

**Our core competence?
We make your facades future-ready.**

Your Challenge: Fenestration Heat Gain in the Tropics

Do we know where the heat gain is coming from?

Our industry has typically focused on reducing center of glass (COG) U-value to drive down overall fenestration U-value. In Singapore, double glazed windows with low-e coating are commonly used in commercial buildings, reducing heat gain through the glazing.

From the below thermal image, we can see that the glazing area is yellow/green/blue, suggesting that it is relatively cool with little heat gain.

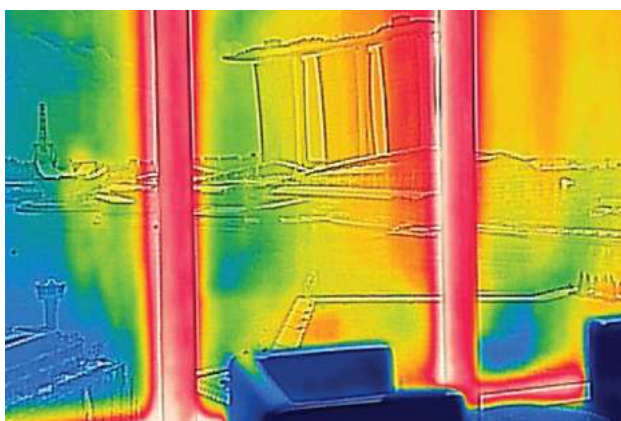


Image captured with FLIR Thermal Imaging Camera

However, there is still significant heat gain into the indoor environment, highlighted by the red region - the frame and edge of glass.

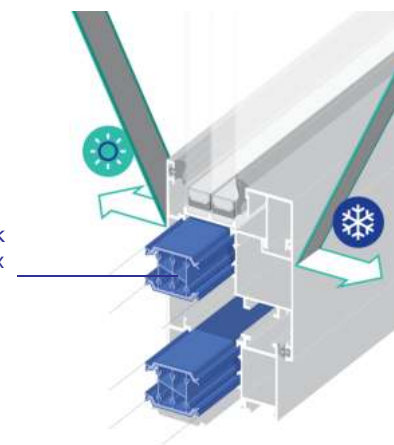
The question now is - how can we address this to optimise the fenestration performance?

Our Solution: Designing for High-performance Facades

Reducing Heat Gain through Aluminum Frames

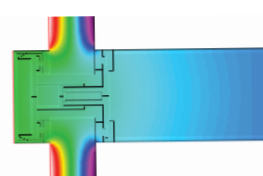
Fenestration frames are often made of aluminum, a good conductor of heat with a material thermal conductivity of 160W/mK.

By using a thermal break, the interior and exterior aluminum sections are separated, substantially reducing heat gain through the frames.

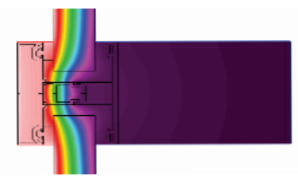


Technoform Thermal break with thermal conductivity 533x lower than aluminum

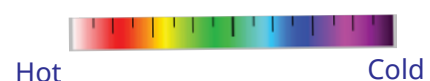
From a thermal simulation we conducted, there is over **70% reduction** in U-frame value from 17.1W/m²K to 3.0W/m²K.



Frame U-value: 17.1W/m²K
Frame SHGC: 0.309



Frame U-value: 3.0W/m²K
Frame SHGC: 0.053

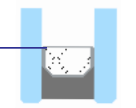


Our next step: Edge of Glass

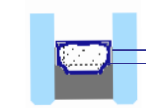
After the frame performance is optimised, heat will then enter through the next weakest link: edge of glass.

Typically, double glazed units are separated by aluminium spacers, which have high thermal conductivity, resulting in heat transfer at edge of glass.

Aluminum with high thermal conductivity of 160 W/mK



Traditional aluminum spacer



Technoform Warm edge spacer

Technoform Warm edge spacer is a hybrid spacer co-extruded with plastic, stainless steel, and polypropylene

However, Technoform Warm edge spacer is a thermally improved spacer, with a linear thermal transmittance almost 2 times better than traditional aluminium spacer.

Hence, when a warm edge spacer is used in place of an aluminum spacer, heat transfer at the edge of glass will be reduced.

The overall results?

By designing for high-performance facades, you can achieve:



More energy efficient buildings

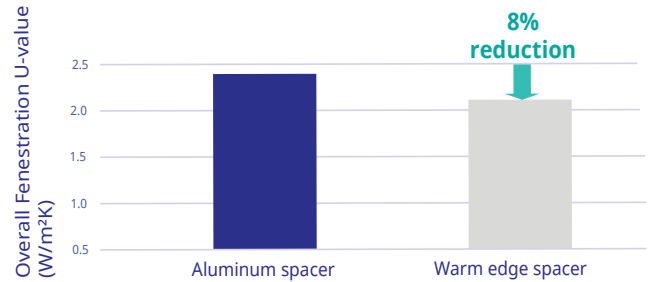


Improved carbon footprint



Better indoor thermal comfort for occupants

Overall, the fenestration U-value is further reduced by 8%.



Beyond thermal performance, we also help ensure seamless aesthetics for your windows, doors and facades. Unlike aluminium spacers which have reflective surfaces, our spacers have a matte surface and come in various colors, matching the highest requirements of building designers.

 Similar to RAL 9016 White	 Similar to RAL 9005 Black
 Similar to RAL 8003 Light brown	 Similar to RAL 8016 Dark brown
 Similar to RAL 7035 Light grey	 Similar to RAL 7040 Dark grey



Black Technoform Warm edge spacer



Conduct of experiment at BCA Skylab with thermally broken system on the left and non-thermally broken system on the right

Trialed and Tested



In collaboration with BCA, NUS and NEA, we conducted a study at the BCA Sky Lab to test the effectiveness of our thermal insulation solutions for facades.

Through the study, we found that a thermally broken system reduces peak heat flux by a whopping 59%!

For more information on the study, please contact us to find out more.

Pushing the Boundaries of Sustainability

Guaranteeing sustainability is at the core of what we do – every single day. Our solutions constantly insulate windows, doors, and facades to the highest degree, conserving valuable global resources in the process.

Our solutions have also received various local and international green building product certifications, such as:

- Singapore Green Building Product (3 ticks)
- CradletoCradle (Gold)
- Passive House Institute (pH A and pH B)

We have an Environmental Product Declaration (EPD) as well.



To date, our thermal insulation solutions have helped to save approximately 119 billion kWh of energy per annum, which is equivalent to 2.16 billion trees saved annually.



Looking to design a high-performance facade? Speak with us today!

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Leeza SOHO
Beijing, China

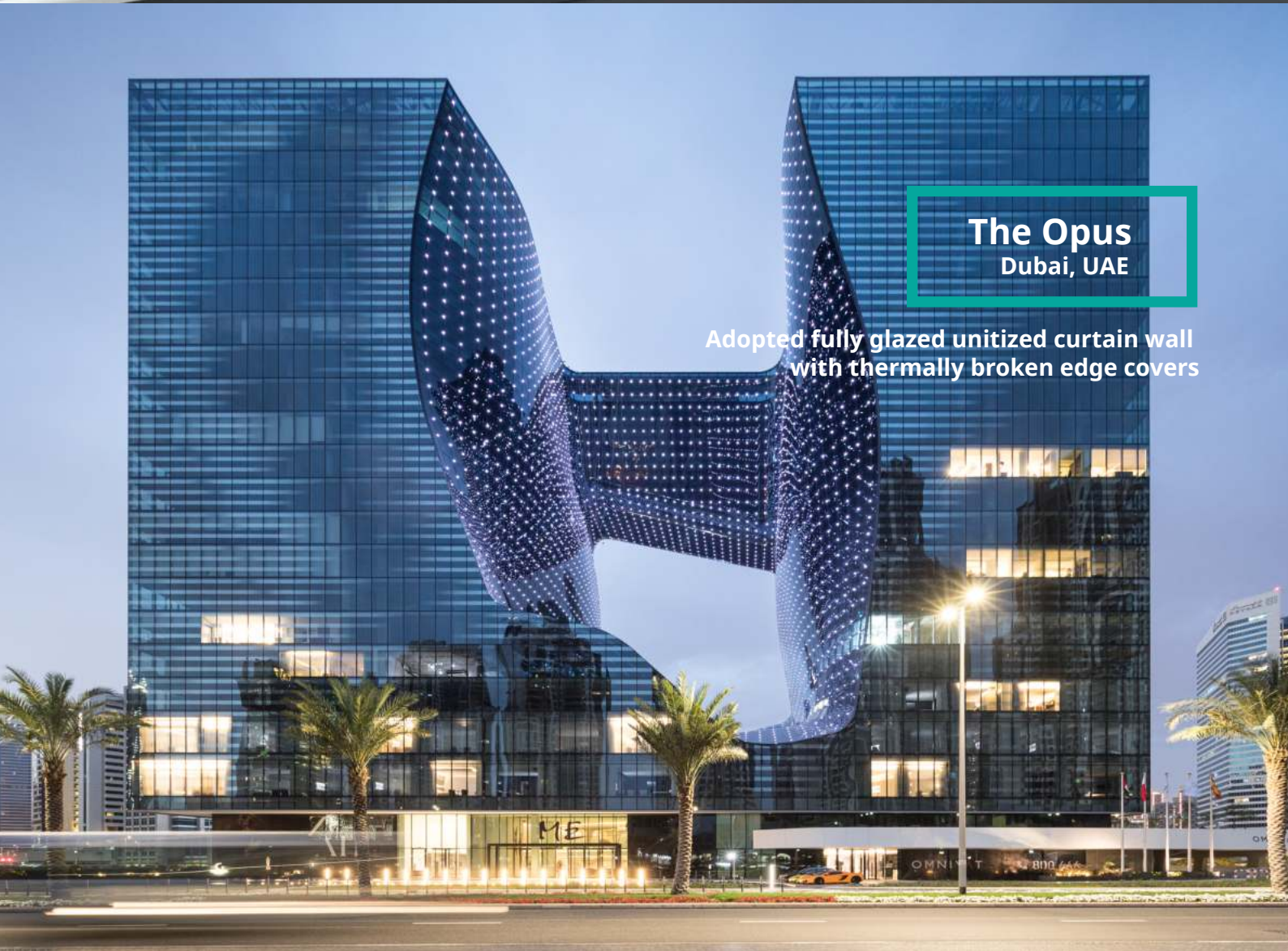
Convexed shaped glass façade holding Technoform warm edge solutions





**PSA Tuas Port
Maintenance Base
Singapore**

First major building and the first Super Low Energy Building (SLEB) to be completed in Tuas Port



**The Opus
Dubai, UAE**

Adopted fully glazed unitized curtain wall with thermally broken edge covers