STÄRKE

uPVC SPECIFIER DESIGN GUIDE

AMBIANCE™

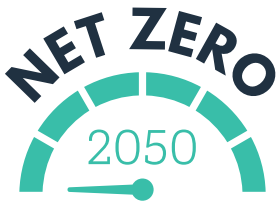
Inline Window Systems


STÄRKE

CONTENTS

1.0
THE BIG PICTURE

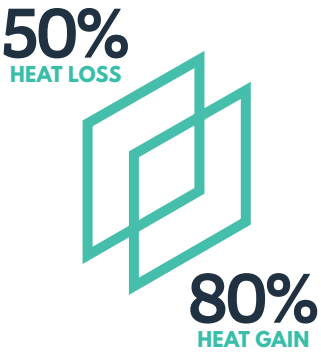
Windows have a vital role in achieving net zero emissions by 2050. Here's why...



1.1
Legislative Environment

New Zealand is on the path to a low emission, climate resilient future. Government has set into law a target for net zero greenhouse gas emissions by 2050. With the built environment accounting for approximately 20% of the country's emissions, the construction sector has an important role in the Governments plan to achieve Net Zero.

New performance requirements have been introduced for wall, floor, and roof insulation. The new thermal performance thresholds are likely to ratchet up in the future as the Government moves towards the Net Zero 2050 goal.



1.2
Windows are critical

In a recent study, 84% of emissions within the built environment relate to operational carbon, in other words the carbon emitted during the lifetime of the building to keep the building running. Energy usage associated with heating and cooling is a significant part of this; hence the need to design homes with improved thermal performance and energy efficiency.

Windows are the single biggest source of heat loss or heat gain in the home. Typically windows account for up to 50% of heat loss and up to 80% of heat gain within the home. Better thermal performance with Starke windows will go along way towards reducing both energy usage and emissions.

1.3
uPVC Windows are the future

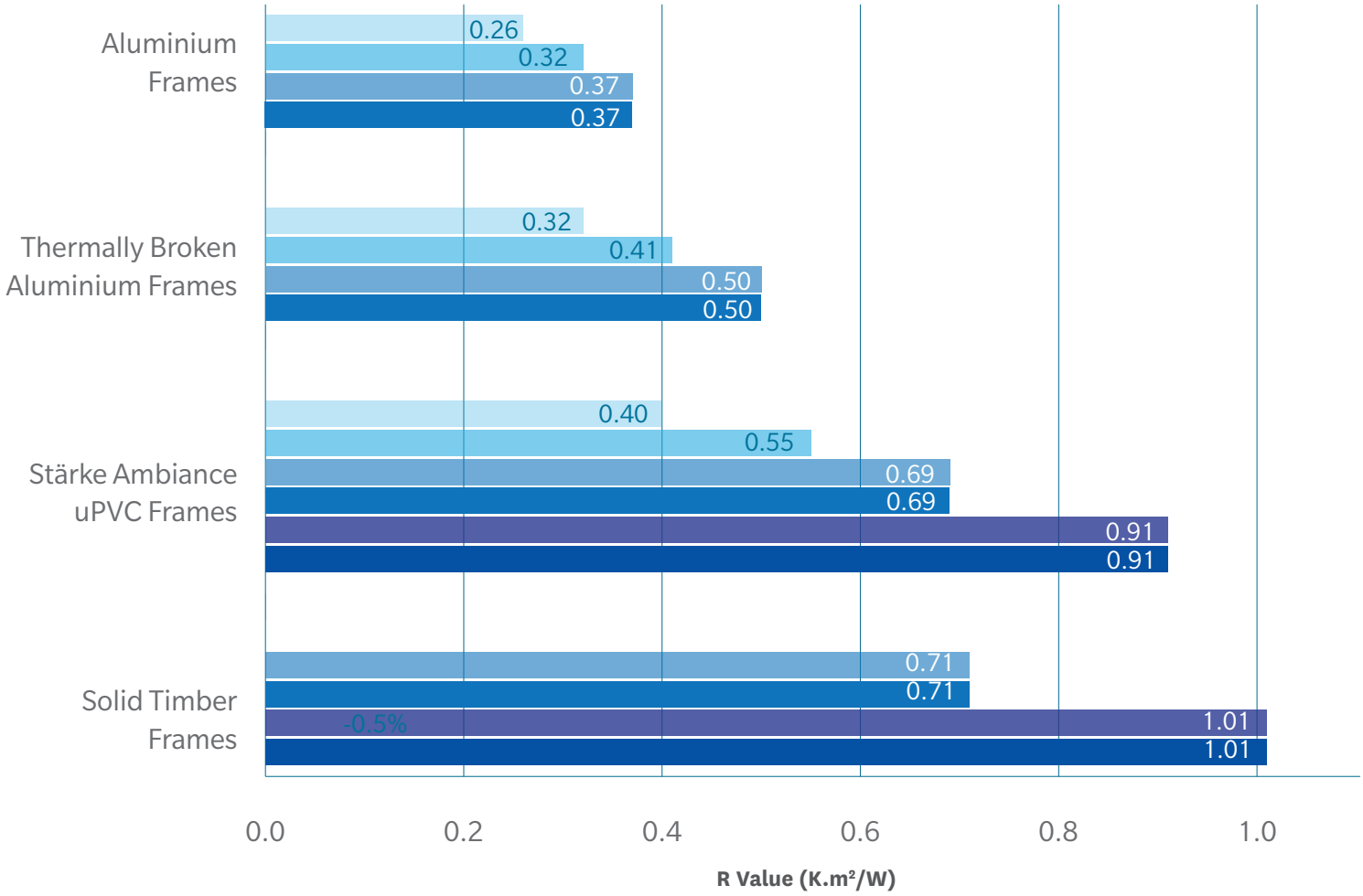
Stärke Ambiance™ Inline Window System is 38% more energy efficient than traditional thermally broken aluminium.

Stärke Ambiance™ windows and doors are made using recyclable materials wherever possible, it's reassuring to know that our high-performance windows are contributing to creating a brighter tomorrow for future generations.

1.43

Window R Value Performance Guide

The following R Value Performance Guide (as per NZBC H1/AS1 Table E.1.1.1) shows just how great the performance gap is between thermally broken aluminium and uPVC window frames – irrespective of the glazing specification.



Glazing R Value

- U 2.8, Cl/CL Double Glazed
- U 1.7, EnergySaver ES (g=0.74)
- U 1.1, Lightbridge LB (Let heat in - g=0.62)
- U 1.1, Performatech PT (Block heat out - g=0.35)
- U 0.6, Lightbridge Triple (Let heat in - g=0.535)
- U 0.6, Performatech Triple (Block heat out - g=0.270)

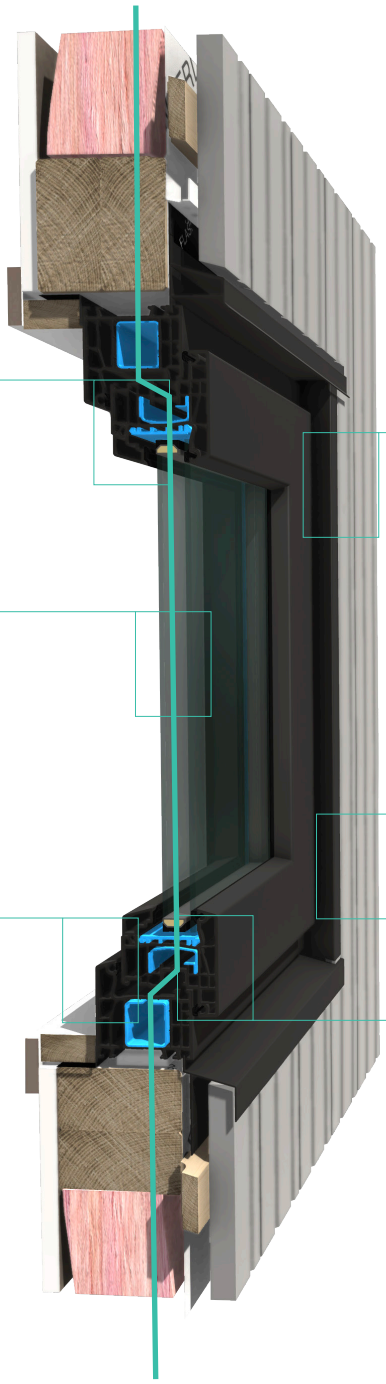
2.0
SYSTEM OVERVIEW

Stärke Ambiance™ Inline Window Systems have been designed and tested to exceed NZS4211 Window Performance Standard. The system offers a range of high-performance and technology options to help achieve your design outcomes. These uPVC windows are designed for a recessed installation which provides optimal thermal performance, energy efficiency and a modern aesthetic.

SECURITY – multi-point locking and internal beading provide much increased resistance to unwanted intrusion

GLAZING CAPACITY – standard 24mm glass capacity, or right up to 41mm for triple glazing

THERMAL PERFORMANCE – more thermal insulation than thermally broken frames can achieve. Window R values R0.69



DURABILITY – UV resistant uPVC especially formulated for New Zealand conditions, tested and proven to last.

WATER-TIGHTNESS – Welded corner connections prevent leakage from corners common in old aluminium systems

AIR-TIGHTNESS – Double co-extruded rubber gaskets at front and rear of sash prevent air leakage, retaining warmth in the home

CONTINUOUS THERMAL BARRIER – Stärke Ambiance™ Inline Window System ensures the thermal barrier within the window and glazing remains aligned with the insulation inside the wall to minimise heat loss.

Pictured
Recessed installation

3.0
DESIGN OUTCOME OPTIONS

Stärke Ambiance™ Inline Window system offers a solution to achieve your design outcomes, whatever the desired building performance. It starts by determining the overall thermal performance objective for your designs and understanding the important role Starke Ambiance uPVC windows can play to achieve your requirements. Remember, choosing one of the following objectives doesn't mean you don't get the benefit of the others.

3.1
Cost effective compliance

Because uPVC with low-e double glazing is such a high performance product, this will make a large difference to the thermal performance calculations for meeting the new requirements of H1/AS1.

In fact, in many instances changing the window performance from R0.26 to R0.55 (or even R0.69) can be the only change necessary to meet the new H1 requirements! This of course enables huge savings elsewhere in the building envelope; in particular the new ceiling requirements of R6.6 need not be met.

3.2
Performance

If you want to leave code-minimum far behind you, then uPVC windows can have a strong part to play. With high airtightness and high thermal performance they are a perfect solution for high performance builds, low energy builds, right through to Passive House and Passive House Plus. All the performance data is available ready for use; frame uF values, glazing g-values and u values, and spacer data.

3.3
Aesthetic

uPVC windows and doors are not only high performance, but can span large distances and can eliminate many of the problems found with thermally broken systems, particularly thermal deflection. As the industry moves away from the aluminium systems we know so well, large walls of glass and feature windows will become more difficult to execute with aluminium. uPVC sliding door systems can be built up to 2.64m high, and fixed windows even larger. They can also come with flush sills, and effortless sliding hardware & rollers.

4.0
uPVC DESIGN CONSIDERATIONS

There are very few differences when specifying Stärke Ambiance™ uPVC windows and doors over aluminium systems, but please find some helpful design considerations below.

4.1
Configurations

- Refer to Configuration & Size chart on pages 9 - 10 for typical configurations and details.
- We do not recommend custom configurations including Roof glazing, curves or complex geometric shaped units.
- uPVC windows are non-corrosive and perform well in coastal or sea spray zones.
- Maximum thermal performance limit of the system is R0.91 when paired with high performance triple glazing.
- Sliding and stacking door frames are generally deeper than aluminium, so please ensure that all products detailed can fit within the project wall thicknesses.
- Stärke Ambiance™is not generally installed via a timber jamb liner, review typical install details and consider what type of external finish material would suit your project best (timber/uPVC/gib).
- It is not possible to have opening windows within the travel path of a sliding panel.
- Minimum size of operable window (awning or casement) is 600x600mm.

4.2
Thermal Performance

- Do factor in the high thermal performance to help with your H1 calculations.
- Do ensure that both heat losses & heat gains are considered.
- Remember that uPVC frames have higher thermal performance when determining your glass specification.
- Max glass thickness in Ambiance is 41mm (Suitable for double or triple glazing).
- For maximum thermal performance recessed installation is recommended, aligning window and wall insulation.

4.3
Aesthetics

- White and Matt Black colours are available ex-stock.
- Stake showroom is available for your customers to view our product or Stärke can provide product samples.
- Inline installation is recommended, ensure that cladding thickness is compatible with inline window flashings.
- Maximum height for Door units is 2.64m.
- Above 1500mm maximum panel width specify stacking sliders.
- Multi-point locking system is standard. Double tongue window handles are no longer required.
- Special colours may require significant lead times contact Starke for further available colours.

4.4

Environmental

Embodied Carbon

Stärke Ambiance™ uPVC has an industry-wide Environmental Product Declaration which contains a detailed report on all embodied carbon considerations. Stärke Ambiance™ uPVC generally has less embodied carbon than aluminium or thermally-broken aluminium suites –full EPD available on request.

Operational Carbon

Because of it's high thermal performance, Stärke Ambiance™ Inline Window System is a primary contributor in all new homes to reduced operational carbon, energy, and heating and cooling costs. Windows are responsible for most of the heat losses and nearly all heat gains in a building envelope, and Stärke Ambiance™ uPVC windows is a high performer in both considerations, greatly reducing operational carbon.

Toxicity

Stärke Ambiance™ uPVC is a non-toxic, stable compound which does not off-gas in any harmful way. Final Report VOC Emission Study 'Plastic Windows' Institut für Holztechnologie Dresden gemeinnützige GmbH (IHD). NO 1516009. July 2017. The results of several examinations of indoor pollution with VOC emissions are summarised in the report.

Results:

- With regard to the French Décret n° 2011-321 VOC ordinance for building products, all window elements examined fulfilled the best possible class A+ according to Arrêté etiquetage 2011.
- With regard to the AgBB German assessment schema, all PVC frame profile variants examined (white, coated, foil-covered) fulfil the requirements.

Recycling

The uPVC used in Stärke Ambiance™ Inline Window Systems consists of up to 55% recycled content – this is the inner section of coloured profile. uPVC is 100% recyclable at end of life.

Fire

Stärke Ambiance™ uPVC is a fire retardant, which means it will not support combustion.

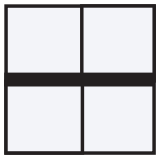
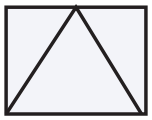
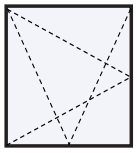
Fire tests in accordance with EN 13823 on several samples from various manufacturers by Efectis Nederland BV, project number 2012-Efectis-R0205

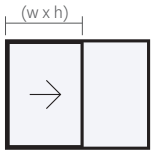
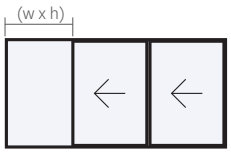
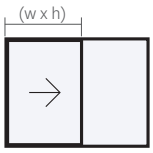
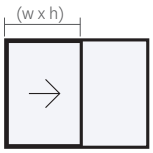
Results: In accordance with the average parameters determined, plastic windows fulfil the classification criteria in accordance with DIN EN 13501-1: 2007+A1:2009 as follows:

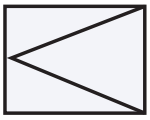
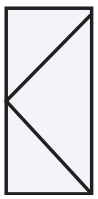
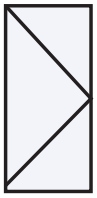
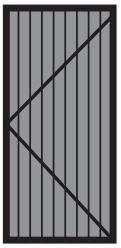
- Fire behaviour class: B–E
- Smoke production: s3
- Flaming droplets: d0

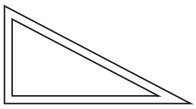
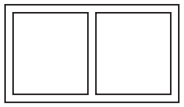
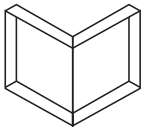
4.5

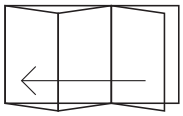
Configuration & Size chart

				
	Fixed Window	**Mullion/Transom length**	**Awning Window**	**Tilt & Turn Window**
MAX SIZE (w x h)	2000 x 3000	2700	1400 x 1600	1600 x 3000
MIN SIZE	400 x 400	200	600 x 600	600 x 600
AVAILABLE OPTIONS	-	-	Multi-point locking	Window or door
NOTES	Limited by glass manufacture only	Varies with wind zone – see span charts	Open out	Open in

				
	Varioslide Sliding Door/Window Panel	**Varioslide Stacking Door**	**Smartslide Sliding Door**	**Liftslide Sliding Door**
MAX SIZE (w x h) per panel	1500 x 2400	1500 x 2400	2000 x 2640	2000 x 2640
MIN SIZE	600 x 600	600 x 600	800 x 2000	800 x 2000
AVAILABLE OPTIONS	XO, XOO + sidelight	OXX, OXX-XXO + sidelight	XO, OX-XO + sidelight	XO, OX-XO + sidelight
NOTES			Frictionless sliding. High air-tightness.	Flush Zero step sill. Extra-high air-tightness.

				
	Casement Window	**Hinged Door Open In**	**Hinged Door Open Out**	**Entry Door Open In**
MAX SIZE (w x h)	800 x 800	1400 x 2600	1400 x 2600	1100 x 2500
MIN SIZE	600 x 600	700 x 2000	700 x 2000	700 x 2000
OPTIONS	Open out	Low-height sill	Low-height sill	T&G, Composite, window lights
NOTES	Open out	Recommend minimum 2100 for head height	Recommend minimum 2100 for head height	Recommend minimum 2100 for head height

				
	Raking Head Units	**Coupled Units**	**Overlights & sidelights**	**Corner Units**
MAX SIZE (w x h)	Enquire	Enquire	Enquire	Enquire
MIN SIZE	Enquire	Enquire	Enquire	Enquire
OPTIONS	-	-	-	-
NOTES				

		
	Oversize Units	**Bifolds - Invisifold**
MAX SIZE (w x h)	Enquire	Enquire
MIN SIZE	Enquire	Enquire
OPTIONS	-	-
NOTES		

5.0

Glazing

GUIDE TO SPECIFYING GLAZING FOR DESIGN OUTCOMES.

5.1 Heat Loss

U-value (W/m²K)

5.2 Heat Gain

SHGC (%) (g-value)

BEST	U0.6	Triple Glazing + Low-E + Argon	35%	Triple Glazing + Low-E + Argon
BETTER	U1.1	Double Glazing + Low-E + Argon	55%	Double Glazing + Low-E + Argon
GOOD	U1.7	Double Glazing + Low-E + Argon	75%	Double Glazing + Low-E + Argon

Pane 1 Low-E - The heat loss value, or the insulation value, is similar to the how we measure wall insulation – it is the measure of how resistant to heat transfer the glazing is. We use the glazing U value to compare units. This is a very important factor in the overall R-value of the window unit, and is a necessary factor in meeting H1/AS1.

Pane 1 Low-E - This factor is often overlooked and not mentioned in H1/AS1, however is a critical component of occupant comfort. The Heat Gain factor (g-value or SHGC value) determines how much heat from the sun enters the home through the glass. It is shown as a percentage, or a decimal (for example, 75% may be shown as 0.75). A good value is 0.35, meaning only 35% of the sun's heat is transmitted. A poor value is 0.8, meaning 80% of the sun's heat is transmitted.

Large windows facing north or west with no shade should nearly always have a low g-value. Glazing facing East or South can have a higher g-value.

5.3

UV Protection

TDW-Iso (Fading)

53%	Double Glazing w/laminate
65%	Double Glazing w/laminate
69%	Double Glazing + Low-E + Argon

Pane 2 Laminate Using laminate glass is the best way to block out harmful elements of the sun's rays can prevent furniture and floor fading. Laminate can block out 99% of all UV, greatly reducing the damaging effect of the sun, and potentially saving the homeowner thousands of dollars of replacement and repairs through the lifetime of the building.

5.4

Acoustic

STC (Sound Transmission Coefficient - Db)

45Db	Thick Double Glazing w/laminate
35Db	Thick Double Glazing w/laminate
30Db	Double Glazing + Low-E + Argon

Pane 2 Laminate - The final consideration is the acoustic performance of the glazing. The best way to increase the performance of the double glazing is also to use a laminate (which helps with the UV too!). All laminates help with the acoustic performance, but these can be individually specified to assist with blocking out different noises, for example traffic noise from a nearby street.

5.5

Clarity - tint

VLT (Visible Light Transmission)

77%	Double Glazing + Low-E + Argon
75%	Double Glazing + Low-E + Argon
73%	Double Glazing + Low-E + Argon

Pane 2 Tint The previous factors can affect the clarity of the glass; sometimes, very high performance glass has a slight green or blue hue to it. This is often to subtle to notice, but is worth considering.

Additionally, tints can be used deliberately for aesthetic purposes, or to reduce glare. Very common is a grey tint for privacy.

Frosted glass reduces clarity for use in bathrooms.

6.0

USEFUL LINKS

MasterSpec Specification – 4541 SU

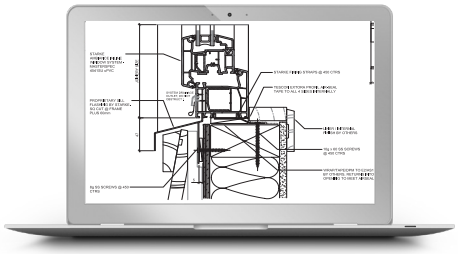
masterspec.co.nz/Link-to-Masterspec-Result/6702-731db613-6a4b-49c0-9dbd-da5e0baeb272

masterspec Partner Net

All BIM Information

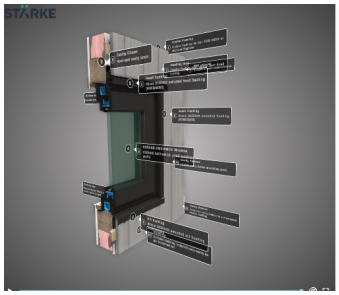
starke.co.nz/architects-portal/

- PDFv
- DWG
- REVIT
- ARCHICAD
- Cross sections, installation drawings



Working Spec 3D Installation

workingspec.me/models/sg-wfl-w70

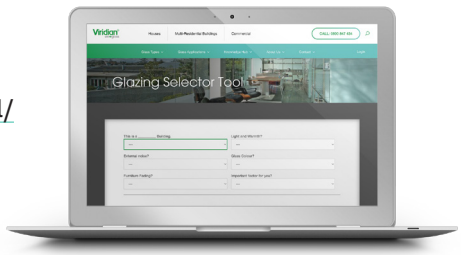


STARKE ACADEMY – Blogs & Learning

starke.co.nz/blog/

Viridians online glazing selector tool

viridianglass.co.nz/login-page/architects/glazing-selector-tool/



7.0

STÄRKE SERVICES

Stärke is one of the only end-to-end joinery suppliers in New Zealand, which makes us uniquely placed to streamline your workflow, and provide high volume, high performance joinery on time and to specification.

We work with architects, engineers and specifiers from initial consultation, right through to pricing building partners, confirming specifications, and then fabrication, delivery and installation.

ARCHITECTURAL SUPPORT & DETAILING

- Design consultation
- Shop Drawings & PS1
- Samples boxes nationwide

TESTING & COMPLIANCE

- H1 compliance documentation via schedule, calculation or modelling method
- Support with council documentation & RFI
- Onsite or offsite joinery testing
- Blower door testing (coming soon)

EDUCATION & TRAINING

- Preliminary, budget and final pricing
- Architects Education, CPD accredited presentations
- Installation & after sales

FABRICATION & DISTRIBUTION

- Joinery fabrication

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a window to a better world

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