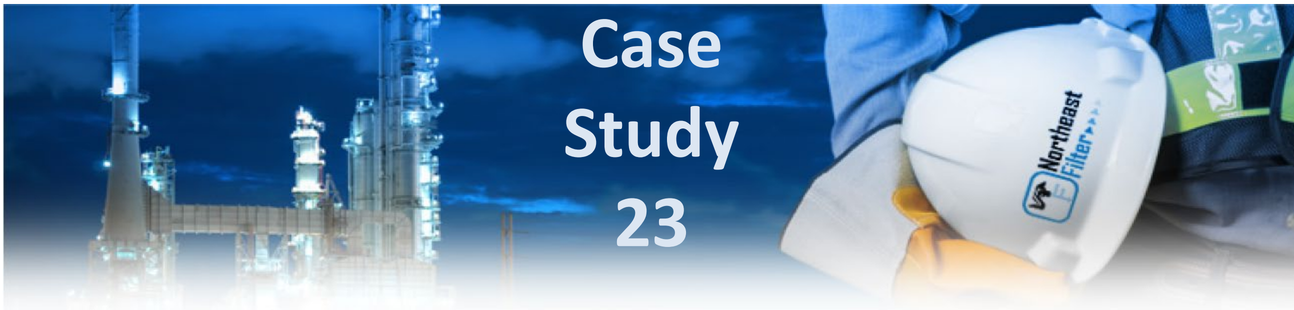

Advanced Optical Coatings Filtration

Background

An optical instrument (optic) is a device that generates and/or manipulates light waves for a specific purpose. Optical coatings are applied to an optic component to enhance the transmission or reflection of the wavelength range to achieve a specific result. The coating "system" is a complex design of single or multiple layers that is deposited on a substrate. The coating materials are applied as a thin film and each layer can vary from polymeric, metallic or any number of proprietary chemicals with each layer performing a specific task. The typical film depth of each layer is ultra thin from 15µM to submicronic, so coating quality is paramount to assure film thickness uniformity that is free from defects in the form of microscopic inclusions. A Government research facility was developing an optic for military application and experiencing issues with producing optical coatings that met the demanding quality requirements of the optic. They contacted Northeast Filter to work with their scientists to establish a filtration strategy to overcome these issues and get their project back on track.

Solution

Upon arrival at the facility we were informed of the proprietary nature of this project so any testing to be performed had to be conducted on-site and any consumable materials used needed to be left behind. Their team would assist with cleaning our test equipment to prevent residual chemistry from leaving the site. Review of their process and objectives presented numerous challenges. The coating(s) being deposited were to be transparent however they were rejecting material as a result of "haze clouds" that appeared to be from fine dispersions of deformable gels as well as sporadic solids generating visible inclusions. Furthermore, the viscosity of the coating was high, and the solvent base was aggressive, so media choice and filter platform were limiting. The Northeast Filter VAS team performed on-site filterability testing in phases. The first phase was to determine the retention required to eliminate the haze and inclusions while the second phase was to establish a serial filter train that would process an entire batch without interruption. After two days of testing, we proposed a final filter strategy. Pilot plant trials mirrored our benchtop test results, so the strategy was applied to production. After 30 days of implementation we were notified that they had eliminated both the haze and inclusions while processing complete batches without the need to change filters.