

03/16/21

CERTIFICATE OF APPROPRIATENESS

Timothy R. Flintoff, Jr.
4545 Architecture
3011 W. Grand Blvd., Ste. 400
Detroit, MI 48202

**RE: Application Number 21-7107; 1566 Bagley; Corktown Historic District
Project Scope: Erect new duplex building**

Dear Applicant,

At the Regular Meeting that was held on March 10, 2021, the Detroit Historic District Commission ("Commission") reviewed the above-referenced application for building permit. Pursuant to Section 5(10) of the Michigan Local Historic District Act, as amended, being MCL 399.205, MSA 5-3407(5)(10) and Section 21-2-73 of the 2019 Detroit City Code; the Commission hereby issues a Certificate of Appropriateness for the following work, effective on March 16, 2021, as it meets the Secretary of Interior's Standards for Rehabilitation and the district's Elements of Design:

Erect new duplex building, per the submitted documents and drawings.

Please retain this COA for your files. You should now proceed to obtain a building permit from the City of Detroit Buildings, Safety, Engineering and Environmental Department. It is important to note that approval by the Detroit Historic District Commission does not waive the applicant's responsibility to comply with any other applicable ordinances or statutes. If you have any questions regarding the foregoing, please contact me at 313-224-1762.

For the Commission:



Garrick Landsberg
Director/Staff
Detroit Historic District Commission

THIS IS A 3-PAGE FORM - ALL INFORMATION IS REQUIRED FOR PROJECT REVIEW

HISTORIC DISTRICT COMMISSION PROJECT REVIEW REQUEST

City of Detroit - Planning & Development Department
2 Woodward Avenue, Suite 808
Detroit, Michigan 48226

Date: _____

PROPERTY INFORMATION

ADDRESS: _____ AKA: _____

HISTORIC DISTRICT: _____

SCOPE OF WORK: (Check ALL that apply)

<input type="checkbox"/> Windows/ Doors	<input type="checkbox"/> Roof/Gutters/ Chimney	<input type="checkbox"/> Porch/ Deck	<input type="checkbox"/> Landscape/Fence/ Tree/Park	<input type="checkbox"/> General Rehab
<input type="checkbox"/> New Construction	<input type="checkbox"/> Demolition	<input type="checkbox"/> Addition	<input type="checkbox"/> Other: _____	

APPLICANT IDENTIFICATION

Property Owner/
Homeowner

Contractor

Tenant or
Business Occupant

Architect/Engineer/
Consultant

NAME: _____ COMPANY NAME: _____

ADDRESS: _____ CITY: _____ STATE: _____ ZIP: _____

PHONE: _____ MOBILE: _____ EMAIL: _____

PROJECT REVIEW REQUEST CHECKLIST

Please attach the following documentation to your request:

PLEASE KEEP FILE SIZE OF ENTIRE SUBMISSION UNDER 30MB

- Completed Building Permit Application** (highlighted portions only)
- ePLANS Permit Number** (only applicable if you've already applied for permits through ePLANS)
- Photographs** of ALL sides of existing building or site
- Detailed photographs** of location of proposed work (photographs to show existing condition(s), design, color, & material)
- Description of existing conditions** (including materials and design)
- Description of project** (if replacing any existing material(s), include an explanation as to why replacement--rather than repair--of existing and/or construction of new is required)
- Detailed scope of work** (formatted as bulleted list)
- Brochure/cut sheets** for proposed replacement material(s) and/or product(s), as applicable

NOTE:

Based on the scope of work, additional documentation may be required.

See www.detroitmi.gov/hdc for scope-specific requirements.

Upon receipt of this documentation, staff will review and inform you of the next steps toward obtaining your building permit from the Buildings, Safety Engineering and Environmental Department (BSEED) to perform the work.

SUBMIT COMPLETED REQUESTS TO HDC@DETROITMI.GOV

P2 - BUILDING PERMIT APPLICATION

Date: _____

PROPERTY INFORMATION

Address: _____ Floor: _____ Suite#: _____ Stories: _____

AKA: _____ Lot(s): _____ Subdivision: _____

Parcel ID#(s): _____ Total Acres: _____ Lot Width: _____ Lot Depth: _____

Current Legal Use of Property: _____ Proposed Use: _____

Are there any existing buildings or structures on this parcel? Yes No

PROJECT INFORMATION

Permit Type: New Alteration Addition Demolition Correct Violations

Foundation Only Change of Use Temporary Use Other: _____

Revision to Original Permit #: _____ (Original permit has been issued and is active)

Description of Work (Describe in detail proposed work and use of property, attach work list)

MBC use change No MBC use change

Included Improvements (Check all applicable; these trade areas require separate permit applications)

HVAC/Mechanical Electrical Plumbing Fire Sprinkler System Fire Alarm

Structure Type

New Building Existing Structure Tenant Space Garage/Accessory Building

Other: _____ Size of Structure to be Demolished (LxWxH) _____ cubic ft.

Construction involves changes to the floor plan? Yes No

(e.g. interior demolition or construction to new walls)

Use Group: _____ Type of Construction (per current MI Bldg Code Table 601) _____

Estimated Cost of Construction \$ _____ By Contractor \$ _____ By Department

Structure Use

Residential-Number of Units: _____ Office-Gross Floor Area _____ Industrial-Gross Floor Area _____

Commercial-Gross Floor Area: _____ Institutional-Gross Floor Area _____ Other-Gross Floor Area _____

Proposed No. of Employees: _____ List materials to be stored in the building: _____

PLOT PLAN SHALL BE submitted on separate sheets and shall show all easements and measurements (must be correct and in detail). SHOW ALL streets abutting lot, indicate front of lot, show all buildings, existing and proposed distances to lot lines. (Building Permit Application Continues on Next Page)

For Building Department Use Only

Intake By: _____ Date: _____ Fees Due: _____ DngBld? No

Permit Description: _____

Permit #: _____ Current Legal Land Use: _____ Proposed Use: _____

Permit#: _____ Date Permit Issued: _____ Permit Cost: \$ _____

Zoning District: _____ Zoning Grant(s): _____

Lots Combined? Yes No (attach zoning clearance)

Revised Cost (revised permit applications only) Old \$ _____ New \$ _____

Structural: _____ Date: _____ Notes: _____

Zoning: _____ Date: _____ Notes: _____

Other: _____ Date: _____ Notes: _____



IDENTIFICATION (All Fields Required)

Property Owner/Homeowner Property Owner/Homeowner is Permit Applicant

Name: _____ Company Name: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Mobile: _____

Driver's License #: _____ Email: _____

Contractor Contractor is Permit Applicant

Representative Name: _____ Company Name: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Mobile: _____ Email: _____

City of Detroit License #: _____

TENANT OR BUSINESS OCCUPANT Tenant is Permit Applicant

Name: _____ Phone: _____ Email: _____

ARCHITECT/ENGINEER/CONSULTANT Architect/Engineer/Consultant is Permit Applicant

Name: _____ State Registration#: _____ Expiration Date: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone: _____ Mobile: _____ Email: _____

HOMEOWNER AFFIDAVIT (Only required for residential permits obtained by homeowner.)

I hereby certify that I am the legal owner and occupant of the subject property and the work described on this permit application shall be completed by me. I am familiar with the applicable codes and requirements of the City of Detroit and take full responsibility for all code compliance, fees and inspections related to the installation/work herein described. I shall neither hire nor sub-contract to any other person, firm or corporation any portion of the work covered by this building permit.

Print Name: _____ Signature: _____ Date: _____
(Homeowner)

Subscribed and sworn to before me this _____ day of _____ 20 ____ A.D. _____ County, Michigan

Signature: _____ My Commission Expires: _____
(Notary Public)

PERMIT APPLICANT SIGNATURE

I hereby certify that the information on this application is true and correct. I have reviewed all deed restrictions that may apply to this construction and am aware of my responsibility thereunder. I certify that the proposed work is authorized by the owner of the record and I have been authorized to make this application as the property owner(s) authorized agent. Further I agree to conform to all applicable laws and ordinances of jurisdiction. **I am aware that a permit will expire when no inspections are requested and conducted within 180 days of the date of issuance or the date of the previous inspection and that expired permits cannot be**

Print Name: _____ Signature: _____ Date: _____
(Permit Applicant)

Driver's License #: _____ Expiration: _____

Subscribed and sworn to before me this _____ day of _____ 20 ____ A.D. _____ County, Michigan

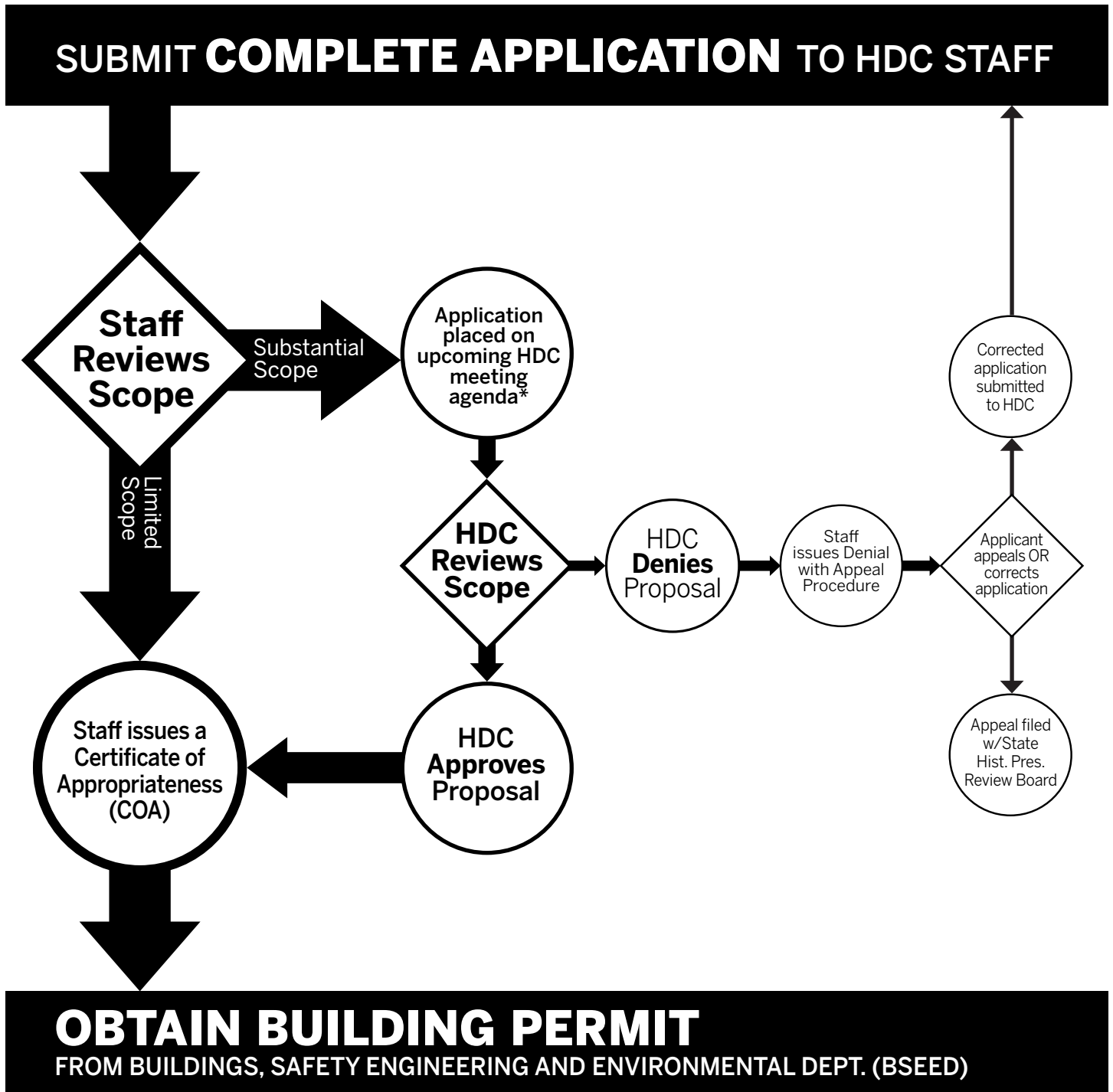
Signature: _____ My Commission Expires: _____
(Notary Public)

Section 23a of the state construction code act of 1972, 1972PA230, MCL 125.1523A, prohibits a person from conspiring to circumvent the licensing requirements of this state relating to persons who are to perform work on a residential building or a residential structure. Visitors of Section 23a are subject to civil fines.

This application can also be completed online. Visit detroitmi.gov/bseed/elaps for more information.



HISTORIC DISTRICT COMMISSION REVIEW & PERMIT PROCESS



* THE COMMISSION MEETS REGULARLY AT LEAST ONCE PER MONTH, TYPICALLY ON THE SECOND WEDNESDAY OF THE MONTH. (SEE WEBSITE FOR MEETING SCHEDULE/AGENDAS)

FIND OUT MORE AT www.detroitmi.gov/hdc



February 22, 2021

1566 Bagley St.
Detroit, MI 48216

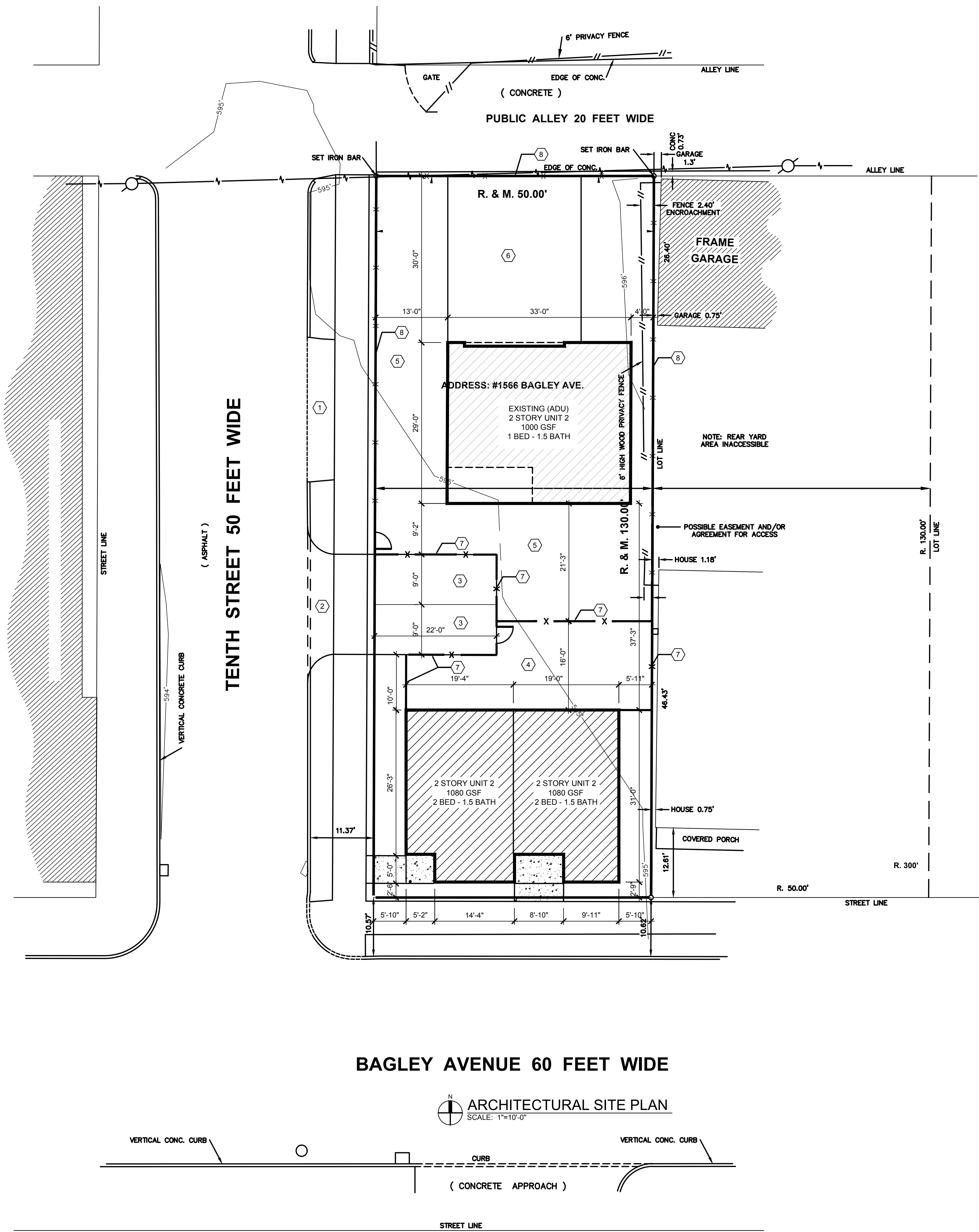
RE: 1566 Bagley St. Residential New Construction, Historic District Commission Submission

Project Narrative

The project proposes to construct a new 2-story 2-unit townhouse building at the corner of Bagley and 10th Streets. In 2016, the owners of the parcel constructed a single-family home with attached first-floor 2-car garage located at the rear (north) side of the site. Their vision always included eventually building rental units at the front of the property, with their unit acting as a carriage house off the alley. The design of the new townhomes takes cues from the existing home, replicating the gray metal siding, wood shiplap siding at the inset entries, and the overall simple massing featuring a single slope roof. The new townhomes introduce brick cladding on the first story along both Bagley and 10th Streets. The addition of brick provides additional durability along the sidewalk and adds visual weight to the base and allows the building to hold the corner. An existing stained wood fence currently encircles the owner's home at the rear of the site. The proposed project adds two off-street parking spaces accessed from 10th Street, and extends the existing fence to create a new shared exterior yard space at the rear of the new townhomes.

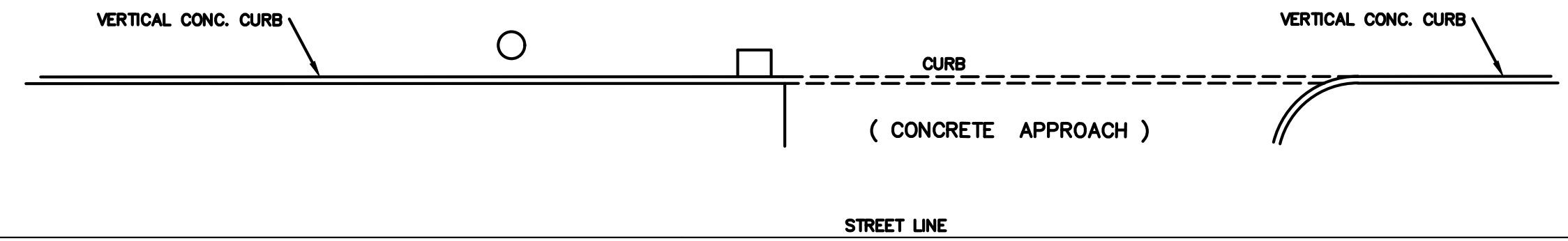
Project Scope

- Construct a new 2-unit Townhouse Building
- Construct 2 new parking spaces off of 10th Street (including new curb cut)
- Extend/modify existing stained wood fence as shown on site plan



BAGLEY AVENUE 60 FEET WIDE

ARCHITECTURAL SITE PLAN
SCALE: 1"=10'-0"



GENERAL SITE PLAN NOTES:

- PAVEMENT SHALL BE OF THE TYPE, THICKNESS AND CROSS SECTION AS INDICATED ON THE PLANS AND AS FOLLOWS:
- CONCRETE: PORTLAND CEMENT TYPE IA (AIR-ENTRAINED) WITH A MINIMUM CEMENT CONTENT OF SIX SACKS PER CUBIC YARD, MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3,500 PSI AND A SLUMP OF 1 1/2 TO 3 INCHES.
- ASPHALT: BASE COURSE - MDOT BITUMINOUS MIXTURE NO. 1100L, 20AA; SURFACE COURSE - MDOT BITUMINOUS MIXTURE NO. 1100T, 20AA; ASPHALT CEMENT PENETRATION GRADE 85-100, BOND COAT - MDOT SS-1H EMULSION AT 0.10 GALLON PER SQUARE YARD; MAXIMUM 2 INCH LIFT.
- PAVEMENT BASE SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY (MODIFIED PROCTOR) PRIOR TO PLACEMENT OF PROPOSED PAVEMENT. EXISTING SUB-BASE SHALL BE PROOF-ROLLED IN THE PRESENCE OF THE ENGINEER TO DETERMINE STABILITY.
- ALL CONCRETE PAVEMENT, DRIVEWAYS, CURB & GUTTER, ETC., SHALL BE SPRAY CURED WITH WHITE MEMBRANE CURING COMPOUND IMMEDIATELY FOLLOWING FINISHING OPERATION.
- ALL CONCRETE PAVEMENT JOINTS SHALL BE FILLED WITH HOT POURED RUBBERIZED ASPHALT JOINT SEALING COMPOUND IMMEDIATELY AFTER SAWCUT OPERATION. FEDERAL SPECIFICATION SS-S164.
- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CURRENT STANDARDS AND SPECIFICATIONS OF THE MUNICIPALITY AND THE MICHIGAN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION.
- ALL TOP OF CURB ELEVATIONS, AS SHOWN ON THE PLANS, ARE CALCULATED FOR A 6" CONCRETE CURB UNLESS OTHERWISE NOTED.
- ALL SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1993, SHALL BE INSTALLED AS INDICATED ON THE PLANS.
- CONSTRUCTION OF A NEW OR RECONSTRUCTED DRIVE APPROACH CONNECTING TO AN EXISTING STATE OR COUNTY ROADWAY SHALL BE ALLOWED ONLY AFTER AN APPROVED PERMIT HAS BEEN SECURED FROM THE AGENCY HAVING JURISDICTION OVER SAID ROADWAY.
- FOR ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL PAY FOR AND SECURE ALL NECESSARY PERMITS AND LIKEWISE ARRANGE FOR ALL INSPECTION.
- EXISTING TOPSOIL, VEGETATION AND ORGANIC MATERIALS SHALL BE STRIPPED AND REMOVED FROM PROPOSED PAVEMENT AREA PRIOR TO PLACEMENT OF BASE MATERIALS.
- EXPANSION JOINTS SHOULD BE INSTALLED AT THE END OF ALL INTERSECTION RADII.
- SIDEWALK RAMPS, CONFORMING TO PUBLIC ACT NO. 8, 1973, SHALL BE INSTALLED AS SHOWN AT ALL STREET INTERSECTIONS AND AT ALL BARRIER FREE PARKING AREAS AS INDICATED ON THE PLANS.

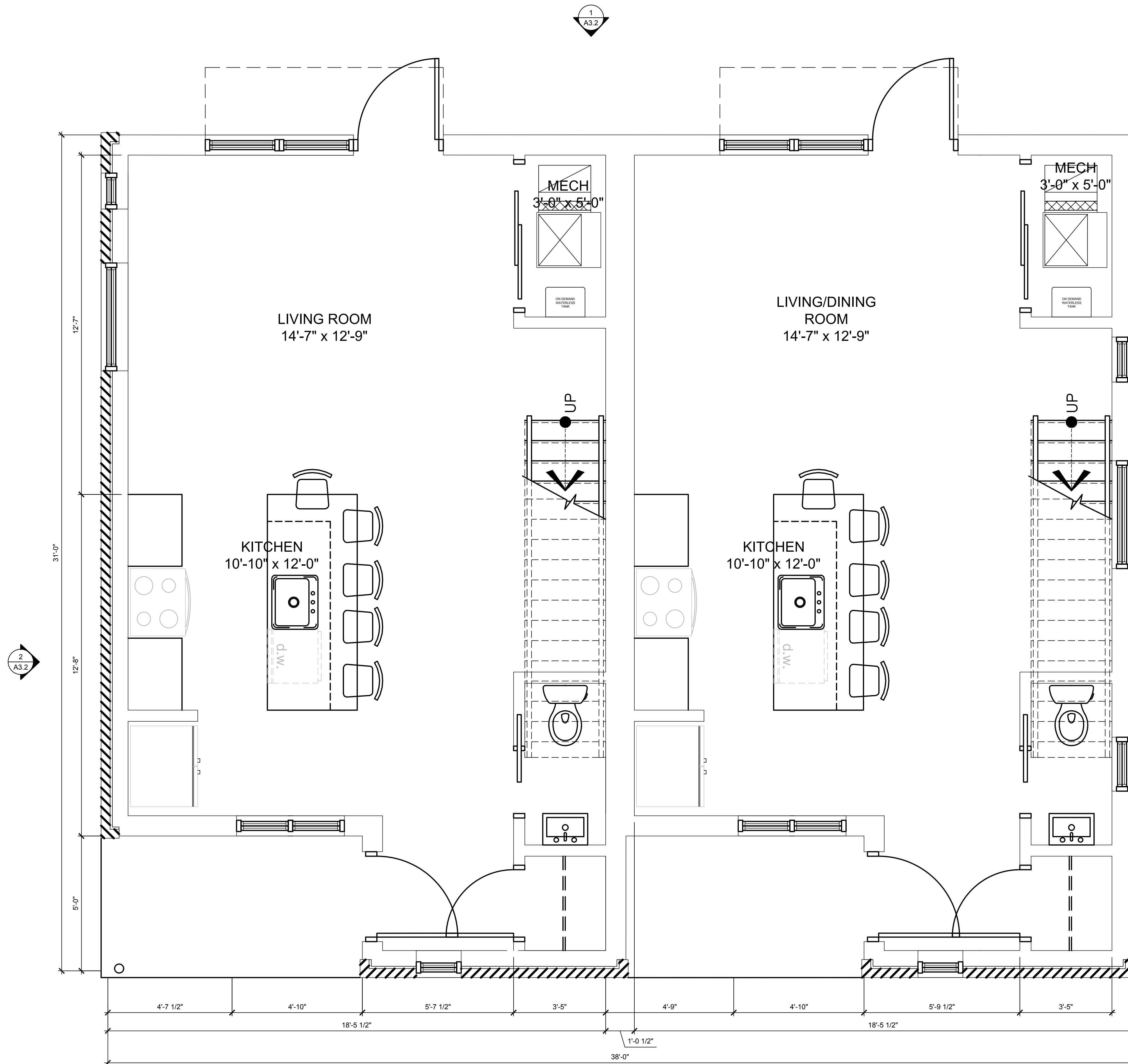
SITE PLAN KEY NOTES:

- (TYPICAL THIS SHEET ONLY)
- 1 EXISTING CURB CUT TO BE REMOVED
 - 2 RELOCATED CURB CUT FOR OFF STREET PARKING
 - 3 TOWNHOUSE PARKING
 - 4 TOWNHOUSE SHARED BACKYARD
 - 5 OWNER (ADU) YARD
 - 6 OWNER (ADU) PARKING
 - 7 EXISTING FENCE TO REMAIN
 - 8 NEW FENCE TO MATCH EXISTING

ARCHITECT: 4545 architecture 3011 W. GRAND BLVD STE 400 DETROIT, MI 48208 P. 248.320.6098 TIM.FLINTOFF@4545ARCHITECTURE.COM	
CONSULTANT:	
Project :	
Issued for : HDC 02-22-2021	
Drawn by : TRF Check by :	
Sheet Title : ARCHITECTURAL SITE PLAN	
Project No. : 2021048	
Sheet No. : SP1.1	

NOT FOR CONSTRUCTION

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GENERAL FLOOR PLAN NOTES:

1. THIS DRAWING IS DIAGRAMMATIC AND SHOULD BE USED TO DETERMINE THE DESIGN INTENT. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE SET OF WORK AS INDICATED AND SHALL FIELD VERIFY ALL WORK, COORDINATE ALL DRAWINGS / NEW WORK AND SHALL NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES IN THE DOCUMENTS BEFORE PROCEEDING. FAILURE TO DO SO WILL RESULT IN THE CONTRACTOR TAKING FULL RESPONSIBILITY AND LIABILITY FOR SAID DISCREPANCIES.
2. ALL DIMENSIONS ARE SHOWN FROM FINISH FACE TO FINISH FACE OF PARTITION UNLESS OTHERWISE NOTED.
3. WALL THICKNESS ARE NOMINAL NOT ACTUAL DIMENSIONS. SEE WALL SCHEDULE FOR ACTUAL DIMENSIONS.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL, STATE, COUNTY CODE REGULATIONS, O.S.H.A., AND THE AMERICAN WITH DISABILITIES ACT (ADA). REFER TO THE CODE PLAN FOR MORE INFORMATION.
5. PROVIDE POSITIVE SLOPE TO ALL FLOOR DRAINS WHILE KEEPING FLOOR LEVEL AT WALL BASE CONDITION.

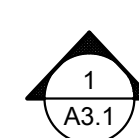
FLOOR PLAN KEY NOTES:

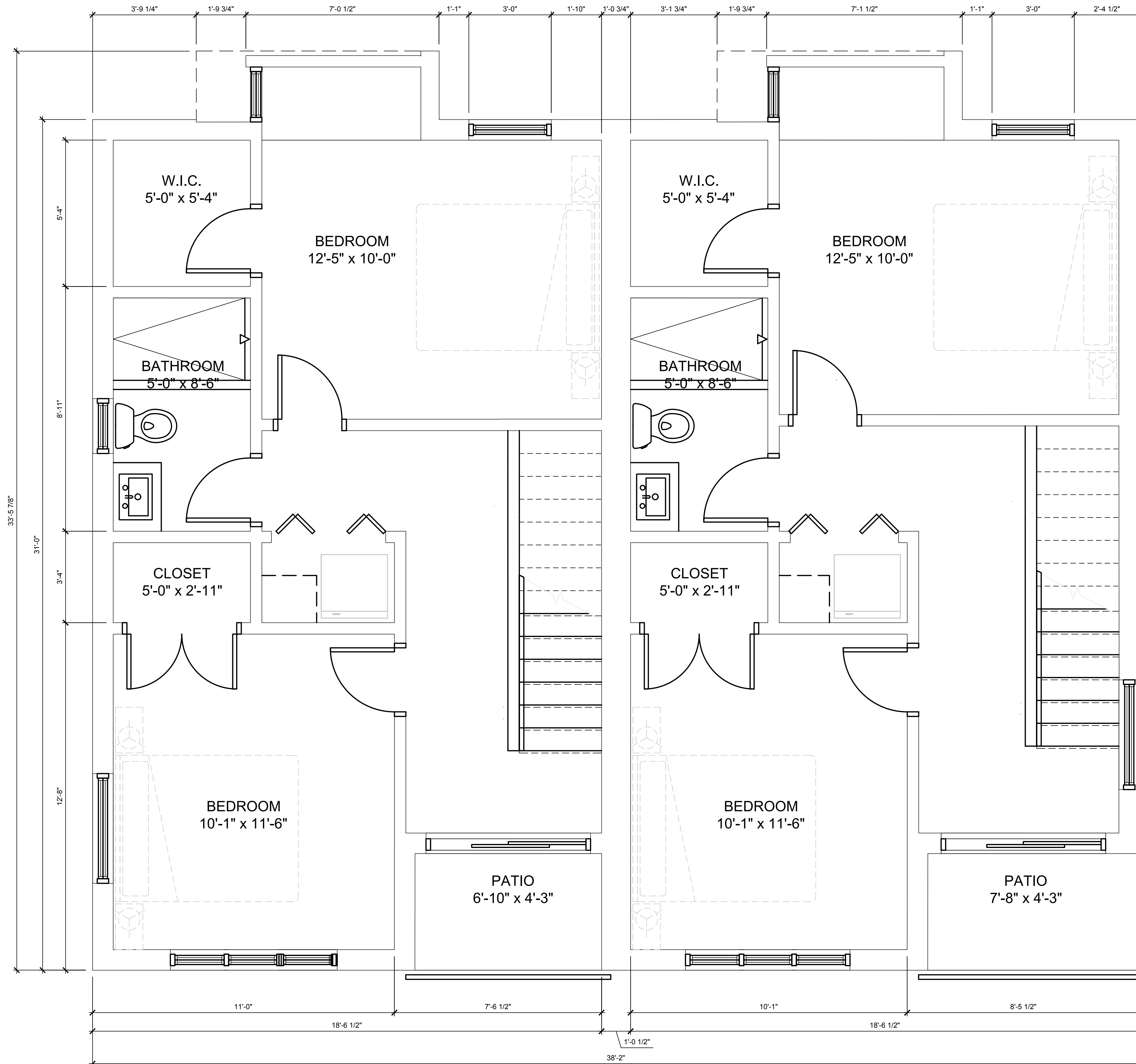
(TYPICAL THIS SHEET ONLY)

- ① -
- ② -

ARCHITECT: 4545 architecture 3011 W. GRAND BLVD STE 400 DETROIT, MI 48208 P. 248.320.6098 TIM.FLINTOFF@4545ARCHITECTURE.COM	
CONSULTANT: 	
Project :	
Issued for : HDC 02/22/2021	
NOT FOR CONSTRUCTION	
Drawn by : TRIF	Check by :
Sheet Title : 1ST FLOOR PLAN	
Project No. : 2021048	
Sheet No. : A1.1	

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FIRST FLOOR PLAN
 SCALE: 1/2"=1'-0"



GENERAL FLOOR PLAN NOTES:

1. THIS DRAWING IS DIAGRAMMATIC AND SHOULD BE USED TO DETERMINE THE DESIGN INTENT. THE CONTRACTOR IS RESPONSIBLE FOR THE COMPLETE SET OF WORK AS INDICATED AND SHALL FIELD VERIFY ALL WORK. COORDINATE ALL DRAWINGS / NEW WORK AND SHALL NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES IN THE DOCUMENTS BEFORE PROCEEDING. FAILURE TO DO SO WILL RESULT IN THE CONTRACTOR TAKING FULL RESPONSIBILITY AND LIABILITY FOR SAID DISCREPANCIES.
2. ALL DIMENSIONS ARE SHOWN FROM FINISH FACE TO FINISH FACE OF PARTITION UNLESS OTHERWISE NOTED.
3. WALL THICKNESS' ARE NOMINAL NOT ACTUAL DIMENSIONS. SEE WALL SCHEDULE FOR ACTUAL DIMENSIONS.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL LOCAL, STATE, COUNTY CODE REGULATIONS, O.S.H.A., AND THE AMERICAN WITH DISABILITIES ACT (ADA). REFER TO THE CODE PLAN FOR MORE INFORMATION.
5. PROVIDE POSITIVE SLOPE TO ALL FLOOR DRAINS WHILE KEEPING FLOOR LEVEL AT WALL BASE CONDITION.

FLOOR PLAN KEY NOTES:

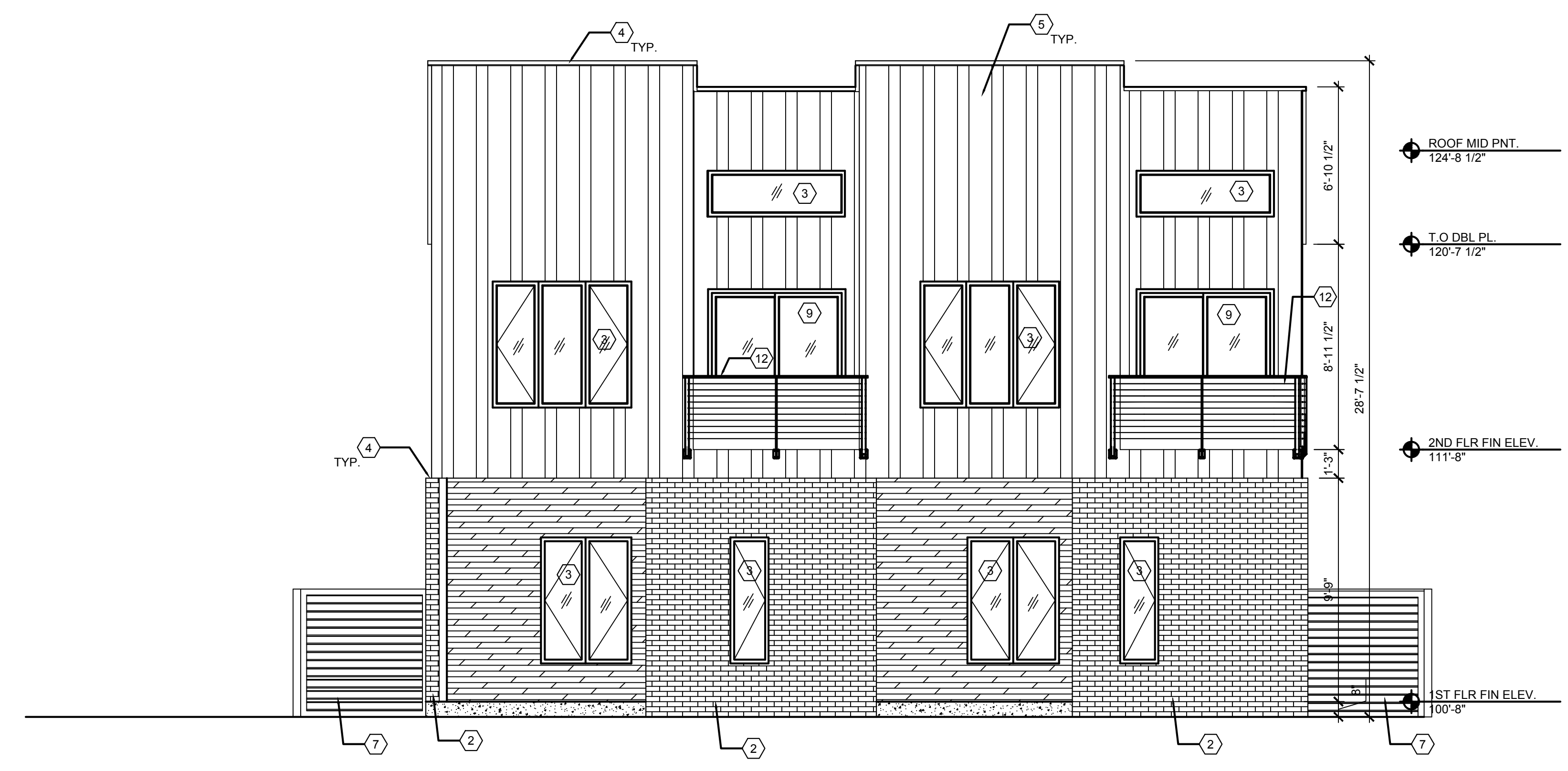
(TYPICAL THIS SHEET ONLY)

- ① -
- ② -

SECOND FLOOR PLAN
SCALE: 1/2"=1'-0"

ARCHITECT: 4545 architecture 3011 W. GRAND BLVD STE 400 DETROIT, MI 48208 P. 248.320.6098 TIM.FLINTOFF@4545ARCHITECTURE.COM	
CONSULTANT:	
Project :	
Issued for : HDC 02/22/2021	
NOT FOR CONSTRUCTION	
Drawn by : TRF	Check by :
Sheet Title : 2ND FLOOR PLAN	
Project No. : 2021048	
Sheet No. : A1.2	

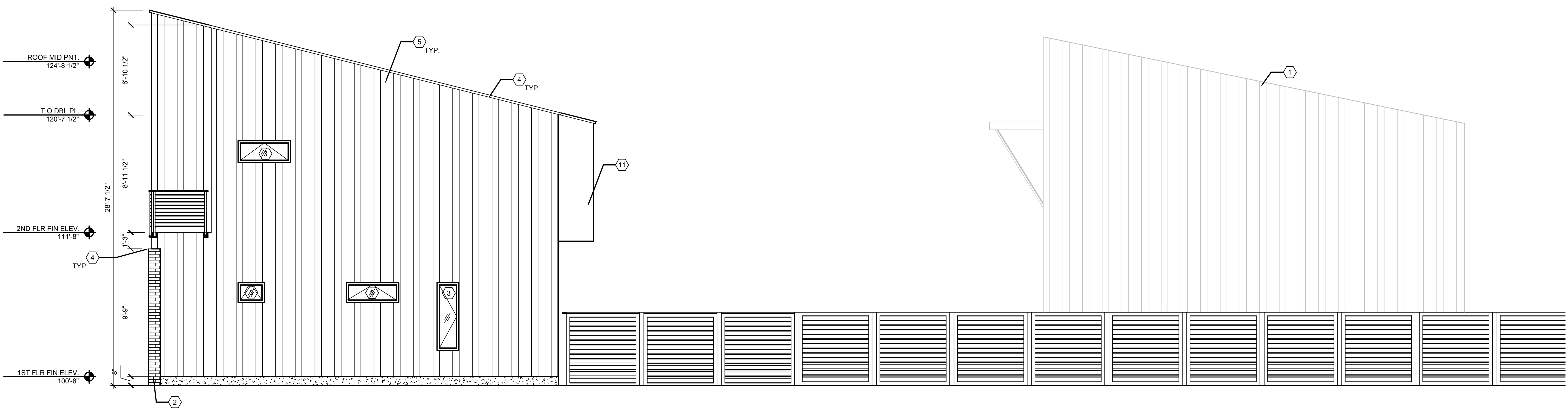
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1 SOUTH ELEVATION
 SCALE: 1/4" = 1'-0"

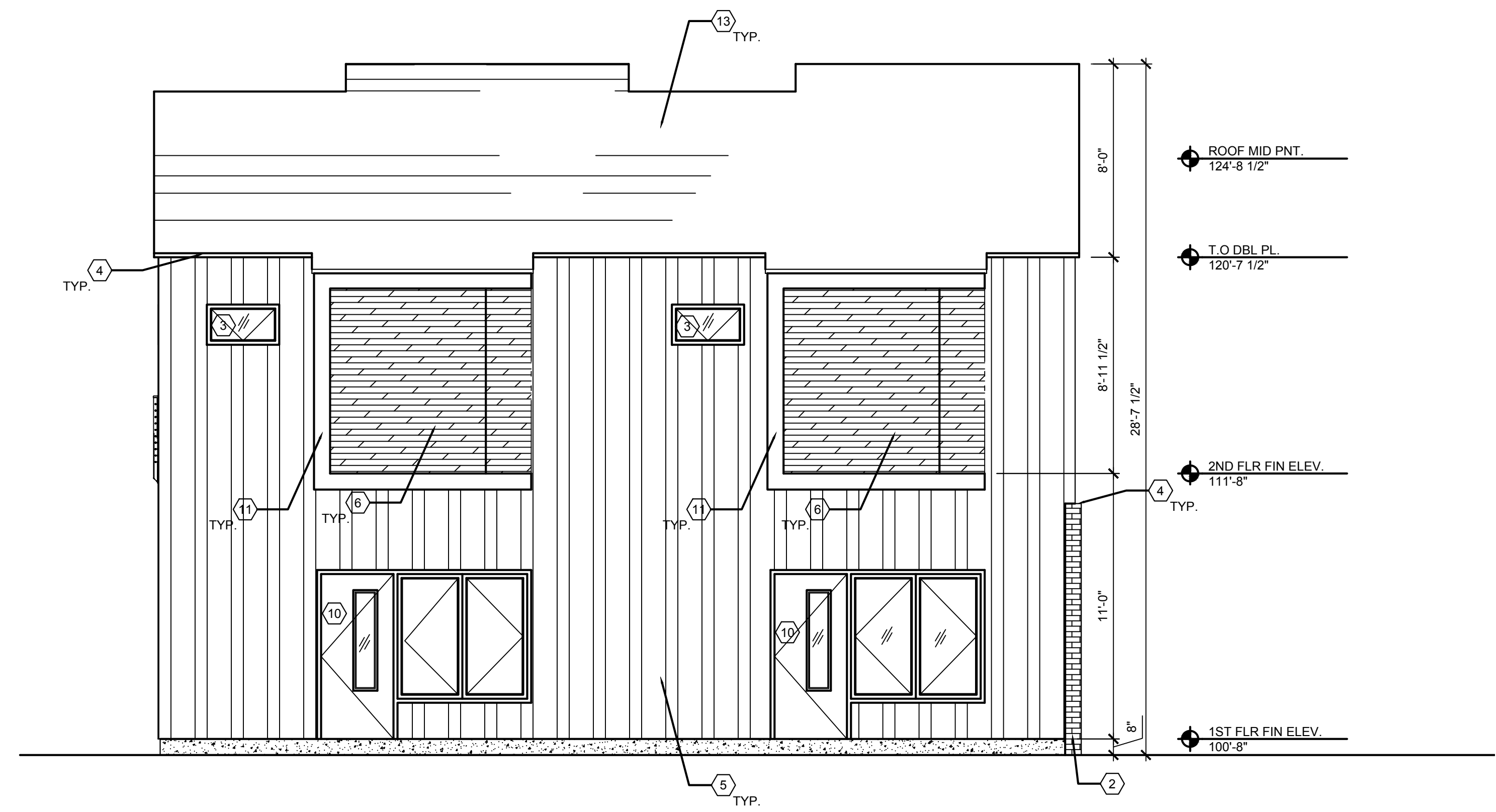
FLOOR PLAN KEY NOTES:

- (TYPICAL THIS SHEET A3.1 & A3.2)
- 1 EXIST RESIDENTIAL STRUCTURE
 - 2 BRICK - GRAY COLOR
 - 3 NEW WINDOW - DARK ANODIZED FINISHED.
 - 4 METAL COPING - SLATE GRAY FINISH
 - 5 CORRUGATED METAL SIDING - DARK GRAY FINISH
 - 6 STAINED CEDAR ON RAIN SCREEN FURRING
 - 7 NEW WOOD FENCE TO MATCH EXISTING ON SITE
 - 8 WOOD ENTRY DOOR TO MATCH EXIST ON ADJACENT HOUSE
 - 9 DOOR WALL - DARK ANODIZED FINISH
 - 10 ENTRY DOOR/WINDOW - DARK ANODIZED FINISH
 - 11 HARDIE SIDING - PAINTED BLACK
 - 12 BLACK METAL RAILING
 - 13 ASPHALT DIMENSIONAL SINGLE ROOF - BLACK FINISH

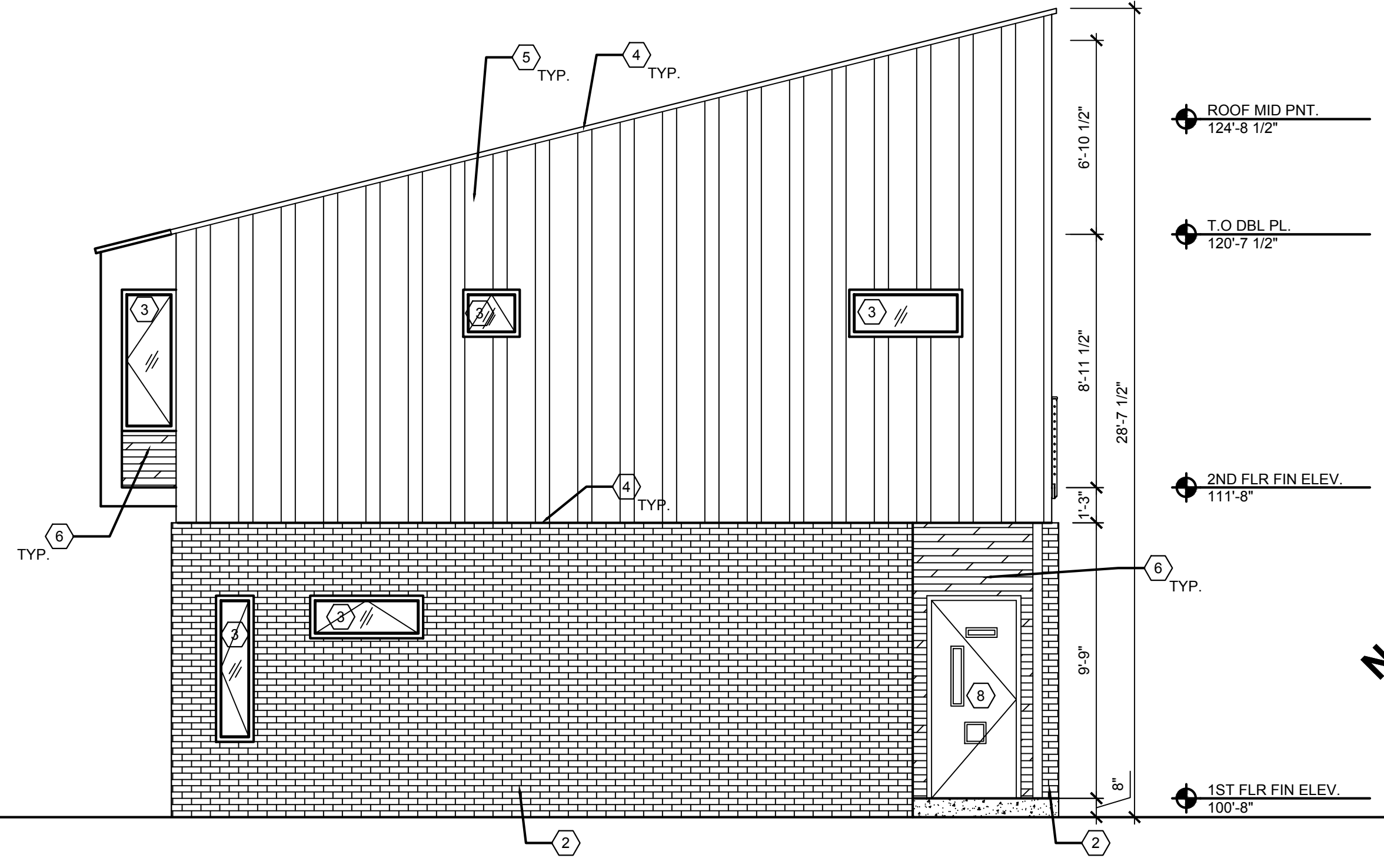
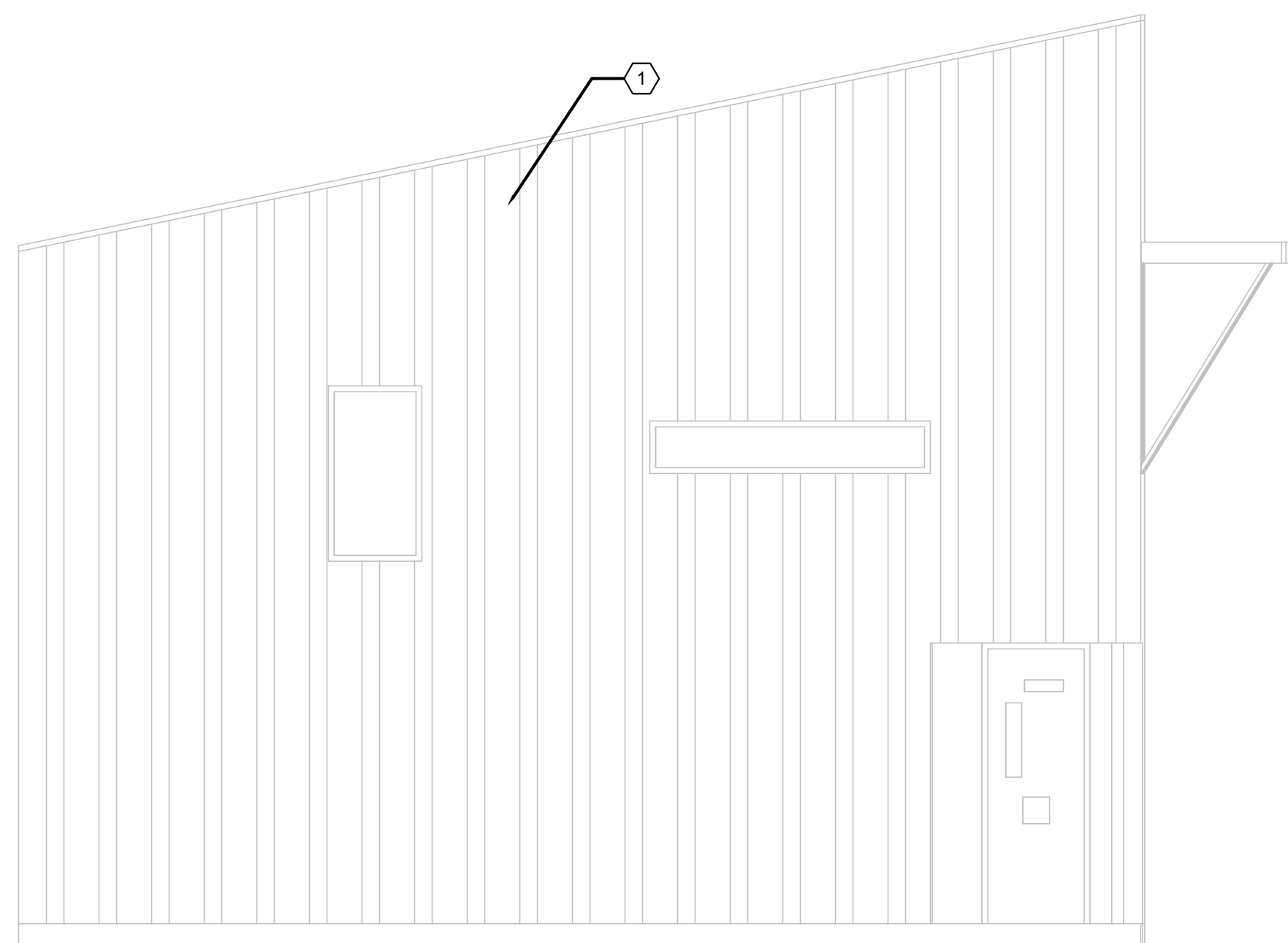


2 EAST ELEVATION
 SCALE: 1/4" = 1'-0"

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1 NORTH ELEVATION
 A1.1 SCALE: 1/4" = 1'-0"



2 WEST ELEVATION
 A1.1 SCALE: 1/4" = 1'-0"

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CONSULTANT:

Project :

Issued for :
 HDC 02/22/2021

Drawn by :
TRF
 Check by :

Sheet Title :
**EXTERIOR COLOR
 ELEVATIONS**

Project No. :
2021048

Sheet No. :
A3.3



1 EXTERIOR RENDERING
 SCALE: NTS

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BAGLEY PERSPECTIVE



CEDAR SHIPLAP SIDING
ON FURRING



PAC CLAD STANDING SEAM SIDING
R-36 PANEL, 24 GA STEEL
COLOR: BURNISHED STEEL



BRICK: BRICKTECH PLATINUM

ARCHITECT:
4545 architecture
2011 W. GRAND BLVD
STE. 400
DETROIT, MI 48205
P. 248.330.4098
T.M.FLINTOFF@4545ARCHITECTURE.COM

CONSULTANT:

Project :

Issued for :

HDC 02/22/2021

Drawn by :

TRF

Check by :

Sheet Title :

EXTERIOR MATERIALS

Project No. :

2021048

Sheet No. :

A3.4

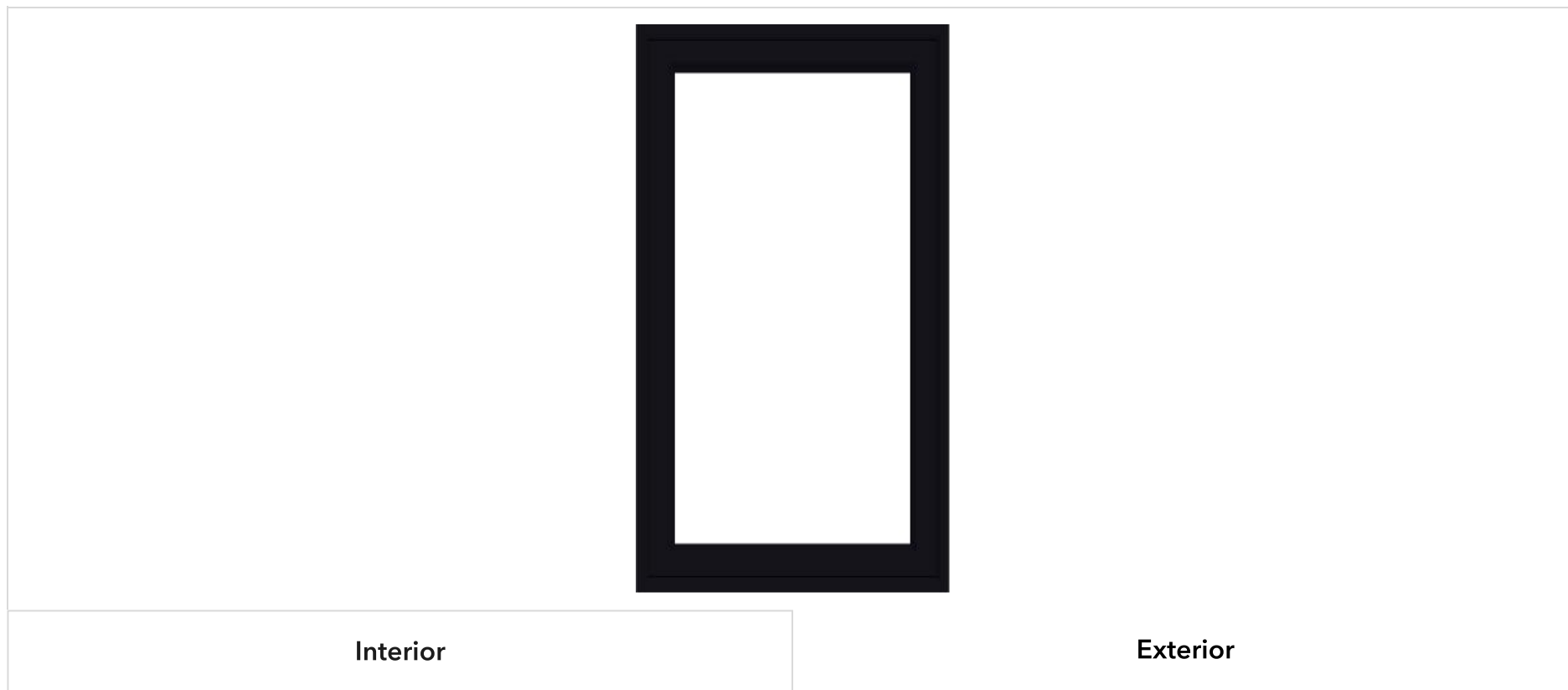
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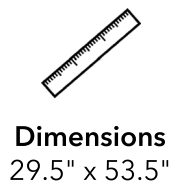
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Pella® Impervia® Casement

Pella® Impervia® fiberglass casement windows can withstand extreme heat and cold, making them incredibly strong and durable. A durable, powder-coat finish provides the look of painted wood and lasts for years.



**Operation / Venting**
Left**Exterior Color**
Black**Interior Color**
Black**Insul****Enter Your Window Dimensions** ⓘ

Measure from inside your home, so you're looking at the interior of the window. Be sure to capture both width and height measurements.

Frame Width	29.5	inches
-------------	------	--------

Frame Height	53.5	inches
--------------	------	--------

How to Measure You...**\$\$****SIGN IN TO SAVE TO PROJECT**

Unavailable online at this time. Save to a project to organize and track your products in one place.

My Product Details

Pella Impervia casement windows open and close with the turn of a crank. Create sleek designs featuring slim profiles and more visible glass with our exceptionally strong fiberglass. And with a durable powder-coat finish, Pella Impervia casement windows deliver a timeless, long-lasting look.

- Made with Pella's patented Duracast® fiberglass composite material.
- Operable sizes up to 3' 1-1/2" x 6' 7-1/2".
- Performance Grade up to PG50.
- Limited opening and egress hardware available.

Additional Information

- [Warranty Information](#)
- [Owners Manual](#)
- [Product Registration](#)
- [Replacement Parts](#)
- [Help Library](#)

Frame Width	29.5
Frame Height	53.5
Operation / Venting	Left
Exterior Color	Black
Interior Color	Black
Insulated Type	Dual
Low-E Glass Style	Advanced Low-E Insulating Glass
Hardware Finish	Matte Black
Screen Option	Full Screen
Grille Type	No Grille
Installation Method	New Construction

U-Factor	0.27
SHGC	0.26
VLT	0.49
CPD	PEL-N-277-00567-00001
PG	50
Calculated Positive DP Rating	50
Calculated Negative DP Rating	60
Egress	Meets Typical 5.7 sqft (E) (United States Only)
Attachment Method	Standard Fin
Overall Rough Opening Width	30
Overall Rough Opening Height	54

FREQUENTLY ASKED QUESTIONS

If I put tinting on my glass will it void the warranty? —

If the tinting contributes to a defect in the product, the defect would not be covered under the warranty.

How long after I receive the product do I have to install it for it to be under warranty? +

Am I eligible for the lifetime coverage mentioned in the limited warranty? +

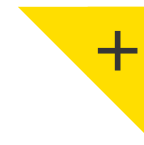
What do I have to do to get the warranty on my product? +

INSIDE THE PELLA IMPERVIA SERIES WINDOW

Made from our patented five-layer fiberglass material, Pella Impervia windows are on average 100x more impact-resistant than a leading wood/plastic composite product.⁵⁹ Tested from -40°F to 180°F, these windows can withstand some of the harshest conditions, making them strong and incredibly energy efficient.¹⁶



IMPERVIA WINDOW INSPIRATION



Sliding Window Invites Fresh Air Into Modern Bathroom

Black Windows Create Bold Contrast In Compact Kitchen

Cro



This document contains the latest information for the new Casement product design.
To see the previous design of the Casement, follow this [link](#).

Size and Performance

Glazing performance

Grille Profiles and Patterns

Size Tables

Design Data

Detailed Product Description

Cross Sections

The information published in this document is believed to be accurate at the time of publication. However, because we are constantly working to improve our products, specifications are subject to change without notice. Consult your local Pella representative for up-to-date product information.



Impervia® Casement Windows

Size and Performance Data

Sizes	
Standard Vent/Fixed	●
Standard Fixed Companion Sizes	●
Transom Sizes	●
Egress Sizes	●
Special Sizes	●
Performance ¹	
Meets or Exceeds AAMA/WDMA Ratings	C - LC45 - LC +50/-60 Hallmark Certified
Air Infiltration (cfm/ft ² of frame @ 1.57 psf wind pressure)	0.05
Water Resistance	6.75 - 7.5 psf
Design Pressure	45 - 50 psf
Other Performance Criteria	
Forced Entry Resistance Level (Minimum Security Grade) ₂	40
Roto-Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	15/6
Easy-Slide Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	10/7

Sound Transmission Class and Outdoor-Indoor Transmission Class							
Product	Frame Size Tested ₃	Glazing System				STC Rating	OITC Rating
		Overall Glazing Thickness	Exterior Glass Thickness	Middle Glass Thickness	Interior Glass Thickness		
VENT	23-1/2" x 59"	11/16"	3mm	–	3mm	28	25
	23-1/2" x 59"	11/16"	4mm	–	4mm	31	26
	23-1/2" x 59"	1"	3mm	3mm	3mm	29	24
	23-1/2" x 59"	1"	4mm	–	6mm	34	28
	23-1/2" x 59"	1"	5mm	–	3mm	34	28
	23-1/2" x 59"	1"	5mm	–	5mm	30	24
	23-1/2" x 59"	1"	6mm	–	6mm	32	26
	23-1/2" x 59"	1"	4mm	–	7mm Laminated	36	29
	23-1/2" x 59"	1"	5mm	–	10mm Laminated	37	32
FIXED	47" x 59"	11/16"	3mm	–	3mm	28	24
	47" x 59"	11/16"	4mm	–	4mm	29	25
	47" x 59"	1"	3mm	3mm	3mm	29	24
	47" x 59"	1"	4mm	4mm	4mm	30	26
	47" x 59"	1"	4mm	–	6mm	33	28
	47" x 59"	1"	5mm	–	3mm	32	27
	47" x 59"	1"	5mm	–	5mm	30	25
	47" x 59"	1"	6mm	–	6mm	30	24
	47" x 59"	1"	4mm	–	7mm Laminated	34	29
	47" x 59"	1"	5mm	–	10mm Laminated	36	31

(1) See Design Data pages in this section for specific product performance class and grade values.

(2) The higher the level, the greater the product's ability to resist forced entry.

(3) ASTM E 1425 defines standard sizes for acoustical testing. Ratings achieved at that size are representative of all sizes of the same configuration.



Impervia® Casement Windows

Features and Options

	Block Frame	Integral Nailing Fin
Glazing		
Glazing Type		
Dual-pane Insulating Glass	S	S
Triple-pane Insulating Glass	O	O
Insulated Glass Options / Low-E Types		
Clear Insulating Glass (no Low-E coating)	S	S
Advanced Low-E Insulating Glass	O	O
SunDefense™ Low-E Insulating Glass	O	O
AdvancedComfort Low-E Insulating Glass	O	O
NaturalSun Low-E Insulating Glass	O	O
Additional Glass Options		
Annealed Glass	S	S
Tempered Glass	O	O
Noise reduction glass (5/3mm, 4/6mm combinations)	O	O
Noise Reduction laminated glass (non-impact)	O	O
Tinted glass (Bronze, Gray, Green) Advanced Low-E	O	O
Obscure Glass ₁	O	O
Gas Fill / High Altitude		
Argon	S	S
High Altitude	O	O
High Altitude with argon	O	O
Exterior / Interior		
Powder-Coat White	S	S
Powder-Coat Tan, Brown, Black, or Morning Sky Gray	O	O
Powder-Coat Dual-color (All exterior colors available with White interior)	O	–
Hardware		
Match interior finish	S	S
White, Tan Brown, Black, Morning Sky Gray, Satin Nickel ₂	O	O
Operator		
Easy-Slide Operator	S	S
Fold Away Crank	O	O
Sash Locks		
SureLock® System	S	S
Unison Lock System ₃	S	S
Screens		
Conventional Black Fiberglass	O	O
InView™ screen	O	O
Grilles		
Grilles-Between-the-Glass		
Traditional, Prairie, Top Row and Custom - Equally Divided	O	O

S = Standard; O = Optional; (–) = Not available

(1) Contact your local Pella sales representative for current offering.

(2) Satin Nickel is not available for Easy-Slide operator.

(3) Unit size determines availability.



Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent										N	NC	SC	S	CA	
11/16"	Clear IG	PEL-N-277-00225-00001	3	3	air	0.44	0.55	0.58	44						
	with grilles-between-the-glass	PEL-N-277-00226-00001				0.45	0.50	0.52	44						
11/16"	Clear IG	PEL-N-277-00229-00001	4	4	air	0.45	0.53	0.57	43						
	with grilles-between-the-glass	PEL-N-277-00230-00001				0.46	0.49	0.52	43						
1"	Clear IG	PEL-N-277-00001-00001	5	5	air	0.43	0.53	0.57	44						
	with grilles-between-the-glass	PEL-N-277-00002-00001				0.43	0.48	0.51	44						
1"	Clear IG	PEL-N-277-00005-00001	6	6	air	0.43	0.51	0.56	44						
	with grilles-between-the-glass	PEL-N-277-00006-00001				0.43	0.46	0.50	44						
11/16"	Advanced Low-E IG	PEL-N-277-00235-00001	3	3	argon	0.28	0.26	0.49	60		NC				
	with grilles-between-the-glass	PEL-N-277-00236-00001				0.29	0.24	0.44	60		NC	SC	S		
11/16"	Advanced Low-E IG	PEL-N-277-00239-00001	4	4	argon	0.30	0.26	0.48	58		NC				
	with grilles-between-the-glass	PEL-N-277-00240-00001				0.31	0.24	0.44	58				S		
1"	Advanced Low-E IG	PEL-N-277-00019-00001	5	5	argon	0.28	0.26	0.48	59		NC				
	with grilles-between-the-glass	PEL-N-277-00020-00001				0.28	0.24	0.43	59		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00023-00001	6	6	argon	0.28	0.25	0.47	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00024-00001				0.28	0.23	0.43	58		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00243-00001	3	3	argon	0.28	0.20	0.45	60		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00244-00001				0.29	0.18	0.41	60		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00247-00001	4	4	argon	0.29	0.20	0.45	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00248-00001				0.30	0.18	0.41	58		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00059-00001	5	5	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00060-00001				0.28	0.18	0.40	59		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00063-00001	6	6	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00064-00001				0.28	0.18	0.40	59		NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00259-00001	3	3	argon	0.25	0.26	0.48	47	N	NC				
	with grilles-between-the-glass	PEL-N-277-00260-00001				0.26	0.24	0.43	47	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00263-00001	4	4	argon	0.26	0.26	0.47	45	N	NC				
	with grilles-between-the-glass	PEL-N-277-00264-00001				0.27	0.23	0.43	45	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00091-00001	5	5	argon	0.25	0.25	0.47	47	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00092-00001				0.25	0.23	0.42	47	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00095-00001	6	6	argon	0.25	0.25	0.46	46	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00096-00001				0.25	0.23	0.42	46	N	NC	SC	S		
11/16"	NaturalSun Low-E IG	PEL-N-277-00251-00001	3	3	argon	0.29	0.48	0.55	59	N					
	with grilles-between-the-glass	PEL-N-277-00252-00001				0.30	0.44	0.50	59	N					
11/16"	NaturalSun Low-E IG	PEL-N-277-00255-00001	4	4	argon	0.30	0.47	0.55	57	N					
	with grilles-between-the-glass	PEL-N-277-00256-00001				0.32	0.43	0.50	57	N					
1"	NaturalSun Low-E IG	PEL-N-277-00075-00001	5	5	argon	0.29	0.47	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00076-00001				0.29	0.43	0.49	58	N					
1"	NaturalSun Low-E IG	PEL-N-277-00079-00001	6	6	argon	0.29	0.45	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00080-00001				0.29	0.41	0.49	58	N					

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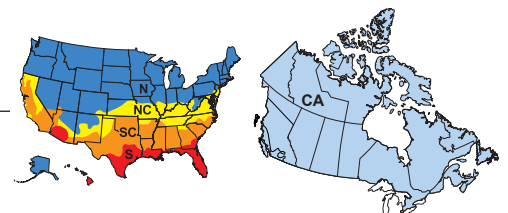
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-277-00567-00001	3	3	argon	0.27	0.26	0.49	60	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00568-00001				0.28	0.24	0.44	60		NC	SC	S	18	
11/16"	Advanced Low-E IG	PEL-N-277-00571-00001	4	4	argon	0.29	0.26	0.48	58		NC			18	
	with grilles-between-the-glass	PEL-N-277-00572-00001				0.30	0.24	0.44	58		NC	SC	S	16	
1"	Advanced Low-E IG	PEL-N-277-00351-00001	5	5	argon	0.27	0.26	0.48	59	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00352-00001				0.27	0.24	0.43	59	N	NC	SC	S	19	
1"	Advanced Low-E IG	PEL-N-277-00355-00001	6	6	argon	0.27	0.25	0.47	58	N	NC	SC	S	20	
	with grilles-between-the-glass	PEL-N-277-00356-00001				0.27	0.23	0.43	58	N	NC	SC	S	19	
11/16"	SunDefense IG	PEL-N-277-00575-00001	3	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00576-00001				0.28	0.18	0.41	61		NC	SC	S	15	
11/16"	SunDefense IG	PEL-N-277-00579-00001	4	4	argon	0.28	0.20	0.45	58		NC	SC	S	16	
	with grilles-between-the-glass	PEL-N-277-00580-00001				0.29	0.18	0.41	58		NC	SC	S	13	
1"	SunDefense IG	PEL-N-277-00391-00001	5	5	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00392-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
1"	SunDefense IG	PEL-N-277-00395-00001	6	6	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00396-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00591-00001	3	3	argon	0.24	0.26	0.48	48	N	NC			24	
	with grilles-between-the-glass	PEL-N-277-00592-00001				0.25	0.24	0.43	48	N	NC	SC	S	22	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00595-00001	4	4	argon	0.25	0.26	0.47	45	N	NC			23	
	with grilles-between-the-glass	PEL-N-277-00596-00001				0.26	0.23	0.43	45	N	NC	SC	S	20	
1"	AdvancedComfort Low-E IG	PEL-N-277-00423-00001	5	5	argon	0.24	0.25	0.47	47	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00424-00001				0.24	0.23	0.42	47	N	NC	SC	S	23	
1"	AdvancedComfort Low-E IG	PEL-N-277-00427-00001	6	6	argon	0.24	0.25	0.46	46	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00428-00001				0.24	0.23	0.42	46	N	NC	SC	S	23	
11/16"	NaturalSun Low-E IG	PEL-N-277-00583-00001	3	3	argon	0.28	0.48	0.55	59	N				32	
	with grilles-between-the-glass	PEL-N-277-00584-00001				0.29	0.44	0.50	59	N				28	
11/16"	NaturalSun Low-E IG	PEL-N-277-00587-00001	4	4	argon	0.29	0.47	0.55	57	N				30	
	with grilles-between-the-glass	PEL-N-277-00588-00001				0.30	0.43	0.50	57	N				27	
1"	NaturalSun Low-E IG	PEL-N-277-00407-00001	5	5	argon	0.28	0.47	0.54	58	N				31	
	with grilles-between-the-glass	PEL-N-277-00408-00001				0.28	0.43	0.49	58	N				29	
1"	NaturalSun Low-E IG	PEL-N-277-00411-00001	6	6	argon	0.28	0.45	0.54	58	N				30	
	with grilles-between-the-glass	PEL-N-277-00412-00001				0.28	0.41	0.49	58	N				28	

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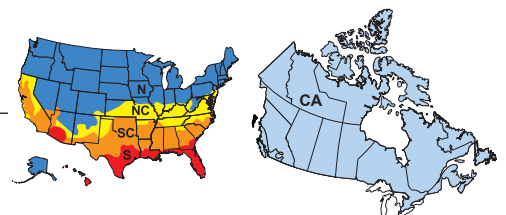
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²				
										Zone		ER	Zone			
Vent - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00233-00001	3	3	air	0.32	0.27	0.49	56							
	with grilles-between-the-glass	PEL-N-277-00234-00001				0.33	0.24	0.44	56				S			
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00237-00001	4	4	air	0.34	0.27	0.48	53							
	with grilles-between-the-glass	PEL-N-277-00238-00001				0.35	0.24	0.44	53				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00017-00001	5	5	air	0.32	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00018-00001				0.32	0.24	0.43	56				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00021-00001	6	6	air	0.31	0.26	0.47	55							
	with grilles-between-the-glass	PEL-N-277-00022-00001				0.31	0.24	0.43	55				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00241-00001	3	3	air	0.32	0.20	0.45	56							
	with grilles-between-the-glass	PEL-N-277-00242-00001				0.33	0.18	0.41	56				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00245-00001	4	4	air	0.33	0.20	0.45	54							
	with grilles-between-the-glass	PEL-N-277-00246-00001				0.35	0.19	0.41	54				S			
1"	(HA) SunDefense IG	PEL-N-277-00057-00001	5	5	air	0.31	0.20	0.44	56							
	with grilles-between-the-glass	PEL-N-277-00058-00001				0.31	0.18	0.40	56				S			
1"	(HA) SunDefense IG	PEL-N-277-00061-00001	6	6	air	0.31	0.20	0.44	55							
	with grilles-between-the-glass	PEL-N-277-00062-00001				0.31	0.18	0.40	55				S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00257-00001	3	3	air	0.28	0.26	0.48	43		C					
	with grilles-between-the-glass	PEL-N-277-00258-00001				0.28	0.24	0.43	44		C	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00261-00001	4	4	air	0.29	0.26	0.47	41		C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00262-00001				0.30	0.24	0.43	41		C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00089-00001	5	5	air	0.27	0.25	0.47	44	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00090-00001				0.27	0.23	0.42	44	N	C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00093-00001	6	6	air	0.27	0.25	0.46	43	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00094-00001				0.27	0.23	0.42	43	N	C	SC	S			
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00249-00001	3	3	air	0.33	0.48	0.55	55							
	with grilles-between-the-glass	PEL-N-277-00250-00001				0.33	0.44	0.50	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00253-00001	4	4	air	0.34	0.47	0.55	53							
	with grilles-between-the-glass	PEL-N-277-00254-00001				0.36	0.43	0.50	53							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00073-00001	5	5	air	0.32	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00074-00001				0.32	0.42	0.49	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00077-00001	6	6	air	0.32	0.45	0.54	54							
	with grilles-between-the-glass	PEL-N-277-00078-00001				0.32	0.41	0.49	54							

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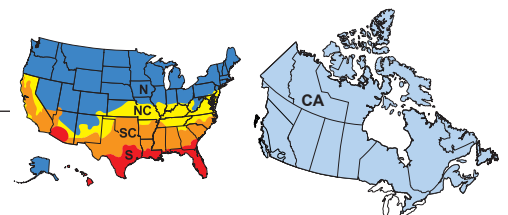
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Vent – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00565-00001	3	3	air	0.31	0.27	0.49	56							
	with grilles-between-the-glass	PEL-N-277-00566-00001				0.32	0.24	0.44	56				S			
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00569-00001	4	4	air	0.33	0.27	0.48	54							
	with grilles-between-the-glass	PEL-N-277-00570-00001				0.34	0.24	0.44	54				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00349-00001	5	5	air	0.31	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00350-00001				0.31	0.24	0.43	56				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00353-00001	6	6	air	0.30	0.26	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-277-00354-00001				0.30	0.24	0.43	55		NC	SC	S			
11/16"	(HA) SunDefense IG	PEL-N-277-00573-00001	3	3	air	0.31	0.20	0.45	57							
	with grilles-between-the-glass	PEL-N-277-00574-00001				0.32	0.18	0.41	57				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00577-00001	4	4	air	0.32	0.20	0.45	54							
	with grilles-between-the-glass	PEL-N-277-00578-00001				0.34	0.19	0.41	54				S			
1"	(HA) SunDefense IG	PEL-N-277-00389-00001	5	5	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00390-00001				0.30	0.18	0.40	56		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-277-00393-00001	6	6	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00394-00001				0.30	0.18	0.40	56		NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00589-00001	3	3	air	0.27	0.26	0.48	44	N	NC					
	with grilles-between-the-glass	PEL-N-277-00590-00001				0.27	0.24	0.43	44	N	NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00593-00001	4	4	air	0.28	0.26	0.47	41		NC					
	with grilles-between-the-glass	PEL-N-277-00594-00001				0.29	0.24	0.43	41		NC	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00421-00001	5	5	air	0.26	0.25	0.47	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00422-00001				0.26	0.23	0.42	44	N	NC	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00425-00001	6	6	air	0.26	0.25	0.46	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00426-00001				0.26	0.23	0.42	44	N	NC	SC	S			
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00581-00001	3	3	air	0.32	0.48	0.55	55							
	with grilles-between-the-glass	PEL-N-277-00582-00001				0.32	0.44	0.50	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00585-00001	4	4	air	0.33	0.47	0.55	53							
	with grilles-between-the-glass	PEL-N-277-00586-00001				0.35	0.43	0.50	53							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00405-00001	5	5	air	0.31	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00406-00001				0.31	0.42	0.49	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00409-00001	6	6	air	0.31	0.45	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00410-00001				0.31	0.41	0.49	55							

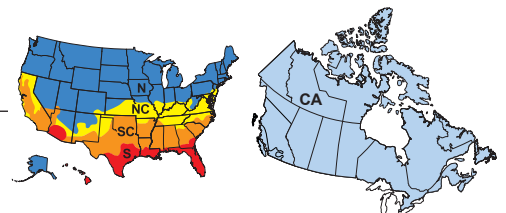
R-Value = 1/U-Factor
 SHGC = Solar Heat Gain Coefficient
 VLT % = Visible Light Transmission
 CR = Condensation Resistance
 ER = Canadian Energy Rating

(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500. ENERGY STAR® values are updated to 2016 (Version 6) criteria.

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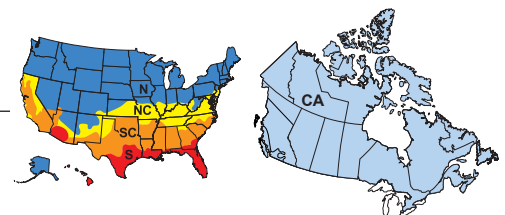




Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Vent - 5 mm/3 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-277-00009-00001	5	3	air	0.43	0.53	0.57	45					
	with grilles-between-the-glass	PEL-N-277-00010-00001				0.43	0.48	0.52	45					
1"	Advanced Low-E IG	PEL-N-277-00051-00001	5	3	argon	0.29	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00052-00001				0.29	0.24	0.44	60		NC	SC	S	
1"	SunDefense™ IG	PEL-N-277-00067-00001	5	3	argon	0.28	0.20	0.45	60		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00068-00001				0.28	0.18	0.41	60		NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00099-00001	5	3	argon	0.25	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00100-00001				0.25	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00083-00001	5	3	argon	0.29	0.47	0.55	59	N				
	with grilles-between-the-glass	PEL-N-277-00084-00001				0.29	0.43	0.50	59	N				
Vent - 5 mm/3 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-277-00383-00001	5	3	argon	0.28	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00384-00001				0.28	0.24	0.44	60		NC	SC	S	
1"	SunDefense IG	PEL-N-277-00399-00001	5	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00400-00001				0.27	0.18	0.41	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00431-00001	5	3	argon	0.24	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00432-00001				0.24	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00415-00001	5	3	argon	0.28	0.47	0.55	60	N				
	with grilles-between-the-glass	PEL-N-277-00416-00001				0.28	0.43	0.50	60	N				
Vent - 5 mm/3 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-277-00049-00001	5	3	air	0.32	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00050-00001				0.32	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00065-00001	5	3	air	0.31	0.20	0.45	57				S	
	with grilles-between-the-glass	PEL-N-277-00066-00001				0.31	0.18	0.41	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00097-00001	5	3	air	0.27	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00098-00001				0.27	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00081-00001	5	3	air	0.32	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00082-00001				0.32	0.43	0.50	56					
Vent - 5 mm/3 mm Glass High Altitude Glazing - with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-277-00381-00001	5	3	air	0.31	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00382-00001				0.31	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00397-00001	5	3	air	0.30	0.20	0.45	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00398-00001				0.30	0.18	0.41	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00429-00001	5	3	air	0.26	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00430-00001				0.26	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00413-00001	5	3	air	0.31	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00414-00001				0.31	0.43	0.50	56					

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Vent - 4 mm/6 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-277-00013-00001	4	6	air	0.43	0.53	0.56	44					
	with grilles-between-the-glass	PEL-N-277-00014-00001				0.43	0.48	0.51	44					
1"	Advanced Low-E IG	PEL-N-277-00055-00001	4	6	argon	0.28	0.26	0.48	58		NC			
	with grilles-between-the-glass	PEL-N-277-00056-00001				0.28	0.24	0.43	58		NC	SC	S	
1"	SunDefense™ IG	PEL-N-277-00071-00001	4	6	argon	0.28	0.20	0.44	59		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00072-00001				0.28	0.18	0.40	59		NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00103-00001	4	6	argon	0.25	0.25	0.47	47	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00104-00001				0.25	0.23	0.42	47	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00087-00001	4	6	argon	0.29	0.47	0.54	58	N				
	with grilles-between-the-glass	PEL-N-277-00088-00001				0.29	0.43	0.49	58	N				
Vent - 4 mm/6 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-277-00387-00001	4	6	argon	0.27	0.26	0.48	59	N	NC			
	with grilles-between-the-glass	PEL-N-277-00388-00001				0.27	0.24	0.43	59	N	NC	SC	S	
1"	SunDefense IG	PEL-N-277-00403-00001	4	6	argon	0.27	0.20	0.44	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00404-00001				0.27	0.18	0.40	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00435-00001	4	6	argon	0.24	0.25	0.47	47	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00436-00001				0.24	0.23	0.42	47	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00419-00001	4	6	argon	0.28	0.47	0.54	58	N				
	with grilles-between-the-glass	PEL-N-277-00420-00001				0.28	0.43	0.49	58	N				
Vent - 4 mm/6 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-277-00053-00001	4	6	air	0.32	0.26	0.48	55					
	with grilles-between-the-glass	PEL-N-277-00054-00001				0.32	0.24	0.43	55				S	
1"	(HA) SunDefense IG	PEL-N-277-00069-00001	4	6	air	0.31	0.20	0.44	55				S	
	with grilles-between-the-glass	PEL-N-277-00070-00001				0.31	0.18	0.40	55				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00101-00001	4	6	air	0.27	0.25	0.47	44	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00102-00001				0.27	0.23	0.42	44	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00085-00001	4	6	air	0.32	0.47	0.54	54					
	with grilles-between-the-glass	PEL-N-277-00086-00001				0.32	0.43	0.49	54					
Vent - 4 mm/6 mm Glass High Altitude Glazing - with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-277-00385-00001	4	6	air	0.31	0.26	0.48	55					
	with grilles-between-the-glass	PEL-N-277-00386-00001				0.31	0.24	0.43	55				S	
1"	(HA) SunDefense IG	PEL-N-277-00401-00001	4	6	air	0.30	0.20	0.44	56		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00402-00001				0.30	0.18	0.40	56		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00433-00001	4	6	air	0.26	0.25	0.47	44	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00434-00001				0.26	0.23	0.42	44	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00417-00001	4	6	air	0.31	0.47	0.54	55					
	with grilles-between-the-glass	PEL-N-277-00418-00001				0.31	0.43	0.49	55					

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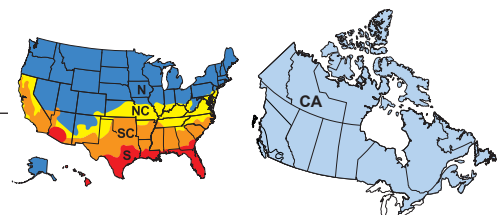
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent - with Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00275-00001	5	3	argon	0.30	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00276-00001				0.31	0.22	0.29	59				S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00027-00001	5	5	argon	0.28	0.23	0.31	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00028-00001				0.28	0.21	0.28	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00039-00001	6	6	argon	0.28	0.22	0.28	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00040-00001				0.28	0.20	0.25	58		NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00279-00001	5	3	argon	0.30	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00280-00001				0.31	0.20	0.25	59				S		
1"	Gray Advanced Low-E IG	PEL-N-277-00031-00001	5	5	argon	0.28	0.21	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00032-00001				0.28	0.19	0.24	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00043-00001	6	6	argon	0.28	0.19	0.24	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00044-00001				0.28	0.18	0.21	58		NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00283-00001	5	3	argon	0.30	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00284-00001				0.31	0.24	0.39	59				S		
1"	Green Advanced Low-E IG	PEL-N-277-00035-00001	5	5	argon	0.28	0.26	0.42	59		NC				
	with grilles-between-the-glass	PEL-N-277-00036-00001				0.28	0.24	0.38	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00047-00001	6	6	argon	0.28	0.25	0.41	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00048-00001				0.28	0.23	0.37	58		NC	SC	S		
Vent - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00607-00001	5	3	argon	0.29	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00608-00001				0.30	0.22	0.29	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00359-00001	5	5	argon	0.27	0.23	0.31	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00360-00001				0.27	0.21	0.28	59	N	NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00371-00001	6	6	argon	0.27	0.22	0.28	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00372-00001				0.27	0.20	0.25	59	N	NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00611-00001	5	3	argon	0.29	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00612-00001				0.30	0.20	0.25	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00363-00001	5	5	argon	0.27	0.21	0.27	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00364-00001				0.27	0.19	0.24	59	N	NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00375-00001	6	6	argon	0.27	0.19	0.24	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00376-00001				0.27	0.18	0.21	59	N	NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00615-00001	5	3	argon	0.29	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00616-00001				0.30	0.24	0.39	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00367-00001	5	5	argon	0.27	0.26	0.42	59	N	NC				
	with grilles-between-the-glass	PEL-N-277-00368-00001				0.27	0.24	0.38	59	N	NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00379-00001	6	6	argon	0.27	0.25	0.41	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00380-00001				0.27	0.23	0.37	59	N	NC	SC	S		

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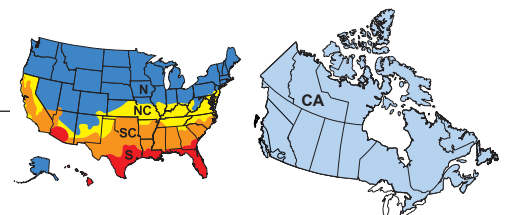
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²		
										Zone		ER	Zone	
Vent - High Altitude Glazing - with Tinted Glazing										N	NC	SC	S	CA
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00273-00001	5	3	air	0.34	0.24	0.32	54				S	
	with grilles-between-the-glass	PEL-N-277-00274-00001				0.35	0.22	0.29	54				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00025-00001	5	5	air	0.32	0.24	0.31	56				S	
	with grilles-between-the-glass	PEL-N-277-00026-00001				0.32	0.22	0.28	56				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00037-00001	6	6	air	0.31	0.22	0.28	55				S	
	with grilles-between-the-glass	PEL-N-277-00038-00001				0.31	0.20	0.25	55				S	
11/16"	Gray Advanced Low-E IG	PEL-N-277-00277-00001	5	3	air	0.34	0.22	0.27	54				S	
	with grilles-between-the-glass	PEL-N-277-00278-00001				0.35	0.21	0.25	54				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00029-00001	5	5	air	0.32	0.22	0.27	56				S	
	with grilles-between-the-glass	PEL-N-277-00030-00001				0.32	0.20	0.24	56				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00041-00001	6	6	air	0.31	0.20	0.24	55				S	
	with grilles-between-the-glass	PEL-N-277-00042-00001				0.31	0.18	0.21	55				S	
11/16"	Green Advanced Low-E IG	PEL-N-277-00281-00001	5	3	air	0.34	0.27	0.43	54					
	with grilles-between-the-glass	PEL-N-277-00282-00001				0.35	0.25	0.39	54				S	
1"	Green Advanced Low-E IG	PEL-N-277-00033-00001	5	5	air	0.32	0.26	0.42	56					
	with grilles-between-the-glass	PEL-N-277-00034-00001				0.32	0.24	0.38	56				S	
1"	Green Advanced Low-E IG	PEL-N-277-00045-00001	6	6	air	0.31	0.25	0.41	55				S	
	with grilles-between-the-glass	PEL-N-277-00046-00001				0.31	0.23	0.37	55				S	
Vent - High Altitude Glazing - with Foam Insulation and Tinted Glazing														
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00605-00001	5	3	air	0.33	0.24	0.32	54				S	
	with grilles-between-the-glass	PEL-N-277-00606-00001				0.34	0.22	0.29	54				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00357-00001	5	5	air	0.31	0.24	0.31	56				S	
	with grilles-between-the-glass	PEL-N-277-00358-00001				0.31	0.22	0.28	56				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00369-00001	6	6	air	0.30	0.22	0.28	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00370-00001				0.30	0.20	0.25	55	NC	SC		S	
11/16"	Gray Advanced Low-E IG	PEL-N-277-00609-00001	5	3	air	0.33	0.22	0.27	54				S	
	with grilles-between-the-glass	PEL-N-277-00610-00001				0.34	0.21	0.25	54				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00361-00001	5	5	air	0.31	0.22	0.27	56				S	
	with grilles-between-the-glass	PEL-N-277-00362-00001				0.31	0.20	0.24	56				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00373-00001	6	6	air	0.30	0.20	0.24	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00374-00001				0.30	0.18	0.21	55	NC	SC		S	
11/16"	Green Advanced Low-E IG	PEL-N-277-00613-00001	5	3	air	0.33	0.27	0.43	54					
	with grilles-between-the-glass	PEL-N-277-00614-00001				0.34	0.25	0.39	54				S	
1"	Green Advanced Low-E IG	PEL-N-277-00365-00001	5	5	air	0.31	0.26	0.42	56					
	with grilles-between-the-glass	PEL-N-277-00366-00001				0.31	0.24	0.38	56				S	
1"	Green Advanced Low-E IG	PEL-N-277-00377-00001	6	6	air	0.30	0.25	0.41	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00378-00001				0.30	0.23	0.37	55	NC	SC		S	

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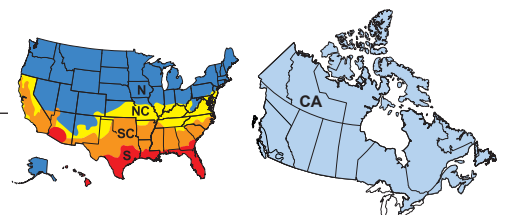
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Vent – with Laminated Glazing											N	NC	SC	S		CA
1"	Advanced Low-E IG	PEL-N-277-00139-00001	4	7	argon	0.28	0.26	0.48	59		NC					
	with grilles-between-the-glass	PEL-N-277-00140-00001				0.28	0.24	0.43	59		NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00151-00001	5	10	argon	0.28	0.26	0.47	58		NC					
	with grilles-between-the-glass	PEL-N-277-00152-00001				0.28	0.23	0.42	58		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00135-00001	4	7	argon	0.28	0.20	0.44	59		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00136-00001				0.28	0.18	0.40	59		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00147-00001	5	10	argon	0.27	0.20	0.44	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00148-00001				0.27	0.18	0.39	58	N	NC	SC	S			
Vent – with Foam insulation and Laminated Glazing																
1"	Advanced Low-E IG	PEL-N-277-00471-00001	4	7	argon	0.27	0.26	0.48	59	N	NC					
	with grilles-between-the-glass	PEL-N-277-00472-00001				0.27	0.24	0.43	59	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00483-00001	5	10	argon	0.27	0.26	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-277-00484-00001				0.27	0.23	0.42	58	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00467-00001	4	7	argon	0.27	0.20	0.44	60	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00468-00001				0.27	0.18	0.40	60	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00479-00001	5	10	argon	0.26	0.20	0.44	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00480-00001				0.26	0.18	0.39	58	N	NC	SC	S			

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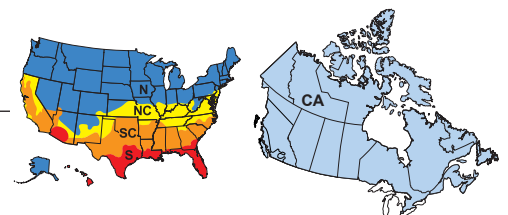
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Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent - High Altitude Glazing - with Laminated Glazing											N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-277-00137-00001	4	7	air	0.31	0.26	0.48	56						
	with grilles-between-the-glass	PEL-N-277-00138-00001				0.31	0.24	0.43	56				S		
1"	Advanced Low-E IG	PEL-N-277-00149-00001	5	10	air	0.31	0.26	0.47	54						
	with grilles-between-the-glass	PEL-N-277-00150-00001				0.31	0.24	0.42	54				S		
1"	SunDefense™ IG	PEL-N-277-00133-00001	4	7	air	0.31	0.20	0.44	56						
	with grilles-between-the-glass	PEL-N-277-00134-00001				0.31	0.18	0.40	56				S		
1"	SunDefense™ IG	PEL-N-277-00145-00001	5	10	air	0.31	0.20	0.44	55						
	with grilles-between-the-glass	PEL-N-277-00146-00001				0.31	0.18	0.39	55				S		
Vent - High Altitude Glazing – with Foam Insulation and Laminated Glazing												NC			
1"	Advanced Low-E IG	PEL-N-277-00469-00001	4	7	air	0.30	0.26	0.48	56		NC				
	with grilles-between-the-glass	PEL-N-277-00470-00001				0.30	0.24	0.43	56		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00481-00001	5	10	air	0.30	0.26	0.47	55		NC				
	with grilles-between-the-glass	PEL-N-277-00482-00001				0.30	0.24	0.42	55		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00465-00001	4	7	air	0.30	0.20	0.44	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00466-00001				0.30	0.18	0.40	56		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00477-00001	5	10	air	0.30	0.20	0.44	55		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00478-00001				0.30	0.18	0.39	55		NC	SC	S		

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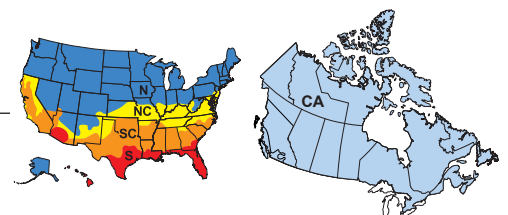
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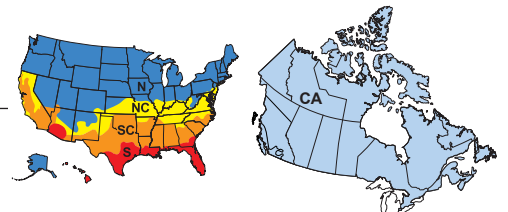




Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
											Zone				ER	Zone	
Vent -Triple Pane											N	NC	SC	S			CA
1"	Advanced Low-E IG	PEL-N-277-00167-00001	3	3	3	argon	0.23	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00168-00001					0.24	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00169-00001	3	3	3	Krypton	0.19	0.24	0.43	72	N	NC	SC	S	29	CA	
	with grilles-between-the-glass	PEL-N-277-00170-00001					0.20	0.22	0.39	72	N	NC	SC	S	27	CA	
1"	SunDefense™ IG	PEL-N-277-00179-00001	3	3	3	argon	0.23	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00180-00001					0.23	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00181-00001	3	3	3	Krypton	0.19	0.18	0.40	72	N	NC	SC	S	26	CA	
	with grilles-between-the-glass	PEL-N-277-00182-00001					0.19	0.16	0.36	72	N	NC	SC	S	25	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00155-00001	3	3	3	argon	0.23	0.40	0.49	66	N	NC					
	with grilles-between-the-glass	PEL-N-277-00156-00001					0.24	0.36	0.44	66	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00157-00001	3	3	3	Krypton	0.20	0.40	0.49	71	N	NC			37	CA	
	with grilles-between-the-glass	PEL-N-277-00158-00001					0.20	0.36	0.44	71	N	NC			35	CA	
Vent - Triple Pane with Foam Insulation																	
1"	Advanced Low-E IG	PEL-N-277-00499-00001	3	3	3	argon	0.22	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00500-00001					0.23	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00501-00001	3	3	3	Krypton	0.18	0.24	0.43	72	N	NC	SC	S	31	CA	
	with grilles-between-the-glass	PEL-N-277-00502-00001					0.19	0.22	0.39	72	N	NC	SC	S	28	CA	
1"	SunDefense IG	PEL-N-277-00511-00001	3	3	3	argon	0.22	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00512-00001					0.22	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense IG	PEL-N-277-00513-00001	3	3	3	Krypton	0.18	0.18	0.40	72	N	NC	SC	S	27	CA	
	with grilles-between-the-glass	PEL-N-277-00514-00001					0.18	0.16	0.36	72	N	NC	SC	S	26	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00487-00001	3	3	3	argon	0.22	0.40	0.49	67	N	NC			35	CA	
	with grilles-between-the-glass	PEL-N-277-00488-00001					0.23	0.36	0.44	67	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00489-00001	3	3	3	Krypton	0.19	0.40	0.49	72	N	NC			38	CA	
	with grilles-between-the-glass	PEL-N-277-00490-00001					0.19	0.36	0.44	72	N	NC			36	CA	

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
											Zone				ER	Zone
Vent - Triple Pane with High Altitude Glazing											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00165-00001	3	3	3	air	0.26	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00166-00001					0.27	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00177-00001	3	3	3	air	0.26	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00178-00001					0.27	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00153-00001	3	3	3	air	0.27	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00154-00001					0.27	0.36	0.44	63	N	NC				
Vent - Triple Pane with High Altitude Glazing and Foam Insulation											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00497-00001	3	3	3	air	0.25	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00498-00001					0.26	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00509-00001	3	3	3	air	0.25	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00510-00001					0.26	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00485-00001	3	3	3	air	0.26	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00486-00001					0.26	0.36	0.44	63	N	NC				

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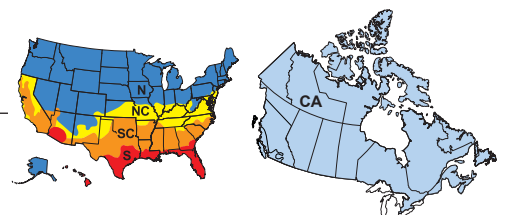
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			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Fixed										N	NC	SC	S	CA	
11/16"	Clear IG	PEL-N-276-00225-00001	3	3	air	0.46	0.63	0.66	44						
	with grilles-between-the-glass	PEL-N-276-00226-00001				0.46	0.56	0.59	44						
11/16"	Clear IG	PEL-N-276-00229-00001	4	4	air	0.47	0.61	0.66	43						
	with grilles-between-the-glass	PEL-N-276-00230-00001				0.48	0.55	0.59	43						
1"	Clear IG	PEL-N-276-00001-00001	5	5	air	0.45	0.60	0.65	44						
	with grilles-between-the-glass	PEL-N-276-00002-00001				0.45	0.54	0.58	44						
1"	Clear IG	PEL-N-276-00005-00001	6	6	air	0.44	0.58	0.64	44						
	with grilles-between-the-glass	PEL-N-276-00006-00001				0.44	0.52	0.57	44						
11/16"	Advanced Low-E IG	PEL-N-276-00235-00001	3	3	argon	0.27	0.30	0.56	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00236-00001				0.28	0.27	0.50	59		NC				
11/16"	Advanced Low-E IG	PEL-N-276-00239-00001	4	4	argon	0.28	0.30	0.56	57		NC				
	with grilles-between-the-glass	PEL-N-276-00240-00001				0.30	0.27	0.50	57		NC				
1"	Advanced Low-E IG	PEL-N-276-00019-00001	5	5	argon	0.27	0.29	0.55	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00020-00001				0.27	0.26	0.49	59	N	NC				
1"	Advanced Low-E IG	PEL-N-276-00023-00001	6	6	argon	0.27	0.29	0.54	58	N	NC				
	with grilles-between-the-glass	PEL-N-276-00024-00001				0.27	0.26	0.48	58	N	NC				
11/16"	SunDefense™ IG	PEL-N-276-00243-00001	3	3	argon	0.27	0.22	0.52	60	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00244-00001				0.28	0.20	0.46	60		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-276-00247-00001	4	4	argon	0.28	0.23	0.52	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00248-00001				0.29	0.21	0.46	58		NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00059-00001	5	5	argon	0.27	0.22	0.51	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00060-00001				0.27	0.20	0.46	59	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00063-00001	6	6	argon	0.27	0.22	0.50	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00064-00001				0.27	0.20	0.45	58	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00259-00001	3	3	argon	0.23	0.29	0.55	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00260-00001				0.24	0.27	0.49	47	N	NC				
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00263-00001	4	4	argon	0.24	0.29	0.54	45	N	NC				
	with grilles-between-the-glass	PEL-N-276-00264-00001				0.26	0.26	0.48	45	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00091-00001	5	5	argon	0.23	0.29	0.54	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00092-00001				0.23	0.26	0.48	47	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00095-00001	6	6	argon	0.23	0.28	0.53	46	N	NC				
	with grilles-between-the-glass	PEL-N-276-00096-00001				0.23	0.26	0.47	46	N	NC				
11/16"	NaturalSun Low-E IG	PEL-N-276-00251-00001	3	3	argon	0.28	0.55	0.64	59	N				37 CA	
	with grilles-between-the-glass	PEL-N-276-00252-00001				0.29	0.50	0.57	59	N					
11/16"	NaturalSun Low-E IG	PEL-N-276-00255-00001	4	4	argon	0.29	0.54	0.63	57	N				35 CA	
	with grilles-between-the-glass	PEL-N-276-00256-00001				0.31	0.48	0.56	57						
1"	NaturalSun Low-E IG	PEL-N-276-00075-00001	5	5	argon	0.28	0.53	0.63	58	N				36 CA	
	with grilles-between-the-glass	PEL-N-276-00076-00001				0.28	0.48	0.56	58	N					
1"	NaturalSun Low-E IG	PEL-N-276-00079-00001	6	6	argon	0.28	0.52	0.62	57	N				35 CA	
	with grilles-between-the-glass	PEL-N-276-00080-00001				0.28	0.47	0.55	57	N					

R-Value = 1/U-Factor
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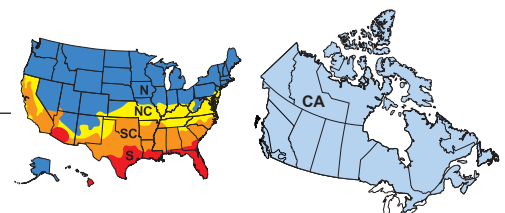
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Fixed – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-276-00567-00001	3	3	argon	0.26	0.30	0.56	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00568-00001				0.27	0.27	0.50	59	N	NC				
11/16"	Advanced Low-E IG	PEL-N-276-00571-00001	4	4	argon	0.28	0.30	0.56	57		NC				
	with grilles-between-the-glass	PEL-N-276-00572-00001				0.29	0.27	0.50	57		NC				
1"	Advanced Low-E IG	PEL-N-276-00351-00001	5	5	argon	0.27	0.29	0.55	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00352-00001				0.27	0.26	0.49	59	N	NC				
1"	Advanced Low-E IG	PEL-N-276-00355-00001	6	6	argon	0.27	0.29	0.54	58	N	NC				
	with grilles-between-the-glass	PEL-N-276-00356-00001				0.27	0.26	0.48	58	N	NC				
11/16"	SunDefense IG	PEL-N-276-00575-00001	3	3	argon	0.26	0.22	0.52	60	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00576-00001				0.27	0.20	0.46	60	N	NC	SC	S		
11/16"	SunDefense IG	PEL-N-276-00579-00001	4	4	argon	0.27	0.23	0.52	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00580-00001				0.29	0.21	0.46	58		NC	SC	S		
1"	SunDefense IG	PEL-N-276-00391-00001	5	5	argon	0.26	0.22	0.51	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00392-00001				0.26	0.20	0.46	59	N	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00395-00001	6	6	argon	0.26	0.22	0.50	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00396-00001				0.26	0.20	0.45	58	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00591-00001	3	3	argon	0.23	0.29	0.55	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00592-00001				0.23	0.27	0.49	47	N	NC				
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00595-00001	4	4	argon	0.24	0.29	0.54	45	N	NC				
	with grilles-between-the-glass	PEL-N-276-00596-00001				0.25	0.26	0.48	45	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00423-00001	5	5	argon	0.22	0.29	0.54	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00424-00001				0.22	0.26	0.48	47	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00427-00001	6	6	argon	0.22	0.28	0.53	46	N	NC				
	with grilles-between-the-glass	PEL-N-276-00428-00001				0.22	0.26	0.47	46	N	NC				
11/16"	NaturalSun Low-E IG	PEL-N-276-00583-00001	3	3	argon	0.27	0.55	0.64	59	N				38	CA
	with grilles-between-the-glass	PEL-N-276-00584-00001				0.28	0.50	0.57	59	N				34	CA
11/16"	NaturalSun Low-E IG	PEL-N-276-00587-00001	4	4	argon	0.29	0.54	0.63	57	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00588-00001				0.30	0.48	0.56	57	N					
1"	NaturalSun Low-E IG	PEL-N-276-00407-00001	5	5	argon	0.28	0.53	0.63	58	N				36	CA
	with grilles-between-the-glass	PEL-N-276-00408-00001				0.28	0.48	0.56	58	N					
1"	NaturalSun Low-E IG	PEL-N-276-00411-00001	6	6	argon	0.28	0.52	0.62	58	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00412-00001				0.28	0.47	0.55	58	N					

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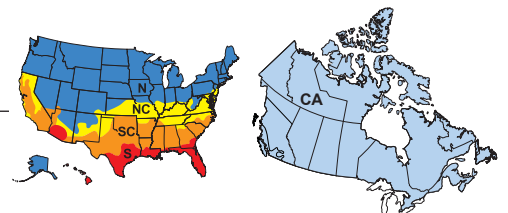
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Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00233-00001	3	3	air	0.31	0.30	0.56	55							
	with grilles-between-the-glass	PEL-N-276-00234-00001				0.33	0.27	0.50	55							
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00237-00001	4	4	air	0.33	0.30	0.56	53							
	with grilles-between-the-glass	PEL-N-276-00238-00001				0.35	0.27	0.50	53							
1"	(HA) Advanced Low-E IG	PEL-N-276-00017-00001	5	5	air	0.31	0.30	0.55	55							
	with grilles-between-the-glass	PEL-N-276-00018-00001				0.31	0.27	0.49	55							
1"	(HA) Advanced Low-E IG	PEL-N-276-00021-00001	6	6	air	0.31	0.29	0.54	55							
	with grilles-between-the-glass	PEL-N-276-00022-00001				0.31	0.27	0.48	55							
11/16"	(HA) SunDefense IG	PEL-N-276-00241-00001	3	3	air	0.31	0.23	0.52	56							S
	with grilles-between-the-glass	PEL-N-276-00242-00001				0.32	0.21	0.46	56							S
11/16"	(HA) SunDefense IG	PEL-N-276-00245-00001	4	4	air	0.33	0.23	0.52	53							S
	with grilles-between-the-glass	PEL-N-276-00246-00001				0.35	0.21	0.46	53							S
1"	(HA) SunDefense IG	PEL-N-276-00057-00001	5	5	air	0.31	0.22	0.51	56							S
	with grilles-between-the-glass	PEL-N-276-00058-00001				0.31	0.20	0.46	56							S
1"	(HA) SunDefense IG	PEL-N-276-00061-00001	6	6	air	0.30	0.23	0.50	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00062-00001				0.30	0.20	0.45	55		NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00257-00001	3	3	air	0.26	0.30	0.55	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00258-00001				0.27	0.27	0.49	43	N	NC					
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00261-00001	4	4	air	0.28	0.29	0.54	41		NC					
	with grilles-between-the-glass	PEL-N-276-00262-00001				0.29	0.26	0.48	41		NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00089-00001	5	5	air	0.26	0.29	0.54	44	N	NC					
	with grilles-between-the-glass	PEL-N-276-00090-00001				0.26	0.26	0.48	44	N	NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00093-00001	6	6	air	0.25	0.28	0.53	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00094-00001				0.25	0.26	0.47	43	N	NC					
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00249-00001	3	3	air	0.32	0.55	0.64	55							
	with grilles-between-the-glass	PEL-N-276-00250-00001				0.32	0.50	0.57	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00253-00001	4	4	air	0.34	0.54	0.63	52							
	with grilles-between-the-glass	PEL-N-276-00254-00001				0.36	0.48	0.56	52							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00073-00001	5	5	air	0.32	0.53	0.63	55							
	with grilles-between-the-glass	PEL-N-276-00074-00001				0.32	0.48	0.56	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00077-00001	6	6	air	0.32	0.52	0.62	54							
	with grilles-between-the-glass	PEL-N-276-00078-00001				0.32	0.47	0.55	54							

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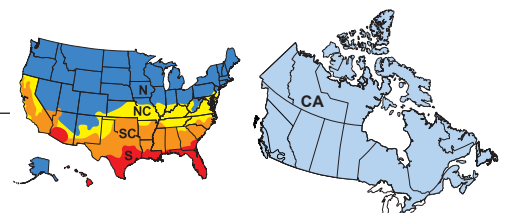
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²			
										Zone		ER	Zone		
Fixed – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA	
11/16"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00565-00001 PEL-N-276-00566-00001	3	3	air	0.31 0.32	0.30 0.27	0.56 0.50	55 55						
11/16"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00569-00001 PEL-N-276-00570-00001	4	4	air	0.33 0.34	0.30 0.27	0.56 0.50	53 53						
1"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00349-00001 PEL-N-276-00350-00001	5	5	air	0.30 0.30	0.30 0.27	0.55 0.49	55 55	NC					
1"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00353-00001 PEL-N-276-00354-00001	6	6	air	0.30 0.30	0.29 0.27	0.54 0.48	55 55	NC					
11/16"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00573-00001 PEL-N-276-00574-00001	3	3	air	0.30 0.32	0.23 0.21	0.52 0.46	56 56	NC	SC	S			
11/16"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00577-00001 PEL-N-276-00578-00001	4	4	air	0.32 0.34	0.23 0.21	0.52 0.46	53 53				S		
1"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00389-00001 PEL-N-276-00390-00001	5	5	air	0.30 0.30	0.22 0.20	0.51 0.46	56 56	NC	SC	S			
1"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00393-00001 PEL-N-276-00394-00001	6	6	air	0.30 0.30	0.23 0.20	0.50 0.45	55 55	NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00589-00001 PEL-N-276-00590-00001	3	3	air	0.26 0.27	0.30 0.27	0.55 0.49	43 43	N	NC				
11/16"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00593-00001 PEL-N-276-00594-00001	4	4	air	0.27 0.28	0.29 0.26	0.54 0.48	41 41	N	NC				
1"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00421-00001 PEL-N-276-00422-00001	5	5	air	0.25 0.25	0.29 0.26	0.54 0.48	44 44	N	NC				
1"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00425-00001 PEL-N-276-00426-00001	6	6	air	0.25 0.25	0.28 0.26	0.53 0.47	43 43	N	NC				
11/16"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00581-00001 PEL-N-276-00582-00001	3	3	air	0.32 0.32	0.55 0.50	0.64 0.57	55 55						
11/16"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00585-00001 PEL-N-276-00586-00001	4	4	air	0.33 0.35	0.54 0.48	0.63 0.56	52 52						
1"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00405-00001 PEL-N-276-00406-00001	5	5	air	0.31 0.31	0.53 0.48	0.63 0.56	55 55						
1"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00409-00001 PEL-N-276-00410-00001	6	6	air	0.31 0.31	0.52 0.47	0.62 0.55	54 54						

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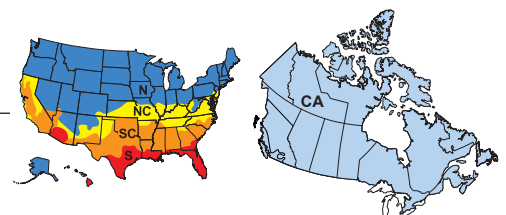
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone	ER	Zone	Zone	
Fixed - 5 mm/3 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00009-00001	5	3	air	0.45	0.61	0.66	45					
	with grilles-between-the-glass	PEL-N-276-00010-00001				0.45	0.55	0.59	45					
1"	Advanced Low-E IG	PEL-N-276-00051-00001	5	3	argon	0.28	0.29	0.55	60		NC			
	with grilles-between-the-glass	PEL-N-276-00052-00001				0.28	0.27	0.50	60		NC			
1"	SunDefense™ IG	PEL-N-276-00067-00001	5	3	argon	0.27	0.22	0.52	60	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00068-00001				0.27	0.20	0.46	60	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00099-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00100-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00083-00001	5	3	argon	0.29	0.54	0.63	60	N				35 CA
	with grilles-between-the-glass	PEL-N-276-00084-00001				0.29	0.48	0.56	60	N				
Fixed - 5 mm/3 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-276-00383-00001	5	3	argon	0.27	0.29	0.55	60	N	NC			
	with grilles-between-the-glass	PEL-N-276-00384-00001				0.27	0.27	0.50	60	N	NC			
1"	SunDefense IG	PEL-N-276-00399-00001	5	3	argon	0.27	0.22	0.52	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00400-00001				0.27	0.20	0.46	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00431-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00432-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00415-00001	5	3	argon	0.28	0.54	0.63	60	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00416-00001				0.28	0.48	0.56	60	N				
Fixed - 5 mm/3 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-276-00049-00001	5	3	air	0.31	0.30	0.55	56					
	with grilles-between-the-glass	PEL-N-276-00050-00001				0.31	0.27	0.50	56					
1"	(HA) SunDefense IG	PEL-N-276-00065-00001	5	3	air	0.31	0.22	0.52	57				S	
	with grilles-between-the-glass	PEL-N-276-00066-00001				0.31	0.20	0.46	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00097-00001	5	3	air	0.26	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00098-00001				0.26	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00081-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00082-00001				0.32	0.48	0.56	56					
Fixed - 5 mm/3 mm Glass High Altitude Glazing – with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-276-00381-00001	5	3	air	0.31	0.30	0.55	57					
	with grilles-between-the-glass	PEL-N-276-00382-00001				0.31	0.27	0.50	57					
1"	(HA) SunDefense IG	PEL-N-276-00397-00001	5	3	air	0.30	0.22	0.52	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00398-00001				0.30	0.20	0.46	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00429-00001	5	3	air	0.25	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00430-00001				0.25	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00413-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00414-00001				0.32	0.48	0.56	56					

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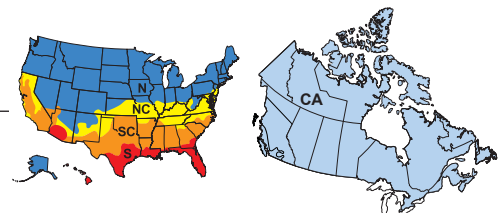
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²		
										Zone	ER	Zone	ER	Zone
Fixed - 4 mm/6 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00013-00001	4	6	air	0.45	0.60	0.65	44					
	with grilles-between-the-glass	PEL-N-276-00014-00001				0.45	0.54	0.58	44					
1"	Advanced Low-E IG	PEL-N-276-00055-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00056-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense™ IG	PEL-N-276-00071-00001	4	6	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00072-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00103-00001	4	6	argon	0.23	0.29	0.54	46	N	NC			
	with grilles-between-the-glass	PEL-N-276-00104-00001				0.23	0.26	0.48	46	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00087-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00088-00001				0.28	0.49	0.56	58	N				
Fixed - 4 mm/6 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-276-00387-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00388-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense IG	PEL-N-276-00403-00001	4	6	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00404-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00435-00001	4	6	argon	0.22	0.29	0.54	47	N	NC			
	with grilles-between-the-glass	PEL-N-276-00436-00001				0.22	0.26	0.48	47	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00419-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00420-00001				0.28	0.49	0.56	58	N				
Fixed - 4 mm/6 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-276-00053-00001	4	6	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00054-00001				0.31	0.27	0.49	55					
1"	(HA) SunDefense IG	PEL-N-276-00069-00001	4	6	air	0.31	0.22	0.51	55				S	
	with grilles-between-the-glass	PEL-N-276-00070-00001				0.31	0.20	0.46	55				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00101-00001	4	6	air	0.26	0.29	0.54	43	N	NC			
	with grilles-between-the-glass	PEL-N-276-00102-00001				0.26	0.26	0.48	43	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00085-00001	4	6	air	0.32	0.54	0.62	54					
	with grilles-between-the-glass	PEL-N-276-00086-00001				0.32	0.48	0.56	54					
Fixed - 4 mm/6 mm Glass High Altitude Glazing – with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-276-00385-00001	4	6	air	0.30	0.30	0.55	55		NC			
	with grilles-between-the-glass	PEL-N-276-00386-00001				0.30	0.27	0.49	55		NC			
1"	(HA) SunDefense IG	PEL-N-276-00401-00001	4	6	air	0.30	0.22	0.51	55		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00402-00001				0.30	0.20	0.46	55		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00433-00001	4	6	air	0.25	0.29	0.54	44	N	NC			
	with grilles-between-the-glass	PEL-N-276-00434-00001				0.25	0.26	0.48	44	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00417-00001	4	6	air	0.31	0.54	0.62	55					
	with grilles-between-the-glass	PEL-N-276-00418-00001				0.31	0.48	0.56	55					

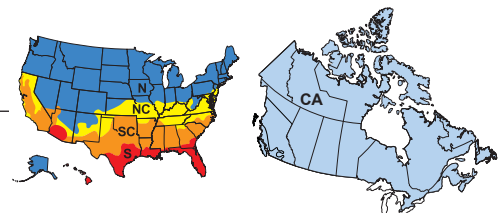
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00275-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00276-00001				0.30	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00027-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00028-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00039-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00040-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00279-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00280-00001				0.30	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00031-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00032-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00043-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00044-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00283-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00284-00001				0.30	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00035-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00036-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00047-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00048-00001				0.27	0.26	0.42	58	N	NC					
Fixed - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00607-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00608-00001				0.29	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00359-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00360-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00371-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00372-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00611-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00612-00001				0.29	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00363-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00364-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00375-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00376-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00615-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00616-00001				0.29	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00367-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00368-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00379-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00380-00001				0.27	0.26	0.42	58	N	NC					

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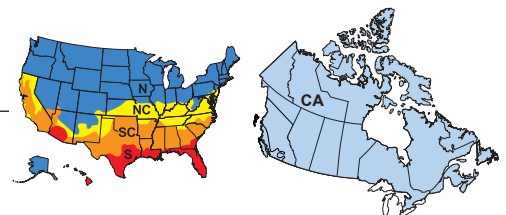
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed - High Altitude Glazing - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00273-00001	5	3	air	0.33	0.27	0.36	54							
	with grilles-between-the-glass	PEL-N-276-00274-00001				0.35	0.25	0.32	54							S
1"	Bronze Advanced Low-E IG	PEL-N-276-00025-00001	5	5	air	0.31	0.27	0.36	56							S
	with grilles-between-the-glass	PEL-N-276-00026-00001				0.31	0.24	0.32	56							S
1"	Bronze Advanced Low-E IG	PEL-N-276-00037-00001	6	6	air	0.31	0.25	0.32	55							S
	with grilles-between-the-glass	PEL-N-276-00038-00001				0.31	0.23	0.29	55							S
11/16"	Gray Advanced Low-E IG	PEL-N-276-00277-00001	5	3	air	0.33	0.25	0.31	54							S
	with grilles-between-the-glass	PEL-N-276-00278-00001				0.35	0.23	0.28	54							S
1"	Gray Advanced Low-E IG	PEL-N-276-00029-00001	5	5	air	0.31	0.24	0.31	56							S
	with grilles-between-the-glass	PEL-N-276-00030-00001				0.31	0.22	0.28	56							S
1"	Gray Advanced Low-E IG	PEL-N-276-00041-00001	6	6	air	0.31	0.22	0.27	55							S
	with grilles-between-the-glass	PEL-N-276-00042-00001				0.31	0.20	0.24	55							S
11/16"	Green Advanced Low-E IG	PEL-N-276-00281-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00282-00001				0.35	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00033-00001	5	5	air	0.31	0.30	0.49	56							
	with grilles-between-the-glass	PEL-N-276-00034-00001				0.31	0.27	0.44	56							
1"	Green Advanced Low-E IG	PEL-N-276-00045-00001	6	6	air	0.31	0.29	0.47	55							
	with grilles-between-the-glass	PEL-N-276-00046-00001				0.31	0.26	0.42	55							
Fixed - High Altitude Glazing - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00605-00001	5	3	air	0.33	0.27	0.36	54							S
	with grilles-between-the-glass	PEL-N-276-00606-00001				0.34	0.25	0.32	54							S
1"	Bronze Advanced Low-E IG	PEL-N-276-00357-00001	5	5	air	0.30	0.27	0.36	56		NC					
	with grilles-between-the-glass	PEL-N-276-00358-00001				0.30	0.24	0.32	56		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00369-00001	6	6	air	0.30	0.25	0.32	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00370-00001				0.30	0.23	0.29	55		NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00609-00001	5	3	air	0.33	0.25	0.31	54							S
	with grilles-between-the-glass	PEL-N-276-00610-00001				0.34	0.23	0.28	54							S
1"	Gray Advanced Low-E IG	PEL-N-276-00361-00001	5	5	air	0.30	0.24	0.31	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00362-00001				0.30	0.22	0.28	56		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00373-00001	6	6	air	0.30	0.22	0.27	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00374-00001				0.30	0.20	0.24	55		NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00613-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00614-00001				0.34	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00365-00001	5	5	air	0.30	0.30	0.49	56		NC					
	with grilles-between-the-glass	PEL-N-276-00366-00001				0.30	0.27	0.44	56		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00377-00001	6	6	air	0.30	0.29	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-276-00378-00001				0.30	0.26	0.42	55		NC					

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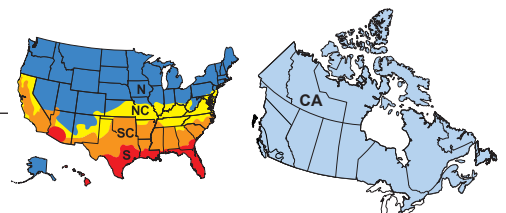
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Fixed – with Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00139-00001	4	7	argon	0.27	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00140-00001				0.27	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00151-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00152-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00135-00001	4	7	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00136-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00147-00001	5	10	argon	0.26	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00148-00001				0.26	0.20	0.45	58	N	NC	SC	S	
Fixed – with Foam insulation and Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00471-00001	4	7	argon	0.26	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00472-00001				0.26	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00483-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00484-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00467-00001	4	7	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00468-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00479-00001	5	10	argon	0.25	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00480-00001				0.25	0.20	0.45	58	N	NC	SC	S	

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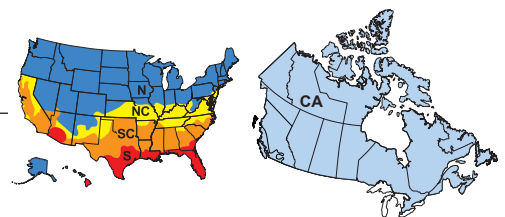
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Fixed - High Altitude Glazing - with Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00137-00001	4	7	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00138-00001				0.31	0.27	0.49	55					
1"	Advanced Low-E IG	PEL-N-276-00149-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00150-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00133-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00134-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00145-00001	5	10	air	0.30	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00146-00001				0.30	0.20	0.45	54	NC	SC	S		
Fixed - High Altitude Glazing - with Foam Insulation and Laminated Glazing														
1"	Advanced Low-E IG	PEL-N-276-00469-00001	4	7	air	0.30	0.30	0.55	56	NC				
	with grilles-between-the-glass	PEL-N-276-00470-00001				0.30	0.27	0.49	56	NC				
1"	Advanced Low-E IG	PEL-N-276-00481-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00482-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00465-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00466-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00477-00001	5	10	air	0.29	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00478-00001				0.29	0.20	0.45	54	NC	SC	S		

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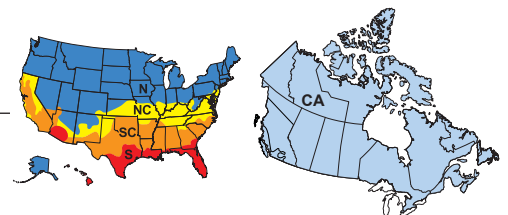
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See the Product Performance section for more detailed information or visit www.energystar.gov for Energy Star guidelines.





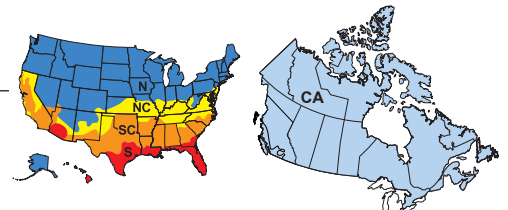
Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown							
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U.S.		Canada ²					
											Zone		ER	Zone				
Fixed -Triple Pane											N	NC	SC	S			CA	
1"	Advanced Low-E IG	PEL-N-276-00167-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC				29	CA	
	with grilles-between-the-glass	PEL-N-276-00168-00001					0.22	0.25	0.44	67	N	NC	SC	S				
1"	Advanced Low-E IG	PEL-N-276-00169-00001	3	3	3	Krypton	0.17	0.27	0.50	72	N	NC				34	CA	
	with grilles-between-the-glass	PEL-N-276-00170-00001					0.17	0.24	0.44	72	N	NC	SC	S		32	CA	
1"	Advanced Low-E IG	PEL-N-276-00173-00001	4	4	4	argon	0.24	0.27	0.49	63	N	NC						
	with grilles-between-the-glass	PEL-N-276-00174-00001					0.25	0.24	0.43	63	N	NC	SC	S				
1"	Advanced Low-E IG	PEL-N-276-00175-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC					33	CA
	with grilles-between-the-glass	PEL-N-276-00176-00001					0.20	0.24	0.43	69	N	NC	SC	S		29	CA	
1"	SunDefense™ IG	PEL-N-276-00179-00001	3	3	3	argon	0.21	0.20	0.46	67	N	NC	SC	S		25	CA	
	with grilles-between-the-glass	PEL-N-276-00180-00001					0.22	0.19	0.41	67	N	NC	SC	S				
1"	SunDefense™ IG	PEL-N-276-00181-00001	3	3	3	Krypton	0.17	0.20	0.46	72	N	NC	SC	S		30	CA	
	with grilles-between-the-glass	PEL-N-276-00182-00001					0.17	0.18	0.41	72	N	NC	SC	S		29	CA	
1"	SunDefense™ IG	PEL-N-276-00185-00001	4	4	4	argon	0.24	0.21	0.45	64	N	NC	SC	S				
	with grilles-between-the-glass	PEL-N-276-00186-00001					0.25	0.19	0.40	64	N	NC	SC	S				
1"	SunDefense™ IG	PEL-N-276-00187-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S		29	CA	
	with grilles-between-the-glass	PEL-N-276-00188-00001					0.19	0.18	0.40	69	N	NC	SC	S		27	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00155-00001	3	3	3	argon	0.22	0.45	0.56	67	N					38	CA	
	with grilles-between-the-glass	PEL-N-276-00156-00001					0.22	0.41	0.50	67	N					36	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00157-00001	3	3	3	Krypton	0.17	0.45	0.56	71	N					45	CA	
	with grilles-between-the-glass	PEL-N-276-00158-00001					0.18	0.41	0.50	71	N					41	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00161-00001	4	4	4	argon	0.24	0.44	0.55	63	N					35	CA	
	with grilles-between-the-glass	PEL-N-276-00162-00001					0.26	0.40	0.50	63	N	NC						
1"	NaturalSun Low-E IG	PEL-N-276-00163-00001	4	4	4	Krypton	0.19	0.44	0.55	68	N					42	CA	
	with grilles-between-the-glass	PEL-N-276-00164-00001					0.20	0.40	0.50	68	N	NC				38	CA	
Fixed - Triple Pane with Foam Insulation																		
1"	Advanced Low-E IG	PEL-N-276-00499-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC				29	CA	
	with grilles-between-the-glass	PEL-N-276-00500-00001					0.21	0.25	0.44	67	N	NC	SC	S		28	CA	
1"	Advanced Low-E IG	PEL-N-276-00501-00001	3	3	3	Krypton	0.16	0.27	0.50	72	N	NC				35	CA	
	with grilles-between-the-glass	PEL-N-276-00502-00001					0.17	0.24	0.44	72	N	NC	SC	S		32	CA	
1"	Advanced Low-E IG	PEL-N-276-00505-00001	4	4	4	argon	0.23	0.27	0.49	64	N	NC						
	with grilles-between-the-glass	PEL-N-276-00506-00001					0.25	0.24	0.43	64	N	NC	SC	S				
1"	Advanced Low-E IG	PEL-N-276-00507-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC					33	CA
	with grilles-between-the-glass	PEL-N-276-00508-00001					0.19	0.24	0.43	69	N	NC	SC	S		30	CA	
1"	SunDefense IG	PEL-N-276-00511-00001	3	3	3	argon	0.21	0.20	0.46	68	N	NC	SC	S		25	CA	
	with grilles-between-the-glass	PEL-N-276-00512-00001					0.21	0.19	0.41	68	N	NC	SC	S		25	CA	
1"	SunDefense IG	PEL-N-276-00513-00001	3	3	3	Krypton	0.16	0.20	0.46	72	N	NC	SC	S		31	CA	
	with grilles-between-the-glass	PEL-N-276-00514-00001					0.16	0.18	0.41	72	N	NC	SC	S		30	CA	
1"	SunDefense IG	PEL-N-276-00517-00001	4	4	4	argon	0.23	0.21	0.45	64	N	NC	SC	S				
	with grilles-between-the-glass	PEL-N-276-00518-00001					0.24	0.19	0.40	64	N	NC	SC	S				
1"	SunDefense IG	PEL-N-276-00519-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S		29	CA	
	with grilles-between-the-glass	PEL-N-276-00520-00001					0.19	0.18	0.40	69	N	NC	SC	S		27	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00487-00001	3	3	3	argon	0.21	0.45	0.56	67	N					40	CA	
	with grilles-between-the-glass	PEL-N-276-00488-00001					0.22	0.41	0.50	67	N					36	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00489-00001	3	3	3	Krypton	0.17	0.45	0.56	72	N					45	CA	
	with grilles-between-the-glass	PEL-N-276-00490-00001					0.17	0.41	0.50	72	N					42	CA	
1"	NaturalSun Low-E IG	PEL-N-276-00493-00001	4	4	4	argon	0.24	0.44	0.55	63	N					35	CA	
	with grilles-between-the-glass	PEL-N-276-00494-00001					0.25	0.40	0.50	63	N	NC						
1"	NaturalSun Low-E IG	PEL-N-276-00495-00001	4	4	4	Krypton	0.18	0.44	0.55	69	N					43	CA	
	with grilles-between-the-glass	PEL-N-276-00496-00001					0.19	0.40	0.50	69	N	NC				39	CA	

R-Value = 1/U-Factor SHGC = Solar Heat Gain Coefficient
VLT % = Visible Light Transmission CR = Condensation Resistance
ER = Canadian Energy Rating

(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500. ENERGY STAR® values are updated to 2016 (Version 6) criteria.

(2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative. For center-glass values, see the Product Performance section.

See the Product Performance section for more detailed information or visit www.energystar.gov for Energy Star guidelines.





Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²				
											Zone		ER	Zone			
Fixed - Triple Pane with High Altitude Glazing											N	NC	SC	S			CA
1"	(HA) Advanced Low-E IG	PEL-N-276-00165-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00166-00001					0.26	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00171-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00172-00001					0.30	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00177-00001	3	3	3	air	0.25	0.21	0.46	63	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00178-00001					0.26	0.19	0.41	63	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00183-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00184-00001					0.30	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00153-00001	3	3	3	air	0.26	0.45	0.56	63	N						
	with grilles-between-the-glass	PEL-N-276-00154-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00159-00001	4	4	4	air	0.29	0.44	0.55	59	N						
	with grilles-between-the-glass	PEL-N-276-00160-00001					0.30	0.39	0.50	59		NC					
Fixed - Triple Pane with High Altitude Glazing and Foam Insulation																	
1"	(HA) Advanced Low-E IG	PEL-N-276-00497-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00498-00001					0.25	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00503-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00504-00001					0.29	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00509-00001	3	3	3	air	0.24	0.21	0.46	64	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00510-00001					0.25	0.19	0.41	64	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00515-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00516-00001					0.29	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00485-00001	3	3	3	air	0.25	0.45	0.56	63	N				35	CA	
	with grilles-between-the-glass	PEL-N-276-00486-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00491-00001	4	4	4	air	0.28	0.44	0.55	60	N						
	with grilles-between-the-glass	PEL-N-276-00492-00001					0.29	0.39	0.50	60	N	NC					

R-Value = 1/U-Factor
 SHGC = Solar Heat Gain Coefficient
 VLT % = Visible Light Transmission
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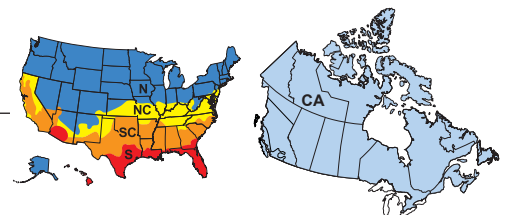
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

ENERGY STAR® values are updated to 2016 (Version 6) criteria.

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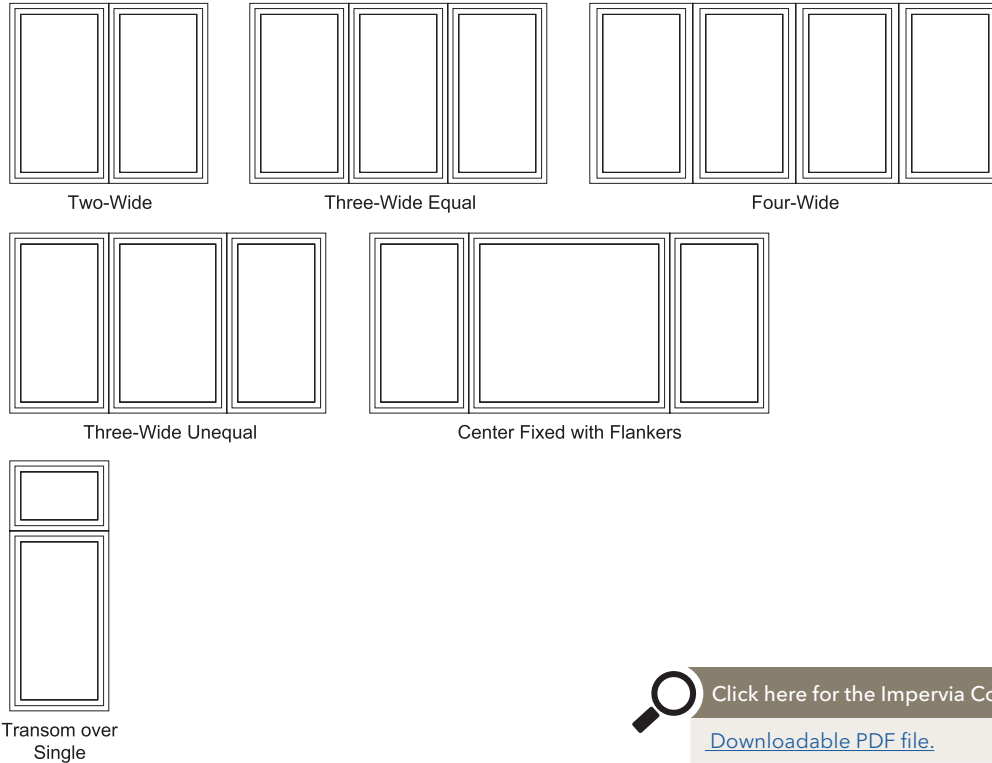
See the Product Performance section for more detailed information or visit www.energystar.gov for Energy Star guidelines.





A combination is defined as an assembly formed by two or more separate windows or doors whose frames are mullered together utilizing a combination mullion or reinforcing mullion.

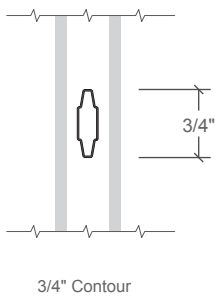
Below are available factory-assembled combinations. See the Combination section for requirements and limitations related to mulling various combinations plus configuration size range information.



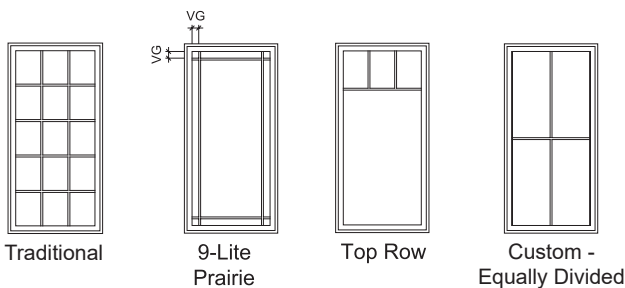
 [Click here for the Impervia Combinations Section](#)
[Downloadable PDF file.](#)

Grille Profiles

Grilles-Between-the-Glass



Grille Patterns



Standard corner lite dimension for Prairie patterns = 4" visible glass (VG).

(1) Standard visible glass to center line of separator bar = 14" or half the total visible glass height, whichever is smaller. Multiple rows are available up to 50% glass size.

Pattern availability may vary depending on size of unit.

VG = Visible Glass
Lite dimensions noted can vary.

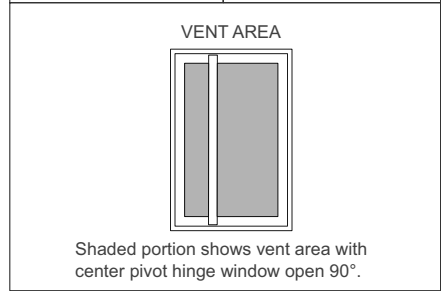
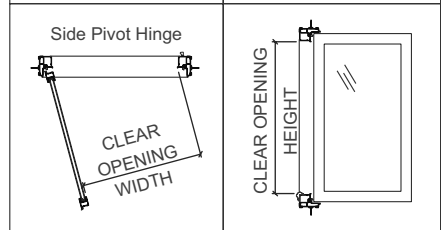
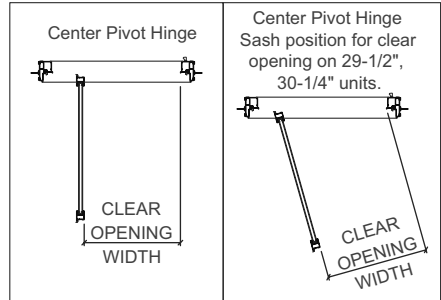


Size Tables

Transoms

	(457) (445)	(610) (597)	(711) (699)	(762) (749)	(813) (800)	(914) (902)
Opening	1' 6"	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"
Frame	1' 5 1/2"	1' 11 1/2"	2' 3 1/2"	2' 5 1/2"	2' 7 1/2"	2' 11 1/2"

SPECIAL NARROWER AND WIDER SIZES AVAILABLE						
SPECIAL SIZES AVAILABLE	1-6/1-2	2-0/1-2	2-4/1-2	2-6/1-2	2-8/1-2	3-0/1-2
	1-6/1-6	2-0/1-6	2-4/1-6	2-6/1-6	2-8/1-6	3-0/1-6
	1-6/2-0	2-0/2-0	2-4/2-0	2-6/2-0	2-8/2-0	3-0/2-0



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

Vent and Fixed Units

	(762) (749)	(914) (902)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)	(1 524) (1 511)	(1 676) (1 664)	(1 829) (1 816)
Opening	2' 6"	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"	5' 6"	6' 0"
Frame	2' 5 1/2"	2' 11 1/2"	3' 5 1/2"	3' 11 1/2"	4' 5 1/2"	4' 11 1/2"	5' 5 1/2"	5' 11 1/2"

SPECIAL SHORTER AND TALLER SIZES AVAILABLE								
SPECIAL SHORTER AND TALLER SIZES AVAILABLE	1-6/2-6	2-0/2-6	2-4/2-6	2-6/2-6	2-8/2-6	3-0/2-6		
	1-6/3-0	2-0/3-0	2-4/3-0	2-6/3-0 E3	2-8/3-0 E3	3-0/3-0 E1		
	1-6/3-6	2-0/3-6	2-4/3-6 E3	2-6/3-6 E2	2-8/3-6 E2	3-0/3-6 E		
	1-6/4-0	2-0/4-0	2-4/4-0 E2	2-6/4-0 E	2-8/4-0 E	3-0/4-0 E		
	1-6/4-6	2-0/4-6	2-4/4-6 E2	2-6/4-6 E	2-8/4-6 E	3-0/4-6 E		
	1-6/5-0	2-0/5-0	2-4/5-0 E2	2-6/5-0 E	2-8/5-0 E	3-0/5-0 E		
	1-6/5-6	2-0/5-6	2-4/5-6 E2	2-6/5-6 E	2-8/5-6 E	3-0/5-6 E		
	1-6/6-0	2-0/6-0	2-4/6-0 E2	2-6/6-0 E	3-8/6-0 E	3-0/6-0 E		

Egress Notes:

Check all applicable local codes for emergency egress requirements.

- E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².
- E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

See Design Data pages in this section for clear opening dimensions.

☐ = Tempered glass.

Not to scale.

Any vent casement with frame height greater than 70" will have 3mm tempered glass to reduce sash weight.

All units are available as fixed in the Casement section.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Size Tables

Transoms

	(1 219) (1 207)	(1 524) (1 511)	(1 829) (1 816)	
Opening	4' 0"	5' 0"	6' 0"	
Frame	3' 11 1/2"	4' 11 1/2"	5' 11 1/2"	
SPECIAL NARROWER AND WIDER SIZES AVAILABLE				
(610) (457) (356) (597) (445) (343)	2' 0"	4-0/1-2	5-0/1-2	6-0/1-2
	1' 6"	4-0/1-6	5-0/1-6	6-0/1-6
	1' 11 1/2"	4-0/2-0	5-0/2-0	6-0/2-0
SPECIAL SIZES AVAILABLE				
	1' 11 1/2"	4-0/1-2	5-0/1-2	6-0/1-2
	1' 5 1/2"	4-0/1-6	5-0/1-6	6-0/1-6
	1' 2"	4-0/2-0	5-0/2-0	6-0/2-0

Fixed Units

(1 829) (1 816)	6' 0"	4-0/6-0	5-0/6-0	6-0/6-0
	5' 11 1/2"	4-0/5-6	5-0/5-6	6-0/5-6
(1 676) (1 664)	5' 6"	4-0/5-0	5-0/5-0	6-0/5-0
	5' 5 1/2"	4-0/4-6	5-0/4-6	6-0/4-6
(1 524) (1 511)	5' 0"	4-0/4-0	5-0/4-0	6-0/4-0
	4' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 372) (1 359)	4' 6"	4-0/3-0	5-0/3-0	6-0/3-0
	4' 5 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 219) (1 207)	4' 0"	4-0/3-0	5-0/3-0	6-0/3-0
	3' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 067) (1 054)	3' 6"	4-0/3-0	5-0/3-0	6-0/3-0
	3' 5 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(914) (902)	3' 0"	4-0/3-0	5-0/3-0	6-0/3-0
	2' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
SPECIAL SHORTER AND TALLER SIZES AVAILABLE				

Not to scale.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Special Size Frame Dimensions*

	Minimum	Maximum
Vent	1' 5-1/2" W x 1' 8" H (17-1/2" x 20") (445 x 508)	3' 1-1/2" W x 6' 7-1/2" H (37-1/2" x 79-1/2") (953 x 2 019)
Fixed	1' 1-1/2" W x 11-1/2" H (13-1/2" x 11-1/2") (343 x 292)	5' 11-1/2" W x 6' 7-1/2" H (71-1/2" x 79-1/2") (1 816 x 2 019)

* Available within size range shown.

Keep frame dimensions to the nearest 1/8" increment. Frame width cannot exceed frame height on special size vent units.

Miscellaneous Formulas

	Formula
Visible Glass	Width = Frame - 5-7/16" Height = Frame - 5-7/16"
Actual Glass	Width = Frame - 4-3/8" Height = Frame - 4-3/8"

Clear Opening Height

Frame Height - 4-3/4"

Clear Opening Width

Hinge	Frame Width	Formula	Angle
Center Pivot / Roto Operator	29-1/2" to 30-1/4"	FW - 9-1/2"	75°
Center Pivot / Roto Operator	30-1/4" to 37-1/2"	FW - 10-1/4"	90°
Side Pivot / Roto Operator	25-1/2" to 32"	FW - 5-1/2"	75°
Side Pivot / Easy Slide Operator	25-1/2" to 37-1/2"	FW - 5-1/2"	75° See chart
Side Pivot / Easy Slide Operator	30" to 37-1/2"	FW x 0.67	54° See chart

Vent Opening Area

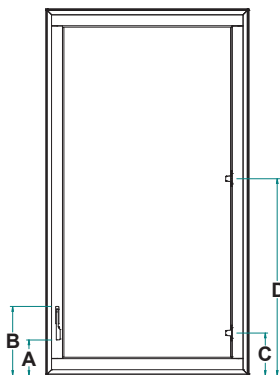
(Clear Opening Width) x (FH - 4.75) ÷ 144

Lock Handle Operator Height

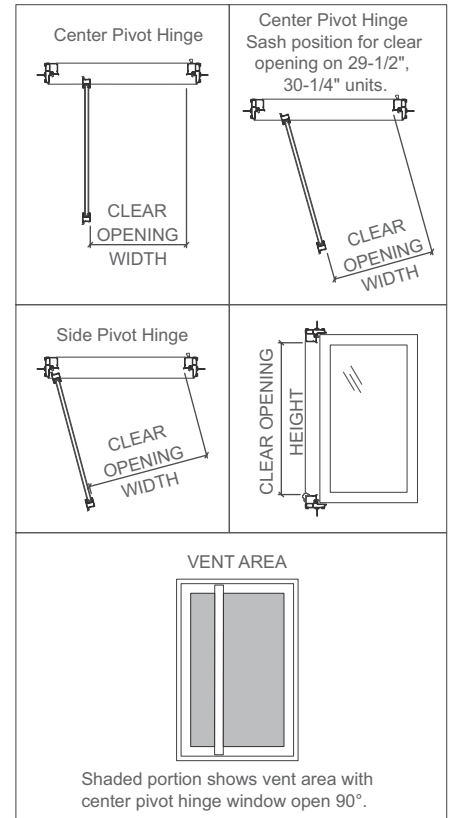
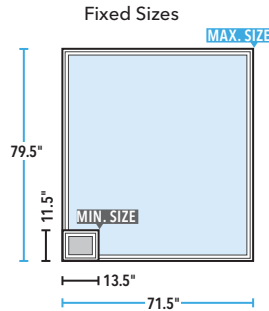
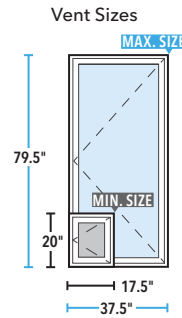
Frame Height	Locked Location (A)	Unlocked Location (B)
≥ 20" to ≤ 59.5"	4-5/8"	9-3/8"
> 59.5" to < 72.5"	9-5/8"	14-3/8"
≥ 72.5" to ≤ 79.5"	30-9/16"	35-5/16"

Easy-Slide Operator Height

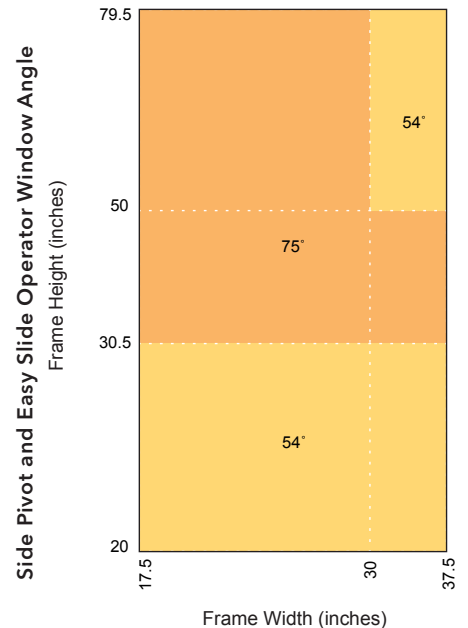
Frame Height	Closed Location (C)	Open Location (D)
≥ 20" to < 30.5"	5-1/2"	15-1/2"
≥ 30.5" to < 72.5"	5-1/2"	25-1/2"
≥ 72.5" to ≤ 79.5"	21-1/2"	41-1/2"



Height is measured from the bottom of the frame, proper installation height is required for ADA compliance.



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

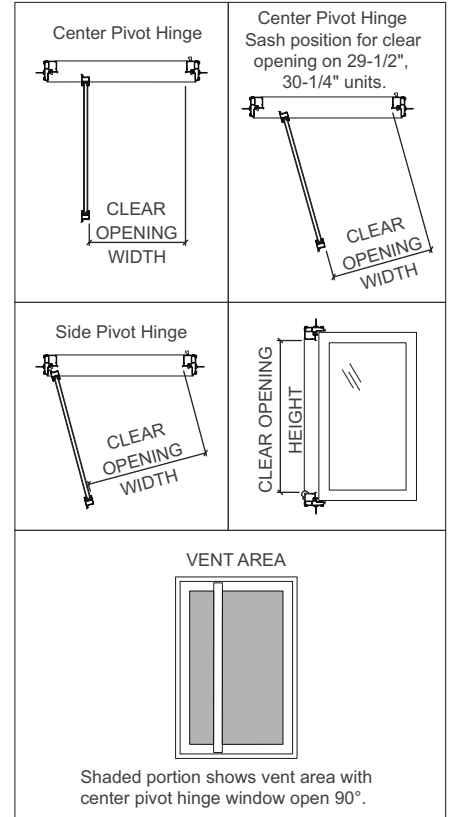




Impervia® Casement Windows

Design Data

Vent									
Unit	Egress	Clear Opening			Vent Area Ft ²	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Width (Inches)	Height (Inches)	Ft ²			Annealed	Tempered	
1-6/2-6		7-1/4	24-3/4	1.2	1.7	2.0	3	3	LC+50/-60
1-6/3-0		7-1/4	30-3/4	1.5	2.1	2.5	3	3	LC+50/-60
1-6/3-6		7-1/4	36-3/4	1.9	2.5	3.0	3	3	LC+50/-60
1-6/4-0		7-1/4	42-3/4	2.2	2.9	3.5	3	3	LC+50/-60
1-6/4-6		7-1/4	48-3/4	2.5	3.3	4.0	3	3	LC+50/-60
1-6/5-0		7-1/4	54-3/4	2.8	3.8	4.5	3	3	LC+50/-60
1-6/5-6		7-1/4	60-3/4	3.1	4.2	5.0	3	3	LC50
1-6/6-0 T		7-1/4	66-3/4	3.4	4.6	5.5	-	3	LC50
2-0/2-6		13-1/4	24-3/4	2.3	2.6	3.0	3	3	LC+50/-60
2-0/3-0		13-1/4	30-3/4	2.8	3.3	3.7	3	3	LC+50/-60
2-0/3-6		13-1/4	36-3/4	3.4	4.0	4.5	3	3	LC+50/-60
2-0/4-0		13-1/4	42-3/4	3.9	4.6	5.2	3	3	LC+50/-60
2-0/4-6		13-1/4	48-3/4	4.5	5.3	6.0	3	3	LC+50/-60
2-0/5-0		13-1/4	54-3/4	5.0	6.0	6.7	3	3	LC+50/-60
2-0/5-6		13-1/4	60-3/4	5.6	6.7	7.5	3	3	LC50
2-0/6-0		13-1/4	66-3/4	6.1	7.3	8.2	3	3	LC50
2-4/2-6		17-1/4	24-3/4	3.0	3.3	3.6	3	3	LC+50/-60
2-4/3-0		17-1/4	30-3/4	3.7	4.1	4.6	3	3	LC+50/-60
2-4/3-6	E3	17-1/4	36-3/4	4.4	5.0	5.5	3	3	LC+50/-60
2-4/4-0	E2	17-1/4	42-3/4	5.1	5.8	6.4	3	3	LC+50/-60
2-4/4-6	E2	17-1/4	48-3/4	5.8	6.6	7.3	3	3	LC+50/-60
2-4/5-0	E2	17-1/4	54-3/4	6.6	7.5	8.2	3	3	LC+50/-60
2-4/5-6	E2	17-1/4	60-3/4	7.3	8.3	9.1	3	3	LC50
2-4/6-0	E2	17-1/4	66-3/4	8.0	9.1	10.1	4	3	LC50
2-6/2-6		20	24-3/4	3.4	3.6	4.0	3	3	LC+50/-60
2-6/3-0	E3	20	30-3/4	4.3	4.5	5.0	3	3	LC+50/-60
2-6/3-6	E2	20	36-3/4	5.1	5.5	6.0	3	3	LC+50/-60
2-6/4-0	E	20	42-3/4	5.9	6.4	7.0	3	3	LC+50/-60
2-6/4-6	E	20	48-3/4	6.8	7.3	8.0	3	3	LC+50/-60
2-6/5-0	E	20	54-3/4	7.6	8.2	9.0	3	3	LC+50/-60
2-6/5-6	E	20	60-3/4	8.4	9.1	10.0	3	3	LC50
2-6/6-0	E	20	66-3/4	9.3	10.1	11.0	4	3	LC50
2-8/2-6		21-1/4	24-3/4	3.7	3.9	4.3	3	3	LC+50/-60
2-8/3-0	E3	21-1/4	30-3/4	4.5	4.9	5.4	3	3	LC+50/-60
2-8/3-6	E2	21-1/4	36-3/4	5.4	5.9	6.5	3	3	LC+50/-60
2-8/4-0	E	21-1/4	42-3/4	6.3	7.0	7.6	3	3	LC+50/-60
2-8/4-6	E	21-1/4	48-3/4	7.2	8.0	8.6	3	3	LC+50/-60
2-8/5-0	E	21-1/4	54-3/4	8.1	9.0	9.7	3	3	LC+50/-60
2-8/5-6	E	21-1/4	60-3/4	9.0	10.0	10.8	3	3	LC50
2-8/6-0	E	21-1/4	66-3/4	9.9	11.0	11.9	4	3	LC50
3-0/2-6		25-1/4	24-3/4	4.3	4.6	5.0	3	3	LC+50/-60
3-0/3-0	E1	25-1/4	30-3/4	5.4	5.8	6.2	3	3	LC+50/-60
3-0/3-6	E	25-1/4	36-3/4	6.4	6.9	7.5	3	3	LC+50/-60
3-0/4-0	E	25-1/4	42-3/4	7.5	8.1	8.7	3	3	LC+50/-60
3-0/4-6	E	25-1/4	48-3/4	8.5	9.3	10.0	3	3	LC+50/-60
3-0/5-0	E	25-1/4	54-3/4	9.6	10.4	11.2	3	3	LC+50/-60
3-0/5-6	E	25-1/4	60-3/4	10.7	11.6	12.5	3	3	LC50
3-0/6-0	E	25-1/4	66-3/4	11.7	12.8	13.7	4	3	LC50



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

Egress Notes:

Check all applicable local codes for emergency egress requirements.

- E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².
- E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m²), multiply square feet by 0.0929.



Impervia® Casement Windows

Design Data

Transom Units				
Unit	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Annealed	Tempered	
1-6/1-2	0.6	3	3	LC+50/-60
1-6/1-6	1.0	3	3	LC+50/-60
1-6/2-0	1.5	3	3	LC+50/-60
2-0/1-2	1.0	3	3	LC+50/-60
2-0/1-6	1.5	3	3	LC+50/-60
2-0/2-0	2.2	3	3	LC+50/-60
2-4/1-2	1.2	3	3	LC+50/-60
2-4/1-6	1.8	3	3	LC+50/-60
2-4/2-0	2.7	3	3	LC+50/-60
2-6/1-2	1.3	3	3	LC+50/-60
2-6/1-6	2.0	3	3	LC+50/-60
2-6/2-0	3.0	3	3	LC+50/-60
2-8/1-2	1.4	3	3	LC+50/-60
2-8/1-6	2.1	3	3	LC+50/-60
2-8/2-0	3.2	3	3	LC+50/-60
3-0/1-2	1.6	3	3	LC+50/-60
3-0/1-6	2.5	3	3	LC+50/-60
3-0/2-0	3.7	3	3	LC+50/-60
4-0/1-2	2.3	3	3	LC+50/-60
4-0/1-6	3.5	3	3	LC+50/-60
4-0/2-0	5.2	3	3	LC+50/-60
5-0/1-2 T	3.0	–	3	LC+50/-60
5-0/1-6	4.5	3	3	LC+50/-60
5-0/2-0	6.7	3	3	LC+50/-60
6-0/1-2 T	3.6	–	3	LC45
6-0/1-6 T	5.5	–	3	LC45
6-0/2-0	8.2	3	3	LC45

Fixed Units				
Unit	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Annealed	Tempered	
3-0/3-0	6.2	3	3	LC+50/-60
3-0/3-6	7.5	3	3	LC+50/-60
3-0/4-0	8.7	3	3	LC+50/-60
3-0/4-6	10.0	3	3	LC+50/-60
3-0/5-0	11.2	3	3	LC+50/-60
3-0/5-6	12.5	3	3	LC50
3-0/6-0	13.7	3	3	LC45/LC50
4-0/3-0	8.7	3	3	LC+50/-60
4-0/3-6	10.5	3	3	LC+50/-60
4-0/4-0	12.2	3	3	LC+50/-60
4-0/4-6	14.0	3	3	LC50/LC-60
4-0/5-0	15.7	3	3	LC45/LC50/LC-60
4-0/5-6	17.5	4	4	LC50
4-0/6-0	19.2	4	4	LC50
5-0/3-0	11.2	3	3	LC+50/-60
5-0/3-6	13.5	3	3	LC50/LC-60
5-0/4-0	15.7	3	3	LC45/LC50/LC-60
5-0/4-6	18.0	4	4	LC+50/-60
5-0/5-0	20.2	4	5	LC50/LC-60
5-0/5-6	22.5	4	5	LC50
5-0/6-0	24.7	5	5	LC50
6-0/3-0	13.7	3	3	LC45
6-0/3-6	16.5	3	3	LC45
6-0/4-0	19.2	4	4	LC45
6-0/4-6	22.0	4	4	LC45
6-0/5-0	24.7	4	5	LC45
6-0/5-6	27.5	5	5	LC45
6-0/6-0	30.2	5	6	LC45

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m²), multiply square feet by 0.0929.



Detailed Product Description

Frame

- Frame is Duracast—five-layer pultruded fiberglass material [with optional foam insulation₁] reinforced with a Pella patented interlocking mat.
- Overall frame depth is 3-1/4".
- Nominal wall thickness of Duracast® fiberglass composite members is .050" to .090" thick.
- Frame corners are mitered, joined and bonded with corner lock and injected with sealant.
- Jambs contain factory-drilled installation screw holes on block frame.

Sash

- Sash is Duracast fiberglass composite – five-layer pultruded fiberglass material, reinforced with a Pella patented interlocking mat.
- All sash members have mitered corners bonded with corner lock and sealed with injected sealant.

Exterior / Interior

- Duracast fiberglass composite surfaces with powder-coat paint finish.
 - Color is [White] [Tan] [Brown] [Black] [Morning Sky Gray].
 - or -
 - Dual-color option [Tan] [Brown] [Black] [Morning Sky Gray] exterior with White interior₂.

Glazing System

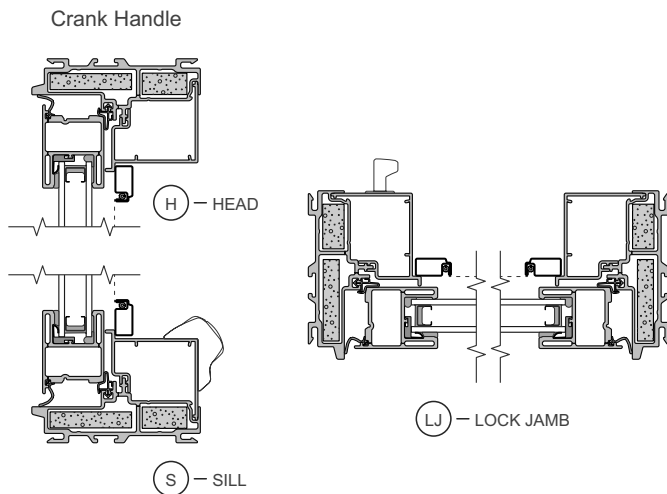
- Quality float glass complying with ASTM C 1036.
- 11/16" dual-pane insulating glass [[annealed] [tempered]] [obscure₃] [[clear] [Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, with argon]] sealed and bonded to sash.
- or -
- 1" Triple-pane insulating glass [annealed] [tempered] [obscure₃] [clear] [[Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, [with argon]]] [[bronze] [gray] [green] Advanced Low-E [with Argon] [with Krypton]]] sealed and bonded to sash.
- High altitude glazing available.

Weatherstripping

Dual weatherstripping.

- Continuous, flexible ThermoPlastic Vulcanizate material in dual durometer design, compressed between frame and sash for positive seal on all four sides.
- Secondary ThermoPlastic Vulcanizate leaf-type weatherstrip between edge of sash and frame.

Foam Insulation Inserts₁



Hardware

- Easy-Slide operator assembly
 - Hardened, nickel-coated Steel worm and wheel gears.
 - Zinc-magnesium alloy hob and gearbox with corrosion-protecting ultra-clear finish.
 - 5 ball bearings.
 - Stainless steel swing arm and hinge pin for extra corrosion protection of exposed components.
 - Kevlar-reinforced drive belt.
 - Harsh environment approved – ASTM B 117 salt chamber and debris cycling, 20,000 life cycle test approved.
 - or -
- Roto operator assembly
 - Steel worm gear sash operator with hardened gears.
 - Operator base is zinc die cast with painted finish.
 - Operator linkage, hinge slide, and hinge arms are 300 series stainless steel.
 - Exposed fasteners are stainless steel.
 - Hardware shall exceed 1,000 hours salt spray exposure per ASTM B 117.
- Finish of integrated folding crank is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)]. All vent units are available with left- or right-hand hinging.
- Unison Locking System—A single handle locking system operates positive-acting arms that reach out and pull the sash into a locked position: one installed on units 27-1/2" and smaller frame height, two unison operating locks installed on units over 27-1/2" frame height, three unison operating locks over 72-1/2".
- Lock handle finish is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)].

Optional Products

Screens

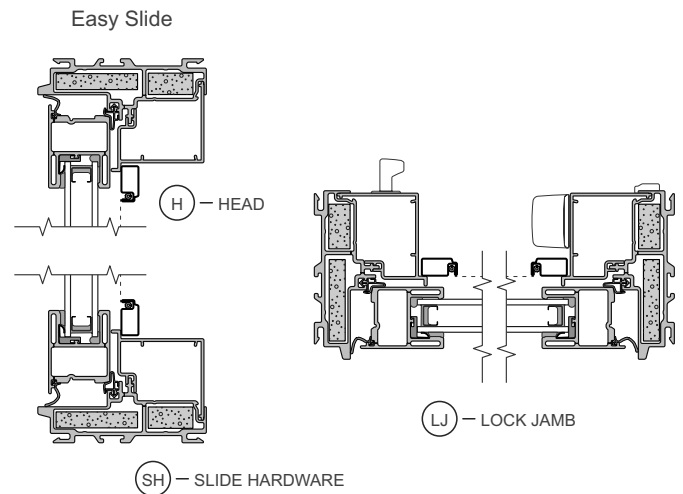
- Conventional Black Vinyl-coated 18/16 mesh fiberglass screen cloth complying with ASTM D 3656 and SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
- InView™ screens
 - Vinyl-coated 18/18 mesh fiberglass screen cloth complying with SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
 - Screen frame finish is baked enamel, color to match interior.

Grilles

- Grilles-Between-the-Glass
 - Insulating glass contains 3/4" contoured aluminum grilles permanently installed between two panes of glass.
 - Grilles are factory prefinished [White] [Tan] [Brown] [Black] [Morning Sky Gray] to match interior and exterior finish.

Hardware

- Optional factory applied limited opening hardware available for vent units in stainless steel; nominal 3" opening.
- Optional window opening control device available for field installation. Device allows window to open less than 4" with normal operation, with a release mechanism that allows the sash to open completely. Complies with ASTM F2090-10.



(1) Foam insulation inserts are not available with clear glazing.
 (2) Dual-color finish is not available on products with integral nailing fin.
 (3) Obscure glazing is not available when AdvancedComfort Low-E coated IG is specified.

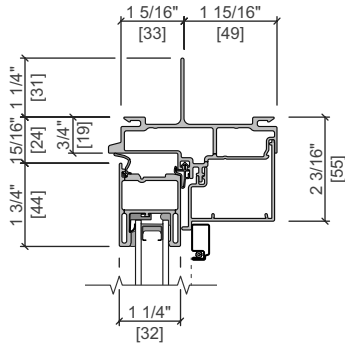


Impervia® Casement Windows

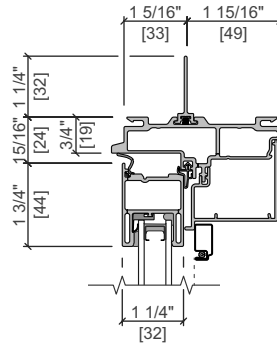
Unit Sections - Frame Types

NEW CONSTRUCTION FRAME

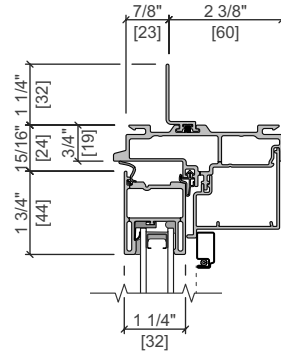
Integral Nailing Fin



Standard Block Frame with Standard Fin

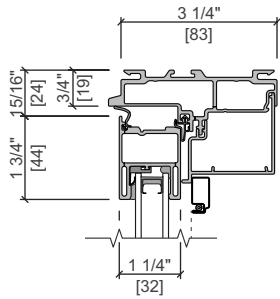


Standard Block Frame with Off Set Fin



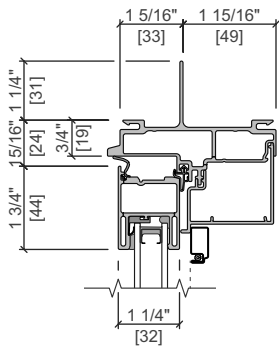
REPLACEMENT FRAME

Standard Block Frame

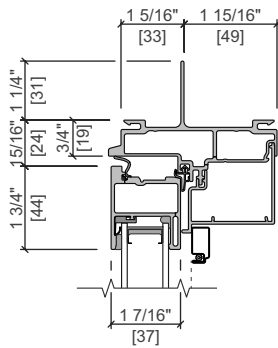


GLAZING OPTIONS

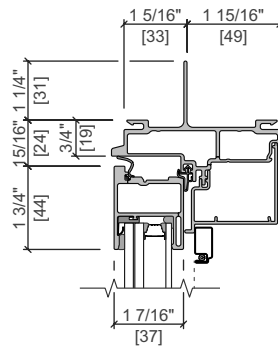
1 1/16\" IG



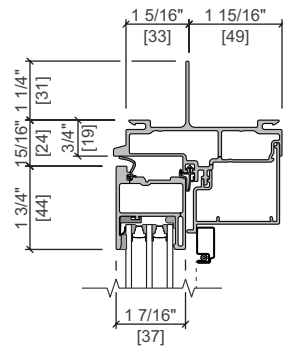
1\" IG



1\" Sound IG



1\" Triple IG



Scale 3" = 1' 0"

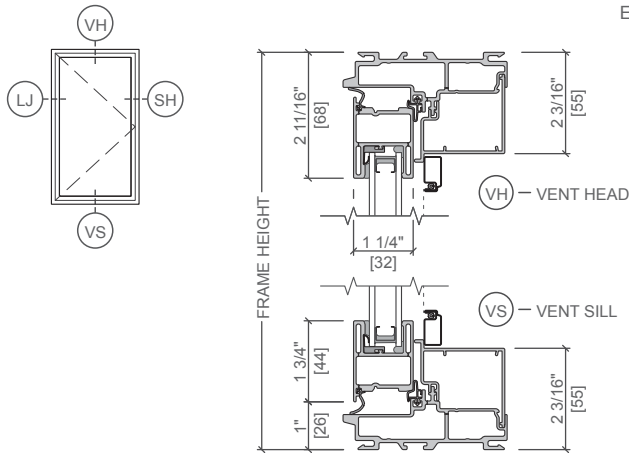
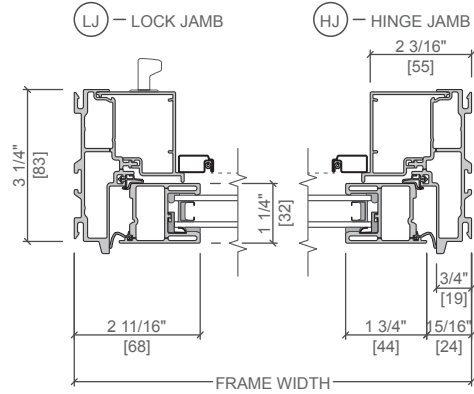
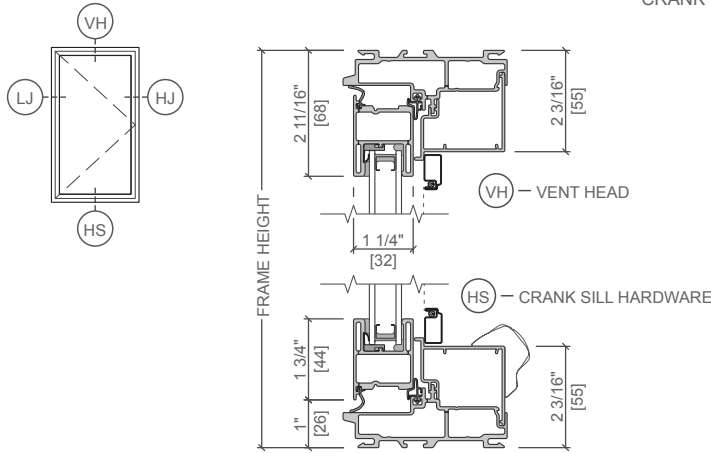
All dimensions are approximate.



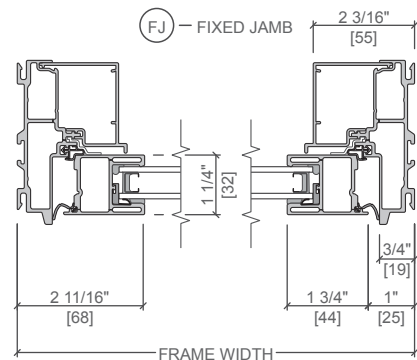
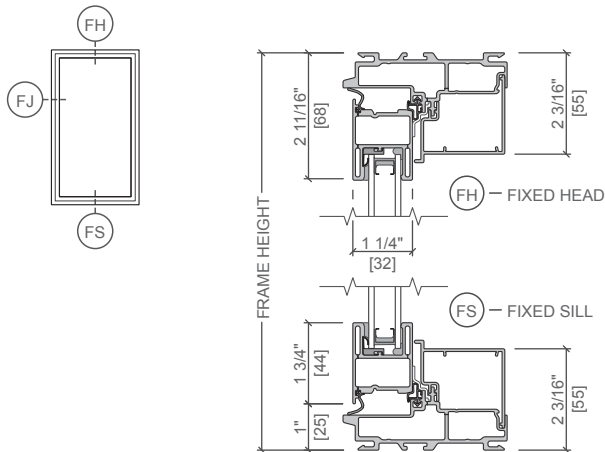
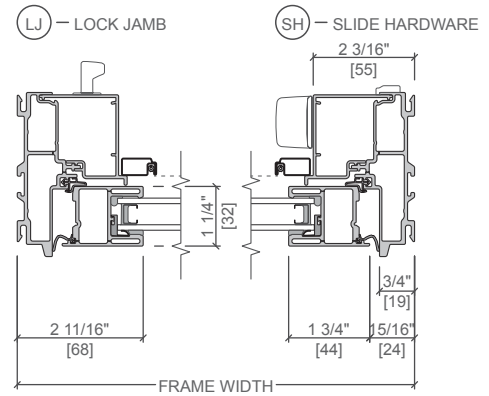
Impervia® Casement Windows

Unit Sections

CRANK HARDWARE



EASY SLIDE HARDWARE



Scale 3" = 1' 0"

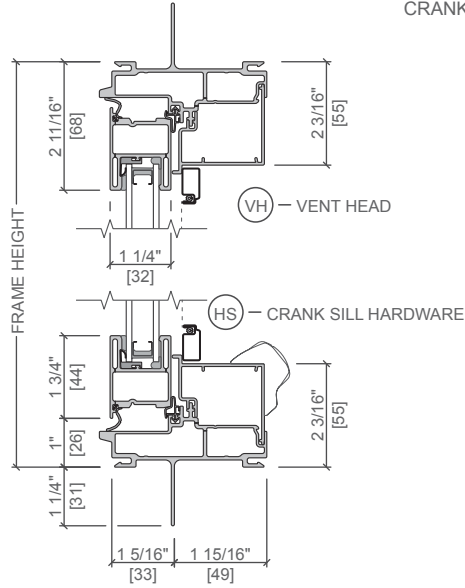
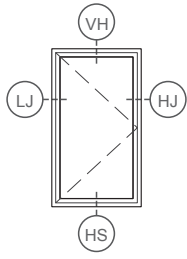
All dimensions are approximate.

See the Installation and Performance section on Pella.com for mullion applications and structural limitations.

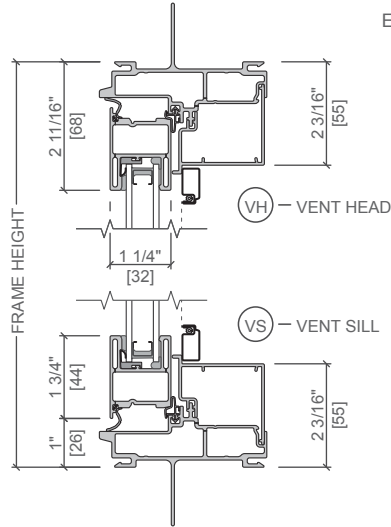
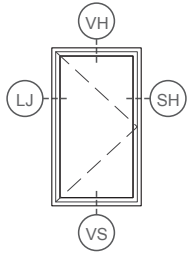
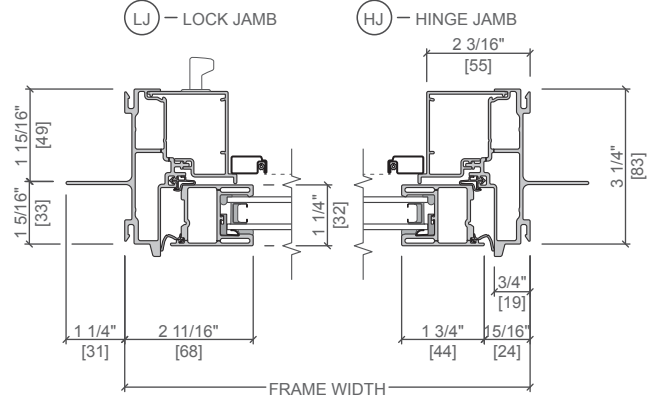


Impervia® Casement Windows

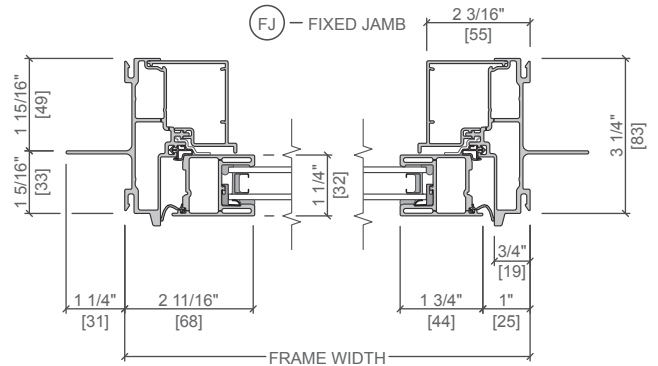
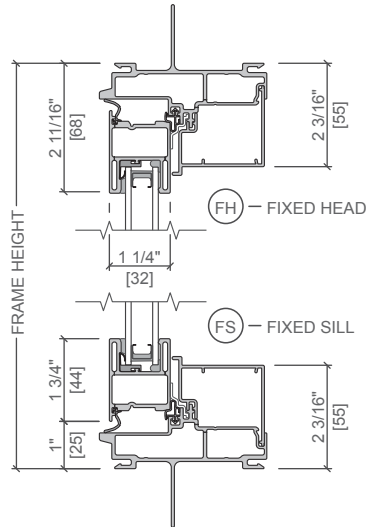
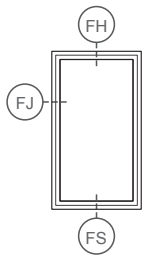
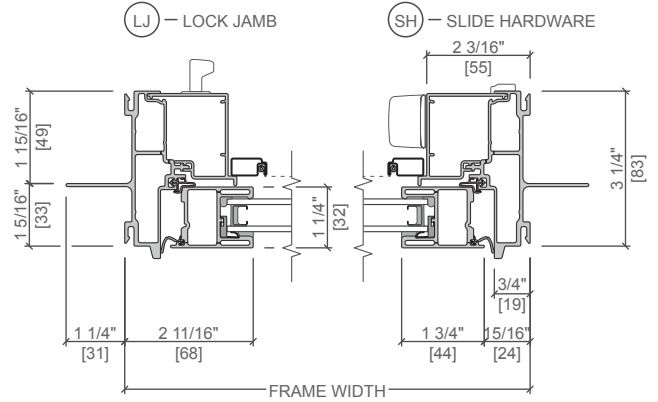
Unit Sections - Integral Fin



CRANK HARDWARE



EASY SLIDE HARDWARE



Scale 3" = 1' 0"
All dimensions are approximate.



PAC-CLAD[®]

P E T E R S E N

A **CARLISLE** COMPANY

Architectural Metal Roof, Wall and
Perimeter/Roof Edge Systems

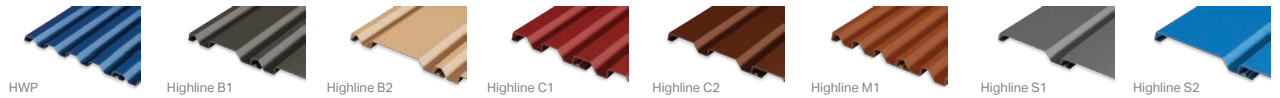
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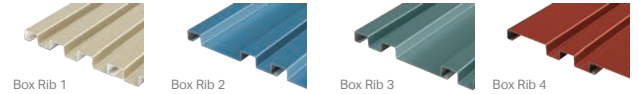
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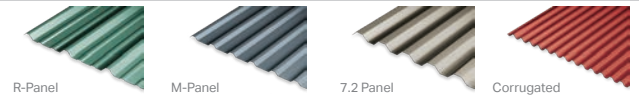


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* Available only from our Georgia, Arizona and Maryland facilities



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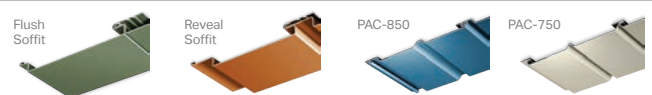
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40 FASCIA SYSTEMS

41 COPING SYSTEMS

42-43 GENERAL CONSIDERATIONS

Cover photo:
Doris M. Reed Elementary School, Las Vegas, NV
Contractor: Andy Russo Jr. Inc.
Architect: Gensler & Associates
GC: Martin Harris Construction
Owner: Clark County School District
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Profile: Precision Series HWP
Color: Custom blue

PAC-CLAD® PRODUCT RANGE

Petersen Aluminum Corporation (PAC), a Carlisle Company, was founded in 1965 as a metals service center to the architectural metal industry. Petersen provides products of the highest possible quality within reliable, dependable lead times. Petersen's strong national sales base allows for large inventories and cost economies for its customers.

Headquartered in Elk Grove Village, Illinois, located just outside of Chicago, Petersen also operates full production facilities in Annapolis Junction, Maryland; Tyler, Texas; Phoenix, Arizona and Acworth, Georgia, plus a regional sales office in Andover, Minnesota. In addition to the information found in this catalog, PAC maintains an extensive website at pac-clad.com where a PDF of this catalog is available in digital format and within the E-Binder on its website.

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PAC-CLAD ARCHITECTURAL SHEET AND COIL

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Petersen is an industry leader in providing factory-produced architectural metal panels, maintaining extensive roll-forming equipment in all regional plants. Standing seam, exposed fastener, soffit and wall panels are factory-formed in lengths up to 64'. Refer to the specific product pages, or consult the local factory, for maximum lengths and capabilities for each facility. Matching flashing and trim also may be factory-formed, or field-formed from PAC-CLAD material.

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Petersen fabricates a wide range of roofing accessories from stocked PAC-CLAD colors and gauges. Trim, gutters and downspouts can be produced from Petersen's 46 standard PAC-CLAD colors.

PERIMETER/ROOF EDGE SYSTEMS

Petersen's perimeter/roof edge product line provides the complete system to ensure a clean, sure-fitting product while eliminating the need for field fabrication. All PAC perimeter systems are produced in 12' lengths for an estimated 20 to 40 percent savings in material handling over the typical 8' or 10' lengths. Perimeter systems are competitively priced while providing superior strength, aesthetics and ease of installation. Perimeter products are tested to the standards of ANSI/SPRI/FM 4435/ES-1, Miami-Dade and FM. For information on our coping and fascia products, please see page 40-41 of this catalog or visit pac-clad.com.



Latrobe Elementary School, Latrobe, PA
Contractor: Pennsylvania Roofing Systems
Architect: Axis Architecture
Photo: hortonphotoinc.com
Profiles: Tite-Loc Plus, PAC-750 Soffit
Color: Custom Marquis Orange

PAC-CLAD® COLOR CHART

TRIM

PAC-CLAD products are available in prime quality aluminum (.032 - .063), 24 and 22 gauge Galvalume steel, finished with a 70% PVDF finish on the top side, with a washcoat on the bottom. Other metals available include mill finish aluminum, stainless steel, Galvalume Plus and anodized aluminum.

A strippable vinyl film can be applied to coil, flat sheet or fabricated parts to protect painted surfaces. Vinyl masking is recommended where extra handling is expected. NOTE: Vinyl film must be removed immediately after installation.

FINISH WARRANTY

Life expectancy is 30 years-plus on 70% PVDF-finished materials. A 30-year, non-prorated finish warranty covering color fade, chalking and film integrity is available at no extra charge. Warranty for Weathered Steel and Weathered Copper does not cover fade. Warranty for Cardinal Red and Award Blue is 10 years for fade and 20 years for chalking and adhesion.

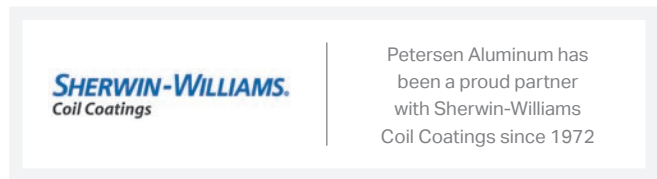
PREMIUM COLORS

Petersen's premium colors include several metallic finishes, plus two two-coat Weathered Steel and Weathered Copper finishes. These colors are ideal for all building envelope applications. A PAC-CLAD 30-year, non-prorated finish warranty applies.

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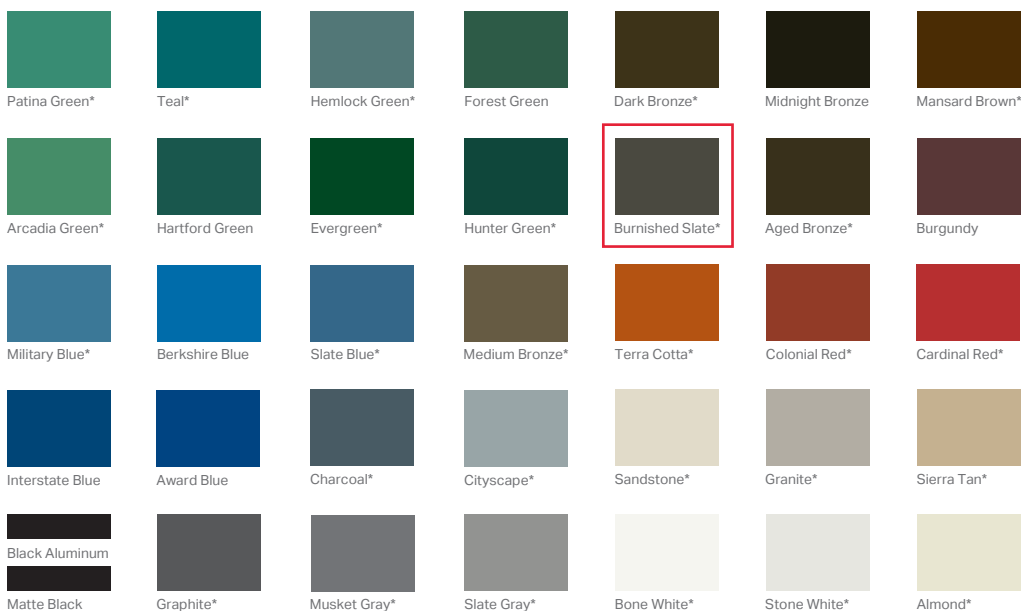
PAC-CLAD products provide unmatched aesthetics and performance, plus an element of sustainability. Where possible, Petersen products include a high percentage of recycled material, which lowers their environmental footprint. Additionally, PAC products are 100% recyclable which may reduce the stream of solid waste to landfills.

Petersen also offers the industry's widest range of 46 standard colors, most of which feature outstanding SRI (Solar Reflectance Index) values for improved cooling and energy savings performance. Petersen offers 35 finishes that are rated by the Cool Roof Ratings Council and 31 colors that are Energy Star®-approved. In addition, 35 PAC-CLAD finishes have an SRI of 29 or higher for steep slope roofs, to allow a building to qualify for credits in the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System.



NOTE: Colors above are not exact representations of actual PAC-CLAD colors. Ask a PAC representative for a color-chip chart or painted metal samples before making final color selection.

STANDARD COLORS



* Denotes PAC-CLAD Cool Color

PREMIUM COLORS



PAC-CLAD® COLOR AVAILABILITY

PAC-CLAD STANDARD COLORS	REFLECTIVITY	EMISSION	3 YEAR EXPOSURE	SRI	STEEL			ALUMINUM			20-IN. COIL		ENERGY STAR
					24 GA.	22 GA.	.032	.040	.050	.063	24 GA.	.032	
AGED BRONZE	0.29	0.87	0.27	29	✓								
ALMOND	0.56	0.86	0.55	65	✓	✓	✓	✓	✓		✓		★
ARCADIA GREEN	0.29	0.87	0.29	29	✓		✓						★
AWARD BLUE***	0.24	0.86	0.23	22	✓		✓		✓				
BERKSHIRE BLUE*	0.30	0.87	0.27	31	✓								
BLACK ALUMINUM**	0.04	0.89	0.04	-2			✓	✓	✓	✓			
BONE WHITE	0.70	0.86	0.69	85	✓	✓	✓	✓	✓	✓	✓	✓	★
BURGUNDY	0.14	0.85	0.13	9	✓		✓		✓				
BURNISHED SLATE	0.32	0.87	0.31	33	✓								
CARDINAL RED***	0.44	0.86	0.44	49	✓		✓		✓				★
CHARCOAL	0.30	0.86	0.30	30	✓		✓	✓	✓		✓	✓	★
CITYSCAPE	0.49	0.86	0.50	56	✓	✓	✓	✓	✓		✓	✓	★
COLONIAL RED	0.31	0.86	0.31	31	✓		✓	✓	✓				★
DARK BRONZE	0.29	0.86	0.29	29	✓	✓	✓	✓	✓	✓	✓	✓	★
EVERGREEN	0.28	0.86	0.26	27	✓		✓						★
FOREST GREEN	0.10	0.86	0.10	4	✓	✓	✓	✓	✓				
GRANITE*	0.33	0.87	N/A	34	✓	✓	✓	✓	✓				★
GRAPHITE	0.29	0.87	0.28	29	✓								
HARTFORD GREEN	0.08	0.88	0.08	3	✓		✓	✓	✓				
HEMLOCK GREEN	0.31	0.87	0.30	32	✓		✓		✓				★
HUNTER GREEN	0.28	0.86	0.27	27	✓		✓						★
INTERSTATE BLUE	0.16	0.87	0.15	12	✓		✓		✓				
MANSARD BROWN	0.31	0.86	0.31	31	✓	✓	✓	✓	✓				★
MATTE BLACK STEEL**	0.26	0.86	0.25	25	✓	✓					✓		
MEDIUM BRONZE	0.30	0.87	0.29	31	✓	✓	✓	✓	✓	✓	✓	✓	★
MIDNIGHT BRONZE	0.06	0.87	0.06	0	✓			✓					
MILITARY BLUE	0.31	0.86	0.30	31	✓		✓						★
MUSKET GRAY	0.32	0.86	0.31	33	✓	✓	✓		✓				★
PATINA GREEN	0.33	0.86	0.32	34	✓		✓						★
SANDSTONE	0.48	0.86	0.48	54	✓	✓	✓	✓	✓	✓	✓	✓	★
SIERRA TAN	0.32	0.82	0.31	31	✓	✓	✓	✓	✓		✓	✓	★
SLATE BLUE	0.28	0.86	0.27	27	✓		✓						★
SLATE GRAY	0.38	0.86	0.37	41	✓	✓	✓	✓	✓		✓	✓	★
STONE WHITE	0.69	0.86	0.67	84	✓	✓	✓	✓	✓	✓	✓	✓	★
TEAL	0.32	0.86	0.32	33	✓		✓						★
TERRA COTTA	0.34	0.87	0.33	36	✓		✓		✓		✓	✓	★
PAC-CLAD PREMIUM COLORS													
AGED COPPER	0.55	0.80	0.53	62	✓		✓						★
ANODIC CLEAR	0.32	0.83	0.31	31				✓					
CHAMPAGNE	0.50	0.85	0.49	57	✓		✓	✓	✓				★
COPPER PENNY	0.52	0.81	0.52	58	✓		✓	✓	✓		✓		★
SILVER	0.47	0.87	0.46	53	✓	✓	✓	✓	✓		✓	✓	★
SILVERSMITH	0.32	0.88	0.32	34				✓					
WEATHERED COPPER	0.45	0.88	N/A	51	✓								
WEATHERED STEEL	0.32	0.89	N/A	34	✓								
WEATHERED ZINC	0.48	0.82	0.46	53	✓	✓	✓		✓				★
ZINC	0.42	0.82	0.38	45	✓		✓	✓	✓				★
CLEAR-COAT ACRYLIC FINISH (NON-KYNAR)													
GALVALUME PLUS	0.68	0.14	0.55	57	✓	✓					✓		★

PAC-CLAD Premium finishes are available from stock at a moderate extra cost. PAC-CLAD Copper Penny is a Non-Weathering finish. Solar Reflectance Index calculated according to ASTM E-1980.
 *Low Gloss/Low Sheen, 70% PVDF finish ** Appearance differs for Black Aluminum and Matte Black Steel *** 10-year finish warranty

ENERGY STAR PERFORMANCE CRITERIA:

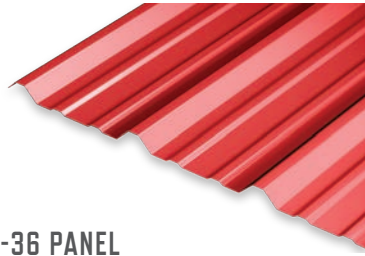
Emissivity uses ASTM C1371 Reflectivity uses ASTM C1549.

TECHNICAL DATA FOR KYNAR 500/HYLAR 5000 COATING:

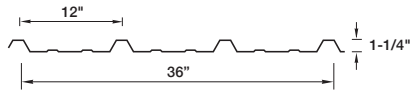
- ▶ South Florida Exposure: Color (ASTM D 2244) - No more than 5ΔE Hunter units at 20 years; Chalk (ASTM D 4214) - Rating no less than 8 at 20 years; Film integrity - 20 years.
- ▶ Accelerated Weathering (ASTM D 4587, ASTM G 154): 5000 Hours; Chalk, per ASTM D 4214, rating of 6 or better; Color, per ASTM D 2244, < 5ΔE (Hunter Units) color change.

- ▶ Humidity Resistance (ASTM D 2247): Galvalume or HDG, 100% RH, 2000 hours - No field blisters; Aluminum, 100% RH, 3000 hours - No field blisters
- ▶ Salt Spray Resistance (ASTM B 117): Aluminum, 3000 hours, Galvalume or HDG, 1000 hours - Creep from scribe no more than 1/16", no field blisters
- ▶ Chemical/Acid Pollution Resistance (ASTM D 1308): Pass
- ▶ T-Bend (ASTM D 4145): 1T - 3T with no loss of adhesion
- ▶ Pencil hardness (ASTM D 3363): HB - 2H
- ▶ Specular Gloss (ASTM D 523) @ 60 degrees: Typical - 20 - 35

- ▶ Abrasion Resistance (ASTM D 968): 67 +/- 10 liters
- ▶ Cross Hatch Adhesion (ASTM D 3359): No loss of adhesion
- ▶ Reverse Impact (ASTM D 2794): Galvalume or HDG, 2x metal thickness inch-pounds, no loss of adhesion; Aluminum, 1.5x metal thickness inch-pounds, no loss of adhesion
- ▶ Flame Test (ASTM E 84): Class A Coating

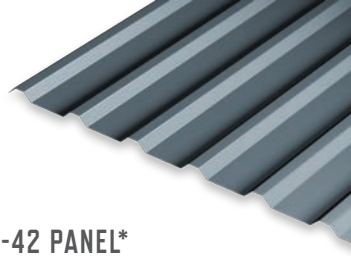


R-36 PANEL

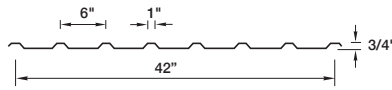


MATERIALS

- .032 aluminum
 - .040 aluminum
 - .050 aluminum
- 24 gauge steel
 - 22 gauge steel

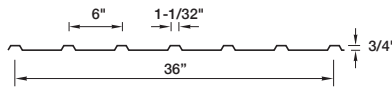


M-42 PANEL*



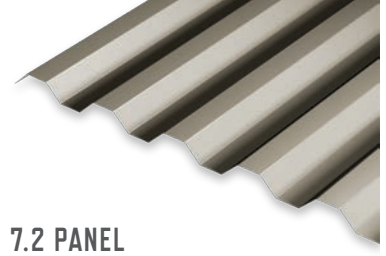
Note: Made only in Tyler, Texas facility

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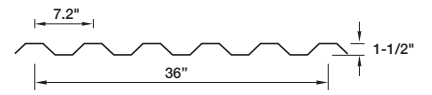


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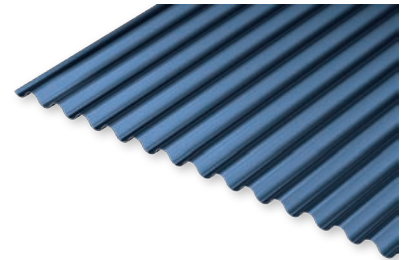


7.2 PANEL

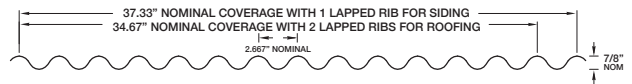


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7/8" CORRUGATED



1/2" CORRUGATED



*Note: The M-36 and M-42 panels are not intended for use in the construction of metal buildings or structural roof applications. Please consult with Petersen regarding the application of this panel. A complete specification is available online at pac-clad.com.

Photo at left:
Hurricane Dockside Grill, Hagerstown, MD
Contractor: Heidler Roofing
Photo: David Fonda
Profile: R-36 panel
Color: Cardinal Red



Private Residence, Chicago, IL
 Contractor: Custom Installations
 Architect: Kipnis Architecture and Planning
 Distributor: Sheet Metal Supply
 GC: Shardon Builders
 Photo: A.J. Brown
 Profile: Snap-Clad
 Color: Weathered Zinc



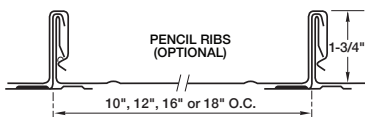
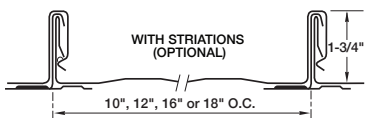
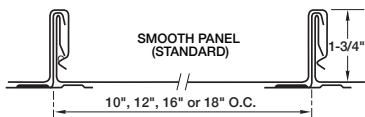
SNAP-CLAD

MATERIALS

.032 aluminum 24 gauge steel
 .040 aluminum 22 gauge steel

SPECS

10", 12", 16" or 18" O.C. 1-3/4" High



Las Vegas Ballpark, Las Vegas, NV
 Contractor: Southwest Specialty Contractors
 Architect: HOK
 GC: Penta Building Group
 GC: AECOM Hunt Construction Group
 Owner: Howard Hughes Corp.
 Photo: Alan Blakely
 Profile: Snap-Clad
 Color: Custom Chocolate Chip



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A **CARLISLE** COMPANY



Architectural Metal Roof, Wall and
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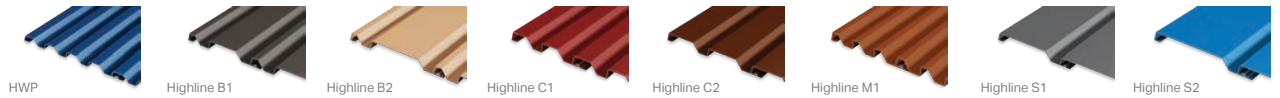
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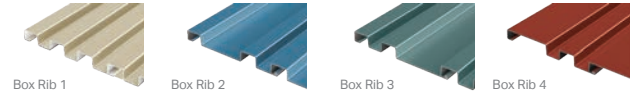
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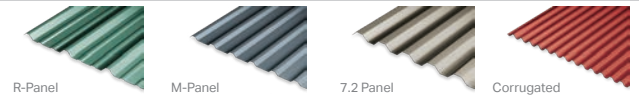


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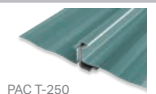
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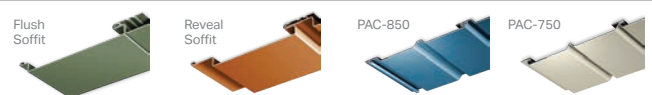
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Latrobe Elementary School, Latrobe, PA
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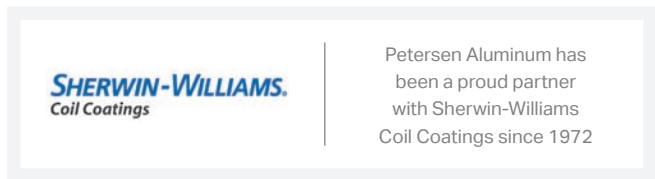
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COMMITMENT TO SUSTAINABILITY

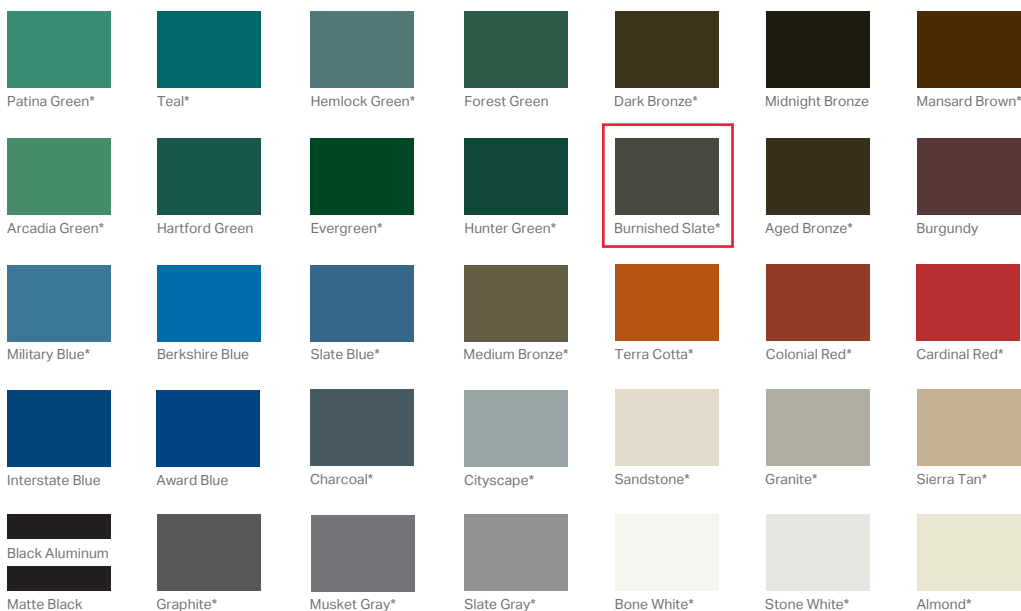
PAC-CLAD products provide unmatched aesthetics and performance, plus an element of sustainability. Where possible, Petersen products include a high percentage of recycled material, which lowers their environmental footprint. Additionally, PAC products are 100% recyclable which may reduce the stream of solid waste to landfills.

Petersen also offers the industry's widest range of 46 standard colors, most of which feature outstanding SRI (Solar Reflectance Index) values for improved cooling and energy savings performance. Petersen offers 35 finishes that are rated by the Cool Roof Ratings Council and 31 colors that are Energy Star®-approved. In addition, 35 PAC-CLAD finishes have an SRI of 29 or higher for steep slope roofs, to allow a building to qualify for credits in the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Green Building Rating System.



NOTE: Colors above are not exact representations of actual PAC-CLAD colors. Ask a PAC representative for a color-chip chart or painted metal samples before making final color selection.

STANDARD COLORS



* Denotes PAC-CLAD Cool Color

PREMIUM COLORS



PAC-CLAD® COLOR AVAILABILITY

PAC-CLAD STANDARD COLORS	REFLECTIVITY	EMISSION	3 YEAR EXPOSURE	SRI	STEEL			ALUMINUM			20-IN. COIL		ENERGY STAR
					24 GA.	22 GA.	.032	.040	.050	.063	24 GA.	.032	
AGED BRONZE	0.29	0.87	0.27	29	✓								
ALMOND	0.56	0.86	0.55	65	✓	✓	✓	✓	✓		✓		★
ARCADIA GREEN	0.29	0.87	0.29	29	✓		✓						★
AWARD BLUE***	0.24	0.86	0.23	22	✓		✓		✓				
BERKSHIRE BLUE*	0.30	0.87	0.27	31	✓								
BLACK ALUMINUM**	0.04	0.89	0.04	-2			✓	✓	✓	✓			
BONE WHITE	0.70	0.86	0.69	85	✓	✓	✓	✓	✓	✓	✓	✓	★
BURGUNDY	0.14	0.85	0.13	9	✓		✓		✓				
BURNISHED SLATE	0.32	0.87	0.31	33	✓								
CARDINAL RED***	0.44	0.86	0.44	49	✓		✓		✓				★
CHARCOAL	0.30	0.86	0.30	30	✓		✓	✓	✓		✓	✓	★
CITYSCAPE	0.49	0.86	0.50	56	✓	✓	✓	✓	✓		✓	✓	★
COLONIAL RED	0.31	0.86	0.31	31	✓		✓	✓	✓				★
DARK BRONZE	0.29	0.86	0.29	29	✓	✓	✓	✓	✓	✓	✓	✓	★
EVERGREEN	0.28	0.86	0.26	27	✓		✓						★
FOREST GREEN	0.10	0.86	0.10	4	✓	✓	✓	✓	✓				
GRANITE*	0.33	0.87	N/A	34	✓	✓	✓	✓	✓				★
GRAPHITE	0.29	0.87	0.28	29	✓								
HARTFORD GREEN	0.08	0.88	0.08	3	✓		✓	✓	✓				
HEMLOCK GREEN	0.31	0.87	0.30	32	✓		✓		✓				★
HUNTER GREEN	0.28	0.86	0.27	27	✓		✓						★
INTERSTATE BLUE	0.16	0.87	0.15	12	✓		✓		✓				
MANSARD BROWN	0.31	0.86	0.31	31	✓	✓	✓	✓	✓				★
MATTE BLACK STEEL**	0.26	0.86	0.25	25	✓	✓					✓		
MEDIUM BRONZE	0.30	0.87	0.29	31	✓	✓	✓	✓	✓	✓	✓	✓	★
MIDNIGHT BRONZE	0.06	0.87	0.06	0	✓			✓					
MILITARY BLUE	0.31	0.86	0.30	31	✓		✓						★
MUSKET GRAY	0.32	0.86	0.31	33	✓	✓	✓		✓				★
PATINA GREEN	0.33	0.86	0.32	34	✓		✓						★
SANDSTONE	0.48	0.86	0.48	54	✓	✓	✓	✓	✓	✓	✓	✓	★
SIERRA TAN	0.32	0.82	0.31	31	✓	✓	✓	✓	✓		✓	✓	★
SLATE BLUE	0.28	0.86	0.27	27	✓		✓						★
SLATE GRAY	0.38	0.86	0.37	41	✓	✓	✓	✓	✓		✓	✓	★
STONE WHITE	0.69	0.86	0.67	84	✓	✓	✓	✓	✓	✓	✓	✓	★
TEAL	0.32	0.86	0.32	33	✓		✓						★
TERRA COTTA	0.34	0.87	0.33	36	✓		✓		✓		✓	✓	★
PAC-CLAD PREMIUM COLORS													
AGED COPPER	0.55	0.80	0.53	62	✓		✓						★
ANODIC CLEAR	0.32	0.83	0.31	31				✓					
CHAMPAGNE	0.50	0.85	0.49	57	✓		✓	✓	✓				★
COPPER PENNY	0.52	0.81	0.52	58	✓		✓	✓	✓		✓		★
SILVER	0.47	0.87	0.46	53	✓	✓	✓	✓	✓		✓	✓	★
SILVERSMITH	0.32	0.88	0.32	34				✓					
WEATHERED COPPER	0.45	0.88	N/A	51	✓								
WEATHERED STEEL	0.32	0.89	N/A	34	✓								
WEATHERED ZINC	0.48	0.82	0.46	53	✓	✓	✓		✓				★
ZINC	0.42	0.82	0.38	45	✓		✓	✓	✓				★
CLEAR-COAT ACRYLIC FINISH (NON-KYNAR)													
GALVALUME PLUS	0.68	0.14	0.55	57	✓	✓					✓		★

PAC-CLAD Premium finishes are available from stock at a moderate extra cost. PAC-CLAD Copper Penny is a Non-Weathering finish. Solar Reflectance Index calculated according to ASTM E-1980.
 *Low Gloss/Low Sheen, 70% PVDF finish ** Appearance differs for Black Aluminum and Matte Black Steel *** 10-year finish warranty

ENERGY STAR PERFORMANCE CRITERIA:

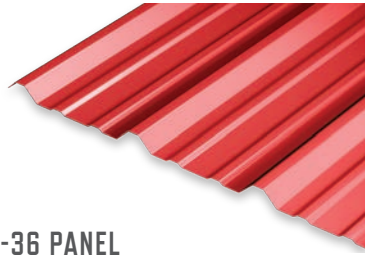
Emissivity uses ASTM C1371 Reflectivity uses ASTM C1549.

TECHNICAL DATA FOR KYNAR 500/HYLAR 5000 COATING:

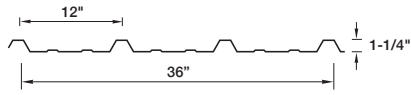
- ▶ South Florida Exposure: Color (ASTM D 2244) - No more than 5ΔE Hunter units at 20 years; Chalk (ASTM D 4214) - Rating no less than 8 at 20 years; Film integrity - 20 years.
- ▶ Accelerated Weathering (ASTM D 4587, ASTM G 154): 5000 Hours; Chalk, per ASTM D 4214, rating of 6 or better; Color, per ASTM D 2244, < 5ΔE (Hunter Units) color change.

- ▶ Humidity Resistance (ASTM D 2247): Galvalume or HDG, 100% RH, 2000 hours - No field blisters; Aluminum, 100% RH, 3000 hours - No field blisters
- ▶ Salt Spray Resistance (ASTM B 117): Aluminum, 3000 hours, Galvalume or HDG, 1000 hours - Creep from scribe no more than 1/16", no field blisters
- ▶ Chemical/Acid Pollution Resistance (ASTM D 1308): Pass
- ▶ T-Bend (ASTM D 4145): 1T - 3T with no loss of adhesion
- ▶ Pencil hardness (ASTM D 3363): HB - 2H
- ▶ Specular Gloss (ASTM D 523) @ 60 degrees: Typical - 20 - 35

- ▶ Abrasion Resistance (ASTM D 968): 67 +/- 10 liters
- ▶ Cross Hatch Adhesion (ASTM D 3359): No loss of adhesion
- ▶ Reverse Impact (ASTM D 2794): Galvalume or HDG, 2x metal thickness inch-pounds, no loss of adhesion; Aluminum, 1.5x metal thickness inch-pounds, no loss of adhesion
- ▶ Flame Test (ASTM E 84): Class A Coating

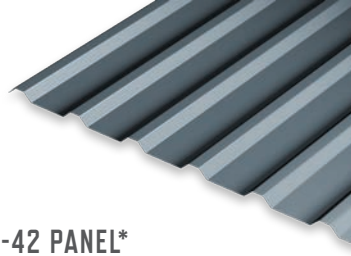


R-36 PANEL

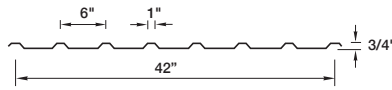


MATERIALS

- .032 aluminum
 - .040 aluminum
 - .050 aluminum
- 24 gauge steel
 - 22 gauge steel

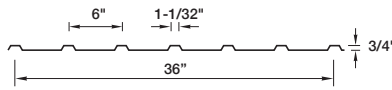


M-42 PANEL*



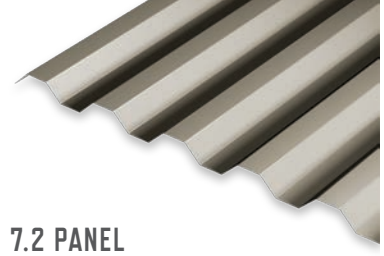
Note: Made only in Tyler, Texas facility

M-36 PANEL*

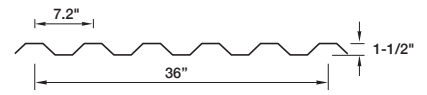


MATERIALS

- .032 aluminum
 - .040 aluminum
 - .050 aluminum
- 24 gauge steel
 - 22 gauge steel

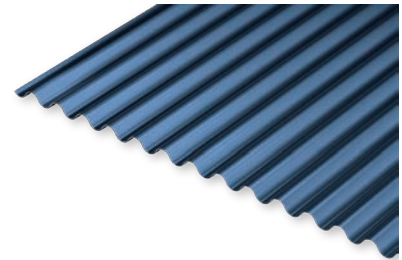


7.2 PANEL

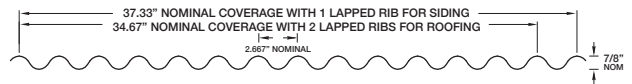


MATERIALS

- .032 aluminum
 - .040 aluminum
 - .050 aluminum
- 24 gauge steel
 - 22 gauge steel



7/8" CORRUGATED



1/2" CORRUGATED



*Note: The M-36 and M-42 panels are not intended for use in the construction of metal buildings or structural roof applications. Please consult with Petersen regarding the application of this panel. A complete specification is available online at pac-clad.com.

Photo at left:
Hurricane Dockside Grill, Hagerstown, MD
Contractor: Heidler Roofing
Photo: David Fonda
Profile: R-36 panel
Color: Cardinal Red



Private Residence, Chicago, IL
 Contractor: Custom Installations
 Architect: Kipnis Architecture and Planning
 Distributor: Sheet Metal Supply
 GC: Shardon Builders
 Photo: A.J. Brown
 Profile: Snap-Clad
 Color: Weathered Zinc



UL
90

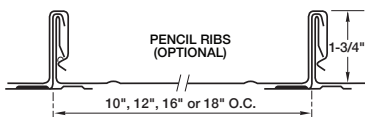
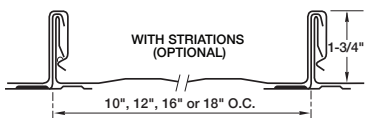
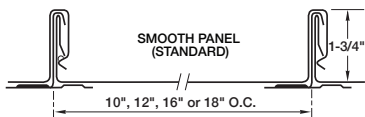
SNAP-CLAD

MATERIALS

.032 aluminum 24 gauge steel
 .040 aluminum 22 gauge steel

SPECS

10", 12", 16" or 18" O.C. 1-3/4" High

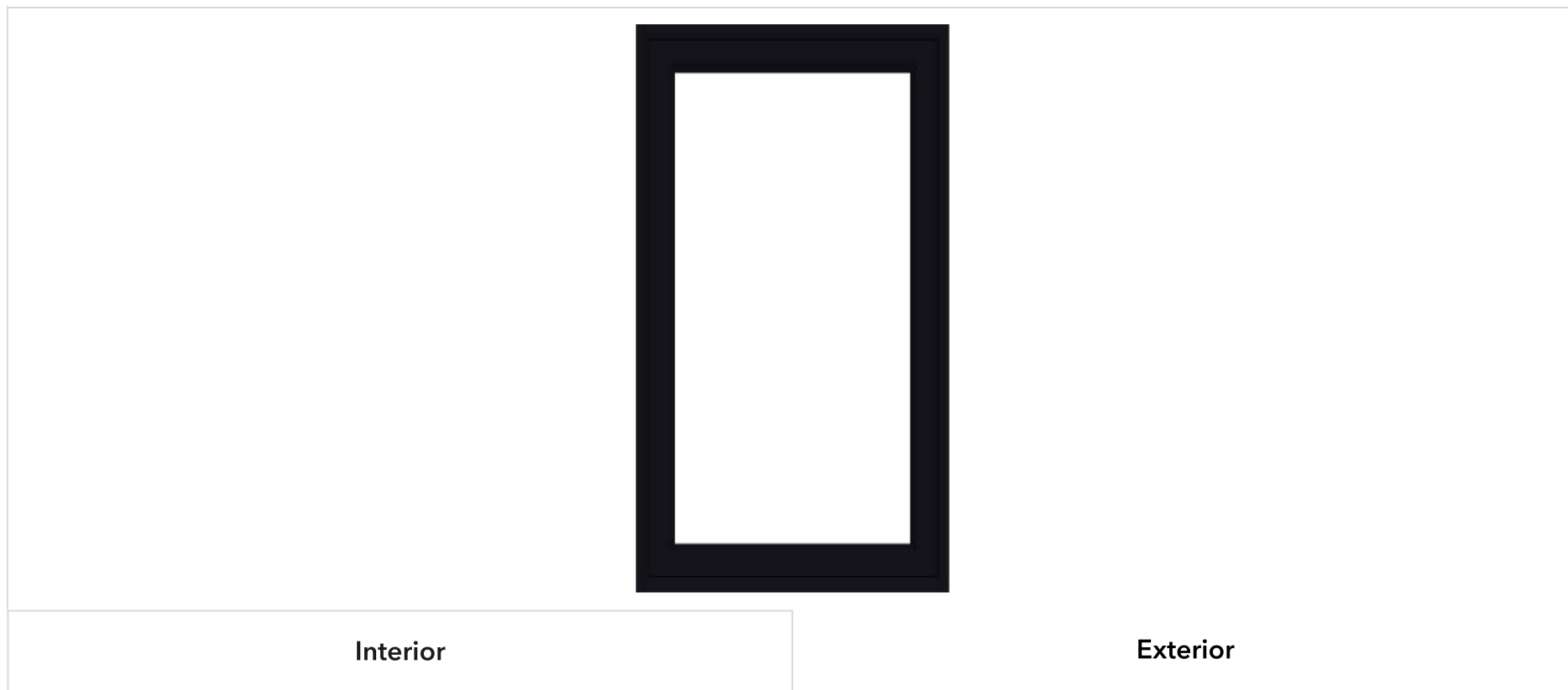


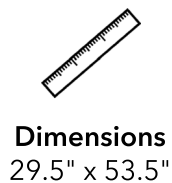
Las Vegas Ballpark, Las Vegas, NV
 Contractor: Southwest Specialty Contractors
 Architect: HOK
 GC: Penta Building Group
 GC: AECOM Hunt Construction Group
 Owner: Howard Hughes Corp.
 Photo: Alan Blakely
 Profile: Snap-Clad
 Color: Custom Chocolate Chip



Pella® Impervia® Casement

Pella® Impervia® fiberglass casement windows can withstand extreme heat and cold, making them incredibly strong and durable. A durable, powder-coat finish provides the look of painted wood and lasts for years.



**Operation / Venting**
Left**Exterior Color**
Black**Interior Color**
Black**Insul****Enter Your Window Dimensions** ⓘ

Measure from inside your home, so you're looking at the interior of the window. Be sure to capture both width and height measurements.

Frame Width	29.5	inches
-------------	------	--------

Frame Height	53.5	inches
--------------	------	--------

How to Measure You...**\$\$****SIGN IN TO SAVE TO PROJECT**

Unavailable online at this time. Save to a project to organize and track your products in one place.

My Product Details

Pella Impervia casement windows open and close with the turn of a crank. Create sleek designs featuring slim profiles and more visible glass with our exceptionally strong fiberglass. And with a durable powder-coat finish, Pella Impervia casement windows deliver a timeless, long-lasting look.

- Made with Pella's patented Duracast® fiberglass composite material.
- Operable sizes up to 3' 1-1/2" x 6' 7-1/2".
- Performance Grade up to PG50.
- Limited opening and egress hardware available.

Additional Information

- [Warranty Information](#)
- [Owners Manual](#)
- [Product Registration](#)
- [Replacement Parts](#)
- [Help Library](#)

Frame Width	29.5
Frame Height	53.5
Operation / Venting	Left
Exterior Color	Black
Interior Color	Black
Insulated Type	Dual
Low-E Glass Style	Advanced Low-E Insulating Glass
Hardware Finish	Matte Black
Screen Option	Full Screen
Grille Type	No Grille
Installation Method	New Construction

U-Factor	0.27
SHGC	0.26
VLT	0.49
CPD	PEL-N-277-00567-00001
PG	50
Calculated Positive DP Rating	50
Calculated Negative DP Rating	60
Egress	Meets Typical 5.7 sqft (E) (United States Only)
Attachment Method	Standard Fin
Overall Rough Opening Width	30
Overall Rough Opening Height	54

FREQUENTLY ASKED QUESTIONS

If I put tinting on my glass will it void the warranty? —

If the tinting contributes to a defect in the product, the defect would not be covered under the warranty.

How long after I receive the product do I have to install it for it to be under warranty? +

Am I eligible for the lifetime coverage mentioned in the limited warranty? +

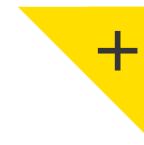
What do I have to do to get the warranty on my product? +

INSIDE THE PELLA IMPERVIA SERIES WINDOW

Made from our patented five-layer fiberglass material, Pella Impervia windows are on average 100x more impact-resistant than a leading wood/plastic composite product.⁵⁹ Tested from -40°F to 180°F, these windows can withstand some of the harshest conditions, making them strong and incredibly energy efficient.¹⁶



IMPERVIA WINDOW INSPIRATION



Sliding Window Invites Fresh Air Into Modern Bathroom

Black Windows Create Bold Contrast In Compact Kitchen

Cro



This document contains the latest information for the new Casement product design.
To see the previous design of the Casement, follow this [link](#).

Size and Performance

Glazing performance

Grille Profiles and Patterns

Size Tables

Design Data

Detailed Product Description

Cross Sections

The information published in this document is believed to be accurate at the time of publication. However, because we are constantly working to improve our products, specifications are subject to change without notice. Consult your local Pella representative for up-to-date product information.



Impervia® Casement Windows

Size and Performance Data

Sizes	
Standard Vent/Fixed	●
Standard Fixed Companion Sizes	●
Transom Sizes	●
Egress Sizes	●
Special Sizes	●
Performance ¹	
Meets or Exceeds AAMA/WDMA Ratings	C-LC45 - LC +50/-60 Hallmark Certified
Air Infiltration (cfm/ft ² of frame @ 1.57 psf wind pressure)	0.05
Water Resistance	6.75 - 7.5 psf
Design Pressure	45 - 50 psf
Other Performance Criteria	
Forced Entry Resistance Level (Minimum Security Grade) ²	40
Roto-Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	15/6
Easy-Slide Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	10/7

Sound Transmission Class and Outdoor-Indoor Transmission Class							
Product	Frame Size Tested ³	Glazing System				STC Rating	OITC Rating
		Overall Glazing Thickness	Exterior Glass Thickness	Middle Glass Thickness	Interior Glass Thickness		
VENT	23-1/2" x 59"	11/16"	3mm	–	3mm	28	25
	23-1/2" x 59"	11/16"	4mm	–	4mm	31	26
	23-1/2" x 59"	1"	3mm	3mm	3mm	29	24
	23-1/2" x 59"	1"	4mm	–	6mm	34	28
	23-1/2" x 59"	1"	5mm	–	3mm	34	28
	23-1/2" x 59"	1"	5mm	–	5mm	30	24
	23-1/2" x 59"	1"	6mm	–	6mm	32	26
	23-1/2" x 59"	1"	4mm	–	7mm Laminated	36	29
	23-1/2" x 59"	1"	5mm	–	10mm Laminated	37	32
FIXED	47" x 59"	11/16"	3mm	–	3mm	28	24
	47" x 59"	11/16"	4mm	–	4mm	29	25
	47" x 59"	1"	3mm	3mm	3mm	29	24
	47" x 59"	1"	4mm	4mm	4mm	30	26
	47" x 59"	1"	4mm	–	6mm	33	28
	47" x 59"	1"	5mm	–	3mm	32	27
	47" x 59"	1"	5mm	–	5mm	30	25
	47" x 59"	1"	6mm	–	6mm	30	24
	47" x 59"	1"	4mm	–	7mm Laminated	34	29
	47" x 59"	1"	5mm	–	10mm Laminated	36	31

(1) See Design Data pages in this section for specific product performance class and grade values.

(2) The higher the level, the greater the product's ability to resist forced entry.

(3) ASTM E 1425 defines standard sizes for acoustical testing. Ratings achieved at that size are representative of all sizes of the same configuration.



Impervia® Casement Windows

Features and Options

	Block Frame	Integral Nailing Fin
Glazing		
Glazing Type		
Dual-pane Insulating Glass	S	S
Triple-pane Insulating Glass	O	O
Insulated Glass Options / Low-E Types		
Clear Insulating Glass (no Low-E coating)	S	S
Advanced Low-E Insulating Glass	O	O
SunDefense™ Low-E Insulating Glass	O	O
AdvancedComfort Low-E Insulating Glass	O	O
NaturalSun Low-E Insulating Glass	O	O
Additional Glass Options		
Annealed Glass	S	S
Tempered Glass	O	O
Noise reduction glass (5/3mm, 4/6mm combinations)	O	O
Noise Reduction laminated glass (non-impact)	O	O
Tinted glass (Bronze, Gray, Green) Advanced Low-E	O	O
Obscure Glass ₁	O	O
Gas Fill / High Altitude		
Argon	S	S
High Altitude	O	O
High Altitude with argon	O	O
Exterior / Interior		
Powder-Coat White	S	S
Powder-Coat Tan, Brown, Black, or Morning Sky Gray	O	O
Powder-Coat Dual-color (All exterior colors available with White interior)	O	–
Hardware		
Match interior finish	S	S
White, Tan Brown, Black, Morning Sky Gray, Satin Nickel ₂	O	O
Operator		
Easy-Slide Operator	S	S
Fold Away Crank	O	O
Sash Locks		
SureLock® System	S	S
Unison Lock System ₃	S	S
Screens		
Conventional Black Fiberglass	O	O
InView™ screen	O	O
Grilles		
Grilles-Between-the-Glass		
Traditional, Prairie, Top Row and Custom - Equally Divided	O	O

S = Standard; O = Optional; (–) = Not available

(1) Contact your local Pella sales representative for current offering.

(2) Satin Nickel is not available for Easy-Slide operator.

(3) Unit size determines availability.



Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²			
										Zone		ER	Zone		
Vent										N	NC	SC	S	CA	
11/16"	Clear IG	PEL-N-277-00225-00001	3	3	air	0.44	0.55	0.58	44						
	with grilles-between-the-glass	PEL-N-277-00226-00001				0.45	0.50	0.52	44						
11/16"	Clear IG	PEL-N-277-00229-00001	4	4	air	0.45	0.53	0.57	43						
	with grilles-between-the-glass	PEL-N-277-00230-00001				0.46	0.49	0.52	43						
1"	Clear IG	PEL-N-277-00001-00001	5	5	air	0.43	0.53	0.57	44						
	with grilles-between-the-glass	PEL-N-277-00002-00001				0.43	0.48	0.51	44						
1"	Clear IG	PEL-N-277-00005-00001	6	6	air	0.43	0.51	0.56	44						
	with grilles-between-the-glass	PEL-N-277-00006-00001				0.43	0.46	0.50	44						
11/16"	Advanced Low-E IG	PEL-N-277-00235-00001	3	3	argon	0.28	0.26	0.49	60		NC				
	with grilles-between-the-glass	PEL-N-277-00236-00001				0.29	0.24	0.44	60		NC	SC	S		
11/16"	Advanced Low-E IG	PEL-N-277-00239-00001	4	4	argon	0.30	0.26	0.48	58		NC				
	with grilles-between-the-glass	PEL-N-277-00240-00001				0.31	0.24	0.44	58				S		
1"	Advanced Low-E IG	PEL-N-277-00019-00001	5	5	argon	0.28	0.26	0.48	59		NC				
	with grilles-between-the-glass	PEL-N-277-00020-00001				0.28	0.24	0.43	59		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00023-00001	6	6	argon	0.28	0.25	0.47	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00024-00001				0.28	0.23	0.43	58		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00243-00001	3	3	argon	0.28	0.20	0.45	60		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00244-00001				0.29	0.18	0.41	60		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00247-00001	4	4	argon	0.29	0.20	0.45	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00248-00001				0.30	0.18	0.41	58		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00059-00001	5	5	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00060-00001				0.28	0.18	0.40	59		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00063-00001	6	6	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00064-00001				0.28	0.18	0.40	59		NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00259-00001	3	3	argon	0.25	0.26	0.48	47	N	NC				
	with grilles-between-the-glass	PEL-N-277-00260-00001				0.26	0.24	0.43	47	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00263-00001	4	4	argon	0.26	0.26	0.47	45	N	NC				
	with grilles-between-the-glass	PEL-N-277-00264-00001				0.27	0.23	0.43	45	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00091-00001	5	5	argon	0.25	0.25	0.47	47	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00092-00001				0.25	0.23	0.42	47	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00095-00001	6	6	argon	0.25	0.25	0.46	46	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00096-00001				0.25	0.23	0.42	46	N	NC	SC	S		
11/16"	NaturalSun Low-E IG	PEL-N-277-00251-00001	3	3	argon	0.29	0.48	0.55	59	N					
	with grilles-between-the-glass	PEL-N-277-00252-00001				0.30	0.44	0.50	59	N					
11/16"	NaturalSun Low-E IG	PEL-N-277-00255-00001	4	4	argon	0.30	0.47	0.55	57	N					
	with grilles-between-the-glass	PEL-N-277-00256-00001				0.32	0.43	0.50	57						
1"	NaturalSun Low-E IG	PEL-N-277-00075-00001	5	5	argon	0.29	0.47	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00076-00001				0.29	0.43	0.49	58	N					
1"	NaturalSun Low-E IG	PEL-N-277-00079-00001	6	6	argon	0.29	0.45	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00080-00001				0.29	0.41	0.49	58	N					

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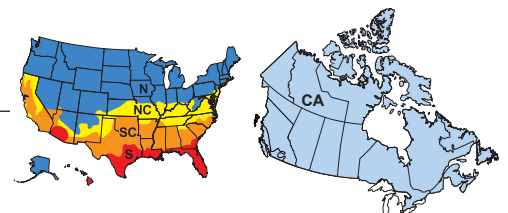
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-277-00567-00001	3	3	argon	0.27	0.26	0.49	60	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00568-00001				0.28	0.24	0.44	60		NC	SC	S	18	
11/16"	Advanced Low-E IG	PEL-N-277-00571-00001	4	4	argon	0.29	0.26	0.48	58		NC			18	
	with grilles-between-the-glass	PEL-N-277-00572-00001				0.30	0.24	0.44	58		NC	SC	S	16	
1"	Advanced Low-E IG	PEL-N-277-00351-00001	5	5	argon	0.27	0.26	0.48	59	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00352-00001				0.27	0.24	0.43	59	N	NC	SC	S	19	
1"	Advanced Low-E IG	PEL-N-277-00355-00001	6	6	argon	0.27	0.25	0.47	58	N	NC	SC	S	20	
	with grilles-between-the-glass	PEL-N-277-00356-00001				0.27	0.23	0.43	58	N	NC	SC	S	19	
11/16"	SunDefense IG	PEL-N-277-00575-00001	3	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00576-00001				0.28	0.18	0.41	61		NC	SC	S	15	
11/16"	SunDefense IG	PEL-N-277-00579-00001	4	4	argon	0.28	0.20	0.45	58		NC	SC	S	16	
	with grilles-between-the-glass	PEL-N-277-00580-00001				0.29	0.18	0.41	58		NC	SC	S	13	
1"	SunDefense IG	PEL-N-277-00391-00001	5	5	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00392-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
1"	SunDefense IG	PEL-N-277-00395-00001	6	6	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00396-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00591-00001	3	3	argon	0.24	0.26	0.48	48	N	NC			24	
	with grilles-between-the-glass	PEL-N-277-00592-00001				0.25	0.24	0.43	48	N	NC	SC	S	22	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00595-00001	4	4	argon	0.25	0.26	0.47	45	N	NC			23	
	with grilles-between-the-glass	PEL-N-277-00596-00001				0.26	0.23	0.43	45	N	NC	SC	S	20	
1"	AdvancedComfort Low-E IG	PEL-N-277-00423-00001	5	5	argon	0.24	0.25	0.47	47	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00424-00001				0.24	0.23	0.42	47	N	NC	SC	S	23	
1"	AdvancedComfort Low-E IG	PEL-N-277-00427-00001	6	6	argon	0.24	0.25	0.46	46	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00428-00001				0.24	0.23	0.42	46	N	NC	SC	S	23	
11/16"	NaturalSun Low-E IG	PEL-N-277-00583-00001	3	3	argon	0.28	0.48	0.55	59	N				32	
	with grilles-between-the-glass	PEL-N-277-00584-00001				0.29	0.44	0.50	59	N				28	
11/16"	NaturalSun Low-E IG	PEL-N-277-00587-00001	4	4	argon	0.29	0.47	0.55	57	N				30	
	with grilles-between-the-glass	PEL-N-277-00588-00001				0.30	0.43	0.50	57	N				27	
1"	NaturalSun Low-E IG	PEL-N-277-00407-00001	5	5	argon	0.28	0.47	0.54	58	N				31	
	with grilles-between-the-glass	PEL-N-277-00408-00001				0.28	0.43	0.49	58	N				29	
1"	NaturalSun Low-E IG	PEL-N-277-00411-00001	6	6	argon	0.28	0.45	0.54	58	N				30	
	with grilles-between-the-glass	PEL-N-277-00412-00001				0.28	0.41	0.49	58	N				28	

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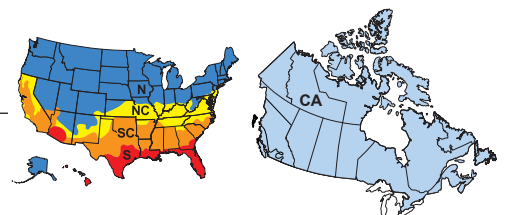
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²				
										Zone		ER	Zone			
Vent - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00233-00001	3	3	air	0.32	0.27	0.49	56							
	with grilles-between-the-glass	PEL-N-277-00234-00001				0.33	0.24	0.44	56				S			
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00237-00001	4	4	air	0.34	0.27	0.48	53							
	with grilles-between-the-glass	PEL-N-277-00238-00001				0.35	0.24	0.44	53				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00017-00001	5	5	air	0.32	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00018-00001				0.32	0.24	0.43	56				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00021-00001	6	6	air	0.31	0.26	0.47	55							
	with grilles-between-the-glass	PEL-N-277-00022-00001				0.31	0.24	0.43	55				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00241-00001	3	3	air	0.32	0.20	0.45	56							
	with grilles-between-the-glass	PEL-N-277-00242-00001				0.33	0.18	0.41	56				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00245-00001	4	4	air	0.33	0.20	0.45	54							
	with grilles-between-the-glass	PEL-N-277-00246-00001				0.35	0.19	0.41	54				S			
1"	(HA) SunDefense IG	PEL-N-277-00057-00001	5	5	air	0.31	0.20	0.44	56							
	with grilles-between-the-glass	PEL-N-277-00058-00001				0.31	0.18	0.40	56				S			
1"	(HA) SunDefense IG	PEL-N-277-00061-00001	6	6	air	0.31	0.20	0.44	55							
	with grilles-between-the-glass	PEL-N-277-00062-00001				0.31	0.18	0.40	55				S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00257-00001	3	3	air	0.28	0.26	0.48	43		C					
	with grilles-between-the-glass	PEL-N-277-00258-00001				0.28	0.24	0.43	44		C	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00261-00001	4	4	air	0.29	0.26	0.47	41		C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00262-00001				0.30	0.24	0.43	41		C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00089-00001	5	5	air	0.27	0.25	0.47	44	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00090-00001				0.27	0.23	0.42	44	N	C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00093-00001	6	6	air	0.27	0.25	0.46	43	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00094-00001				0.27	0.23	0.42	43	N	C	SC	S			
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00249-00001	3	3	air	0.33	0.48	0.55	55							
	with grilles-between-the-glass	PEL-N-277-00250-00001				0.33	0.44	0.50	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00253-00001	4	4	air	0.34	0.47	0.55	53							
	with grilles-between-the-glass	PEL-N-277-00254-00001				0.36	0.43	0.50	53							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00073-00001	5	5	air	0.32	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00074-00001				0.32	0.42	0.49	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00077-00001	6	6	air	0.32	0.45	0.54	54							
	with grilles-between-the-glass	PEL-N-277-00078-00001				0.32	0.41	0.49	54							

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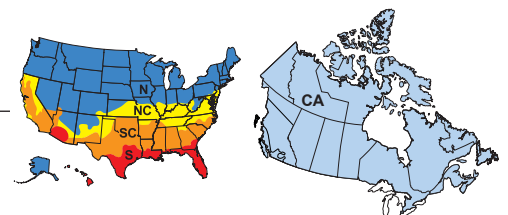
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA	
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00565-00001	3	3	air	0.31	0.27	0.49	56						
	with grilles-between-the-glass	PEL-N-277-00566-00001				0.32	0.24	0.44	56				S		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00569-00001	4	4	air	0.33	0.27	0.48	54						
	with grilles-between-the-glass	PEL-N-277-00570-00001				0.34	0.24	0.44	54				S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00349-00001	5	5	air	0.31	0.26	0.48	56						
	with grilles-between-the-glass	PEL-N-277-00350-00001				0.31	0.24	0.43	56				S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00353-00001	6	6	air	0.30	0.26	0.47	55		NC				
	with grilles-between-the-glass	PEL-N-277-00354-00001				0.30	0.24	0.43	55		NC	SC	S		
11/16"	(HA) SunDefense IG	PEL-N-277-00573-00001	3	3	air	0.31	0.20	0.45	57						
	with grilles-between-the-glass	PEL-N-277-00574-00001				0.32	0.18	0.41	57				S		
11/16"	(HA) SunDefense IG	PEL-N-277-00577-00001	4	4	air	0.32	0.20	0.45	54						
	with grilles-between-the-glass	PEL-N-277-00578-00001				0.34	0.19	0.41	54				S		
1"	(HA) SunDefense IG	PEL-N-277-00389-00001	5	5	air	0.30	0.20	0.44	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00390-00001				0.30	0.18	0.40	56		NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00393-00001	6	6	air	0.30	0.20	0.44	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00394-00001				0.30	0.18	0.40	56		NC	SC	S		
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00589-00001	3	3	air	0.27	0.26	0.48	44	N	NC				
	with grilles-between-the-glass	PEL-N-277-00590-00001				0.27	0.24	0.43	44	N	NC	SC	S		
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00593-00001	4	4	air	0.28	0.26	0.47	41		NC				
	with grilles-between-the-glass	PEL-N-277-00594-00001				0.29	0.24	0.43	41		NC	SC	S		
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00421-00001	5	5	air	0.26	0.25	0.47	44	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00422-00001				0.26	0.23	0.42	44	N	NC	SC	S		
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00425-00001	6	6	air	0.26	0.25	0.46	44	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00426-00001				0.26	0.23	0.42	44	N	NC	SC	S		
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00581-00001	3	3	air	0.32	0.48	0.55	55						
	with grilles-between-the-glass	PEL-N-277-00582-00001				0.32	0.44	0.50	55						
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00585-00001	4	4	air	0.33	0.47	0.55	53						
	with grilles-between-the-glass	PEL-N-277-00586-00001				0.35	0.43	0.50	53						
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00405-00001	5	5	air	0.31	0.47	0.54	55						
	with grilles-between-the-glass	PEL-N-277-00406-00001				0.31	0.42	0.49	55						
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00409-00001	6	6	air	0.31	0.45	0.54	55						
	with grilles-between-the-glass	PEL-N-277-00410-00001				0.31	0.41	0.49	55						

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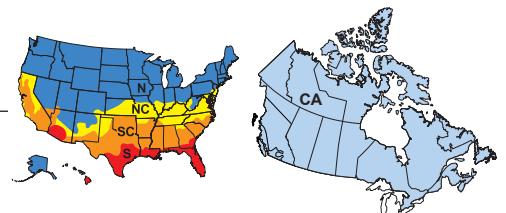
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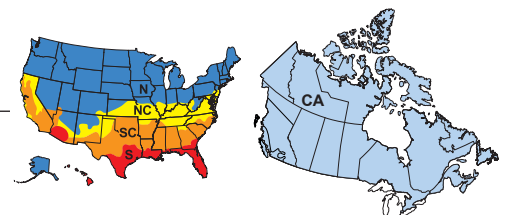




Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Vent - 5 mm/3 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-277-00009-00001	5	3	air	0.43	0.53	0.57	45					
	with grilles-between-the-glass	PEL-N-277-00010-00001				0.43	0.48	0.52	45					
1"	Advanced Low-E IG	PEL-N-277-00051-00001	5	3	argon	0.29	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00052-00001				0.29	0.24	0.44	60		NC	SC	S	
1"	SunDefense™ IG	PEL-N-277-00067-00001	5	3	argon	0.28	0.20	0.45	60		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00068-00001				0.28	0.18	0.41	60		NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00099-00001	5	3	argon	0.25	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00100-00001				0.25	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00083-00001	5	3	argon	0.29	0.47	0.55	59	N				
	with grilles-between-the-glass	PEL-N-277-00084-00001				0.29	0.43	0.50	59	N				
Vent - 5 mm/3 mm Glass with Foam Insulation											NC			
1"	Advanced Low-E IG	PEL-N-277-00383-00001	5	3	argon	0.28	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00384-00001				0.28	0.24	0.44	60		NC	SC	S	
1"	SunDefense IG	PEL-N-277-00399-00001	5	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00400-00001				0.27	0.18	0.41	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00431-00001	5	3	argon	0.24	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00432-00001				0.24	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00415-00001	5	3	argon	0.28	0.47	0.55	60	N				
	with grilles-between-the-glass	PEL-N-277-00416-00001				0.28	0.43	0.50	60	N				
Vent - 5 mm/3 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-277-00049-00001	5	3	air	0.32	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00050-00001				0.32	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00065-00001	5	3	air	0.31	0.20	0.45	57				S	
	with grilles-between-the-glass	PEL-N-277-00066-00001				0.31	0.18	0.41	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00097-00001	5	3	air	0.27	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00098-00001				0.27	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00081-00001	5	3	air	0.32	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00082-00001				0.32	0.43	0.50	56					
Vent - 5 mm/3 mm Glass High Altitude Glazing - with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-277-00381-00001	5	3	air	0.31	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00382-00001				0.31	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00397-00001	5	3	air	0.30	0.20	0.45	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00398-00001				0.30	0.18	0.41	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00429-00001	5	3	air	0.26	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00430-00001				0.26	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00413-00001	5	3	air	0.31	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00414-00001				0.31	0.43	0.50	56					

R-Value = 1/U-Factor
 SHGC = Solar Heat Gain Coefficient
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone	ER	Zone	Zone	Zone
Vent - 4 mm/6 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-277-00013-00001	4	6	air	0.43	0.53	0.56	44					
	with grilles-between-the-glass	PEL-N-277-00014-00001				0.43	0.48	0.51	44					
1"	Advanced Low-E IG	PEL-N-277-00055-00001	4	6	argon	0.28	0.26	0.48	58		NC			
	with grilles-between-the-glass	PEL-N-277-00056-00001				0.28	0.24	0.43	58		NC	SC	S	
1"	SunDefense™ IG	PEL-N-277-00071-00001	4	6	argon	0.28	0.20	0.44	59		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00072-00001				0.28	0.18	0.40	59		NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00103-00001	4	6	argon	0.25	0.25	0.47	47	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00104-00001				0.25	0.23	0.42	47	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00087-00001	4	6	argon	0.29	0.47	0.54	58	N				
	with grilles-between-the-glass	PEL-N-277-00088-00001				0.29	0.43	0.49	58	N				
Vent - 4 mm/6 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-277-00387-00001	4	6	argon	0.27	0.26	0.48	59	N	NC			
	with grilles-between-the-glass	PEL-N-277-00388-00001				0.27	0.24	0.43	59	N	NC	SC	S	
1"	SunDefense IG	PEL-N-277-00403-00001	4	6	argon	0.27	0.20	0.44	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00404-00001				0.27	0.18	0.40	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00435-00001	4	6	argon	0.24	0.25	0.47	47	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00436-00001				0.24	0.23	0.42	47	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00419-00001	4	6	argon	0.28	0.47	0.54	58	N				
	with grilles-between-the-glass	PEL-N-277-00420-00001				0.28	0.43	0.49	58	N				
Vent - 4 mm/6 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-277-00053-00001	4	6	air	0.32	0.26	0.48	55					
	with grilles-between-the-glass	PEL-N-277-00054-00001				0.32	0.24	0.43	55				S	
1"	(HA) SunDefense IG	PEL-N-277-00069-00001	4	6	air	0.31	0.20	0.44	55				S	
	with grilles-between-the-glass	PEL-N-277-00070-00001				0.31	0.18	0.40	55				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00101-00001	4	6	air	0.27	0.25	0.47	44	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00102-00001				0.27	0.23	0.42	44	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00085-00001	4	6	air	0.32	0.47	0.54	54					
	with grilles-between-the-glass	PEL-N-277-00086-00001				0.32	0.43	0.49	54					
Vent - 4 mm/6 mm Glass High Altitude Glazing - with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-277-00385-00001	4	6	air	0.31	0.26	0.48	55					
	with grilles-between-the-glass	PEL-N-277-00386-00001				0.31	0.24	0.43	55				S	
1"	(HA) SunDefense IG	PEL-N-277-00401-00001	4	6	air	0.30	0.20	0.44	56		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00402-00001				0.30	0.18	0.40	56		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00433-00001	4	6	air	0.26	0.25	0.47	44	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00434-00001				0.26	0.23	0.42	44	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00417-00001	4	6	air	0.31	0.47	0.54	55					
	with grilles-between-the-glass	PEL-N-277-00418-00001				0.31	0.43	0.49	55					

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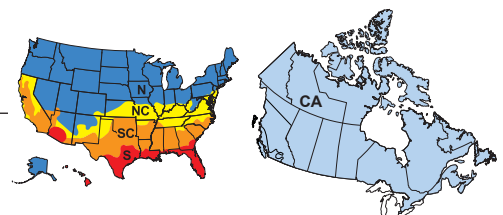
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Vent - with Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00275-00001	5	3	argon	0.30	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00276-00001				0.31	0.22	0.29	59				S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00027-00001	5	5	argon	0.28	0.23	0.31	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00028-00001				0.28	0.21	0.28	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00039-00001	6	6	argon	0.28	0.22	0.28	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00040-00001				0.28	0.20	0.25	58		NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00279-00001	5	3	argon	0.30	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00280-00001				0.31	0.20	0.25	59				S		
1"	Gray Advanced Low-E IG	PEL-N-277-00031-00001	5	5	argon	0.28	0.21	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00032-00001				0.28	0.19	0.24	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00043-00001	6	6	argon	0.28	0.19	0.24	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00044-00001				0.28	0.18	0.21	58		NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00283-00001	5	3	argon	0.30	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00284-00001				0.31	0.24	0.39	59				S		
1"	Green Advanced Low-E IG	PEL-N-277-00035-00001	5	5	argon	0.28	0.26	0.42	59		NC				
	with grilles-between-the-glass	PEL-N-277-00036-00001				0.28	0.24	0.38	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00047-00001	6	6	argon	0.28	0.25	0.41	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00048-00001				0.28	0.23	0.37	58		NC	SC	S		
Vent - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00607-00001	5	3	argon	0.29	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00608-00001				0.30	0.22	0.29	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00359-00001	5	5	argon	0.27	0.23	0.31	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00360-00001				0.27	0.21	0.28	59	N	NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00371-00001	6	6	argon	0.27	0.22	0.28	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00372-00001				0.27	0.20	0.25	59	N	NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00611-00001	5	3	argon	0.29	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00612-00001				0.30	0.20	0.25	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00363-00001	5	5	argon	0.27	0.21	0.27	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00364-00001				0.27	0.19	0.24	59	N	NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00375-00001	6	6	argon	0.27	0.19	0.24	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00376-00001				0.27	0.18	0.21	59	N	NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00615-00001	5	3	argon	0.29	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00616-00001				0.30	0.24	0.39	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00367-00001	5	5	argon	0.27	0.26	0.42	59	N	NC				
	with grilles-between-the-glass	PEL-N-277-00368-00001				0.27	0.24	0.38	59	N	NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00379-00001	6	6	argon	0.27	0.25	0.41	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00380-00001				0.27	0.23	0.37	59	N	NC	SC	S		

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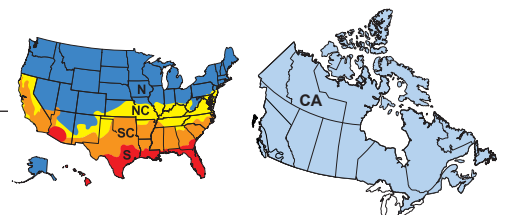
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²		
										Zone		ER	Zone	
Vent - High Altitude Glazing - with Tinted Glazing										N	NC	SC	S	CA
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00273-00001	5	3	air	0.34	0.24	0.32	54				S	
	with grilles-between-the-glass	PEL-N-277-00274-00001				0.35	0.22	0.29	54				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00025-00001	5	5	air	0.32	0.24	0.31	56				S	
	with grilles-between-the-glass	PEL-N-277-00026-00001				0.32	0.22	0.28	56				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00037-00001	6	6	air	0.31	0.22	0.28	55				S	
	with grilles-between-the-glass	PEL-N-277-00038-00001				0.31	0.20	0.25	55				S	
11/16"	Gray Advanced Low-E IG	PEL-N-277-00277-00001	5	3	air	0.34	0.22	0.27	54				S	
	with grilles-between-the-glass	PEL-N-277-00278-00001				0.35	0.21	0.25	54				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00029-00001	5	5	air	0.32	0.22	0.27	56				S	
	with grilles-between-the-glass	PEL-N-277-00030-00001				0.32	0.20	0.24	56				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00041-00001	6	6	air	0.31	0.20	0.24	55				S	
	with grilles-between-the-glass	PEL-N-277-00042-00001				0.31	0.18	0.21	55				S	
11/16"	Green Advanced Low-E IG	PEL-N-277-00281-00001	5	3	air	0.34	0.27	0.43	54					
	with grilles-between-the-glass	PEL-N-277-00282-00001				0.35	0.25	0.39	54				S	
1"	Green Advanced Low-E IG	PEL-N-277-00033-00001	5	5	air	0.32	0.26	0.42	56					
	with grilles-between-the-glass	PEL-N-277-00034-00001				0.32	0.24	0.38	56				S	
1"	Green Advanced Low-E IG	PEL-N-277-00045-00001	6	6	air	0.31	0.25	0.41	55				S	
	with grilles-between-the-glass	PEL-N-277-00046-00001				0.31	0.23	0.37	55				S	
Vent - High Altitude Glazing - with Foam Insulation and Tinted Glazing														
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00605-00001	5	3	air	0.33	0.24	0.32	54				S	
	with grilles-between-the-glass	PEL-N-277-00606-00001				0.34	0.22	0.29	54				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00357-00001	5	5	air	0.31	0.24	0.31	56				S	
	with grilles-between-the-glass	PEL-N-277-00358-00001				0.31	0.22	0.28	56				S	
1"	Bronze Advanced Low-E IG	PEL-N-277-00369-00001	6	6	air	0.30	0.22	0.28	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00370-00001				0.30	0.20	0.25	55	NC	SC		S	
11/16"	Gray Advanced Low-E IG	PEL-N-277-00609-00001	5	3	air	0.33	0.22	0.27	54				S	
	with grilles-between-the-glass	PEL-N-277-00610-00001				0.34	0.21	0.25	54				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00361-00001	5	5	air	0.31	0.22	0.27	56				S	
	with grilles-between-the-glass	PEL-N-277-00362-00001				0.31	0.20	0.24	56				S	
1"	Gray Advanced Low-E IG	PEL-N-277-00373-00001	6	6	air	0.30	0.20	0.24	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00374-00001				0.30	0.18	0.21	55	NC	SC		S	
11/16"	Green Advanced Low-E IG	PEL-N-277-00613-00001	5	3	air	0.33	0.27	0.43	54					
	with grilles-between-the-glass	PEL-N-277-00614-00001				0.34	0.25	0.39	54				S	
1"	Green Advanced Low-E IG	PEL-N-277-00365-00001	5	5	air	0.31	0.26	0.42	56					
	with grilles-between-the-glass	PEL-N-277-00366-00001				0.31	0.24	0.38	56				S	
1"	Green Advanced Low-E IG	PEL-N-277-00377-00001	6	6	air	0.30	0.25	0.41	55	NC	SC		S	
	with grilles-between-the-glass	PEL-N-277-00378-00001				0.30	0.23	0.37	55	NC	SC		S	

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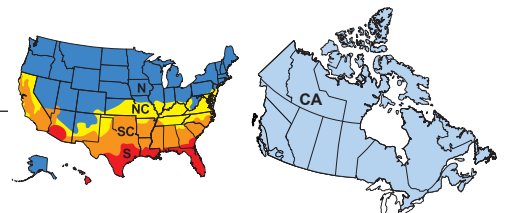
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Vent – with Laminated Glazing											N	NC	SC	S		CA
1"	Advanced Low-E IG	PEL-N-277-00139-00001	4	7	argon	0.28	0.26	0.48	59		NC					
	with grilles-between-the-glass	PEL-N-277-00140-00001				0.28	0.24	0.43	59		NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00151-00001	5	10	argon	0.28	0.26	0.47	58		NC					
	with grilles-between-the-glass	PEL-N-277-00152-00001				0.28	0.23	0.42	58		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00135-00001	4	7	argon	0.28	0.20	0.44	59		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00136-00001				0.28	0.18	0.40	59		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00147-00001	5	10	argon	0.27	0.20	0.44	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00148-00001				0.27	0.18	0.39	58	N	NC	SC	S			
Vent – with Foam insulation and Laminated Glazing																
1"	Advanced Low-E IG	PEL-N-277-00471-00001	4	7	argon	0.27	0.26	0.48	59	N	NC					
	with grilles-between-the-glass	PEL-N-277-00472-00001				0.27	0.24	0.43	59	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00483-00001	5	10	argon	0.27	0.26	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-277-00484-00001				0.27	0.23	0.42	58	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00467-00001	4	7	argon	0.27	0.20	0.44	60	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00468-00001				0.27	0.18	0.40	60	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00479-00001	5	10	argon	0.26	0.20	0.44	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00480-00001				0.26	0.18	0.39	58	N	NC	SC	S			

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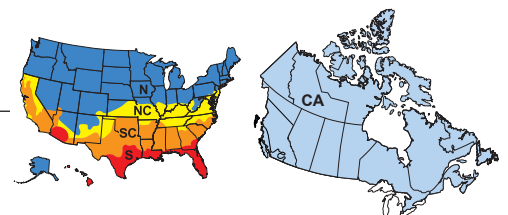
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Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Vent - High Altitude Glazing - with Laminated Glazing											N	NC	SC	S	CA	
1"	Advanced Low-E IG	PEL-N-277-00137-00001	4	7	air	0.31	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00138-00001				0.31	0.24	0.43	56				S			
1"	Advanced Low-E IG	PEL-N-277-00149-00001	5	10	air	0.31	0.26	0.47	54							
	with grilles-between-the-glass	PEL-N-277-00150-00001				0.31	0.24	0.42	54				S			
1"	SunDefense™ IG	PEL-N-277-00133-00001	4	7	air	0.31	0.20	0.44	56					S		
	with grilles-between-the-glass	PEL-N-277-00134-00001				0.31	0.18	0.40	56				S			
1"	SunDefense™ IG	PEL-N-277-00145-00001	5	10	air	0.31	0.20	0.44	55					S		
	with grilles-between-the-glass	PEL-N-277-00146-00001				0.31	0.18	0.39	55				S			
Vent - High Altitude Glazing – with Foam Insulation and Laminated Glazing												NC				
1"	Advanced Low-E IG	PEL-N-277-00469-00001	4	7	air	0.30	0.26	0.48	56		NC					
	with grilles-between-the-glass	PEL-N-277-00470-00001				0.30	0.24	0.43	56		NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00481-00001	5	10	air	0.30	0.26	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-277-00482-00001				0.30	0.24	0.42	55		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00465-00001	4	7	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00466-00001				0.30	0.18	0.40	56		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00477-00001	5	10	air	0.30	0.20	0.44	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00478-00001				0.30	0.18	0.39	55		NC	SC	S			

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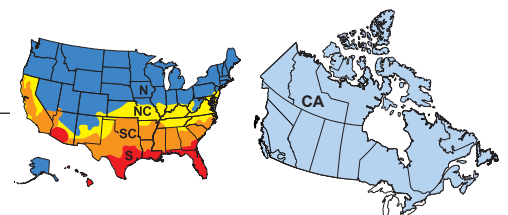
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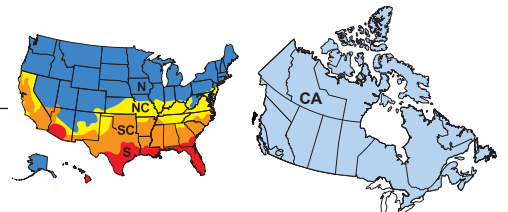




Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
											Zone				ER	Zone	
Vent -Triple Pane											N	NC	SC	S			CA
1"	Advanced Low-E IG	PEL-N-277-00167-00001	3	3	3	argon	0.23	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00168-00001					0.24	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00169-00001	3	3	3	Krypton	0.19	0.24	0.43	72	N	NC	SC	S	29	CA	
	with grilles-between-the-glass	PEL-N-277-00170-00001					0.20	0.22	0.39	72	N	NC	SC	S	27	CA	
1"	SunDefense™ IG	PEL-N-277-00179-00001	3	3	3	argon	0.23	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00180-00001					0.23	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00181-00001	3	3	3	Krypton	0.19	0.18	0.40	72	N	NC	SC	S	26	CA	
	with grilles-between-the-glass	PEL-N-277-00182-00001					0.19	0.16	0.36	72	N	NC	SC	S	25	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00155-00001	3	3	3	argon	0.23	0.40	0.49	66	N	NC					
	with grilles-between-the-glass	PEL-N-277-00156-00001					0.24	0.36	0.44	66	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00157-00001	3	3	3	Krypton	0.20	0.40	0.49	71	N	NC			37	CA	
	with grilles-between-the-glass	PEL-N-277-00158-00001					0.20	0.36	0.44	71	N	NC			35	CA	
Vent - Triple Pane with Foam Insulation																	
1"	Advanced Low-E IG	PEL-N-277-00499-00001	3	3	3	argon	0.22	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00500-00001					0.23	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00501-00001	3	3	3	Krypton	0.18	0.24	0.43	72	N	NC	SC	S	31	CA	
	with grilles-between-the-glass	PEL-N-277-00502-00001					0.19	0.22	0.39	72	N	NC	SC	S	28	CA	
1"	SunDefense IG	PEL-N-277-00511-00001	3	3	3	argon	0.22	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00512-00001					0.22	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense IG	PEL-N-277-00513-00001	3	3	3	Krypton	0.18	0.18	0.40	72	N	NC	SC	S	27	CA	
	with grilles-between-the-glass	PEL-N-277-00514-00001					0.18	0.16	0.36	72	N	NC	SC	S	26	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00487-00001	3	3	3	argon	0.22	0.40	0.49	67	N	NC			35	CA	
	with grilles-between-the-glass	PEL-N-277-00488-00001					0.23	0.36	0.44	67	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00489-00001	3	3	3	Krypton	0.19	0.40	0.49	72	N	NC			38	CA	
	with grilles-between-the-glass	PEL-N-277-00490-00001					0.19	0.36	0.44	72	N	NC			36	CA	

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
											Zone				ER	Zone
Vent - Triple Pane with High Altitude Glazing											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00165-00001	3	3	3	air	0.26	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00166-00001					0.27	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00177-00001	3	3	3	air	0.26	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00178-00001					0.27	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00153-00001	3	3	3	air	0.27	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00154-00001					0.27	0.36	0.44	63	N	NC				
Vent - Triple Pane with High Altitude Glazing and Foam Insulation											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00497-00001	3	3	3	air	0.25	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00498-00001					0.26	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00509-00001	3	3	3	air	0.25	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00510-00001					0.26	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00485-00001	3	3	3	air	0.26	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00486-00001					0.26	0.36	0.44	63	N	NC				

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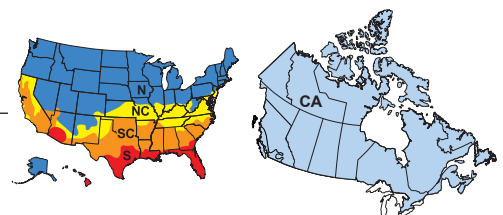
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed										N	NC	SC	S	CA		
11/16"	Clear IG	PEL-N-276-00225-00001	3	3	air	0.46	0.63	0.66	44							
	with grilles-between-the-glass	PEL-N-276-00226-00001				0.46	0.56	0.59	44							
11/16"	Clear IG	PEL-N-276-00229-00001	4	4	air	0.47	0.61	0.66	43							
	with grilles-between-the-glass	PEL-N-276-00230-00001				0.48	0.55	0.59	43							
1"	Clear IG	PEL-N-276-00001-00001	5	5	air	0.45	0.60	0.65	44							
	with grilles-between-the-glass	PEL-N-276-00002-00001				0.45	0.54	0.58	44							
1"	Clear IG	PEL-N-276-00005-00001	6	6	air	0.44	0.58	0.64	44							
	with grilles-between-the-glass	PEL-N-276-00006-00001				0.44	0.52	0.57	44							
11/16"	Advanced Low-E IG	PEL-N-276-00235-00001	3	3	argon	0.27	0.30	0.56	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00236-00001				0.28	0.27	0.50	59		NC					
11/16"	Advanced Low-E IG	PEL-N-276-00239-00001	4	4	argon	0.28	0.30	0.56	57		NC					
	with grilles-between-the-glass	PEL-N-276-00240-00001				0.30	0.27	0.50	57		NC					
1"	Advanced Low-E IG	PEL-N-276-00019-00001	5	5	argon	0.27	0.29	0.55	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00020-00001				0.27	0.26	0.49	59	N	NC					
1"	Advanced Low-E IG	PEL-N-276-00023-00001	6	6	argon	0.27	0.29	0.54	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00024-00001				0.27	0.26	0.48	58	N	NC					
11/16"	SunDefense™ IG	PEL-N-276-00243-00001	3	3	argon	0.27	0.22	0.52	60	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00244-00001				0.28	0.20	0.46	60		NC	SC	S			
11/16"	SunDefense™ IG	PEL-N-276-00247-00001	4	4	argon	0.28	0.23	0.52	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00248-00001				0.29	0.21	0.46	58		NC	SC	S			
1"	SunDefense™ IG	PEL-N-276-00059-00001	5	5	argon	0.27	0.22	0.51	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00060-00001				0.27	0.20	0.46	59	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-276-00063-00001	6	6	argon	0.27	0.22	0.50	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00064-00001				0.27	0.20	0.45	58	N	NC	SC	S			
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00259-00001	3	3	argon	0.23	0.29	0.55	47	N	NC					
	with grilles-between-the-glass	PEL-N-276-00260-00001				0.24	0.27	0.49	47	N	NC					
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00263-00001	4	4	argon	0.24	0.29	0.54	45	N	NC					
	with grilles-between-the-glass	PEL-N-276-00264-00001				0.26	0.26	0.48	45	N	NC					
1"	AdvancedComfort Low-E IG	PEL-N-276-00091-00001	5	5	argon	0.23	0.29	0.54	47	N	NC					
	with grilles-between-the-glass	PEL-N-276-00092-00001				0.23	0.26	0.48	47	N	NC					
1"	AdvancedComfort Low-E IG	PEL-N-276-00095-00001	6	6	argon	0.23	0.28	0.53	46	N	NC					
	with grilles-between-the-glass	PEL-N-276-00096-00001				0.23	0.26	0.47	46	N	NC					
11/16"	NaturalSun Low-E IG	PEL-N-276-00251-00001	3	3	argon	0.28	0.55	0.64	59	N					37	CA
	with grilles-between-the-glass	PEL-N-276-00252-00001				0.29	0.50	0.57	59	N						
11/16"	NaturalSun Low-E IG	PEL-N-276-00255-00001	4	4	argon	0.29	0.54	0.63	57	N					35	CA
	with grilles-between-the-glass	PEL-N-276-00256-00001				0.31	0.48	0.56	57							
1"	NaturalSun Low-E IG	PEL-N-276-00075-00001	5	5	argon	0.28	0.53	0.63	58	N					36	CA
	with grilles-between-the-glass	PEL-N-276-00076-00001				0.28	0.48	0.56	58	N						
1"	NaturalSun Low-E IG	PEL-N-276-00079-00001	6	6	argon	0.28	0.52	0.62	57	N					35	CA
	with grilles-between-the-glass	PEL-N-276-00080-00001				0.28	0.47	0.55	57	N						

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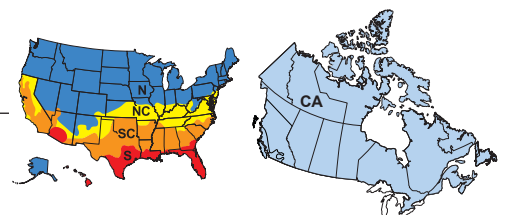
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²	
										Zone				ER	Zone
Fixed – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-276-00567-00001	3	3	argon	0.26	0.30	0.56	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00568-00001				0.27	0.27	0.50	59	N	NC				
11/16"	Advanced Low-E IG	PEL-N-276-00571-00001	4	4	argon	0.28	0.30	0.56	57		NC				
	with grilles-between-the-glass	PEL-N-276-00572-00001				0.29	0.27	0.50	57		NC				
1"	Advanced Low-E IG	PEL-N-276-00351-00001	5	5	argon	0.27	0.29	0.55	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00352-00001				0.27	0.26	0.49	59	N	NC				
1"	Advanced Low-E IG	PEL-N-276-00355-00001	6	6	argon	0.27	0.29	0.54	58	N	NC				
	with grilles-between-the-glass	PEL-N-276-00356-00001				0.27	0.26	0.48	58	N	NC				
11/16"	SunDefense IG	PEL-N-276-00575-00001	3	3	argon	0.26	0.22	0.52	60	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00576-00001				0.27	0.20	0.46	60	N	NC	SC	S		
11/16"	SunDefense IG	PEL-N-276-00579-00001	4	4	argon	0.27	0.23	0.52	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00580-00001				0.29	0.21	0.46	58		NC	SC	S		
1"	SunDefense IG	PEL-N-276-00391-00001	5	5	argon	0.26	0.22	0.51	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00392-00001				0.26	0.20	0.46	59	N	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00395-00001	6	6	argon	0.26	0.22	0.50	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00396-00001				0.26	0.20	0.45	58	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00591-00001	3	3	argon	0.23	0.29	0.55	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00592-00001				0.23	0.27	0.49	47	N	NC				
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00595-00001	4	4	argon	0.24	0.29	0.54	45	N	NC				
	with grilles-between-the-glass	PEL-N-276-00596-00001				0.25	0.26	0.48	45	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00423-00001	5	5	argon	0.22	0.29	0.54	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00424-00001				0.22	0.26	0.48	47	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00427-00001	6	6	argon	0.22	0.28	0.53	46	N	NC				
	with grilles-between-the-glass	PEL-N-276-00428-00001				0.22	0.26	0.47	46	N	NC				
11/16"	NaturalSun Low-E IG	PEL-N-276-00583-00001	3	3	argon	0.27	0.55	0.64	59	N				38	CA
	with grilles-between-the-glass	PEL-N-276-00584-00001				0.28	0.50	0.57	59	N				34	CA
11/16"	NaturalSun Low-E IG	PEL-N-276-00587-00001	4	4	argon	0.29	0.54	0.63	57	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00588-00001				0.30	0.48	0.56	57	N					
1"	NaturalSun Low-E IG	PEL-N-276-00407-00001	5	5	argon	0.28	0.53	0.63	58	N				36	CA
	with grilles-between-the-glass	PEL-N-276-00408-00001				0.28	0.48	0.56	58	N					
1"	NaturalSun Low-E IG	PEL-N-276-00411-00001	6	6	argon	0.28	0.52	0.62	58	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00412-00001				0.28	0.47	0.55	58	N					

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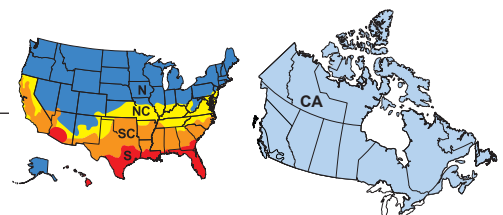
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00233-00001	3	3	air	0.31	0.30	0.56	55							
	with grilles-between-the-glass	PEL-N-276-00234-00001				0.33	0.27	0.50	55							
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00237-00001	4	4	air	0.33	0.30	0.56	53							
	with grilles-between-the-glass	PEL-N-276-00238-00001				0.35	0.27	0.50	53							
1"	(HA) Advanced Low-E IG	PEL-N-276-00017-00001	5	5	air	0.31	0.30	0.55	55							
	with grilles-between-the-glass	PEL-N-276-00018-00001				0.31	0.27	0.49	55							
1"	(HA) Advanced Low-E IG	PEL-N-276-00021-00001	6	6	air	0.31	0.29	0.54	55							
	with grilles-between-the-glass	PEL-N-276-00022-00001				0.31	0.27	0.48	55							
11/16"	(HA) SunDefense IG	PEL-N-276-00241-00001	3	3	air	0.31	0.23	0.52	56							S
	with grilles-between-the-glass	PEL-N-276-00242-00001				0.32	0.21	0.46	56							S
11/16"	(HA) SunDefense IG	PEL-N-276-00245-00001	4	4	air	0.33	0.23	0.52	53							S
	with grilles-between-the-glass	PEL-N-276-00246-00001				0.35	0.21	0.46	53							S
1"	(HA) SunDefense IG	PEL-N-276-00057-00001	5	5	air	0.31	0.22	0.51	56							S
	with grilles-between-the-glass	PEL-N-276-00058-00001				0.31	0.20	0.46	56							S
1"	(HA) SunDefense IG	PEL-N-276-00061-00001	6	6	air	0.30	0.23	0.50	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00062-00001				0.30	0.20	0.45	55		NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00257-00001	3	3	air	0.26	0.30	0.55	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00258-00001				0.27	0.27	0.49	43	N	NC					
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00261-00001	4	4	air	0.28	0.29	0.54	41		NC					
	with grilles-between-the-glass	PEL-N-276-00262-00001				0.29	0.26	0.48	41		NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00089-00001	5	5	air	0.26	0.29	0.54	44	N	NC					
	with grilles-between-the-glass	PEL-N-276-00090-00001				0.26	0.26	0.48	44	N	NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00093-00001	6	6	air	0.25	0.28	0.53	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00094-00001				0.25	0.26	0.47	43	N	NC					
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00249-00001	3	3	air	0.32	0.55	0.64	55							
	with grilles-between-the-glass	PEL-N-276-00250-00001				0.32	0.50	0.57	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00253-00001	4	4	air	0.34	0.54	0.63	52							
	with grilles-between-the-glass	PEL-N-276-00254-00001				0.36	0.48	0.56	52							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00073-00001	5	5	air	0.32	0.53	0.63	55							
	with grilles-between-the-glass	PEL-N-276-00074-00001				0.32	0.48	0.56	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00077-00001	6	6	air	0.32	0.52	0.62	54							
	with grilles-between-the-glass	PEL-N-276-00078-00001				0.32	0.47	0.55	54							

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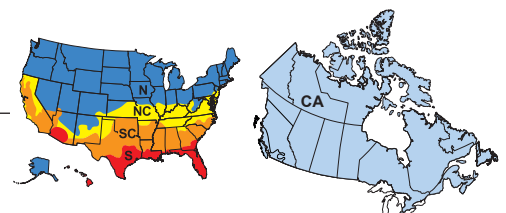
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²			
										Zone		ER	Zone		
Fixed – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA	
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00565-00001	3	3	air	0.31	0.30	0.56	55						
	with grilles-between-the-glass	PEL-N-276-00566-00001				0.32	0.27	0.50	55						
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00569-00001	4	4	air	0.33	0.30	0.56	53						
	with grilles-between-the-glass	PEL-N-276-00570-00001				0.34	0.27	0.50	53						
1"	(HA) Advanced Low-E IG	PEL-N-276-00349-00001	5	5	air	0.30	0.30	0.55	55		NC				
	with grilles-between-the-glass	PEL-N-276-00350-00001				0.30	0.27	0.49	55		NC				
1"	(HA) Advanced Low-E IG	PEL-N-276-00353-00001	6	6	air	0.30	0.29	0.54	55		NC				
	with grilles-between-the-glass	PEL-N-276-00354-00001				0.30	0.27	0.48	55		NC				
11/16"	(HA) SunDefense IG	PEL-N-276-00573-00001	3	3	air	0.30	0.23	0.52	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00574-00001				0.32	0.21	0.46	56				S		
11/16"	(HA) SunDefense IG	PEL-N-276-00577-00001	4	4	air	0.32	0.23	0.52	53				S		
	with grilles-between-the-glass	PEL-N-276-00578-00001				0.34	0.21	0.46	53				S		
1"	(HA) SunDefense IG	PEL-N-276-00389-00001	5	5	air	0.30	0.22	0.51	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00390-00001				0.30	0.20	0.46	56		NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-276-00393-00001	6	6	air	0.30	0.23	0.50	55		NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00394-00001				0.30	0.20	0.45	55		NC	SC	S		
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00589-00001	3	3	air	0.26	0.30	0.55	43	N	NC				
	with grilles-between-the-glass	PEL-N-276-00590-00001				0.27	0.27	0.49	43	N	NC				
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00593-00001	4	4	air	0.27	0.29	0.54	41	N	NC				
	with grilles-between-the-glass	PEL-N-276-00594-00001				0.28	0.26	0.48	41		NC				
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00421-00001	5	5	air	0.25	0.29	0.54	44	N	NC				
	with grilles-between-the-glass	PEL-N-276-00422-00001				0.25	0.26	0.48	44	N	NC				
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00425-00001	6	6	air	0.25	0.28	0.53	43	N	NC				
	with grilles-between-the-glass	PEL-N-276-00426-00001				0.25	0.26	0.47	43	N	NC				
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00581-00001	3	3	air	0.32	0.55	0.64	55						
	with grilles-between-the-glass	PEL-N-276-00582-00001				0.32	0.50	0.57	55						
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00585-00001	4	4	air	0.33	0.54	0.63	52						
	with grilles-between-the-glass	PEL-N-276-00586-00001				0.35	0.48	0.56	52						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00405-00001	5	5	air	0.31	0.53	0.63	55						
	with grilles-between-the-glass	PEL-N-276-00406-00001				0.31	0.48	0.56	55						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00409-00001	6	6	air	0.31	0.52	0.62	54						
	with grilles-between-the-glass	PEL-N-276-00410-00001				0.31	0.47	0.55	54						

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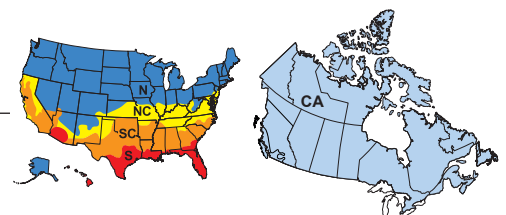
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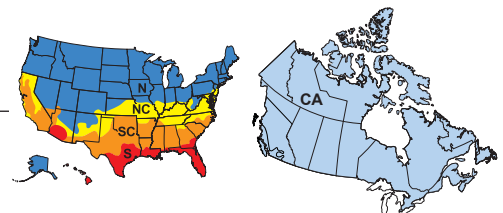
Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone	ER	Zone	Zone	
Fixed - 5 mm/3 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00009-00001	5	3	air	0.45	0.61	0.66	45					
	with grilles-between-the-glass	PEL-N-276-00010-00001				0.45	0.55	0.59	45					
1"	Advanced Low-E IG	PEL-N-276-00051-00001	5	3	argon	0.28	0.29	0.55	60		NC			
	with grilles-between-the-glass	PEL-N-276-00052-00001				0.28	0.27	0.50	60		NC			
1"	SunDefense™ IG	PEL-N-276-00067-00001	5	3	argon	0.27	0.22	0.52	60	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00068-00001				0.27	0.20	0.46	60	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00099-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00100-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00083-00001	5	3	argon	0.29	0.54	0.63	60	N				35 CA
	with grilles-between-the-glass	PEL-N-276-00084-00001				0.29	0.48	0.56	60	N				
Fixed - 5 mm/3 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-276-00383-00001	5	3	argon	0.27	0.29	0.55	60	N	NC			
	with grilles-between-the-glass	PEL-N-276-00384-00001				0.27	0.27	0.50	60	N	NC			
1"	SunDefense IG	PEL-N-276-00399-00001	5	3	argon	0.27	0.22	0.52	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00400-00001				0.27	0.20	0.46	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00431-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00432-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00415-00001	5	3	argon	0.28	0.54	0.63	60	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00416-00001				0.28	0.48	0.56	60	N				
Fixed - 5 mm/3 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-276-00049-00001	5	3	air	0.31	0.30	0.55	56					
	with grilles-between-the-glass	PEL-N-276-00050-00001				0.31	0.27	0.50	56					
1"	(HA) SunDefense IG	PEL-N-276-00065-00001	5	3	air	0.31	0.22	0.52	57				S	
	with grilles-between-the-glass	PEL-N-276-00066-00001				0.31	0.20	0.46	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00097-00001	5	3	air	0.26	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00098-00001				0.26	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00081-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00082-00001				0.32	0.48	0.56	56					
Fixed - 5 mm/3 mm Glass High Altitude Glazing – with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-276-00381-00001	5	3	air	0.31	0.30	0.55	57					
	with grilles-between-the-glass	PEL-N-276-00382-00001				0.31	0.27	0.50	57					
1"	(HA) SunDefense IG	PEL-N-276-00397-00001	5	3	air	0.30	0.22	0.52	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00398-00001				0.30	0.20	0.46	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00429-00001	5	3	air	0.25	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00430-00001				0.25	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00413-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00414-00001				0.32	0.48	0.56	56					

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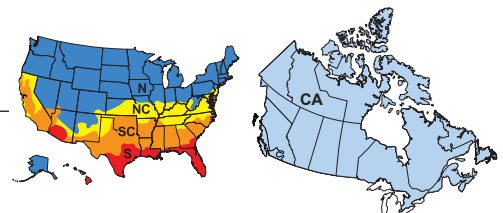
Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²		
										Zone	ER	Zone	ER	Zone
Fixed - 4 mm/6 mm Glass										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00013-00001	4	6	air	0.45	0.60	0.65	44					
	with grilles-between-the-glass	PEL-N-276-00014-00001				0.45	0.54	0.58	44					
1"	Advanced Low-E IG	PEL-N-276-00055-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00056-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense™ IG	PEL-N-276-00071-00001	4	6	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00072-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00103-00001	4	6	argon	0.23	0.29	0.54	46	N	NC			
	with grilles-between-the-glass	PEL-N-276-00104-00001				0.23	0.26	0.48	46	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00087-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00088-00001				0.28	0.49	0.56	58	N				
Fixed - 4 mm/6 mm Glass with Foam Insulation														
1"	Advanced Low-E IG	PEL-N-276-00387-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00388-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense IG	PEL-N-276-00403-00001	4	6	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00404-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00435-00001	4	6	argon	0.22	0.29	0.54	47	N	NC			
	with grilles-between-the-glass	PEL-N-276-00436-00001				0.22	0.26	0.48	47	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00419-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00420-00001				0.28	0.49	0.56	58	N				
Fixed - 4 mm/6 mm Glass High Altitude Glazing														
1"	(HA) Advanced Low-E IG	PEL-N-276-00053-00001	4	6	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00054-00001				0.31	0.27	0.49	55					
1"	(HA) SunDefense IG	PEL-N-276-00069-00001	4	6	air	0.31	0.22	0.51	55				S	
	with grilles-between-the-glass	PEL-N-276-00070-00001				0.31	0.20	0.46	55				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00101-00001	4	6	air	0.26	0.29	0.54	43	N	NC			
	with grilles-between-the-glass	PEL-N-276-00102-00001				0.26	0.26	0.48	43	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00085-00001	4	6	air	0.32	0.54	0.62	54					
	with grilles-between-the-glass	PEL-N-276-00086-00001				0.32	0.48	0.56	54					
Fixed - 4 mm/6 mm Glass High Altitude Glazing – with Foam Insulation														
1"	(HA) Advanced Low-E IG	PEL-N-276-00385-00001	4	6	air	0.30	0.30	0.55	55		NC			
	with grilles-between-the-glass	PEL-N-276-00386-00001				0.30	0.27	0.49	55		NC			
1"	(HA) SunDefense IG	PEL-N-276-00401-00001	4	6	air	0.30	0.22	0.51	55		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00402-00001				0.30	0.20	0.46	55		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00433-00001	4	6	air	0.25	0.29	0.54	44	N	NC			
	with grilles-between-the-glass	PEL-N-276-00434-00001				0.25	0.26	0.48	44	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00417-00001	4	6	air	0.31	0.54	0.62	55					
	with grilles-between-the-glass	PEL-N-276-00418-00001				0.31	0.48	0.56	55					

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²		
										Zone				ER	Zone	
Fixed - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00275-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00276-00001				0.30	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00027-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00028-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00039-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00040-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00279-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00280-00001				0.30	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00031-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00032-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00043-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00044-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00283-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00284-00001				0.30	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00035-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00036-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00047-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00048-00001				0.27	0.26	0.42	58	N	NC					
Fixed - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00607-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00608-00001				0.29	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00359-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00360-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00371-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00372-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00611-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00612-00001				0.29	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00363-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00364-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00375-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00376-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00615-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00616-00001				0.29	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00367-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00368-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00379-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00380-00001				0.27	0.26	0.42	58	N	NC					

R-Value = 1/U-Factor
 SHGC = Solar Heat Gain Coefficient
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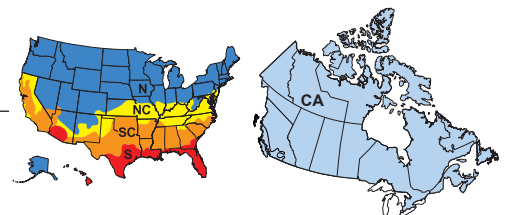
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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Impervia® Casement Windows

Glazing Performance - Total Unit

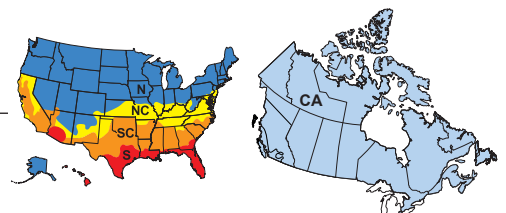
Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²				
										Zone		ER	Zone			
Fixed - High Altitude Glazing - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00273-00001	5	3	air	0.33	0.27	0.36	54							
	with grilles-between-the-glass	PEL-N-276-00274-00001				0.35	0.25	0.32	54				S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00025-00001	5	5	air	0.31	0.27	0.36	56				S			
	with grilles-between-the-glass	PEL-N-276-00026-00001				0.31	0.24	0.32	56				S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00037-00001	6	6	air	0.31	0.25	0.32	55				S			
	with grilles-between-the-glass	PEL-N-276-00038-00001				0.31	0.23	0.29	55				S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00277-00001	5	3	air	0.33	0.25	0.31	54				S			
	with grilles-between-the-glass	PEL-N-276-00278-00001				0.35	0.23	0.28	54				S			
1"	Gray Advanced Low-E IG	PEL-N-276-00029-00001	5	5	air	0.31	0.24	0.31	56				S			
	with grilles-between-the-glass	PEL-N-276-00030-00001				0.31	0.22	0.28	56				S			
1"	Gray Advanced Low-E IG	PEL-N-276-00041-00001	6	6	air	0.31	0.22	0.27	55				S			
	with grilles-between-the-glass	PEL-N-276-00042-00001				0.31	0.20	0.24	55				S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00281-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00282-00001				0.35	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00033-00001	5	5	air	0.31	0.30	0.49	56							
	with grilles-between-the-glass	PEL-N-276-00034-00001				0.31	0.27	0.44	56							
1"	Green Advanced Low-E IG	PEL-N-276-00045-00001	6	6	air	0.31	0.29	0.47	55							
	with grilles-between-the-glass	PEL-N-276-00046-00001				0.31	0.26	0.42	55							
Fixed - High Altitude Glazing - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00605-00001	5	3	air	0.33	0.27	0.36	54							
	with grilles-between-the-glass	PEL-N-276-00606-00001				0.34	0.25	0.32	54				S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00357-00001	5	5	air	0.30	0.27	0.36	56		NC					
	with grilles-between-the-glass	PEL-N-276-00358-00001				0.30	0.24	0.32	56		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00369-00001	6	6	air	0.30	0.25	0.32	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00370-00001				0.30	0.23	0.29	55		NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00609-00001	5	3	air	0.33	0.25	0.31	54				S			
	with grilles-between-the-glass	PEL-N-276-00610-00001				0.34	0.23	0.28	54				S			
1"	Gray Advanced Low-E IG	PEL-N-276-00361-00001	5	5	air	0.30	0.24	0.31	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00362-00001				0.30	0.22	0.28	56		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00373-00001	6	6	air	0.30	0.22	0.27	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00374-00001				0.30	0.20	0.24	55		NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00613-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00614-00001				0.34	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00365-00001	5	5	air	0.30	0.30	0.49	56		NC					
	with grilles-between-the-glass	PEL-N-276-00366-00001				0.30	0.27	0.44	56		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00377-00001	6	6	air	0.30	0.29	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-276-00378-00001				0.30	0.26	0.42	55		NC					

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 CR = Condensation Resistance
 ER = Canadian Energy Rating

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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Fixed – with Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00139-00001	4	7	argon	0.27	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00140-00001				0.27	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00151-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00152-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00135-00001	4	7	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00136-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00147-00001	5	10	argon	0.26	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00148-00001				0.26	0.20	0.45	58	N	NC	SC	S	
Fixed – with Foam insulation and Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00471-00001	4	7	argon	0.26	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00472-00001				0.26	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00483-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00484-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00467-00001	4	7	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00468-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00479-00001	5	10	argon	0.25	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00480-00001				0.25	0.20	0.45	58	N	NC	SC	S	

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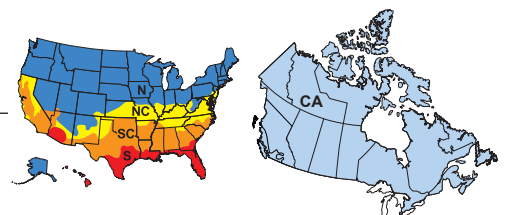
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Impervia® Casement Windows

Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada ²
										Zone				ER
Fixed - High Altitude Glazing - with Laminated Glazing										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00137-00001	4	7	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00138-00001				0.31	0.27	0.49	55					
1"	Advanced Low-E IG	PEL-N-276-00149-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00150-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00133-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00134-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00145-00001	5	10	air	0.30	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00146-00001				0.30	0.20	0.45	54	NC	SC	S		
Fixed - High Altitude Glazing - with Foam Insulation and Laminated Glazing														
1"	Advanced Low-E IG	PEL-N-276-00469-00001	4	7	air	0.30	0.30	0.55	56	NC				
	with grilles-between-the-glass	PEL-N-276-00470-00001				0.30	0.27	0.49	56	NC				
1"	Advanced Low-E IG	PEL-N-276-00481-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00482-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00465-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00466-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00477-00001	5	10	air	0.29	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00478-00001				0.29	0.20	0.45	54	NC	SC	S		

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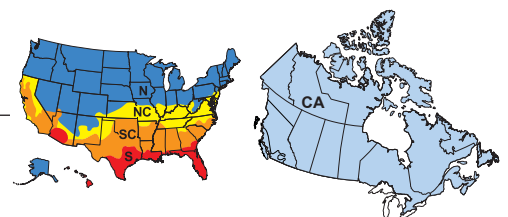
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Glazing Performance - Total Unit

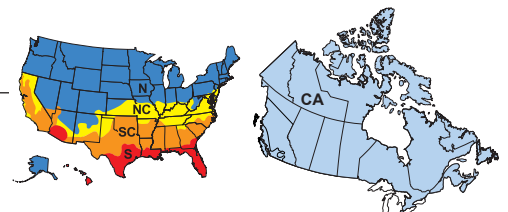
Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²			
											Zone		ER	Zone		
Fixed -Triple Pane											N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00167-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC			29	CA
	with grilles-between-the-glass	PEL-N-276-00168-00001					0.22	0.25	0.44	67	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00169-00001	3	3	3	Krypton	0.17	0.27	0.50	72	N	NC			34	CA
	with grilles-between-the-glass	PEL-N-276-00170-00001					0.17	0.24	0.44	72	N	NC	SC	S	32	CA
1"	Advanced Low-E IG	PEL-N-276-00173-00001	4	4	4	argon	0.24	0.27	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-276-00174-00001					0.25	0.24	0.43	63	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00175-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC			33	CA
	with grilles-between-the-glass	PEL-N-276-00176-00001					0.20	0.24	0.43	69	N	NC	SC	S	29	CA
1"	SunDefense™ IG	PEL-N-276-00179-00001	3	3	3	argon	0.21	0.20	0.46	67	N	NC	SC	S	25	CA
	with grilles-between-the-glass	PEL-N-276-00180-00001					0.22	0.19	0.41	67	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00181-00001	3	3	3	Krypton	0.17	0.20	0.46	72	N	NC	SC	S	30	CA
	with grilles-between-the-glass	PEL-N-276-00182-00001					0.17	0.18	0.41	72	N	NC	SC	S	29	CA
1"	SunDefense™ IG	PEL-N-276-00185-00001	4	4	4	argon	0.24	0.21	0.45	64	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00186-00001					0.25	0.19	0.40	64	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00187-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S	29	CA
	with grilles-between-the-glass	PEL-N-276-00188-00001					0.19	0.18	0.40	69	N	NC	SC	S	27	CA
1"	NaturalSun Low-E IG	PEL-N-276-00155-00001	3	3	3	argon	0.22	0.45	0.56	67	N				38	CA
	with grilles-between-the-glass	PEL-N-276-00156-00001					0.22	0.41	0.50	67	N				36	CA
1"	NaturalSun Low-E IG	PEL-N-276-00157-00001	3	3	3	Krypton	0.17	0.45	0.56	71	N				45	CA
	with grilles-between-the-glass	PEL-N-276-00158-00001					0.18	0.41	0.50	71	N				41	CA
1"	NaturalSun Low-E IG	PEL-N-276-00161-00001	4	4	4	argon	0.24	0.44	0.55	63	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00162-00001					0.26	0.40	0.50	63	N	NC				
1"	NaturalSun Low-E IG	PEL-N-276-00163-00001	4	4	4	Krypton	0.19	0.44	0.55	68	N				42	CA
	with grilles-between-the-glass	PEL-N-276-00164-00001					0.20	0.40	0.50	68	N	NC			38	CA
Fixed - Triple Pane with Foam Insulation																
1"	Advanced Low-E IG	PEL-N-276-00499-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC			29	CA
	with grilles-between-the-glass	PEL-N-276-00500-00001					0.21	0.25	0.44	67	N	NC	SC	S	28	CA
1"	Advanced Low-E IG	PEL-N-276-00501-00001	3	3	3	Krypton	0.16	0.27	0.50	72	N	NC			35	CA
	with grilles-between-the-glass	PEL-N-276-00502-00001					0.17	0.24	0.44	72	N	NC	SC	S	32	CA
1"	Advanced Low-E IG	PEL-N-276-00505-00001	4	4	4	argon	0.23	0.27	0.49	64	N	NC				
	with grilles-between-the-glass	PEL-N-276-00506-00001					0.25	0.24	0.43	64	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00507-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC			33	CA
	with grilles-between-the-glass	PEL-N-276-00508-00001					0.19	0.24	0.43	69	N	NC	SC	S	30	CA
1"	SunDefense IG	PEL-N-276-00511-00001	3	3	3	argon	0.21	0.20	0.46	68	N	NC	SC	S	25	CA
	with grilles-between-the-glass	PEL-N-276-00512-00001					0.21	0.19	0.41	68	N	NC	SC	S	25	CA
1"	SunDefense IG	PEL-N-276-00513-00001	3	3	3	Krypton	0.16	0.20	0.46	72	N	NC	SC	S	31	CA
	with grilles-between-the-glass	PEL-N-276-00514-00001					0.16	0.18	0.41	72	N	NC	SC	S	30	CA
1"	SunDefense IG	PEL-N-276-00517-00001	4	4	4	argon	0.23	0.21	0.45	64	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00518-00001					0.24	0.19	0.40	64	N	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00519-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S	29	CA
	with grilles-between-the-glass	PEL-N-276-00520-00001					0.19	0.18	0.40	69	N	NC	SC	S	27	CA
1"	NaturalSun Low-E IG	PEL-N-276-00487-00001	3	3	3	argon	0.21	0.45	0.56	67	N				40	CA
	with grilles-between-the-glass	PEL-N-276-00488-00001					0.22	0.41	0.50	67	N				36	CA
1"	NaturalSun Low-E IG	PEL-N-276-00489-00001	3	3	3	Krypton	0.17	0.45	0.56	72	N				45	CA
	with grilles-between-the-glass	PEL-N-276-00490-00001					0.17	0.41	0.50	72	N				42	CA
1"	NaturalSun Low-E IG	PEL-N-276-00493-00001	4	4	4	argon	0.24	0.44	0.55	63	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00494-00001					0.25	0.40	0.50	63	N	NC				
1"	NaturalSun Low-E IG	PEL-N-276-00495-00001	4	4	4	Krypton	0.18	0.44	0.55	69	N				43	CA
	with grilles-between-the-glass	PEL-N-276-00496-00001					0.19	0.40	0.50	69	N	NC			39	CA

R-Value = 1/U-Factor SHGC = Solar Heat Gain Coefficient
VLT % = Visible Light Transmission CR = Condensation Resistance
ER = Canadian Energy Rating

(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500. ENERGY STAR® values are updated to 2016 (Version 6) criteria.

(2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative. For center-glass values, see the Product Performance section.

See the Product Performance section for more detailed information or visit www.energystar.gov for Energy Star guidelines.





Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values ¹				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada ²				
											Zone		ER	Zone			
Fixed - Triple Pane with High Altitude Glazing											N	NC	SC	S			CA
1"	(HA) Advanced Low-E IG	PEL-N-276-00165-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00166-00001					0.26	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00171-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00172-00001					0.30	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00177-00001	3	3	3	air	0.25	0.21	0.46	63	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00178-00001					0.26	0.19	0.41	63	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00183-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00184-00001					0.30	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00153-00001	3	3	3	air	0.26	0.45	0.56	63	N						
	with grilles-between-the-glass	PEL-N-276-00154-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00159-00001	4	4	4	air	0.29	0.44	0.55	59	N						
	with grilles-between-the-glass	PEL-N-276-00160-00001					0.30	0.39	0.50	59		NC					
Fixed - Triple Pane with High Altitude Glazing and Foam Insulation																	
1"	(HA) Advanced Low-E IG	PEL-N-276-00497-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00498-00001					0.25	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00503-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00504-00001					0.29	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00509-00001	3	3	3	air	0.24	0.21	0.46	64	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00510-00001					0.25	0.19	0.41	64	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00515-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00516-00001					0.29	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00485-00001	3	3	3	air	0.25	0.45	0.56	63	N				35	CA	
	with grilles-between-the-glass	PEL-N-276-00486-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00491-00001	4	4	4	air	0.28	0.44	0.55	60	N						
	with grilles-between-the-glass	PEL-N-276-00492-00001					0.29	0.39	0.50	60	N	NC					

R-Value = 1/U-Factor
 SHGC = Solar Heat Gain Coefficient
 VLT % = Visible Light Transmission
 CR = Condensation Resistance
 ER = Canadian Energy Rating

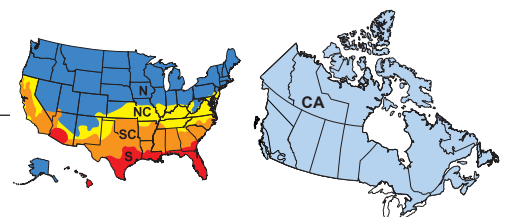
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

ENERGY STAR® values are updated to 2016 (Version 6) criteria.

(2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative.

For center-glass values, see the Product Performance section.

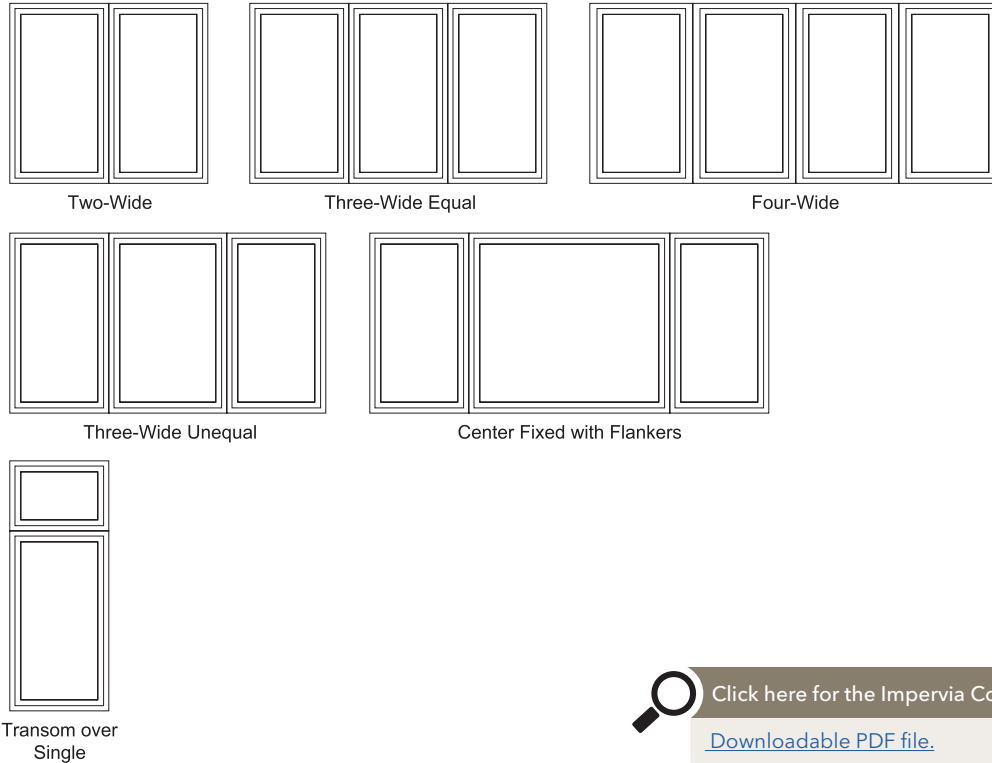
See the Product Performance section for more detailed information or visit www.energystar.gov for Energy Star guidelines.





A combination is defined as an assembly formed by two or more separate windows or doors whose frames are mullered together utilizing a combination mullion or reinforcing mullion.

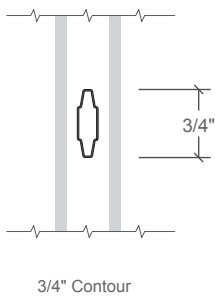
Below are available factory-assembled combinations. See the Combination section for requirements and limitations related to mulling various combinations plus configuration size range information.



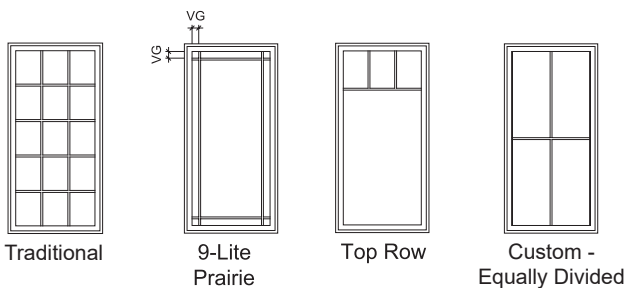
 [Click here for the Impervia Combinations Section](#)
[Downloadable PDF file.](#)

Grille Profiles

Grilles-Between-the-Glass



Grille Patterns



Standard corner lite dimension for Prairie patterns = 4" visible glass (VG).

(1) Standard visible glass to center line of separator bar = 14" or half the total visible glass height, whichever is smaller. Multiple rows are available up to 50% glass size.

Pattern availability may vary depending on size of unit.

VG = Visible Glass
Lite dimensions noted can vary.



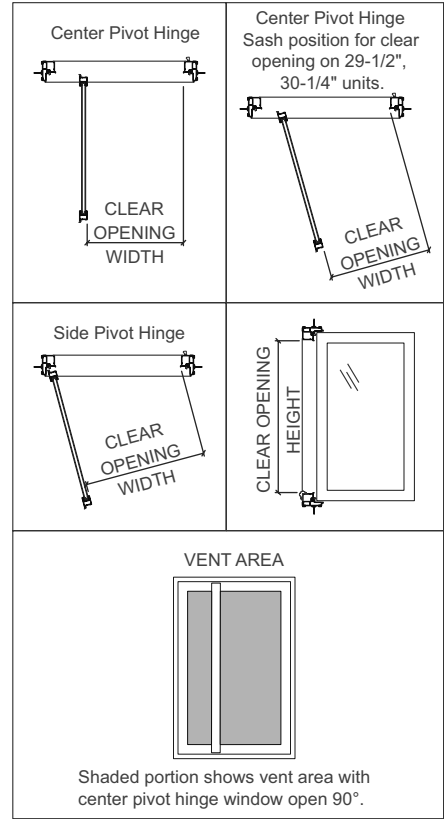
Size Tables

Transoms

	(457) (445)	(610) (597)	(711) (699)	(762) (749)	(813) (800)	(914) (902)	
Opening	1' 6"	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"	
Frame	1' 5 1/2"	1' 11 1/2"	2' 3 1/2"	2' 5 1/2"	2' 7 1/2"	2' 11 1/2"	
SPECIAL NARROWER AND WIDER SIZES AVAILABLE							
SPECIAL SIZES AVAILABLE	(356) (343)	1-6/1-2	2-0/1-2	2-4/1-2	2-6/1-2	2-8/1-2	3-0/1-2
	(457) (445)	1-6/1-6	2-0/1-6	2-4/1-6	2-6/1-6	2-8/1-6	3-0/1-6
	(610) (597)	1-6/2-0	2-0/2-0	2-4/2-0	2-6/2-0	2-8/2-0	3-0/2-0

Vent and Fixed Units

	(762) (749)	(914) (902)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)	(1 524) (1 511)	(1 676) (1 664)	(1 829) (1 816)
Opening	2' 6"	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"	5' 6"	6' 0"
Frame	2' 5 1/2"	2' 11 1/2"	3' 5 1/2"	3' 11 1/2"	4' 5 1/2"	4' 11 1/2"	5' 5 1/2"	5' 11 1/2"
SPECIAL SHORTER AND TALLER SIZES AVAILABLE								
SPECIAL SHORTER AND TALLER SIZES AVAILABLE	1-6/2-6	2-0/2-6	2-4/2-6	2-6/2-6	2-8/2-6	3-0/2-6		
	1-6/3-0	2-0/3-0	2-4/3-0	2-6/3-0 E3	2-8/3-0 E3	3-0/3-0 E1		
	1-6/3-6	2-0/3-6	2-4/3-6 E3	2-6/3-6 E2	2-8/3-6 E2	3-0/3-6 E		
	1-6/4-0	2-0/4-0	2-4/4-0 E2	2-6/4-0 E	2-8/4-0 E	3-0/4-0 E		
	1-6/4-6	2-0/4-6	2-4/4-6 E2	2-6/4-6 E	2-8/4-6 E	3-0/4-6 E		
	1-6/5-0	2-0/5-0	2-4/5-0 E2	2-6/5-0 E	2-8/5-0 E	3-0/5-0 E		
	1-6/5-6	2-0/5-6	2-4/5-6 E2	2-6/5-6 E	2-8/5-6 E	3-0/5-6 E		
	1-6/6-0	2-0/6-0	2-4/6-0 E2	2-6/6-0 E	3-8/6-0 E	3-0/6-0 E		



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

Egress Notes:

Check all applicable local codes for emergency egress requirements.

E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².

E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².

E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

See Design Data pages in this section for clear opening dimensions.

☐ = Tempered glass.

Not to scale.

Any vent casement with frame height greater than 70" will have 3mm tempered glass to reduce sash weight.

All units are available as fixed in the Casement section.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Size Tables

Transoms

	(1 219) (1 207)	(1 524) (1 511)	(1 829) (1 816)	
Opening	4' 0"	5' 0"	6' 0"	
Frame	3' 11 1/2"	4' 11 1/2"	5' 11 1/2"	
SPECIAL NARROWER AND WIDER SIZES AVAILABLE				
(610) (457) (356) (597) (445) (343)	2' 0"	4-0/1-2	5-0/1-2	6-0/1-2
	1' 6"	4-0/1-6	5-0/1-6	6-0/1-6
	1' 11 1/2"	4-0/2-0	5-0/2-0	6-0/2-0
SPECIAL SIZES AVAILABLE				
1' 11 1/2"	4-0/1-2	5-0/1-2	6-0/1-2	
1' 5 1/2"	4-0/1-6	5-0/1-6	6-0/1-6	
1' 1 1/2"	4-0/2-0	5-0/2-0	6-0/2-0	

Fixed Units

(1 829) (1 816)	6' 0"	4-0/6-0	5-0/6-0	6-0/6-0
	5' 11 1/2"	4-0/5-6	5-0/5-6	6-0/5-6
(1 676) (1 664)	5' 6"	4-0/5-0	5-0/5-0	6-0/5-0
	5' 5 1/2"	4-0/4-6	5-0/4-6	6-0/4-6
(1 524) (1 511)	5' 0"	4-0/4-0	5-0/4-0	6-0/4-0
	4' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 372) (1 359)	4' 6"	4-0/3-0	5-0/3-0	6-0/3-0
	4' 5 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 219) (1 207)	4' 0"	4-0/3-0	5-0/3-0	6-0/3-0
	3' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(1 067) (1 054)	3' 6"	4-0/3-0	5-0/3-0	6-0/3-0
	3' 5 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
(914) (902)	3' 0"	4-0/3-0	5-0/3-0	6-0/3-0
	2' 11 1/2"	4-0/3-6	5-0/3-6	6-0/3-6
SPECIAL SHORTER AND TALLER SIZES AVAILABLE				

Not to scale.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Special Size Frame Dimensions*

	Minimum	Maximum
Vent	1' 5-1/2" W x 1' 8" H (17-1/2" x 20") (445 x 508)	3' 1-1/2" W x 6' 7-1/2" H (37-1/2" x 79-1/2") (953 x 2 019)
Fixed	1' 1-1/2" W x 11-1/2" H (13-1/2" x 11-1/2") (343 x 292)	5' 11-1/2" W x 6' 7-1/2" H (71-1/2" x 79-1/2") (1 816 x 2 019)

* Available within size range shown.

Keep frame dimensions to the nearest 1/8" increment. Frame width cannot exceed frame height on special size vent units.

Miscellaneous Formulas

	Formula
Visible Glass	Width = Frame - 5-7/16" Height = Frame - 5-7/16"
Actual Glass	Width = Frame - 4-3/8" Height = Frame - 4-3/8"

Clear Opening Height

Frame Height - 4-3/4"

Clear Opening Width

Hinge	Frame Width	Formula	Angle
Center Pivot / Roto Operator	29-1/2" to 30-1/4"	FW - 9-1/2"	75°
Center Pivot / Roto Operator	30-1/4" to 37-1/2"	FW - 10-1/4"	90°
Side Pivot / Roto Operator	25-1/2" to 32"	FW - 5-1/2"	75°
Side Pivot / Easy Slide Operator	25-1/2" to 37-1/2"	FW - 5-1/2"	75° See chart
Side Pivot / Easy Slide Operator	30" to 37-1/2"	FW x 0.67	54° See chart

Vent Opening Area

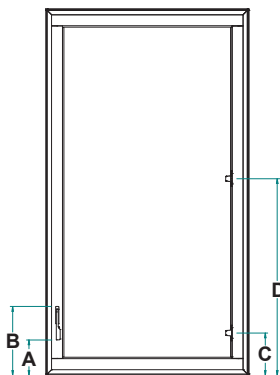
(Clear Opening Width) x (FH - 4.75) ÷ 144

Lock Handle Operator Height

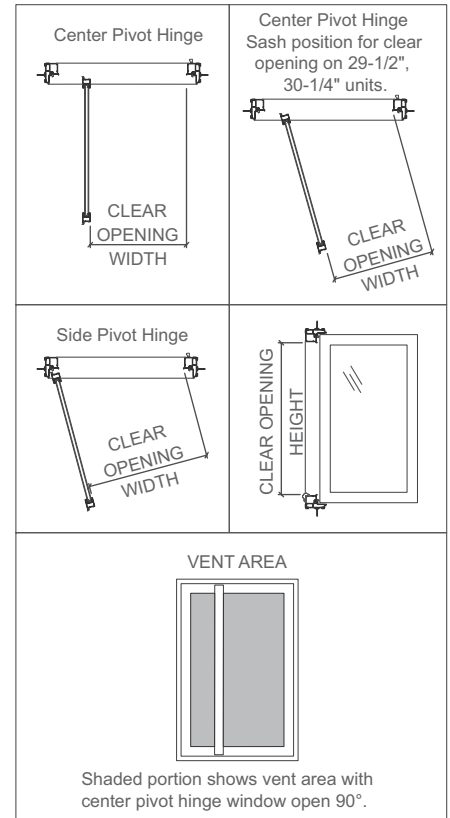
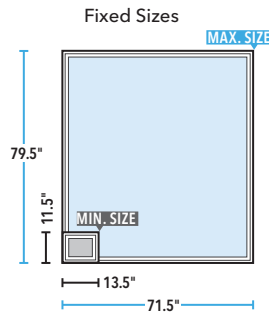
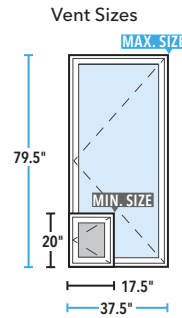
Frame Height	Locked Location (A)	Unlocked Location (B)
≥ 20" to ≤ 59.5"	4-5/8"	9-3/8"
> 59.5" to < 72.5"	9-5/8"	14-3/8"
≥ 72.5" to ≤ 79.5"	30-9/16"	35-5/16"

Easy-Slide Operator Height

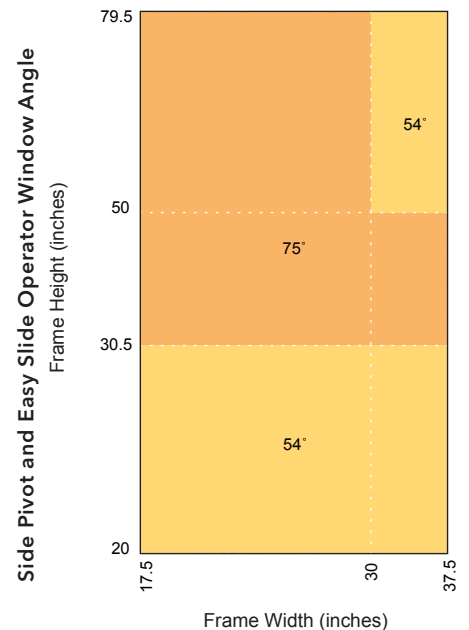
Frame Height	Closed Location (C)	Open Location (D)
≥ 20" to < 30.5"	5-1/2"	15-1/2"
≥ 30.5" to < 72.5"	5-1/2"	25-1/2"
≥ 72.5" to ≤ 79.5"	21-1/2"	41-1/2"



Height is measured from the bottom of the frame, proper installation height is required for ADA compliance.



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

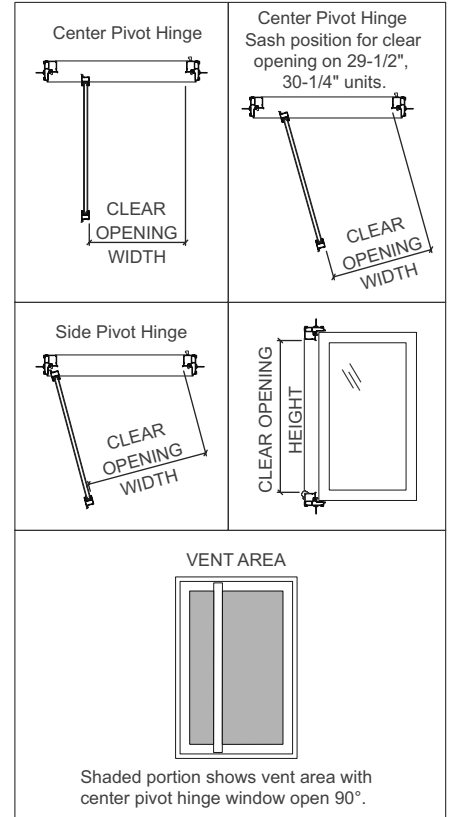




Impervia® Casement Windows

Design Data

Vent									
Unit	Egress	Clear Opening			Vent Area Ft ²	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Width (Inches)	Height (Inches)	Ft ²			Annealed	Tempered	
1-6/2-6		7-1/4	24-3/4	1.2	1.7	2.0	3	3	LC+50/-60
1-6/3-0		7-1/4	30-3/4	1.5	2.1	2.5	3	3	LC+50/-60
1-6/3-6		7-1/4	36-3/4	1.9	2.5	3.0	3	3	LC+50/-60
1-6/4-0		7-1/4	42-3/4	2.2	2.9	3.5	3	3	LC+50/-60
1-6/4-6		7-1/4	48-3/4	2.5	3.3	4.0	3	3	LC+50/-60
1-6/5-0		7-1/4	54-3/4	2.8	3.8	4.5	3	3	LC+50/-60
1-6/5-6		7-1/4	60-3/4	3.1	4.2	5.0	3	3	LC50
1-6/6-0 T		7-1/4	66-3/4	3.4	4.6	5.5	-	3	LC50
2-0/2-6		13-1/4	24-3/4	2.3	2.6	3.0	3	3	LC+50/-60
2-0/3-0		13-1/4	30-3/4	2.8	3.3	3.7	3	3	LC+50/-60
2-0/3-6		13-1/4	36-3/4	3.4	4.0	4.5	3	3	LC+50/-60
2-0/4-0		13-1/4	42-3/4	3.9	4.6	5.2	3	3	LC+50/-60
2-0/4-6		13-1/4	48-3/4	4.5	5.3	6.0	3	3	LC+50/-60
2-0/5-0		13-1/4	54-3/4	5.0	6.0	6.7	3	3	LC+50/-60
2-0/5-6		13-1/4	60-3/4	5.6	6.7	7.5	3	3	LC50
2-0/6-0		13-1/4	66-3/4	6.1	7.3	8.2	3	3	LC50
2-4/2-6		17-1/4	24-3/4	3.0	3.3	3.6	3	3	LC+50/-60
2-4/3-0		17-1/4	30-3/4	3.7	4.1	4.6	3	3	LC+50/-60
2-4/3-6	E3	17-1/4	36-3/4	4.4	5.0	5.5	3	3	LC+50/-60
2-4/4-0	E2	17-1/4	42-3/4	5.1	5.8	6.4	3	3	LC+50/-60
2-4/4-6	E2	17-1/4	48-3/4	5.8	6.6	7.3	3	3	LC+50/-60
2-4/5-0	E2	17-1/4	54-3/4	6.6	7.5	8.2	3	3	LC+50/-60
2-4/5-6	E2	17-1/4	60-3/4	7.3	8.3	9.1	3	3	LC50
2-4/6-0	E2	17-1/4	66-3/4	8.0	9.1	10.1	4	3	LC50
2-6/2-6		20	24-3/4	3.4	3.6	4.0	3	3	LC+50/-60
2-6/3-0	E3	20	30-3/4	4.3	4.5	5.0	3	3	LC+50/-60
2-6/3-6	E2	20	36-3/4	5.1	5.5	6.0	3	3	LC+50/-60
2-6/4-0	E	20	42-3/4	5.9	6.4	7.0	3	3	LC+50/-60
2-6/4-6	E	20	48-3/4	6.8	7.3	8.0	3	3	LC+50/-60
2-6/5-0	E	20	54-3/4	7.6	8.2	9.0	3	3	LC+50/-60
2-6/5-6	E	20	60-3/4	8.4	9.1	10.0	3	3	LC50
2-6/6-0	E	20	66-3/4	9.3	10.1	11.0	4	3	LC50
2-8/2-6		21-1/4	24-3/4	3.7	3.9	4.3	3	3	LC+50/-60
2-8/3-0	E3	21-1/4	30-3/4	4.5	4.9	5.4	3	3	LC+50/-60
2-8/3-6	E2	21-1/4	36-3/4	5.4	5.9	6.5	3	3	LC+50/-60
2-8/4-0	E	21-1/4	42-3/4	6.3	7.0	7.6	3	3	LC+50/-60
2-8/4-6	E	21-1/4	48-3/4	7.2	8.0	8.6	3	3	LC+50/-60
2-8/5-0	E	21-1/4	54-3/4	8.1	9.0	9.7	3	3	LC+50/-60
2-8/5-6	E	21-1/4	60-3/4	9.0	10.0	10.8	3	3	LC50
2-8/6-0	E	21-1/4	66-3/4	9.9	11.0	11.9	4	3	LC50
3-0/2-6		25-1/4	24-3/4	4.3	4.6	5.0	3	3	LC+50/-60
3-0/3-0	E1	25-1/4	30-3/4	5.4	5.8	6.2	3	3	LC+50/-60
3-0/3-6	E	25-1/4	36-3/4	6.4	6.9	7.5	3	3	LC+50/-60
3-0/4-0	E	25-1/4	42-3/4	7.5	8.1	8.7	3	3	LC+50/-60
3-0/4-6	E	25-1/4	48-3/4	8.5	9.3	10.0	3	3	LC+50/-60
3-0/5-0	E	25-1/4	54-3/4	9.6	10.4	11.2	3	3	LC+50/-60
3-0/5-6	E	25-1/4	60-3/4	10.7	11.6	12.5	3	3	LC50
3-0/6-0	E	25-1/4	66-3/4	11.7	12.8	13.7	4	3	LC50



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

Egress Notes:

Check all applicable local codes for emergency egress requirements.

- E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².
- E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m²), multiply square feet by 0.0929.



Impervia® Casement Windows

Design Data

Transom Units				
Unit	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Annealed	Tempered	
1-6/1-2	0.6	3	3	LC+50/-60
1-6/1-6	1.0	3	3	LC+50/-60
1-6/2-0	1.5	3	3	LC+50/-60
2-0/1-2	1.0	3	3	LC+50/-60
2-0/1-6	1.5	3	3	LC+50/-60
2-0/2-0	2.2	3	3	LC+50/-60
2-4/1-2	1.2	3	3	LC+50/-60
2-4/1-6	1.8	3	3	LC+50/-60
2-4/2-0	2.7	3	3	LC+50/-60
2-6/1-2	1.3	3	3	LC+50/-60
2-6/1-6	2.0	3	3	LC+50/-60
2-6/2-0	3.0	3	3	LC+50/-60
2-8/1-2	1.4	3	3	LC+50/-60
2-8/1-6	2.1	3	3	LC+50/-60
2-8/2-0	3.2	3	3	LC+50/-60
3-0/1-2	1.6	3	3	LC+50/-60
3-0/1-6	2.5	3	3	LC+50/-60
3-0/2-0	3.7	3	3	LC+50/-60
4-0/1-2	2.3	3	3	LC+50/-60
4-0/1-6	3.5	3	3	LC+50/-60
4-0/2-0	5.2	3	3	LC+50/-60
5-0/1-2 T	3.0	–	3	LC+50/-60
5-0/1-6	4.5	3	3	LC+50/-60
5-0/2-0	6.7	3	3	LC+50/-60
6-0/1-2 T	3.6	–	3	LC45
6-0/1-6 T	5.5	–	3	LC45
6-0/2-0	8.2	3	3	LC45

Fixed Units				
Unit	Visible Glass Ft ²	Standard Glass Thickness (mm)		Performance Class & Grade ¹
		Annealed	Tempered	
3-0/3-0	6.2	3	3	LC+50/-60
3-0/3-6	7.5	3	3	LC+50/-60
3-0/4-0	8.7	3	3	LC+50/-60
3-0/4-6	10.0	3	3	LC+50/-60
3-0/5-0	11.2	3	3	LC+50/-60
3-0/5-6	12.5	3	3	LC50
3-0/6-0	13.7	3	3	LC45/LC50
4-0/3-0	8.7	3	3	LC+50/-60
4-0/3-6	10.5	3	3	LC+50/-60
4-0/4-0	12.2	3	3	LC+50/-60
4-0/4-6	14.0	3	3	LC50/LC-60
4-0/5-0	15.7	3	3	LC45/LC50/LC-60
4-0/5-6	17.5	4	4	LC50
4-0/6-0	19.2	4	4	LC50
5-0/3-0	11.2	3	3	LC+50/-60
5-0/3-6	13.5	3	3	LC50/LC-60
5-0/4-0	15.7	3	3	LC45/LC50/LC-60
5-0/4-6	18.0	4	4	LC+50/-60
5-0/5-0	20.2	4	5	LC50/LC-60
5-0/5-6	22.5	4	5	LC50
5-0/6-0	24.7	5	5	LC50
6-0/3-0	13.7	3	3	LC45
6-0/3-6	16.5	3	3	LC45
6-0/4-0	19.2	4	4	LC45
6-0/4-6	22.0	4	4	LC45
6-0/5-0	24.7	4	5	LC45
6-0/5-6	27.5	5	5	LC45
6-0/6-0	30.2	5	6	LC45

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m²), multiply square feet by 0.0929.



Detailed Product Description

Frame

- Frame is Duracast—five-layer pultruded fiberglass material [with optional foam insulation₁] reinforced with a Pella patented interlocking mat.
- Overall frame depth is 3-1/4".
- Nominal wall thickness of Duracast® fiberglass composite members is .050" to .090" thick.
- Frame corners are mitered, joined and bonded with corner lock and injected with sealant.
- Jambs contain factory-drilled installation screw holes on block frame.

Sash

- Sash is Duracast fiberglass composite – five-layer pultruded fiberglass material, reinforced with a Pella patented interlocking mat.
- All sash members have mitered corners bonded with corner lock and sealed with injected sealant.

Exterior / Interior

- Duracast fiberglass composite surfaces with powder-coat paint finish.
 - Color is [White] [Tan] [Brown] [Black] [Morning Sky Gray].
 - or -
 - Dual-color option [Tan] [Brown] [Black] [Morning Sky Gray] exterior with White interior₂.

Glazing System

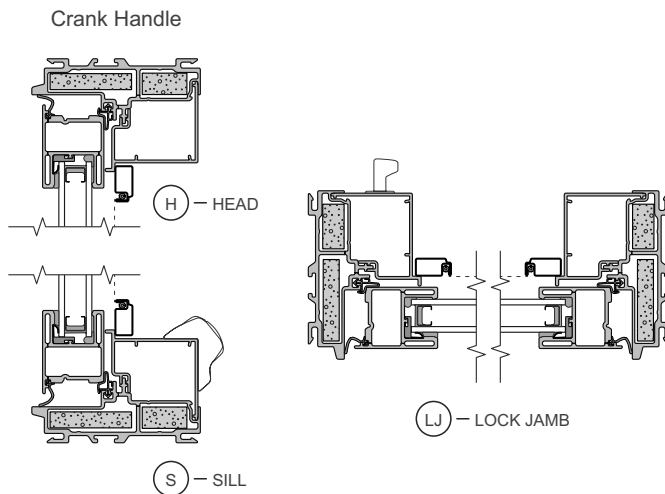
- Quality float glass complying with ASTM C 1036.
- 11/16" dual-pane insulating glass [[annealed] [tempered]] [obscure₃] [[clear] [Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, with argon]] sealed and bonded to sash.
- or -
- 1" Triple-pane insulating glass [annealed] [tempered] [obscure₃] [clear] [[Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, [with argon]] [[bronze] [gray] [green] Advanced Low-E [with Argon] [with Krypton]] sealed and bonded to sash.
- High altitude glazing available.

Weatherstripping

Dual weatherstripping.

- Continuous, flexible ThermoPlastic Vulcanizate material in dual durometer design, compressed between frame and sash for positive seal on all four sides.
- Secondary ThermoPlastic Vulcanizate leaf-type weatherstrip between edge of sash and frame.

Foam Insulation Inserts₁



Hardware

- Easy-Slide operator assembly
 - Hardened, nickel-coated Steel worm and wheel gears.
 - Zinc-magnesium alloy hob and gearbox with corrosion-protecting ultra-clear finish.
 - 5 ball bearings.
 - Stainless steel swing arm and hinge pin for extra corrosion protection of exposed components.
 - Kevlar-reinforced drive belt.
 - Harsh environment approved – ASTM B 117 salt chamber and debris cycling, 20,000 life cycle test approved.
 - or -
- Roto operator assembly
 - Steel worm gear sash operator with hardened gears.
 - Operator base is zinc die cast with painted finish.
 - Operator linkage, hinge slide, and hinge arms are 300 series stainless steel.
 - Exposed fasteners are stainless steel.
 - Hardware shall exceed 1,000 hours salt spray exposure per ASTM B 117.
- Finish of integrated folding crank is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)]. All vent units are available with left- or right-hand hinging.
- Unison Locking System—A single handle locking system operates positive-acting arms that reach out and pull the sash into a locked position: one installed on units 27-1/2" and smaller frame height, two unison operating locks installed on units over 27-1/2" frame height, three unison operating locks over 72-1/2".
- Lock handle finish is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)].

Optional Products

Screens

- Conventional Black Vinyl-coated 18/16 mesh fiberglass screen cloth complying with ASTM D 3656 and SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
- InView™ screens
 - Vinyl-coated 18/18 mesh fiberglass screen cloth complying with SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
 - Screen frame finish is baked enamel, color to match interior.

Grilles

- Grilles-Between-the-Glass
 - Insulating glass contains 3/4" contoured aluminum grilles permanently installed between two panes of glass.
 - Grilles are factory prefinished [White] [Tan] [Brown] [Black] [Morning Sky Gray] to match interior and exterior finish.

Hardware

- Optional factory applied limited opening hardware available for vent units in stainless steel; nominal 3" opening.
- Optional window opening control device available for field installation. Device allows window to open less than 4" with normal operation, with a release mechanism that allows the sash to open completely. Complies with ASTM F2090-10.

(1) Foam insulation inserts are not available with clear glazing.

(2) Dual-color finish is not available on products with integral nailing fin.

(3) Obscure glazing is not available when AdvancedComfort Low-E coated IG is specified.

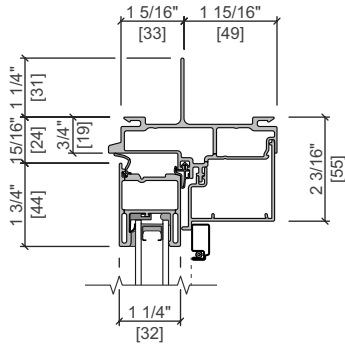


Impervia® Casement Windows

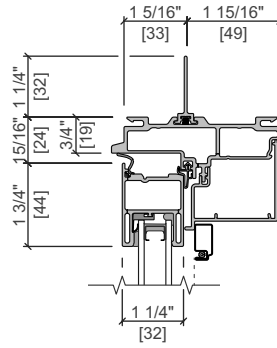
Unit Sections - Frame Types

NEW CONSTRUCTION FRAME

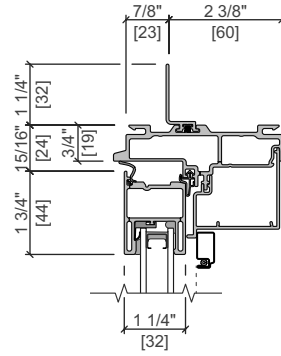
Integral Nailing Fin



Standard Block Frame with Standard Fin

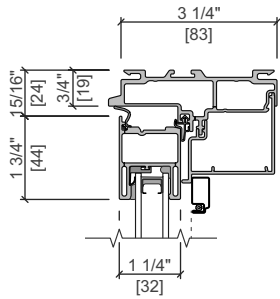


Standard Block Frame with Off Set Fin



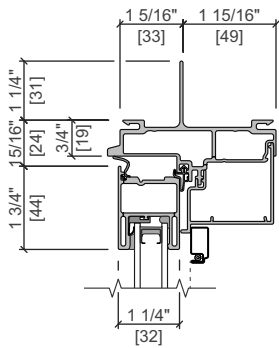
REPLACEMENT FRAME

Standard Block Frame

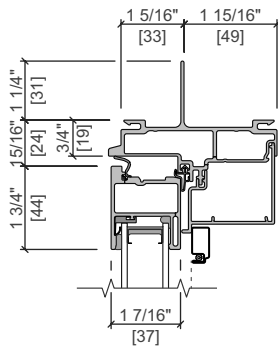


GLAZING OPTIONS

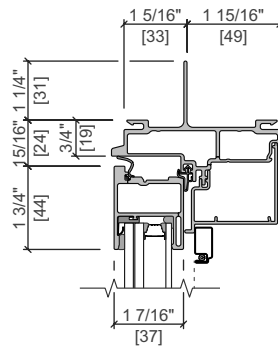
1 1/16\" IG



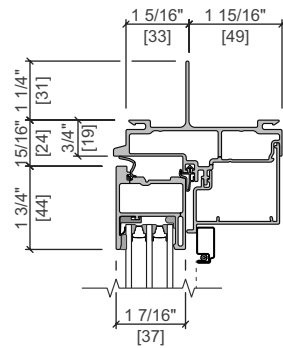
1\" IG



1\" Sound IG



1\" Triple IG



Scale 3" = 1' 0"

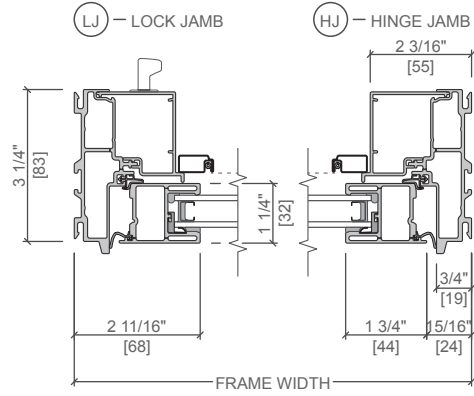
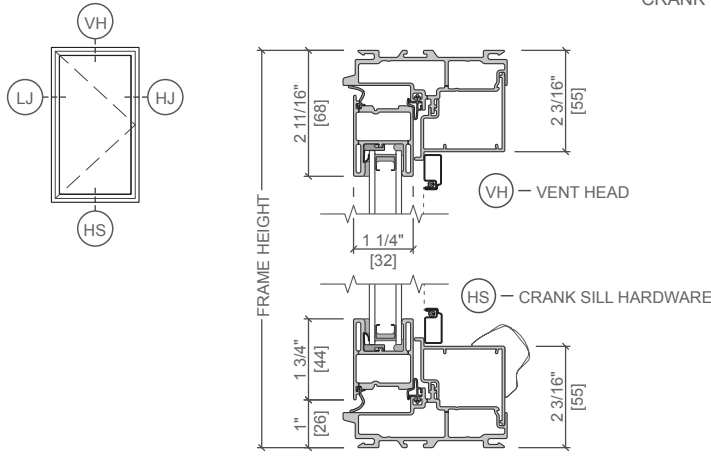
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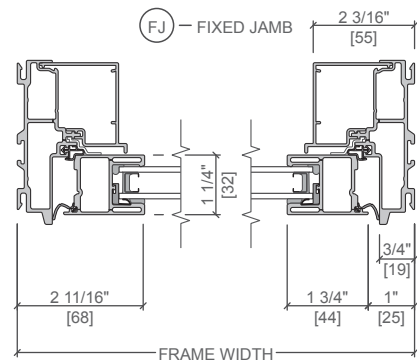
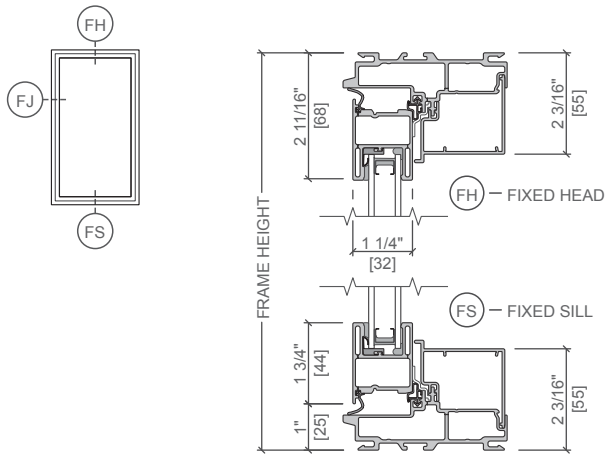
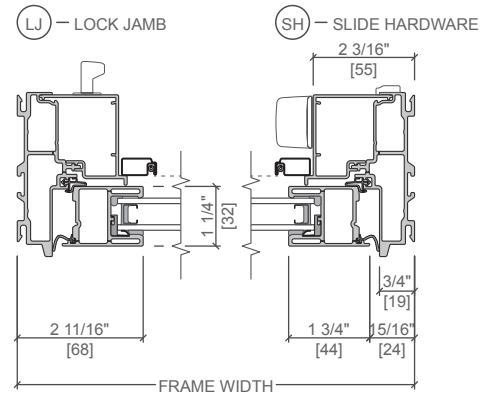
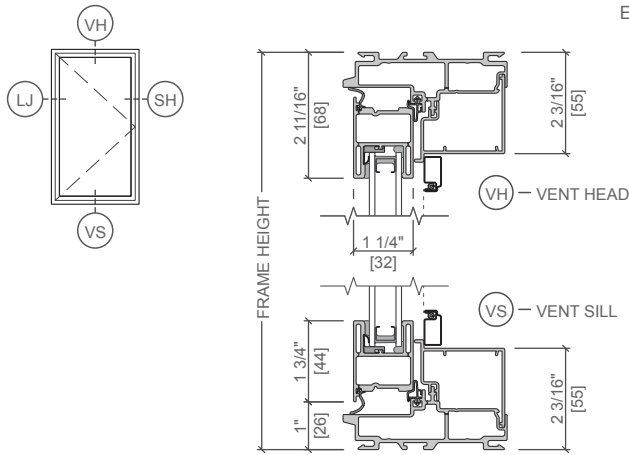
Impervia® Casement Windows

Unit Sections

CRANK HARDWARE



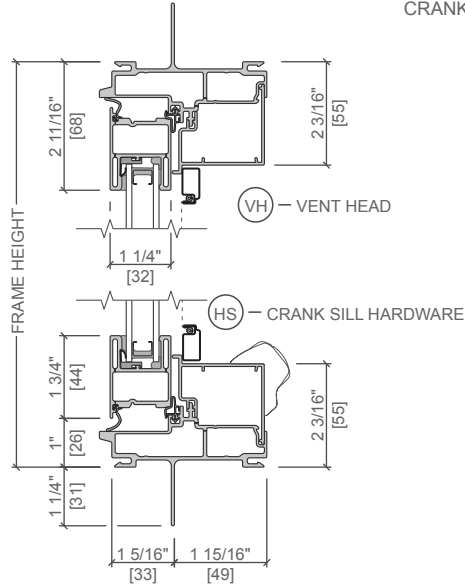
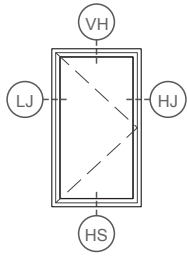
EASY SLIDE HARDWARE



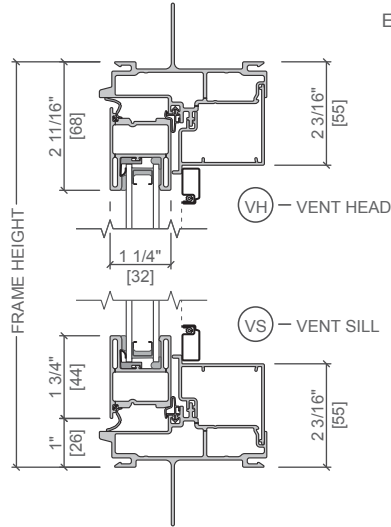
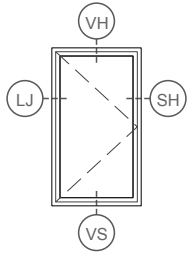
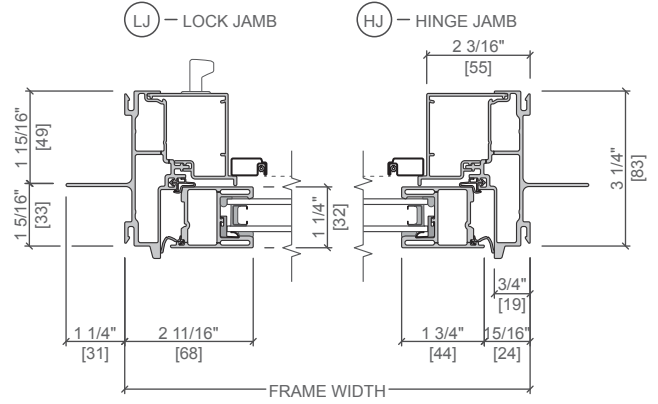
Scale 3" = 1' 0"

All dimensions are approximate.

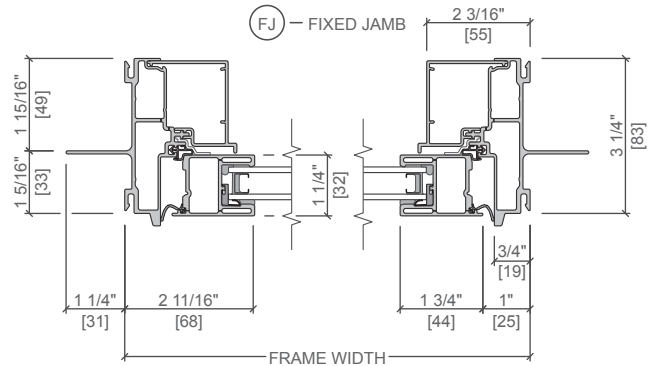
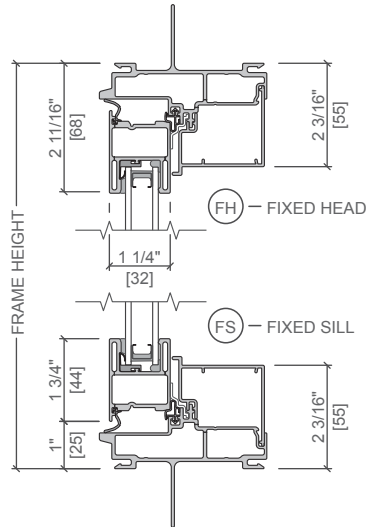
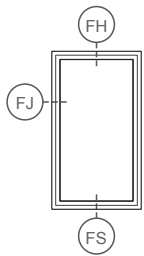
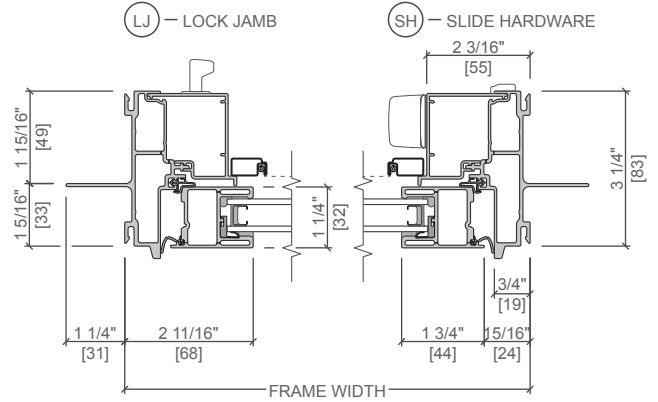
See the Installation and Performance section on Pella.com for mullion applications and structural limitations.



CRANK HARDWARE



EASY SLIDE HARDWARE



Scale 3" = 1' 0"
All dimensions are approximate.