
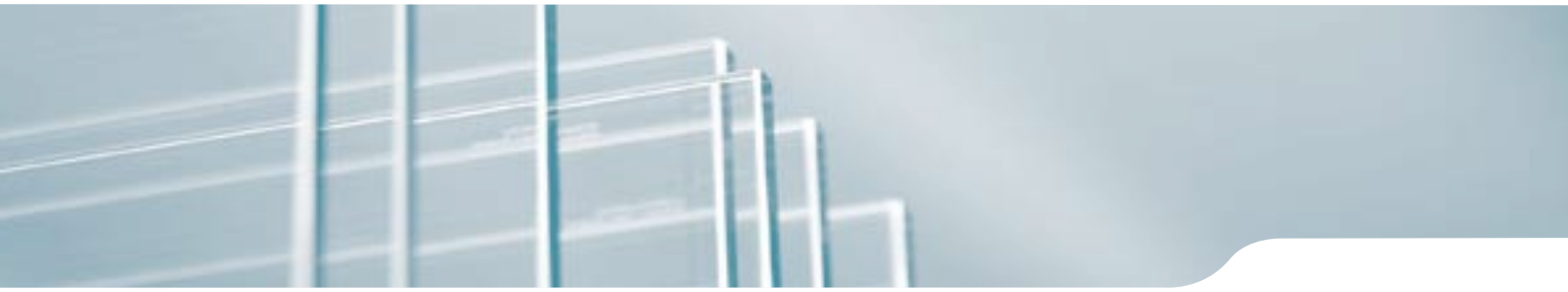


# Glass Manual





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## Toughened Glass

Through a process of heating the glass surface to above 270° then cooling rapidly, the resulting surface compression formed on the panel increases the mechanical strength of the piece.

The toughening process increases the strength from 4 - 6 times that of annealed or standard float glass.

### Benefits

- Increased wind or human impact loading.
- Classified as Grade A Safety Glass
  - Should the glass be broken the process ensures the panel disintegrates into small relatively harmless pieces.
- The clarity or visual properties of the glass are unaffected by the process.

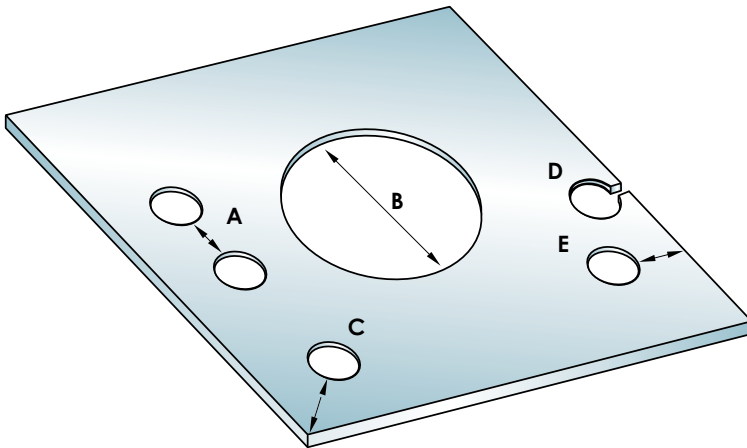
All work on the panel - cutting, edging etc, needs to be completed before the toughening process.

### Application

The toughening process increases strength and the ability to handle temperature extremes, creating the solution for frameless products such as shower screens, pool fences, balustrades and splashbacks.

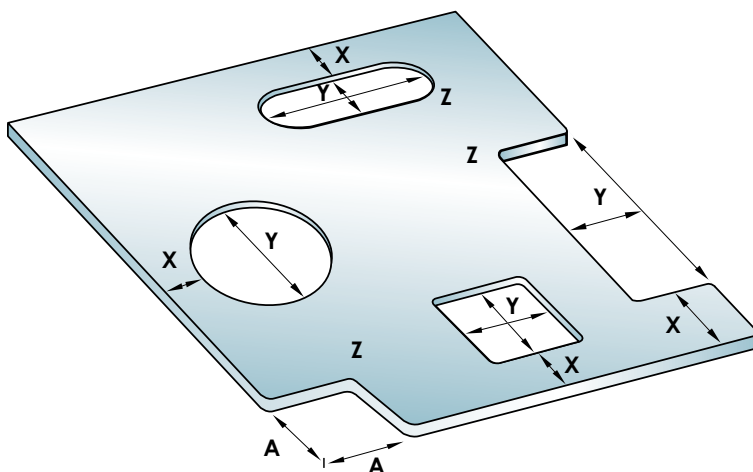


## Hole Guidelines for **Toughened Glass**



- A: Distance between the holes must be at least 4 x the glass thickness
- B: Diameter of the hole must not be greater than 33% of the panel measurement at the narrowest point
- C: Distance from the edge of the hole to the corner must be 4 x glass thickness
- D: For a hole that is positioned closer than the recommended distance, a saw cut is made to minimise stresses and chance of breakage
- E: Distance from the edge of the glass must be at least 1.5 x thickness 4-6mm glass or 2 x thickness 8-15mm glass

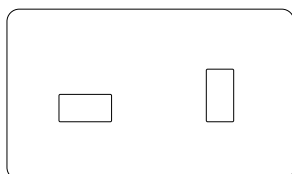
## Cut-Out Guidelines for **Toughened Glass**



- X: Distance between the holes/cut-outs and/or glass edge must be at least 4 x the glass thickness.
- Y: Height/width of the hole/centre cut-out must not be more than 33% of the glass height/width. Dimensions of hole/centre cut-out should not be less than the thickness of the glass
- Z: All non-circular centre cut-outs must have a minimum radius of not less than the glass thickness

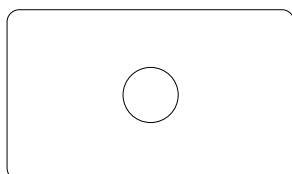


## Guidelines for Toughened Glass



### Centre Cut Out (GPO)

Standard size for GPO cut out is 100mm (w) x 60mm (h)



### Internal Polishing

Internal polishing is performed by the CNC machine.  
Minimum hole 40mm



### Mitre

Mitres are polished and can be 22.5° to 45° edge



### Tipped Corners

Tipped corners are standard for all product, removes sharp corners



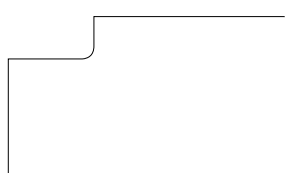
### Polished Tipped Corners

Manual process,  
Maximum 5mm radius



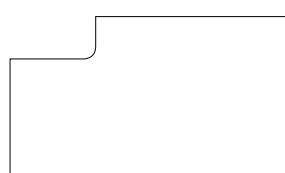
### Polished Radius Corners

CNC process,  
Polished radius corners greater than 5mm



### Corner Cut Out

Internal radius must have a minimum radius of 7mm



### Polished Cut Out

Internal radius must have a minimum radius of 15mm



### Flat Polish

Used when glass edge is to be exposed, or as furniture component

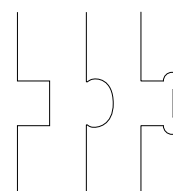


### Holes

Minimum diameter not less than glass thickness



### Counter Sunk Holes



### Cut Out

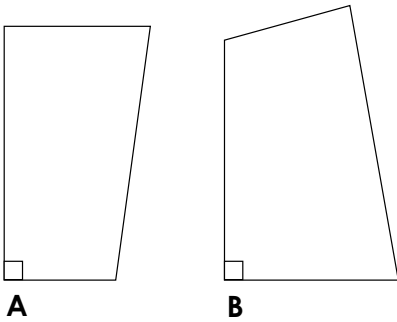
Hinge Edge Cut Outs

## Guidelines for **Toughened Glass**

### **Simple Shape**

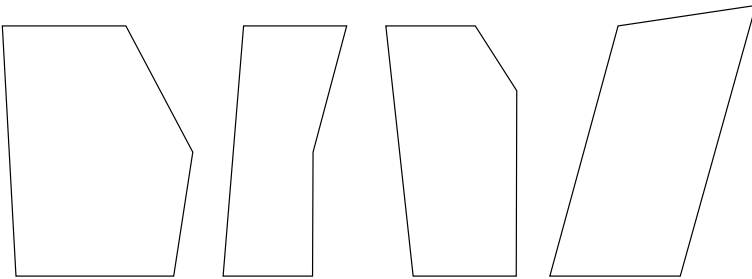
Shape contains at least one right angle

A: 1 rake, B: 2 rakes

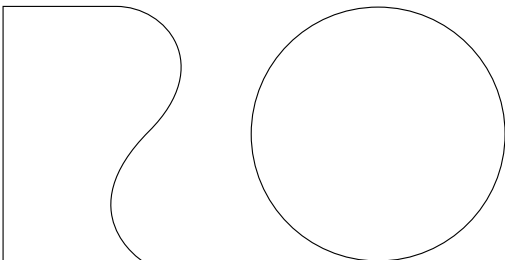


### **Complex Shape**

Shape contains no right angles



### **Multi Complex Shape**



## Guidelines for **Toughened Glass Template**

Drawing can be supplied as an Autocad DWG or DXF file.

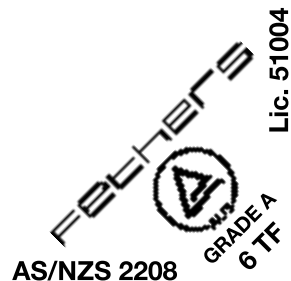
If you would prefer to supply a solid template, please be aware a template handling charge will be applied.

- Templates must be complete and full size
- Templates must be made from a solid and manageable material; do not use glass, we recommend 3mm MDF as a minimum, ensure no screws or sharp objects protrude through the surface.
- Templates must be labelled with the customer's name, job number, glass type and thickness. All templates require a written order
- Hole positions must be marked with a cross to indicate centre point, also include the diameter of the hole on the template.
- If you make a mistake please ensure all irrelevant markings are removed and any drill holes are covered
- If the glass is mirrored, painted or has a pattern on one side please indicate clearly by writing 'FACE' on the outside (non-painted)/smooth side.
- Do not hesitate to contact Fethers should you have any queries relating to Glass Templates.

## Identification **Stamp**

As directed by the Australian Standards - AS/NZS 2208, Fethers is required by law to apply safety marks to all glass toughened by our plant.

As specified by the client, the glass can be permanently printed with the approved logo or a non-reusable sticker applied. The logo or sticker will appear in the lower left hand corner of the glass panel unless otherwise specified on ordering.



Example shown: Stamp for 6mm Toughened Float Glass

## Production **Capabilities**

### **CNC**

Full CNC Glass processing facility utilising the best quality tooling to ensure consistently repetitive high quality results.

## Machine Capabilities

<b>Toughening:</b>	4mm	3600mm x 2400mm	<b>CNC:</b>	4mm	4000mm x 2100mm
	5mm	3600mm x 2400mm		5mm	4000mm x 2100mm
	6mm	3600mm x 2400mm		6mm	4000mm x 2100mm
	8mm	3600mm x 2400mm		8mm	4000mm x 2100mm
	10mm	3600mm x 2400mm		10mm	4000mm x 2100mm
	12mm	3600mm x 2400mm		12mm	4000mm x 2100mm
	15mm	3600mm x 2400mm		15mm	4000mm x 2100mm
				19mm	4000mm x 2100mm

Larger sizes can be supplied by Fethers upon request.

**Edging:** All cases will be at Fethers discretion and will be determined by safe work practices

## Types of Glass

### **Toughened Glass**

We offer a full range of toughened glass products.

6mm	Clear, Starphire, Diamond Frost and Tints*
8mm	Clear, Starphire, Diamond Frost and Tints*
10mm	Clear, Starphire, Diamond Frost and Tints*
12mm	Clear, Starphire, Diamond Frost and Tints*
15mm	Clear
19mm	Clear

\* Lead times may vary subject to availability

### **Mirror**

Currently stocked in 6mm. Mirror can be cut to size with a full range of CNC processing available. Standard edgework is available (excluding bevelled edge).

### **Toughened Laminated Glass** (refer standards)

PVB and SGP laminated glass available, please enquire as to your specific project.

## Delivery

Excellent turn around times in production, the option of pick-up or delivery to site.

Glass and Hardware sets despatched daily and delivered to nominated depots or directly to your job site.

Information supplied is as a general guide only. Technical specifications are a recommendation and should be verified with an engineer for your individual projects. Further information relating to Australian Standards for Glass can be found at [www.standards.org.au](http://www.standards.org.au)

Fethers **Glass Label**

<b>Job Number</b> (as appears on invoice)	<b>4520</b>	<b>FETHERS</b> FRAMELESS the future in glass		
<b>Your Ref &amp; Order Number</b> Customer supplied references	Your Ref: <b>Johns Street</b>	Your Order No.: <b>16370</b>	Glass Mark: <b>BATH</b>	<b>29 NOV</b> — Order Due Date
<b>P</b> - Total number of panels in the order eg 1 of 10 panels	6mm Clear Toughened	H900	W120	1.7KG
In the case of 'No Stamp' a removable distructable sticker will be applied.	<b>P 1 - 10</b>	<b>S/N - 1</b>	<b>B/N - 1866</b>	
<b>Special instructions</b>	Flat Polish All Edges			
<b>Individual Panel ID</b>	<b>NO STAMP</b>	<b>DELIVERY</b>	<b>DRAWING</b>	<b>16653</b> — Delivery / Pick- Up
	<b>OPTO - H/W</b>			
	<b>P/ID 38110</b>	