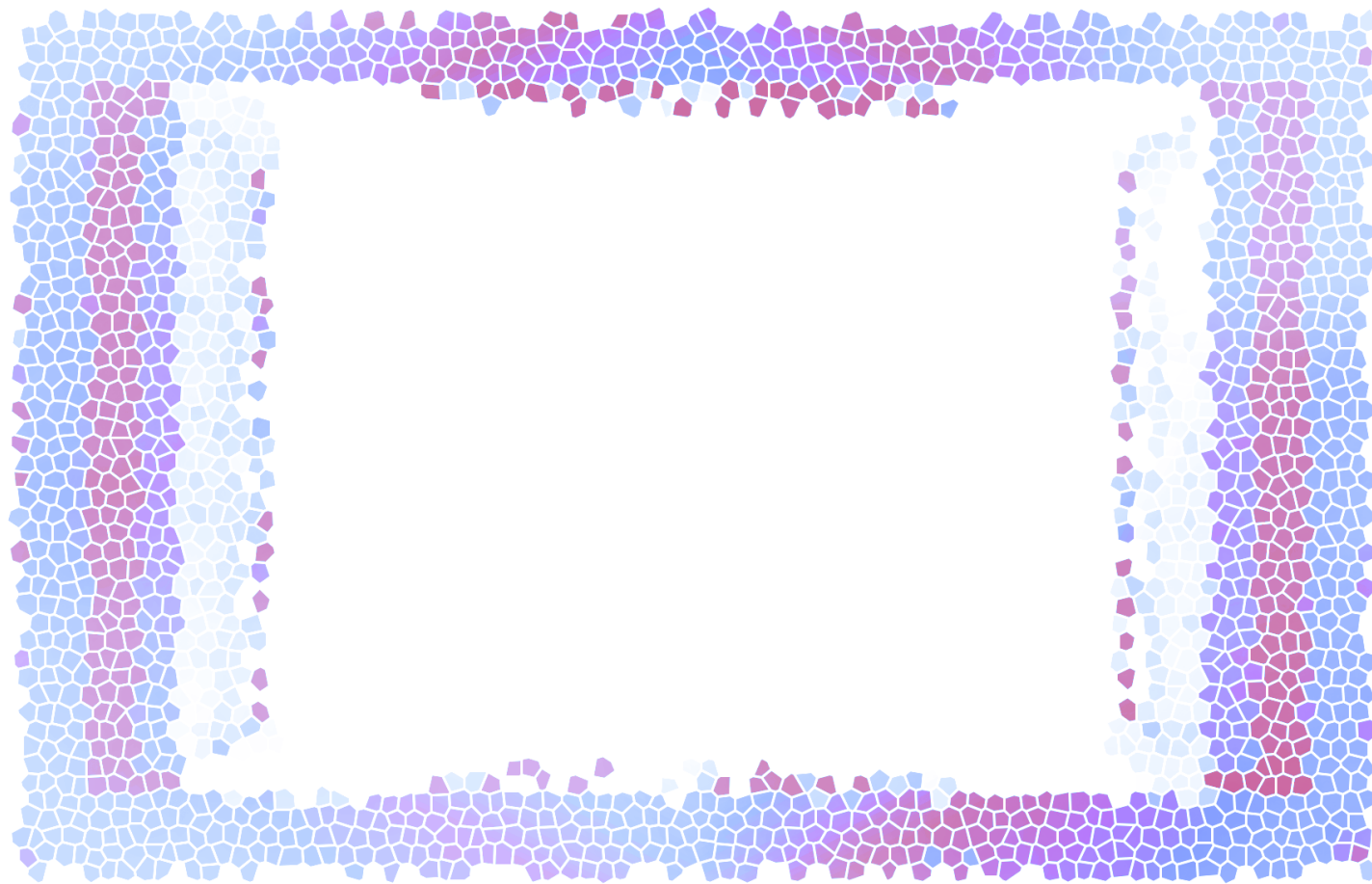


Window System



Under the guidance of Prof. V. Bapat
Co-guide: Prof. Kumaresan

Baisampayan Saha | 136130004

Window

The word '**window**' is derived from a old Norse word 'vindauga' [1]. The word vindauga is made of two separate world - **Vindr** means wind and **auga** means eye.

Window Types

There are various types of windows available in the market. Starting from the ubiquitous casement window to bay-windows and skylights.

Some of the common types of windows are :

- Fixed windows
- Casement windows
- Slider windows
- Pivoted windows
- Double hung windows
- Louvered windows etc

Limitations of existing windows



One of the windows found inside IIT
Bombay campus

- Every window comes with peripheral systems like curtains, mosquito nets, grills etc. which are sometimes difficult to attach with the window
- Cleaning of mosquito nets becomes very messy when the mosquito nets pores get clogged by dirt and debris
- Structural members of a window is often of different sizes which creates a visual noise



Design Brief

“

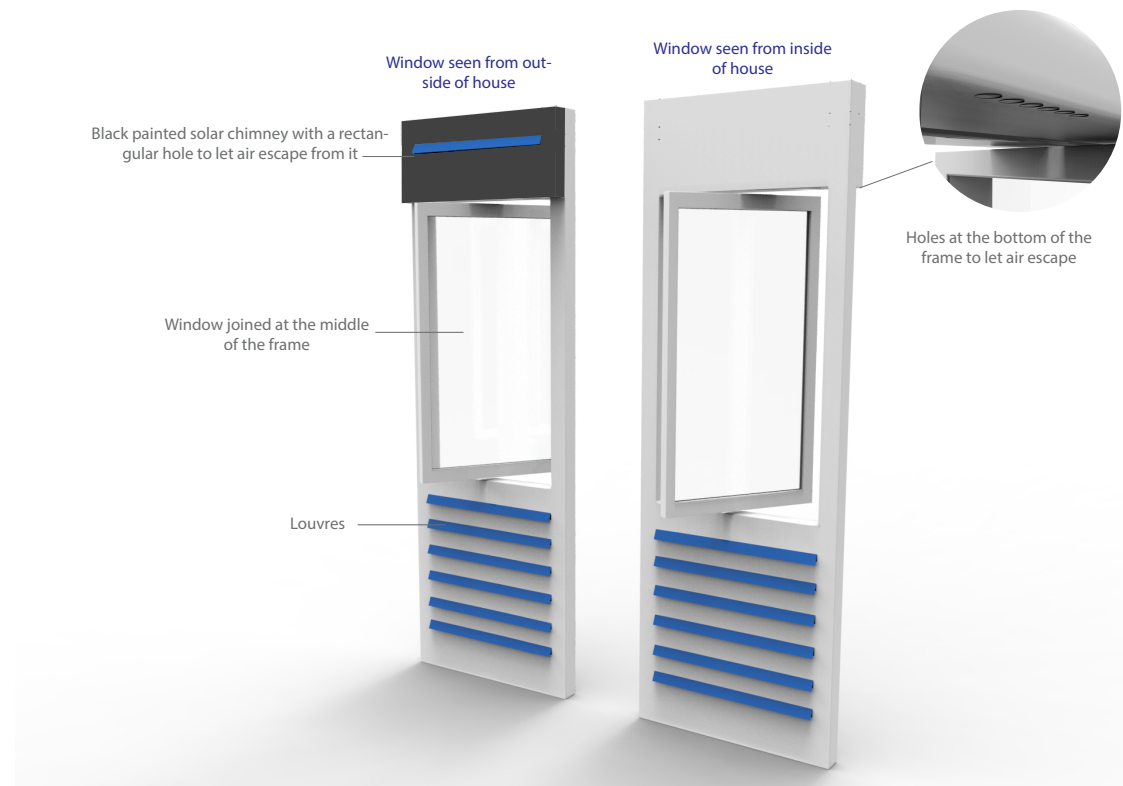
To design a window and hardware details for ease in fabrication and improved aesthetics.

Design to give maximum view of outside with less / no visual noise and addressing improved functionality and user interaction of the product

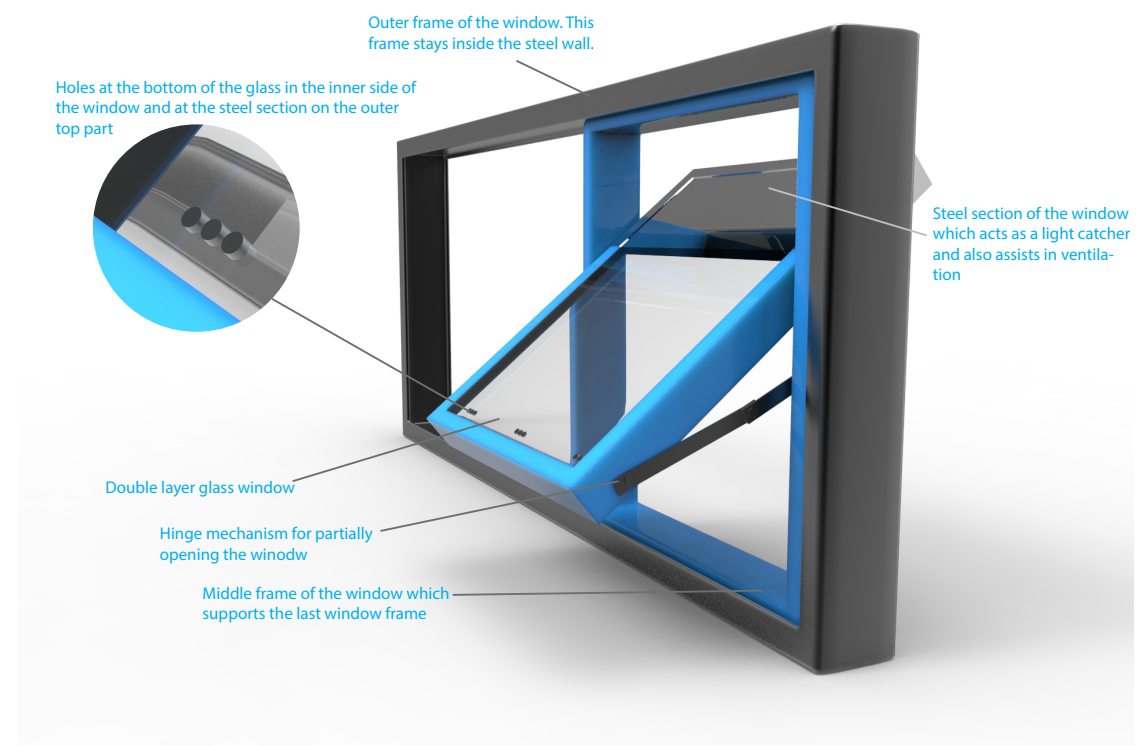
To create an integrated window with homogenous aesthetics with grill and mosquito net added even at later stage”



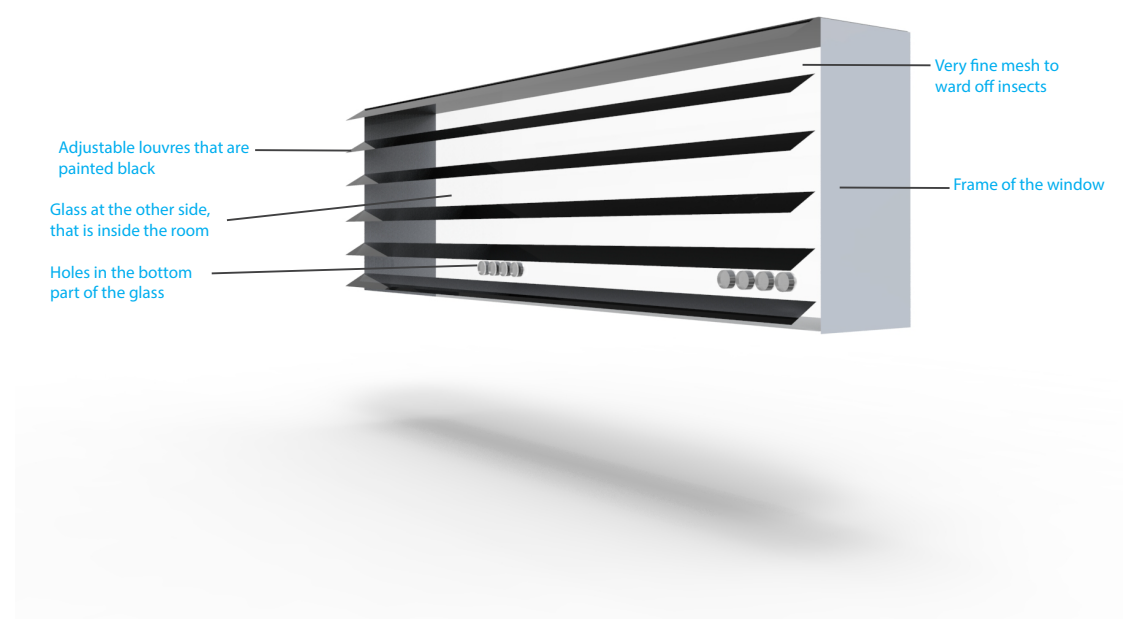
Initial Ideation



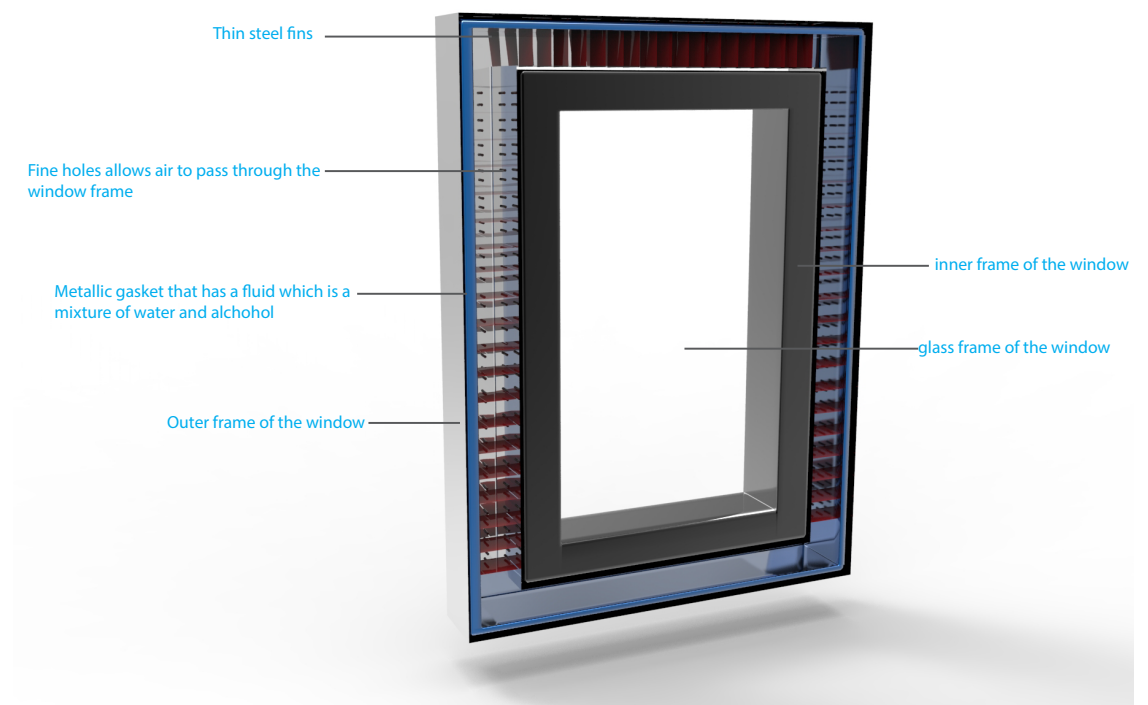
Long modular window



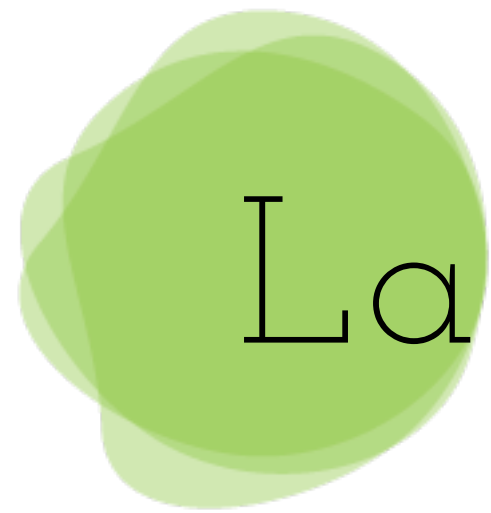
Passive cooling window



Louvered window



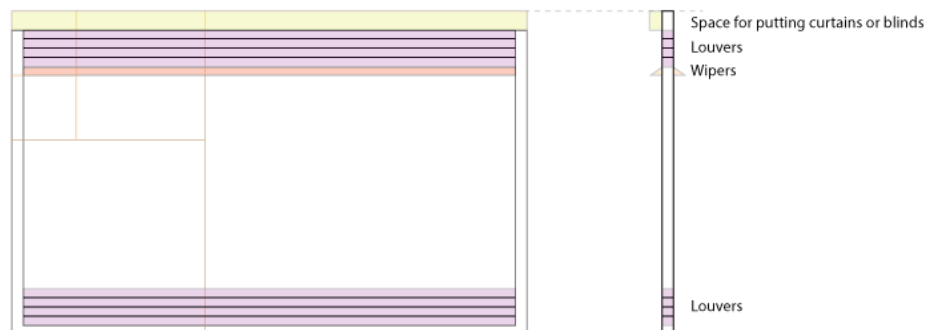
Natural air conditioner window



Lacunae in the ideation

The ideations were more technically biased and may require too many calculations and experiments and might result in a hypothetical solution.

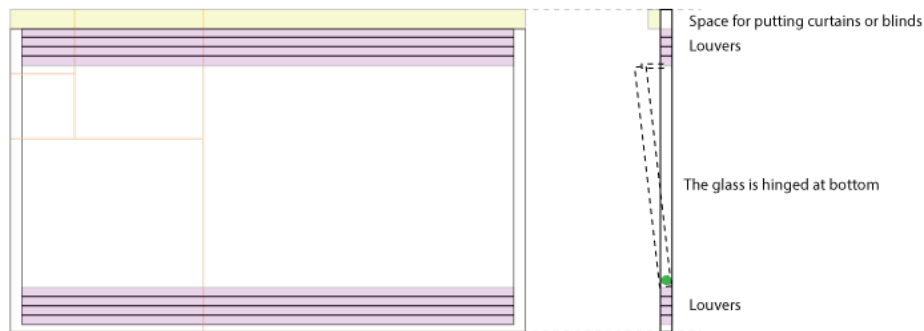
Ideation based on window opening orientation



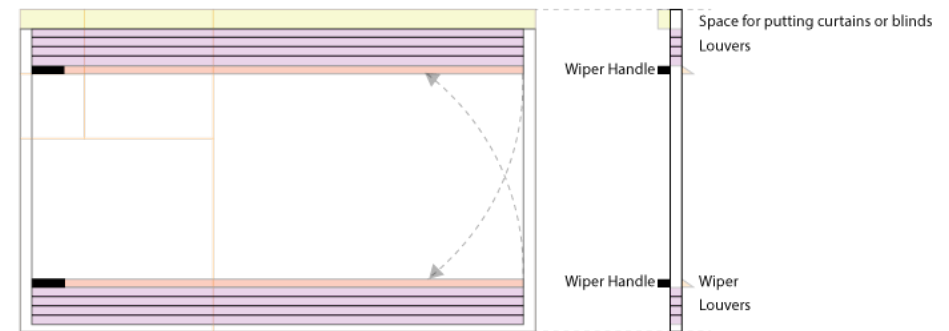
Fixed window



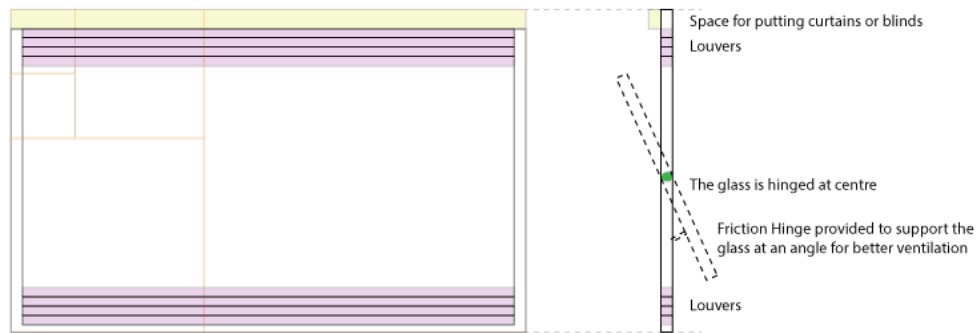
Centre pivoted window



Bottom pivoted window



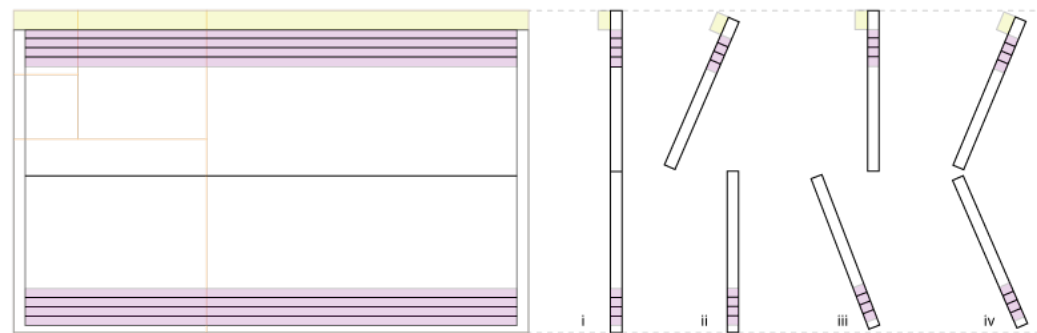
Wiper for easy cleaning



Centre pivoted window with a restricted degree of freedom

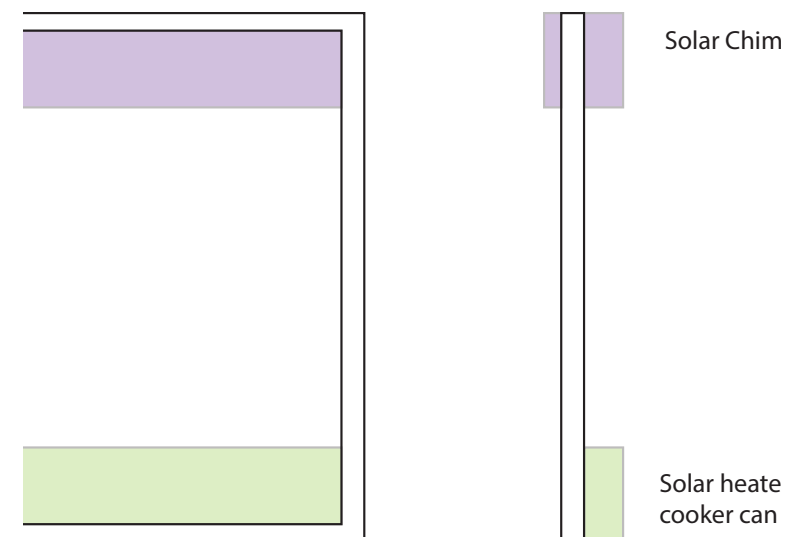
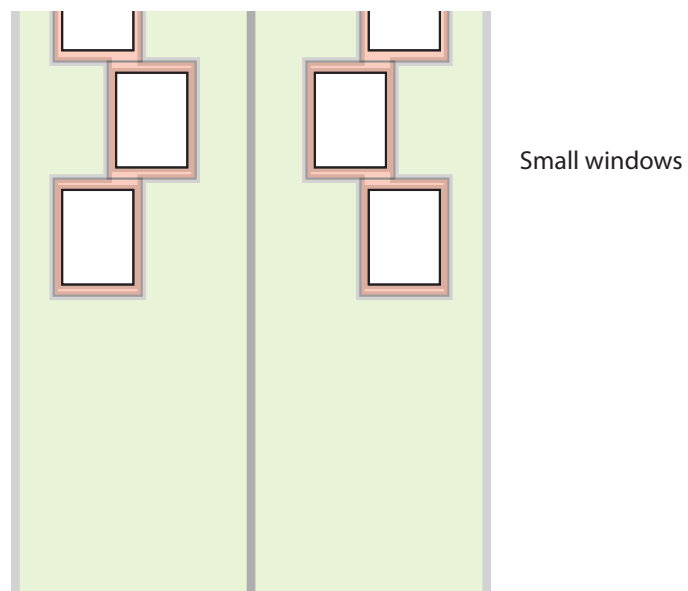
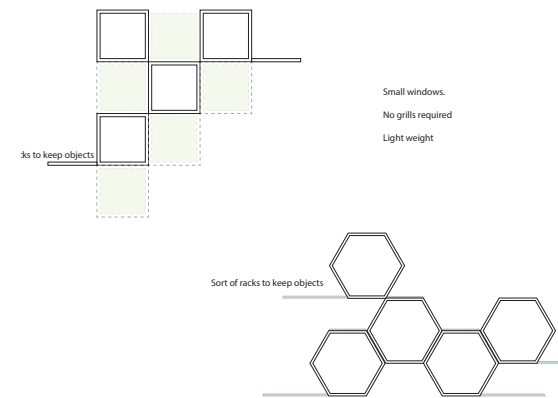
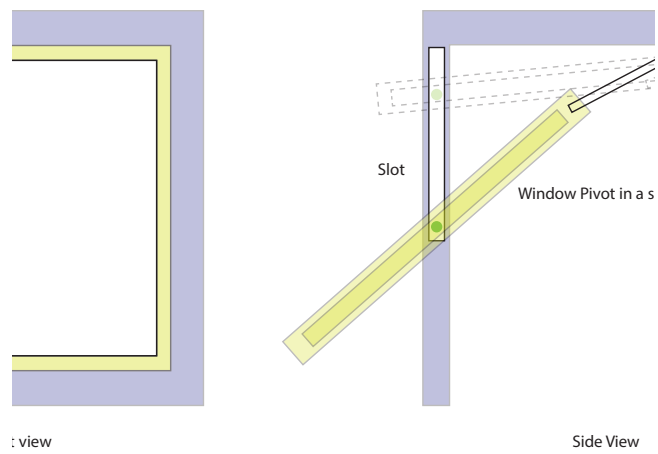


Fixed window with louvers

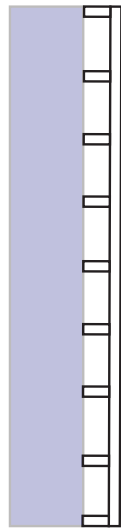


Windows that open from centre in different orientation

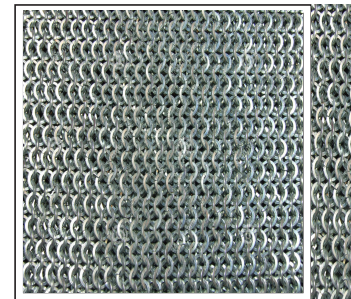
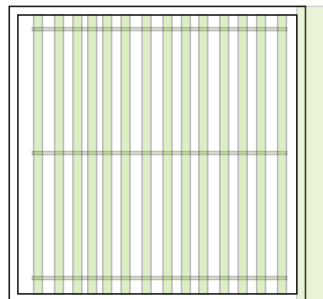
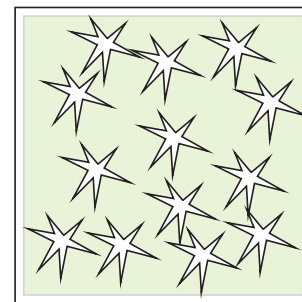
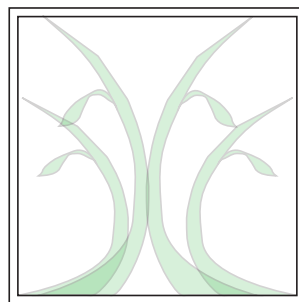
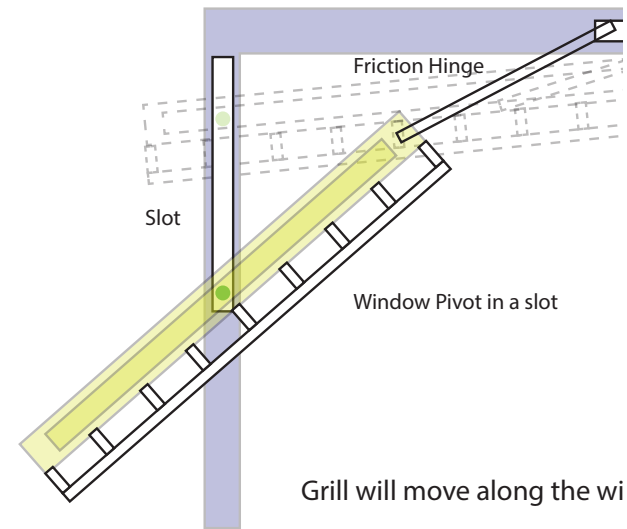
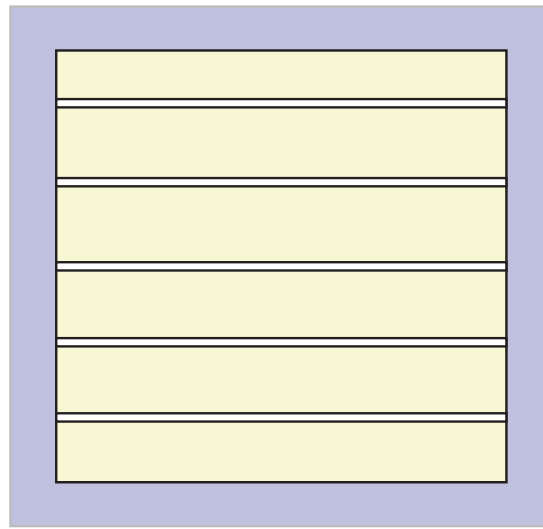
Ideation based on window shapes and functions

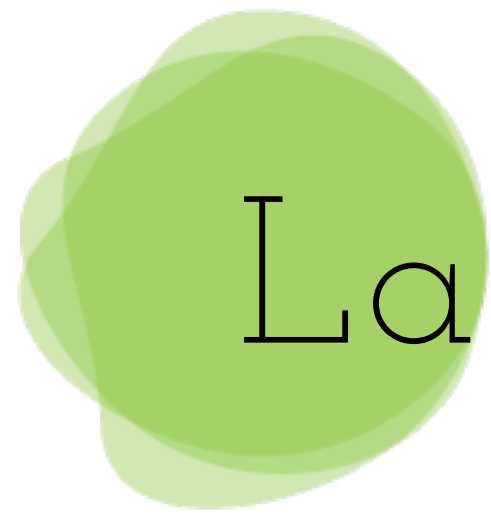


Ideation on grill types



Grill bolted or welded to the frame



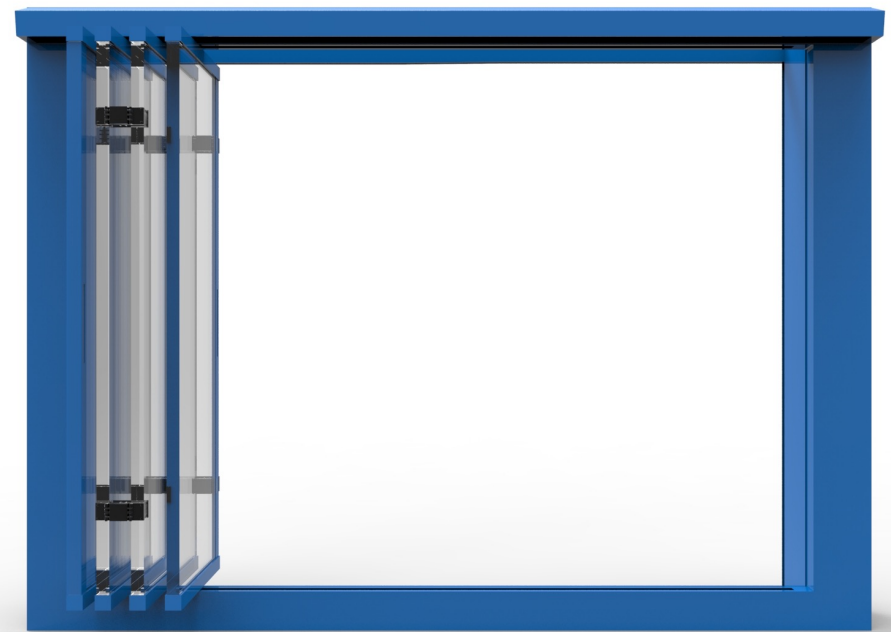
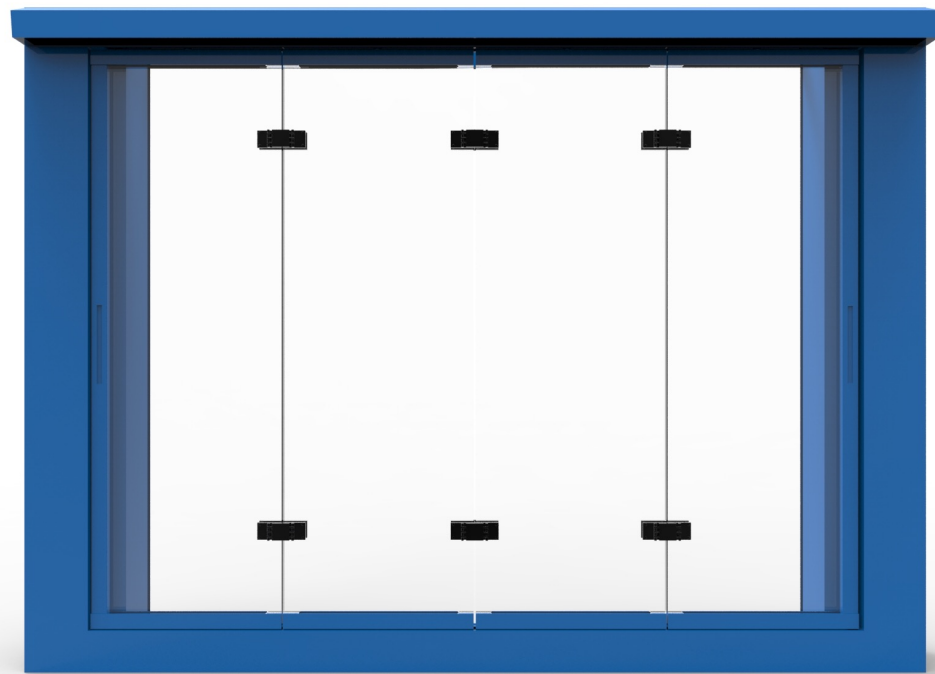


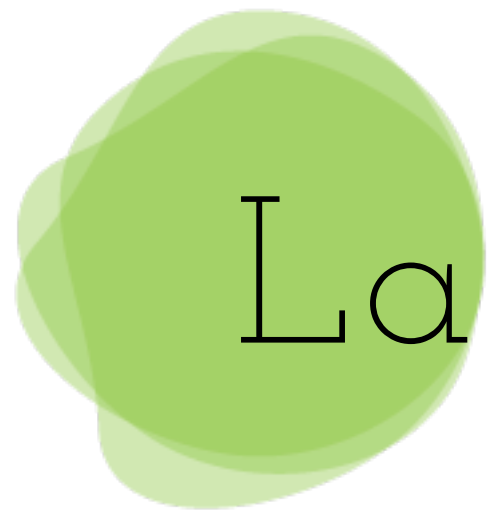
Lacunae in the ideation

The wow factor was found missing when the ideation were compared to some of the existing windows available in the market

We wanted to design a window system having homogenous aesthetics in every detail of it and also render it as a modular product. So the next phase of ideation began...

Sliding and folding window 1





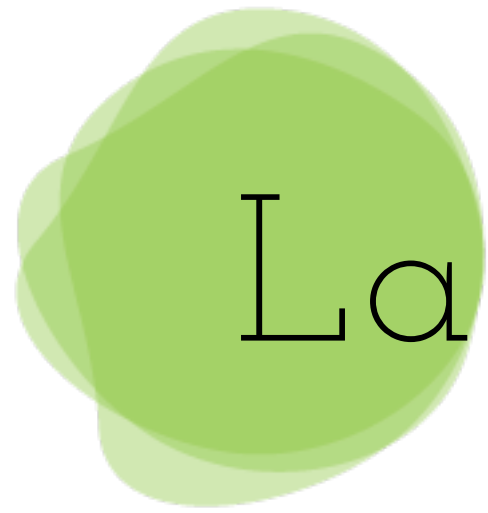
Lacunae in the ideation

A heavier glass has to be used as the window is frameless, thus making it more costly.

The grill system provided was not fool proof.

Sliding and folding window 2

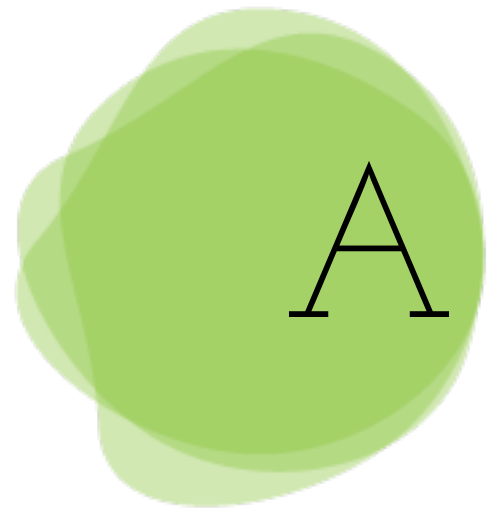




Lacunae in the ideation

Cleaning the glass panes was an issue as the new design has grills attached to it.

It still occupied some portion of the inside of house when opened up.



A Revised Brief

- No visual noise
- Grill as a part of the window
- Easy installation and removal of mosquito net.
- Easy cleaning of mosquito net
- New design of rails
- Aesthetics of the window pane channels
- Locking mechanism
- Opening mechanism

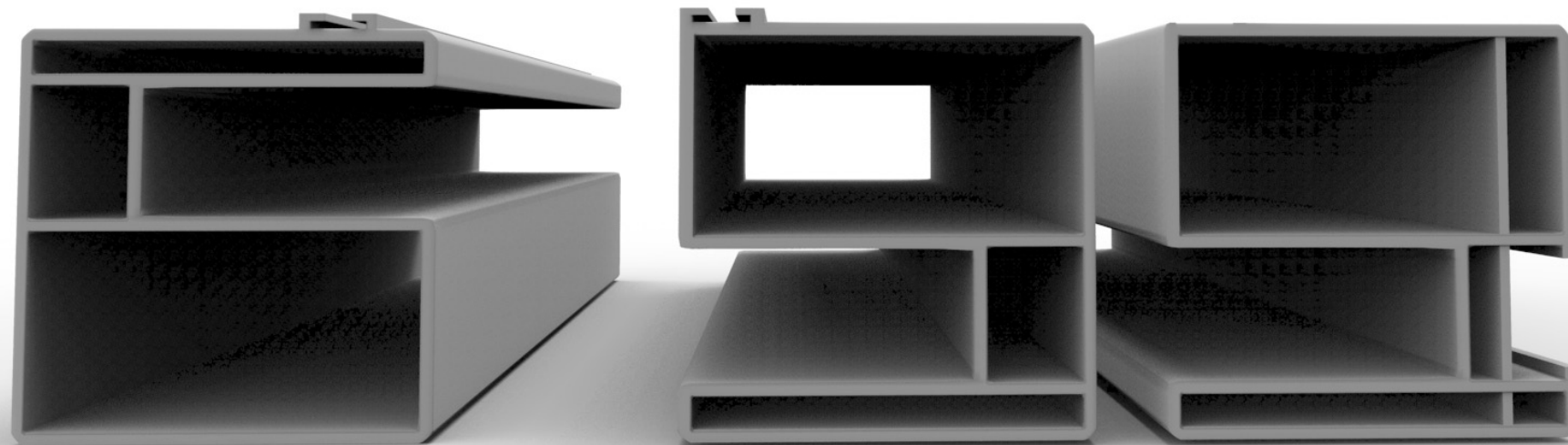
What creates Visual Noise in a window system?

- Various sections (vertical and horizontal) of not homogenous dimensions
- Too many planes or steps when the window is observed carefully
- Bad workmanship at the corners



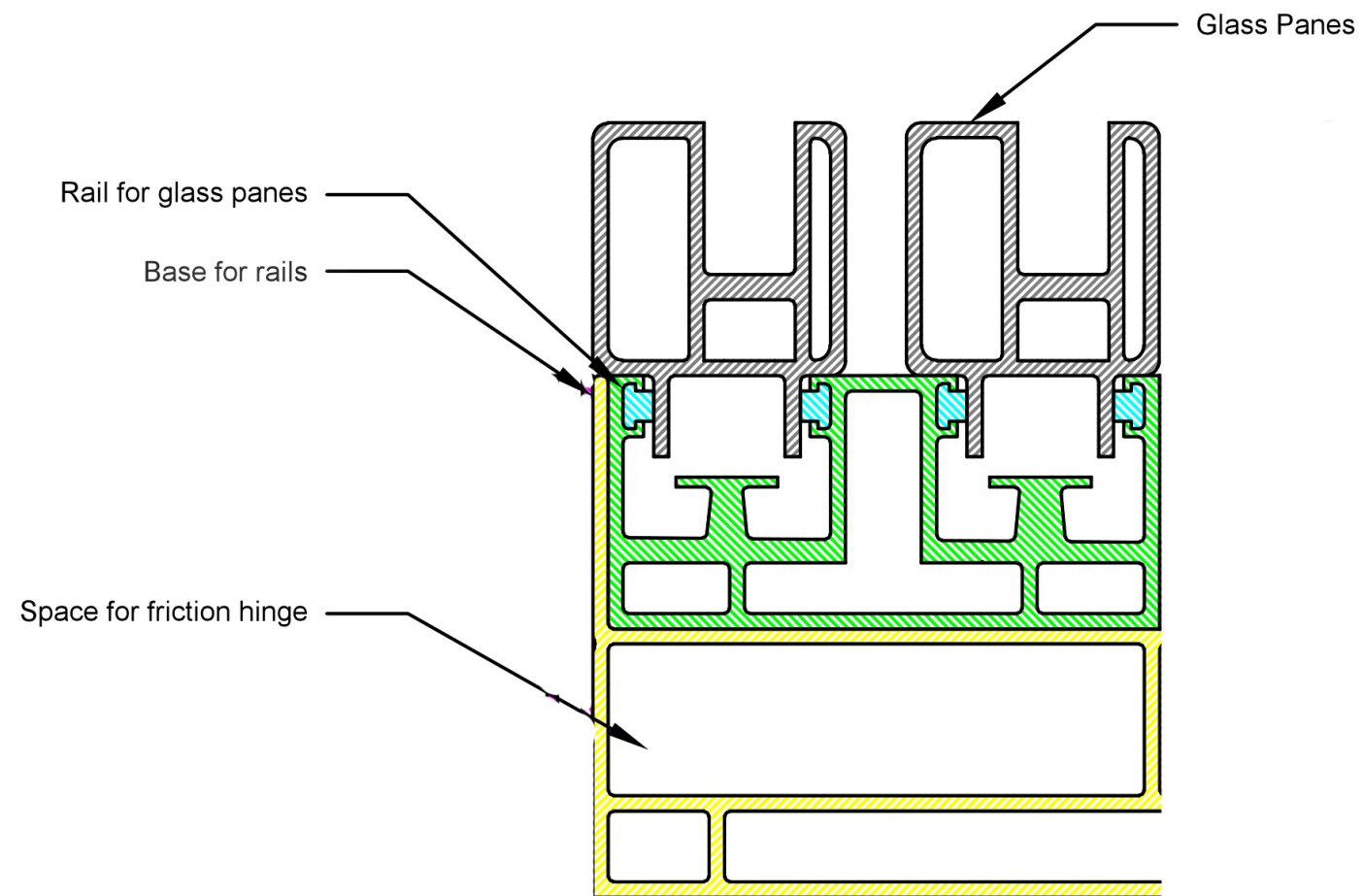
Window sections

Various sections of a pane



Window sections

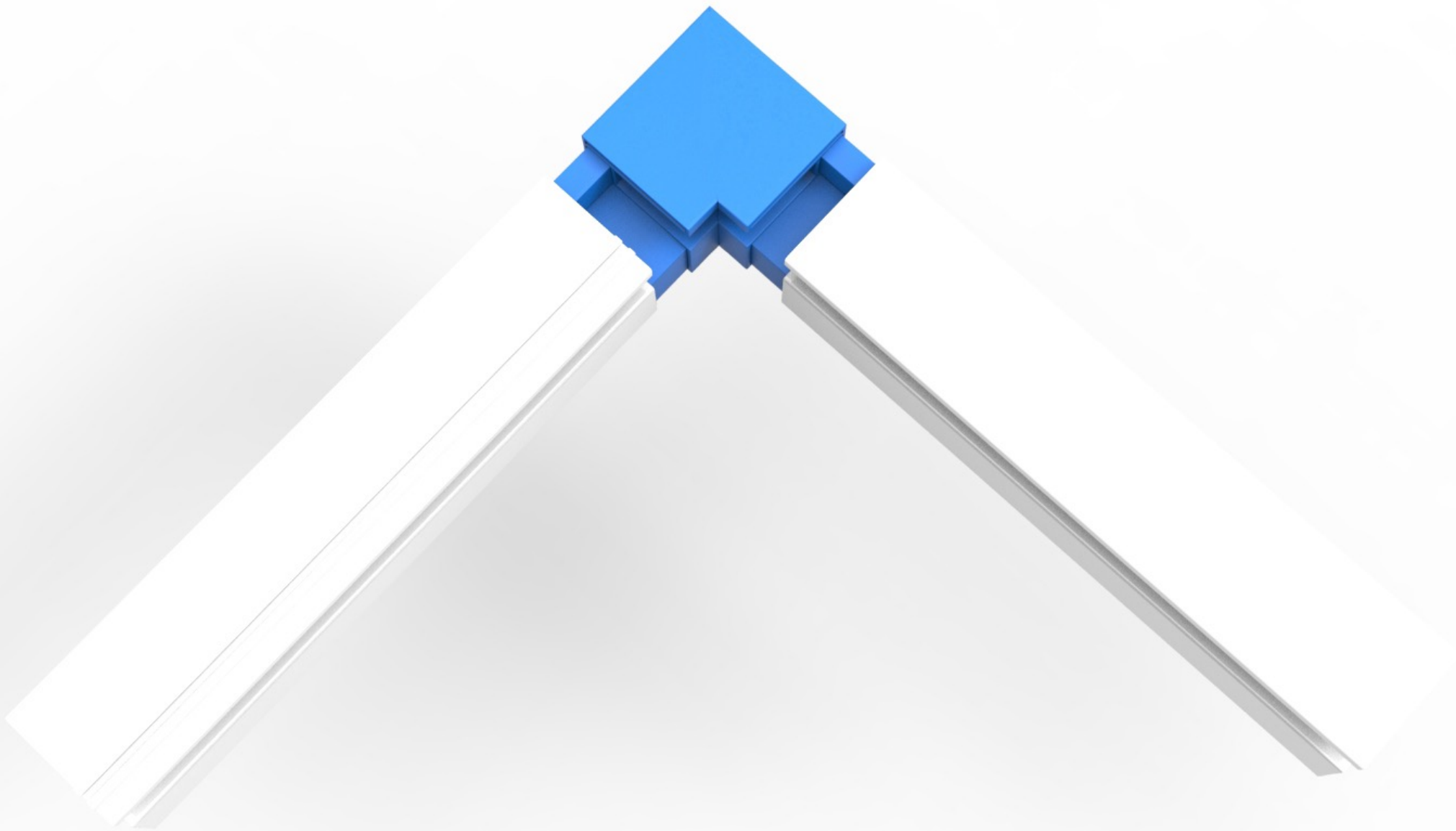
Various sections of a window assembly



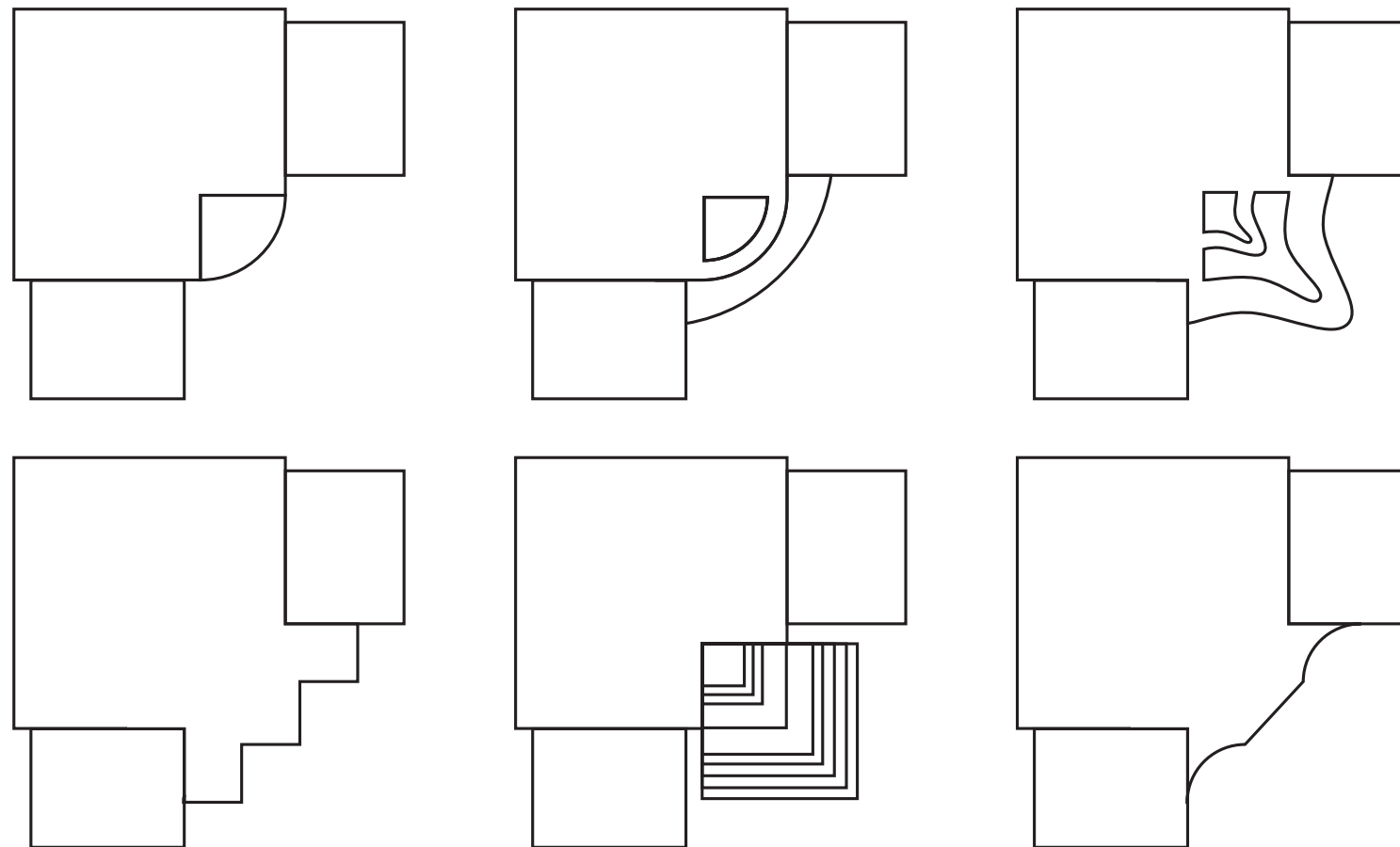


Window sections

Joining detail



Aesthetic treatment of the corner joint



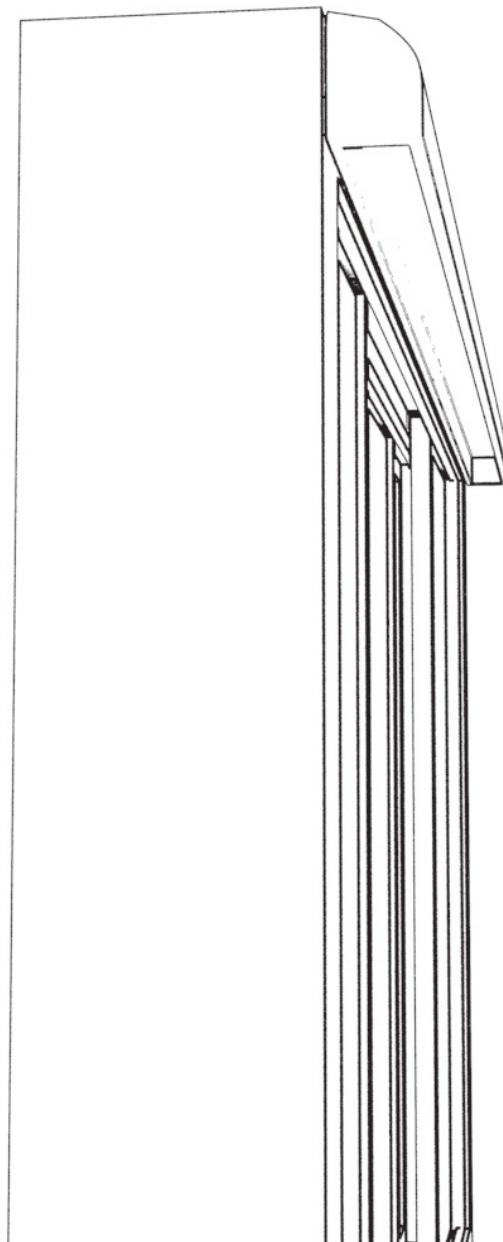


Aesthetic treatment of the corner joint





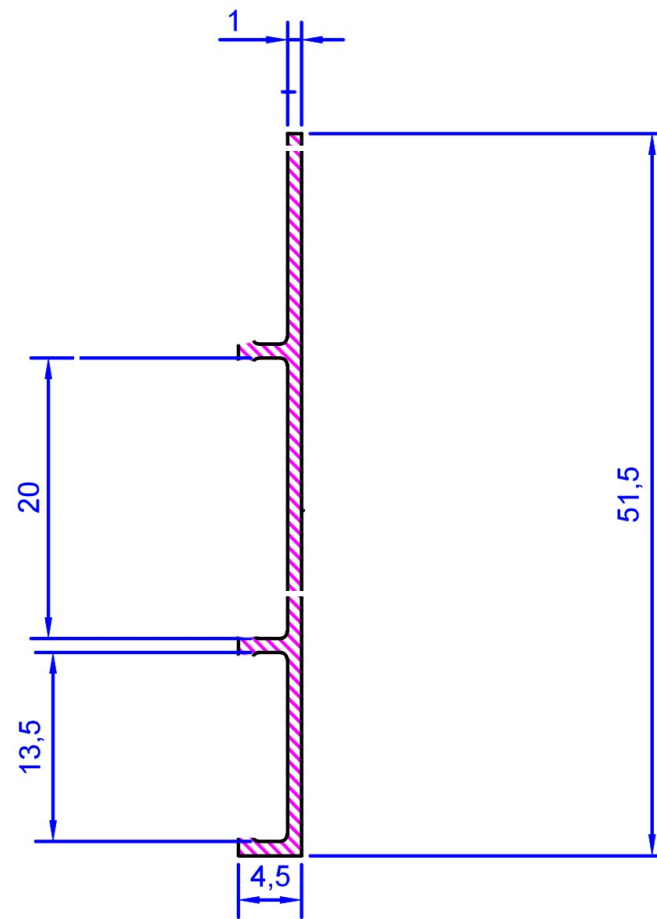
Provision for Mosquito net





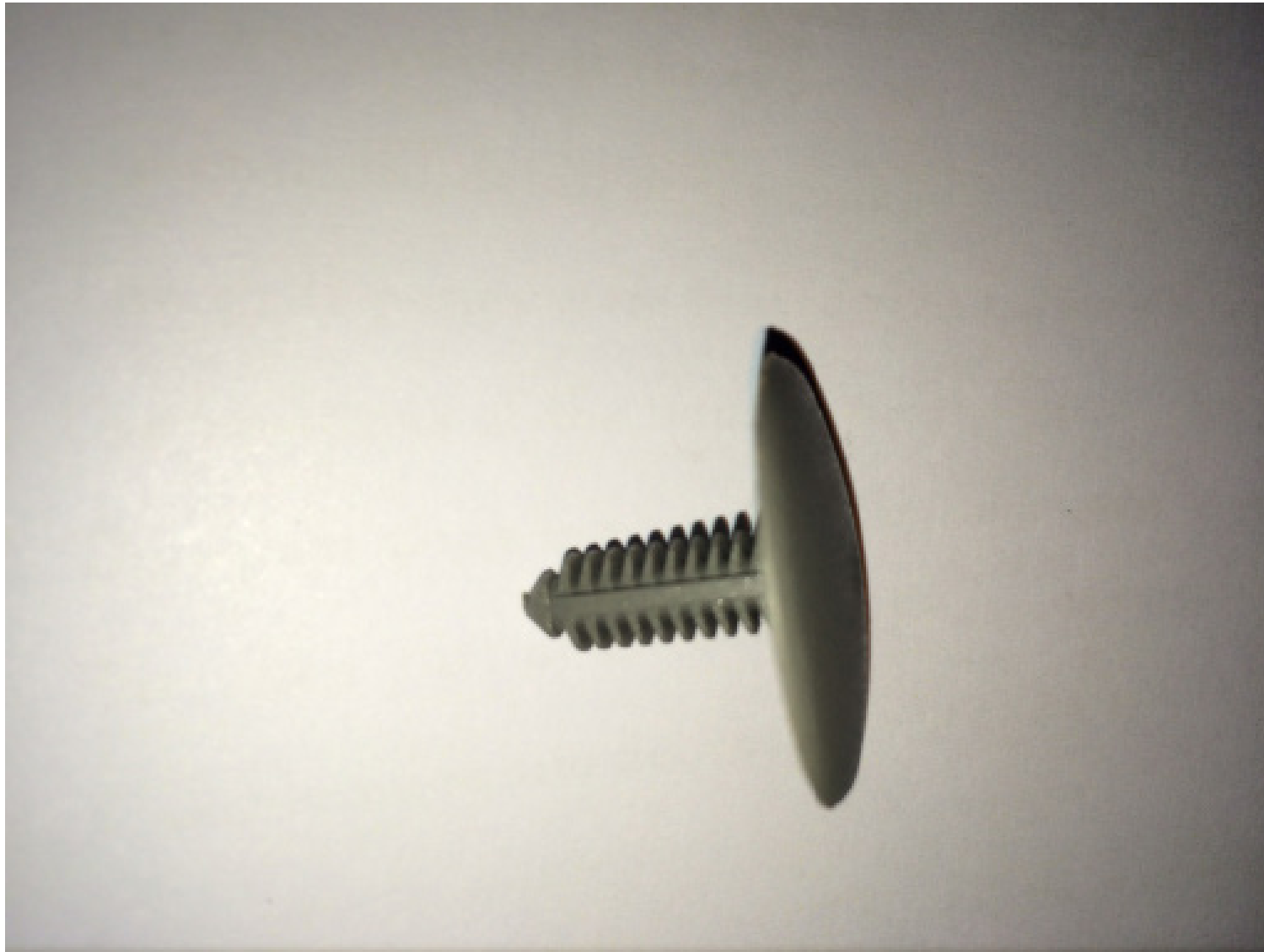
Provision for Mosquito net

A channel for putting the net



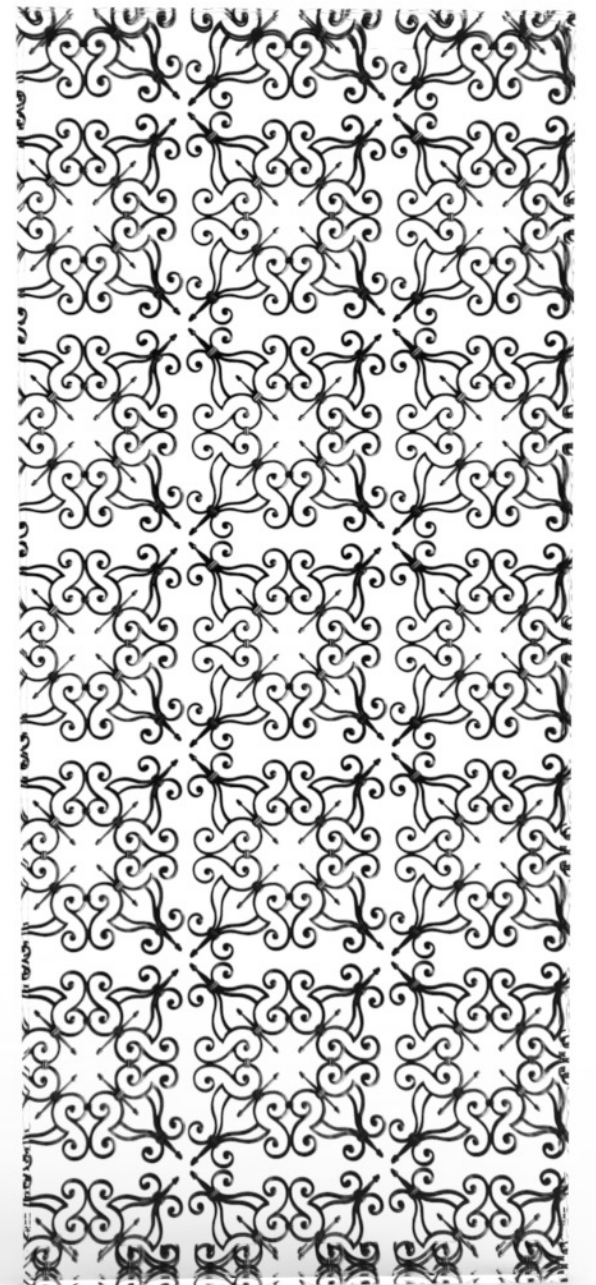
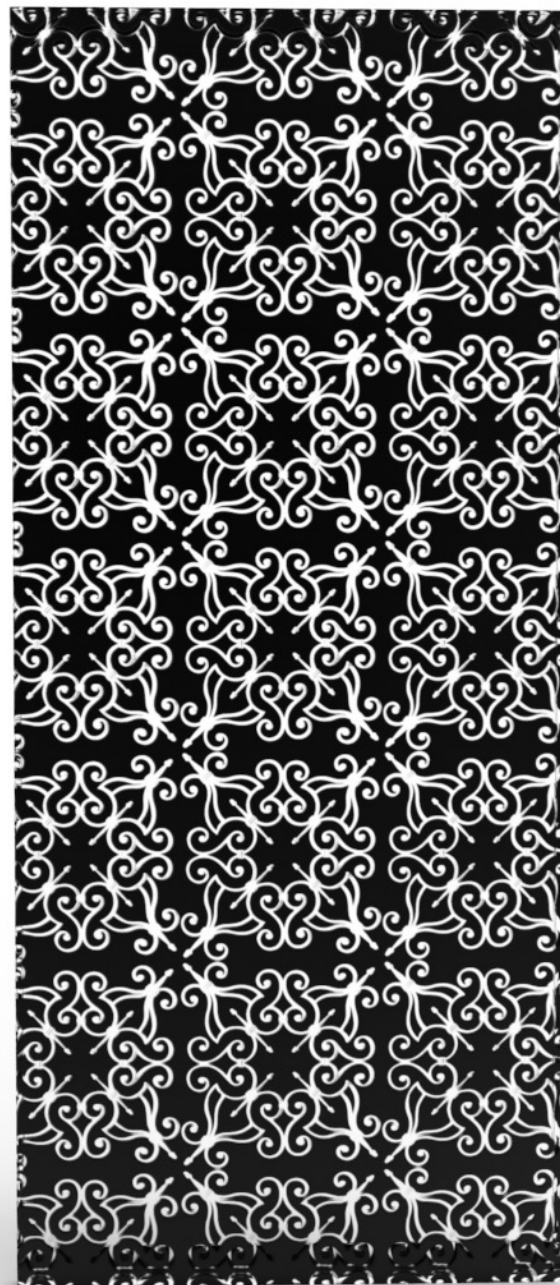
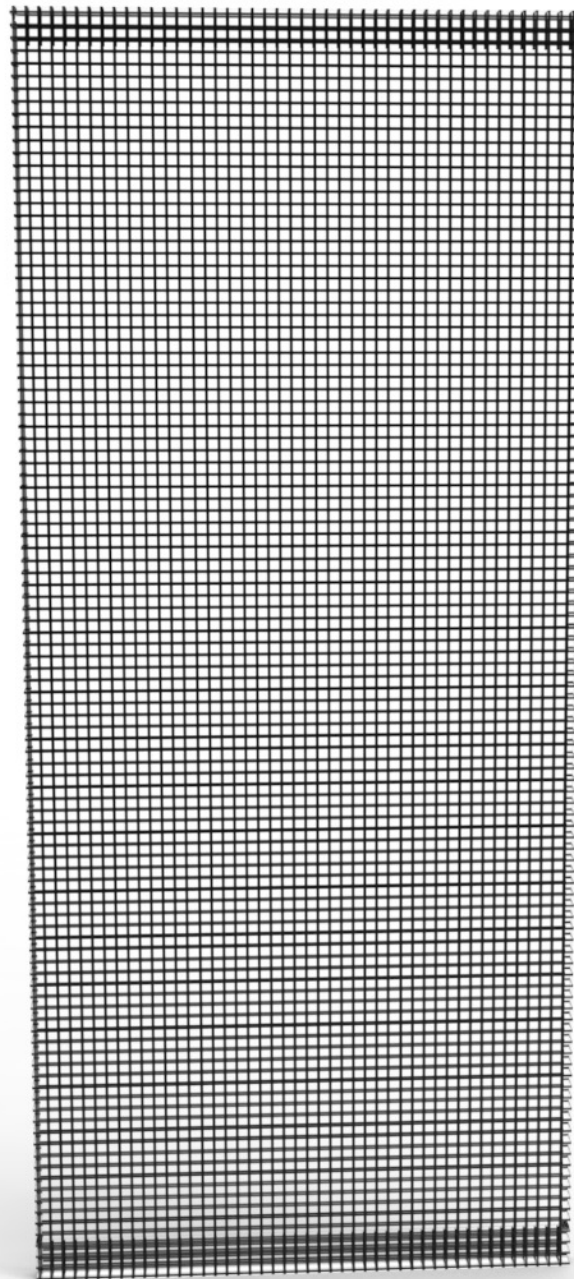
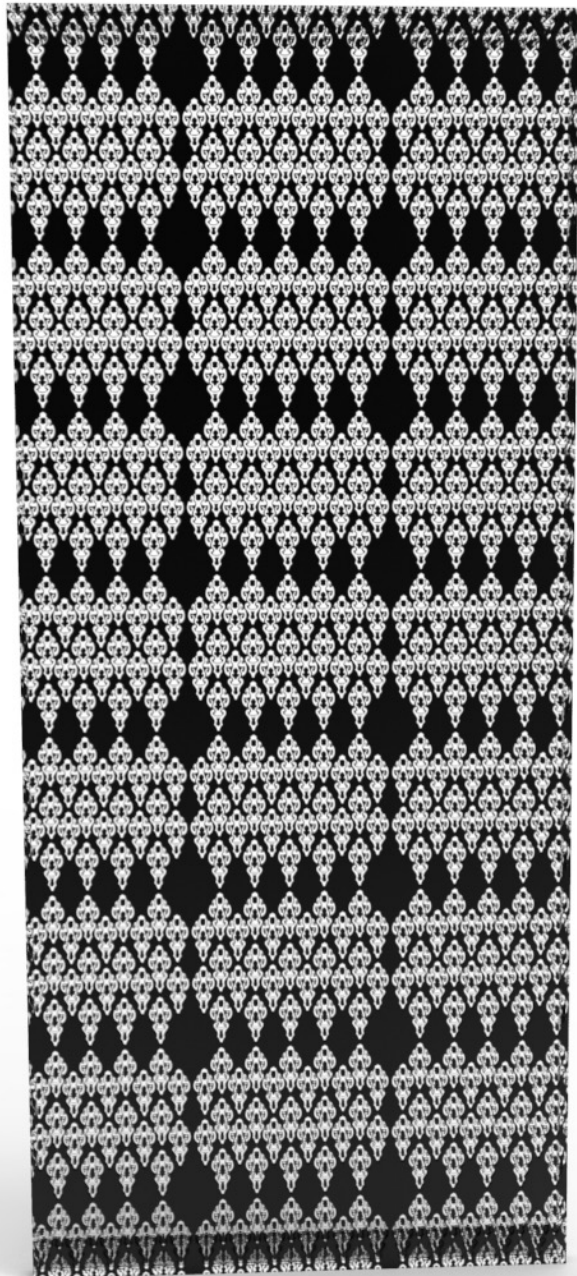
All Dimensions are in mm

Joining detail for Mosquito net



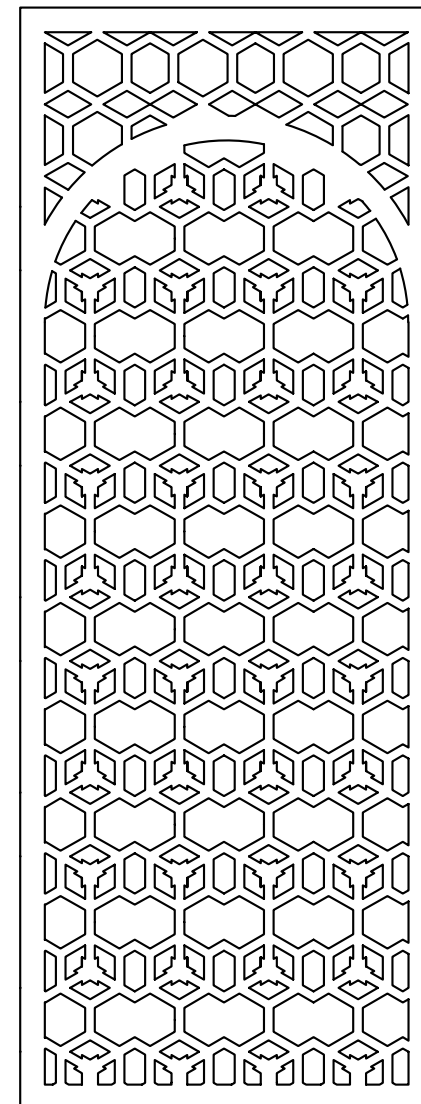
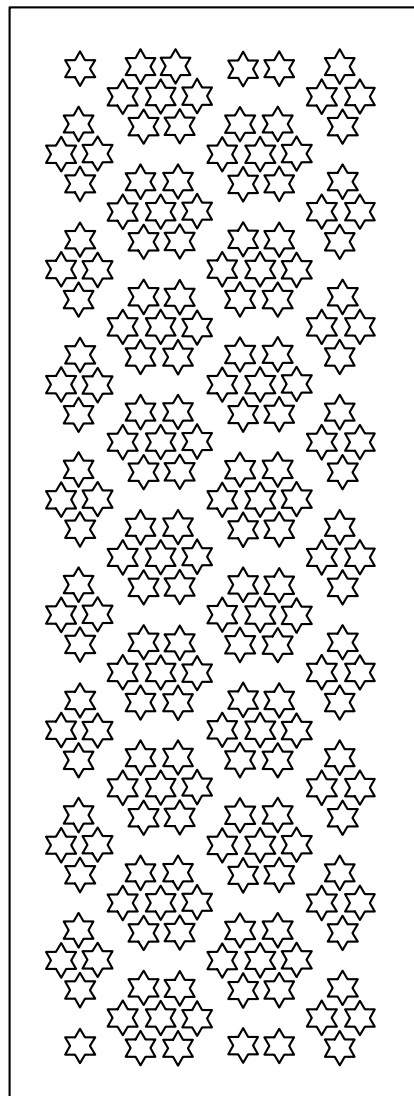
Grills

Various possibilities for grills

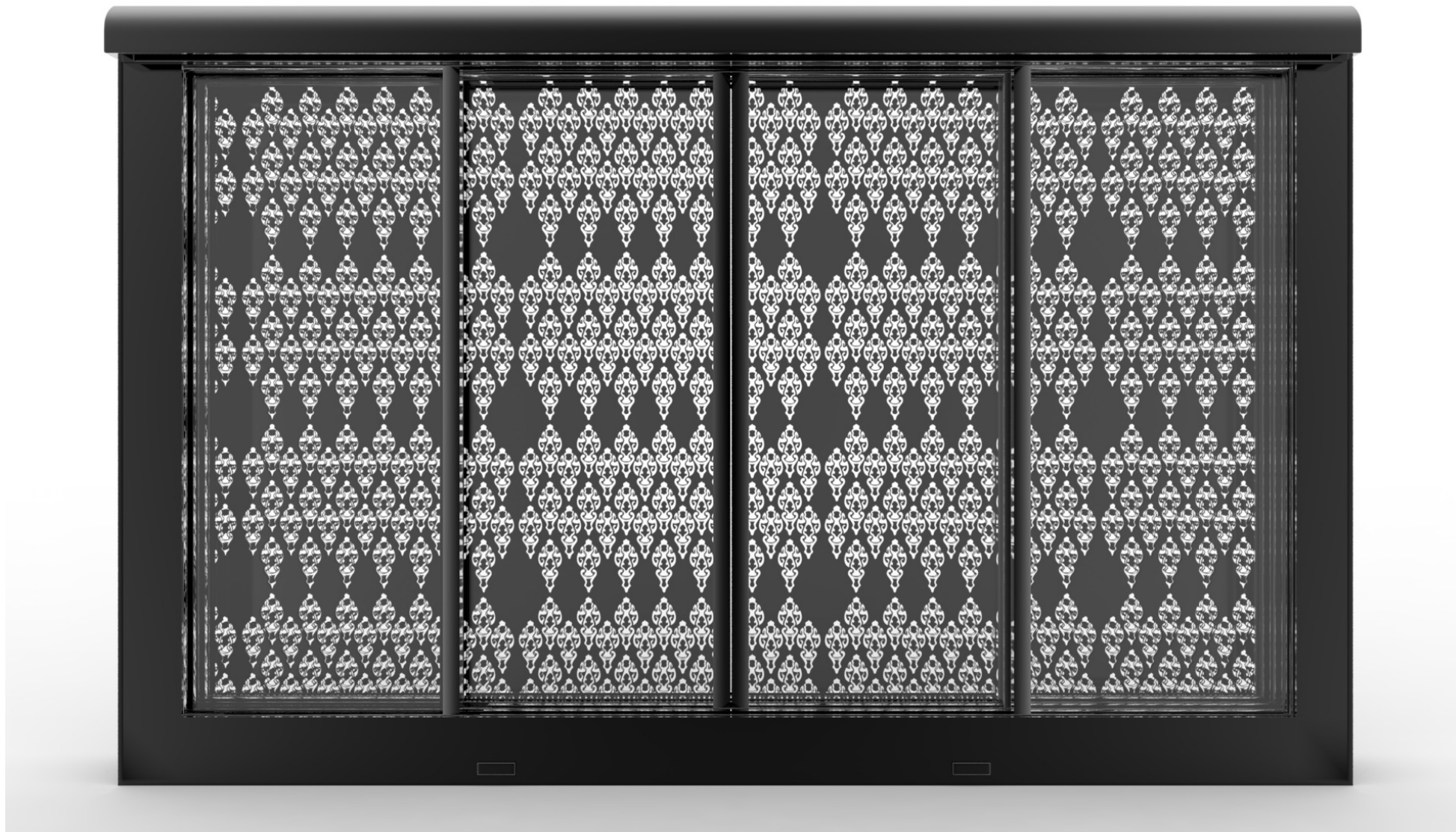


Grills

Various possibilities for grills

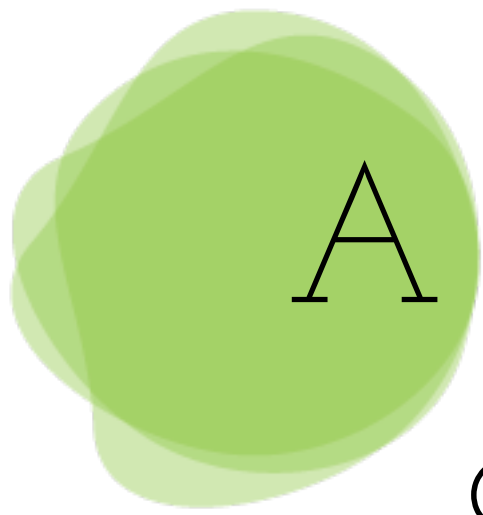


When fully closed

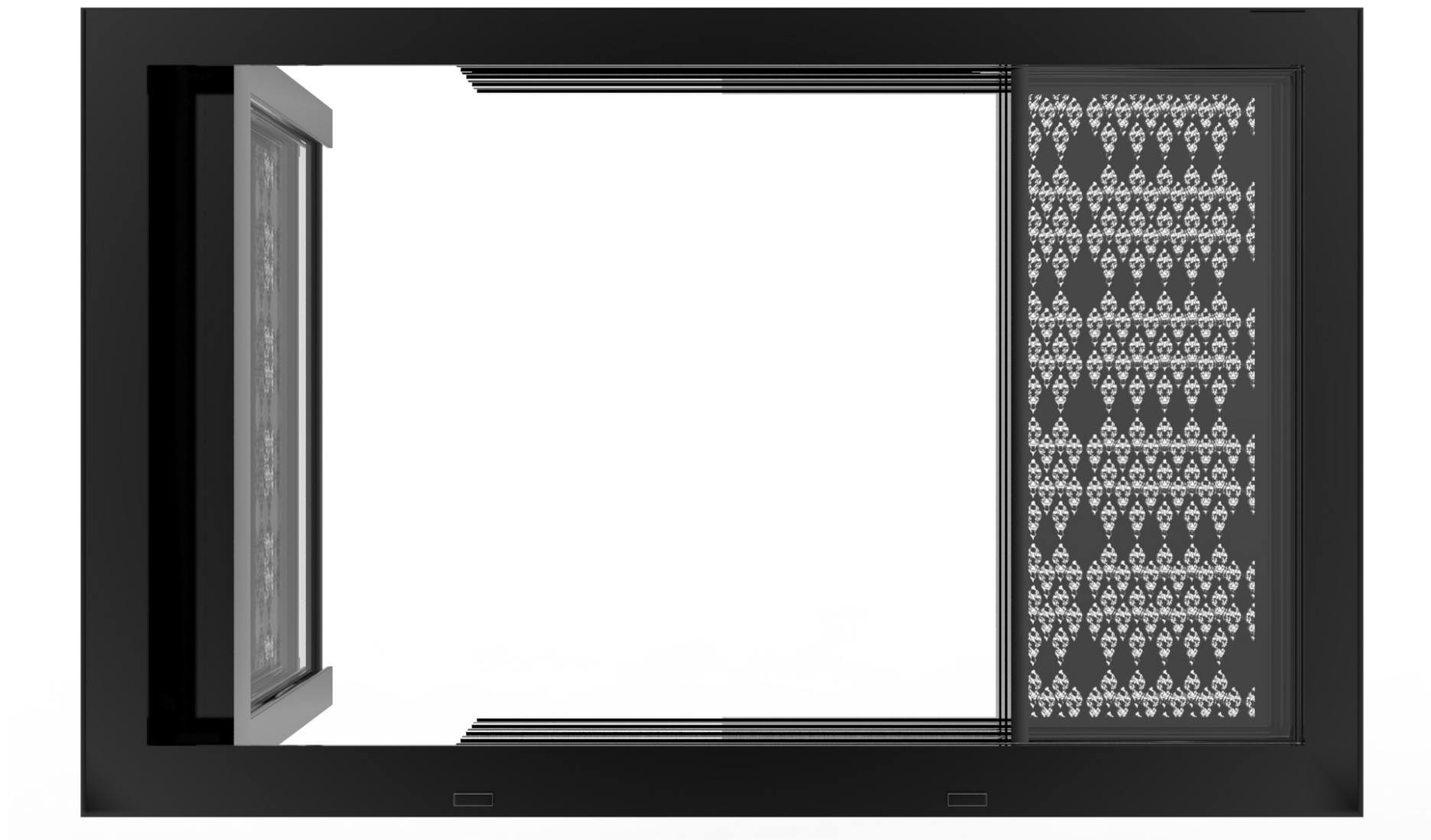


When half opened



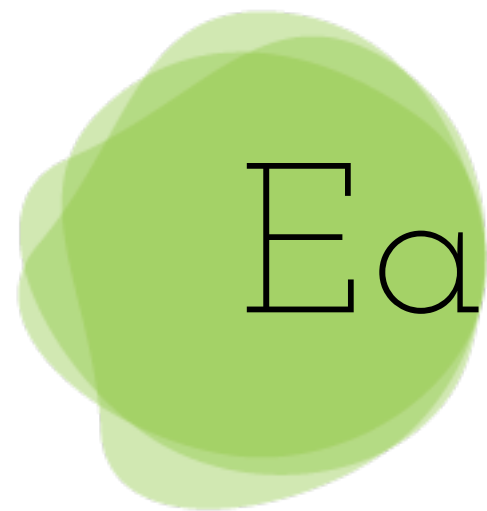


A marriage of casement and sliding window



Fully opened window :
View from outside

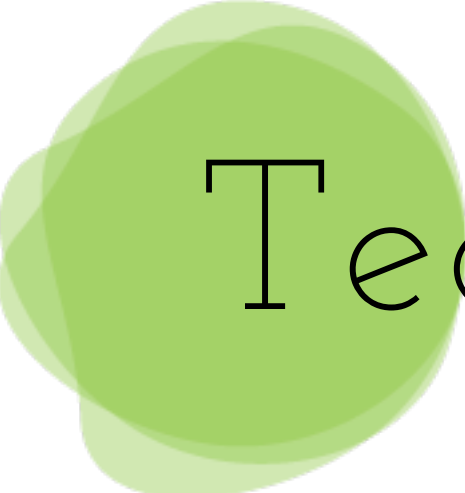




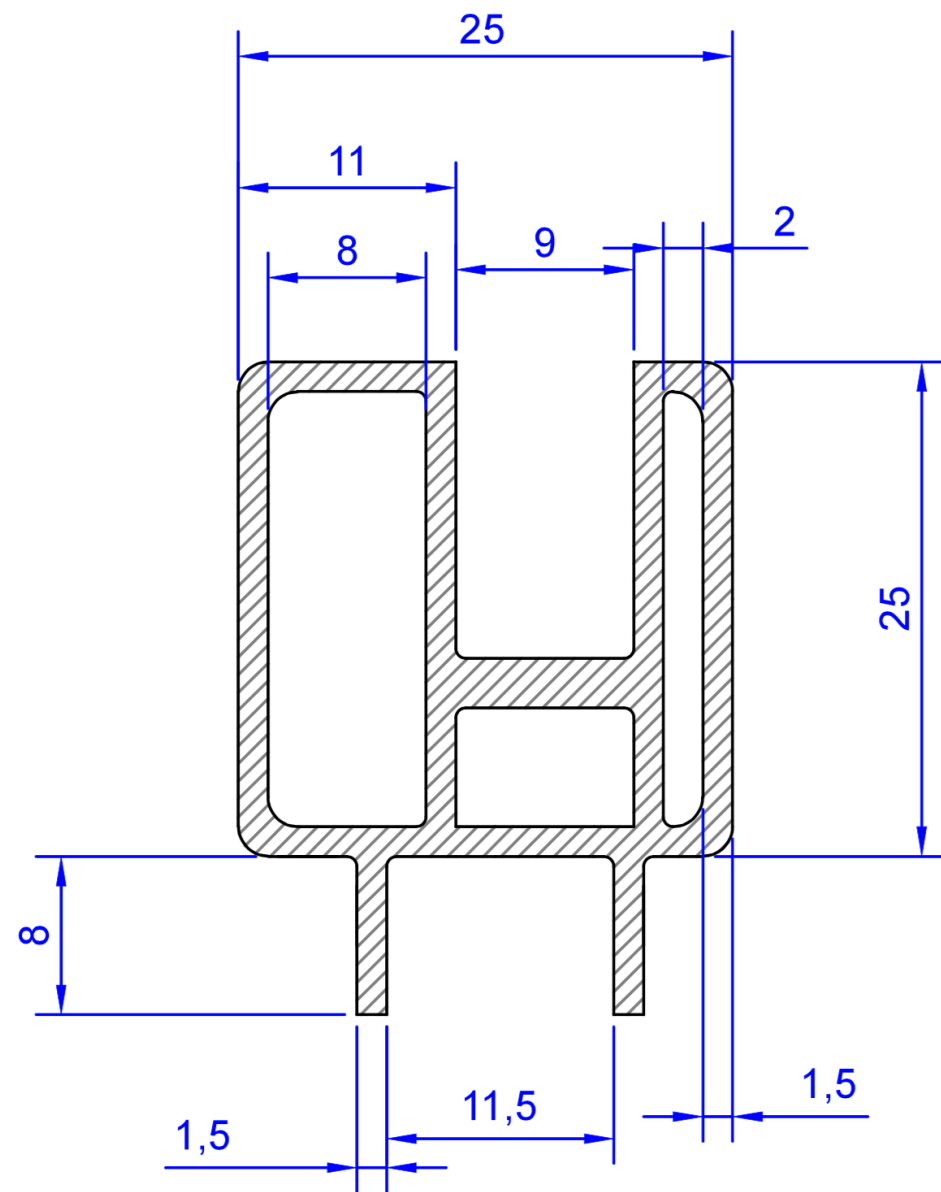
Ease of cleaning

Cleaning is now easy

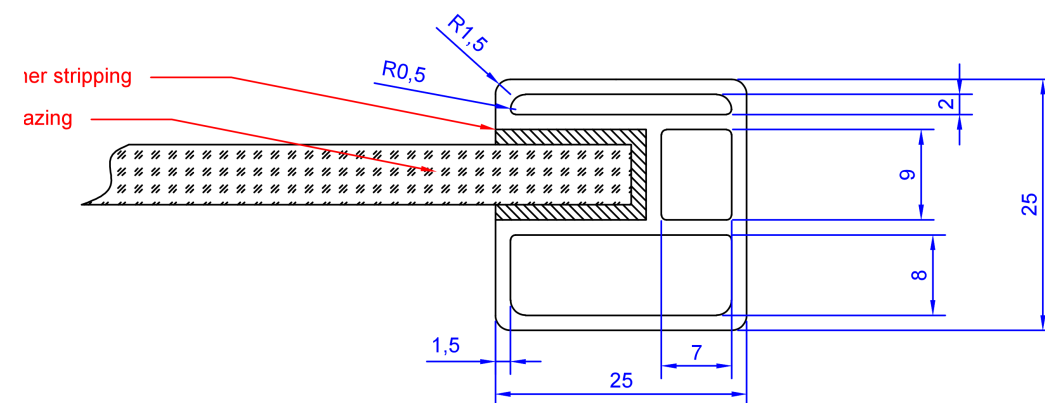


The text "Technical details" is displayed in a black, monospaced font. The letter "T" is positioned to the right of a decorative graphic consisting of three overlapping circles in various shades of green. The circles are arranged in a cluster, with the largest one in the center and two smaller ones partially overlapping it from the left and top-left.

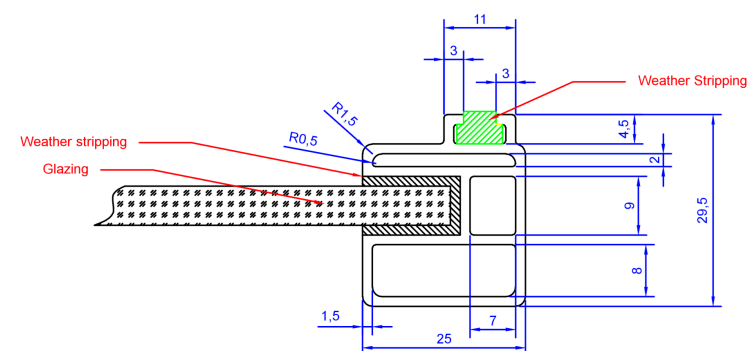
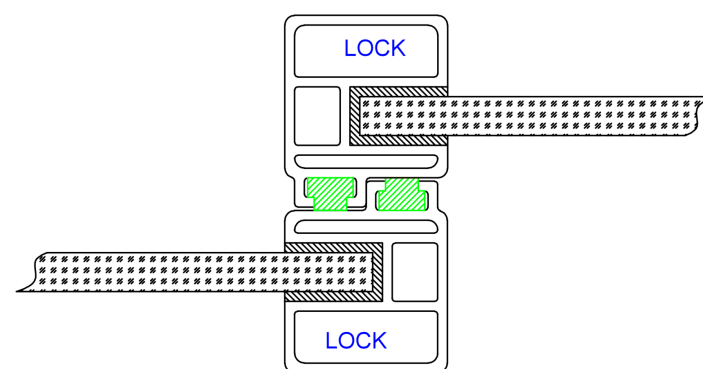
Technical details



All Dimensions are in mm



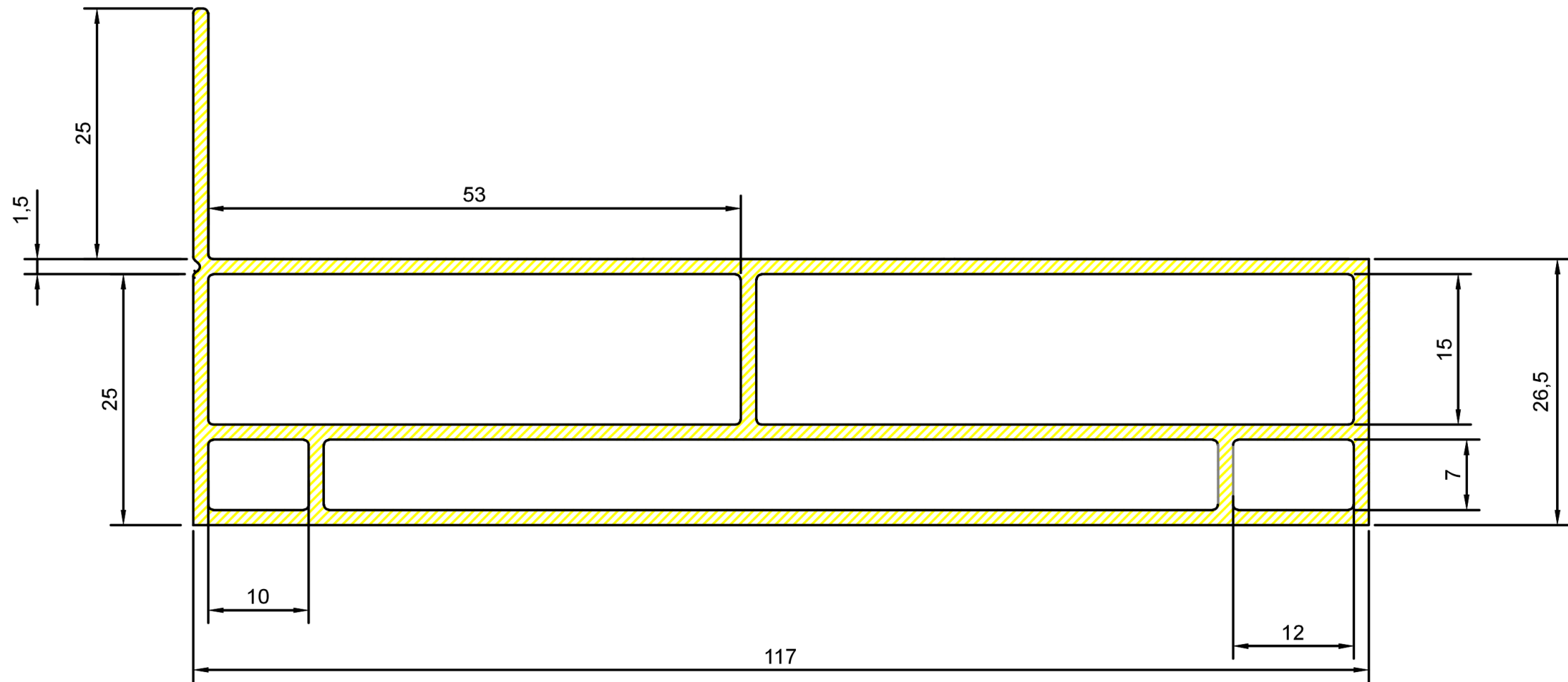
All dimensions are in mm.



Bo



Bottom frame section



All Dimensions are in mm

References

[1] WIKIPEDIA

Window

In-text: (Wikipedia, 2014)

Bibliography: Wikipedia, (2014). Window. [online] Available at: <http://en.wikipedia.org/wiki/Window> [Accessed 20 Sep. 2014].

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Doors and windows

In-text: (Slideshare.net, 2014)

Bibliography: Slideshare.net, (2014). Doors and windows. [online] . Available at: <http://www.slideshare.net/animesh91/doors-and-windows> [Accessed 20 Sep. 2014].

REPLACEMENT WINDOWS CONNECT

Fixed Windows | Fixed Frame Window Costs, Pros And Cons

In-text: (Replacement Windows Connect, 2014)

Bibliography: Replacement Windows Connect, (2014). Fixed Windows | Fixed Frame Window Costs, Pros And Cons. [online] Available at: <http://replacementwindowsconnect.com/styles/fixed-frame-windows/> [Accessed 20 Sep. 2014].

ARCHITECTURE AND DESIGN

Timber versus aluminium

In-text: (Architecture And Design, 2008)

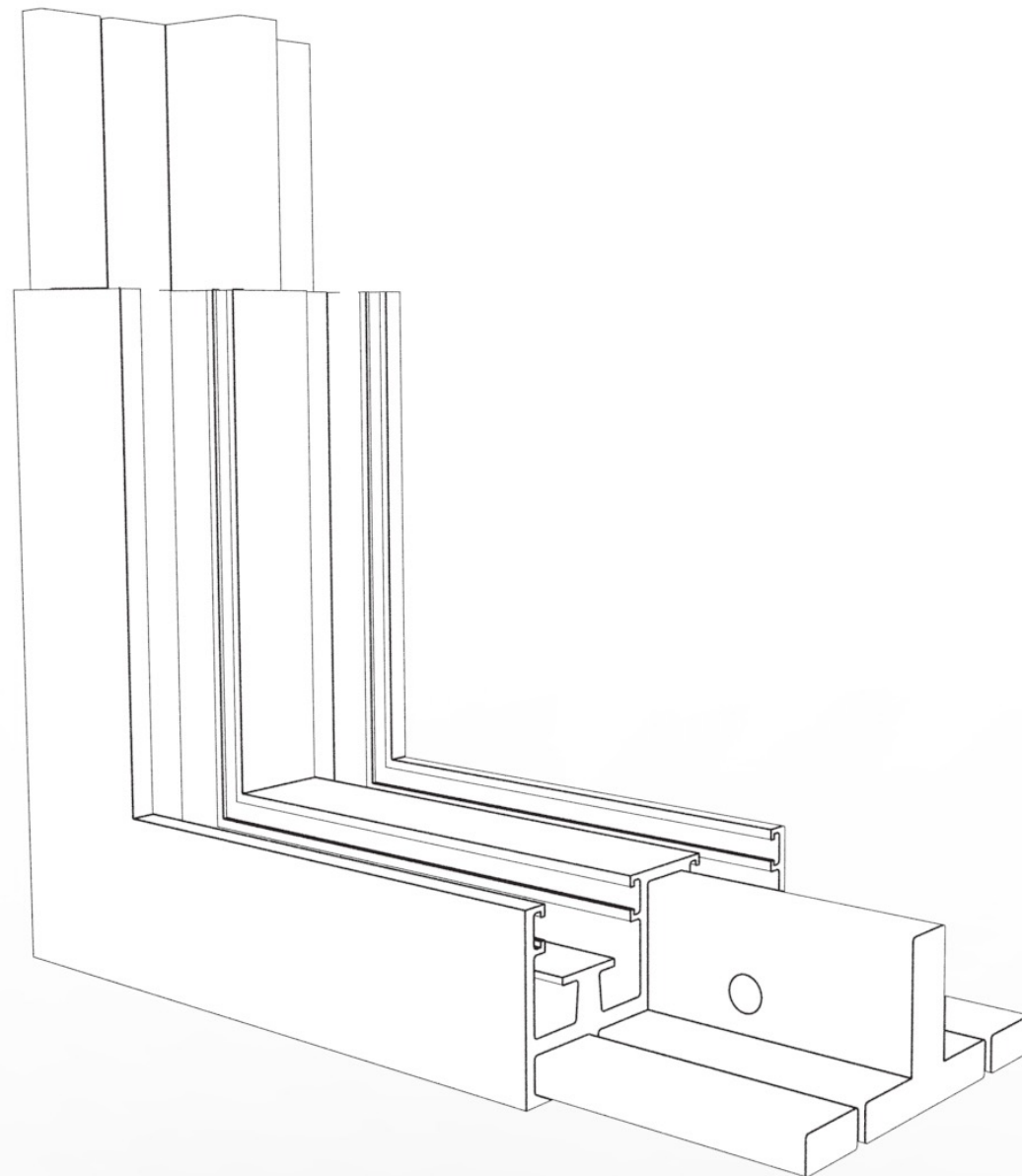
Bibliography: Architecture And Design, (2008). Timber versus aluminium. [online] Available at: <http://www.architectureanddesign.com.au/news/industry-news/timber-versus-aluminium> [Accessed 10 Oct. 2014].



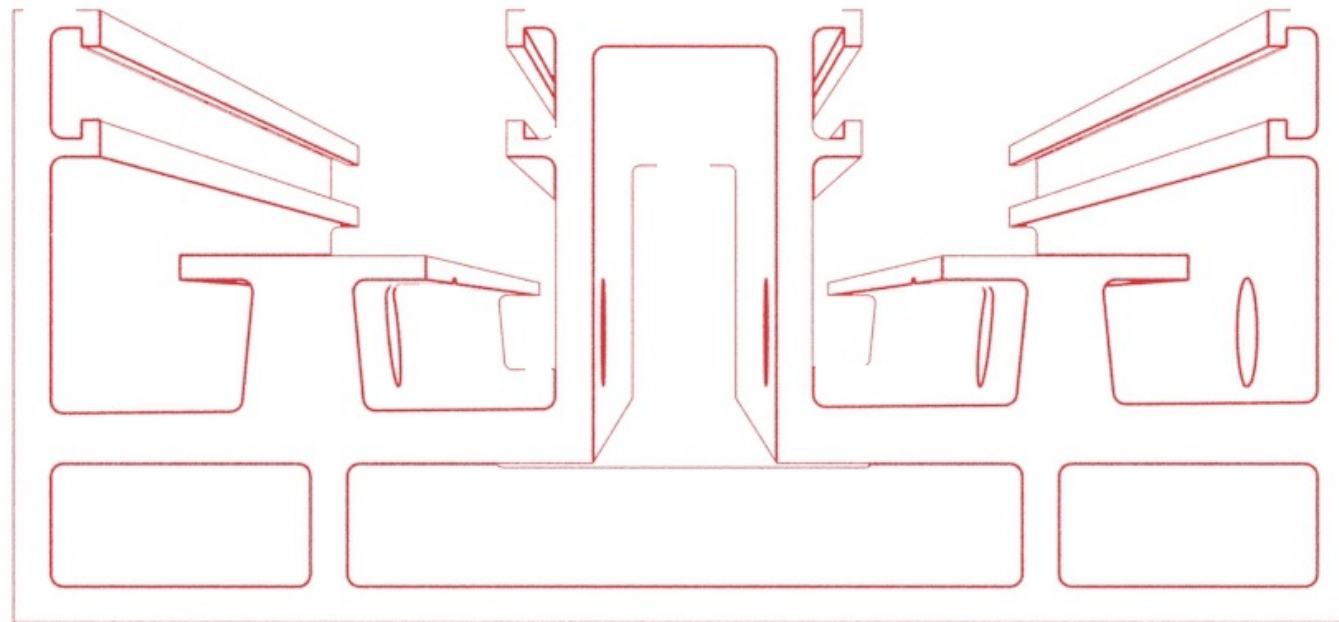
Thank You

Bottom Rail sections

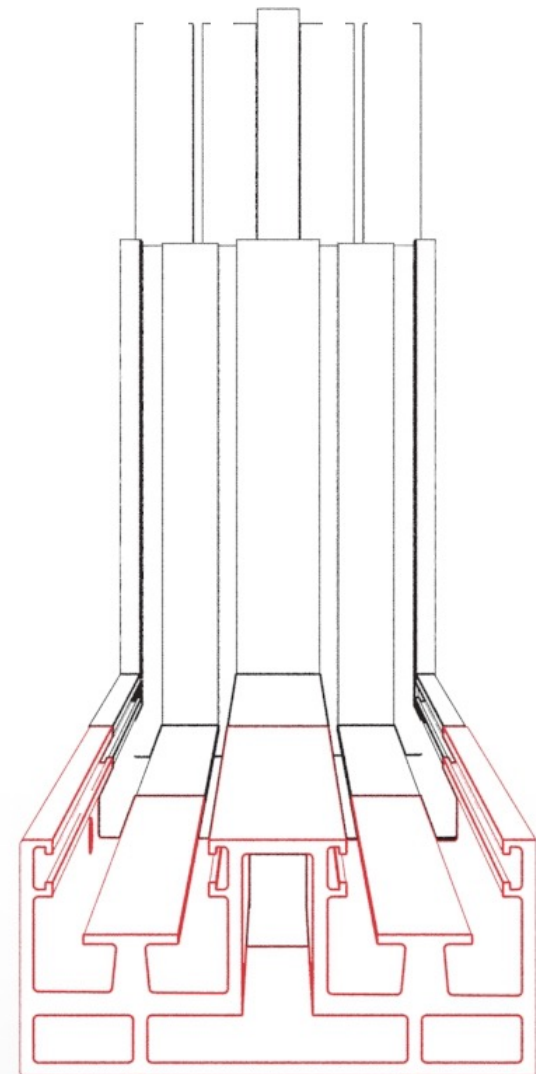
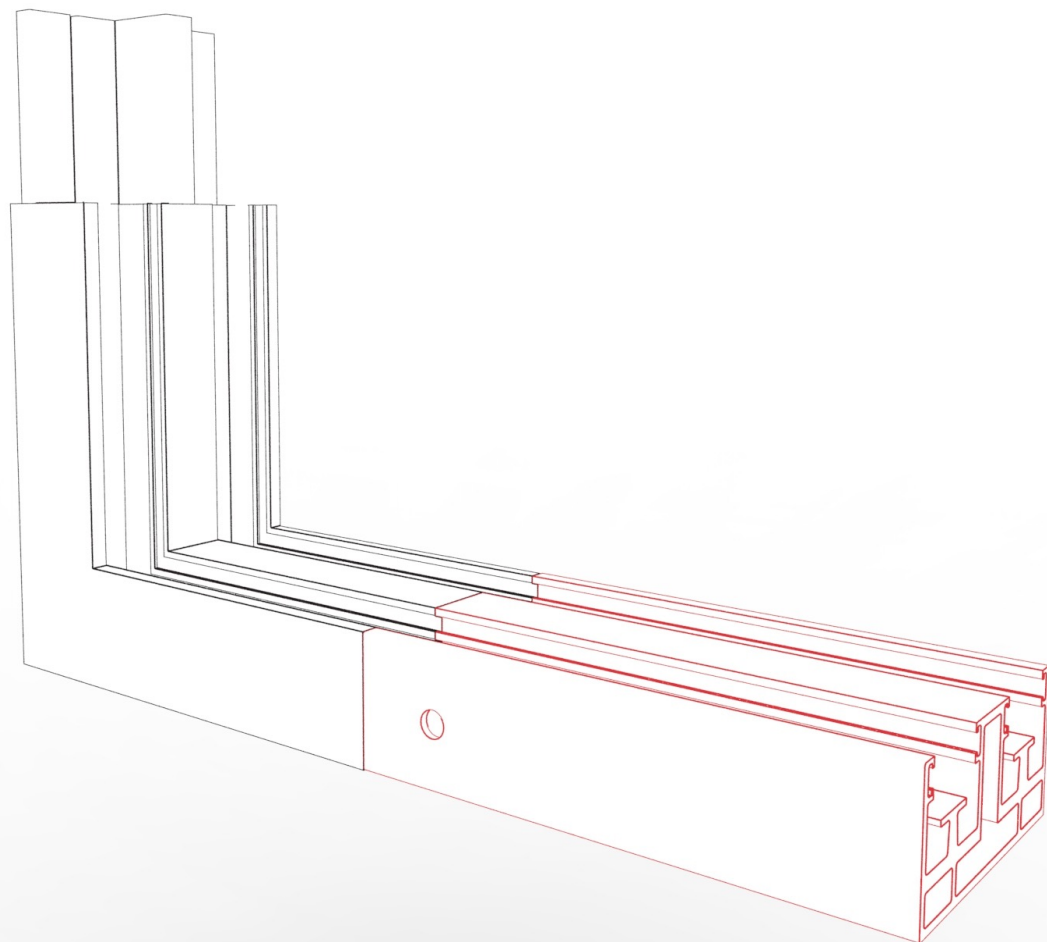
Corner joining detail



Bottom Rail sections



Bottom Rail sections



Joining detail: Rails

