

# LUCITE® DIAKON®

## Case Study PMMA Frost



**How Lucite International managed the aesthetic & sheet thickness requirement on a frost PMMA grade.**

Polymer: Lucite® Diakon® Frost

Application: Architectural – roofing and canopies

Processing: Extruded sheet PMMA

### Key Benefits

- Match the colors, light transmission and diffusivity required, before and after sheet thermoforming
- Maintain the aesthetic at a specific sheet thickness
- Maintain the UV resistance and processing characteristics during extrusion

### The Challenge

Lucite International has been approached to develop frost PMMA grades with specific colors (natural, blue and green) for use in extruded architectural **roofing and canopies, produced from extruded sheet.**

Customer requirements:

- **Match the aesthetic requirements** in terms of color, light transmission and diffusivity
- **Reach the aesthetic requirements at the specified sheet thickness of 4mm**
- **Maintain the color and effects after the sheet thermoforming**
- **Maintain the UV resistance, cost-effectiveness and processability** of the current product

### Challenges raised by the customer's demand.

#### Match the aesthetic requirements

- Provide a specific frost PMMA with the right color, light transmission and diffusion level.
- Need to develop a pigment which delivers a color spectrum profile close to the original product.

#### Maintain the effects at 4mm thick

- The transmission, diffusivity and colors are very sensitive to the sheet thickness.
- Need to tailor a standard frost PMMA grade for 4mm thick sheets and retain the aesthetic after the thermoforming.

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## The Solution

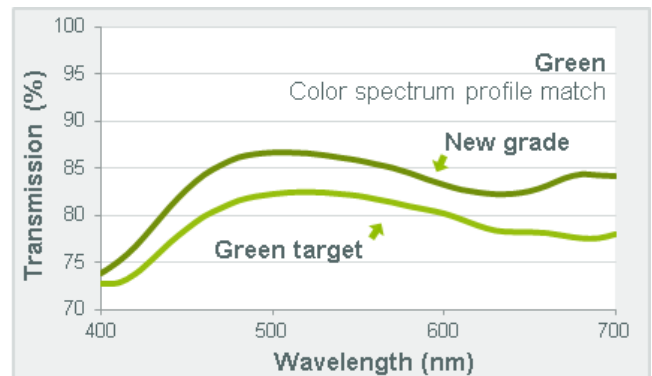
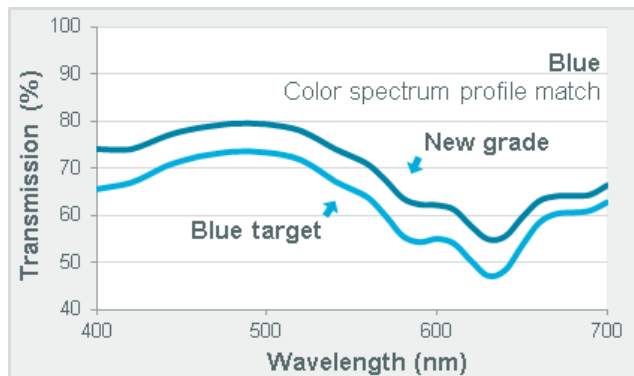
Lucite International rapidly developed a tailor-made frost grade. They succeeded in providing a Lucite® Diakon® PMMA material matching the aesthetic requirements of their customer:

Example based on the blue color	Customer Target	New Lucite® Elvakon® development
LAB color space (at 4mm thickness)	83.9 / -9.9 / -6.4	83.7 / -8.7 / -5.5
Color		
Light transmission (at 4mm thickness)	>89%	90%
Diffusivity (at 4mm thickness)	Haze >90%	Haze 92%
UV - Weather resistance	>10 years	>20 years
Thermoforming characteristic	Retain aesthetic	Retain aesthetic
Melt Flow Index	Maintain same	Maintain same

How did Lucite International achieve the required colour?

Lucite International selected a specific pigment formulation matching the color spectrum profile of the original product. Added to the PMMA, this pigment produces the correct color in terms of strength and hue at 4mm material light path as requested.

The color spectrum profile match ensures a correct color in natural daylight and zero metamerism as shown in the chart below: **(the metamerism is the perceived change of color when the object is viewed under different light sources).**



In order to achieve the correct surface finish and gloss, Lucite International ran experimental iterations to find the right technology blend. Based on their experience and expertise in frosted acrylic materials, they minimized the number of iterations and rapidly developed the new frost PMMA grades.

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