



# SMALES FARM AIR NZ BUILDING THERMAFILM TRIAL RESULTS

## TEMPERATURE DATA RESULTS

### Conclusion

- Thermafilm window reduced aluminium plate temperature by 4 °C at maximum solar intensity
- Aluminium plate temperature was influenced by sun angle to building windows.
- Victoria University calculations indicate a total reduction of 20% solar energy through Thermafilm product.

### Method

Thermafilm NZ ltd placed A4 size anodized aluminum 2mm sheets in front of the windows with and without Thermafilm window insulating film as seen in figure 1. Each aluminium sheet has a thermistor temperature recording device attached to it to measure the temperature of each sheet as opposed to the ambient room temperature which would be the same for each sheet.

The aluminium sheets are anodized a dark colour to reduce reflection of heat energy and mimic what a person may experience from solar heat gain. The temperature of each sheet was logged each 15 minutes for 2 days.



Fig 1





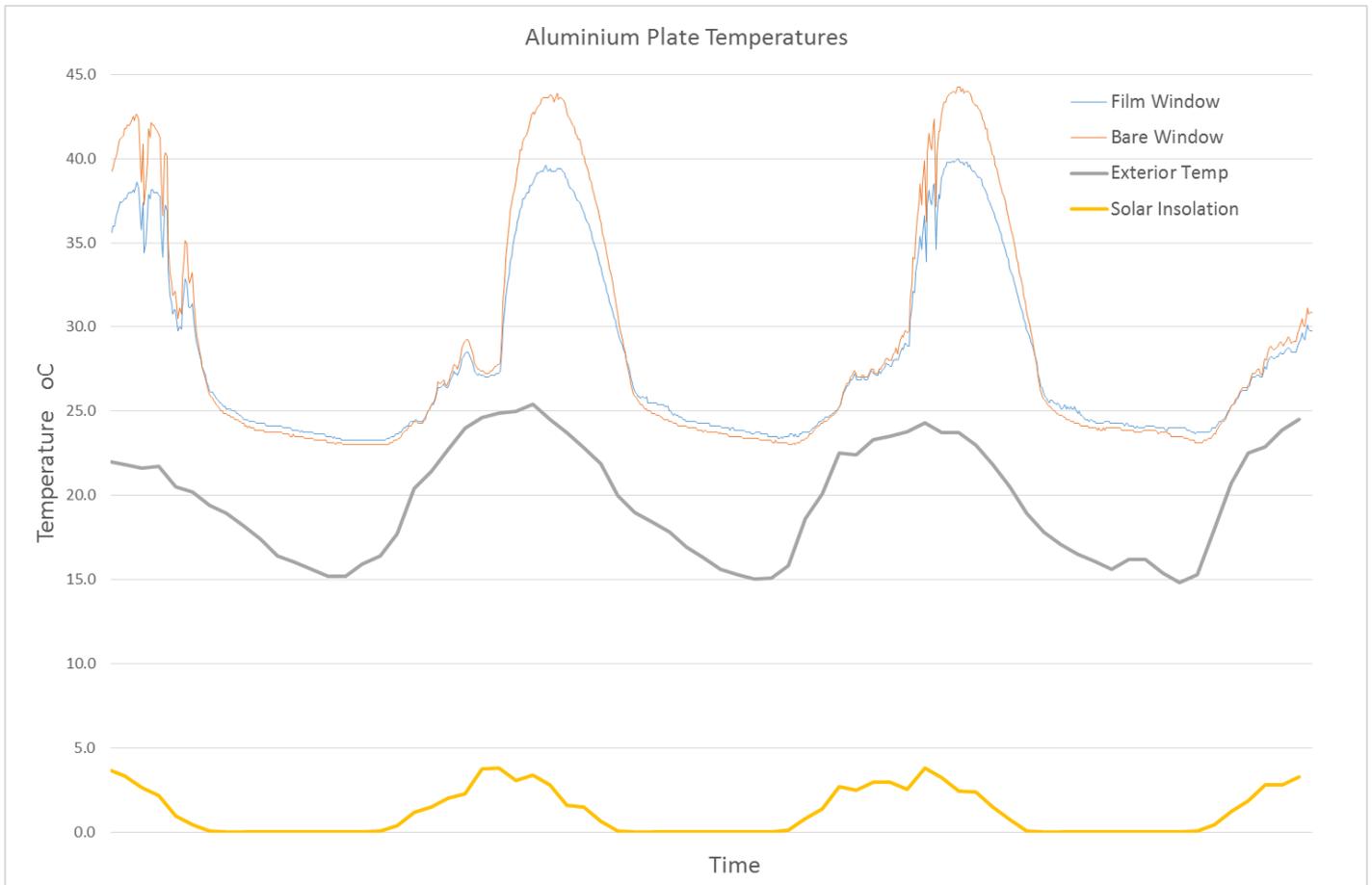
# Results

## Temperature Results

The temperatures of the aluminium plates can be seen across approximately 3 days in figures 2.

Most notable observations are

- During the early afternoon of each day, the temperature of each plate reaches a difference of approx. 4°C, the one behind the film window being lower.
- The plate temp lags the maximum outdoor temperature and global diffuse insolation values, most likely as a result of the decreasing sun angle to the building windows.
- Aluminium plate temperatures fluctuate as a result of localised cloud cover lowering the insolation effect.
- During the low solar gain periods (overnight), the ThermoFilm plate is approx. 0.5 °C higher temperature than the plain glass plate. This is due to the ThermoFilm reflecting heat energy back into the room and keeping the plate temperature elevated.





## Solar Heat Gain Improvement

With the application of Thermafilm to the Air NZ building windows, the Solar Heat Gain Coefficient (SHGC) value of the original glass is reduced from 0.5 to 0.31 as calculated by Victoria University analysis. This is a 38% improvement which results in a 20% total decrease in solar energy reaching the interior of the building through the window film.

In the colder months, heat loss through windows is reduced by 40% from U value decreasing from 5.8 to 3.4 W/m<sup>2</sup>K

Record Tools View Help

ID #: 1 Name: new  
 # Layers: 1 Tilt: 90 ° IG Height: 1000.00 mm  
 Environmental Conditions: NFRC 100-2010 IG Width: 1000.00 mm  
 Comment:  
 Overall thickness: 5.138 mm Mode:



	ID	Name	Mode	Thick	Flip	Tsol	Rsol1	Rsol2	Tvis	Rvis1	Rvis2	Tir	E1	E2	Cond	Comment
▼	Glass 1 ▶▶ 60006	EmeraldGreen5mm them		5.1	<input type="checkbox"/>	0.179	0.062	0.062	0.429	0.057	0.057	0.000	0.840	0.090	0.909	

Center of Glass Results | Temperature Data | Optical Data | Angular Data | Color Properties | Radiance Results

Ufactor	SC	SHGC	Rel. Ht. Gain	Tvis	Keff	Layer 1 Keff
W/m <sup>2</sup> K			W/m <sup>2</sup>		W/m-K	W/m-K
3.419	0.361	0.314	247	0.429	N/A	0.9092





## Visual Impression

Emerald Green glass at the Smales Farm Air NZ building has a Visual Transmission value of 0.56 and with ThermoFilm applied it has a theoretical calculated value of 0.43.

The low impact can be seen in the images below.



## Next Steps

These results indicate the potential reduction 20% of summer heat load on the HVAC system and increasing occupant comfort where the HVAC cooling mechanisms have limited ability to provide required results.

If further testing is required, ThermoFilm can install heat flux measurement devices to establish actual heat energy reduction through ThermoFilm windows to demonstrate the Victoria University calculated SHGC reduction.

