Technical Bulletin

1015 – Fins

March 2022 – V1.0

Australian Glass Group®

TB 1015 – Fins

Cited National Standards:

- **AS 1288** – Glass in Buildings – Selection and installation
- **AS 4055** – Wind loads for Housing
- **AS/NZS 1170.2** – Wind Action

Glass fins offer a more open and cleaner look compared to mullions and are most commonly used in shopfronts, internal partitions and large windows. The simplest fin designs include single story fins, dry glazed into glazing channels and the head & sill, and silicone to the façade glass. More complex designs can involve fins multiple stories high, connected together by steel splice plates or where fins and facade glass are hung from the overhead structure.

Key points to consider:

- Wind loading
- Glass types for both fins and façade glass
- Support structure for fin shoes
- Detailing/shop drawings
- Ease of installation
- Building movement

Wind Loading

Like all building elements, glass fins are subject to wind loads. These wind loads are calculated in the same manner as other building elements such as cladding. Refer to **AGG Technical Bulletin 1009 - Wind Loads** for more detail. The dimension of the façade glass panes – height & width – will determine how much wind load each fin will take and in turn the glass type & thickness required.

AGG NSW
140 Gilba Rd
Girraween, NSW
P: (02) 9896 0566
F: (02) 9896 0190

AGG VIC
81-83 Rushdale St
Knoxfield, VIC
P: (03) 9730 7400
F: (03) 9730 7488

AGG TAS
39 South Arm Rd
Rokeby, TAS
P: (03) 6247 1625
F: (03) 6247 6843

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Glass Types – Fins

The simplest and cheapest glass fin is comprised of monolithic annealed glass. These can only be used in single storey arrangements where there is no requirement to attach façade glass to them with point fixings nor bolt them to the fin shoes. Annealed laminate can be used in similar situations as monolithic annealed glass – but may need to be made thicker to handle larger loads.

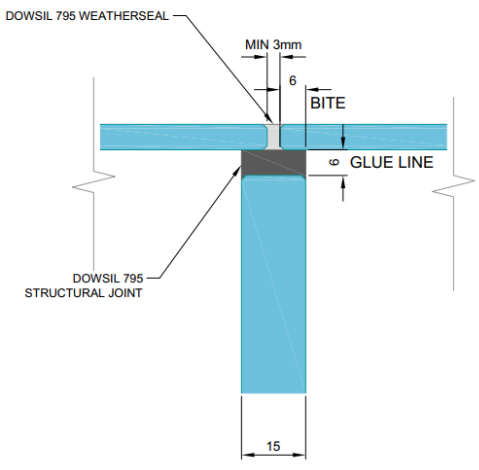
Monolithic toughened glass is required whenever holes are required in the fin itself. This is most common when spider arms and point fixings are used to attach façade glass to the fins. Toughened glass fins have an additional design criteria; the minimum aspect ratio of the toughening furnace. Typically, this is limited to a 15:1 ratio, so single storey toughened fins are often governed by this instead of the loads placed upon them.

Toughened laminate fins are required when loads are significant and holes in the fin are required. This is typically for multi storey assemblies where glass fins must be joined together at the ends with a steel splice plate to attain the required height. They are still subject to the furnace aspect ratio, but more often than not it is wind loads that determine their size.

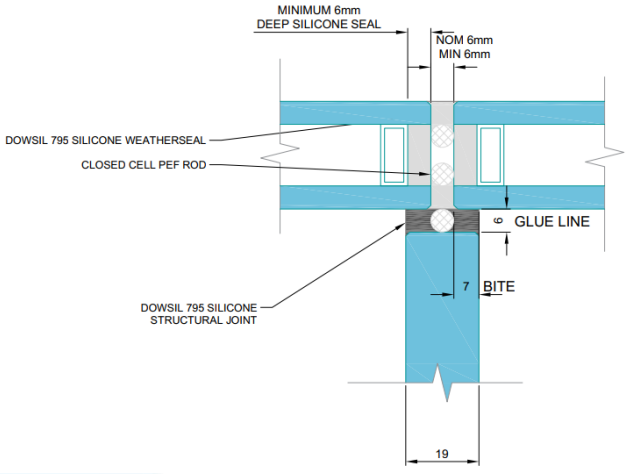
Glass Types – Façade Glass

Façade glass can be either single or double glazed. For single glazed, the minimum gap between façade panes is 3mm. Anything less than this is too difficult to install on site. If no point fixings are present, it is only the structural silicone between fins and façade glass that keeps the glass in place under negative wind pressure. As the minimum silicone bite is 6mm, the minimum theoretical fin thickness is 15mm. For double glazed, the minimum gap between façade panes is 6mm. This increases the minimum theoretical fin thickness to 19mm.

180° Butt Joint with fin - SG



180° Butt Joint with fin - DG



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Support structure for fin shoes

The purpose of glass fins is to replace mullions and present a more open aesthetic. These fins still have the role of mullions in any normal façade design; they act as an edge support for the façade glass and transmit loads from it to the building structure via the fin shoes. Therefore, how the shoes are connected to the structure is key and should not be overlooked or omitted from the design process. Each fin shoe requires at least two fixings into the substrate to remain stable. Substrate edge clearance and/or minimum fixing centres may result in a deeper fin than other design criteria.

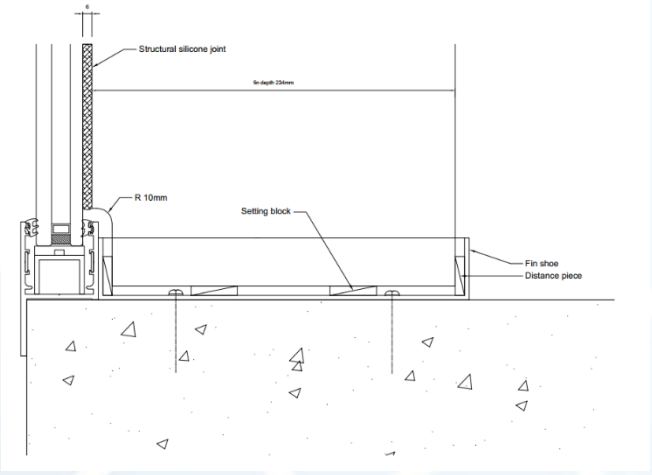
Detailing and shop drawings

AGG have typical fin details already drawn up and available upon request. If the design is more complex than these typical details, it is recommended that shop drawings be undertaken. AGG does not produce shop drawings but will be available to review shop drawings undertaken for a project that was originally designed by AGG.

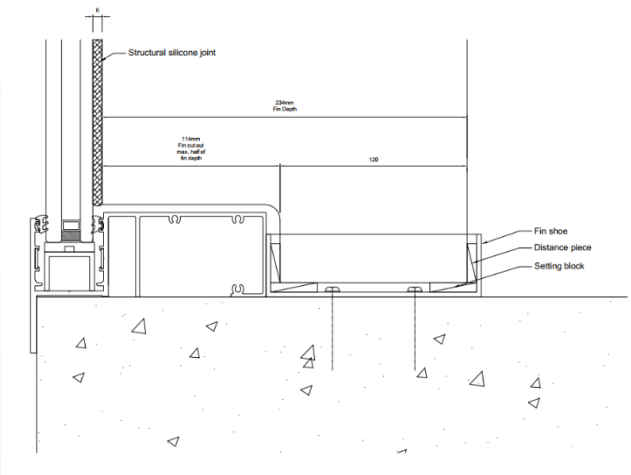
Ease of installation

Fin assemblies can be complicated to install. Factors such as the previously mentioned gap between façade panes or a fin cut back to provide joinery clearance will be included in any AGG fin design. A fin cut out is where the bottom or top corner of a fin is sliced back to allow clearance for any nearby joinery at the head or sill. The maximum allowable cut back is half of the fin depth. Take note that this will reduce the length of the fin shoe and may require a deeper fin to attach the fin shoe to the structure adequately.

A simple fin design with cut out for glazing channel



A simple fin design with cut out to clear sill joinery



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Building Movement

Any building will move a little when external forces act upon it, such as wind or earthquakes. The main part of building movement that is of concern to any fin design is called 'inter storey drift'. This is how much the floor above moves horizontally in relation to the floor below. As fins connect floor to ceiling, building movement does need to be accounted for during the design. Simple single story fins with no point fixings have the most capacity to deal with inter storey drift as there are no holes in the glass; capacity to handle movement is the edge clearance of the fins or façade glass in the joinery. As such, building movement it not normally a governing constraint for these types of installations.

However, complex fin designs with point fixed façade glass and fin splice plates are more susceptible to building movement. By their nature, point fixings have less capacity for movement as it's only the distance between the bush and the edge of the hole that allows for movement. To compound this further, these designs are always taller than one storey so the relative movement between head and sill is larger. These types of designs can be up to 10m tall and located in an entry lobby or atrium, which has less rigidity than the rest of the building, resulting in larger inter storey drifts.

Fin & façade glass design

AGG accounts managers have the ability to design & quote on simple fin designs: single storey with no holes in the fins or façade glass. These designs do not require an engineering certification to demonstrate compliance with the National Construction Code (NCC). AGG also has the capability to provide more complex fin designs in house via the Technical department. These designs will require an engineering certification, which AGG can also provide.

A more complex fin design with part height fins bolted on the façade glass. Engineering certification required and shop drawings are recommended.

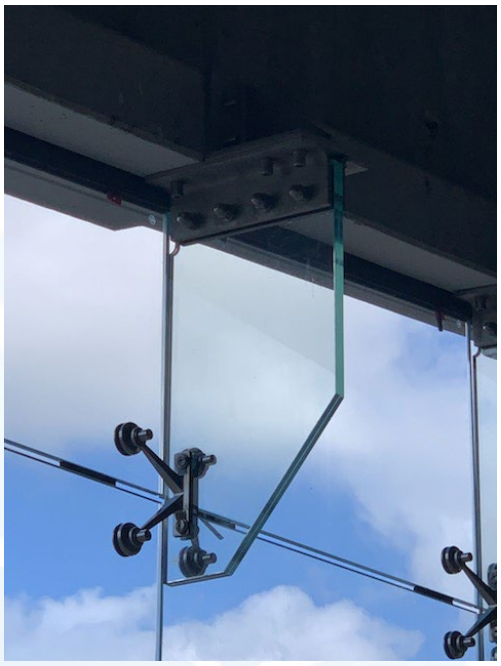

*Photo shows Silicone butt joints (black) yet to be completed

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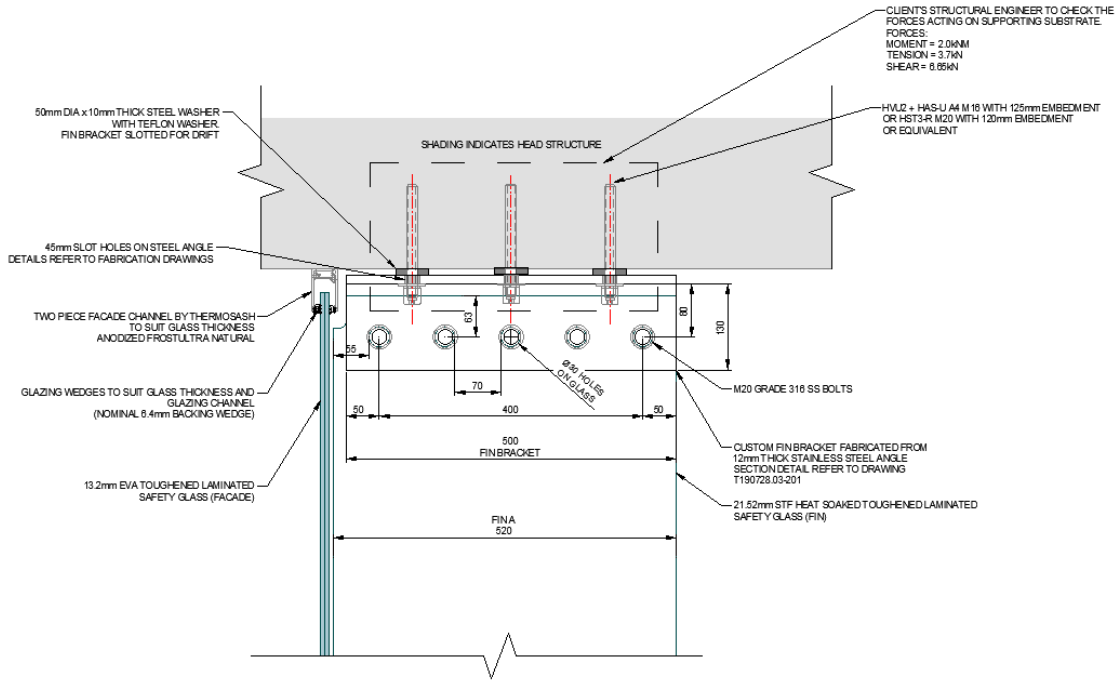
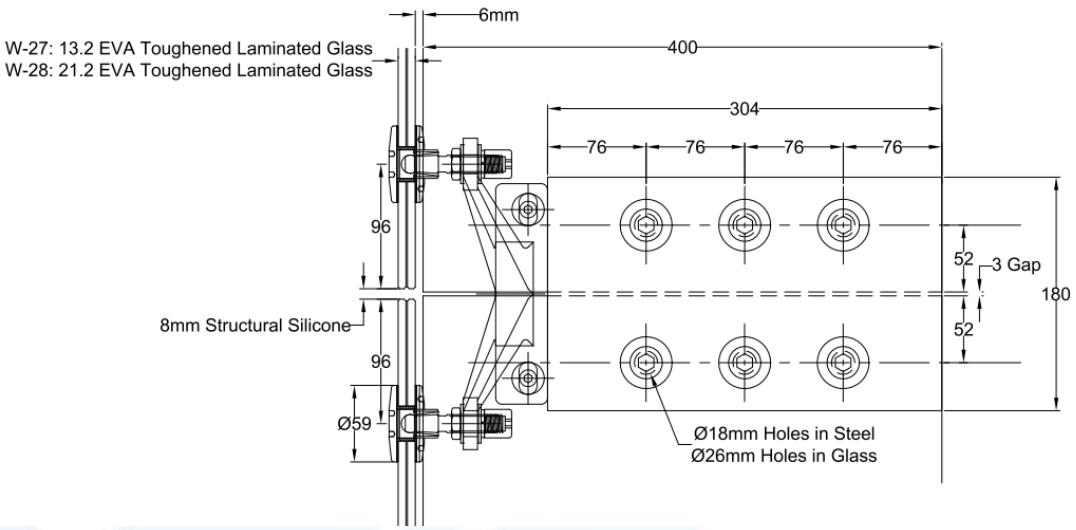
A shop drawing of a more complex fin design with custom fin brackets and holes in the glass Engineering certification required & shop drawings recommended.



A fin splice plate, joining two fin pieces together



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