

## Casements - Operating

- Minimum R.O. Size = 18 x 24
- Maximum R.O. Size = 36 x 72
- 8:1 glass ratio must be tempered

\*\*All operating casement units have reinforcement in the bottom rail as standard. Units exceeding 42" in height will have reinforcement in the stiles and top rail.

## Casement - Stationary

- Minimum R.O. Size = 18 x 12
- Maximum R.O. Size = 96 x 72 - Cannot be larger in width or height

## Casement Bow / Bay Windows

- U.D. width not to exceed 120"

## Casement Transoms

- Maximum R.O. = 96 x 12
- 28" 3 wide is the largest 1 lite transom used over mullied units - Glass width larger than 96" will be a multiple unit
- 8:1 glass ratio must be tempered

## Operating Awnings

- Minimum R.O. = 20-1/2 x 15-1/4
- Maximum R.O. = 48 x 36

**Note:** Units larger than 36 x 36 must be disclaimed - No Warranty for Operation or Performance

## Double/Single Hung

- Minimum R.O. = 14 x 28
- DH Maximum R.O. = 48 x 84
- SH Maximum R.O. = 48 x 96 or 44 x 108

## Single Gliders

- Minimum R.O. = 28 x 14
- Maximum R.O. = 72 x 60

## Triple Gliders

- Minimum R.O. = 54 x 24
- Maximum R.O. = 96 x 60

## Slide Door (Operating and Stationary)

- Minimum R.O. = 4/0 x 6/0
- Maximum R.O. = 16/0 x 8/0

**Note:** All door glass is tempered

## Slide Door Transoms

- Max R.O. = 110-3/16 x 12
- Note:** Local code may require transom glass to be tempered
- 8:1 glass ratio must be tempered

## In-Swing Doors

- Minimum R.O. = 2/6 x 6/8
- Maximum R.O. = 6/0 x 6/10
- Radius Door Minimum R.O. = 2/8 x 6/10
- Radius Door Maximum R.O. = 6/0 x 6/10
- 8:1 glass ratio must be tempered

## Direct Set / Single Hung Studio

- Minimum R.O. - Direct Set = 12 x 12
- Minimum R.O. - SH Studio = 12 x 18
- 10' Maximum in either width or height, not to exceed 40 square ft.

## Segment Head Casements

- Minimum R.O. = 24 x 24
- Maximum R.O. = 36 x 60 or 32 x 66 or 28 x 72

## Segment Head Single Hung

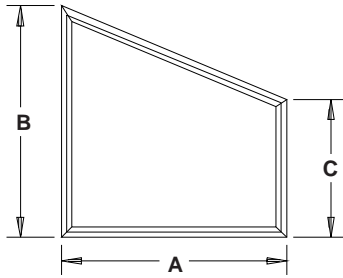
- Minimum R.O. = 18 x 28
- Maximum R.O. = 48 x 84

## Jamb Extensions

Maximum Applied Jamb Extension:

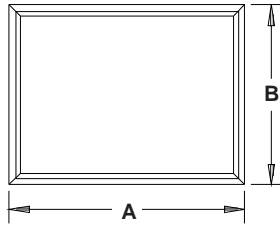
- Single Hung and Single Slider = 6-9/16"
- Double Hung, Casement & Direct Set = 7-3/16"

## TRAPEZOID



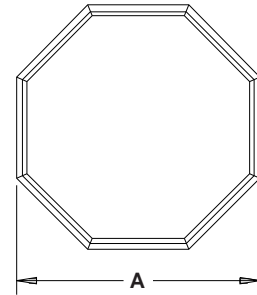
Minimum Side: 7"  
Minimum Height: 18"  
Minimum Base: 18"  
Maximum Base: 120"  
Minimum Pitch: 5/12

## RECTANGLE



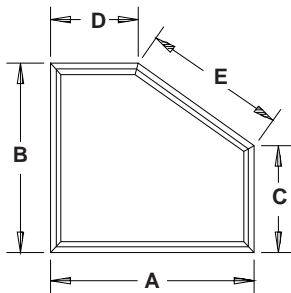
Minimum Base: 12"  
Maximum Base: 120"  
Maximum R.O. = 40 sq. ft.

## OCTAGON



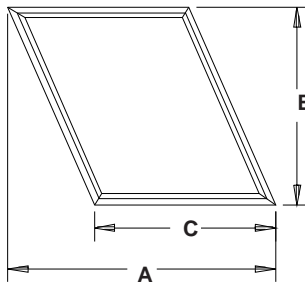
Minimum Side: 20"  
Maximum Base: 72"

## TRAPEZOID



Minimum Side: 7"  
Minimum Height: 18"  
Minimum Base: 18"  
Maximum Base: 120"

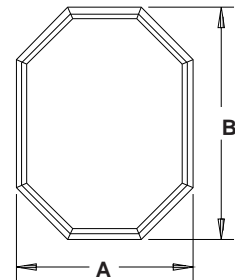
## PARALLELOGRAM



### RIGHT

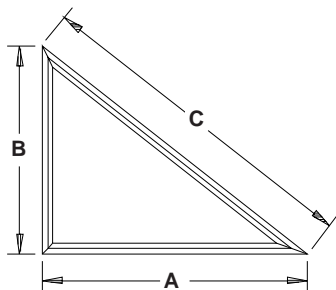
Minimum Side: 14"  
Maximum Base: 120"  
Minimum Pitch: 5/12

## EXTENDED OCTAGON



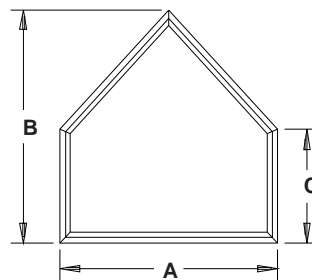
Minimum Side: 20"  
Maximum Base: 72"

## TRIANGLE



Minimum Base: 18"  
Minimum Height: 7"  
Maximum Base: 120"  
Minimum Pitch: 5/12

## PENTOID

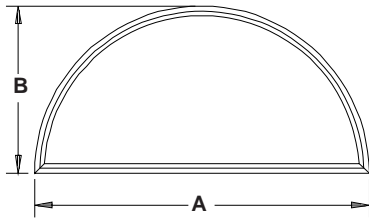


Minimum Side: 7"  
Minimum Base: 18"  
Minimum Height: 18"  
Maximum Base: 120"  
Minimum Pitch: 5/12

Direct Set and Single Hung Picture Frame Specialty units are available within the above parameters. Other custom shapes are available upon request. 10' Maximum in either width or height, not to exceed 40 sq. ft.

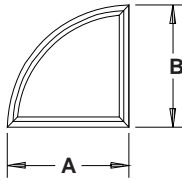
**IF YOU HAVE ANY QUESTIONS REGARDING SIZE OUTSIDE OF THESE LIMITATIONS, PLEASE CONTACT TIMELINE**

## HALF ROUNDS



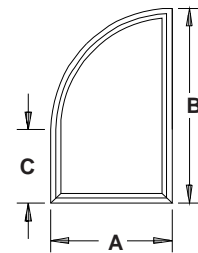
Minimum Diameter DS Frame: 24"  
Minimum Diameter SH Picture Frame: 24"  
Maximum Diameter: 114"

## QUARTER ROUNDS



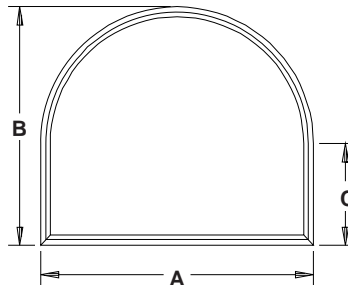
Minimum Base: 14"  
Maximum Base: 80"

## EXTENDED LEG QUARTER ROUNDS



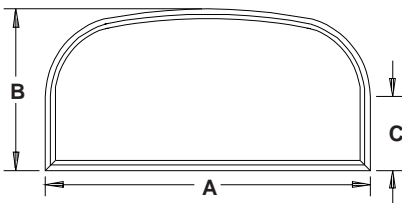
Minimum Leg: 7"  
Minimum Base: 14"  
Maximum Base: 80"  
Maximum R.O.: 40 Sq. Ft.

## EXTENDED LEG HALF ROUNDS



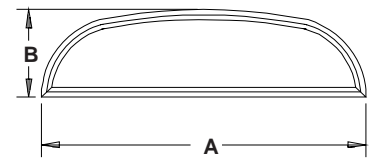
Minimum Leg: 7"  
Minimum Base: 24"  
Maximum Base: 120"  
Maximum R.O.: 40 Sq. Ft.

## EXTENDED LEG ELLIPSE



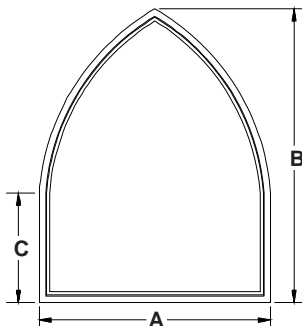
Minimum Leg: 7"  
Minimum Base: 30"  
Maximum Base: 120"  
Maximum R.O.: 40 Sq. Ft.

## ELLIPSE



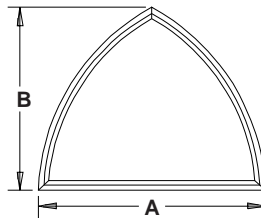
Minimum Height: 15"  
Minimum Base: 30"  
Maximum Base: 120"

## EXTENDED LEG GOTHIC



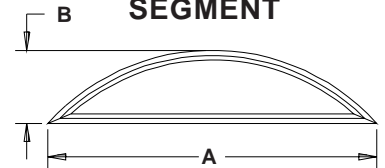
Minimum Radius: 12"  
Minimum Base: 20"  
Maximum Base: 120"  
Maximum R.O.: 40 Sq. Ft.

## GOthic



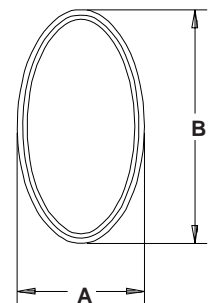
Minimum Radius: 12"  
Minimum Base: 14"  
Maximum Base: 120"  
Maximum R.O.: 40 Sq. Ft.

## SEGMENT



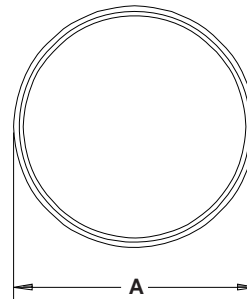
Minimum Height: 12"  
Minimum Base: 24"  
Maximum Base: 144"  
Minimum Width to Height Ratio: 5:1

## OVAL



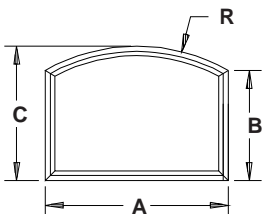
Minimum Width: 24" (36" SH)  
Minimum Height: 36" (40" SH)  
Maximum Width: 84"  
Maximum Height: 144"  
Maximum R.O.: 40 Sq. Ft.

## CIRCLE

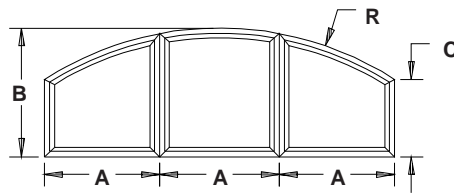


Minimum Diameter: 24"  
Maximum Diameter: 80"

## EXTENDED LEG SEGMENTS



Minimum Base: 14"  
Maximum Radius: 12"  
Minimum Leg: 7"



Maximum Height: 120"  
Maximum Base: 120"  
Maximum R.O.: 40 Sq. Ft.

Direct Set and Single Hung Picture Frame Specialty units are available within the above parameters. Other custom shapes are available upon request. 10' Maximum in either width or height, not to exceed 40 sq. ft.

## Glass Limitations

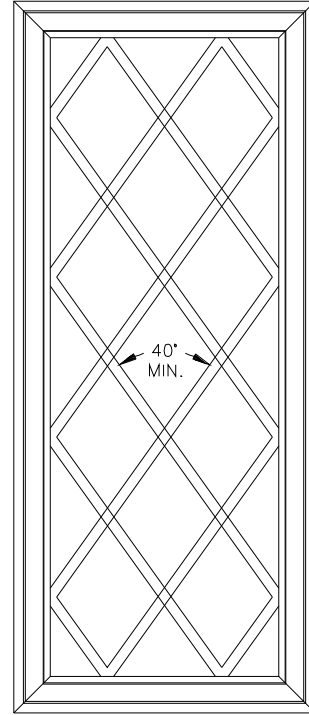
- 1/8" GLASS – Up to 15 square feet
- 5/32" GLASS – 15 to 24 square feet
- 3/16" GLASS – 24 to 34 square feet
- 1/4" GLASS – 34 to 44 square feet
- 1/8" Tempered – maximum 16 square feet, maximum width 34", maximum height 80"
- 1/4" LAMINATED – maximum sheet size 60" x 96"
- 1/8" LAMINATED – maximum sheet size 48" x 84" – cannot exceed 9 square feet
- 5/32" PATTERN "62" – maximum sheet size 60" x 84"
- TEMPERED GLASS – 84" X 152" maximum sheet – must not exceed our square foot limitations, even if within our limitations cannot exceed 84" in either direction.
- MINIMUM TEMPERED SIZE = 6" X 9"
- When matching Low "E" with solar cool bronze or grey glass the Low "E" lite must be tempered.
- Our 7/16" overall glass causes some combinations to be unavailable. For example, pattern "62" glass is 5/32" thick and cannot be matched with tempered for this thickness of glass.
- "V" Groove glass – the thickness of the glass increases one increment in order to be grooved. Example, normal 1/8" glass would have to increase to 5/32". Again thin spacer can be a problem.
- Spandrel Glass is only available in 1/4" thickness and must be matched with either heat strengthened or tempered lite. This could again cause problems with our overall glass thickness.
- 8:1 Glass Ratio Must be Tempered

## Truck Limitations

- 120" x 103" Maximum Size

## Grill Limitations

40° Minimum Angle Between Diamond Grill Patterns  
Wood & SDL Grids Only  
(See Drawing Below)



## Grill Limitations

Minimum Diameter for Radius Bars

**SDL** - 6" Inside Diameter  
**Internal Grid** - 8" On-Center Diameter

Minimum Distance Between SDL Notches = 3"



## CARDINAL IG UNIT SIZE LIMITS <sup>1</sup> AND MAXIMUM DIMENSIONS PER AIR SPACE

| Glass Thickness (mm) | Minimum Recommended Short Glass Dimension for Argon Filled Unit <sup>2</sup> (in.) | ANNEALED GLASS               |  |                             | HEAT TREATED GLASS            |                              |  | Maximum Dimensions Per Air Space |                              |  |
|----------------------|--|------------------------------|--|-----------------------------|-------------------------------|------------------------------|--|----------------------------------|------------------------------|--|
|                      |  | Maximum Long Dimension (in.) | Maximum Area <sup>3</sup> (ft <sup>2</sup> ) |                             | Maximum Short Dimension (in.) | Maximum Long Dimension (in.) | Maximum Area <sup>3</sup> (ft <sup>2</sup> ) | Airspace Dimension (mm)          | Maximum Long Dimension (in.) | Maximum Area <sup>3</sup> (ft <sup>2</sup> ) |
|                      |  |                              | Aspect Ratio Less than 2                     | Aspect Ratio Greater than 2 |                               |                              |  |                                  |                              |  |
| 2.2                  | 8  | 70                           | 9  | 6                           | -                             | 70                           | 15   | 5.5                              | 70                           | 15   |
| 3.0                  | 12   | 80                           | 14   | 10                          | 36                            | 80                           | 20   | 6.5 & 7.0                        | 80                           | 20   |
| 3.9                  | 16   | 90                           | 19   | 16                          | 48                            | 90                           | 30   | 8.0                              | 90                           | 30   |
| 4.7                  | 20   | 100                          | 25   | 21                          | 60                            | 100                          | 40   | 9.8                              | 100                          | 40   |
| 5.7                  | 24   | 120                          | 32   | 29                          | 83 1/2                        | 143 1/2                      | 60   | ≥11.5                            | 143 1/2                      | 60   |

- Limits shown do not apply to shapes or units fabricated with mismatched glass thickness<sup>1</sup>.
- Minimum dimensions do not apply to breather tube units.
- Maximum area based on 40 psf design windload and/or safe handling limit.
- This chart applies to both 2-pane IGUs and 3-pane IGUs.
- The suggested limit on maximum short dimension for Heat Treated glass is based on reducing the potential of bi-stable glass (oil canning and soft centered).
- The maximum short and long dimension for 5.7mm glass is based on the size of the tempering line and also allows for glass trim.
- These are guidelines only, and is not a substitute for the ASTM standard E1300.

## Cardinal IG Square Foot Limits

| IG Construction | ANNEALED GLASS         |                | HEAT STRENGTHENED or TEMPERED GLASS |                | Squareness Factor            |                |
|-----------------|------------------------|----------------|-------------------------------------|----------------|------------------------------|----------------|
|                 | Maximum Square Footage | Maximum Length | Maximum Square Footage              | Maximum Length | Max Short Dimension (inches) | Maximum Length |
| 2.2mm/2.2mm     | 10                     | 72 inches      | NA                                  | NA             | NA                           | 72 inches      |
| 3.0mm/3.0mm     | 15                     | 82 inches      | 20                                  | 36             | 36                           | 84 inches      |
| 3.9mm/3.9mm     | 24                     | 90 inches      | 30                                  | 48             | 48                           | 96 inches      |
| 4.7mm/4.7mm     | 33                     | 140 inches     | 50                                  | 60             | 60                           | 140 inches     |
| 5.7mm/5.7mm     | 50                     | 143.5 inches   | 60                                  | 80             | 80                           | 143.5 inches   |

- Square footage limits are based on handling and manufacturing limits only. The above limits do not take into account windload requirements.
- The squareness factor/oil canning factor for Heat Treated Glas is based on reducing the potential of bi-stable glass (oil canning & soft center).
- All factors must be meet for fabrication allowance. For example: An IG unit constructed with 3mm tempered glass that has a dimension of 37" x 74" has a square footage of 19 square feet, and it maximum length is 74 inches. Both of these criteria are under the specified limits for 3mm tempered glass, however, the minimum short dimension is greater than 36 inches, therefore, it does not meet the Squareness Factor.