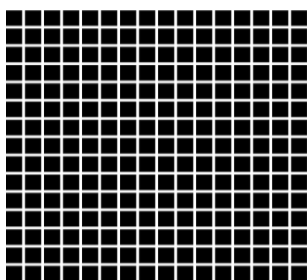


Introduction

Adding integrated surface masks to optical assemblies is a process feature offered along with Luximprint optical 3D printing capabilities. Having both the mask and optical features fabricated in one single process leads to interesting advances and reduces the need for further component assembly and sourcing. ‘Substrate Masking’ uses typical ‘white’ and ‘black’ pigments to create opaque white and/or black surface masks, with or without embedded optical features.

MASKING EXAMPLE



In this example, we are exploring two scenarios of applying a black printed mask onto the top surface of a given flat substrate, which typically includes an acrylic (PMMA) or Polycarbonate (PC) optical plastic.

‘Scenario 1’ includes an applied black mask onto the surface, with an sandwiched ‘white reflective’ layer beneath it to ensure minimal light losses and optimal reflections inside the substrate. Exit areas are ‘flat’.

‘Scenario 2’ has a black mask on the surface as well, it comes with an identical overprinted white reflective layer to ensure minimal light losses and optimal reflection properties inside the substrate.

Additionally, the exit areas are foreseen with an integrated optical lens feature. Those may include prismatic or (a)spherical lens features for dispersion of the light at the surface.

Figure 1: A black square grid representing the mask area. Black squares define the mask, whereas the white lines represent the surface exits.

BLACK & WHITE MASKING (INTEGRATED FLAT SURFACE EXITS)

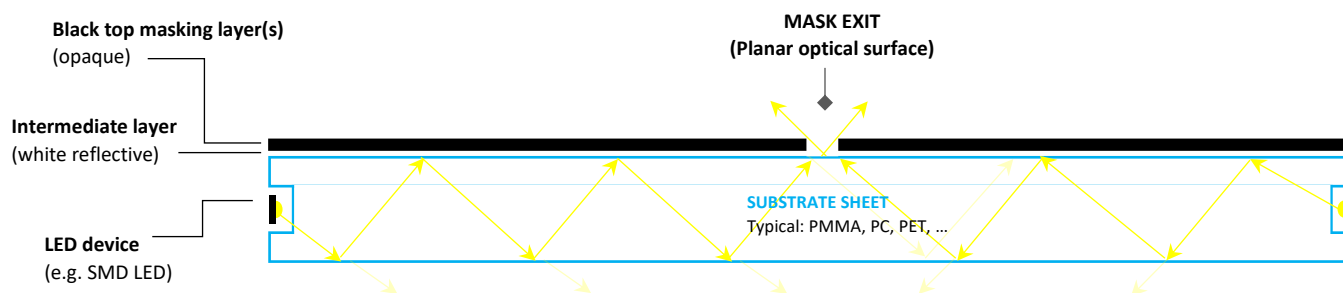


Figure 2: Light traveling through optical sheet material (input: side mounted SMD LED). The resulting output is the light escaping through the defined exits in the black mask at the top surface.

BLACK & WHITE MASKING (INTEGRATED OPTICAL SURFACE FEATURES)

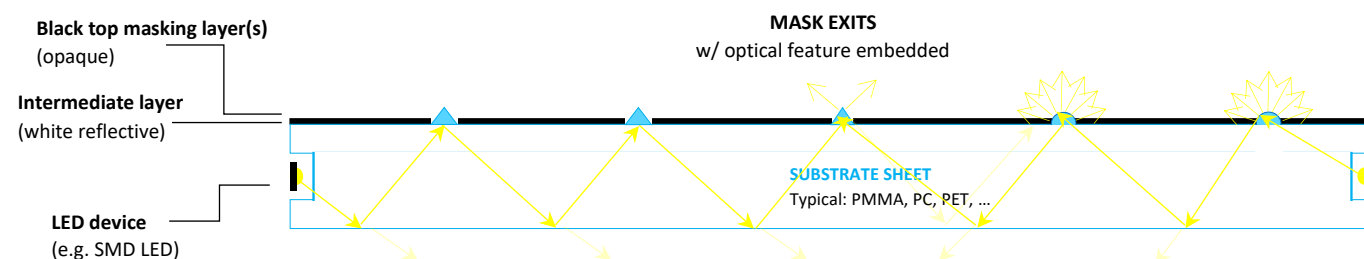


Figure 3: Light traveling through the optical sheet material (input: side mounted SMD LED). The light is exiting through the defined lens features positioned at the exit areas in the black top surface.



Pre-Process	Process Attributes	Post-Process
<p>Substrate sourcing:</p> <ul style="list-style-type: none"> Optical / clear / milky / colored substrate sheets Incl. or excl embedded secondary materials such as electronics and films Delivery of custom substrates for printing possible 	<p>Application of:</p> <ul style="list-style-type: none"> White base layer (if applicable) Black cover / mask Optical features (PMMA-like resin) Frosted Finishes (if applicable) 	<p>Reworking of surfaces:</p> <ul style="list-style-type: none"> Laser cutting shape to defined shape contour Reworking of surfaces with integrated mounting features, hollows/undercuts or applied performance coatings using machining, laser-cutting or Physical Vapor Deposition technologies.

**) Other substrate combinations or even thin films are possible. In case of any doubts or suggestions, please feel free to contact the Luximprint Sales Engineering team for consult.*

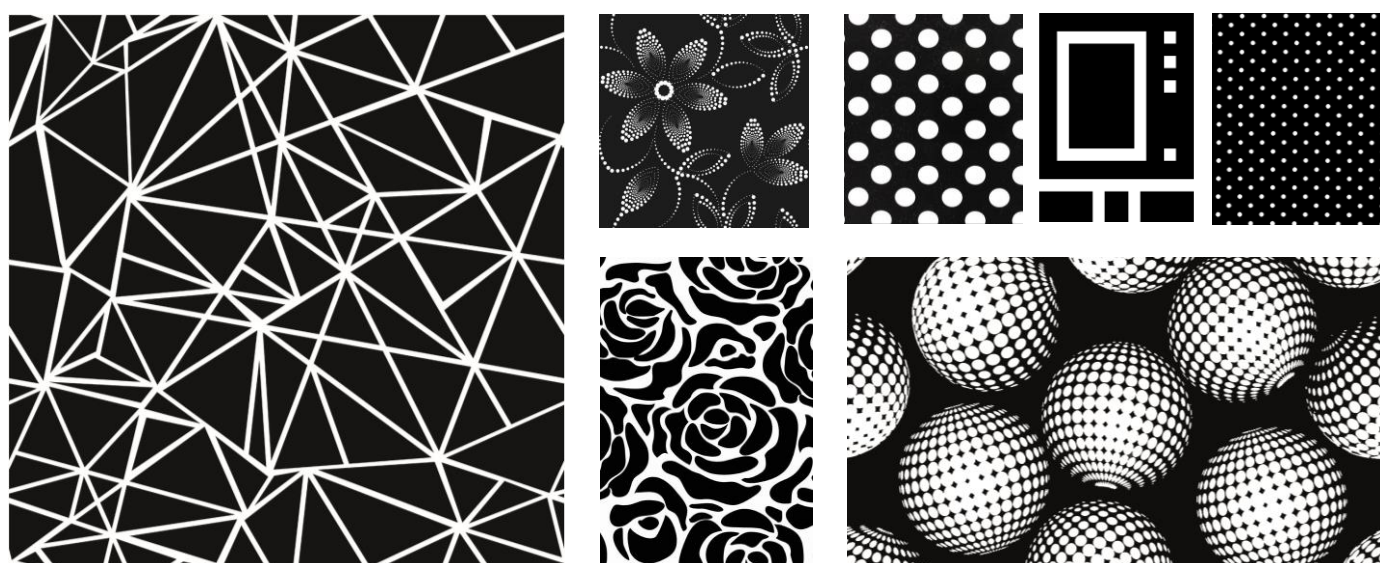


Figure 4: Example patterns for black – white masking. Surface masks may incorporate functional or decorative masking patterns.

SAMPLES

Engineering Samples can be obtained online via the [Luximprint Sample Shop](#).

Printoptical Capabilities

This 'Surfaces & Finishes' document is part of our Printoptical Capabilities Library and includes 'Frosted Finishes', 'Masking' and 'Coatings' definitions. For design and material related questions please refer to our 'Design Guidelines' or 'Material Specifications' documentation.

