



1. Title:	Improvements Made to Corning ULE® Glass to Meet P-37 Specifications
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3. Abstract body:

Corning ULE® glass is a binary  $\text{SiO}_2 + \text{TiO}_2$  composition that is formed directly using a flame hydrolysis process. It possesses a very low thermal expansion range that can be adjusted to accommodate different uses, including mask blanks for EUV photolithography. For this particular application, it is necessary to produce a material that can be polished to meet stringent flatness and roughness specifications. However, small compositional striations formed in the glass during hydrolysis affect the surface roughness when the mask blank is polished.

Recently, predictive models of furnace burner coverage and furnace oscillation patterns utilized during glass formation have been developed and experimentally verified. These models have been employed to enhance the fundamental understanding of the glass forming process. This understanding has led to process adjustments that have produced glass with improved striae characteristics.

It has also been shown that the striae can be improved by applying additional thermal treatments to the glass. Effective use of these treatments depends on the striae characteristics of the glass. These thermal treatments and the aforementioned process adjustments via modeling have resulted in significant improvements in striae characteristics critical to polishing performance.