Glass Optics for UVC LED Applications

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UVC Applications

• How do UVC LEDs fit into current applications?
Traditional Technology

Traditional Lamps

Quartz Sleeves and Tubes
Enabling Technology: Breaking the Mold

UVC LEDs

Molded Glass Optics

CONFIDENTIAL
# Moldable Glass

## Table

<table>
<thead>
<tr>
<th></th>
<th>#1</th>
<th>#2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTE (E-7/°C)</td>
<td>81</td>
<td>34</td>
</tr>
<tr>
<td>Temperature Resistance</td>
<td>350°C 660°F</td>
<td>450°C 840°F</td>
</tr>
<tr>
<td>Thickness Range</td>
<td>0.100-10” 2.5-250mm</td>
<td>0.100-5” 2.5-125mm</td>
</tr>
</tbody>
</table>

## Graph

**Spectral Transmission**

- **UVC Composition #1 0.15”**
- **UVC Composition #2 0.15”**

**Wavelength (nm)**

**Transmission (%)**
What are the possibilities?

UV LED and Optics promote:

- Design flexibility
- Optimized solutions
- Efficient design solutions

Today, we will look at unique ways to use UV LEDs and optics.
SIMULATION #1
CIRCULAR SURFACE
Case Study

Desired Performance:
• Homogenous exposure to UV energy

Target Area:
• 60 mm diameter, circular area

Applications:
• Laboratory testing
• Sample exposure
• Dish or equipment disinfection
Optical System

150 mm

265 nm
15° Beam

60 mm
Molded Glass Optic

3 different freeform curvatures not defined by functions or radii
Results (10 million rays)

<table>
<thead>
<tr>
<th></th>
<th>LED</th>
<th>LED with Optic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency (F/EF)</td>
<td>87.1%</td>
<td>83.9%</td>
</tr>
<tr>
<td>Average Flux</td>
<td>43.1%</td>
<td>85.2%</td>
</tr>
<tr>
<td>Uniformity (%90)</td>
<td>21.6%</td>
<td>88.3%</td>
</tr>
</tbody>
</table>
SIMULATION #2
SQUARE SURFACE
Case Study

Desired Performance:

• Homogenous exposure to UV energy

Target Area:

• 100 x 100 mm area

Applications:

• Laboratory testing
• Sample exposure
• Item disinfection
Optical System

- 25 mm pitch
- 45 mm
- 100 mm
- 265 nm
- 120° Beam

Glass Optics for UVC LED Applications
Molded Glass Optic

- TIR surfaces
- 2 freeform surfaces
Results (8 million rays)

<table>
<thead>
<tr>
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<th>LED with Optic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Efficiency (F/EF)</td>
<td>39.2%</td>
<td>61.8%</td>
</tr>
<tr>
<td>Average Flux</td>
<td>70.4%</td>
<td>76.3%</td>
</tr>
<tr>
<td>Uniformity (%90)</td>
<td>45.5%</td>
<td>80.9%</td>
</tr>
</tbody>
</table>
Molded Glass Optic
Optimize Your Device with the Latest Technology

Light control for improved testing and application results:

- Significant gains in uniformity
- Increased flux on target surface
- Increased fixture efficiency
Thank You!

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