

Garibaldi Glass Capabilities

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2. Garibaldi Glass Capabilities – Purpose And Scope

The purpose of this document is to provide Garibaldi's employees a resource to understand the capabilities for each product type through each manufacturing process.

Whenever the customer requirements are different (higher or lower) than the ones specified in this document, the designated authorization personnel for the capability in question must be consulted before information is relayed to the customer.

3. Garibaldi Glass Capabilities – Flat Annealed Glass

3.1. Definition

Flat Annealed Glass is any Annealed glass that is processed by Garibaldi Glass Industries Inc.

Any of the capabilities for the following sections must still adhere to the capabilities defined under Flat Glass.

3.2. Glass Stock Dimensions

For stock sheet sizes, refer to materials on hand document:

3.3. Cutting

Dimensions:

- Min Glass Thickness: 2.2 mm (Hegla)
- Max Glass Thickness: 19mm (Hegla)
- Max Glass Size: 204" x 130" (Hegla)
- Min Glass Size for 3mm-6mm: 1" x 1"
- Min Glass Size for 8mm-10mm: 2" x 2"
- Min Glass Size for 12mm: 3" x 3"
- Min Glass Size for 15mm-19mm: 4" x 4"

Load:

- Max Load for Cutting On-Load: 1800 lbs

Radius:

- Min Radius for 3mm-6mm: 1"
- Min Radius for 8mm-10mm: 2"
- Min Radius for 12mm: 3"
- Min Radius for 15mm-19mm: 4"

3.4. Arrising and Washing

Dimensions:

- Max and Min Glass Size for Arris: Same as Cutting
- Max Width of Glass for Washer: 84"
- Min Width of Glass for Washer: 15" diagonal
- Thickness Range for Washer: 3mm-19mm

4. Garibaldi Glass Capabilities – Heat-Treated Safety Glass

4.1. Definition

Heat-treated safety glass is any flat glass that is either heat-strengthened or tempered through heating and rapid cooling the glass lite.

Heat-strengthening makes the glass approximately twice as strong and causes it to remain in a few large pieces when broken. This form of safety glass is used when fallout needs to be prevented

Tempering makes the glass approximately four times as strong and causes it to shatter into many small pieces when broken. This form of safety glass is used for structural applications or when broken glass could result in injury.

4.2. Tempering Capabilities

Dimensions:

- Max Size for Uncoated Glass: 84" x 204" or 98" x 168"
- Min Size for Uncoated Glass: 10" diagonal
- Max Size for Soft Coated Glass: 84" x 165" or 98" x 168"
- Min Size for Soft Coated Glass: 10" diagonal
- Max size for Fritted Glass: 84" x 204"
- Min Size for Fritted Glass: 10" diagonal

Thickness:

- Thickness for Uncoated Tempered Glass: 3mm – 19mm
- Thickness for Soft Coated Tempered Glass: 3mm – 10mm
- Thickness for All Heat-Treated Glass: 3mm – 10mm

Cycle Times:

Capacity Time: 84" Oven					
Processing time (in minutes) at this machine by glass type and thickness					
Glass Thickness	Min/Sqft Coated	Min/Sqft Clear	Min/Sqft Tinted	Min/Sqft Frit	Min/Sqft Etch Frit
3mm	0.0720	0.0300	0.0280	0.0280	
4mm	0.1002	0.0388	0.0336	0.0504	
5mm	0.1224	0.0272	0.0245	0.0376	0.0448
6mm	0.1280	0.0417	0.0305	0.0500	0.0533
8mm	0.1680	0.1050		0.1050	0.1200
10mm	0.2480	0.1093	0.0940	0.1093	0.1350
12mm		0.1548	0.1416	0.1548	0.1848
15mm		0.4533			
19mm		0.8213			
Slump					

Capacity Time: 100" Oven					
Processing time (in minutes) at this machine by glass type and thickness					
Glass Thickness	Min/Sqft Coated	Min/Sqft Clear	Min/Sqft Tinted	Min/Sqft Frit	Min/Sqft Etch Frit
3mm		0.0550			
4mm	0.1662	0.0667	0.0642	0.0642	
5mm	0.2200	0.0543	0.0525	0.0525	
6mm	0.2405	0.0975	0.0590	0.0975	0.0967
8mm	0.3150	0.1589		0.1589	
10mm	0.4655	0.2398	0.2173	0.2398	
12mm		0.3058	0.2772	0.3058	0.2706
15mm		0.4548			
19mm		0.7500			
Slump		0.5397			

5. Garibaldi Glass Capabilities – Heat Soak

5.1. Definition

Heat Soaking is the process of simulating stress over time in heat treated safety glass. It involves baking the glass at 290°C for a period of time in order to grow nickel sulphide crystals that occur after the tempering process. If the crystal grows across the border between compression and expansion within the lite, it will cause spontaneous breakage

This process is used for glass that must be proven to be structurally sound

5.2. Dimensions

- Max Size: 98" x 204"
- Min Size: N/A
- Thickness: 3mm – 19mm

5.3. Quantities per Load

Glass Thickness	max qty/load 100" -204"	max qty/load 50"-100"	max qty/load 0"-50"	hours/load
3mm	42	84	126	12
4mm	40	80	120	12
5mm	38	76	114	12
6mm	36	72	108	12
8mm	34	68	102	12
10mm	32	64	96	12
12mm	30	60	90	12
15mm	26	52	78	12
19mm	24	48	72	12

6. Garibaldi Glass Capabilities – Ceramic Frit

6.1. Definition

Ceramic Frit is pigmented glass that is applied to the glass surface with a liquid carrier using a silk-screening process. The applied pattern is then baked at 300°C to dry, and then fused to the glass through heat treating.

6.2. Dimensions

- Max Size: 94" x 204"
- Min Size: 8" diagonal
- Thickness: 5mm – 19mm
- Largest dot pattern screen: 179"
- Widest standard squeegee: 84"
- Printing table top width: 102"
(but screen could hang out over the edges)

Notes:

Images over 70" wide can have issues with screen and squeegee flex
 Images over 160" long can have issues

6.3. Cycle Rate:

Standard Size: less than 48" x 100"

Large Size: greater than 84" x 100"

Screens must be changed every 15 minutes

Glass Thickness	Easy pcs/shift	Hard pcs/shift	Easy (factor)	Hard (Factor)	Easy min/pcs	Hard min/pcs
3-8mm standard	140	85	1.0000	1.0000	3.4286	5.6471
10-12mm standard	60	45	2.3333	1.8889	8.0000	10.6667
15-19mm standard	50	40	2.8000	2.1250	9.6000	12.0000
3-8mm large	80	50	1.7500	1.7000	6.0000	9.6000
10-12mm large	60	45	2.3333	1.8889	8.0000	10.6667
15-19mm large	50	40	2.8000	2.1250	9.6000	12.0000

7. Garibaldi Glass Capabilities – Fabricated Glass

7.1. Definition

Fabricated glass is any flat glass that has had edges polished, holes drilled, or notches routed out after it has been cut.

7.2. Straight Edge polishing

- Max Glass Length for 3mm-8mm: 168"
- Max Glass Length for 10mm +: 180"
- Min Glass Length: 3"
- Thickness Range: 3mm – 50mm
- Mitre: 0 – 45 degrees

7.3. Shape Polishing

- Max Diameter: 70"
- Max Length: 84"

7.4. Forvet

- Max Glass Length: 150"
- Min Glass Length: 16"
- Max Distance From Edge to Center of Tool: 49"

Glass must have at least one (1) polished edge. See minimum hole specification chart

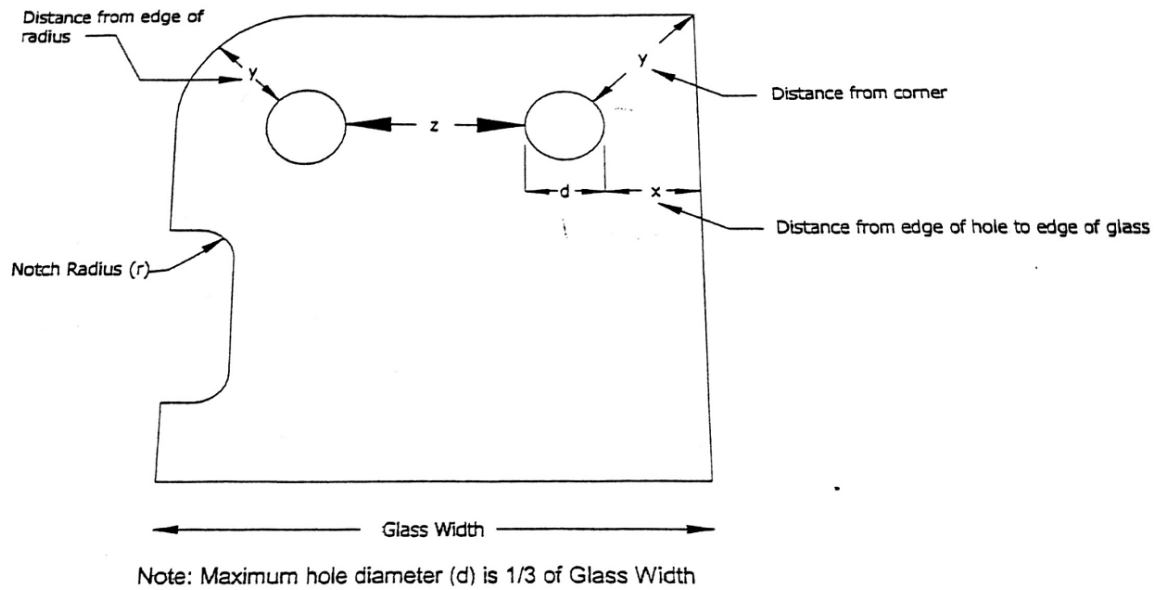
7.5. Manual Drill

- Max Distance from Edge to Center of Tool: 48"

See Minimum hole specification chart

7.6. Minimum Hole Specification Chart

Note: glass that does not meet these specs may still be possible but should be flagged for approval						
Glass Size	hole diam (d)	notch inside radius (r)	from glass edge (x)	from corner (y)	glass width	distance between holes (z)
3mm	0.125	0.125	0.25	0.8125	1	0.5" or 0.5* hole dia (whichever is greater)
4mm	0.15625	0.15625	0.25	1	1.25	0.5" or 0.5* hole dia (whichever is greater)
5mm	0.1875	0.1875	0.3125	1.25	1.5	0.5" or 0.5* hole dia (whichever is greater)
6mm	0.25	0.25	0.375	1.625	2	0.5" or 0.5* hole dia (whichever is greater)
8mm	0.3125	0.3125	0.5	2.0625	2.5	0.5" or 0.5* hole dia (whichever is greater)
10mm	0.375	0.375	0.5625	2.4375	3	0.5" or 0.5* hole dia (whichever is greater)
12mm	0.5	0.5	0.75	3.25	4	0.5" or 0.5* hole dia (whichever is greater)
15mm	0.625	0.625	1.25	4.0625	5	0.5" or 0.5* hole dia (whichever is greater)
19mm	0.875	0.875	1.5	4.875	6	0.5" or 0.5* hole dia (whichever is greater)



8. Garibaldi Glass Capabilities Guidelines – Laminated Glass

8.1. Size

MAX: 84x204” (provided weight limit not exceeded) | MIN: 16x16” (regular process)/12x12” (special handing req’d)

8.2. Weight

Per lite: 1000 lbs | Overall laminate: 4000 lbs

8.3. Interlayers

a. Clear PVB

- We offer 030/060/090+ (multiples of 0.030”)
- 030 & thicker is considered safety glass based on industry standards

b. White Translucent PVB

- We offer 030/060/090+ (multiples of 0.030”)
- Can stack white translucent with white translucent OR white translucent on clear
 - White translucent against surface #1 & clear on surface #2 will look different from clear on surface #1 & white translucent against surface #2

c. Clear SGP

- We offer 035/060/070/090/105/120+ (combinations of 0.035” and/or 0.030”)
- 030 should not be offered because it is not considered safety glass
 - Will fracture when glass is damaged

d. Heat Strengthened or Tempered Glass

- Minimum interlayer thickness of 060 highly recommended to avoid rejects

- 3mm to 5mm glass thickness, 060 interlayer thickness strongly suggested
- Square aspect ratio glass (e.g. 36x36”), 060 interlayer thickness strongly suggested

8.4. Glass Types

a. Heat Strengthened or Tempered

- Tempering capabilities may limit glass sizes available

b. Annealed

- Any interlayer thickness is acceptable
- Large sizes @ 3mm and 4mm may not be acceptable for handling safety purposes

c. Low-E

- Must be edge deleted when low-e is on surface # 2 or 3 (i.e. surfaces against the interlayer)

- For SGP when low-e on inner surface, put in comments that **adhesion promoter** is required

- Vacuum bagging is recommended but can test first

d. Holes & Other Fab (not incl. Edging)

- Slower processing time, but no restrictions
- Vacuum bagging is recommended unless holes are close to outer edge

e. Frit

- Alert engineering or make note that **adhesion promoter** is required if SGP is in contact with frit surface (air side of glass)
- Vacuum bagging is recommended if frit on surface #1 or surface #4, but can test first

f. Edge Polish

- Post-lami polish looks best but compromises stability of glass
- Vacuum bagged edge looks second best
- Non-vacuum bagged pre-lami polished glass has inconsistent edge quality

g. Combo Makeups (e.g. Frit on Surf. #2, Low-E on Surf. #4)

- Vacuum bagging strongly recommended but can test first

h. 8+mm/060 SGP/8+mm makeups

- Vacuum bagging strongly recommended

9. Garibaldi Glass Capabilities Guidelines – Insulated Glass Units

9.1. Definition

Insulated glass units (IG Units) are two or more glass lights that are bonded together with a sealed gas chamber between them. IG units are used to provide insulation to a structure in either a vision or spandrel application. The insulation factor of an IG unit is affected by the type of gas and the number of gas chambers. Furthermore, the insulation factor (or R factor) can be increased by using a thermally broken spacer, which prevents conductive materials such as metal and glass from touching.

9.2. Dimensions

- Max Height for IG Line: 98"
- Max Length for IG Press: 190"
- Min Height for IG Line: 10"
- Max Length for Gunning Robot: 158"
- Max Length for Manual Gunning: no limit

9.3. IG Concerns to Flag

- Any Units in excess of 770lbs requires special handling to unload
- Triples longer than 138"
- Doubles longer than 158"
- Any units wider than 98"
- Edge deletions larger than 3"
- Units with VIP inserts
- 4 & 3 sided offset units
- Structural IG units
- Custom edge fills
- Complex edge deletion patterns
- Double Low-E on an odd and even surface (ex surface 2&3 or 2&5)
- Quad units
- Capillary Tube
- Manually cut bar if not a standard shape (DXF)
- Manually cut bar that has a radius
- Manually cut bar if edge longer than 96"
- Manually cut grids

10. Garibaldi Glass Capabilities – Revision History

- Rev A New document, created by Andrew D.
- Rev B Updated Section 6.2, by Andrew D.
- Rev C Added Section 8 “Laminated Glass”, by Kai H.