

3000 SERIES

VINYL INSWING TILT & TURN WINDOW

PRODUCT CATALOGUE
VINYL WINDOW



STARLINE
WINDOWS



Foreword

This Design Guide provides specifications on the Series 3000 Vinyl Casement/Tilt/Fixed Window.

This document is intended to provide information on our standard products. Non-standard designs and applications can be reviewed to determine the feasibility on a project-specific basis.

Please email any project specific enquiries to architectural@starlinewindows.com or technical@starlinewindows.com.

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Document Number TS-00014

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Recommended Size Guidelines

Starline Windows provides maximum guidelines for window module area and weight for new construction and restoration projects.

Double Glazed Fixed Lite and Combination Window Maximum Weight and Area

FRAME FINISH ¹	MAXIMUM WEIGHT ²	MAXIMUM FIXED LITE AREA ³	MAXIMUM COMBO WINDOW AREA ⁴
White (unpainted). Beige, Silver -UV Cure Coat	300 pounds	50 sq. ft.	72 sq. ft.
Black, Charcoal, and Brown -UV Cure Coat	300 pounds	50 sq. ft.	60 sq. ft.

Triple Glazed Fixed Lite and Combination Window Maximum Weight and Area

FRAME FINISH ¹	MAXIMUM WEIGHT ²	MAXIMUM FIXED LITE AREA ³	MAXIMUM COMBO WINDOW AREA ⁴
White (unpainted). Beige, Silver -UV Cure Coat	300 pounds	50 sq. ft.	62 sq. ft.
Black, Charcoal, and Brown -UV Cure Coat	300 pounds	50 sq. ft.	50 sq. ft.

Maximum Combination Window Width and Height

FRAME FINISH ¹	MAXIMUM WIDTH	MAXIMUM HEIGHT
White (unpainted). Beige, Silver -UV Cure Coat	144"	120"
Black, Charcoal, and Brown -UV Cure Coat	120"	96"

Note: Limitations are guidelines and depend on site conditions.

Maximum Fixed Window Width and Height

FRAME FINISH ¹	MAXIMUM WIDTH	MAXIMUM HEIGHT
White (unpainted). Beige, Silver -UV Cure Coat	108"	108"
Black, Charcoal, and Brown -UV Cure Coat	108"	108"

Note: Limitations are guidelines and depend on site conditions.

For instructions and examples on how to calculate area and weight, refer to [Calculate Fixed, Combination, and Vent Window Size and Weight](#).

¹ UV Cure coat is available for the exterior and interior of the window frame.

² Maximum weight is a guideline that considers, production capabilities, tailgate deliveries and window installer capabilities. Please consult with the window installers on a project specific basis to determine their ideal overall window weight with respects to handling and installing. Industry standard for installation typically ranges from 200 lbs. and up, depending on site conditions, man power and equipment that will be used to assist with installation. If an overall window is greater than 300 lbs site glazing is required due to manufacturing limitations. Windows that are heavier than installers are willing to install (approximate range 200lbs – 300 lbs) site glazing may be an option, however it is Starline Window's recommendation that factory glazing, in a controlled environment, is utilized whenever possible.

³ Maximum fixed lite area for an individual insulated glass unit (IGU) is dependent on the glass thickness selected. Once the desired IGU area has been determined, refer to [Maximum IGU Area Based on Glass Lite Thickness](#) for minimum allowable glass thickness. **Note:** There may be certain design, structural, building code, by-law etc. requirements that could dictate the glass thickness. Glass thickness will be confirmed during the shop drawing phase, if applicable, and /or ordering of the windows.

⁴ A combo window is a window that has multiple lites, either fixed and / or operable vents. These lites are divided either by mullions and / or couplers and / or T-Bars.

Maximum Vent Size

In order to design an operable vent that is within Starline's recommended maximum vent size, refer to the chart below:

OPERABLE VENT	MAX. WIDTH	MAX. HEIGHT	MAX. AREA DOUBLE GLAZED	MAX. AREA TRIPLE GLAZED	MAX. WEIGHT
Tilt/Turn	48"	84"	20 sq. ft.	15 sq. ft.	120 pounds

Minimum Vent Size

Sizes are based on heel to center dimensions

HARDWARE	OPERABLE VENT	WIDTH (In)	HEIGHT (In)
Actuator Handle	Casement	21"	24"

Minimum Balance Sash Size

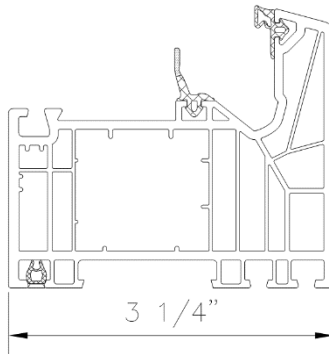
Sizes are based on heel to center dimensions

HARDWARE	FIXED	WIDTH (In)	HEIGHT (In)
NA	Fixed Lite	18"	18"

Note: It is Starline's standard to restrict all windows to 4" unless a non-restricted window is required for egress purposes.

Perimeter Frame

Starline Windows offers the following standard perimeter frame type.



Note: Refer to the ***Eurostar 3000 Series – Standard Details*** pdf for further information. These details will provide some standard installation methods for the above standard frame. These installation details are a suggested method of installation and does not necessarily represent a detail that is suitable for a specific project. To confirm project specific details, please check with your Waterproofing / Building Envelope Consultant.

Seamless Welder

The 3000 series product line includes a seamless weld at all four corners of the frame and tbar joints. This innovation in machinery eliminates the welding seam, corner touch ups on painted product and ensures the weld is perfectly flush with the exterior frame.



Window Hardware

The standard handle for the Series 3000 operable vent is an actuator handle that operates the locking system within the window to enable the swing and tilt function. Handles are available in white or black.



White



Black

Options

- Insect Screens: Frames are made from extruded aluminum and are rigidly joined at the corners. The aluminum frame shall be either black or white in color. Screen shall be black fiber mesh. Screens are held in place with corner hardware protruding the system.
- 4" Restrictor

Frame Finishes

Starline Windows offers various options for vinyl frame finish.

Starlines standard finish for the exterior and interior of the vinyl frame is Standard White. The extrusion is left as a bare substrate (not painted) as the colour is impregnated into the vinyl material.

Options

There is an option to paint the exterior of the frame using an exterior grade UV cure coating which is specifically designed for use on vinyl fenestration products. This coating contains 100% solids, thus emits no volatile organic compounds (VOCs) or hazardous air pollutants (HAPs).

The following **standard colours** are available:

- *Black
- *Black Charcoal

The following **semi-standard colours**¹ are available:

- *Brown
- *Silver
- *Beige

***Available to be painted on the exterior and interior**

Custom colours may also be available for the exterior and interior of the frame. The scope of work and overall custom colour quantity will be reviewed by Starline on a project specific basis to determine the feasibility of the custom colour request.

Note: Standard and Semi-standard colours are available for an additional cost. May require up to a 4-week lead time.

Custom colours are available for an additional cost premium. An approximate 12-week lead time is required to procure custom colour requests.

¹Semi Standard colors that are painted on the exterior and interior must have a minimum of 10 windows to apply.

Refer to the **Vinyl Finishes** document in the **Miscellaneous section** of the catalogue for images of the stock and semi-standard colours available.

Glazing

Starline Windows standard insulated glass unit (IGU) will be comprised of the following glass make-up:

- Double glazed, double sealed IGU with an overall thickness of 3/4" (20mm).
- Standard high-performance soft coat (sputtered) Low E which is applied to surface #2.
- Aluminum spacer with argon fill.
- Minimum glass thickness is 3mm.

Options

There is an option to upgrade to a triple glazed IGU¹, which will provide enhanced energy performance. The triple glazed IGU will be comprised of the following glass make-up:

- Triple glazing, double seal insulated glass unit with an overall thickness of 1 3/8" (36 mm).
- Standard high-performance soft coat (sputtered) Low E which is applied to surface #2.
- Warm edge spacer with argon fill.
- Minimum glass thickness is 3mm.

Additional options are available for an additional cost.

¹Triple glazed windows must have the middle glass lite tempered when there is more than 1 low E coating being used.

Maximum IGU Area Based on Glass Lite Thickness

GLASS THICKNESS	MAX IGU AREA	MAX. UNITED INCHES (One Width + Height)
3mm	19.5 sq. ft.	< 105"
4mm	30 sq. ft.	105"-150"
5mm	41 sq. ft.	>150"-175"
6mm	50 sq. ft.	>175" +

Note: There are minimum and maximum dimensions as well as overall IGU areas to consider for different types of glass, such as annealed, tempered, laminated, spandrel, etc. Maximum dimensions are as laid out in above chart, regardless of the glass type. For all other sizing information please visit the Products tab on the Vitrum Glass Groups website at: <http://www.vitrum.ca/> for the most up to date information.

Refer to the **Vinyl Windows & Doors - Glass & IGU Product Information** document in the Miscellaneous section of the catalogue for more detailed information regarding size limitations, available configurations, defects and definitions.

IGU Charts

SERIES 3000 DOUBLE GLAZED IGU: 20mm, Overall thickness of primary seal (Butyl): 0.8mm

EXTERIOR		SPACER		INTERIOR	
mm	inch	mm	inch	mm	inch
3	1/8	12.6	1/2	3	1/8
4	5/32	11.6	7/16	4	5/32
4	5/32	9.6	3/8	6	1/4
5	3/16	9.6	3/8	5	3/16
6	1/4	6.6 ¹	1/4 ¹	6	1/4
4	5/32	9.6	3/8	6LAM .030	1/4

SERIES 3000 TRIPLE GLAZED IGU: 36 mm Overall thickness of primary seal (Butyl): 0.8mm

EXTERIOR		SPACER		CENTRE		SPACER		INTERIOR	
mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
3	1/8			3	1/8			3	1/8
4	5/32	9.6	3/8	4	5/32			4	5/32
4	5/32	9.6	3/8	4	5/32			6	1/4
5	3/16		3/8	5	3/16			5	3/16
6				6				6	

¹Warm edge spacer is not available

Note: The IGU, glass thickness and spacer bar size is based on nominal dimension. Actual dimensions will vary slightly. There are other glass make-up combinations available other than noted in the above chart. These charts' purpose is to provide a few examples. There are various other combinations available that can be reviewed on a project specific basis.

Acoustical Ratings

DOUBLE GLAZED IGU

GLASS EXT.	GAP	GLASS INT.	TEST NUMBER	STC	OITC
3mm Ann	13mm	3mm Ann	TL9095	32	26
4mm Ann	12mm	4mm Ann	TL9097	34	27
3mm Ann	12mm	5mm Ann	TL9096	36	29
4mm Ann	22mm	6mm Ann	TL9207	39	31
5mm Ann	25mm	6mm Ann	TL9099	39	31

TRIPLE GLAZED IGU

GLASS EXT.	GAP	GLASS CENTRE	GAP	GLASS INT.	TEST NUMBER	STC	OITC
3mm Ann	13mm	4mm Ann	13mm	4mm Ann	TL9204A	37	28
6mm Ann	12mm	4mm Ann	11mm	4mm Ann	TL9121	41	31
4mm Ann	12mm	4mm Ann	12mm	6mm Lam. W/0.8mm PVB	TL9122	40	32

Performance Test Results

Series 3000 window has been tested to AAMA/WDMA/CSA 101 I.S.2/A440-08, AAMA/WDMA/CSA 101 I.S.2/A440-11 and CSA A440SI-09.

Canada

PRODUCT DESIGNATOR	AIR TIGHTNESS	WATER PENETRATION RESISTANCE		UNIFORM LOAD DEFLECTION	RESISTANCE TO FORCED ENTRY
		LAB TESTED	FIELD TEST ^{2, 3}		
CW-PG50	A3	720Pa	400Pa	3600Pa	Pass

¹The performance test results are based on lab testing and will vary depending on the specific window configuration. Contact your local Starline Sales Representative to determine the specific performance test results for the window configurations on a project specific basis.

²Water penetration resistance field tests shall follow the criteria and testing procedures as outlined in the AAMA 502-08 specification standard.

³400Pa / 8.35 psf is the maximum field test result that can be achieved. Should the Project Specifications state a water penetration field test requirement of a lesser value, the project specified values shall govern.

Egress Requirements

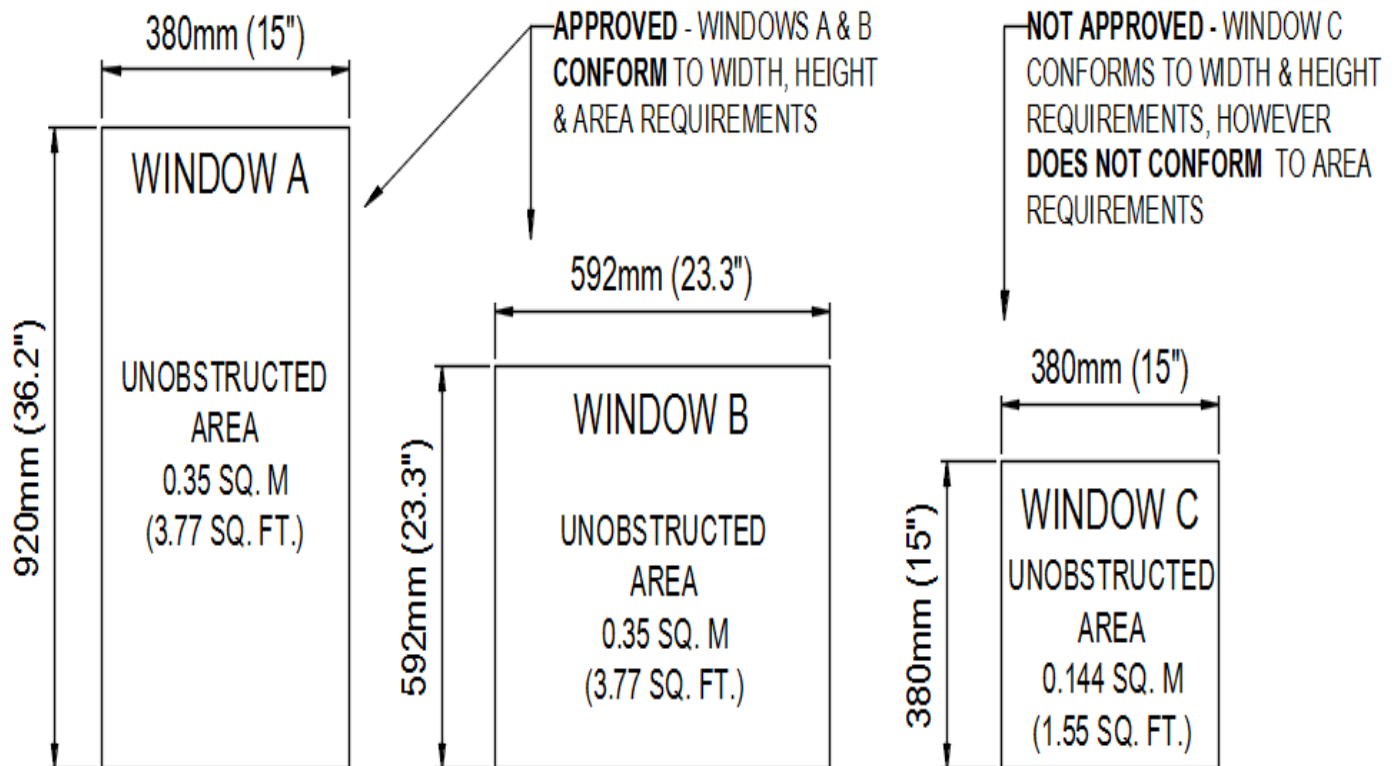
NBC 2015, BCBC 2012 & IBC 2015 Egress Size Requirements

Windows have to be a certain size in order to meet egress requirements. The size of the window is dependent on the project location.

Generally, for buildings that are 3 stories or less and except where the suite is sprinklered, or a bedroom door provides direct access to the exterior, each bedroom shall have one window which can be opened and leads to the exterior.

The NBC 2015 & BCBC 2012 – Part 9 – 9.9.10.1.2 codes requirement for egress is as follows:

- Minimum Clear Opening Width = 15" (380 mm)
- Minimum Clear Opening Height = 15" (380 mm)
- Minimum Clear Opening Area = 3.77 sq. ft or 543 sq. in (0.35 m²)

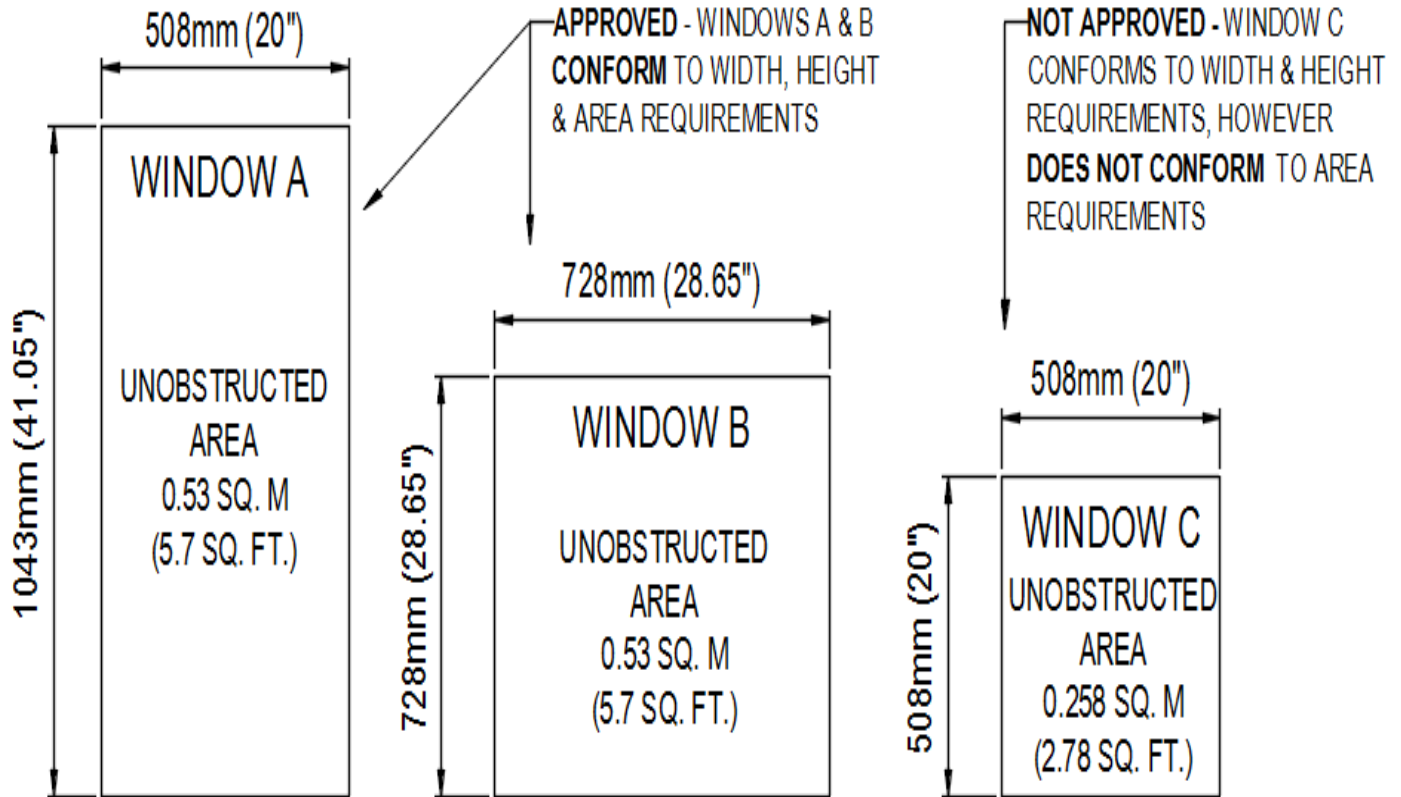


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The IBC – Section 1030.2 & 1030.2.1 codes requirement for egress is as follows:

- Minimum Clear Opening Width = 20" (508 mm)
- Minimum Clear Opening Height = 24" (610 mm)
- Minimum Clear Opening Area = 5.7 sq. ft (0.53 m²)
 - **Exception:** Minimum Clear Opening Area Ground Floor = 5.0 sq. ft (0.47 m²).



Product Specification 08 53 13 – Vinyl Windows



Note: Bolded text in this specification are options that are highlighted for the specifier to select or to list requirements.

Part 1 - General

A fully welded 3 1/4" PVC window frame designed for single family homes, townhouses, residential low and midrise construction and institutional projects. ¹

1.1 Summary

A. Section Includes: Vinyl Windows:

1. Vinyl **fixed and/or inswing and/or tilt** windows complete with **a flangeless frame** to be Starline's Eurostar 3000 Series window manufactured by Starline Windows Ltd.
2. Work included: Furnish labor, material and other services to complete the fabrication and installation of the windows, including all materials and fitments required for the operation of the units in the manner, direction and performance shown on the shop drawings and specified herein.

Work not included: Structural support of window framing, interior trims. (**Specifier list others**).

Related work specified elsewhere: (**Specifier to list**).

B. Related Sections: (**Specifier to select the following related sections**)

1. 07 27 00 – Air Barriers
2. 07 60 00 – Flashing and Trim
3. 07 92 00 – Joint Sealants
4. 08 15 23 – Vinyl-Framed Glass Swing Doors
5. 08 32 13 – Sliding Vinyl-Framed Glass Doors
6. 08 80 00 – Glazing

1.2 Quality Assurance

- A. Drawings and specifications for Work of this Section are based upon the Eurostar Series 3000 Punched Windows manufactured by Starline Windows. Whenever alternative products are offered, submit supporting technical literature, samples, drawings and performance data for comparison 10 days prior to closing date. Test reports must be made available on request.
- B. Windows shall be tested and conform to the AAMA/WDMA/CSA 101 I.S.2/A440-08, AAMA/WDMA/CSA 101 I.S.2/A440-11, and CSA A440SI-09 requirements.
- C. Manufacturer Qualifications:
1. Manufacturer to have a minimum 10 years of documented experience.
 2. Manufacturer capable of providing a vinyl window system that meet or exceed the performance requirements indicated.
- D. Installers to follow manufacture's installation procedures and recommendations.

- E. Mock-Up: If requested by consultant, a mock up is to be provided and installed at project site. Mock-up to include acceptable products and manufacturer approved installation methods. Obtain Owner's and Consultant's acceptance of finish color, and workmanship standard.

1.3 Structural requirements¹

Specifier to select or remove section depending on if project is engineered.

A. Limit mullion deflection to L/175.

- B. Allow for deflection of building structure. Vinyl windows shall be designed, fabricated and installed to withstand slab edge vertical differential deflections of maximum $3/4''^2$ and seismic inter-story lateral drift movements of elastic $\pm 3/8''^1$ without significant damage to the fenestration system or in-elastic $\pm 1 3/4''^1$ with significant damage expected but framing to be designed to remain anchored to the structure.

¹ Note to specifier: This section is only applicable if there is a Professional Engineer involved with the project.

² Values may change based on the configuration of the windows. Values to be specified by a Professional Engineer.

1.4 Test and Performance Requirements

Specifier to select from the following performance requirements.

- A. Fixed window wall shall meet performance class **CW-PG50** when tested to AAMA/WDMA/CSA 101 I.S.2/A440-08, AAMA/WDMA/CSA 101 I.S.2/A440-11, and CSA A440SI-09:
1. Air Infiltration: Fixed window air infiltration shall not exceed 0.02 cfm/ft² (A3) when tested in accordance with ASTM E 283 with a pressure difference of 1.57 psf / 75 Pa.
 2. Water Penetration Resistance:
 - I. There shall be no water infiltration for fixed windows when tested in accordance with ASTM E547 with a pressure difference of 15.3 psf / 720 Pa (Laboratory Test).
 - II. There shall be no water infiltration for fixed windows when tested in accordance with AAMA 502-08 with a pressure difference up to a maximum of 8.35 psf / 400 Pa (Field Test) ²
 3. Uniform Load Deflection Test: The deflection of fixed window shall not exceed L/175 and there shall be no permanent set when tested in accordance with ASTM E330 with a design pressure of 50 psf / 3600 Pa, positive and negative.
 4. Uniform Load Structural Test: There shall be no damage to hardware, accessories, fasteners, or any other damage that would render the window in operable when tested in accordance with ASTM E330 with a structural test pressure of 2400 Pa, positive and negative.
 5. Thermal Performance³
 - I. U-value: The maximum fixed window thermal transmittance U-value shall be **0.20 BTU/ hr*ft²*°F (1.14 W/m²*k) for double glazed and / or 0.12 BTU/ hr*ft²*°F (0.68 W/m²*k) for triple glazed** when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2. Windows shall be tested and labeled to N.F.R.C. standard 100 & 200.
 - II. Solar Heat Gain Coefficient: A (**maximum or minimum**) of **0.22 for double glazed and /or 0.16 for triple glazed**.
 - III. Visible Light Transmittance: A (**maximum or minimum**) of **0.51 for double glazed and /or 0.36 for triple glazed**.
- B. Operable windows (ventilator) shall meet performance class **CW- PG50¹** when tested to AAMA/WDMA/CSA 101 I.S.2/A440-08, AAMA/WDMA/CSA 101 I.S.2/A440-11 and CSA A440SI-09:

1. Air Infiltration: Operable window air infiltration shall not exceed 0.02 cfm/ft² (A3) when tested in accordance with ASTM E 283 with a pressure difference of 1.57 psf / 75 Pa.
2. Water Penetration Resistance:
 - I. There shall be no water infiltration for operable windows when tested in accordance with ASTM E547 with a pressure difference of 15.3 psf / 720 Pa (Laboratory Test).
 - II. There shall be no water infiltration for operable windows when tested in accordance with AAMA 502-08 with a pressure difference up to a maximum of 8.35 psf/ 400 Pa (Field Test)²
3. Uniform Load Deflection Test: The deflection of operable window shall not exceed L/175 and there shall be no permanent set when tested in accordance with ASTM E330 with a design pressure of 50 psf / 2400 Pa, positive and negative.
4. Uniform Load Structural Test: There shall be no damage to hardware, accessories, fasteners, or any other damage that would render the window in operable when tested in accordance with ASTM E330 with a structural test pressure of 3600 Pa, positive and negative.
5. Operable windows shall meet performance criteria for Operating Force and Force to latch when tested to ASTM E2068.
6. Thermal Performance³
 - I. U-value:
 - a. **Tilt & Turn:** The maximum window thermal transmittance U-value shall be **0.20 BTU/ hr*ft²*°F (1.14 W/m²*k) for double glazed and /or 0.14 BTU/ hr*ft²*°F (0.79 W/m²*k) for triple glazed** when tested in accordance with AAMA 1503.1 and CAN/CSA-A440.2. Windows shall be tested and labeled to N.F.R.C. standard 100 & 200.
 - II. Solar Heat Gain Coefficient:
 - a. **Tilt & Turn:** A (maximum or minimum) of **0.18 for double glazed and /or 0.14 for triple glazed.**
 - III. Visible Light Transmittance:
 - IV. **Tilt & Turn:** A (maximum or minimum) of **0.42 for double glazed and /or 0.31 for triple glazed.**

¹Note to specifier: Performance class result is based on lab testing and will vary by configuration and glass type. Contact Starline Windows for information on how the product can be engineered to achieve higher performance class than specified above.

²Note to specifier: 400Pa / 8.35 psf is the maximum field test result that can be achieved. Should the Project Specifications state a water penetration resistance field test pressure of a lesser value, the project specified values shall govern. The water penetration resistance field tests shall follow the criteria and testing procedures as outlined in the AAMA 502-08 specification standard.

³Note to specifier: Thermal performance depends on glass specified. For double glazed values the above test was performed using 20mm double glazed insulated glass unit (3mm/Argon/3mm) with Standard high-performance soft coat (sputtered) Low E which is applied to surface #2, argon filled with a stainless steel spacer bar. For triple glazed values the above test was performed using 36mm triple glazed insulated glass unit (3mm/Argon/3mm/Argon/3mm) with Standard high-performance soft coat (sputtered) Low E which is applied to surface #2, argon/air filled with aluminum spacer bar.

1.5 Submittals

- A. Product Data: Submit complete product data on system being used.
- B. Samples: Submit glass and frame colour(s) samples.
- C. Close-out Submittals:
 1. Warranty: Submit executed Manufacturer's warranty.

2. Project Record Documents: Submit operation and maintenance data for installed product in accordance with General Conditions.

Part 2 – Products

2.1 Manufacturers

- A. Acceptable Manufacturers: Starline Windows
 1. Vinyl Windows (Punched Opening): Eurostar 3000 Series
- B. Substitutions: Approved alternates

2.2 Material

- A. Vinyl Extrusion:
 1. 83 mm (3 1/4") deep perimeter frame member¹.
 2. Multi-chamber for strength and thermal performance
 3. Frame member and intermediate bars 100% uPVC and is UV stabilized for optimum outdoor performance.
- B. Fasteners: Stainless steel and / or steel coated with Leland DT200 coating and of sufficient size and quantity to perform their intended function.
- C. Gaskets: Extruded Santoprene, flexible PVC, Santoprene or EPDM
- D. Weather-stripping: Finseal material.
- E. Glass Setting Blocks:
 1. Fixed and Tilt/Turn: FPVC, Neoprene, EPDM, Santoprene or silicone with an 80 to 90 ± Shore A durometer hardness. Block material shall be compatible with sealed unit edge sealant.
- F. Glazing bead: uPVC and glazed from the inside.
- G. Glazing tape: Foam tape.

2.3 Fabrication

- A. Fabricate framing from extrusions of size and shape shown on approved shop drawings or approved signed order if shop drawings are not applicable.
- B. Main framing and operable sash (ventilator) extrusions shall be welded mitre corner construction.
- C. Intermediate mullions and T-Bars shall be butt jointed and gasketed, mechanically screwed and sealed to the main perimeter frame.
- D. All framing profiles shall be straight and free of deformations and defects.
- E. Joints shall be accurately machined, fitted and sealed.
- F. Coupling mullions shall be designed to provide a functional split to permit modular construction and allow for thermal expansion.
- G. Perimeter frame shall be 83mm (3 1/4") deep with a minimum wall thickness of 2mm (0.078") and be thermally broken.¹
- H. Operable window (ventilator) shall be 83mm (3 1/4") deep with a minimum wall thickness of 2mm (0.078") and be thermally broken.
- I. All interior joints and interior screw heads shall be sealed with a non-hardening sealant.

- J. Operable sash (ventilator) shall be weather sealed with triple gaskets.
- K. All glazing pockets shall be vented, pressure equalized, and drained to the outside.
- L. Glass bead shall be uPVC and a snap-in screw less type.

2.4 Glazing^{1,2}

- A. Double glazed, double seal insulated glass unit (IGU) with an overall thickness of 3/4" (20 mm). **Triple glazed IGU 1 3/8" (36mm) thick is available** (Refer to [2.7.A.1](#) of this specification).
- B. Standard high-performance soft coat (sputtered) Low E applied to surface #2.
- C. Aluminum spacer with argon fill.
- D. Glass thickness shall be 3mm. Glass thickness and quality shall conform to the requirements of the U.S.A. and Canadian Code for commercial construction, current edition.
- E. Where practical, glazing shall be installed at the factory before shipping to site.

¹ Note to specifier: Glazing noted above is based on Starline Windows standard product offering. There are various other options available. See [2.7.A.](#) of this specification.

² Note to specifier: Ensure 1.4.A.6 and / or 1.4.B.7 Thermal Performance values selected reflect if double and / or triple glazing is selected.

2.5 Hardware¹

- A. Hardware for the vinyl operable sash (ventilator) and window frames shall be furnished by the window manufacturer.
- B. Where practical, all hardware fittings shall be installed at the factory before shipping to site.
- C. Hardware shall be as follows:
 - 1. Tilt & Turn Operable sash (ventilator) shall be hung on concealed stainless-steel hinge. Hinges are completely concealed when operable sash (ventilator) is in its closed position.
 - 2. Zinc-alloy cam handle with an internal multi-point locking system. Handles are available in white and black powder coat finish.
 - 3. 60-degree hinge restricted to 4" with a plate restrictor.

2.6 Frame Finish¹

- A. All exposed surfaces of vinyl window and framing members shall be free of scratches and other serious surface blemishes.
- B. Finish: Standard white on the exterior and interior

¹ Note to Specifier: Option to have dual frame colour; painted colour on the exterior and interior of the window. Should an exterior colour be required, refer to [2.7.E.](#) of this specification.

2.7 Optional Items

Specifier to select from the following options and remove options not being selected

- A. Glazing
 - 1. Triple glazed 1 3/8" (36mm) IGU with black warm edge spacer bar with air fill.
 - 2. **4mm, 5mm, 6mm and greater thickness** available.
 - 3. Tinted, obscured & reflective glass

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4. Laminated glass
5. Insulated glass internal grilles
6. Surface mounted (plant-on) muntins.
7. Spacer bars
 - i. Warm edge spacer bar

B. Coupling mullions – Range of couplers are available, i.e.: 180°, 135° (Bay), variable degree, etc.

C. Extruded aluminum head flashing

D. Dual frame color upgrade options – 1 color on exterior and white on the interior:

E. Dual frame color upgrade options- 1 color on the exterior and one color on the interior

1. UV cure coating¹: UV cure coating on the exterior with white interior or uv- cure coat both interior and exterior² (**Specifier to select from the colour(s) listed below**).

Black

Brown

Silver

Charcoal

Beige

2. **Custom colours**³ may be available. Virtually any colour can be matched or closely matched. The scope of work and overall custom colour quantity will be reviewed by Starline on a project specific basis to determine the feasibility of the custom colour request.

F. Shop Drawings: Submit complete shop drawings which include floor plans, elevations, window schedule, and product components including anchorage, fasteners, accessories and finish colour

1. Non-engineered shop drawings.
2. Engineered shop drawings, stamped and sealed by professional engineer.

G. Hardware:

1. Operator opening restrictor

H. Protection: Insulated Glass Unit shall be protected with smart guard on the **exterior and / or interior**.

¹ Note to Specifier: UV colours are available for an additional cost premium.

² Note to specifier: All colors are available to be painted on the exterior and interior for an additional cost premium(minimum 10 windows to apply).

³ Custom colours are available for an additional cost premium. An approximate 12-week lead time is required to procure custom colour requests.

Part 3 - Execution

3.1 Examination

- A. Installer to examine openings, structural support, substrates and any other conditions that would affect the installation, for compliance with manufacturer's instructions.
- B. Verify rough opening dimensions.
- C. Verify sill is within tolerance of levelness to ensure adequate shimming to obtain proper drainage.

3.2 Installation

- A. Install manufacturer's system in accordance with manufacturer's installation procedures and recommendations and **approved shop drawings**.
- B. Windows shall be installed and adjusted by experienced personnel in accordance with the manufacturer instructions and **approved shop drawings**.
- C. All items in this section shall be set in their correct location and shall be set level, square, plumb and at proper elevations and in alignment with other work.

3.3 Field Quality and Control

- A. Manufacturer's Field Services: Upon Owner and/or Consultants written request, provide manufacturer's field service representative for site visit to inspect installation and to ensure accordance with manufacturer's instruction and approved shop drawings.
- B. Field Tests: Owner and/or Consultant may choose to conduct tests for water penetration and air infiltration.
 - 1. Testing Standard per AAMA 502.
 - 2. Field testing shall be performed by a qualified independent testing agency.
 - 3. Field testing should not occur until the window has been installed and the caulking is cured. Ensure the products used to complete building envelope tie in (membrane, caulking, flashing, cladding, etc.) are installed complete and have cured.

3.4 Protection and Cleaning

- A. Protection: Windows shall be isolated from concrete, mortar, plaster and dissimilar metals with bituminous paint or other isolation coatings.
- B. Cleaning: It shall be the responsibility of the General Contractor to maintain protection and provide final cleaning.

Note: This specification is intended to be used by a qualified Specifier and will require modifications for the project specific requirements. This specification is not intended to be use verbatim as the project specific specification.

Laws, building and safety codes governing the design and use of this product vary widely. Starline Windows does not control the selection and use of this product and assumes no responsibility therefor.

Series 3000 NFRC Product Energy Chart

NFRC PRODUCT ENERGY CHART							
DOUBLE (19mm IGU) TRIPLE (35mm IGU)	GLAZING (Exterior / Interior)	U VALUE (W/M ² K)	U VALUE (Btu/hft ² F)	Shading Coefficient	Solar Heat Gain Coefficient	Visible Light Transmittance	CPD (Certified Product Directory)
Center of Glass (COG)	3mm 270 (#2) / 3mm Clear	1.41	0.25	0.42	0.37	0.70	
	3mm 270 (#2) / 3mm i89 (#4)	1.14	0.20	0.41	0.36	0.68	
	3mm 366 (#2) / 3mm Clear	1.38	0.24	0.31	0.27	0.65	
	3mm 366 (#2) / 3mm i89 (#4)	1.11	0.20	0.31	0.27	0.63	
	3mm 180 (#2) / 3mm Clear	1.49	0.26	0.74	0.65	0.79	
	3mm 180 (#2) / 3mm i89 (#4)	1.19	0.21	0.72	0.62	0.77	
	3mm 270 (#2) / 3mm Clear / 3mm Clear	1.06	0.19	0.39	0.34	0.64	
	3mm 270 (#2) / 3mm Clear / 3mm 270 (#5)	0.69	0.12	0.36	0.31	0.55	
	3mm 270 (#2) / 3mm 270 (#4) / 3mm i89 (#6)	0.61	0.11	0.32	0.28	0.53	
	3mm 366 (#2) / 3mm Clear / 3mm Clear	1.03	0.18	0.29	0.25	0.59	
	3mm 366 (#2) / 3mm Clear / 3mm 366 (#5)	0.67	0.12	0.27	0.24	0.47	
	3mm 366 (#2) / 3mm 366 (#4) / 3mm i89 (#6)	0.59	0.10	0.23	0.20	0.46	
	3mm 180 (#2) / 3mm Clear / 3mm Clear	1.10	0.19	0.68	0.59	0.73	
	3mm 180 (#2) / 3mm Clear / 3mm 180 (#5)	0.75	0.13	0.64	0.56	0.70	
	3mm 180 (#2) / 3mm 180 (#4) / 3mm i89 (#6)	0.66	0.12	0.61	0.53	0.68	
PICTURE	3mm 270 (#2) / 3mm Clear	1.41	0.25	0.34	0.30	0.56	STL-A-56-00233-00001
	3mm 270 (#2) / 3mm i89 (#4)	1.18	0.21	0.33	0.29	0.55	STL-A-56-00234-00001
	3mm 366 (#2) / 3mm Clear	1.39	0.24	0.25	0.22	0.52	STL-A-56-00235-00001
	3mm 366 (#2) / 3mm i89 (#4)	1.16	0.20	0.25	0.22	0.51	STL-A-56-00236-00001
	3mm 180 (#2) / 3mm Clear	1.47	0.26	0.60	0.52	0.63	STL-A-56-00345-00001
	3mm 180 (#2) / 3mm i89 (#4)	1.22	0.22	0.58	0.50	0.62	STL-A-56-00346-00001
	3mm 270 (#2) / 3mm Clear / 3mm Clear	1.10	0.19	0.31	0.27	0.51	STL-A-56-00285-00001
	3mm 270 (#2) / 3mm Clear / 3mm 270 (#5)	0.81	0.14	0.29	0.25	0.44	STL-A-56-00286-00001

	3mm 270 (#2) / 3mm 270 (#4) / 3mm i89 (#6)	0.74	0.13	0.26	0.23	0.42	STL-A-56-00287-00001
	3mm 366 (#2) / 3mm Clear / 3mm Clear	1.08	0.19	0.23	0.20	0.47	STL-A-56-00288-00001
	3mm 366 (#2) / 3mm Clear / 3mm 366 (#5)	0.79	0.14	0.22	0.19	0.37	STL-A-56-00289-00001
	3mm 366 (#2) / 3mm 366 (#4) / 3mm i89 (#6)	0.72	0.13	0.19	0.17	0.36	STL-A-56-00290-00001
	3mm 180 (#2) / 3mm Clear / 3mm Clear	1.13	0.20	0.55	0.48	0.58	STL-A-56-00373-00001
	3mm 180 (#2) / 3mm Clear / 3mm 180 (#5)	0.85	0.15	0.52	0.45	0.56	STL-A-56-00374-00001
	3mm 180 (#2) / 3mm 180 (#4) / 3mm i89 (#6)	0.77	0.14	0.49	0.43	0.55	STL-A-56-00375-00001

TILT&TURN	3mm 270 (#2) / 3mm Clear	1.37	0.24	0.29	0.25	0.47	STL-A-58-00233-00001
	3mm 270 (#2) / 3mm i89 (#4)	1.18	0.21	0.28	0.25	0.46	STL-A-58-00234-00001
	3mm 366 (#2) / 3mm Clear	1.35	0.24	0.21	0.19	0.43	STL-A-58-00235-00001
	3mm 366 (#2) / 3mm i89 (#4)	1.16	0.21	0.21	0.18	0.42	STL-A-58-00236-00001
	3mm 180 (#2) / 3mm Clear	1.42	0.25	0.50	0.44	0.53	STL-A-58-00345-00001
	3mm 180 (#2) / 3mm i89 (#4)	1.22	0.21	0.48	0.42	0.52	STL-A-58-00346-00001
	3mm 270 (#2) / 3mm Clear / 3mm Clear	1.10	0.19	0.27	0.23	0.43	STL-A-58-00285-00001
	3mm 270 (#2) / 3mm Clear / 3mm 270 (#5)	0.86	0.15	0.24	0.21	0.36	STL-A-58-00286-00001
	3mm 270 (#2) / 3mm 270 (#4) / 3mm i89 (#6)	0.80	0.14	0.22	0.19	0.36	STL-A-58-00287-00001
	3mm 366 (#2) / 3mm Clear / 3mm Clear	1.09	0.19	0.20	0.17	0.40	STL-A-58-00288-00001
	3mm 366 (#2) / 3mm Clear / 3mm 366 (#5)	0.85	0.15	0.19	0.16	0.31	STL-A-58-00289-00001
	3mm 366 (#2) / 3mm 366 (#4) / 3mm i89 (#6)	0.79	0.14	0.16	0.14	0.30	STL-A-58-00290-00001
	3mm 180 (#2) / 3mm Clear / 3mm Clear	1.13	0.20	0.46	0.40	0.49	STL-A-58-00373-00001
	3mm 180 (#2) / 3mm Clear / 3mm 180 (#5)	0.90	0.16	0.44	0.38	0.47	STL-A-58-00374-00001
	3mm 180 (#2) / 3mm 180 (#4) / 3mm i89 (#6)	0.83	0.15	0.41	0.36	0.46	STL-A-58-00375-00001