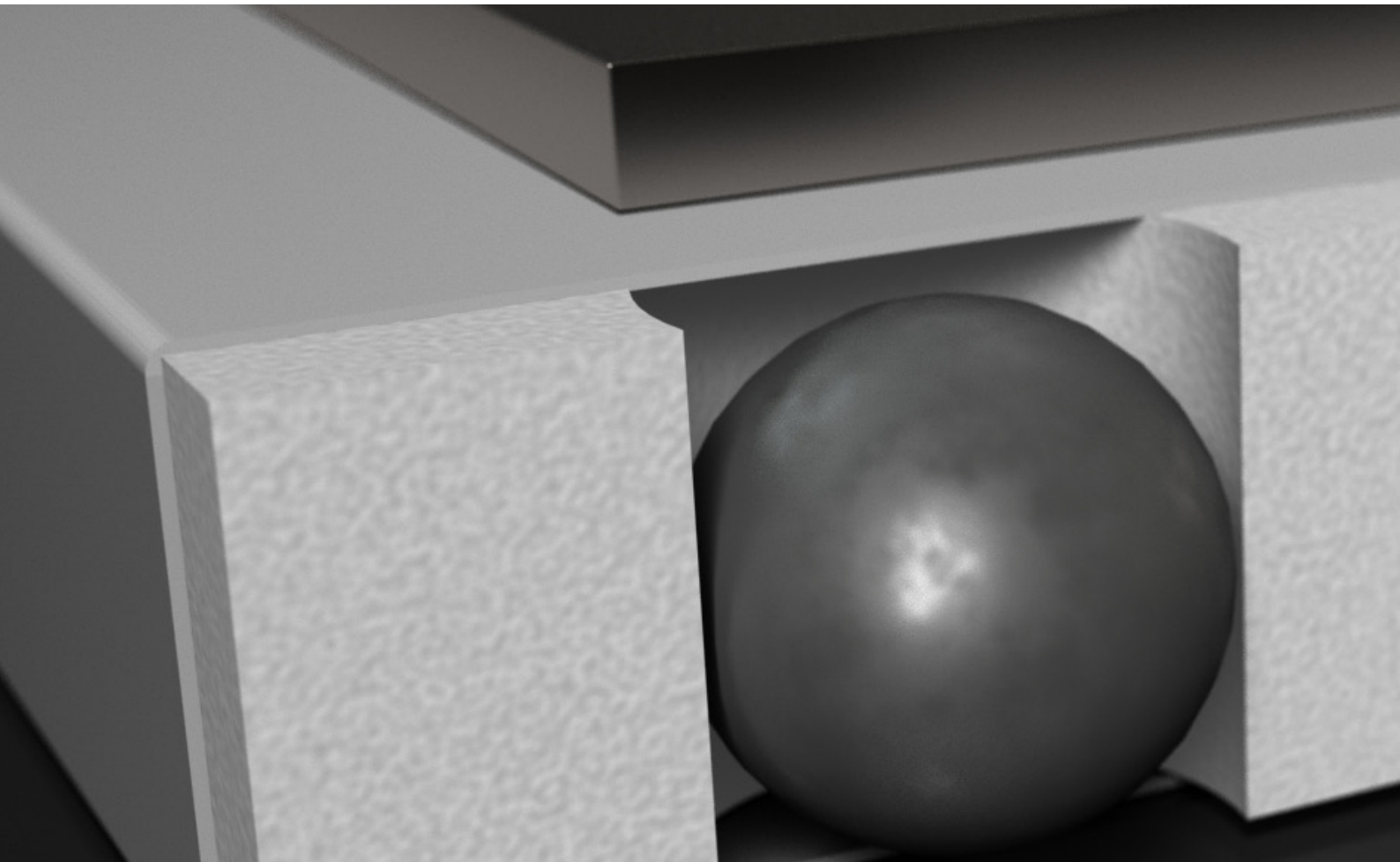
A key development in NVELOPE® Thermal Solutions is the creation of both Aluminium and Stainless Steel brackets which offer differing thermal properties. The range is further enhanced by the creation of two further bracket types where the inclusion of a non compressible insulation medium is bonded to a standard bracket.

The insulation brackets utilises SFS UK Patent Pending technology which utilises a high performing insulant and effectively thermally "decouples" the façade structure from the ventilated façade. This can significantly improve the bracket point loss and ultimately improve U values and thermal performance of a ventilated rainscreen façade λ .

In accordance with BS EN 13501 The insulant element of the Thermal Pad is classified as non-combustible achieving a rating of A2-s1,d0.

The insulation is very thermally efficient and has an accredited thermal conductivity of only 0.015 w/mK λ .

A key feature of the bonded insulation is that it cannot be compressed during installation. Clearly if any thermal insulant is compressed in any way it is likely to impart a detrimental effect on thermal conductivity and therefore impairing real life performance.



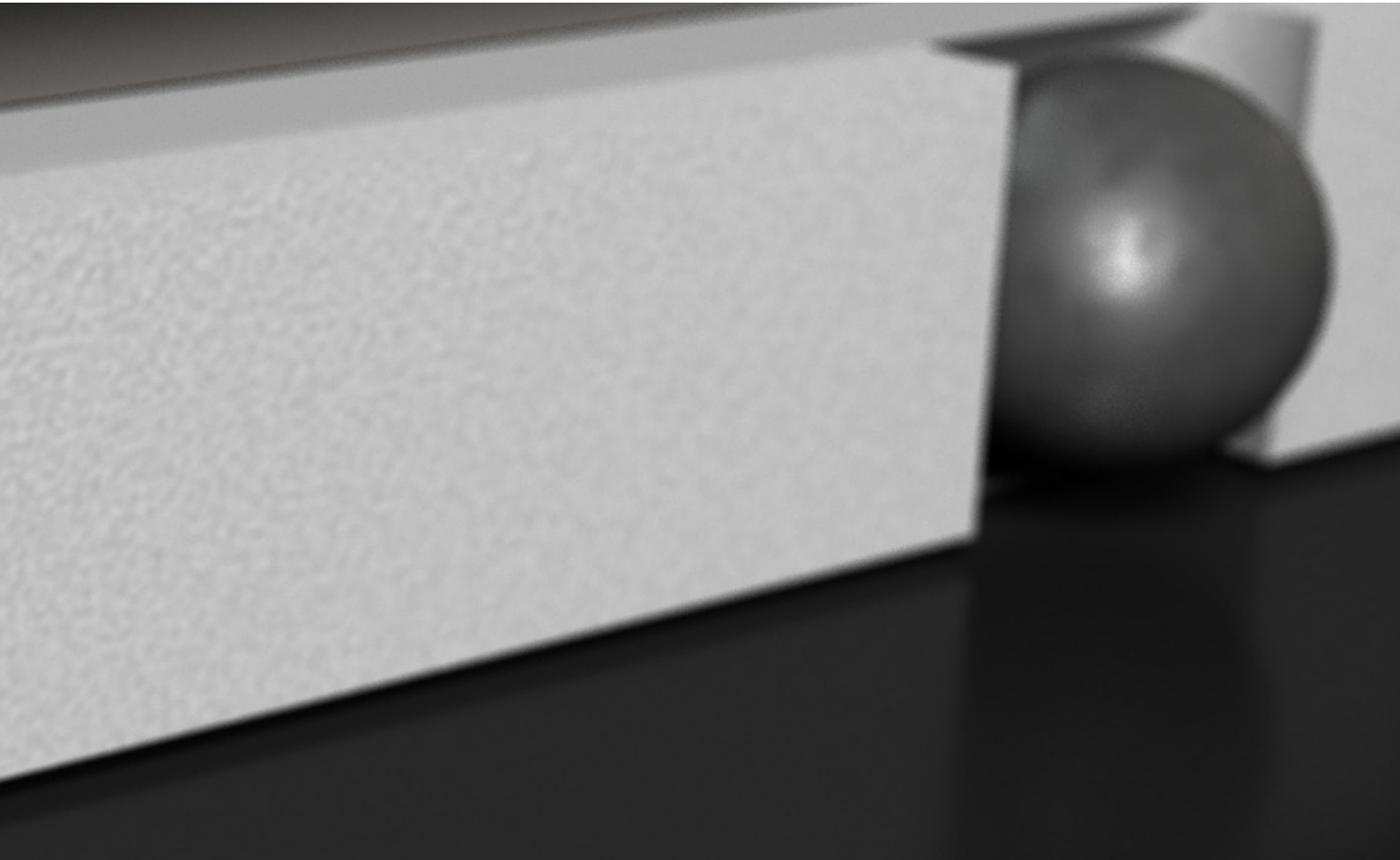
Example

U-value improvements

Target U-Value (W/m²K)

Thermal Option	0.30	0.29	0.28	0.27	0.26	0.25	0.24	0.23	0.22	0.21	0.2	0.19	0.18	0.17	0.16	0.14	0.13	0.12
NVELOPE® VB	[Bar from 0.30 to 0.22]																	
NVELOPE® VB + Thermal	[Bar from 0.30 to 0.21]																	
NVELOPE® NVS	[Bar from 0.30 to 0.19]																	
NVELOPE® NVS + Thermal	[Bar from 0.30 to 0.18]																	

*(Based on a 210mm bracket and 190mm insulation, 3 brackets per rail, fixed to a concrete substrate)



Features and benefits

4 ranges across many NVELOPE® Rainscreen sub-frame systems

Thermal Solutions makes use of 4 bracket ranges to ensure that you have the maximum flexibility to balance budget against thermal performance. The ranges are provided across virtually all of the industry leading NVELOPE® rainscreen sub-frame systems.

Reduced performance gap

Non-compressible insulation pad on the NVELOPE® VB+Thermal, NVELOPE® HB+Thermal and the NVELOPE® NVS + Thermal products reduces the effects from thermal degradation due to compression of the insulating pad. This helps to reduce the performance gap from design to real world installation.

Materials

Aluminium brackets are manufactured from extruded 6005A T6 alloys conforming to EN 573-3 material and EN 755 production standards providing exceptional strength and durability and ideal for good thermal performance. The Stainless Steel brackets utilise the superior 316 grade of material which provides increased resistance to localised corrosion such as in marine or polluted environments. The stainless steel brackets also provide superior thermal performance. The Thermal options incorporate the addition of thermal insulant in the form of a bonded non-compressible insulating pad to enable exceptional thermal performance to be achieved.

Reduction in the performance gap

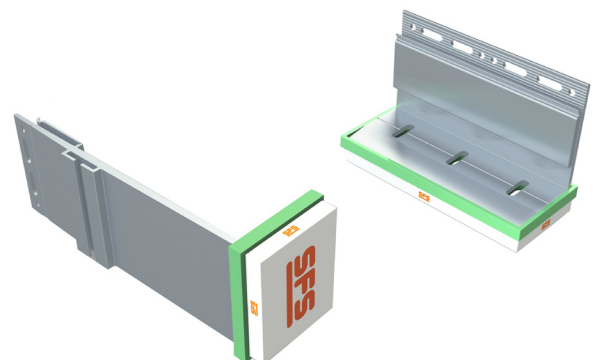
Non-compressible insulation pad on the NVELOPE® VB+Thermal, NVELOPE® HB+Thermal and the NVELOPE® NVS + Thermal products reduces the effects from thermal degradation due to compression of the insulating pad. This helps to reduce the performance gap from design to real world installation.

Thermal enhancement

NVELOPE® VB + Thermal, NVELOPE® HB + Thermal and the NVELOPE® NVS + Thermal come with a preinstalled thermal insulated pad. There is no need to assemble these on site which ensures that all brackets are installed correctly with the insulated pad saving time on rework or assembly on site.

Fire Safety

All our NVELOPE® aluminium and stainless steel brackets are defined as Euroclass A1 Non Combustible EC Directive – 94/611/EC. The insulant used within our Thermal pad has an A2 Non Combustible Euroclassification.



Thermal Pad

NVELOPE® VB + Thermal, NVELOPE® HB + Thermal and the NVELOPE® NVS + Thermal come with a preinstalled thermal insulated pad. There is no need to assemble these on site which ensures that all brackets are installed correctly with the insulated pad saving time on rework or assembly on site.

Part of the Project Builder solutions

Project Builder was built to make your job easier. It is the leading software of its kind on the market today and is free to use. The software provides system specifications and budget costing for your project, often within 24hrs.

Project Builder makes specifying the right solution simple, providing a free project-specific PDF complete with: List pricing per M², static calculations, NBS specification and thermal values. Enabling budget and thermal performance to be optimised

Overlay and optimised cutting service

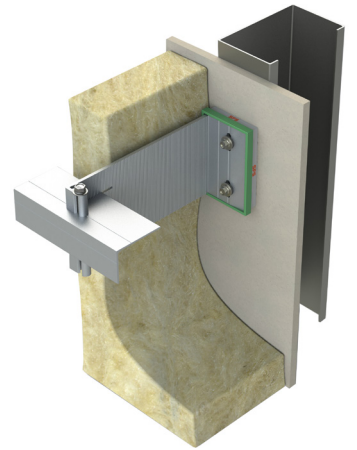
NVELOPE® Thermal Solutions further improves efficiencies through the overlay and optimised cutting service – reducing time and material waste on site by cutting rails to the specific lengths you need.

Full technical support

As with all NVELOPE® products we offer full technical support.

Warranty

As with all SFS products we offer an industry leading warranty.



Project Builder

the faster route to specification

To help identify the optimised solution SFS can take your project details and create specific thermal calculations. Based on your project's unique wall build-up configuration, our service thermally 3D models each bracket variant to calculate each point loss Chi value. This service is able to dynamically calculate the required insulation depth to achieve your target U-value.

These calculations conform to BS EN 10211 as well as BRE 443 (Convections for U-value calculations) and ensure the full detailed construction is understood rather than a generic scenario which as such play no reference to the intended design.

Our Static calculations determine the parameters for these calculations and thus can also include project specific information such as insulation type and brand.

Our calculations consider the following criteria

- Thermal bridges via bracket point loss cause increased flow of heat and should be taken into consideration when designing a façade/façade system. Since the fixing of ventilated cladding must go through the thermal insulation into the substrate it cannot be avoided.
- Thermal decoupling of the substructure from the ventilated façade is achieved through thermal separation layers. Our SFS NVELOPE® + Thermal Range can significantly improve bracket point loss and ultimately improve thermal performance.
- The U-value of the plane elements, necessary for the calculation of the overall loss from the building.
- Corrections need to be made for any thermal bridging, fixings & bracketry. This includes linear heat loss should the rail penetrate the insulation layer.
- The Chi value is the heat loss at (for example) a bracket and is measured as W/mK. Either a default correction is used or a 3D calculation is carried out.

N.B Default bracket corrections can be alarmingly inaccurate with a nominal 0.02W/mK Chi value considered within the default calculation.



Thermal calculations made easy

Our free service lets you submit your rainscreen building project requirements online and our technical experts will get back to you within 24 hours, to get your project moving quickly.

Try it for yourself

Scan the QR code to go directly to project builder. It works in 3 easy steps:

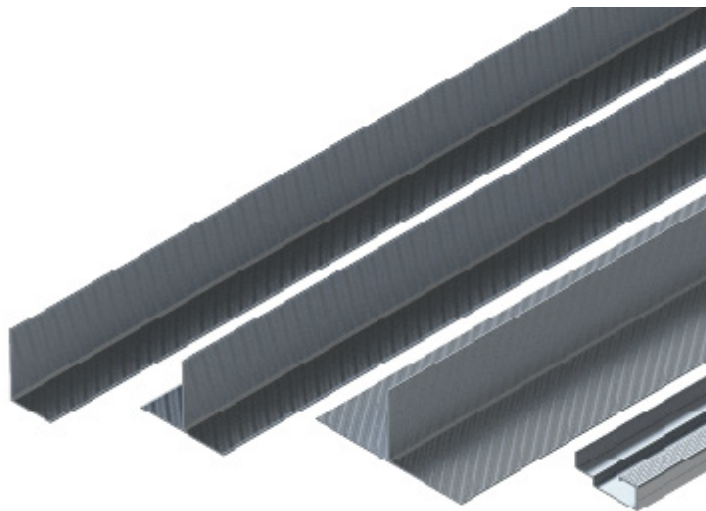
1. Define the requirements of your project
2. Our experienced in-house Technical Team work on your solution within 24 hours
3. You receive a free project-specific PDF featuring pricing per M2, static calculations, NBS specification and thermal values

Use Project Builder for your Thermal project today at: nvelope.me →



Cutting service

SFS offers a customised cutting service for the NVELOPE® range. We take your specific profile lengths and cut them prior to delivery to site. By opting for the customised cutting service, we are able to minimise cutting of profiles and reduce waste on site. Please ask for details when enquiring on your next project.



**Interested?
Get in touch!**





SFS Group Fastening Technology Ltd.
Division Construction
153 Kirkstall Road
Leeds, LS4 2AT

0330 0555 888
enquiries@sfs.biz
uk.sfs.com

SFS Group Fastening Technology Ltd.
Division Construction
Unit A, City Park, Watchmead
Welwyn Garden City, AL7 1LT