





### Safe and Secure

Alumina products include bespoke hardware with shootbolts, independently tested to PAS24, Part Q and Secured By Design.



## **Energy Efficient**

Thanks to the innovative patented combined lock and thermal insert, ultra-low U-values can be achieved with ease.



## **Fully tested**

All Alumina products have been independently tested to ensure they are secure, robust, durable and operate smoothly.



### **Foiled Finishes**

Alumina products are availlable with an optional foiled finish, giving warmth and a beautiful matching appearance.



### Guaranteed

Foiled finishes come with Liniar's
10 year guarantee - and when
installed with Liniar windows,
you're assured of a single point
of warranty



## **Reliable Supply Chain**

As they are manufactured within Liniar's existing, reliable supply chain, Alumina products can be delivered together with your PVCu windows.

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.

Aluminium windows were formerly the preferred choice for many commercial installations, due to the structural strength and size they could reach. With developments in the PVCu sector, including 'flush sash' in-line frames, many developers have seen the benefits of using cost effective PVCu windows and doors in projects both large and small.

There are still projects that require aluminium, however, and the Liniar design team began to address this with the launch in 2016 of its first aluminium system: Alumina.

The bi-folding door system spans sash heights of up to 2.5m and sash widths up to 1.2m, with U-values as low as 1.2 W/m<sup>2</sup>K, thanks to Alumina's patented thermal lock.

Alumina doors have two distinct differences to other aluminium doors on the market: they have been designed with a sculptured shape that replicates the lines of Liniar PVCu windows; and they can be supplied with a foiled finish.

As a result, projects can now achieve the best of both worlds – cost effective and thermally efficient PVCu windows, with large scale aluminium doors – for a perfect match

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Alumina component chart

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# Why Choose Aluminium?

## Aluminium [al-yuh-min-ee-uh-m] - noun

a light, malleable, ductile, silvery-white metallic element that resists corrosion; the third most abundant element in the Earth's crust (8.1 per cent), occurring only as a compound, principally in bauxite.



# High strength to weight ratio

Aluminium is the perfect material for large door apertures – as one of the lightest engineering metals, it has a density of one-third that of steel.

Its strength to weight ratio is therefore far superior to steel, meaning aluminium is lighter and easier to transport and fit, whilst retaining supreme strength for large glazed units.



# Ideal for commercial projects

Larger apertures require larger windows and doors, and aluminium provides the strength and support for increasingly larger sizes to be specified.

Retail outlets, restaurants and car showrooms are all ideal locations for aluminium bi-folding doors, especially when combined with Alumina's low threshold option.



# Resists weathering

When the surface of aluminium is exposed to air, a protective oxide coating forms. This oxide layer is corrosion resistant and can be further enhanced with surface treatments such as anodising.

Alumina products are treated with either a powder-coated colour, or a factory-fitted foiled finish, making them truly weatherproof and built to last



# Aesthetically pleasing

Due to the strength of aluminium, wider and taller panes of glass are achievable. This means a higher glazing to frame ratio, creating large expanses of glass for a cutting edge appearance.

The uniquely sculptured frames of Alumina offer a perfect match to Liniar PVCu windows whilst allowing for greater sizes – offering clients the best of both worlds.



# Supreme security

The ModLok™ concept, first seen in the Liniar patio suite and PVCu bi-fold system, has been carried over to the Alumina range, which has its own unique modular lock and combined thermal insert.

Alumina products include high security features such as shootbolts, anti-lift features and anti-bump cylinders, achieving PAS24 accreditation with ease.

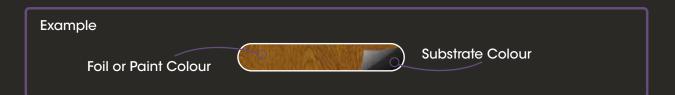


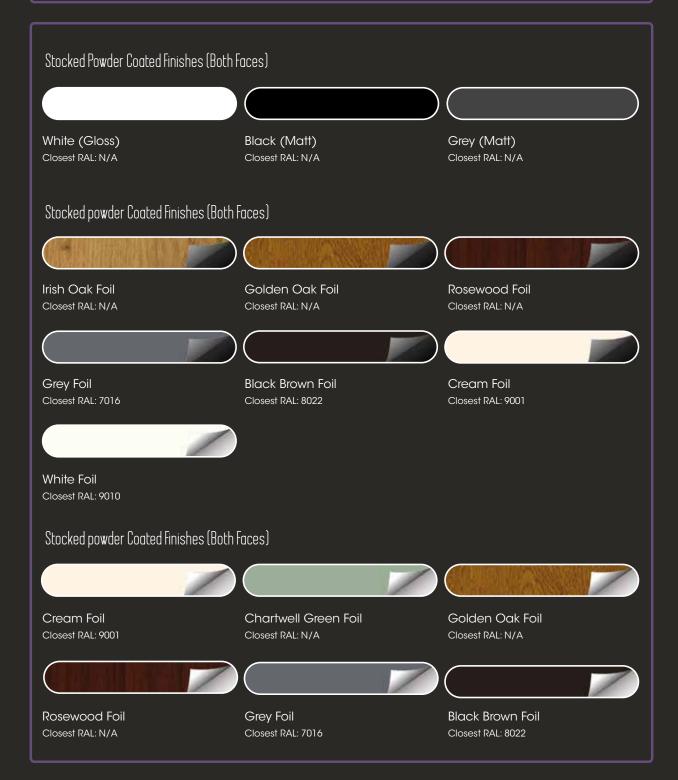
# Sustainable

Aluminium is a good reflector of both visible light and heat. Furthermore, its recyclability is unparalleled.

When recycled aluminium is compared to virgin aluminium, there is no degradation in properties – and recycling requires just 5% of the input energy that's needed to produce virgin aluminium metal.

Alumina doors are supplied as standard in plain white, black or grey powder coated finishes. Uniquely, Alumina can also be ordered with a wide range of different coloured precision factory-fitted foils, on one or both faces, ensuring a perfect match to Liniar PVCu windows.







# Why Specify Alumina?

The only true aluminium system on the market designed to match perfectly with PVCu windows, Alumina also holds its own as a beautiful stand-alone aluminium residential, French or bi-folding door.



# British made

Alumina products are designed in the heart of the UK by Liniar and manufactured both in-house and by a small handful of carefully selected specialist aluminium fabricators around the UK.

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



# Fully accredited

The Liniar factory is accredited with ISO 9001 for quality standards, and all products are subjected to an exhaustive testing process, both before and after launch. A full-sized Alumina bi-fold system was independently tested to PAS24, passing with flying colours at the first attempt and achieving Part Q compliance and Secured By Design status.



# Choice of thresholds

Alumina threshold options have been designed in-house, including a Part M compliant low threshold, measuring just 23.5mm high. The 2.5m x 1.2m aluminium sash bi-fold was found to beat the requirements for both air and water tightness by more than double the most severe pressures within BS 6375 Part 1 – even with a low threshold.



# Best of both worlds

The Alumina suite has been designed to match fully with the Liniar PVCu range of products – not only in its shape but also due to the foiled finishes available. This means your project can be specified with a mix of fully matching PVCu and aluminium products, giving a beautiful result with a single point of guarantee.



The maximum sizes stated below are based on 28mm 4-20-4 standard double glazed units within frames manufactured to the reinforcement guidelines.

The minimum & maximum sash sizes are shown below for the Alumina door system. These have been calculated for sashes manufactured to the size limitations and glazed with different glass combinations.

Maximum 6-6-0 outer frame = 6m Minimum 2-2-0, 4-4-0, 6-6-0 sash size = 700mm

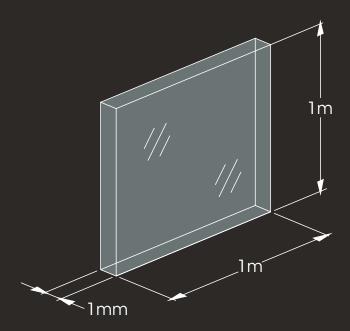
## Glazed unit Double Glazing (20kg/m²)

		Sash Width (mm)													
Sash Weight (kg)							3USI 1	Main	(111111)						
		500	600	700	750	800	850	900	950	1000	1050	1100	1150	1200	
	2500	25.0	30.0	35.0	37.5	40.0	42.5	45.0	47.5	50.0	52.5	55.0	57.5	60.0	
	2450	24.5	29.4	34.3	36.8	39.2	41.7	44.1	46.6	49.0	51.5	53.9	56.4	58.8	
	2400	24.0	28.8	33.6	36.0	38.4	40.8	43.2	45.6	48.0	50.4	52.8	55.2	57.6	
	2350	23.5	28.2	32.9	35.3	37.6	40.0	42.3	44.7	47.0	49.4	51.7	54.1	56.4	
	2300	23.0	27.6	32.2	34.5	36.8	39.1	41.4	43.7	46.0	48.3	50.6	52.9	55.2	
nm)	2250	22.5	27.0	31.5	33.8	36.0	38.3	40.5	42.8	45.0	47.3	49.5	51.8	54.0	
yht (r	2200	22.0	26.4	30.8	33.0	35.2	37.4	39.6	41.8	44.0	46.2	48.4	50.6	52.8	
Sash Height (mm)	2150	21.5	25.8	30.1	32.3	34.4	36.6	38.7	40.9	43.0	45.2	47.3	49.5	51.6	
Sash	2100	21.0	25.2	29.4	31.5	33.6	35.7	37.8	39.9	42.0	44.1	46.2	48.3	50.4	
	2050	20.5	24.6	28.7	30.8	32.8	34.9	36.9	39.0	41.0	43.1	45.1	47.2	49.2	
	2000	20.0	24.0	28.0	30.0	32.0	34.0	36.0	38.0	40.0	42.0	44.0	46.0	48.0	
	1950	19.5	23.4	27.3	29.3	31.2	33.2	35.1	37.1	39.0	41.0	42.9	44.9	46.8	
	1900	19.0	22.8	26.6	28.5	30.4	32.3	34.2	36.1	38.0	39.9	41.8	43.7	45.6	
	1850	18.5	22.2	25.9	27.8	29.6	31.5	33.3	35.2	37.0	38.9	40.7	42.6	44.4	

## Custom Sash Weight Calculation

All custom sash weight is calculated by taking the overall width and height of the sash and assuming it is made completely from glass.

The calculation is as follows:



Calculate the glazing weight per m<sup>2</sup> 1mm thickness of glass weight 2.5kg/m<sup>2</sup>

To calculate the weight per m2 of a glazed unit, add up the total thickness of the glass e.g. 8.4/14/6 = 8+6mm of glass (14mm)

Multiply the total glass thickness by  $2.5 kg/m^2$ 

e.g.  $14 \times 2.5 = 35 \text{kg/m}^2$ 

This is the glazed unit weight m²

The following formulas can now be used to calculate the sash weight

Sash weight (kg) = glazing weight/ $m^2$  (kg) x (sash width (m) x sash height (m))

Any glazing combination used must not exceed the maximum sash weight of 60kg

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

Alumina doors have been subjected to rigorous testing and have been confirmed as satisfying the demanding requirements of PAS:24 and Secured by Design, for your customers' peace of mind. The innovative, patented thermal polyamide locking mechanism included in every Alumina door helps with thermal efficiency and has been certified by independent third party testing to meet these strict security requirements.

## SBL

Secured by Design status is 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.

## PAS 24

This accreditation is part of the British
Standards system and shows the product has
been subjected to a series of tests, demonstrating
enhanced security performance, air and water
tightness and wind loading to BS 6375.

## BS 6375

Parts 1, 2 and 3 of British Standard
BS 6375 are the requirements for
performance of windows and doors. This includes
weather performance testing, inclusive of wind
loading, functionality testing and cyclic testing.

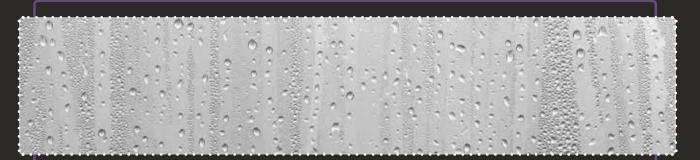
## PAS24 & Part Q

Part Q regulations introduced in 2015, state that all new ground floor dwellings and flats, together with new extensions, must meet strict criteria: "provision must be made to resist unauthorised access to any dwelling.

In essence, doors must be "manufactured to a design that has been shown by test to meet the security requirements of British Standards PAS:24:2012" – so as the Alumina door range has already been accredited with this standard, they are fully Part Q compliant.

# Quality assured

All of Liniar's operations have been assessed by the British Standards Institute and confirmed to meet the exacting requirements of ISO:9001, so you can be assured that your foiled pre-fabricated Alumina doors will be manufactured to the highest standards.



## Weather Performance

The Alumina bi-folding door from Liniar has been tested at its maximum door size with a thermally broken low threshold, achieving incredible results.

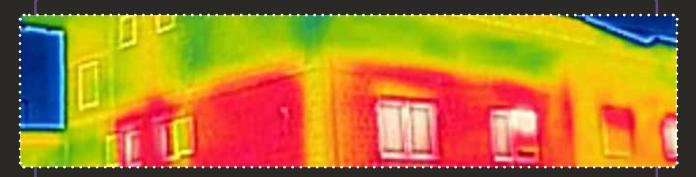
The 2.5m x 1.2m aluminium sash bi-fold was found to beat the minimum requirements for both air and water tightness by more than double the most severe pressures within BS 6375 Part 1 – even with a low threshold; unusual for a bi-fold of this size.

Liniar classes the following as "severe weather performance:"

- Coastal locations (<1km to sea)</li>
- Elevated locations (>100m above sea level)
- Exposed locations (long stretches of open level country)

When an installation falls within the category of "severe", Liniar recommends:

- Open out only door configurations
- Rebated frame threshold (ABF091)
- Consult Liniar technical/design & development for enhanced gasket configurations.



## Thermal Performance

Alumina bi-folds can achieve a U-value as low as 1.2 W/m²K with triple glazing.

Other combinations of glazing can be used - please see table below for an indication of the U-values achievable

Glazing	Glazing Centre Pane U-Value	Spacer Bar Gas	Door Whole U-Value
4-20-4	1.1	Warm Edge Argon	1.5
4-20-4	1.2	Warm Edge Argon	1.6
4-12-4-12-4	0.7	Warm Edge Argon	1.3
4-14-4-14-4	0.6	Warm Edge Argon	1.2

# Alumina Range

Alumina by Liniar: a true aluminium system. Beautifully sculptured and foiled to match perfectly with the full Liniar product suite.

## Thermally efficient

Alumina doors offer market-leading thermal performance for tomorrow's legislation - resulting in superb U-values as low as 1.2, thanks to the patented thermal lock. The innovative combined polyamide lock and thermal insert gives Alumina its high energy efficiency combined with a sleek appearance.

#### Strength with size

Alumina offers superb strength and high security, with sashes spanning up to 1.2m wide and 2.5m high - with the Alumina bi-fold spanning apertures up to 6m wide.

#### Colour range

Alumina doors can be manufactured with factory fitted woodgrain foils, or powder coated in any choice of RAL colour.

#### Reliable supplu chain.

No need to deal with other manufacturers - Alumina is manufactured within Liniar's existing, reliable supply chain, which includes Liniar Approved Fabricators.

## Why Choose Alumina?

- True aluminium products, manufactured in the tradtional manner.
- Bi-folding doors with 2.5m high and 1.2m wide sashes.
- 28mm double or 36mm/40mm triple glazing available.
- Fully matches the sculptured lines of Liniar PVCu windows.
- Optional foiling to exterior, interior, or both.
- Thermally efficient U-values as low as 1.2W/m²K.
- Weather tested low thresholds.
- PAS24, Secured by Design and Part Q compliant.
- A number of threshold options, including a Part M compliant low threshold, measuring just 23.5mm high.
- High security features in every door.
- All finishes come with a 10 year guarantee and when installed with Liniar windows, Alumins offers a single point of guarantee.





## Case Study - Alumina Bi-Fold Door

# Alumina and PVCu - a perfect match

A property renovation in Essex was the perfect opportunity to showcase the perfect match between Liniar PVCu windows and the Alumina aluminium bi-folding door.

Having chosen replacement casement windows and residential doors in Irish Oak when they first moved into the property, the homeowners had also applied for planning permission to build an extension.

The original requirement was for large French doors with sidelights, as the belief was that PVCu bi-folds would not allow for wide panes of glass. However, when the installer spotted the Alumina bi-fold, with its matching sculptured beads, he knew it was ideal for the project. A true aluminium bi-folding system, Alumina also offered great thermal efficiency, thanks to its innovative thermal lock – and as it could uniquely be foiled to match the window system, the whole project would benefit from seamless aesthetics.

The homeowner agreed immediately, and ordered a three-pane Alumina bi-fold with Irish Oak foiled exterior and white powder coated interior.

The installer commented:

"I found the Alumina bi-fold very straightforward to install. It compares very well with other bi-folds I've fitted, and the fact it comes from a trusted systems house gives me confidence that it's been properly tested and won't cause me any issues.

"Alumina is extremely well designed, with finishing touches that make it stand out, such as the innovative folding keys which greatly reduce the possibility of damaging the doors if left in situ. And the fact it's foiled and sculptured to match the Liniar window suite gives it a distinct advantage over other bi-folds!"

The homeowners agreed:

"We weren't sure about a bi-fold door at first – but as our installer had made such a fantastic job of our windows and doors, we trusted him completely. As soon as he showed us Alumina, with its low U-value and matching Irish Oak finish, we were sold!

"We've had lots of compliments from visitors as the Alumina bi-folding doors look amazing."



The Alumina door range has a wide variety of options when it comes to sizes and opening configurations – available from 1 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.

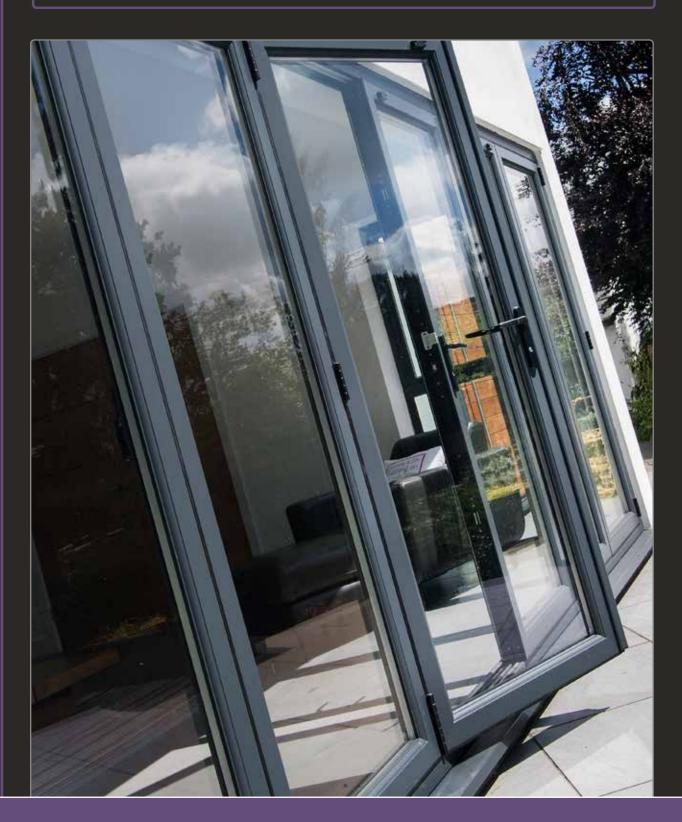
To see all opening/closing sequences visit our website at:

www.alumina.liniar.co.uk/openingclosing









#### Alumina door minimum and maximum sizes

If you know the rough measurements of your aperture, you can see the configuration options available to you using the table below. Find the nearest width across the top, and look down the relevant column to ascertain the choices available.

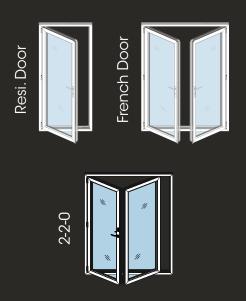
Alternatively, if you've already decided on a certain configuration, look across from the number of doors to find the approx opening width required. Please note: this table is for guidance only; each set of Alumina doors is made to order to your exact measurements.



## Opening width

	0.6m	1.0m	1.2m	1.4m	1.6m	1.8m	2.0m	2.2m	2.4m	2.6m	2.8m	3.0m	3.2m	3.4m	3.6m	3.8m	4.0m	4.2m	4.4m	4.6m	4.8m	5.0m	5.2m	5.4m	5.6m	5.8m	6.0m
1 door																											
2 doors*																											
3 doors																											
4 doors*																											
5 doors																											
6 doors*																											
7 doors																											

## land 2 Pane



With the residential and French doors opening inwards or outwards, and the 2-2-0 bi-fold having all doors folding to one side, they are versatile and ideal for smaller openings.

## 3 Pane



With three panes, you can choose all three doors folding back to one side (3-3-0), or two folding panes with a single access door (3-2-1).



#### 4 Pane



There are three choices for 4-pane door sets; a single access door (4-3-1), all four panes folding back (4-4-0), or the more symmetrical 4-2-2 where two doors fold out to each side from the centre.







4-4-0

## 5 Pane



With 5-pane doors, choose from a set with a single access door (5-4-1), all five panes folding back (5-5-0) or three panes folding from one side and two from the other (5-3-2).





#### 6 Pane



Select from three options for 6-pane doors; a single access door (6-5-1), all six panes folding back (6-6-0) or the more symmetrical 6-3-3, where three doors fold out to each side from the centre.



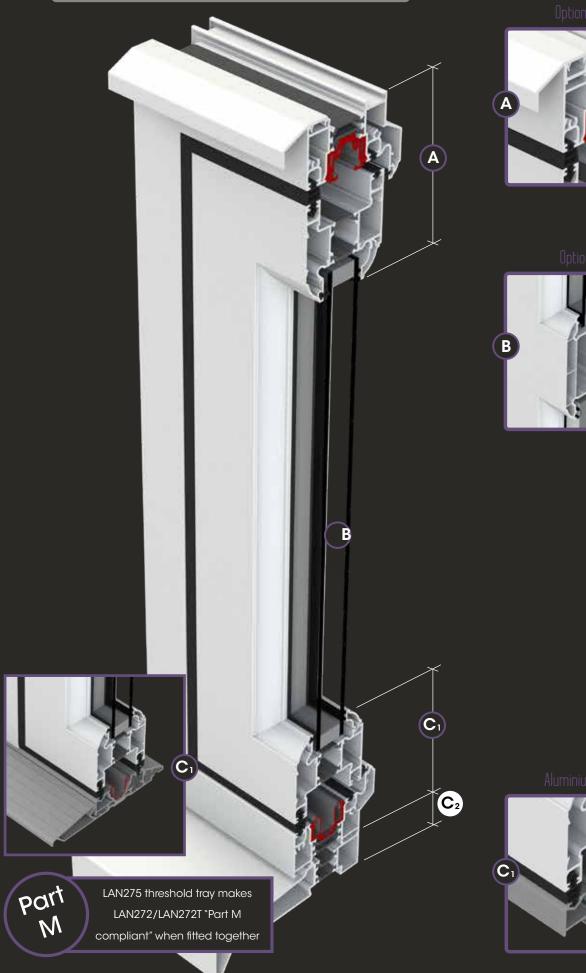
#### 7 Pane



Wider configurations offer the most choice – so select from a set with a single access door (7-6-1), all seven panes folding back (7-7-0), or a combination of folding doors (7-4-3 and 7-5-2).



Vertical Cross Section - Outward opening\*, internally beaded

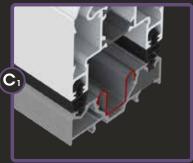




Optional Midrail



Aluminium I hreshold



\*inward opening styles are also available

#### Alumina Doors

- Sculptured suite
- Flush external finish
- 28mm double or 36mm/40mm triple glazing
- U-values as low as 1.2 W/m²K
- Foiled or RAL powder coat finish
- Patented thermal lock
- Captive top track, bottom rolling
- Up to 7 panes wide
- Sashes up to 1.2m high and 2.5m wide
- PVCu beads for fast glazing
- Concealed drainage
- Ideal for commercial applications

#### Accreditations







PAS24

ISO 900



Product	Dim.
Outer frame & sash ABF091 & ABF092	125mm
Outer frame, sash & 10mm add on ABF901, AB092 & LAN116	135mm
Outer frame, sash & 20mm add on ABF901, AB092 & LAN106	135mm
Outer frame, sash & 50mm add on ABF901, AB092 & LAN126	175mm

Product	Dim.
Int. transom LSW026	87mm
Midrail LSW029	117mm

Product	Dim.
Outer frame & sash L#W026	125mm
Ali. threshold & sash L#W029	106.5mm

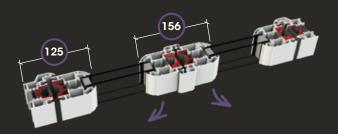
Product	Dim.
85, 150, 165, 180 cills LSL085, LSL150, LCL165, LSL180	30mm

<sup>\*</sup> SLCW037 for chamfered suite

<sup>#</sup> Replace notation with (C) for Chamfered Suite or (S) for Sculptured

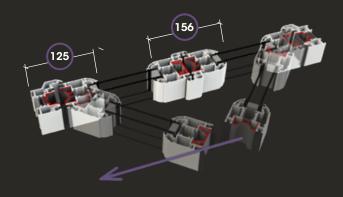
#### Aluming French Door

One master door and one slave door opening in opposite directions.



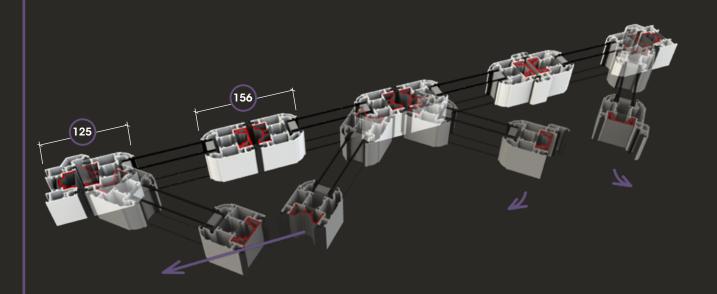
# Alumina Bi-Fold Door - 2-2-0 - example 2 pane door

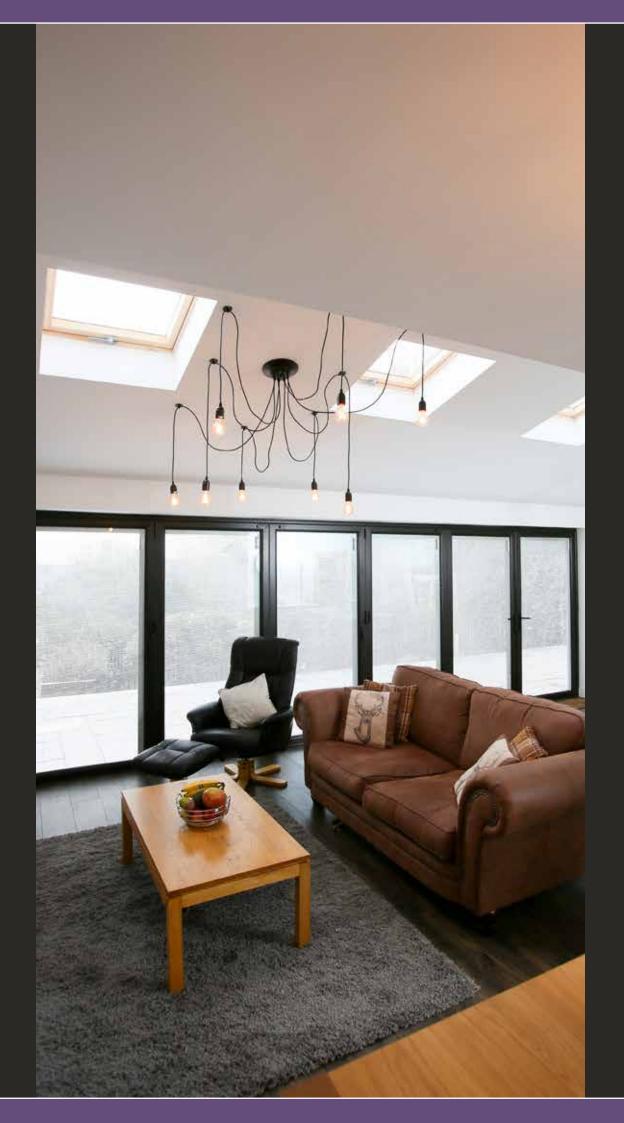
All doors slide together in one chosen direction.

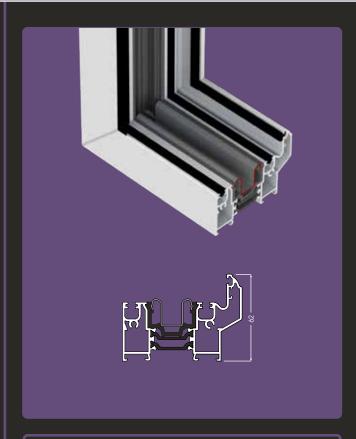


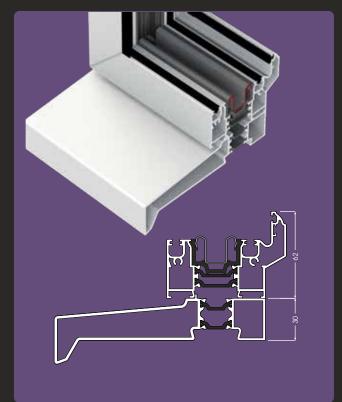
## Alumina Bi-Fold Door - 4-3-1 - example 4 pane door

One main access door, with the remaining doors folding in the opposite direction.









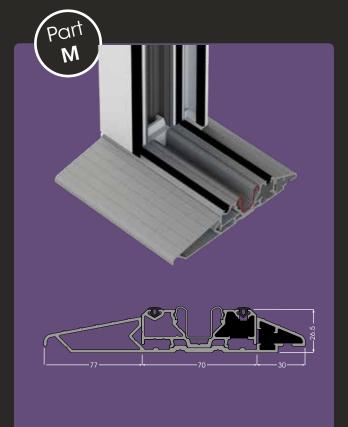
Frame only

Threshold height: 62mm



Threshold height: 92mm (inc cil)





Low Ihreshold

Threshold Height: 23.5mm

Low Threshold and Full Trau

Threshold Height: 26.5mm

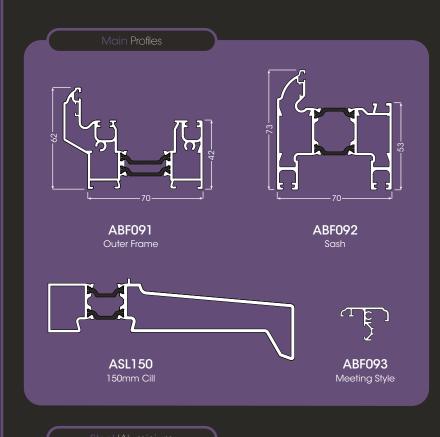


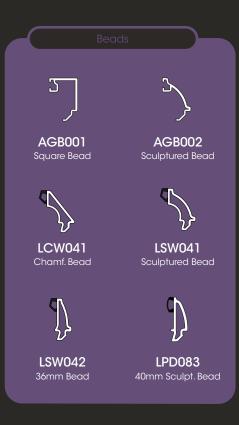
#### Low Threshold

Threshold height: 23.5mm













LAN275T Thermally Broken Low Threshold Tray



MSR091 Bottom Track



MBF291T
Thermally Broken
Low Threshold



LAN278 Low Threshold Half Tra

#### Corner Gaskets



**AGA 192** No. 1



**AGA292** No. 2



AGA392



**AGA492** No. 4



AGA592



**AGA692** No. 6



**AGA792** No. 7

#### Gaskets



AGA001 Glazing Gasket

**AGA002** 

Wedge Gasket



ABF194 Sash to Sash Gasket

V

**LGA412** 

Button Strip



MBF194 Closing Jamb Seal



LBF197 Q-Lon



Threshold Gasket

ABF196

LPD483
Meeting Style
Brush Pile

#### Cylinde



MBF034N 45/45 Anti Bump Nickel Inc. 3 Folding Keys

MBF035N

2x Key Alike, 45/45 Anti Bump Nickel Inc. 3 Folding Keys



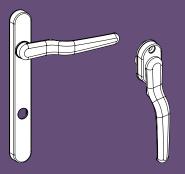
MBF033 Folding Key Blank

#### MBF034N3S 45 Anti Bump Nick

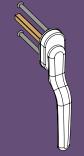
45/45 Anti Bump Nickel (3 star cylinder)

#### **MBF035N3S**

2x Key Alike, 45/45 Anti Bump Nickel (3 star cylinder)



**MBF080** Door Handle



LBF082 Ext. Slim Door Handle



O. Frame Cradle

Meeting Style



**ABF192** 

Sash Gripper Trim

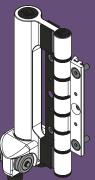
MBF191 Channel Capping



**ABF292** 

Keep Carrier

MBF392 Corner Locator



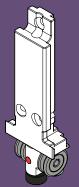
**ABF050** Double Roller



LBF081

Slim Door Handle

ABF072 'C' Handle



**MBF060** Single Roller



LMO275 LEC150 150mm, 165mm & Low Threshold 180mm Cill End Cap Tray End Cap



LMO301 Glazing Platform



LMO311 36mm/40mm Glazing Platform



**ABF391** L.Threshold Moulding



MBF042 Escutcheon/Lock Plate



**LBF041** Door Magnets



ABF045\$ Small Non-Locking Espag ABF045L Large Non-Locking Espag

ABF045LS Small Non-Locking Espag ABF045LL Large Non-Locking Espag



O.Frame Cleat ACT001C (Crimp type) ACT001M (Mech type)



Sash Cleat ACT002C (Crimp type) ACT002M (Mech type)



AAN001 Cleat Adhesive



**AAN003** Glue Cleaner



LBF191 Meeting Style



AAN004 2.5mm Allen Key T-Bar

ABF047S Small Main Door Lock ABF047L Large Main Door Lock



ABF048\$ Small French Door Lock ABF048L Large French Door Lock



**ALPT025L** - 25mm **ALPT050L** - 50mm **ALPT120L** - 120mm **ALPT030L** - 30mm **ALPT070L** - 70mm

**ALPT040L** - 40mm **ALPT080L** - 80mm

#### Contact

Flamstead House, Denby Hall Business Park, Denby, Derbyshire DE5 8JX

Telephone: +44 (0)1332 883900

Fax: +44 (0)1332 883901 Email: alumina@liniar.co.uk



#### Nnline

www.alumina.liniar.co.uk

## Alumina survey form

www.alumina.liniar.co.uk/surveyform



#### How to order upur Alumina door

To obtain a quotation for an Alumina door, you'll need to complete the Alumina survey form, which can be downloaded from www.alumina.liniar.co.uk/surveyform.

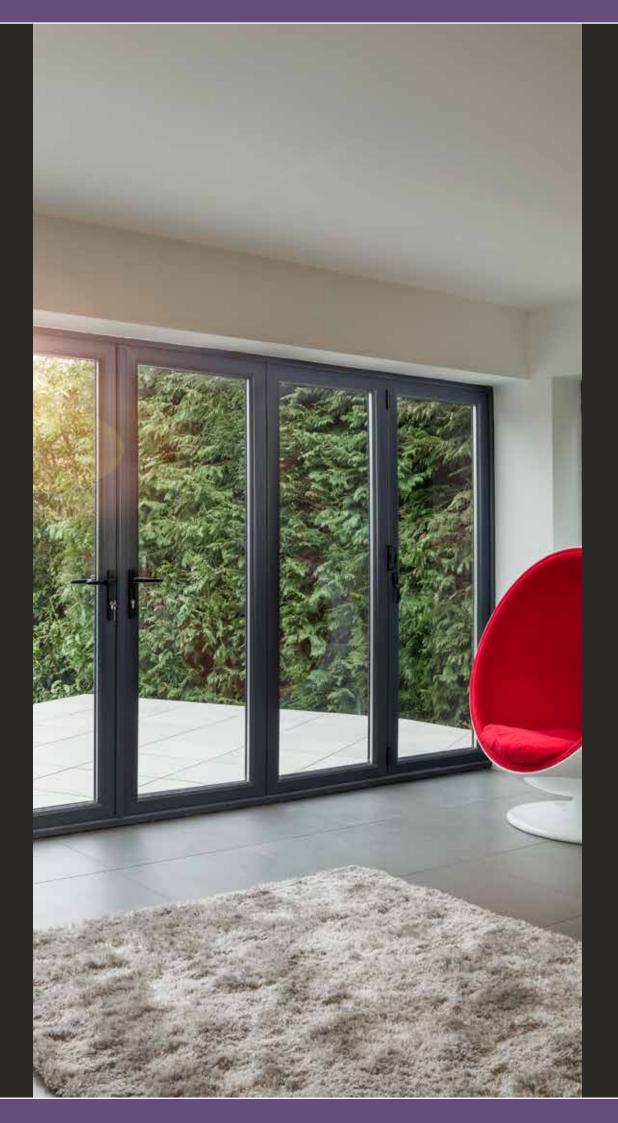
Please email your completed form to alumina@liniar.co.uk. Please note that no quotation can be supplied without all fields being completed accurately, as each door will be made to order. We cannot process a quotation without this form.

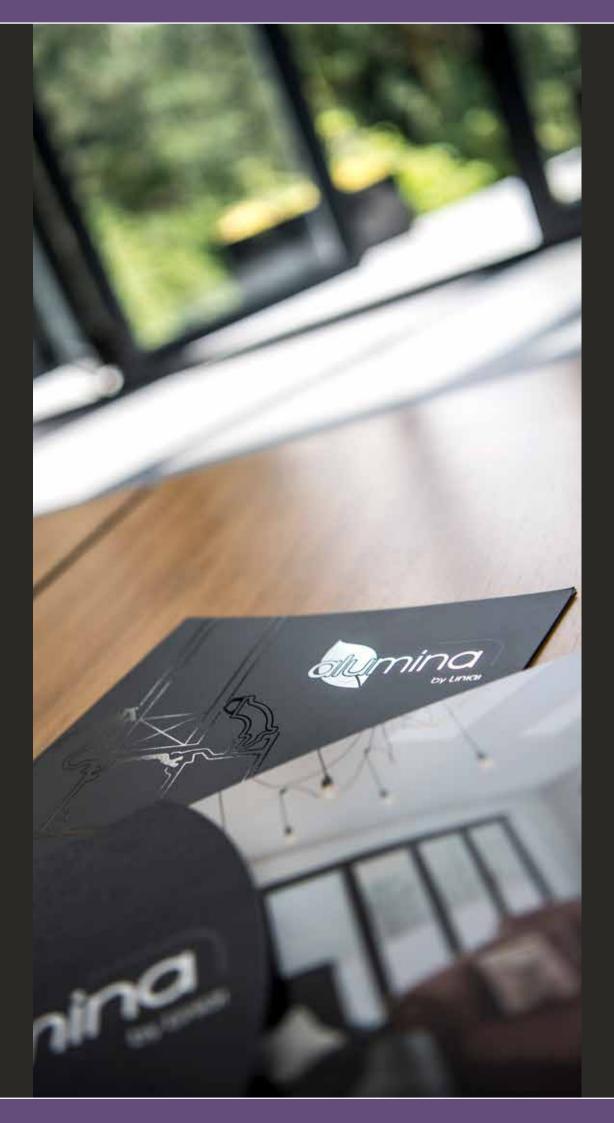
Your accurate quotation will be sent to you by email from the allocated Alumina Approved fabricator within two working days. From this point on, please communicate directly with them.

#### Thanks

Linair would like to thank all those customers who contributed by kindly supplying images and case studies, along with 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. See www.liniar.co.uk/specifiers for more information





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