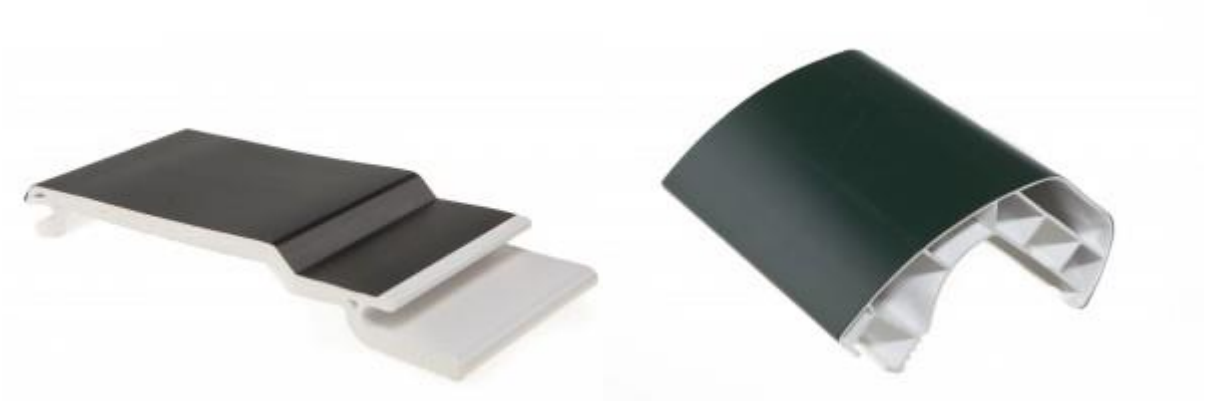
LUCITE® ELVAKON ®

Case Study PMMA on PVC Substrate



How Lucite International tailored an ultra-matt PMMA with higher impact resistance for architectural PVC sheets.

Polymer: Lucite® Elvakon® coextrusion PMMA
Application: Coextruded PMMA / PVC Architectural rainwater goods (outdoor)
Processing: Coextrusion

Key Benefits:
– Achieve the ultra-matt and visual aspect required
– Improve the impact resistance compared to the current product
– Maintain the same rheology as defined by the customer
– Maintain the UV resistance and cost-effectiveness

The challenge – provide a coextrusion PMMA grade with the right gloss level (ultra-matt)
Lucite International has been approached to develop a coextrusion PMMA grade with an ultra-matt surface for use in architectural rainwater goods (coextruded products), using PVC as the base substrate.

Customer requirements:
Demonstrate a very low PMMA surface gloss value of 4-5 units (60° measurement) for the ultra-matt effect
Match the required surface aspect, meaning the visual roughness and light reflection
Improve the impact strength of the current customer's product
Maintain a good melt flow for processing with PVC, meaning a very low temperature for PMMA
Maintain the UV resistance and cost effectiveness of the current product

The Solution – A cost effective coextrusion PMMA tailored to these specific requirements
Lucite International developed a tailor-made grade and succeeded in providing a Lucite® Elvakon® PMMA material for the specific customer architectural rainwater application and matching customer requirements as described in the table below:

	Customer Target	New Lucite® Elvakon® development
Gloss value (measured 60°)	4 - 5	4 - 5
Visual aspect	Maintain same	Maintain same
Melt Flow Index (ISO 1133, g/10 min 230°C/3.8kg)	> 5.0	5.1
Impact Izod notched (kJ/m²)	> 2.1	3.8
Impact Charpy unnotched (kJ/m²)	> 21.2	34.4
UV resistance	Maintain same	Maintain same

Table 1: Lucite International succeeded in developing a PMMA grade fulfilling all the customer's requirements.

1. How did Lucite International achieve the required surface finish?
The main challenge was to achieve the right visual aspect and ultra-matt effect of the coextruded sheets. Lucite International developed a specific PMMA recipe using a unique combination of polymer material technologies working for this application.

During the coextrusion process, the PVC sheets are covered with a thin PMMA ultra-matt layer exhibiting the required roughness and light reflection.

2. How did Lucite International achieve the right impact resistance and melt flow?
The second requirement was also to improve the impact resistance while improving the melt flow (normally a higher impact resistance leads to a lower melt flow). To achieve this objective, Lucite International manufactured an impact modifier for use in conjunction with the PMMA material and specifically formulated this to give a higher melt flow and rheology suitable for coextrusion onto PVC substrate.

By doing this, Lucite International provided a cost effective solution which did not involve any capital expenditure on new processing equipment to the customer, or require any further secondary processing operations.