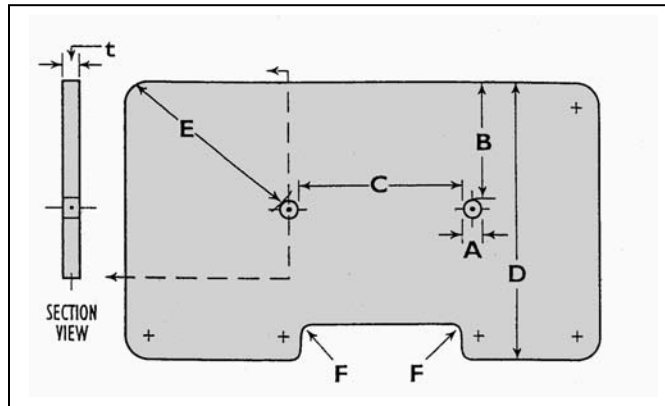


TUFFVUE TEMPERED GLASS TECHNICAL INFORMATION

HOLES AND NOTCHES – This Chart Should be Used to Determine Minimum Sizes and Placement of Holes and Notches in Tempered or Heat Strengthened Glass:

GLASS THICKNESS (t)		1/8	3/16	1/4	3/8	1/2	3/4	GENERAL RULE
Minimum Diameter of Holes	A	1/4"	1/4"	5/16"	7/16"	9/16"	13/16"	$A \geq t + 1/16"$ and 1/4"
Distance from Hole Rim to Edge of Glass	B	1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	$B \geq 2t$ and 1/4"
Distance between Rims of Holes	C	3/8"	3/8"	1/2"	3/4"	1"	1 1/2"	$C \geq 2t$ and 3/8"
Distance from Corner to Rim of Hole	E	13/16"	1 7/32"	1 5/8"	2 7/16"	3 1/4"	4 7/8"	$E \geq 6.5 \times t$
Minimum Fillet Radius	F	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	$F \geq t$



- Countersink Holes Require Technical Review and Approval Before Order Acceptance.
- Large Holes and Notches Greater than 1/3 the Narrow Dimension Require Technical Review and Approval.

HOLE AND NOTCH LOCATION TOLERANCES-

- For Dimensions of Hole Center from Specified Edge +/- 1/16"
- For Dimensions Between Hole Centers +/- 1/16"
- Chips and Flakes Will Not Exceed 1/16"
- Notch Dimensions for Glass 1/4" and Under +/- 1/16"
- Notch Dimensions for 3/8" and 1/2" +/- 1/8"

MONOLITHIC GLASS SIZE TOLERANCES-

THICKNESS	CLEAN CUT	EDGEWORK STANDARD	EDGEWORK TIGHT
3/32" - 1/4"	+/- 1/16"	+/- 1/8"	+/- 1/16"
3/8"	+/- 3/32"	+/- 3/16"	+1/16" - 1/8"
1/2"	+/- 1/8"	+/- 1/4"	+ 1/16" - 1/8"
3/4"	+/- 3/16"	+/- 3/8"	+1/8" - 3/16"

- Bath and Shower Enclosures and All Glass Entrances are Fabricated to Tight Tolerance. All Other Applications are Fabricated to Standard Tolerances Unless Specified "Tight Tolerance" at Time of Quotation and Order. Extra Charges May Apply.
- Shapes Fabricated to Standard Tolerance, Unless "Tight Tolerance" is Requested and Full Sized Hardboard Pattern or .dxf File is Submitted. Paper Patterns Fabricated to Standard Tolerance Only.



TUFFVUE TEMPERED GLASS TECHNICAL INFORMATION

TEMPERED GLASS BOW AND WARP TOLERANCES –

EDGE DIMENSIONS	GLASS THICKNESS				
	1/8"	3/16"	1/4"	3/8"	1/2"
0-20"	1/8"	1/8"	5/64"	5/64"	5/64"
>20"-35"	5/32"	5/32"	1/8"	5/64"	5/64"
>35"-47"	13/64"	13/64"	5/32"	5/64"	5/64"
>47"-59"	9/32"	9/32"	13/64"	13/64"	5/64"
>59"-71"	23/64"	11/32"	9/32"	13/64"	5/32"
>71"-83"	15/32"	15/32"	11/32"	15/64"	13/64"
>83"-94"		17/32"	15/32"	9/32"	13/64"
>94"-106"		21/32"	17/32"	11/32"	9/32"
>106"-118"		3/4"	21/32"	15/32"	3/8"
>118"-130"			3/4"	9/16"	15/32"
>130"-144"			13/16"	21/32"	17/32"

- This Chart Lists Bow Allowed Over Entire Dimension. Localize Warp Will Not Exceed 1/16" Over any 12" Span.

TEMPERED SIZE RANGE – 4" X 10" Minimum to 84" X 144" Maximum. 1/8" Tempered Maximum 40" X 80". Warpage in Large Pieces of 1/8" Tempered may exceed ASTM C1048 Standards.

EDGE TREATMENT – Tempered and Heat Strengthened Glass has Seamed Edges unless Ordered with Polished Edges. The Seamed Edge is Not a Suitable Exposed Finished Edge.

LOGOS – Tempered and Heat Strengthened Glass is Permanently Marked unless Ordered "NO LOGO".

DISTORTION – Heat Treating adds Distortion to Glass Products. All Requirements for Distortion, Roller Wave, Consistent Furnace Orientation or Distortion Measurement Must Be Disclosed at Quotation and Order.

STRAIN PATTERN - Tempered or HS Glass Contains a Strain Pattern or "Quench Marks" that Appear as Areas of Shadows in a Pattern Corresponding to the Location of Air Nozzles in the Tempering Furnace Quench Section. This Condition Becomes More Visible:

- Under Certain Lighting Conditions, Like Polarized Sunlight
- When the Glass is Viewed at Glancing Angles
- With Tinted Glass, Especially When Multiple Lites are Combined in Laminated and Insulating Constructions

The Strain Pattern is Not Considered a Defect in Tempered or HS Glass Products.

SPONTANEOUS BREAKAGE – Tempered Glass is Subject to Rare Spontaneous Breakage, where the Glass will Break for No Apparent Reason. For Applications where Additional Glass Strength is Required due to Thermal Stress and Safety Glass is Not Mandated, SGC Recommends Heat Strengthened Glass.

INSPECTION – Tempered and HS Glass is Inspected in Accordance with ASTM C1048.

INSTALLATION - Monolithic Low Light Transmitting Glass (ie. Graylite, Optigray 23, Supergray, 3/8" and 1/2" Bronze and Gray) Should Be Glazed With a Consistent Tin Side/ Air Side Orientation.

FABRICATION – All Fabrication that Penetrates the Glass Surface (i.e. holes, notches, sand blasting, cutting) Must Take Place **prior** to Tempering or Heat Strengthening.