



# Specification guide

for energy efficient windows and doors



“ Fusing industry experience  
with innovation, sustainability  
and loyalty. ”

BSF/004

Front page image

White bay and casement windows  
Bellway Homes







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# Why PVCu windows?

uPVC (unplasticised PolyVinyl Chloride) was the term used in Britain before the name was changed to PVCu in the late 1980s to fall in line with the rest of Europe. It's called PVCu on the continent because most European languages place the noun (the word PVC in this case) before the adjective (U).

## 1. Thermal efficiency



It's well known that PVCu is a low conductor of heat, helping to retain warmth within a building and keep the cold out. This is further enhanced by designing multiple chambers inside the window profiles, allowing them to trap air and create a thermal barrier.

Add double or triple glazing to a PVCu frame, and U-values as low as 0.8 W/m<sup>2</sup>K can be achieved.

According to the British Fenestration Rating Council (BFRC), when it comes to 'A' rated windows, PVCu outperforms any other material, with 10 times more PVCu windows achieving an 'A' rating compared to the nearest alternative.

## 3. Low maintenance



With PVCu, the ongoing maintenance consists of a wipe down with warm soapy water, making them simpler and more cost effective to look after. Woodgrain or foiled windows with minor scratches can be repaired using a RAL-matched pen.

Contrast this with timber windows – they need treating or painting on a regular basis, which is time consuming and can be costly. Aluminium windows can fade and oxidise when exposed to the sun, often requiring the use of specialist cleaners and coatings to restore.

## 2. Benefit vs. cost



There are three distinct areas where installing PVCu windows saves on cost and adds benefit:

- Lower purchase price and installation costs
- Higher energy savings over the life of the windows, and
- Lower maintenance costs.

According to the Glass & Glazing Federation's Energy Saving Calculator, if single glazed windows of an alternative material are replaced by 'A' rated PVCu double-glazed windows, annual savings would be achieved.

## 4. Durable



PVCu windows have an expected life span of up to 35 years.

Frames will not rot, corrode, warp or split, and special additives make them tough enough to suit European requirements. In addition, the lightweight nature of a PVCu frame makes it easier to handle and install, reducing time on site for fitters and contractors.

## 5. Attractive



The old chunky white PVCu frames seen in the 1980s are well and truly in the past.

With a wide range of woodgrain effects and colours, as well as slim sightlines, PVCu windows can be as aesthetically pleasing as their timber or aluminium counterparts.

Designs have advanced to the extent that sashes can sit flush in the frame, mirroring a pre-1932 style timber frame – ideal for conservation properties where timber is preferred, or alternatively to offer a sleek, contemporary appearance.

## 7. Eco friendly



It's often believed that PVCu windows are not environmentally friendly.

In fact, the case can be argued for quite the opposite.

- PVCu windows can be made from 100% lead-free materials, better for both family living and for the environment.
- PVCu windows use less energy to produce in the factory, in comparison to both aluminium and timber windows.
- The ongoing energy savings are higher, with more PVCu windows achieving BFRC 'A' ratings than other materials.
- A PVCu window is 100% recyclable and can be recycled up to 10 times, giving each window an estimated life span of 350 years – far more eco-friendly than depleting timber sources.

## 6. Weather proof



PVCu windows are ideal for the damp British weather. The frames will not swell or rot, and co-extruded gaskets provide excellent resistance to air and water.

With both timber and aluminium frames, the seals are added in afterwards. Joints can also shrink back over time, causing gaps in the seals.

With PVCu, the gaskets are welded together as part of the manufacturing process, providing a continuous seal all the way round and eliminating draughts for longer.





◀ Black arched casement windows  
Burscough Wharf



White casement windows with  
Georgian bars  
University of Chichester





# Specifying **Liniar**

Our mission is to be recognised as a leading force for quality and excellence in product development - fusing industry experience with innovation, sustainability and loyalty.

## Ideal for 21st century developments

One of the newest and most technically advanced window systems on the market, the Liniar system was launched in 2008 by bringing together some of the window industry's most experienced and forward thinking designers and a technical team with over 500 years of industry experience between them.

With a focus on research, development, design and testing, Liniar continues to push the boundaries when it comes to product innovation.

### British made

Liniar's 100% lead-free PVCu profile is made in the heart of the UK, its award-winning extrusion facility in Derbyshire boasting the largest mixing plant in Europe.

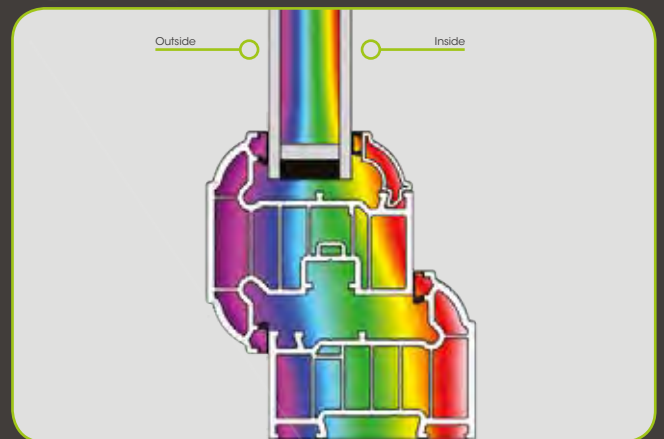
Continued investment in the factory, facilities and research and development keeps Liniar at the forefront of innovation.



### Thermally efficient

Whether double or triple glazed, Liniar windows outperform other leading brands in the UK, thanks to its innovative multi-chambered profile design.

The Liniar EnergyPlus window can achieve an incredible U-value of  $0.8 \text{ W/m}^2\text{K}$  when manufactured with triple glazing - achieving Passivhaus standard and creating a carbon neutral dwelling.



### Research and development

The team's knowledge and experience have ensured they designed out the challenges and pitfalls that earlier window systems experienced.

Liniar's patented co-extruded bubble gasket, glazing platforms and screw retainer combine to make the Liniar range easier to fabricate as well as being more fitter-friendly - making it the cost-effective choice of system for large developments.



# Why specify Liniar?

The Liniar range has been designed to meet the demanding requirements of today's construction market.

Reducing installation time whilst increasing energy efficiency, the Liniar system continues to lead the way - beating legislative requirements and building regulations well in advance of due dates.

The Liniar range of casement windows, French windows, tilt and turn windows and pivot windows; along with residential doors, French doors, bi-folding doors, patio doors, and composite doors are suitable for installation into low-rise and high-rise applications, new-build developments and refurbishment projects.



White fire exit casement windows  
The Anchorage, Liverpool



## Technically advanced

Constant product innovation means customer feedback can regularly be incorporated, leading to the one of the most technically advanced window and door systems available on the market.

A 3D printer is used to create a prototype for each new product, enabling enhancements to be made at the design stage.

# More reasons to specify **Liniar**

1

## British made

Liniar profiles are extruded in Derbyshire at the HL Plastics manufacturing plant, which features the largest PVCu mixing plant in Europe. Continued investment in the factory and facilities keeps Liniar at the forefront of innovation.

2

## Comprehensive colour range

Liniar's coloured foils give the appearance of woodgrain and won't peel or scratch off - and the whole Liniar range is available in a wide choice of colours with an easy clean, low maintenance finish.

3

## Designed by experts

The Liniar range is designed, manufactured and supported by a forward-thinking team with over 500 years' experience within the window industry.

4

## Fully tested

Not only does Liniar carry out weather testing and security testing, it has invested in a robot for cyclic testing - giving peace of mind that Liniar products will endure the rigours of daily living.

5

## More thermally efficient

Liniar's revolutionary profiles are far more thermally efficient than traditional PVCu window profiles. By removing unnecessary steel reinforcement, instead developing the latest in multi-chambered profile technology.

6

## Strong and secure

Liniar windows and doors are tested to the latest security standards; PAS 24:2012 enhanced security performance was passed with flying colours. Built-in security features mean that Liniar frames hold Secured by Design status.

7

## Most cost-effective

The reduction in steel results in a more cost effective window at the fabrication stage. Fitter-friendly features also reduce installation times and the occupant also benefits with systems capable of A+ and a U-value as low as 0.8.

8

## Less frame, more glass

Ultra-slim sightlines designed into Liniar products allow in maximum natural light - and result in more attractive windows and doors.

9

## Better for the environment

Liniar frames have always been 100% lead-free, well in advance of legislation. Furthermore, all elements of a Liniar window are fully and easily recyclable at the end of its life.

10

## Guaranteed

Liniar profiles come with a 10 year guarantee against cracking, warping and discolouration.

For more information visit the Specifier's Centre at [www.liniar.co.uk/specifiers](http://www.liniar.co.uk/specifiers)



# About Liniar

With a focus on research, development and design, Liniar continues to push the boundaries when it comes to product innovation.

Other PVCu windows are energy efficient. Other PVCu windows are strong and secure. The Liniar system is both. Its range of lead-free profiles has been designed from scratch, significantly reducing the need for steel reinforcement and eliminating draughts and leaks whilst delivering superb aesthetics and the highest Windows Energy Ratings as standard.

Liniar isn't constrained by history or by corporate politics. Designed and manufactured by HL Plastics Ltd, Liniar PVCu profile is fully British made. The extrusion facility in Derbyshire boasts the largest mixing plant in Europe and continued investment in the factory, facilities and research and development keeps the Liniar range at the forefront of innovation.

An award-winning company, HL Plastics was visited by the UK Prime Minister in 2014, who was keen to discover the benefits of the thermally efficient profiles and the significant investment the company

continues to make in plant, machinery, employees and training.

Having grown significantly since the launch of the Liniar range in 2008, the company has retained its friendly approach and flat structure. This means it is able to respond to customer demands quickly and effectively, giving the brand a well-deserved reputation of excellence within the industry.

Embedded in the firm's culture is a clear customer focus combined with an ethos of constant innovation and development, quality systems and testing – all of which means Liniar customers always have access to the most modern products in the industry and can stay ahead of the game in a competitive market.

With a customer base of approved window fabricators and installers all over the UK and Ireland, together with commercial, technical and design teams to support customers, specifiers can rest assured the Liniar range can meet and exceed industry regulations across its entire product range.



## At a glance...

- The Liniar brand belongs to HL Plastics Ltd, part of the Flamstead Holdings group
- £60 million turnover (2014)
- > 400 employees
- Capital investment of £5m per annum
- 10% market share of UK PVCu profiles in the UK
- National Fenestration Awards Systems Company of the Year 2014
- Derby Telegraph Company of the Year 2014
- Flamstead Holdings listed in "1000 companies to inspire Britain"
- Winner of the 2014 Lloyds Bank Growing Business Award - mid-sized company

## Fully accredited

It's important to Liniar to prove its products are backed by the highest standards, and an ongoing testing programme ensures that all systems remain fully compliant – often ahead of legislation.

### ModLok™



Developed by Liniar, ModLok™ technology not only provides the most secure locking mechanism and unbeatable strength, but also enables the PVCu to be disposed of in the most environmentally friendly way possible at the end of its life.

### Secured by Design



Secured by Design is a police-backed initiative, with this status being awarded to products designed with exceptional security features as their main priority. Liniar products that qualify to hold this certification are tested to meet the requirements of the Association of Chief Police Officers.

### BBA Approval



The BBA (British Board of Agrément) is the UK's major authority offering approval of construction products, systems and installers. Their certificates are recognised by architects, engineers and specifiers as an impartial and unbiased review on the performance of products, and Liniar holds a certificate for the whole window system.

### BS EN ISO 9001:2008



The Liniar factory has achieved BS EN ISO 9001:2008 accreditation, meeting British Standards for a quality management system. The standard is based on a number of principles including a strong customer focus, management motivation, the process approach and continuous improvement. By continuing to meet this standard, Liniar customers benefit from consistently great products and service.

### PAS24:2012



This accreditation is part of the British Standards system and shows that every component used to make the product has been subjected to a series of tests, demonstrating enhanced security performance, air and water tightness and wind loading to BS6375 for peace of mind.

### BS EN 12608:2003



BS EN 12608:2003 is the standard of quality, consistency and performance required for PVCu extruded hollow profiles. Products are regularly tested to ensure that they continue to meet these standards.

## Thermal efficiency vs. reinforcement

Many old 'first generation' PVCu windows relied heavily on steel reinforcement. It was considered essential to securely fix hardware such as hinges and locking mechanisms, in addition to increasing the stiffness of the frame and reducing deflection when subjected to wind gusts. For many years, this was the accepted make up of a PVCu window – and some are still manufactured in this way.

In more recent times energy efficiency became a more prominent topic and the evolution of window products continued with the introduction of PVCu thermal inserts.

These inserts replaced the thermally inefficient steel, occupying the same internal chamber and creating a multi-chambered thermal barrier in the same 3-chambered profiles. Not exactly a giant technological leap, more of a 'gap filler' and not without its drawbacks – these thin inserts add very little to the stiffness of a profile, nor do they provide a secure fixing for hardware.

This resulted in many window systems providers having two different offerings – one which is thermally efficient (with thermal inserts) and one suitable for enhanced security (with steel).

In 2007 the Linar team set about designing a brand new system with a blank sheet of paper and loads of new ideas – a system which would be both thermally efficient AND strong and secure.

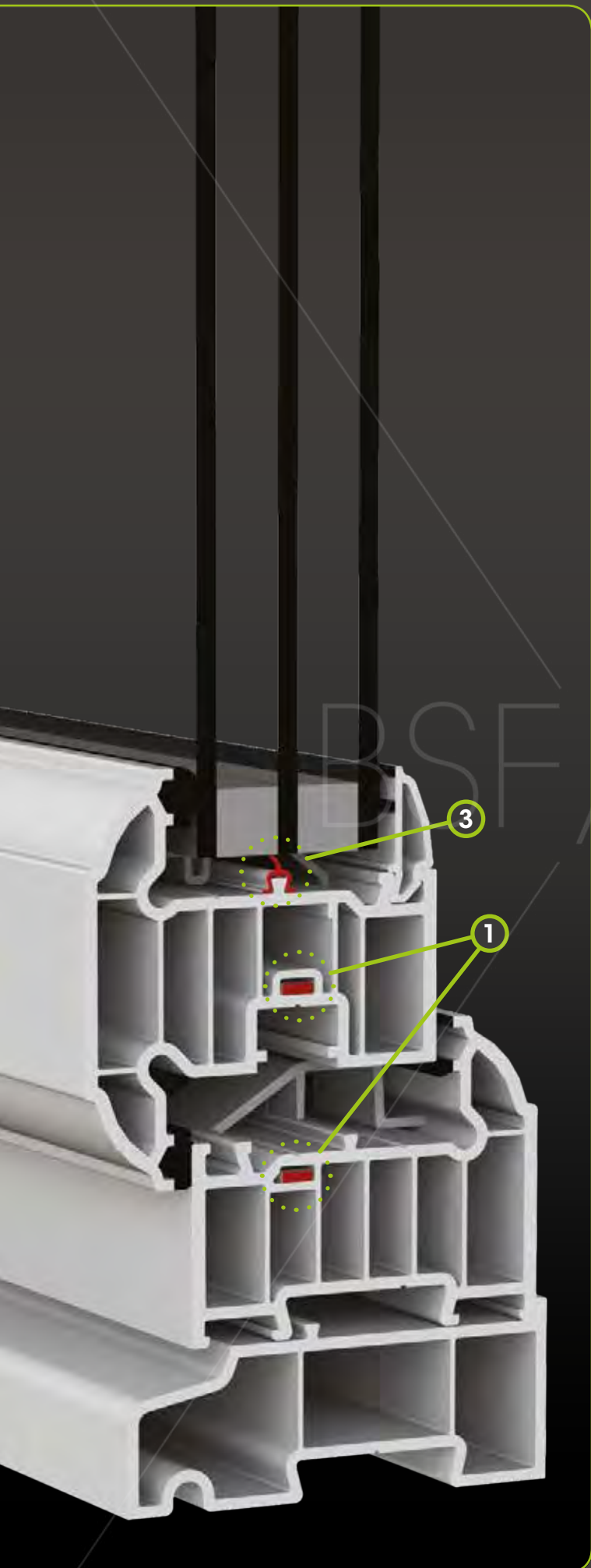
Firstly, there were to be no thermal inserts – the multi-chambered effect was designed to be part of the profile, with both the amount of internal webs and their spacing being fine-tuned with Therm software to achieve exceptional thermal performance.

This principle could only be applied to specific profiles within the system, with transoms and mullions remaining steel-reinforced using a steel box section within the central chamber – this provides the rigidity needed within the frame.

Secondly, the issue of secure fixing for hardware was addressed by incorporating a rectangular pocket directly behind areas where fixings would be used, achieving screw pull-out forces equivalent to that of 1.2mm thick steel when inserted with a PVCu screw retainer (1).

The Linar window system has been independently tested and verified by the British Standards Institute, meeting PAS 24 with reduced steel and BS6375; air and water leakage and wind loading for structural strength.

By making the most efficient use of materials and avoiding the need for expensive triple glazing, the overall cost of manufacturing a window has also been reduced – delivering benefits to fabricators, installers and end users.



## Patented bubble gasket

Historically, PVCu window systems were fitted with a range of EPDM (rubber) gaskets at the fabrication stage, similar to the method still used on timber and aluminium windows. The resulting permeability of the assembled frame was dependent upon the quality of each seal joint, with many suffering from draughts and wind noise.

The PVCu extrusion process lends itself to the well-established technology of co-extrusion - adhering the gasket onto the frame using a separate extrusion machine during manufacture. This evolutionary step eliminates the time-consuming gasket insertion process and creates a more reliable corner seal at each joint.

Many PVCu window systems make use of co-extruded gaskets, most adapting existing profiles to the process.

Starting from scratch, the Liniar team had no constraints, and spent a significant amount of time developing its patented bubble gasket (2) to outperform all others in speed of fabrication and in permeability - achieving a zero air leakage during independent tests at BSI.

The design of both the gasket and the area behind the gasket is crucial, not only to the permeability of the finished window, but during the welding process where hard lumps can form in the corners of each joint, cracking sealed units.

Liniar's dual-action gasket performs equally well as a soft dynamic seal on opening sashes as it does as a firm glazing gasket for sealed units, its tolerance friendly design always ensuring a whistle-free seal inside and out - and no gaps, not even in the corners.



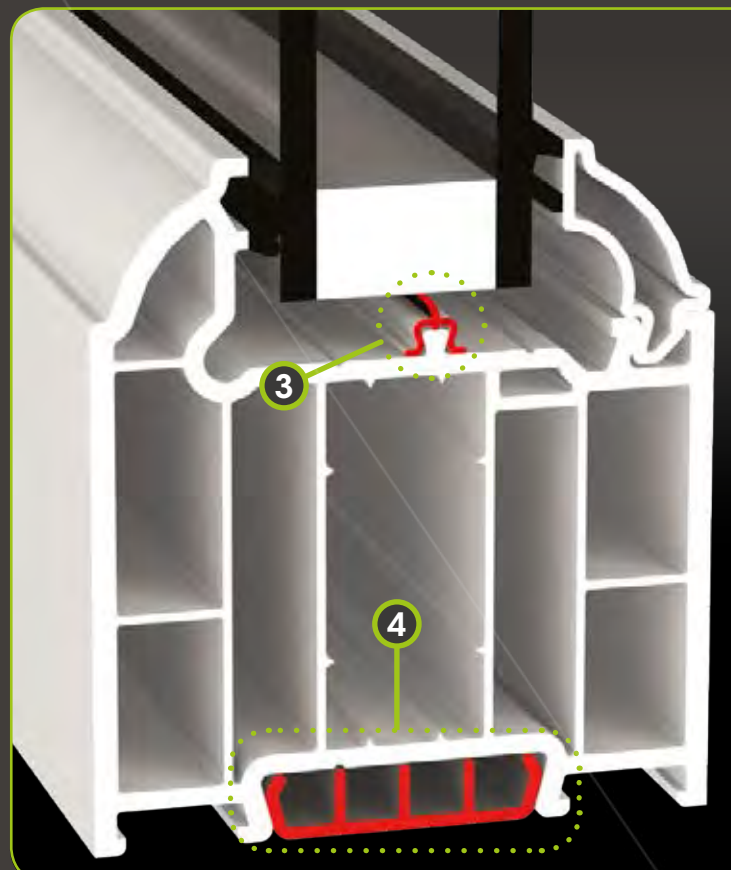
## Enhanced performance

As the quantity and spacing of internal webs reduce thermal transmittance through Liniar frames, the flow is directed towards the path of least resistance. To address this, the Liniar design team introduced a brace of simple but effective ancillary products.

The first is the innovative glazing flipper (3) - this can be clipped onto the short central up-stand within the glazing area, creating a thermal barrier and additional gasket, and sealing the perimeter of any glazed unit - keeping the heat in and moisture out.

The second is the patented thermal dam (4) - introduced to address heat loss at the outer edge of the frame, Liniar's clip-in thermal dam creates a multi-chambered barrier with optimized leg spacing and is manufactured from recycled material produced during the extrusion 'start-up' procedure.

The result is a supremely energy efficient double glazed product, one capable of achieving a cost-effective A+ Window Energy Rating, or 1.2 W/m<sup>2</sup>K U-Value and if required a triple glazed 0.8 W/m<sup>2</sup>K U-Value window.





## Fully tested and compliant

Not only does Liniar carry out weather testing and security testing, it has invested in a state of the art articulated robot for in-house cyclic testing and development - giving peace of mind that Liniar products will endure the rigours of daily living.

All Liniar systems conform to the provisions of BS 6375 Part 1 for weather performance and Part 2 for window operation and strength characteristics.

Liniar's patented bubble gaskets give optimum weather performance, being co-extruded onto window and door profiles to give a full continuous seal and eradicate draughts.

Liniar systems exceed Part L requirements with the innovative multi-chambered profile achieving BFRC A+ rating as standard. Liniar also provides a database of over 1,000 BFRC thermal simulations to refer to. For more information on the requirements of Part L, please refer to **Approved Document L**.

Liniar has also developed Part M compliant low thresholds with shootbolt facility, for its range of residential, composite, French, patio and bi-folding doors. For more information on Part M, refer to **Approved Document M**.



## Approved fabricators



Liniar windows and doors are manufactured by a wide network of fabricators across the UK, many of which have gone through a stringent testing and validation process to become Liniar Approved Fabricators.

Where a Liniar fabricator has the stamp of approval, you can be assured the windows and doors they produce:

- Contain only Liniar supplied or approved parts
- Use only Liniar approved manufacturing processes
- Conform to the latest British Standards
- Have been quality checked before leaving the factory
- Are CE marked in accordance with the latest regulations.

In addition, all Liniar Approved Fabricators have a clear dispute resolution process in place - giving customers assurance that any problems will be swiftly dealt with, together with the peace of mind offered by the Liniar 10 year profile guarantee.



## Recycling and sustainability

PVCu is now recognised as a sustainable option when it comes to fenestration products, with the Liniar range leading the way in its environmental credentials.

All PVCu windows are recyclable, but the Liniar system is simpler, and cheaper, to recycle at the end of its life than other systems. The low steel content in a Liniar window results in speedier separation of PVCu and steel and our externally mounted ModLok™ products can be separated in seconds,

As each window can be recycled up to 10 times, this gives PVCu windows an estimated life span of 350 years – more eco-friendly than depleting timber resources.

As a company, Liniar continually strives to improve its environmental performance and reduce its carbon footprint, and has even developed new products to avoid wastage and create opportunities to re-use the PVCu offcuts that would otherwise be sent to landfill.

The company is proud of its record of ZERO operational wastage, with 100% of production waste PVCu (around 1,200 tonnes per year) re-ground at its in-house recycling facility before being formulated into new products. The Liniar decking range is made from 86% recycled PVCu, with its plastic piling range composed of a staggering 100% recycled material.

Liniar's environmental policy is to ensure its processes, conditions and systems shall have as little effect on the environment as is reasonably practicable.

It is the company's policy to:

- Comply with the relevant environmental legislation and codes of practice
- Minimise the risk to the public from its operations
- Protect the natural environment
- Conserve resources and minimise waste
- Train and supervise staff to ensure their actions are with due care for the environment
- Require contractors to meet the same standards of environmental care
- Assess the environmental impact of any new site development
- Regularly assess the environmental impact of the company's operations.

The Liniar fleet delivers products nationwide around the UK. All vehicles are selected with low emissions and the highest fuel economy in order to minimise this impact.



# Liniar's **product range**

A continued programme of investment in research and development results in the highest quality products. With 21 patents and 23 Registered Community Designs to protect the range, the Liniar team leads the way in innovation.



## **Casement window**

A Liniar casement window offers total versatility, with its traditional British style offering slim sight lines to let in maximum light.

Available in sculptured or chamfered profile, 28mm double or 36mm triple glazing, internally or externally beaded, with standard 4-chamber or EnergyPlus 6-chamber profile – with a wide choice of opening configurations, colours, finishes, hardware and glazing options, with Georgian bars also available.



## **Tilt & Turn window**

Perfect as a fire escape or simply to let in more fresh air, Liniar tilt and turn windows are available with either 'tilt before turn' and 'turn before tilt' options.

Available in sculptured or chamfered profile, 28mm double or 36mm triple glazing, internally beaded - available with a wide choice of opening configurations, colours, finishes, hardware and glazing options, with Georgian bars also available.



## **Flush Sash window**

The latest exciting development from Liniar, the flush sash offers the realism of a traditional pre-1932 timber window combined with 21st century thermal benefits. With the sash fitting flush into the frame, this window can also offer a contemporary appearance.

Available in sculptured profile with the flush finish on external faces, 28mm double glazing, internally beaded, with a wide choice of opening configurations, colours, finishes, hardware and glazing.



## **Pivot window**

Offering a full 180° pane rotation, the Liniar pivot window provides a clever solution for high windows that are difficult to clean from the outside.

Available in chamfered profile, 28mm double or 36mm triple glazing, internally beaded, with a wide choice of colours, finishes, hardware and glazing options.



## **Residential door**

The Liniar range of PVCu doors is designed to perfectly match the suite of windows and offers the same thermal benefits.

Available in sculptured or chamfered profile, 28mm double or 36mm triple glazing, internally beaded, with standard 4-chamber or EnergyPlus 6-chamber profile – together with threshold options including Part M compliant and a wide choice of colours, finishes, hardware and glazing options.



## **Composite door**

Offering up to six times the insulation properties of a timber door, a Liniar composite door guarantees high security combined with maintenance free enduring performance.

Available in sculptured or chamfered profile, with 44mm or 49mm door slabs, together with a wide choice of colours, finishes, hardware and glazing options.



### French door

The Liniar French door range is designed to perfectly match the suite of windows, offering the same thermal benefits with a choice of 'open in' or 'open out' styles.

Available in sculptured or chamfered profile, 28mm double or 36mm triple glazing, internally beaded, with standard 4-chambered or EnergyPlus 6-chambered profile – together with a wide choice of colours, finishes, hardware, thresholds and glazing options.



### ModLok™ Patio door

The Liniar sliding patio door was designed from scratch to take advantage of the very latest technology, and has been cyclic tested by Liniar's in-house robot to provide assurance that it's built to last.

Available in sculptured profile with external sliding and internal beading, EnergyPlus 6-chambered profile, 28mm double or triple glazing, with a wide choice of colours, finishes, thresholds and glazing options.



### Standard bi-fold door

The original bespoke designed PVCu bi-folding door, the Liniar standard bi-fold offers opening configurations up to 4 panes wide.

Available in sculptured profile with outward or inward opening, internally beaded, multi-chambered profile, 28mm double glazing, with a wide choice of colours, finishes, thresholds and glazing options.



### ModLok™ bi-fold door

The ModLok™ bi-fold door is a heavy duty solution for applications up to 7 panes wide. Cyclic tested to more than 10 times British Standard, the Liniar ModLok™ bi-fold combines the structural benefits of an aluminium with the energy efficiency of PVCu. The ModLok™ bi-fold features aluminium reinforcing with a high security locking mechanism. Available in the same colours, finishes and glazing options as the Standard.

## The Liniar outdoor range

Not only for housing and commercial developments, the Liniar range also includes outdoor products, providing low maintenance PVCu solutions for a variety of applications.



### Piling and retaining systems

The Liniar range of piling is made from recycled PVCu and is available in a variety of styles for different applications. From flood defence to soil retention, utility trench piling to track side shelters for the rail industry, plastic piling is a cost effective alternative to steel or timber. A free CPD training session is available – please contact us.



### Verandahs and decking

A huge success in the caravan and holiday home industries, Liniar verandah and decking systems are also used for domestic gardens and landscaping applications. Beautifully foiled finishes give the sculptured balustrade system an authentic, maintenance free appearance, and a wide range of accessories is also available.



### Fencing

Liniar's fencing range comprises a fence post and gravel board system, which is surprisingly strong. The steel-reinforced posts are installed in exactly the same way as more unattractive concrete or timber products, whilst offering a more durable and maintenance-free solution. The fencing range can be used as the basis for bespoke landscaping projects.

# 70mm system



Liniar's innovative lead-free 70mm window system is available in a choice of chamfered and sculptured suites, with all style options in a wide range of colours and finishes to suit any building or project.

## Thermally efficient

Liniar's revolutionary 70mm profiles are far more thermally efficient than traditional PVCu window profiles. By removing unnecessary steel reinforcement, instead developing the latest in multi-chambered profile technology, the heat stays where it belongs - inside the property.

## Cost effective

The reduction in steel results in a more cost effective window at the fabrication stage. Fitter friendly features also reduce installation times, saving money on the job. The occupant also benefits with systems capable of A+ and a U-value as low as 0.8.

## Better for the environment

Liniar frames have always been 100% lead-free, well in advance of legislation. Furthermore, all elements of a Liniar window are fully and easily recyclable at the end of its life.

## Guaranteed

Liniar profiles come with a 10 year guarantee against cracking, warping or discolouration.

- Designed completely from scratch by a team with over 500 years of industry experience
- Fitted with high security multi-point locking as standard
- Available in a wide range of colours and foiled finishes
- Ultra-slim sightlines for maximum light
- Patented co-ex bubble gasket - tested and assessed to BFRC energy rating standards with zero air leakage shown in the results
- Designed with two thirds less steel than a GGF standard window
- Fully tested and accredited
- Met requirements of PAS 24:2012 with reduced steel reinforcing
- All systems conform to BS 6375 Part 1 for weather performance and Part 2 for window operation and strength characteristics.

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French door

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## Case study

Redrow Homes is one of the UK's leading residential property developers, and was looking for something slightly different when it came to specifying windows for its brand new development of luxury homes, Abode in Buckley.

The development, consisting of 63 highly-specified 2-4 bedroomed homes, is aimed at the younger house buyer; with Redrow's designers aiming for a combination of traditional and contemporary in one dwelling.

Redrow requested a sample of the Liniar flush sash PVCu window, designed by Liniar to replicate traditional timber windows from the pre-1932 era, where the sash fits flush into the frame – totally unlike other types of PVCu window. The sample was foiled in flat grey to give this traditional-looking window a modern edge, and the Redrow team liked the contemporary appearance of the window.

The aesthetics of the project were so critical that Redrow took the somewhat unusual step of building a house within its head office so they could see what the windows would actually look like when fitted. The replica house was made from stud walls and exterior brickwork.

The project team were delighted with the finished result, not only from the perspective of appearance, but also the ease of installation, which would make the on-site build more efficient for the fitters and



ensure the project could be completed well within the planned timescales.

Steve Walsh, Redrow's Construction Director for the North West region, commented:

As soon as we saw the flush sash window, we knew it was what we needed for the Abode development.

It ticked all our boxes – lead-free, energy efficient, easy to install – and best of all, it gave us the overall aesthetics we were looking for.

# Window & door configurations

The below tables show the different window and door configurations available from Liniar.

## Casement Window



Standard Configurations



Mock Sash Horn



Arched Top Moulding



French Window Fire Escape

## Tilt & Turn Window



Standard Configurations



Arched Top Moulding



French Window Fire Escape

## Flush Sash Window



Standard Configurations



French Window Fire Escape

## Pivot Window



Standard Configurations

## Residential and French Doors



Residential Door Full Glass or Panel



Residential Door with Midrail



Residential Door Half Cruciform



Residential Door Full Cruciform



French Door Full Glass or Panel



French Door with Midrail

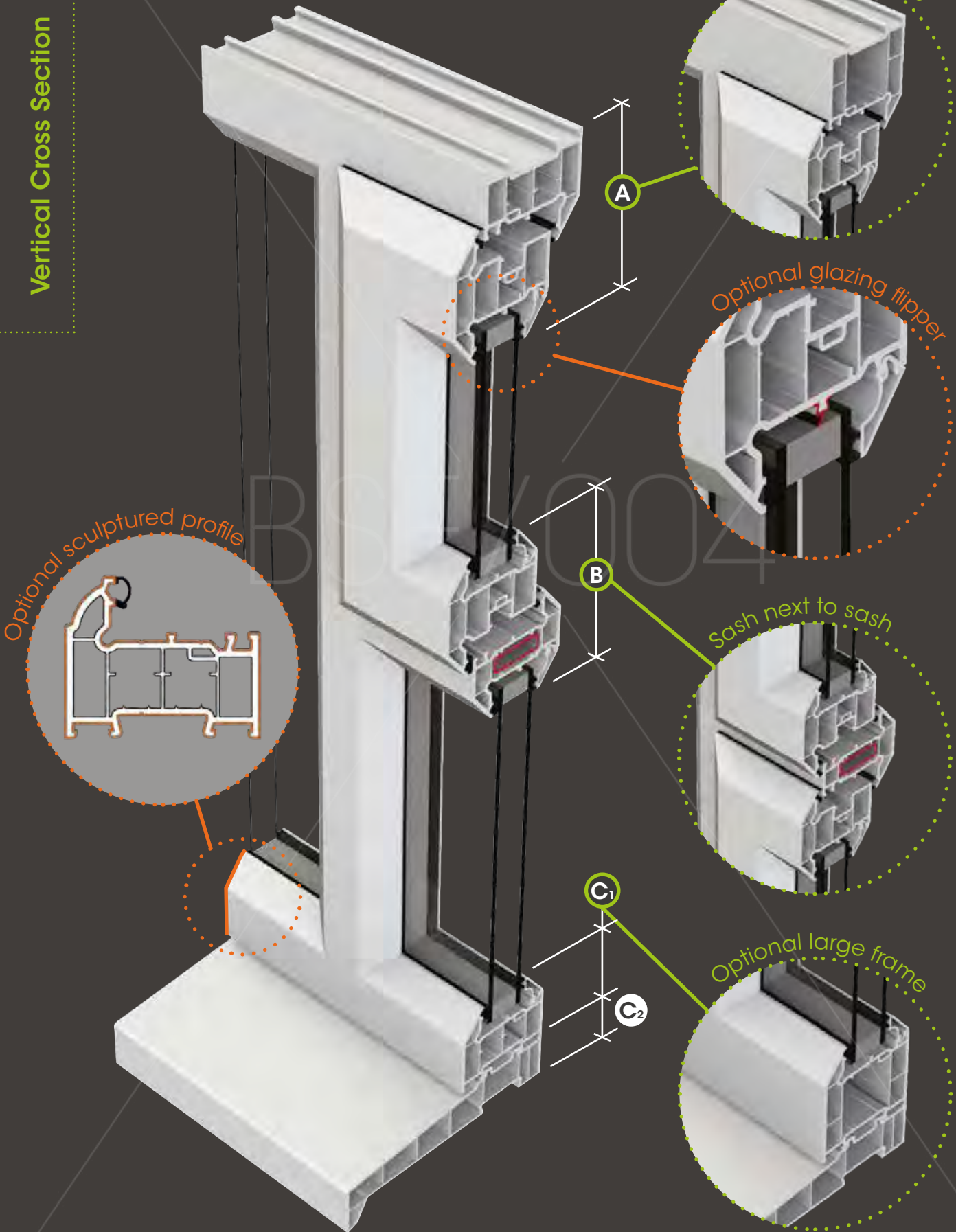


White mock sash horn casement windows  
Seddon Homes

# Casement window

Outward opening, internally beaded\*

Vertical Cross Section



\* externally beaded options are also available and feature the same sightlines



# Technical information

## Casement window

- Sculptured and chamfered suites
- 28mm double and 36mm triple glazing
- 4 chambered multi wall profiles
- U-values from 1.2 (DGU) and 0.9 (TGU)
- Patented co-ex gasket

## Accreditations



## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



Product	Dim. <b>A</b>
<b>Small frame &amp; sash</b> L#W011 & L#W031	104mm
<b>Large frame &amp; sash</b> L#W016 & L#W031	124mm

Product	Dim. <b>B</b>
<b>Transom &amp; sash</b> L#W022 & L#W031	114mm
<b>Int. transom &amp; sash</b> L#W027 & L#W031	134mm
<b>Transom &amp; 2 x sash</b> L#W021 & 2 x L#W031	161mm
<b>Int. transom &amp; 2 x sash</b> L#W026 & 2 x L#W031	181mm

Product	Dim. <b>C<sub>1</sub></b>
<b>Small frame</b> L#W011	57mm
<b>Large frame</b> L#W016	77mm

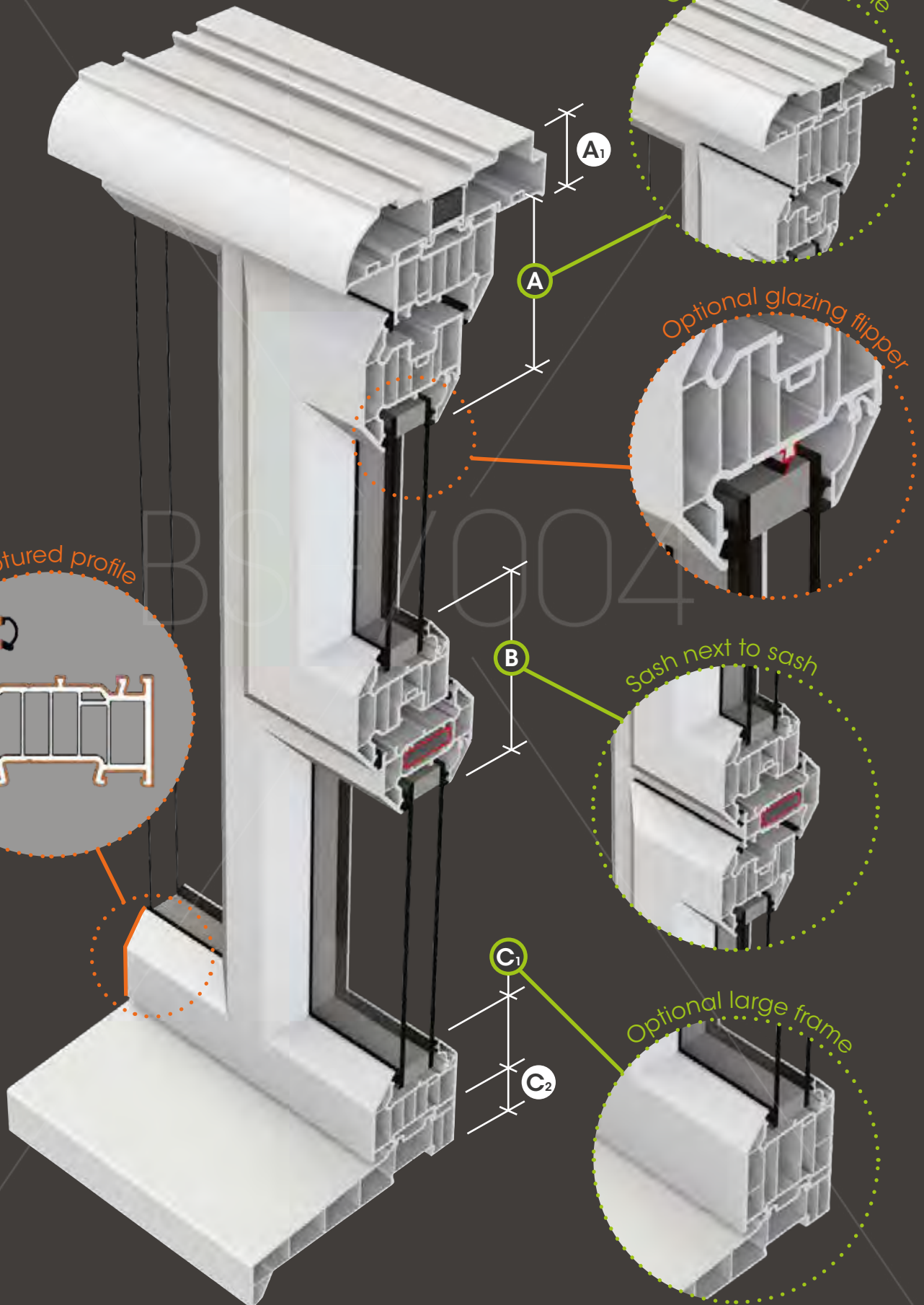
Product	Dim. <b>C<sub>2</sub></b>
<b>85, 150, 165, 180 cills</b> LSL085, LSL150, LCL165, LSL180	30mm

# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

# EnergyPlus Casement window

Outward opening, internally beaded\*

Vertical Cross Section

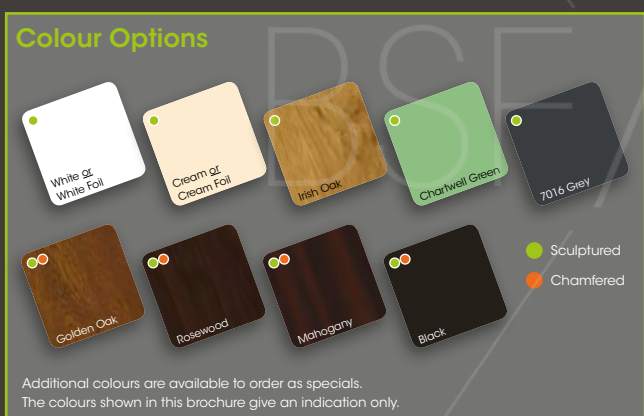


\* externally beaded options are also available and feature the same sightlines



# Technical information

- EnergyPlus Casement window**
- Sculptured and chamfered suites
  - 28mm double and 36mm triple glazing
  - Multi chambered EnergyPlus profiles
  - U-values from 1.2 (DGU) and 0.8 (TGU)
  - Patented co-ex gasket



Product	Dim. <b>A<sub>1</sub></b>
Head vent LHV30 & LHV31	30mm
Optional for all Linar products	

Product	Dim. <b>A</b>
Small frame & sash L#W012 & L#W033	104mm
Large frame & sash L#W017 & L#W033	124mm

Product	Dim. <b>B</b>
Transom & sash L#W022 & L#W033	114mm
Int. transom & sash L#W027 & L#W033	134mm
Transom & 2 x sash L#W021 & 2 x L#W033	161mm
Int. transom & 2 x sash L#W026 & 2 x L#W033	181mm

Product	Dim. <b>C<sub>1</sub></b>
Small frame L#W012	57mm
Large frame L#W017	77mm

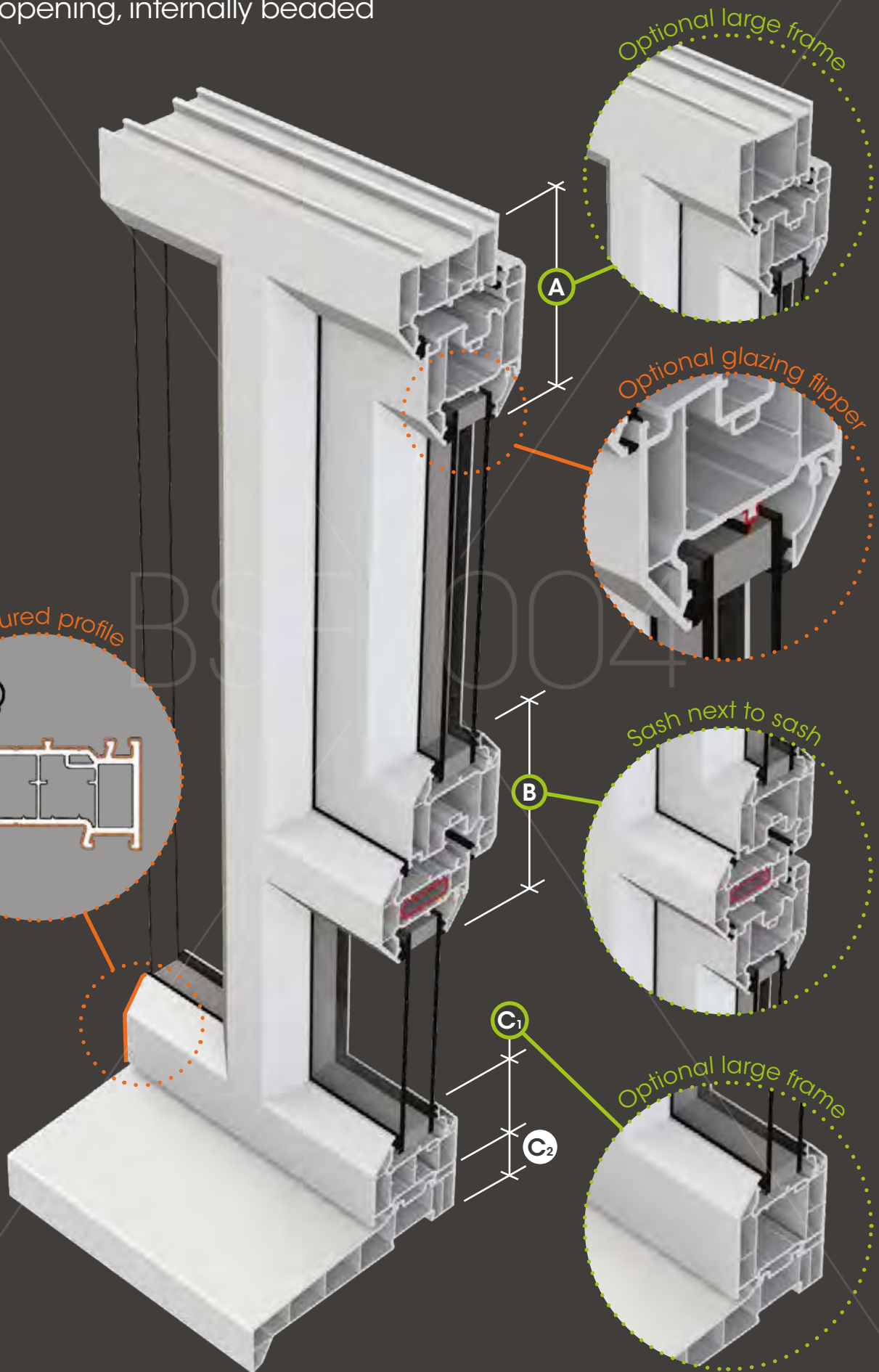
Product	Dim. <b>C<sub>2</sub></b>
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

# Tilt & Turn **window**

Inward opening, internally beaded

Vertical Cross Section



# Technical information

## Tilt & Turn window

- Sculptured and chamfered suites
- 28mm double and 36mm triple glazing
- Ideal for fire exits
- U-values from 1.3 (DGU) and 0.9 (TGU)
- Patented co-ex gasket

## Accreditations



## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



Product	Dim. A
Small frame & sash L#W011 & L#W035	111mm
Large frame & sash L#W016 & L#W035	131mm

Product	Dim. B
Transom & sash L#W021 & L#W035	121mm
Int. transom & sash L#W026 & L#W035	141mm
Transom & 2 x sash L#W021 & 2 x L#W035	175mm
Int. transom & 2 x sash L#W026 & 2 x L#W035	195mm

Product	Dim. C <sub>1</sub>
Small frame L#W011	57mm
Large frame L#W016	77mm

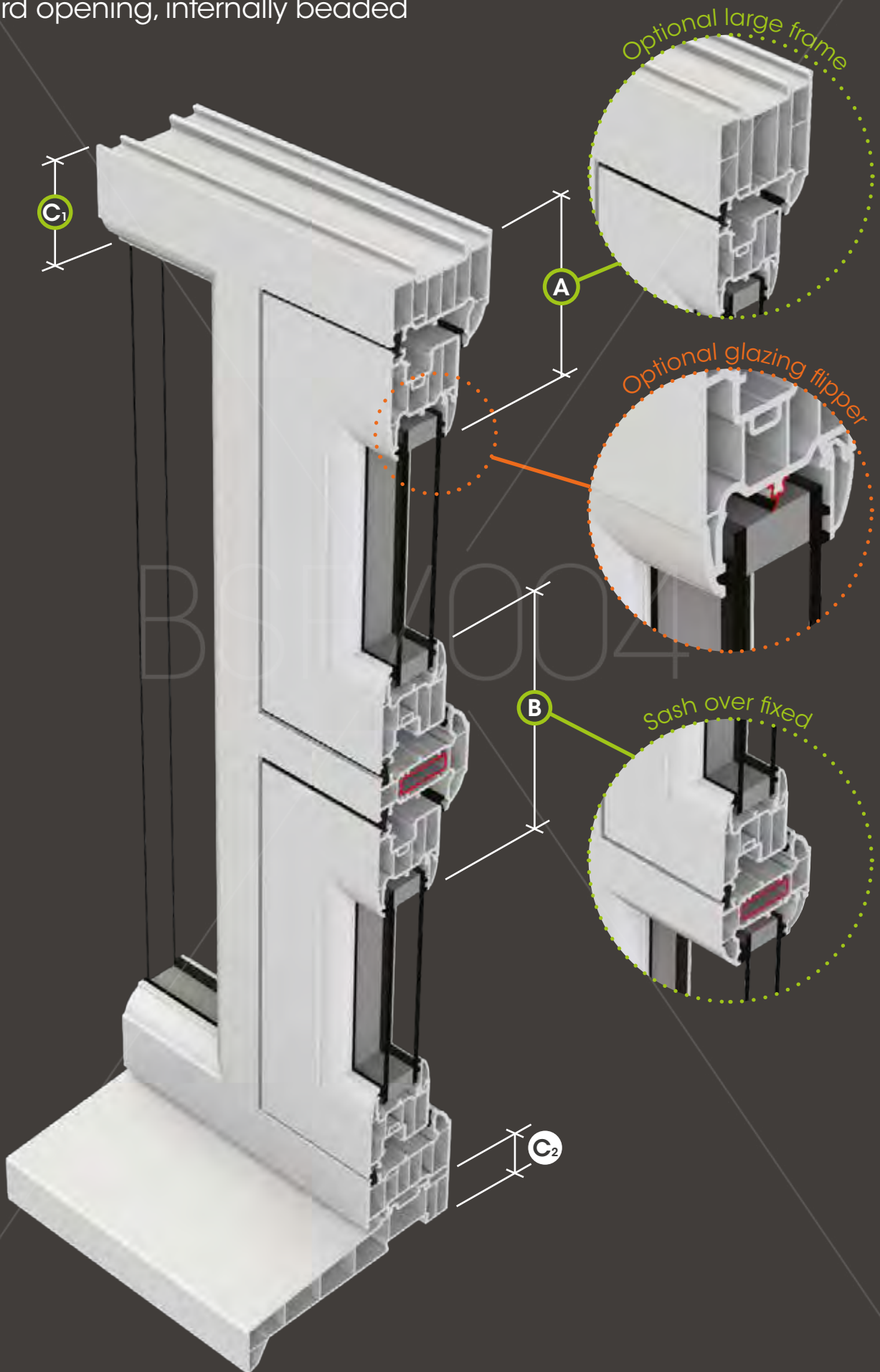
Product	Dim. C <sub>2</sub>
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

# Flush Sash **window**

Outward opening, internally beaded

Vertical Cross Section



# Technical information

## Flush Sash window

- Sculptured suite
- Flush sash finish on external faces
- 28mm double or triple glazing
- U-values from 1.3 (DGU) and 0.9 (TGU)
- Patented co-ex gasket

## Accreditation



## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



Product	Dim. <b>A</b>
<b>Small frame &amp; sash</b> LSW011/012 & LSW030	102mm
<b>Large frame &amp; sash</b> LSW016/017 & LSW030	122mm

Product	Dim. <b>B</b>
<b>Transom &amp; sash</b> LSW022 & LSW030	112mm
<b>Int. transom &amp; sash</b> LSW027 & LSW030	132mm
<b>Transom &amp; 2 x sash</b> LSW021 & 2 x LSW030	157mm
<b>Int. transom &amp; 2 x sash</b> LSW026 & 2 x LSW030	177mm

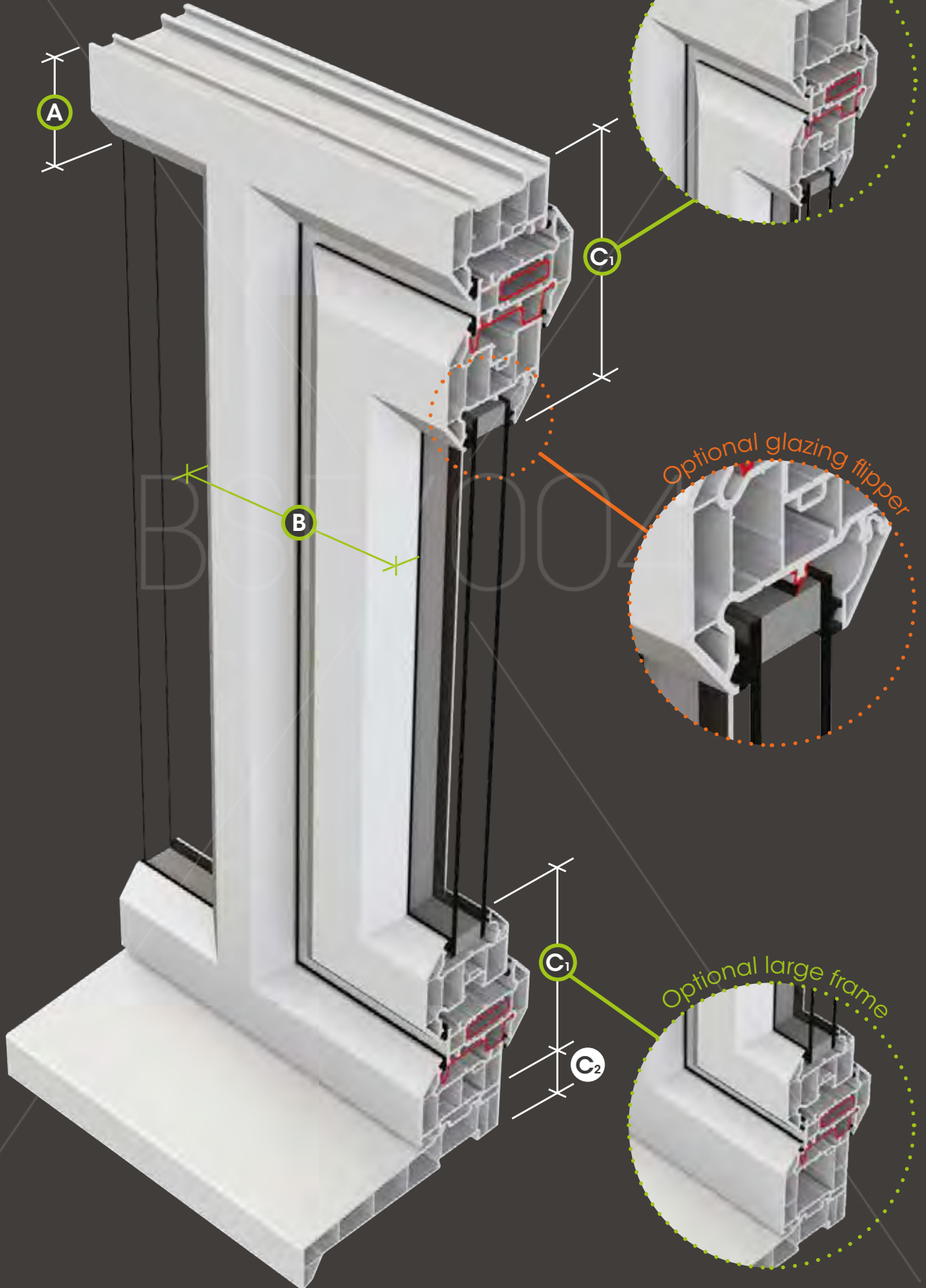
Product	Dim. <b>C<sub>1</sub></b>
<b>Small frame</b> LSW011/012	57mm
<b>Large frame</b> LSW016/017	77mm

Product	Dim. <b>C<sub>2</sub></b>
<b>85, 150, 165, 180 cills</b> LSL085, LSL150, LCL165, LSL180	30mm

# Pivot window

Central pivoting, internally beaded

Vertical Cross Section





# Technical information

## Pivot window

- Chamfered suite
- 28mm double and 36mm triple glazing
- Ease of cleaning from inside the property
- U-values from 1.3 (DGU) and 1.0 (TGU)
- Patented co-ex gasket

## Accreditation



## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



Product	Dim. <b>A</b>
Small frame LCW011	57mm
Large frame LCW016	77mm

Product	Dim. <b>B</b>
Transom & sash LCW021 & LCW031	153mm
Int. transom & sash LCW026 & LCW031	173mm

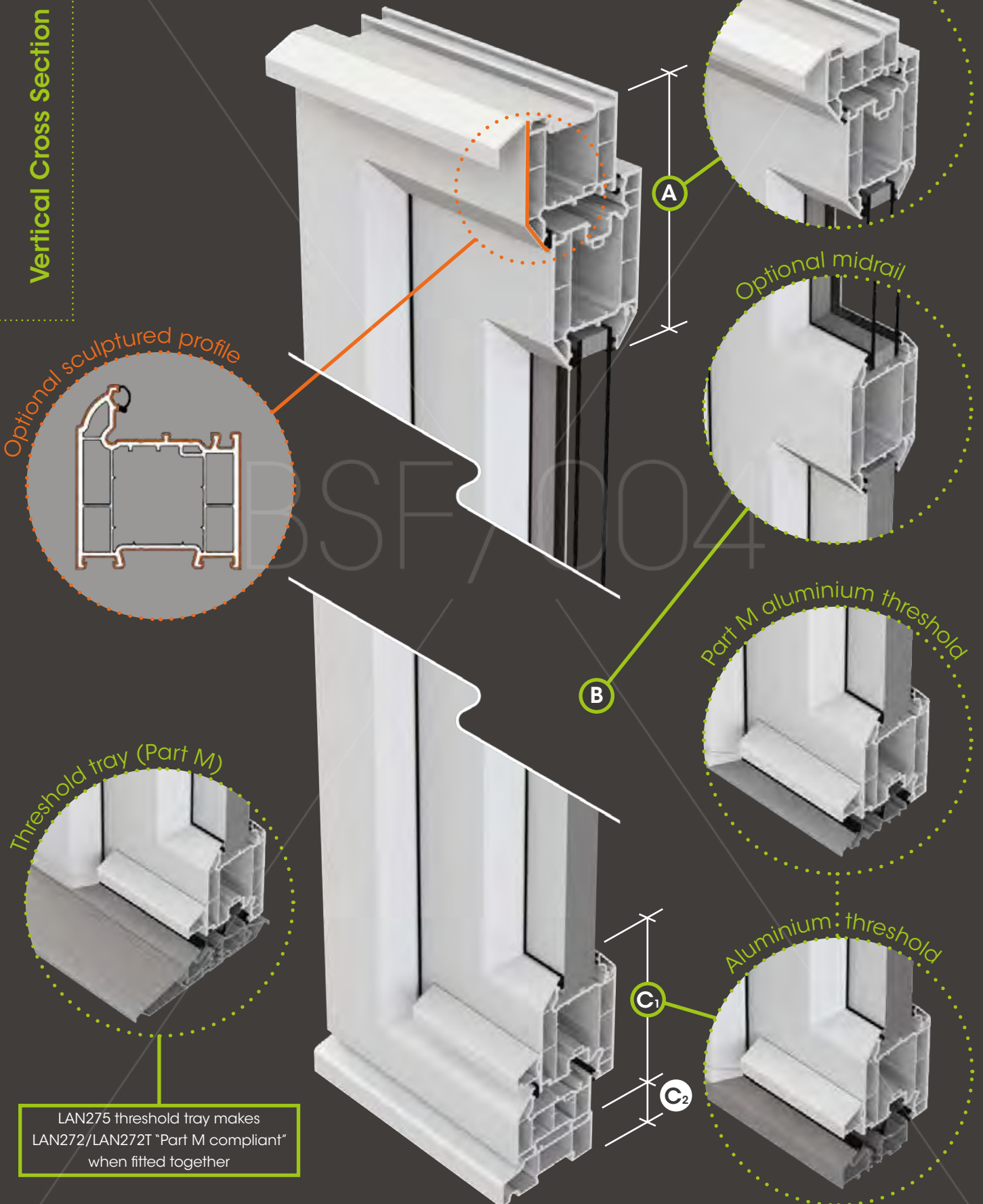
Product	Dim. <b>C<sub>1</sub></b>
Small frame & sash LCW011 & LCW031	143mm
Large frame & sash LCW016 & LCW031	163mm

Product	Dim. <b>C<sub>2</sub></b>
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

# Residential door

Inward opening\*, internally beaded

Vertical Cross Section



LAN275 threshold tray makes LAN272/LAN272T "Part M compliant" when fitted together

\* outward opening options are also available and feature the same sightlines

# Technical information

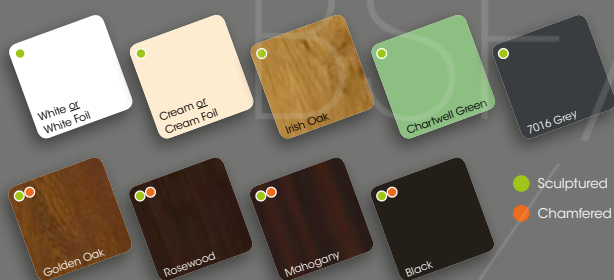
## Residential door

- Sculptured and chamfered suites
- 28mm double and 36mm triple glazing
- 4 or 6 multi chamber EnergyPlus profiles
- U-values from 1.3 (DGU) and 1.0 (TGU)
- Patented co-ex gasket

## Accreditations



## Colour Options



Additional colours are available to order as specials.  
The colours shown in this brochure give an indication only.



Product	Dim. <b>A</b>
Small frame & sash L#W011 & LSW037*	136mm
Large frame & sash L#W016 & LSW037*	156mm

Product	Dim. <b>B</b>
Int. transom L#W026	87mm
Midrail L#W029	117mm

Product	Dim. <b>C<sub>1</sub></b>
Large frame & sash L#W016 & LSW037*	156mm
Small frame & sash L#W011 & LSW037*	136mm
Aluminium thresh. & sash LAN272/272T & LSW037*	127mm
Part M ali. thresh & sash LAN271 & LSW037*	112mm

Product	Dim. <b>C<sub>2</sub></b>
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

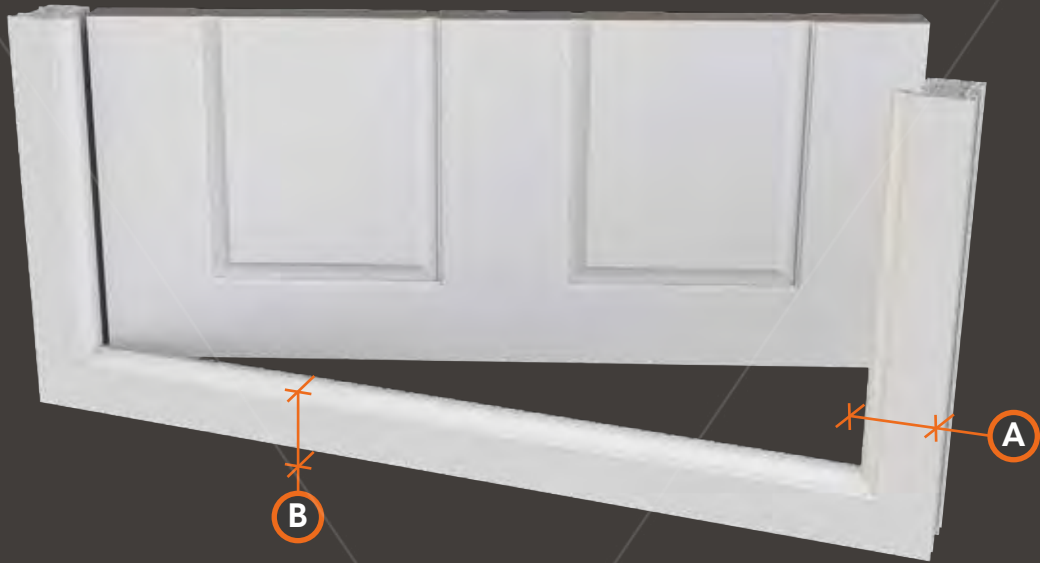
\* SLCW037 for chamfered suite

# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

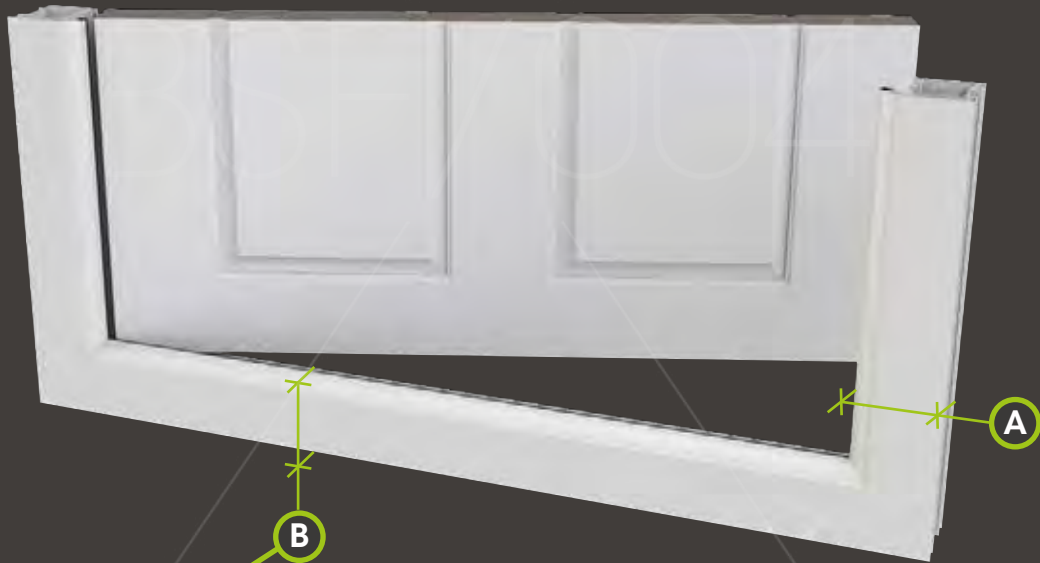
# Composite door

Inward opening\*

Horizontal Cross Section  
44mm Door Slab (Option X)



Horizontal Cross Section  
49mm Door Slab (Option Y)



Small frame threshold



Aluminium threshold



Part M Aluminium threshold



LAN275 threshold tray makes  
LAN272/LAN272T "Part M compliant"  
when fitted together

\* outward opening options are also available and feature the same sightlines

# Technical information

**Composite door**

- Sculptured and chamfered suites
- Wide variety of 44mm and 49mm door slabs
- Part M low threshold options
- Capable of PAS24 (specific door slab required)

**Accreditations**



**Colour Options (outer frame only)**



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



## 44mm, Option X

Product	Dim. A
Composite frame LSW018	67mm

Dim. B	
Composite frame LSW018	67mm
Proprietary thresholds available, contact your preferred supplier	

## 49mm, Option Y

Product	Dim. A
Small frame L#W011 or L#W012	57mm
Large frame L#W016 or L#W017	77mm

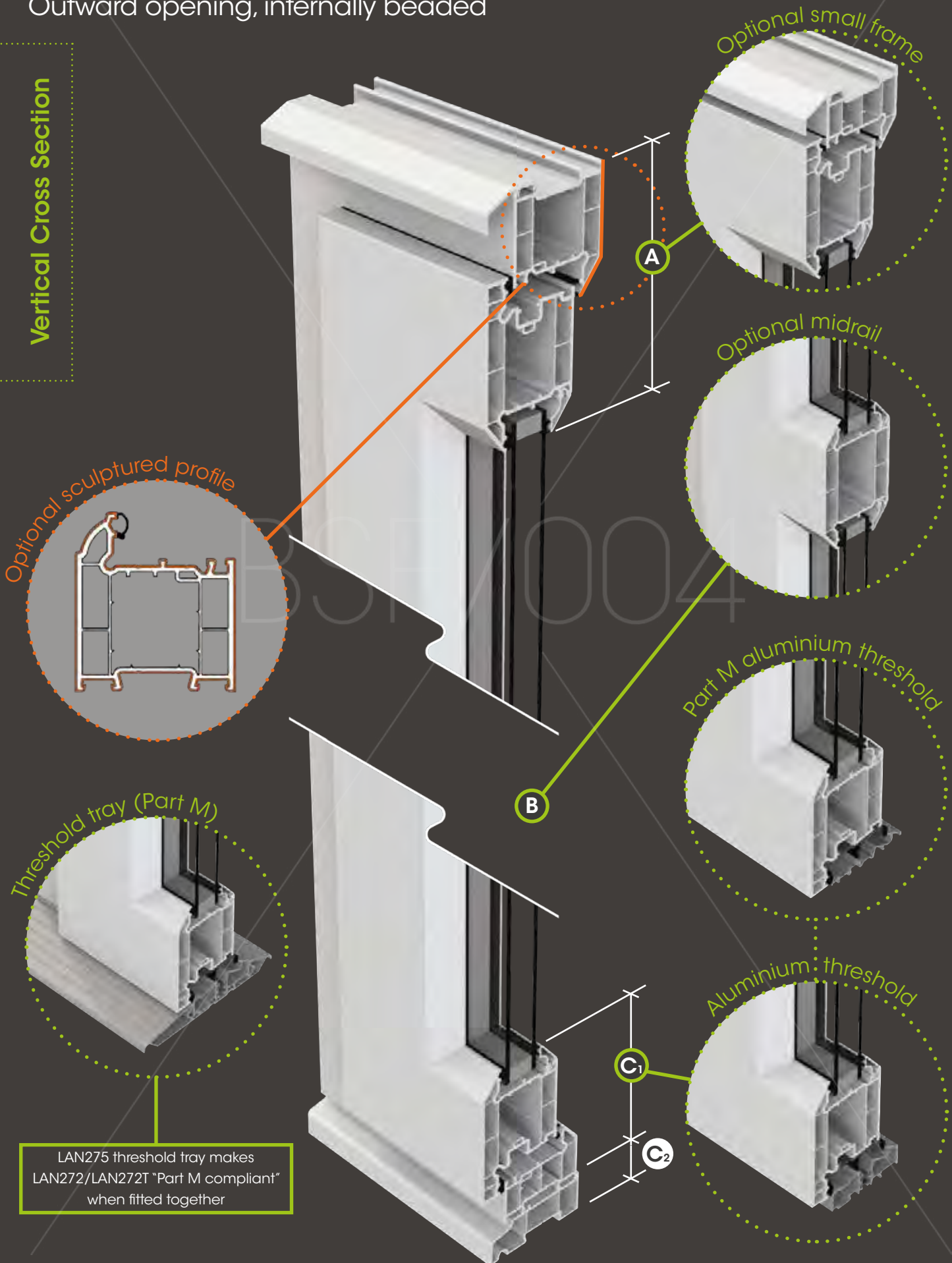
Product	Dim. B
Large frame L#W016 or L#W017	77mm
Small frame L#W011 or L#W012	57mm
Aluminium threshold LAN272 or LAN272T	25mm
Part M threshold LAN271	15mm

# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

# French door

Outward opening, internally beaded

Vertical Cross Section



# Technical information

## Residential door

- Sculptured and chamfered suites
- 28mm double and 36mm triple glazing
- 4 or 6 multi chambered EnergyPlus profiles
- U-values from 1.3 (DGU) and 1.0 (TGU)
- Patented co-ex gasket

## Accreditations



## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.



Product	Dim. <b>A</b>
Small frame & sash L#W011 & LSW036*	136mm
Large frame & sash L#W016 & LSW036*	156mm

Product	Dim. <b>B</b>
Int. transom L#W026	87mm
Midrail L#W029	117mm

Product	Dim. <b>C<sub>1</sub></b>
Large frame & sash L#W016 & LSW036*	156mm
Small frame & sash L#W016 & LSW036*	136mm
Aluminium thresh. & sash LAN272/272T & LSW036*	127mm
Part M ali. thresh. & sash LAN271 & LSW036*	112mm

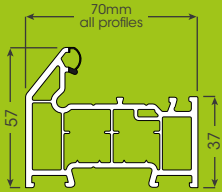
Product	Dim. <b>C<sub>2</sub></b>
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

\* SLCW037 for chamfered suite

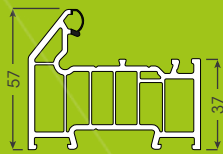
# Replace notation with (C) for Chamfered suite or (S) for Sculptured suite

# Window/door product chart

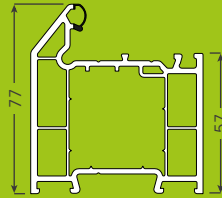
## Chamfered Profile



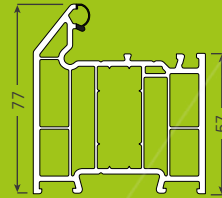
**LCW011**  
Small Main Frame



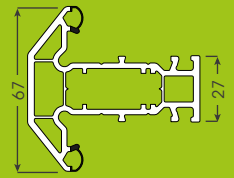
**LCW012**  
EnergyPlus Small Main Frame



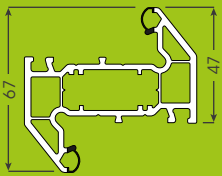
**LCW016**  
Large Main Frame



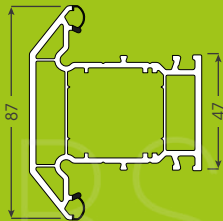
**LCW017**  
EnergyPlus Large Main Frame



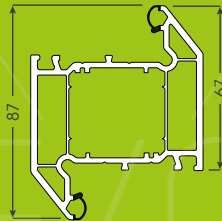
**LCW021**  
Transom T



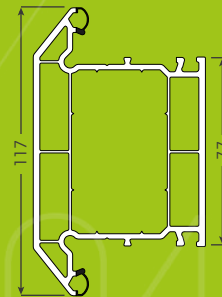
**LCW022**  
Transom Z



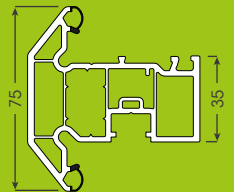
**LCW026**  
Int. Transom Z



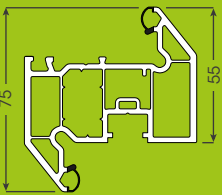
**LCW027**  
Int Transom Z



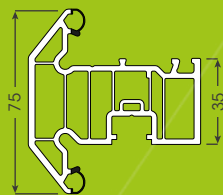
**LCW029**  
Midrail



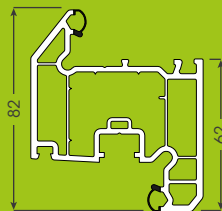
**LCW031**  
Sash T



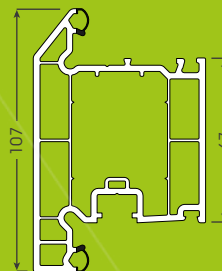
**LCW032**  
Sash Z



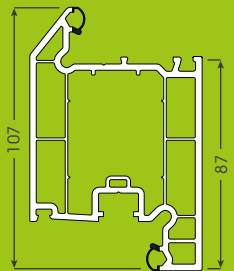
**LCW033**  
EnergyPlus Sash T



**LCW035**  
T&T Sash

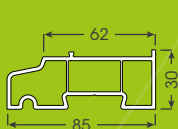


**SLCW036**  
Door Sash T

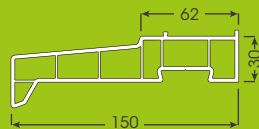


**SLCW037**  
Door Sash Z

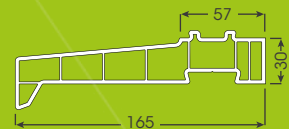
## Cills



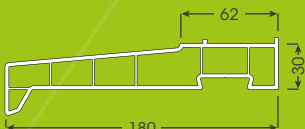
**LSL085**  
85mm Stub Cill



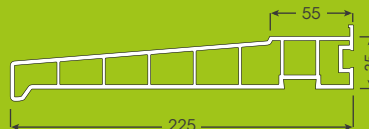
**LSL150**  
150mm Cill



**LCL165**  
165mm Cill



**LSL180**  
180mm Cill

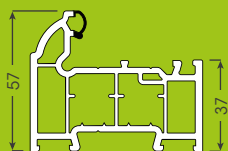


**LCL225**  
225mm Cill





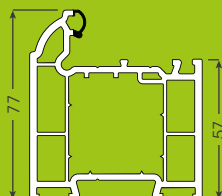
Sculptured Profile



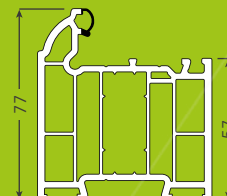
**LSW011**  
Small Main Frame



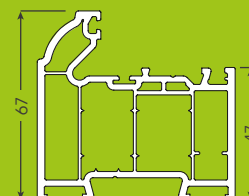
**LSW012**  
EnergyPlus Small Main Frame



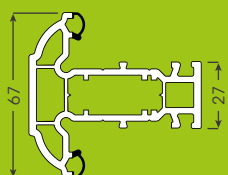
**LSW016**  
Large Main Frame



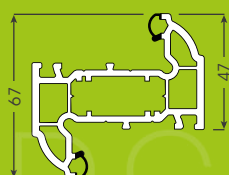
**LSW017**  
EnergyPlus Large Main Frame



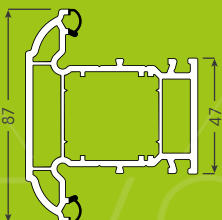
**LSW018**  
Composite Door Outer Frame



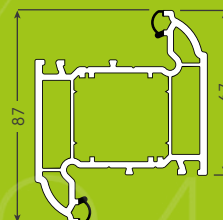
**LSW021**  
Transom T



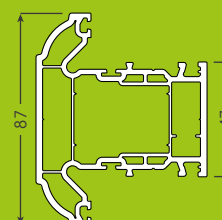
**LSW022**  
Transom Z



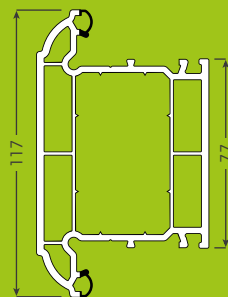
**LSW026**  
Int Transom T



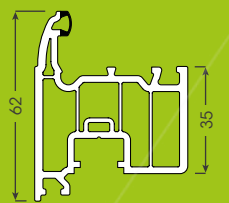
**LSW027**  
Int Transom T



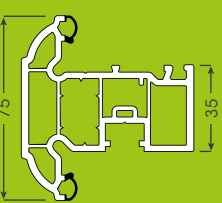
**LSW028**  
44mm Comp. Door Transom T



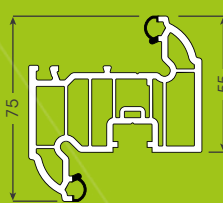
**LSW029**  
Midrail



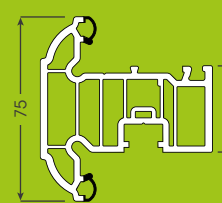
**LSW030**  
Flush Sash



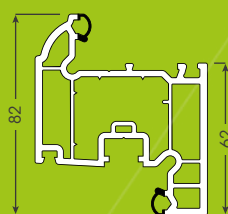
**LSW031**  
Sash T



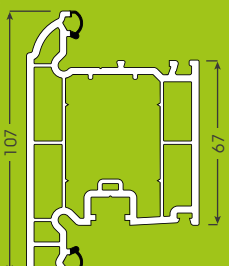
**LSW032**  
EnergyPlus Sash Z



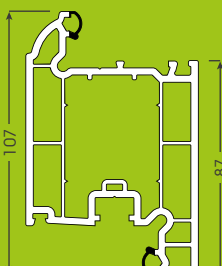
**LSW033**  
EnergyPlus Sash T



**LSW035**  
T&T Sash



**LSW036**  
Door Sash T














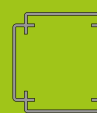











**LSW037**  
Door Sash Z

# Window/door product chart











**Ancillary PVCu**

 <b>LAN101</b> Screw Retainer	 <b>LAN102</b> Glazing Flipper	 <b>LAN103</b> Single Butt Joint	 <b>LAN104</b> Head Drip	 <b>LAN105</b> Cill Drip	 <b>LAN106</b> 20mm Frame Extension	 <b>LAN107</b> Thermal Dam	 <b>LAN111</b> Cover Strip	 <b>LAN112</b> Small Trim
 <b>LAN113</b> Heavy Duty Butt Joint Capping	 <b>LAN114</b> Struct. Butt Joint Capping	 <b>LAN116</b> 10mm Frame Extension	 <b>LAN118</b> Composite Door Mechanical Joint	 <b>LAN126</b> 50mm Frame Extension	 <b>LAN131</b> Large Trim	 <b>LAN134</b> Bay Pole	 <b>LAN135</b> Bay Pole Nest	 <b>LAN141</b> 20mm rebate add on
 <b>LAN142</b> 35mm rebate add on	 <b>LAN153</b> 90° Corner Post	 <b>LAN160</b> 20mm Georgian Bar	 <b>LAN161</b> 28mm Georgian Bar	 <b>LAN162</b> 20mm Slim Georgian Bar	 <b>LAN165</b> Cill Reinforcing	 <b>LAN171</b> Low Threshold Trim	 <b>LAN180</b> Comp. Door Reinforcing	

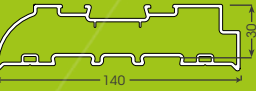

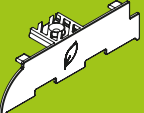

**Ancillary Aluminium**

 <b>LAN211</b> Std. Butt Joint	 <b>LAN212</b> Med Duty Butt Joint	 <b>LAN213</b> HD Butt Joint	 <b>LAN214</b> Structural Butt Joint	 <b>LAN230</b> Flush Sash French Window Adapter	 <b>LAN231</b> Small Bay Pole	 <b>LAN232</b> Large Bay Pole	 <b>LAN233</b> Bow Pole	 <b>LAN234</b> Bay Pole
 <b>LAN251</b> 135° Corner Joint	 <b>LAN252</b> 150° Corner Joint	 <b>LAN253</b> 90° Corner Joint	 <b>LAN271</b> Part 'M' Compliant Low Threshold	 <b>LAN272</b> Std Low Threshold	 <b>LAN272T</b> Thermally Broken Std. Low Threshold	 <b>LAN273</b> Threshold Packer	 <b>LAN274</b> Threshold Packer	
 <b>LAN275</b> Low Threshold Tray	 <b>LAN276</b> Sculptured Kick Strip	 <b>LAN277</b> Chamfered Kick Strip	 <b>LAN278</b> Low Threshold Half Tray	 <b>LAN279</b> Comp. Door Low Threshold Seal Carrier	 <b>LAN291</b> Meeting Stile Adapter			

**Steel Reinforcement**

 <b>LSR011</b>	 <b>LSR016</b>	 <b>LSR017</b>	 <b>LSR018</b>	 <b>LSR021</b>	 <b>LSR026</b>	 <b>LSR028</b>	 <b>LSR031</b>	 <b>LSR035</b>	 <b>LSR036/ LSR036P</b>
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**Head Vent**

 <b>LHV30</b> Head Vent	 <b>LHV31</b> Head Vent Channel	 <b>LHV32</b> Head Vent End Cap	 <b>LHVf</b> Head Vent Foam
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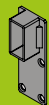
**Aluminium Reinforcement**

 <b>LAR011</b>	 <b>LAR021</b>	 <b>LAR026</b>	 <b>LAR029</b>	 <b>LAR031</b>
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Ancillary Steel



**LAN301**  
Fixing Cleat



**LAN314**  
Structural Joint  
Fixing Cleat



**LAN371**  
Low Threshold  
Shootbolt Keep



**LAN311**  
Buff Joint Jack



**LAN331**  
Small Bay  
Pole Jack

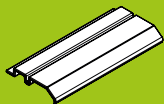


**LAN332**  
Large Bay  
Pole Jack



**LAN353**  
Square Bay  
Pole Jack

Ancillary Mouldings



**LMO301**  
Glazing Platform



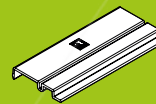
**LMO302**  
Interlocking  
Wedges



**LMO303**  
Run Up Ramp



**LMO305**  
Cill Drip End  
Cap



**LMO311**  
36mm Glazing  
Platform



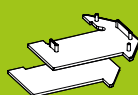
**LMO316**  
Flag Hinge  
Packer



**LMO321**  
Chamfered French  
Door End Cap



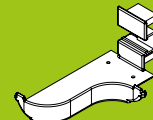
**LMO322**  
Sculptured French  
Door End Cap



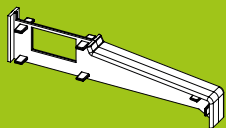
**LMO323**  
Pivot End Cap



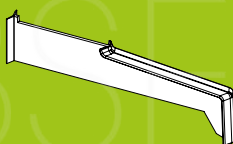
**LMO021**  
PVCu Transom  
Mech Joint



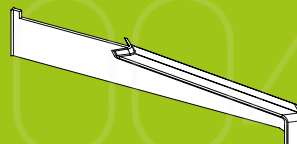
**LK001/LK002**  
Sculptured/  
Chamfered Mock  
Sash Horn Kit



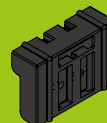
**LMO354**  
In-line 150mm Cill Joint



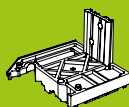
**LMO355**  
135° 150mm Cill Joint



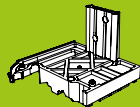
**LMO356**  
90° 150mm Cill Joint



**LMO357**  
Corner Protector



**LMO371**  
Chamfered Low  
Threshold Moulding



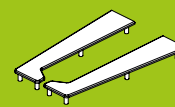
**LMO372**  
Sculptured Low  
Threshold Moulding



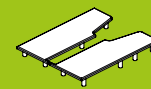
**LMO275**  
Low Threshold Tray  
End Cap



**LMO365**  
150mm & 165mm Cill  
End Cap



**LMO381**  
180mm Cill End Cap



**LMO386**  
85mm Cill End Cap



**LMO325**  
225mm Cill End Cap



**LMO011**  
Outerframe Mech  
Joint Block



**LGA401**  
Repair Gasket



**LGA412**  
Flush Sash  
Button Strip



**LGA418**  
12mm  
Brush Pile



**LGA432**  
Flush Sash  
Brush Pile Seal



**LGA435**  
Bay Pole  
Nest Seal



**LGA479**  
Composite Door  
Low Threshold Seal  
Carrier Q-Lon



**LBF197**  
Q-Lon

Gaskets

Clip On Georgian Bar



**ULI**  
Intermediate  
Bridging Clip



**ULCC**  
Cruciform Clip



**CJC2VS**  
Cruciform Joint  
Cover



**GB2VS**  
Featured Low  
Level Bar



**EP2VS-OVF**  
Featured End  
Cap



**EP2VS-55**  
Chamfered End  
Cap



**UL28**  
28mm Double  
Sided Clip

Adhesive Tape  
**4943F-16**  
16mm grey  
bridging clip tape  
**4943F**  
40mm grey  
cruciform tape

# ModLok™ Patio door



As with the window system, the Liniar sliding patio door was designed from scratch to take advantage of the very latest technology, and has been cyclic tested by Liniar's in-house robot to provide assurance that it's built to last.

## Strong and secure

The Liniar patio door features the patented ModLok™ system, a combined reinforcement and multi-point locking system developed in conjunction with Yale. In addition, all external sliders feature multiple anti-lift properties to combat would-be intruders.

## Unique 'air glide' system

Other patio doors operate on a four-wheel steel opening system. The Liniar patio features a unique eight-wheel acetal system, providing stability, durability and smooth, silent operation.

## Self-cleaning track

One of the reasons other patio doors are hard to open is when dirt and mud fall into the track. The Liniar patio features built-in brushes that sweep the track clean every time the door is opened.

## Attractive

With ultra-slim sculptured sightlines, no unsightly crash stops and a built-in decelerator, the Liniar patio door is one of the most attractive on the market.

- 2, 3 and 4 pane options available
- Slim sash design (80mm high)
- Optional mechanically jointed outer frame
- Thermally broken Part M low threshold available - just 25mm high with integral ramp
- External sliders are anti-lift, providing additional security
- Patented centre seal creates continuous seal between sash and threshold to prevent water tracking
- Patented decelerator discreetly fixed in head - eliminates unattractive external fix crash stop
- Mechanically jointed, fully sculptured midrail, with letterbox facility
- Patented sealing packer for fixed sash, no need to fit brush pile, halving insertion time
- Fully foiled finish including trims



## Case study

Energy efficient windows and patio doors were a key requirement for a small development of two-bedroomed starter homes in Nottingham, as the architect's practice involved with the scheme was renowned for its focus on low energy housing schemes.

The developer was looking for cost effective glazed products that could deliver U-values lower than 1.5 W/m<sup>2</sup>K, including casement windows and 2-pane sliding patio doors.

PVCu was the obvious choice – and after carrying out research on the different PVCu systems available, the architect selected Liniar's sculptured range to specify for the project.

The high thermal efficiency of the profile used in the Liniar sliding patio door in particular meant that a lower specification of sealed double glazed units could be used to achieve a U-value of 1.2 W/m<sup>2</sup>K for each door.

This, together with the casement windows utilising standard double glazed sealed units to achieve an A+ rating, significantly reduced the overall project cost.

Once on site, Liniar's window and patio systems also helped to reduce the installation time that was necessary, with installer-friendly features including Liniar's glazing packers and simple beading system speeding up the fitting of each product, and a



full instruction guide and video supplied for the patio door.

The developer is delighted with the end result:

“The focus on high thermal efficiency meant we wanted to select the best product for the lowest cost – and Liniar was able to deliver exactly what we needed.

The project is almost completed and we're very happy with the quality of the products and service – we'll definitely use Liniar again.

# Patio door configurations

The below images show the different patio door configurations available from Liniar.

**2 Pane - Style OX/XO**



**3 Pane - Style XOO/OOX**



**2 Pane - Style OXO (L/R)**



**3 Pane - Style OOX/XOO (Optional)**



**4 Pane - Style OXXO**



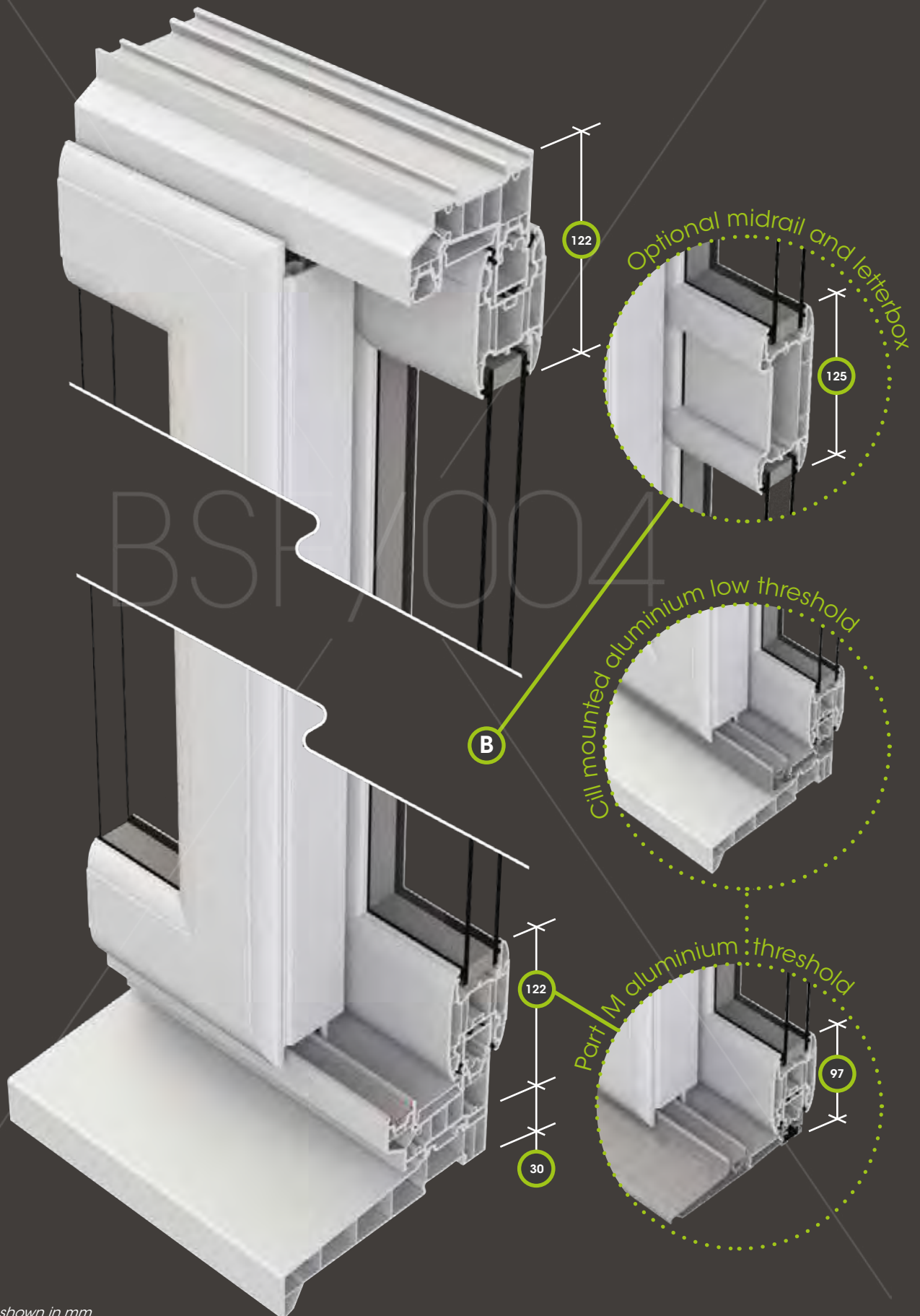


White patio door and casement windows  
New build development

# ModLok™ Patio door

External sliding, internally beaded

Vertical Cross Section



\* all dimensions shown in mm



# Technical information

## Patio door

- Sculptured suite
- 28mm double and triple glazing
- Multi chambered EnergyPlus profiles
- U-values from 1.2 (DGU) and 1.0 (TGU)
- Patented co-ex gasket

## Accreditation



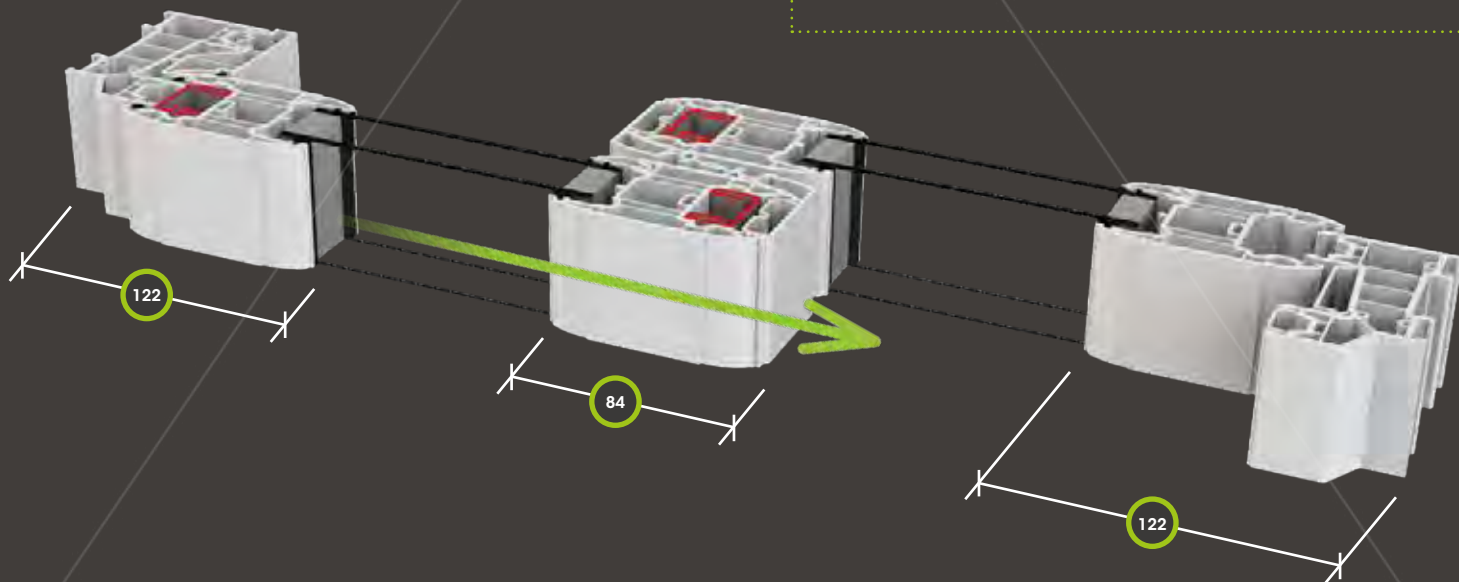
## Colour Options



Additional colours are available to order as specials. The colours shown in this brochure give an indication only.

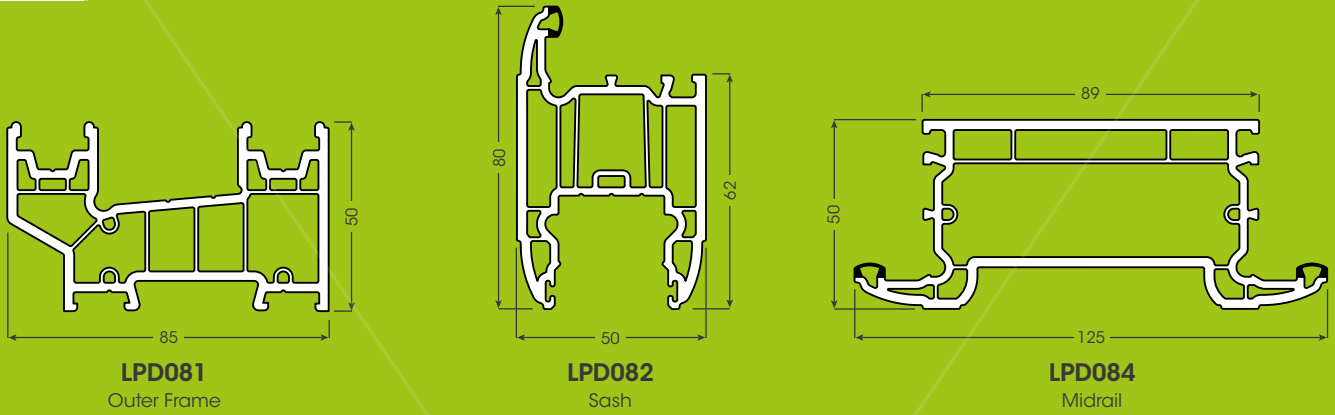


## Horizontal Cross Section



# Modlok™ Patio product chart

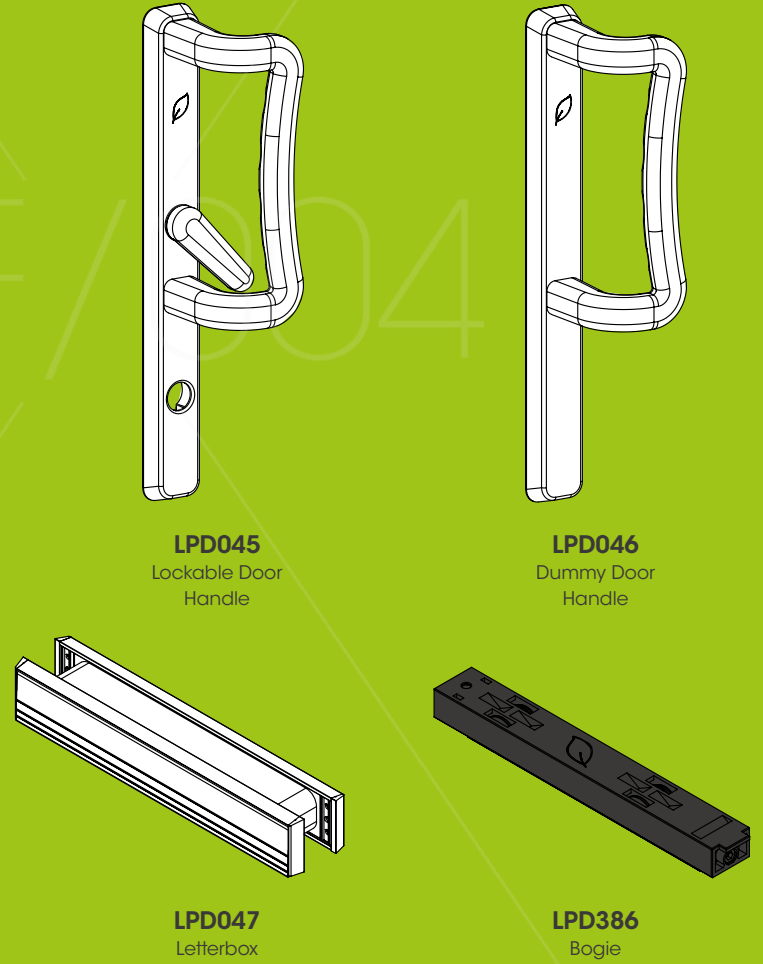
## Frames



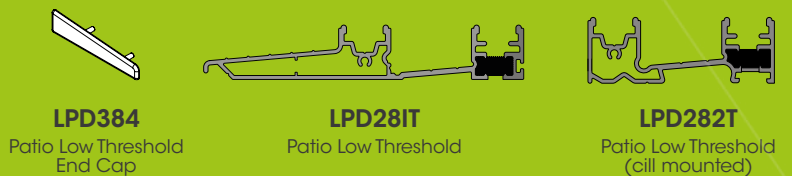
## Mouldings



## Hardware

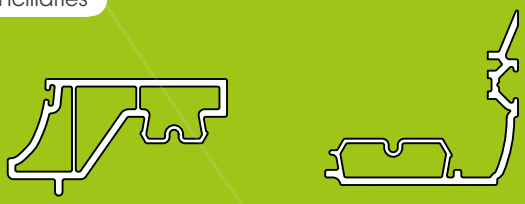


## Low Threshold





Ancillaries



**LPD181**  
Threshold

**LPD182**  
Interlock



**LPD183**  
Sealing Packer



**LPD184**  
Blanking Strip



**LPD185**  
3/4 Pane Adapter



**LPD186**  
Shootbolt Cover



**LPD187**  
Drainage Cover

Gaskets



**LPD482**  
Brush Pile



**LPD483**  
Interlock Brush Pile

Beads



**LPD083**  
28mm Bead

Steels



**LSR081**  
Steel Track

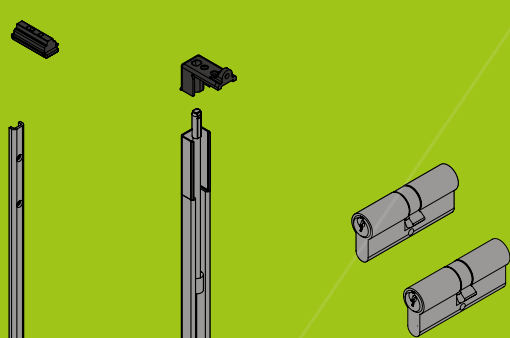


**LSR082170**  
1.7m  
Sash Reinforcing



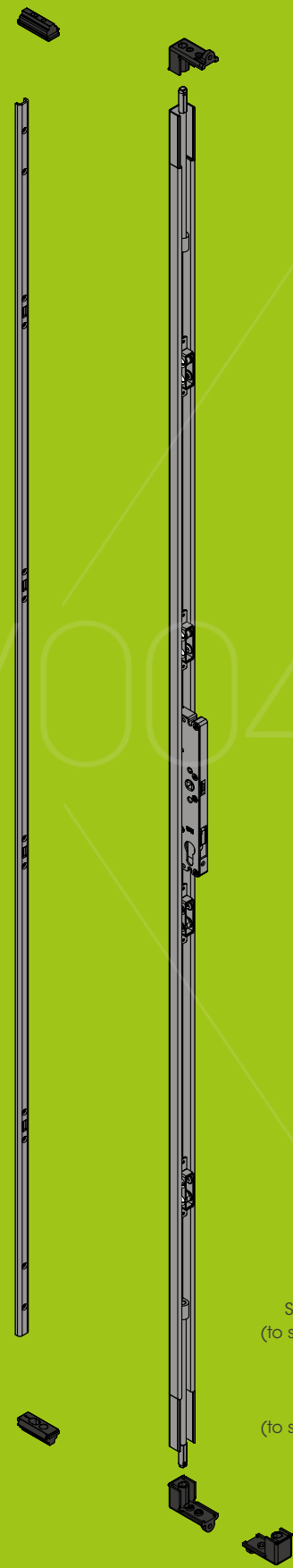
**LPD042**  
1.95m  
Sash Reinforcing

Cylinders



**LPD032N**  
35/35 Anti Bump Nickel

**LPD033N**  
35/35 Anti Pick, Anti Snap,  
Anti Bump and Anti Drill  
Security Cylinder Nickel



**LPD042**  
Standard Lock & Keep Assembly  
(to suit 1.9 - 2.15m outer frame height)

**LPD043**  
Long Lock & Keep Assembly  
(to suit 2.15 - 2.4m outer frame height)

# Bi-fold door



The first bespoke PVCu bi-fold to be launched to the marketplace, the Liniar bi-fold range was designed completely from scratch to meet the growing desire for bi-folding doors in the 'grand design' style, for aspirational living.

## Strong and secure

Patented ModLok™, a combined aluminium exo-skeleton reinforcement and multi-point locking system provides additional strength and security together with an unrivalled appearance. Featuring 3 opposing hooks and 2 shootbolts on the master door, together with 2 anti-lift shootbolts on each slave door, the ModLok™ bi-fold has built in anti-lift features and anti-bump cylinders, with optional anti-snap cylinders. Each door's slim hinges are tamper-proof with fixings hidden inside.

## Unrivalled benefits

The Liniar ModLok™ bi-fold is the first to combine the structural benefits of an aluminium bi-fold with the thermal efficiency and colour benefits of PVCu.

## Crammed with innovative features

The system is protected by 4 patents and 12 registered designs. A neat master/slave lock means the wrong door cannot be opened first, avoiding sprained locks, and folding keys avoid potential issues if keys are left in locks. The unique built-in 'keep within lock' faceplate gives the ModLok™ bi-fold an unparalleled appearance.

### Standard

- The first bespoke, designed from scratch, PVCu bi-fold
- Doesn't require any trench excavation to benefit from low threshold option
- Ultra slim sightlines for maximum light
- Opening configurations from 2 to 4 panes

### ModLok™

- ModLok™ bi-fold provides the first true alternative to an aluminium bi-fold - robot tested to 100,000+ full opening cycles
- Weather tested to 'severe' (category 4, 600 Pascal)
- Four-wheel bottom rolling mechanism with anodised aluminium captive top track
- Patented exo-skeleton - no steel required
- Opening configurations from 2 to 7 panes.



## Case study

A brand new residential development of 2, 3 and 4 bed homes in Leicestershire found a cost effective way of being able to offer buyers a truly unique selling point with the Liniar bi-fold door.

Having already chosen Liniar windows for the project, the development team spotted the Liniar 4-pane bi-fold and commented that although they loved it, and it would look great on the development, it would probably be too costly.

Upon investigation, the original plans had been drawn up to include a window and a set of French doors at the rear of each property. It was pointed out that the developer would see additional cost savings if they were to consider a bi-folding door set instead – not just the French doors and the window, but also reducing costs through having just one lintel rather than two, in addition to the reduction in brickwork and plastering between the products.

Even better, the reduced installation time to fit one product instead of two would result in a speedier completion time for each property.

When the team re-worked their calculations, they found that the cost difference taking all of the above into account was only marginal. They agreed the benefits of being able to offer a bi-folding door as standard in each property would set the development apart from others and provide additional value to home buyers, so it was an easy decision to make.



The bi-folding doors were supplied in cream PVCu to match with the Liniar windows on the entire development, and the installation went perfectly to plan.

“It was great to realise we were able to offer a matching Liniar 4-pane bi-folding door as part of every single property.

Today’s homeowners are buying into the dream of opening up an entire wall of their homes – the bi-fold offers a unique selling point for this development and we will look to replicate it on future projects.”

# Bi-fold door configurations

## How configurations work

The Liniar bi-folding door range has a wide variety of options when it comes to sizes and opening configurations – with the Standard range available up to 4 panes wide and the ModLok™ version up to 7 panes wide.

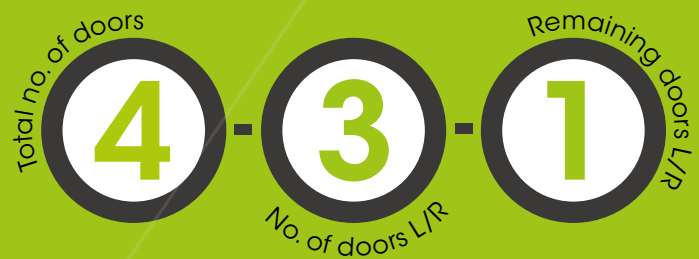
Our door pane numbering works like this:

- The first number shows the number of doors in total within the frame.
- The second number shows the majority of doors folding back to either left or right.
- The third number shows the balance of doors opening in the opposite direction.

So, a 4-3-1 bi-folding door would be four panes wide, with three doors folding back to one side of the frame, and a single opening door on the other.

To see all opening/closing sequences visit our website at:

[www.liniar.co.uk/bifoldopeningclosing](http://www.liniar.co.uk/bifoldopeningclosing)



## Standard and ModLok™ configurations

2-2-0 (L or R)



3-2-1 (L or R)



3-3-0 (L or R)



4-3-1 (L or R)



4-4-0 (L or R)



4-2-2\*



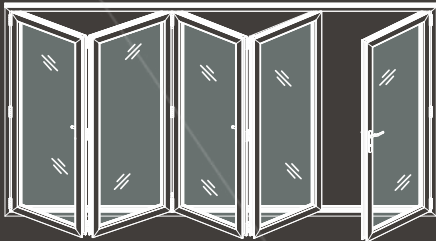
OVERALL FRAME SIZE NOT TO EXCEED 4M FOR FOILED DOORS

\* Master door to be designated

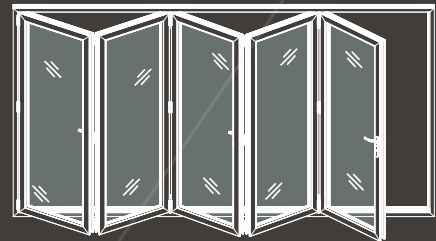


**ModLok™ only configurations**

**5-4-1 (L or R)**



**5-5-0 (L or R)**



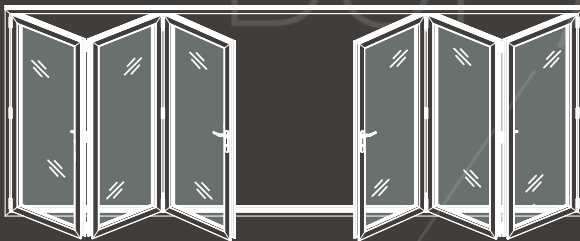
**5-3-2 (L or R)**



**6-5-1 (L or R)**



**6-3-3\***



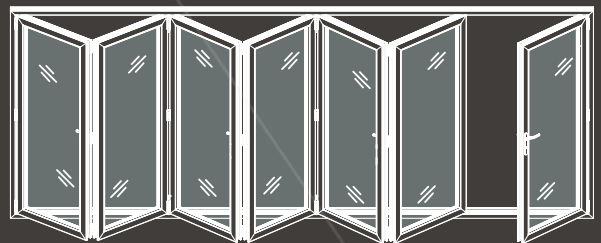
**6-6-0 (L or R)**



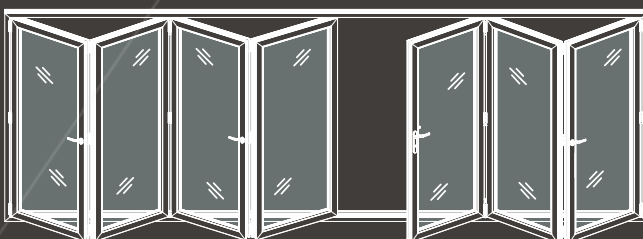
**7-7-0 (L or R)**



**7-6-1 (L or R)**



**7-4-3 (L or R)**



**7-5-2 (L or R)**



OVERALL FRAME SIZE NOT TO EXCEED 4M FOR FOILED DOORS

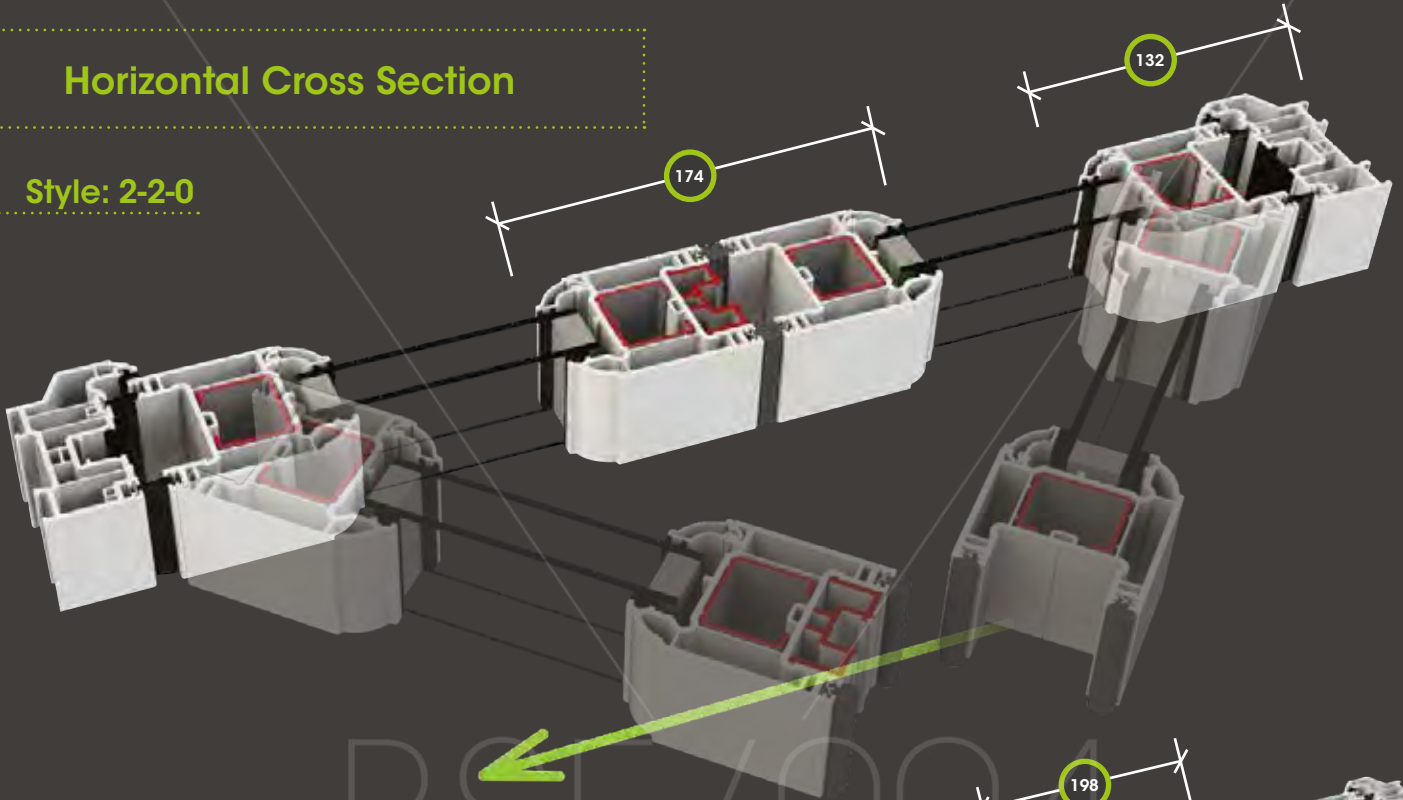
\* Master door to be designated

# Standard Bi-fold door

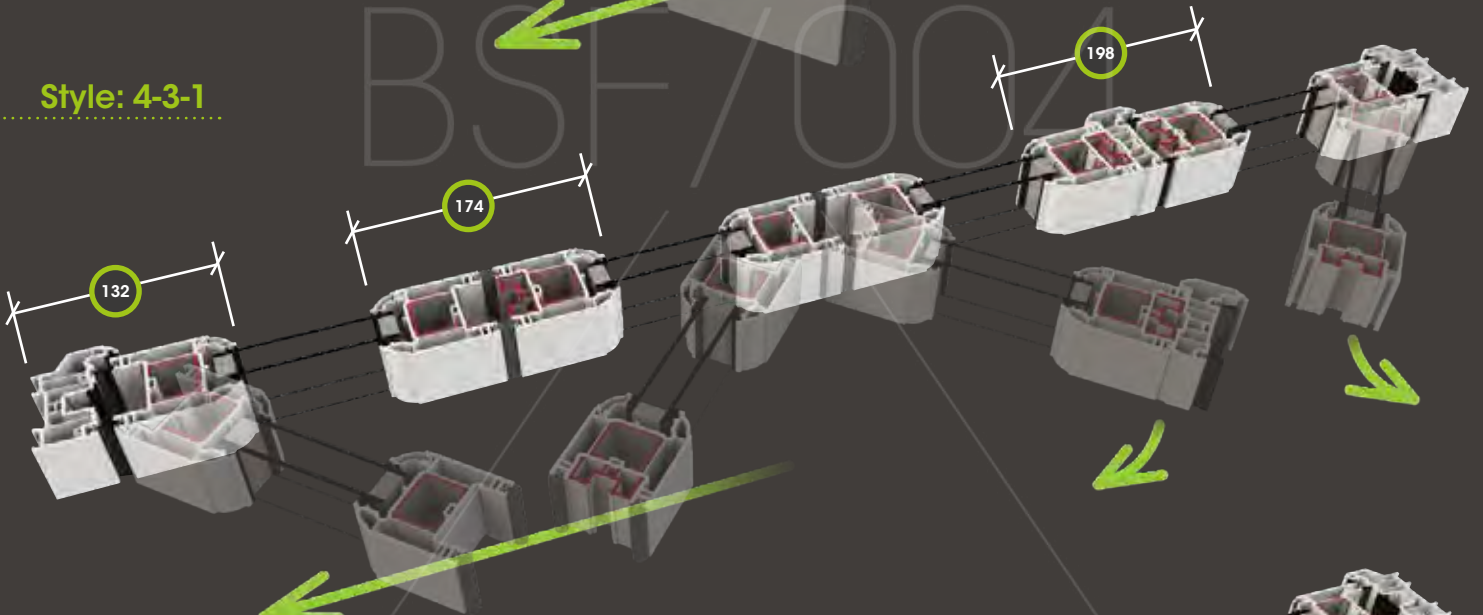
Outward\* opening, internally beaded

## Horizontal Cross Section

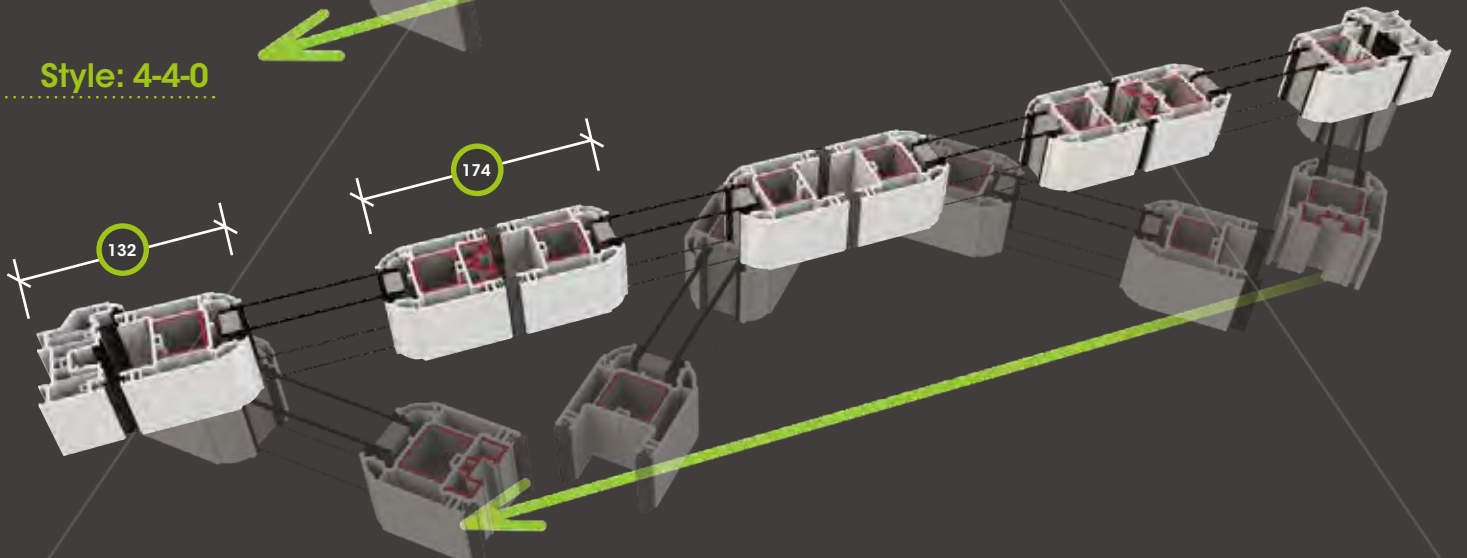
Style: 2-2-0



Style: 4-3-1



Style: 4-4-0



\* inward opening styles are also available

\*\* all dimensions shown in mm



# Technical information

## Standard bi-fold door

- Sculptured suite
- 28mm double glazing
- Multi chambered profiles
- U-values from 1.3 (DGU)
- Patented co-ex gasket

## Accreditation



## Colour Options

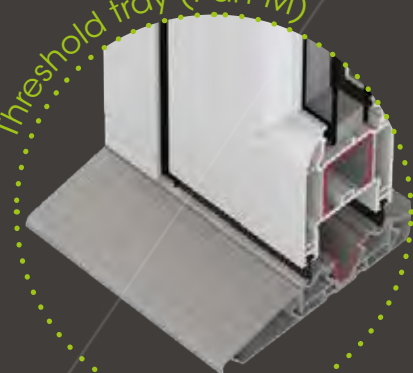


Additional colours are available to order as specials. The colours shown in this brochure give an indication only.

Product	Dim. A
<b>PVCu outer frame &amp; sash</b> LBF091 & LBF092	132mm
<b>Aluminium thresh. &amp; sash</b> LBF291 & LBF092	115.5mm

Product	Dim. B
<b>PVCu outer frame</b> LBF091	56mm
<b>Aluminium threshold</b> LBF291	24mm

Threshold tray (Part M)



Aluminium threshold



LAN275 threshold tray makes LBF291 "Part M compliant" when fitted together



Vertical Cross Section

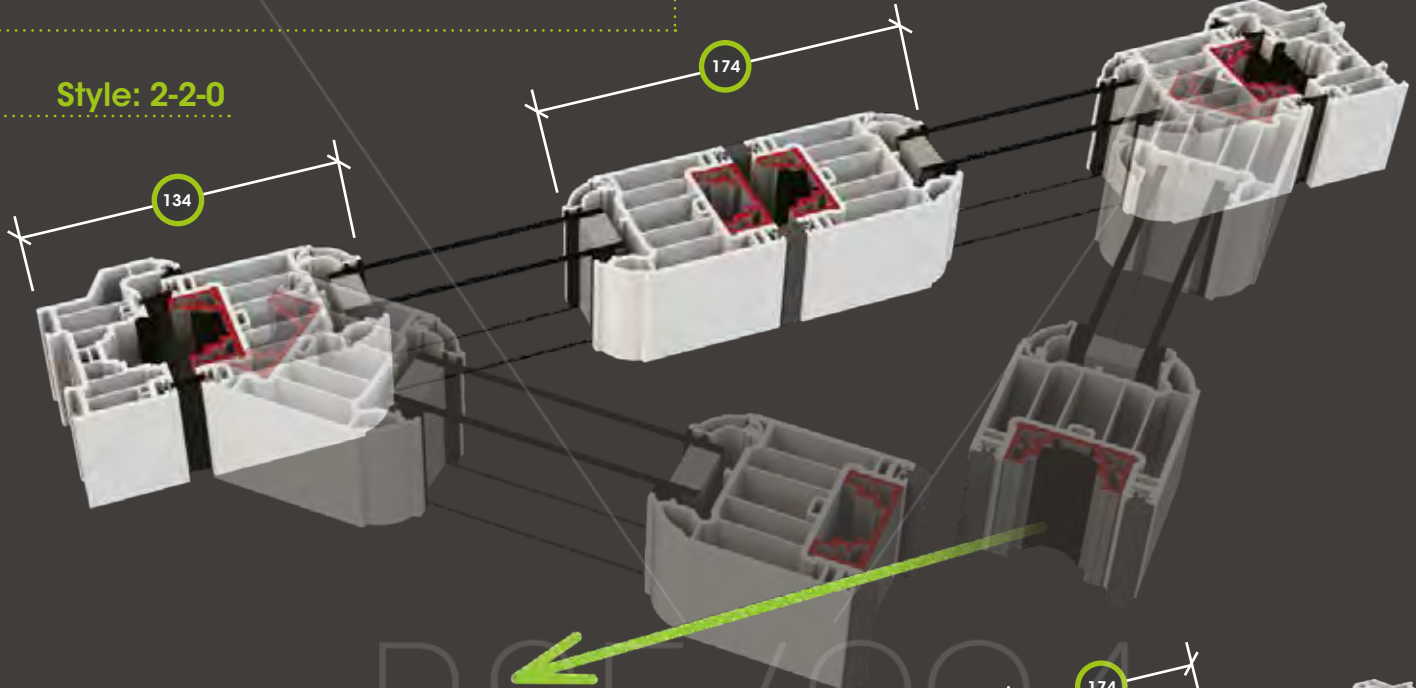


# ModLok™ Bi-fold door

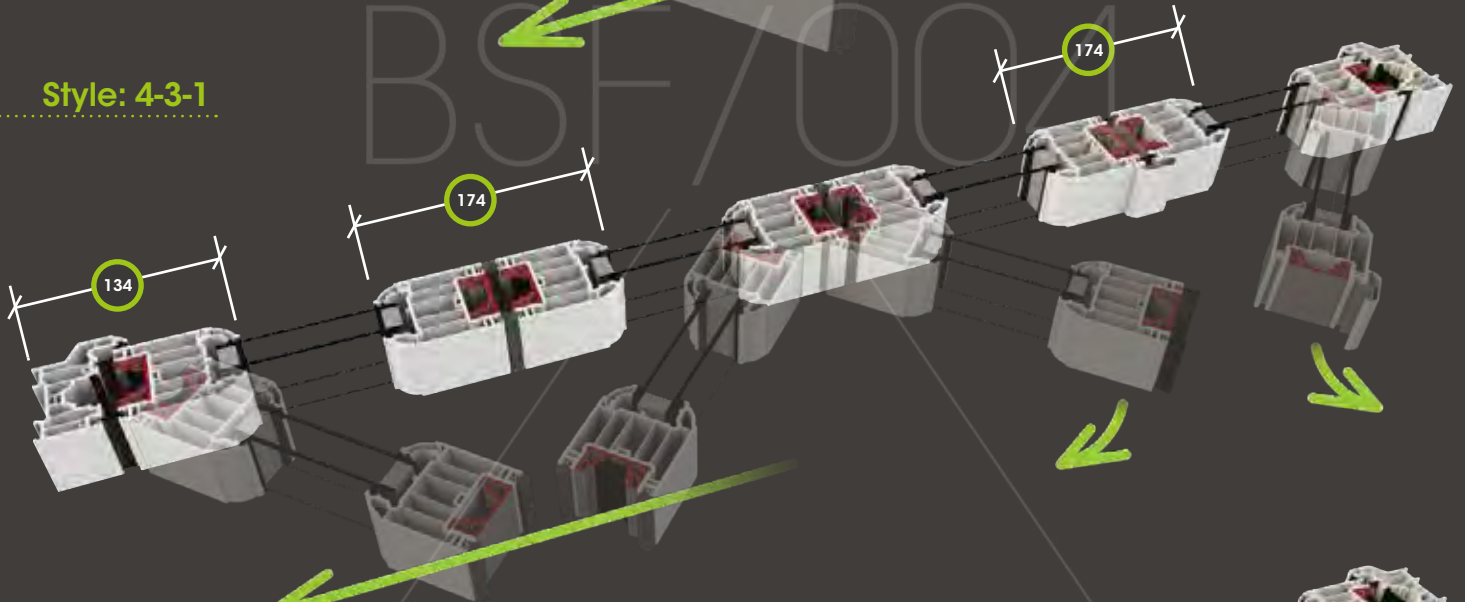
Outward\* opening, internally beaded

## Horizontal Cross Section

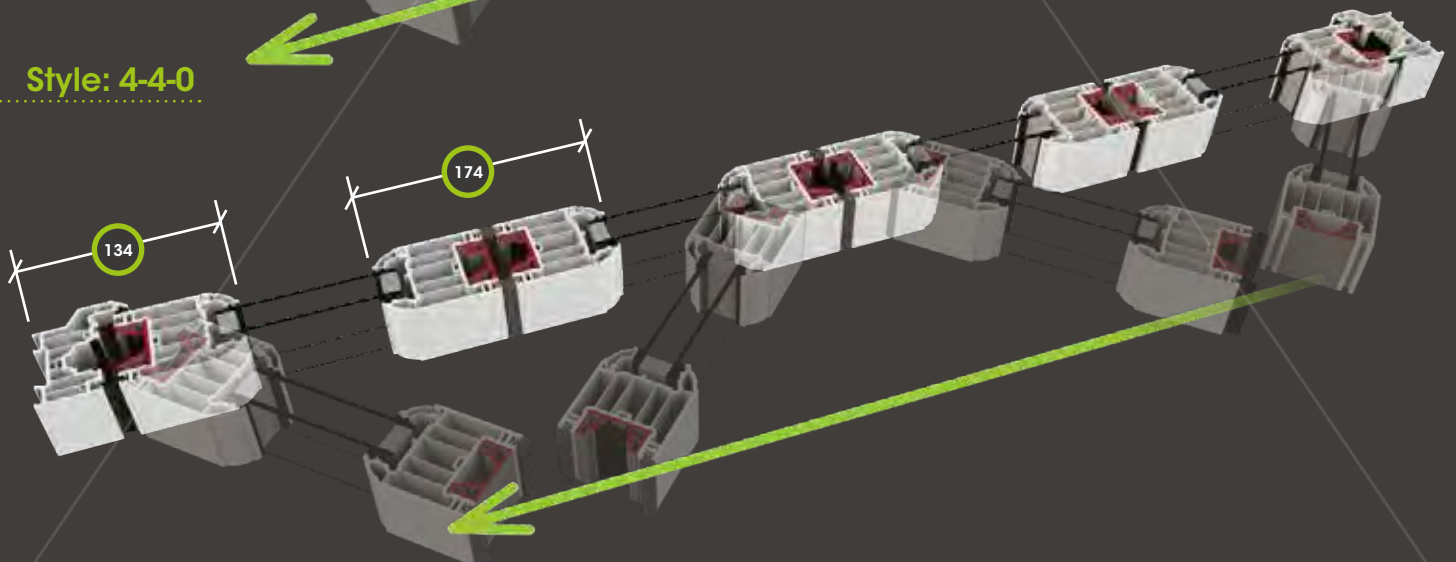
Style: 2-2-0



Style: 4-3-1



Style: 4-4-0



\* inward opening styles are also available

\*\* all dimensions shown in mm

# Technical information

## ModLok™ bi-fold door

- Sculptured suite
- 28mm double and 36mm triple glazing
- Multi chambered EnergyPlus profiles
- U-values from 1.3 (DGU) and 1.0 (TGU)
- Patented co-ex gasket

## Accreditation



## Colour Options

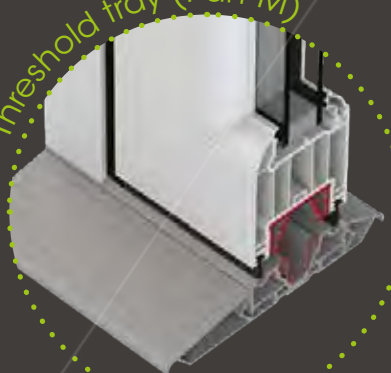


Additional colours are available to order as specials. The colours shown in this brochure give an indication only.

Product	Dim. A
<b>PVCu outer frame &amp; sash</b> MBF091 & MBF092	134mm
<b>Aluminium thresh. &amp; sash</b> MBF291 & MBF092	115.5mm

Product	Dim. B
<b>PVCu outer frame</b> MBF091	62mm
<b>Aluminium threshold</b> MBF291	23.5mm

Threshold tray (Part M)



Aluminium threshold



LAN275 threshold tray makes MBF291 "Part M compliant" when fitted together



Vertical Cross Section

A

B

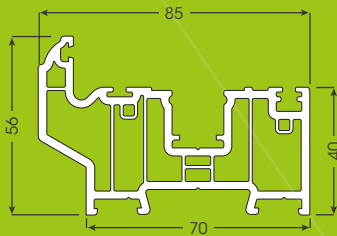
30

134

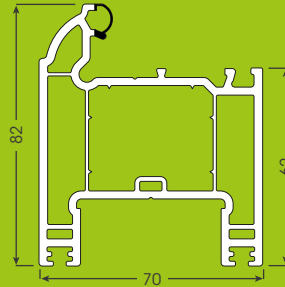
# Bi-fold product chart

## Standard Bi-Fold

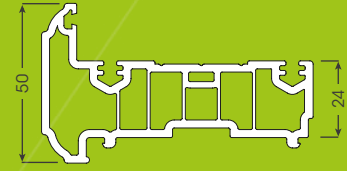
### Frames



**LBF091**  
Bi-Fold Outer Frame



**LBF092**  
Bi-Fold Sash



**LBF191**  
Meeting Stile

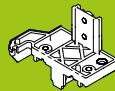
### Ancillaries



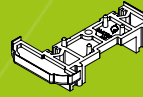
**LBF192**  
Channel Capping



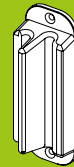
**LBF193**  
Eurogroove Insert



**LBF391**  
Low Threshold Moulding



**LMO191**  
Meeting Stile



**LBF043**  
Tenon/Finger Pull

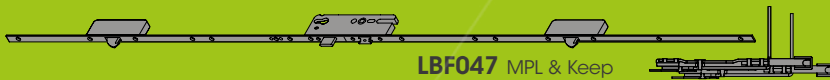
### Locks



**LBF045** Espag Non Locking



**LBF045L** Espag Locking

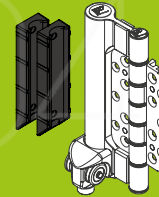


**LBF047** MPL & Keep



**LBF048** French Door Lock

### Hardware



**LBF050**  
Double Roller



**LBF060**  
Single Roller



**LSR091**  
Bi-Fold St. Stl Track



**LSR092**  
**LSR092P (Punched)**  
Sash Reinforcing

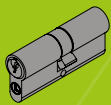


**LBF291**  
Low Threshold

Steel or aluminium

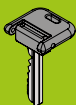
## Common Components

### Cylinders



**MBF031N**  
45/45 Anti Bump, Nickel

**MBF032N**  
2 x Key Alike,  
45/45 Anti Bump, Nickel



**MBF033**  
Folding Key Blank

### Gaskets



**MBF196**  
14mm Brush Pile



**LBF197**  
Q-Lon (Bi-Fold  
Outerframe)



**MBF194**  
Q-Lon  
(Bi-Fold Sash)

### Ancillaries



**LMO275**  
Low Threshold Tray  
End Cap

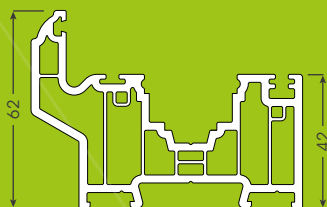


**LMO301**  
Glazing Platform

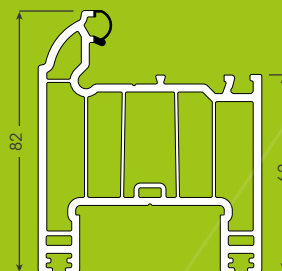


## ModLok™ Bi-Fold

### Frames



**MBF091**  
ModLok Bi-Fold Outer Frame



**MBF092**  
ModLok Bi-Fold Sash

### Ancillaries



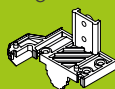
**MBF093**  
ModLok Bi-Fold Meeting Stile Cover



**MBF191**  
Channel Capping



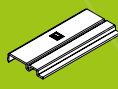
**MBF192**  
Screw Capping



**MBF391**  
Low Threshold Moulding



**MBF392**  
Corner Locator

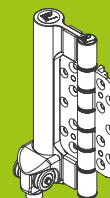


**LMO311**  
36mm Glazing Platform



**MBF393**  
ModLok Bi-Fold Meeting Style End Cap

### Hardware



**MBF050**  
Double Roller



**MBF060**  
Single Roller

### Locks



**MBF045** ModLok Bi-Fold Espag Non Locking



**MBF045L** ModLok Bi-Fold Espag Locking



**MBF047** ModLok Bi-Fold MPL & Keep



**MBF048** ModLok Bi-Fold French Door Lock Kit



**MSR091**  
ModLok Bi-Fold Bottom Track



**MAR091**  
ModLok Bi-Fold Top Track



**MAR092**  
ModLok Bi-Fold Reinforcing Sash (2.1m)



**MAR093**  
ModLok Bi-Fold Meeting Stile (2.15m)



**MBF291**  
ModLok Bi-Fold Low Threshold

Steel or aluminium

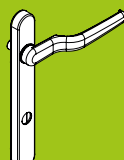
### Hardware



**MBF071**  
Butt Hinge



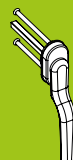
**MBF072**  
C Handle



**MBF080**  
Door Handle



**LBF081**  
Slim Door Handle



**LBF082**  
Ext. Slim Door Handle



**LBF041**  
Door Magnets



**MBF042**  
Escutcheon

### Beads



**LCW041**  
Chamf. Bead



**LSW041**  
Sculp. Bead



**LSW042**  
36mm Bead

### Aluminium



**LAN275**  
Low Threshold Tray



**LAN278**  
Low Threshold Half Tray

# Ancillaries



Ensure a perfect match with the Liniar range of trims and couplings. Specifying a full Liniar installation ensures a single point of guarantee in addition to colour matching products.

## Cills, trims and reinforcements

Liniar cills are available in five sizes along with a range of end caps, jointers and reinforcing. Cills are designed to match the Liniar suite and can be foiled to colour match the Liniar range of window systems. Cills are multi chambered for strength.

## Structural couplings

Liniar have a comprehensive range of frame couplers, which are necessary for the combination of window sections. We have provided tables showing the end loads for all Liniar couplers, which have been calculated in accordance with the BPF Code of Practice for the Survey and Installation of White High Impact uPVC Windows.

- Foiled to colour match the rest of the Liniar range
- Snap together feature on 165mm cill, outer frames, low thresholds, frame extensions and 90° corner post
- 10, 20 and 50mm frame extensions available
- Acoustic head vent available to fit to all Liniar products
- One piece door drip bar for ease of assembly

## In this section

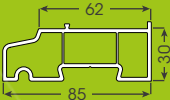

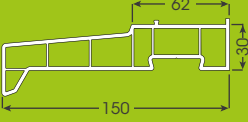


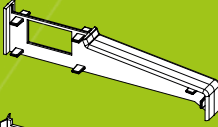
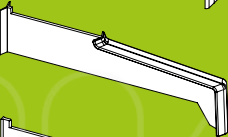
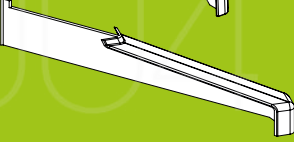
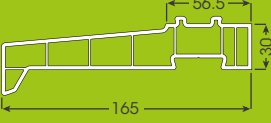


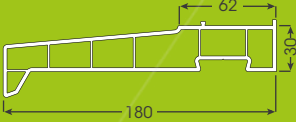


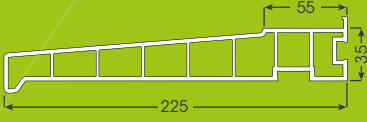
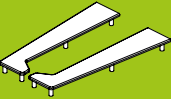
**1**

Cills and associated items  
Page 65

**2**

Structural couplings  
Page 66

# Cills and associated items

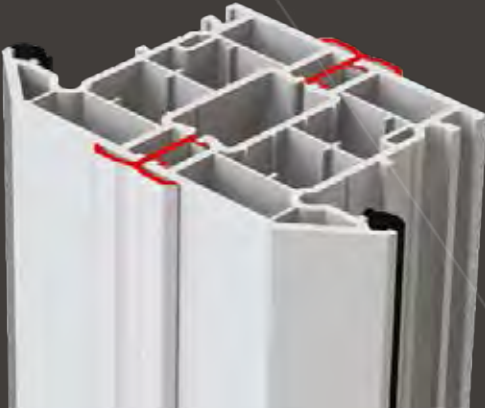
Cills	Related products
 <p><b>LSL085</b> 85mm stub cill</p>	<p><b>LMO386</b> 85mm cill end cap</p> 
 <p><b>LSL150</b> 150mm cill</p>	<p><b>LMO365</b> 150mm cill end cap</p>  <p><b>LAN165</b> PVCu cill reinforcement</p>  <p><b>LMO354</b> 150mm inline cill jointer</p>  <p><b>LMO355</b> 150mm 135° cill jointer</p>  <p><b>LMO356</b> 150mm 90° cill jointer</p> 
 <p><b>LCL165</b> 165mm cill</p>	<p><b>LMO365</b> 165mm cill end cap</p>  <p><b>LAN165</b> PVCu cill reinforcement</p> 
 <p><b>LSL180</b> 180mm cill</p>	<p><b>LMO381</b> 180mm cill end cap</p>  <p><b>LAN165</b> PVCu cill reinforcement</p> 
 <p><b>LCL225</b> 225mm cill</p>	<p><b>LMO325</b> 225mm cill end cap</p> 

## Structural couplings

These 'load tables' have been calculated in accordance with BPF Code of Practice for the Survey and Installation of White High Impact uPVC Windows and are only applicable for those joint profiles restrained at their centre. The load tables must not be applied to those joint profiles used in isolation.

All structural couplings are to be used with the corresponding Liniar bay pole jack when used for end (axial) loadings.

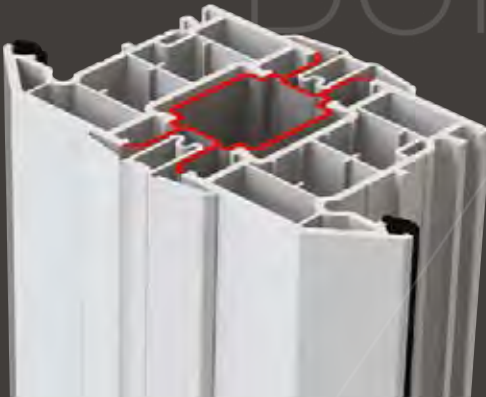
### PVCu Butt Joint



The Liniar PVCu Butt Joint is not designed to take any end loadings.

End loads for all the other Liniar couplers are listed below

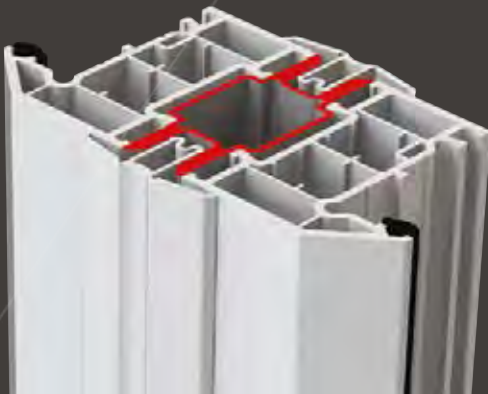
### Standard Butt Joint



Length (mm)	Axial Load (tonnes)
500	2.49
600	2.34
700	2.24
800	2.16
900	2.04
1000	1.92
1100	1.79
1200	1.62
1300	1.38

Length (mm)	Axial Load (tonnes)
1400	1.18
1500	1.06
1600	0.94
1700	0.83
1800	n/a
1900	n/a
2000	n/a
2100	n/a
2200	n/a

### Medium Duty Butt Joint



Length (mm)	Axial Load (tonnes)
500	3.60
600	3.43
700	3.23
800	3.13
900	2.91
1000	2.72
1100	2.54
1200	2.16
1300	1.85

Length (mm)	Axial Load (tonnes)
1400	1.61
1500	1.43
1600	1.24
1700	1.09
1800	n/a
1900	n/a
2000	n/a
2100	n/a
2200	n/a

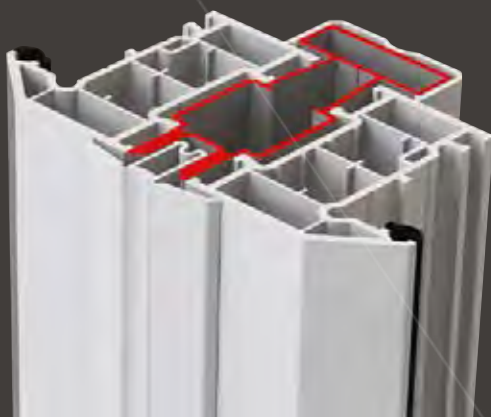
*These tables should be used for guidance only.*



**N/A** Joint profile IS NOT suitable for load bearing at this length and above.

**Consult** Joint profile IS suitable for load bearing at this length and above. Consult the Linar design office

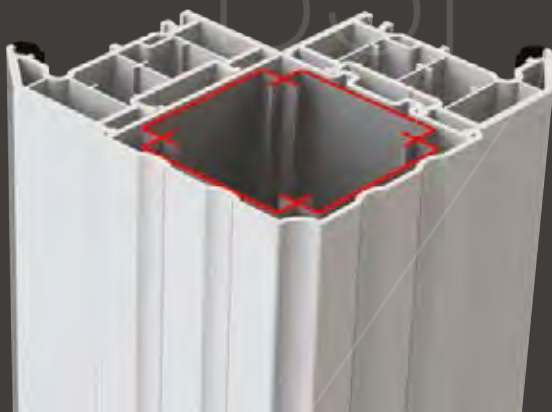
### Heavy Duty Butt Joint



Length (mm)	Axial Load (tonnes)
500	4.37
600	4.23
700	4.05
800	3.83
900	3.68
1000	3.53
1100	3.35
1200	3.17
1300	2.98

Length (mm)	Axial Load (tonnes)
1400	2.62
1500	2.30
1600	2.01
1700	1.82
1800	1.63
1900	1.46
2000	1.30
2100	1.16
2200	n/a

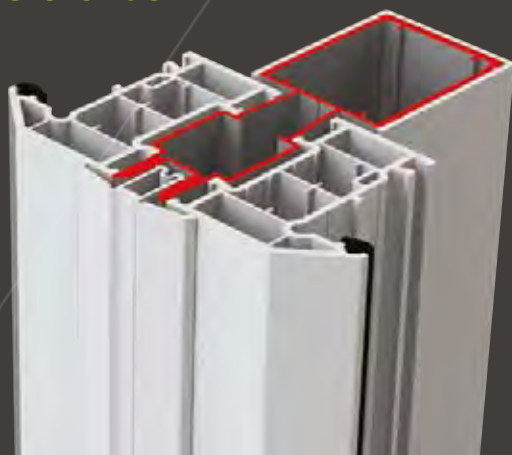
### 90° Corner Joint



Length (mm)	Axial Load (tonnes)
500	4.00
600	3.94
700	3.87
800	3.80
900	3.74
1000	3.67
1100	3.61
1200	3.55
1300	3.50

Length (mm)	Axial Load (tonnes)
1400	3.44
1500	3.37
1600	3.29
1700	3.21
1800	3.13
1900	3.08
2000	3.03
2100	2.98
2200	Consult

### Structural Joint



Length (mm)	Axial Load (tonnes)
500	6.71
600	6.58
700	6.29
800	6.20
900	5.99
1000	5.69
1100	5.48
1200	5.39
1300	5.18

Length (mm)	Axial Load (tonnes)
1400	4.97
1500	4.76
1600	4.59
1700	4.33
1800	3.74
1900	3.57
2000	3.36
2100	2.89
2200	Consult

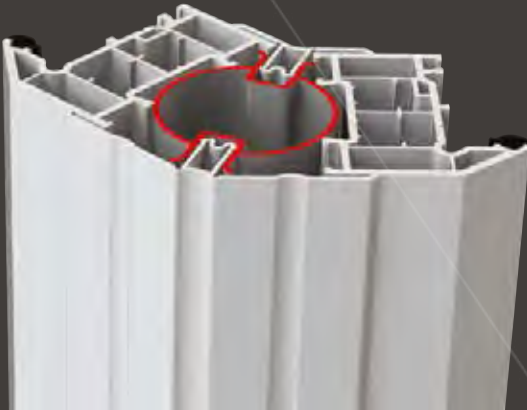
*These tables should be used for guidance only.*

## Structural couplings

These 'load tables' have been calculated in accordance with BPF Code of Practice for the Survey and Installation of White High Impact uPVC Windows and are only applicable for those joint profiles restrained at their centre. The load tables must not be applied to those joint profiles used in isolation.

All structural couplings are to be used with the corresponding Linear bay pole jack when used for end (axial) loadings.

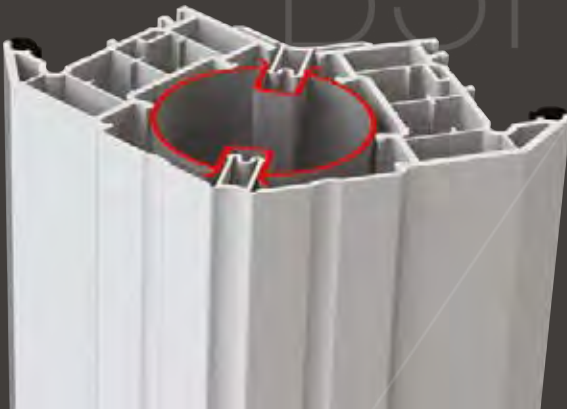
### Small Bay Pole



Length (mm)	Axial Load (tonnes)
500	2.99
600	2.91
700	2.83
800	2.76
900	2.67
1000	2.56
1100	2.47
1200	2.35
1300	2.33

Length (mm)	Axial Load (tonnes)
1400	2.23
1500	2.15
1600	2.06
1700	1.96
1800	1.80
1900	1.63
2000	1.48
2100	1.34
2200	Consult

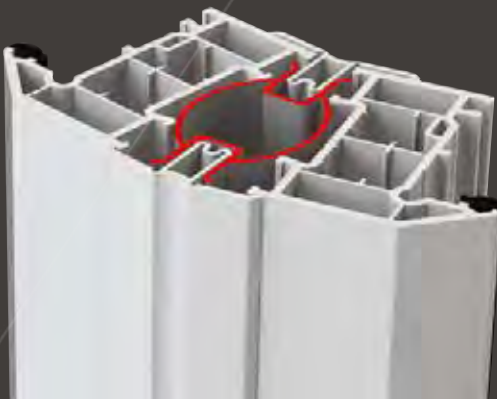
### Large Bay Pole



Length (mm)	Axial Load (tonnes)
500	3.53
600	3.45
700	3.37
800	3.29
900	3.22
1000	3.16
1100	3.08
1200	2.98
1300	2.88

Length (mm)	Axial Load (tonnes)
1400	2.81
1500	2.74
1600	2.67
1700	2.59
1800	2.51
1900	2.43
2000	2.35
2100	2.27
2200	Consult

### Bow Pole



Length (mm)	Axial Load (tonnes)
500	2.40
600	2.31
700	2.18
800	2.07
900	1.98
1000	1.87
1100	1.77
1200	1.64
1300	1.42

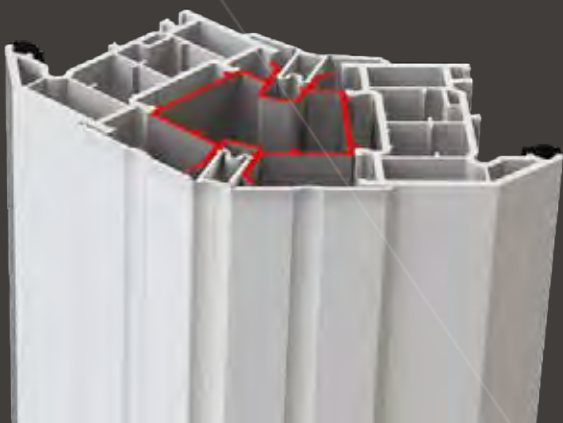
Length (mm)	Axial Load (tonnes)
1400	1.23
1500	1.07
1600	0.96
1700	0.85
1800	n/a
1900	n/a
2000	n/a
2100	n/a
2200	n/a

These tables should be used for guidance only.

**N/A** Joint profile IS NOT suitable for load bearing at this length and above.

**Consult** Joint profile IS suitable for load bearing at this length and above. Consult the Liniar design office

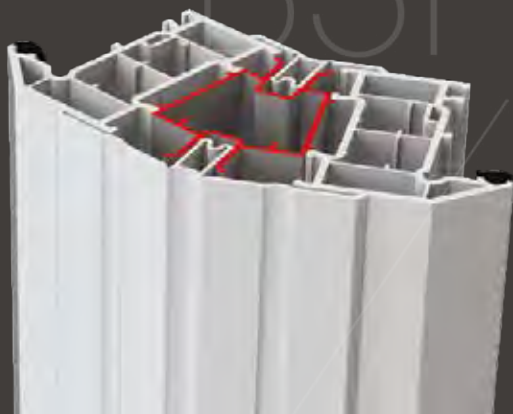
### 135° Joint



Length (mm)	Axial Load (tonnes)
500	3.40
600	3.31
700	3.21
800	3.14
900	3.07
1000	2.96
1100	2.85
1200	2.75
1300	2.68

Length (mm)	Axial Load (tonnes)
1400	2.60
1500	2.50
1600	2.41
1700	2.32
1800	2.23
1900	2.05
2000	1.87
2100	1.67
2200	Consult

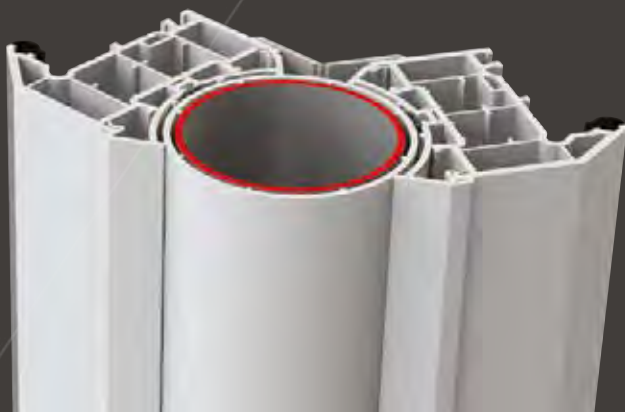
### 150° Joint



Length (mm)	Axial Load (tonnes)
500	3.08
600	2.98
700	2.90
800	2.79
900	2.67
1000	2.57
1100	2.48
1200	2.38
1300	2.30

Length (mm)	Axial Load (tonnes)
1400	2.17
1500	2.07
1600	1.87
1700	1.66
1800	1.49
1900	1.34
2000	1.23
2100	1.13
2200	Consult

### Bay Pole Nest



Length (mm)	Axial Load (tonnes)
500	3.19
600	3.12
700	3.06
800	3.00
900	2.94
1000	2.88
1100	2.83
1200	2.79
1300	2.72

Length (mm)	Axial Load (tonnes)
1400	2.64
1500	2.57
1600	2.51
1700	2.46
1800	2.41
1900	2.35
2000	2.29
2100	2.23
2200	Consult

*These tables should be used for guidance only.*

# Technical information



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## Maximum sizes for windows and doors

Linear windows and doors can be manufactured to the following maximum sizes.

Product Category	Width (mm)	Height (mm)
Casement Window (Top Hung)	Frame: 1300	Frame: 1300
Casement Window (Side Hung)	Frame: 700	Frame: 1300
Casement Window (Fixed)	Frame: 3000	Frame: 2000
Flush Sash Casement Window (Top Hung)	Frame: 1200	Frame: 1200
Flush Sash Casement Window (Side Hung)	Frame: 600	Frame: 1200
Tilt & Turn Window	Frame: 1500	Frame: 1500
Residential Door	Frame: 1000	Frame: 2150
French Door	Frame: 1000	Frame: 2150
Standard Bi-fold door**	Minimum sash: 600 Maximum sash: 800	Sash: 2150
ModLok™ Bi-fold door**	Minimum sash: 600 Maximum sash: 1000*	Minimum sash: 1850 Maximum sash: 2150*
ModLok™ Patio door	Sash: 1500	Sash: 2300

\* Double glazing only. Consult Linear Technical for triple glazing maximum size.

\*\* Overall frame size should not exceed 6m (4m for foiled products)



White casement windows and  
black composite door  
**David Wilson Homes** ▶

## Wind loading

BS 6399-2:1997 gives dead and minimum recommended imposed loads for use in designing buildings. It applies to:

- new buildings and new structures
- alterations and additions to existing buildings and structures
- existing construction on change of use

For windows manufactured at an abnormally large size or those, which will feature within a glass facade please consult the Linar design office for wind load calculations.

Calculations are performed in accordance with **BS 6399-2:1997, loading for buildings, code of practice for wind loads.**



## CE marking

BS EN 14351-1:2006+A1:2010 Windows and Doors.

Product standard and performance characteristics. Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics.

- CE Marking became a legal requirement on 1st July 2013 for construction products supplied within the EU and the UK, including windows and external doorsets.
- By affixing the CE label, a manufacturer is declaring conformity with all legal requirements applicable to its products.
- CE Marking is a self certification scheme and requires minimal involvement with independent third parties.

It is the responsibility of the organisation supplying the complete product to market to provide the CE certification.

The responsibility to comply and provide a CE mark falls to the installer or organisation adding the glazed unit to the frame.

Failure to comply may result in prosecution, fines and possible custodial sentences.



## Thermal efficiency



Where windows, roof windows, rooflights or doors are to be provided, reasonable provision in normal cases would be the installation of draught-proofed units whose performance is no worse than given in Table 1.

In addition, insulated cavity closers should be installed where appropriate. Where the replacement windows are unable to meet the requirements of Table 1 because of the need to maintain the external appearance of the facade or the character of the building, replacement windows should meet a centre pane U-value of 1.2W/m<sup>2</sup>K, or single glazing should be supplemented with low-e secondary glazing. In this latter case, the weather stripping should be on the secondary glazing to minimise condensation risk between the primary and secondary glazing.

**Standard for controlled fittings**

Fitting	Standard
Window, roof window or rooflight	WER Band C or better, or U-value 1.6 W/m <sup>2</sup> K
Doors with >50% of internal faced glass	U-value 1.6 W/m <sup>2</sup> K
Other doors	U-value 1.6 W/m <sup>2</sup> K

Table 1

For more information refer to **Approved Document L**.

## Survey and installation



Liniar strongly recommends that all installations comply with the **code of practice for installation of PVCu window and door sets**.

BS8213 gives recommendations for the surveying and installation of non-load bearing windows and external doorsets of any material, to be installed vertically into the external face of buildings.

It gives guidance on the good practices necessary for the successful surveying and installation of windows and external doorsets in both new build and replacement situations. It is primarily aimed at installations in dwellings but much of the guidance given is relevant to other types of installations

For more information refer to **BS 8213-4:2007**.





◀ White tilt & turn windows  
Humphries House, Walsall

## Fire safety



Any window provided for emergency egress purposes and any external door provided for escape should comply with the following conditions:

- the window should have an unobstructed openable area that is at least 0.33m<sup>2</sup> and at least 450mm high and 450mm wide (the route through the window may be at an angle rather than straight through).
- The bottom of the openable area should not be more than 1100mm above the floor.

For more information please refer to **Approved Document B.**

## Condensation



Water vapour is naturally present in the atmosphere. Natural water content is increased by normal day to day living – for example, activity that generates steam such as cooking, bathing, laundering, boiling a kettle and even breathing.

The water vapour remains undetectable while floating in warm air – but upon contact with cold surfaces such as windows, mirrors and tiles, condensation occurs as the vapour turns into water droplets.

Traditional house construction allowed the escape of this water vapour through natural ventilation, including open flues of coal fires, air bricks and ill-fitting windows and doors – however the drive to conserve energy and reduce heating costs has led to the sealing of homes, resulting in trapped water vapour and increased problems of condensation.

With Liniar's highly energy efficient windows and doors, condensation can even form on the outside face of a double glazed unit, due to the outside surface being much colder than the inside.

Certain elevations of property can be more susceptible to condensation e.g. north facing.

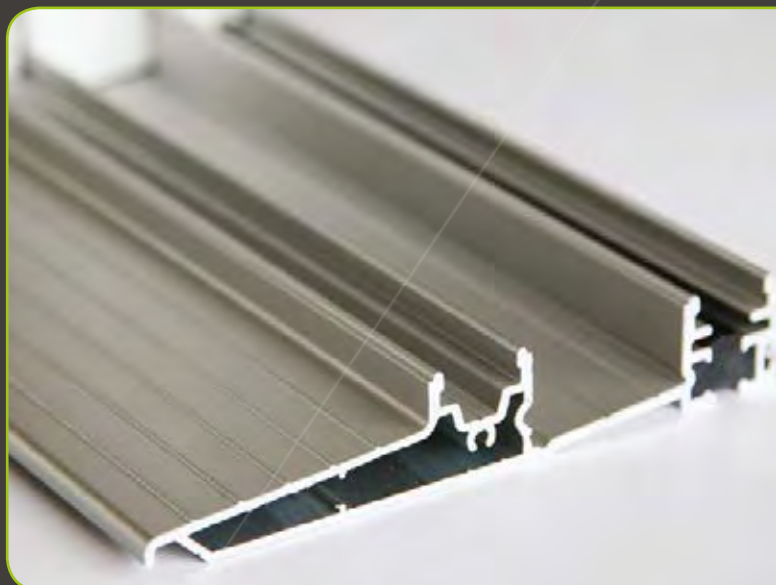
Ventilation should also be provided by fitting ventilation or extraction units in the kitchen and bathroom and fitting wall vents to provide air flow.

## Wheelchair compliance

Any external doors provided for wheelchair access purposes should comply with the following conditions.

- Requirement M1 will be satisfied if an external door providing access for disabled people has a minimum clear opening width of 775mm.
- The threshold is level, if a raised threshold is unavoidable, it has a total height of not more than 15mm, a minimum number of upstands and slopes, with any upstands higher than 5mm chamfered or rounded.

For more information please refer to **Approved Document M**.



## Ventilation

For both new and existing buildings the key aim of Part F is to provide a ventilation system capable of limiting the accumulation of moisture and pollutants originating within a building which would otherwise become a hazard to the health of the people living within the building.

For more information please refer to **Approved Document F**.



**Total equivalent ventilator area (mm<sup>2</sup>) for a dwelling with any design air permeability**

Total floor m <sup>2</sup>	Number of bedrooms				
	1	2	3	4	5
< 50	35000	40000	50000	60000	65000
51-60	35000	40000	50000	60000	65000
61-70	45000	45000	50000	60000	65000
71-80	50000	50000	50000	60000	65000
81-90	55000	60000	60000	60000	65000
91-100	65000	65000	65000	65000	65000
>100	Add 7000 m <sup>2</sup> for every additional 10 m <sup>2</sup> floor area				



Irish oak casement windows  
and 6-3-3 bi-fold door  
**Self Build**

## Hardware

The Liniar system is compatible with a wide range of quality hardware, resulting in better choice for the end user.

From child-friendly safety features such as restrictors, to security features including hinge guards, Liniar's network of approved fabricators can produce windows and doors to your exact specifications – with a huge choice of handles offering a contemporary or traditional appearance.

Bi-folding and patio doors offer Liniar's patented ModLok™ security technology including shoot-bolts, anti-lift and anti-snap features, and handles in white, black, gold or chrome.

For more information, see the Liniar Specifier's Centre at [www.liniar.co.uk/specifiers](http://www.liniar.co.uk/specifiers).



## Installer support

The full Liniar range has been designed to save time for installers, making it ideal for large scale commercial projects where speed is of the essence.

Bespoke glazing platforms mean double or triple glazed units are fitted to the frame more effectively, and Liniar's unique beading system provides a quick, easy and attractive finish.

The Liniar patio can be mechanically jointed, making it easier to install in hard-to-reach areas, and the low threshold option on both the patio and bi-fold systems doesn't require trench excavation, reducing preparation time.

Liniar's co-extruded gaskets ensure no draughts or leaks for the end user – resulting in fewer call-backs for installers.

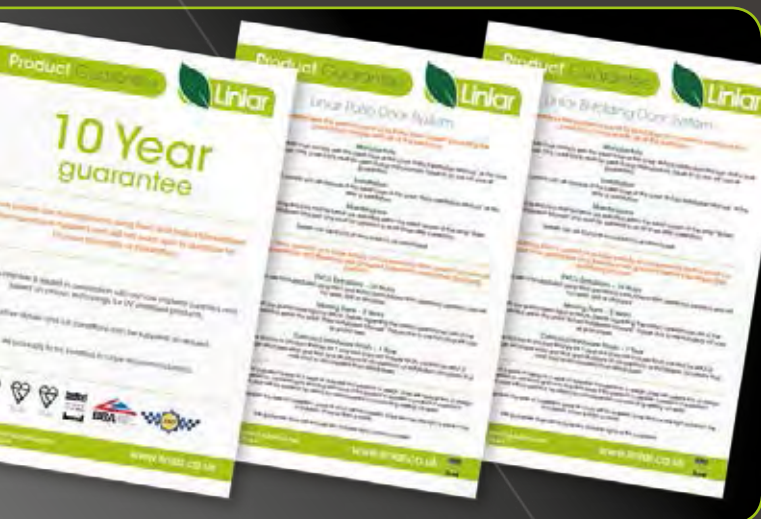
With guidance for on-site fitters including a range of installation guides and videos to ensure the highest quality installations, the Liniar range is also fully supported by an in-house technical team to answer any queries.

### At a glance....

- Glazing platforms to aid fitting
- Unique beading system for faster glazing
- Co-extruded gaskets mean fewer call-backs
- No trench excavation for low thresholds
- Full installation support for fitters.



## Liniar 10 year guarantee



Liniar profiles are manufactured using tried and tested formulations from approved suppliers and will not warp, split or discolour for 10 years\* from date of installation.

The Liniar guarantee is issued in association with our raw material suppliers and based on proven technology for UV stabilised products.

Further details, weathering data and full conditions can be supplied on request.

All products are to be installed to Liniar recommendations.

\* Liniar bi-folding and patio doors consist of a wide variety of components that cannot be covered under one guarantee - see separate product guarantees for more information.

## Specifier's centre



[www.liniar.co.uk/specifiers](http://www.liniar.co.uk/specifiers)

The Specifier's Centre on the Liniar website is the place you'll always find the very latest information.

In addition to legislative changes, the Liniar range is constantly being developed - so please check our online Specifier's Centre for updates and access to a wide range of content including:

- Product charts
- Case studies
- Certificates and guarantees
- CE Marking information
- Approved Documents
- WER calculator
- Hardware information
- Product fact sheets
- Operation and maintenance guide
- Installation guides
- Videos
- Finding an Approved Liniar Fabricator

If there's something you need but cannot find in the Specifier's Centre, please email us at [info@liniar.co.uk](mailto:info@liniar.co.uk) and we'll do our best to help.

# Further information

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Email: [sales@liniar.co.uk](mailto:sales@liniar.co.uk)

## Online

[www.liniar.co.uk](http://www.liniar.co.uk)

Useful links:

Specifiers centre: [www.liniar.co.uk/specifiers](http://www.liniar.co.uk/specifiers)

WER calculator: [www.liniar.co.uk/wer-calculator](http://www.liniar.co.uk/wer-calculator)

Compatible hardware: [www.liniar.co.uk/hardware](http://www.liniar.co.uk/hardware)

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LiniarUK

## Thanks

Liniar would like to thank all those customers who contributed by kindly supplying images and case studies, along with the homeowners and developers who have let us photograph their properties.

We reserve the right to change or amend product specifications at any time in the interests of our ongoing commitment to innovation. To keep up to date join our mailing list by visiting [www.liniar.co.uk/subscribe](http://www.liniar.co.uk/subscribe) or scan the QR code.



# Case study



## Creating a sustainable development for Leeds PFI

The Leeds City Centre regeneration PFI project spans 7 blocks of high-rise apartments totalling 550 dwellings, together with almost 1,500 low-rise and new build houses. The project is being managed by developer Keepmoat.

The project commenced in December 2013 and is set to be completed in late 2015. The Liniar system was specified and is ideal for large-scale projects such as these, as explained by the Liniar fabricator in charge of the project:

"The Liniar system goes through the factory much faster than other systems, so it's more cost effective to manufacture.

It's also much easier to achieve an 'A' rated window, as we have to do less to it than we would with a different system, such as enhanced (and more expensive) glazing.

Our installers also love fitting Liniar as it's been designed to be fitter-friendly – so they're on site for less time overall, which helps with project completion deadlines."

Sean Corcoran, Regional Director at Keepmoat, commented:

"The Leeds PFI is a major scheme for both ourselves and our client.

We are responsible for all designs on the project covering high rise new build and refurbishment, sheltered accommodation, new build housing and the refurbishment of varying types of non-traditional housing.

"Combining the requirements of high standards and tight timescales has meant ensuring our sub-contractors have the resource and technical expertise required.

"The lead-free and energy efficient aspects of the Liniar profile were also important to us in creating a sustainable development for Leeds PFI.

All targets have been achieved to date and we look forward to completing this and other schemes using Liniar profile in the coming years."







“The lead-free and energy efficient aspects of the Liniar profile were also important to us in creating a sustainable development.”

Sean Corcoran  
Regional Director, Keepmoat

# Case study



## Quality homes need quality windows and doors

Kirk Hallam Building Company is one of the longest established house building and development companies in Amber Valley.

When specifying windows and doors for its development of four and five bedroomed executive homes in Heanor, it turned to Linjar.

The plots at Starthe View were specified with 'A' rated cream window frames featuring mock sash horns as a decorative finishing touch,

together with argon-filled double-glazed units for thermally efficient performance.

The Linjar range was ideal for the development, as its lead-free, multi-chambered profile fitted well with Kirk Hallam's desire for eco-friendly homes - which also featured rainwater harvesting systems, solar hot water heating and high levels of insulation.

Linjar French doors were also provided for each property as well as a smart black front door with a cream interior to match the inside of each home, giving the exclusive scheme a personal touch.

Leigh and Jamie Stevenson, directors of Kirk Hallam homes, explained:

"Quality homes need quality windows and doors, so we were careful in our choice of supplier in order to meet this requirement.

"The Linjar range delivers the energy efficiency we were looking for, with A rated windows as standard, and we chose cream to give a different look and feel to the usual white PVCu windows on other sites."





“ Liniar delivers the energy efficiency we were looking for, and we chose cream to give a different look and feel to standard white ”

Leigh Stevenson  
Director, Kirk Hallam Homes

# Case study



## Cost effective and environmentally friendly

Willmott Dixon is one of the UK's largest privately-owned development and property support companies, winning a Queens Award for Enterprise for sustainable development in 2014.

One recent project involved a 74-bedroomed care home and 11 associated bungalows in Bedworth, Coventry. Originated by Glancy Nicholls Architects on behalf of their client Housing 21, the project specified grey PVCu casement windows for the care home, to match existing aluminium features

and white PVCu for the bungalows, as well as requiring an interface with different materials such as cedar boarding to be jointly designed into the window system.

The main requirements for the windows were:

- Cost effectiveness
- Secured by Design status
- Low U-values
- Overall life cyclic costs.

An open approach combined with a superb site set up by the main contractor made the whole project run smoothly, without the usual site obstacles to contend with.

The project was completed on time and within budget, and looks set to lead to further projects using Linjar profile in the future.

Matt Somers, Principal Surveyor for Willmott Dixon said,

"The Linjar profile met all of the specified requirements.

Throughout the process the fabricator has been a delight to work with, promoting a cost effective and environmentally friendly option for the client which met all their needs."





“The Liniar profile met all of the specified requirements... a cost effective and environmentally friendly option for the client”

Matt Somers

Quantity Surveyor, Willmott Dixon

If you would like to request a full colour copy  
of the Liniar Specification Guide  
please click the link below:

[Request a Liniar Specification Guide](#)



BSF/004

◀ White casement windows  
Stuart Milne Homes

## 7 great reasons to choose Liniar

**Innovative** – a culture of research and development means exciting new product launches and continuous improvements

**Energy efficient** – designed from scratch to achieve the pinnacle of thermal performance and retain more heat inside the property

**Safe and secure** – engineered with built-in security features and approved by independent testing facilities

**British made** – manufactured in a state-of-the-art factory in the heart of Derbyshire

**Lead free** – all Liniar profiles are extruded using materials that are 100% lead free

**Quality assured** – backed with ISO 9001 accreditation for peace of mind

**Guaranteed** – all Liniar PVCu profiles are guaranteed to not warp, split or discolour for a period of 10 years



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