Case Study

Optical Coating System Enables Precision Thin-Film Deposition for Entertainment Lighting Systems

WHY
Today's display and entertainment solutions need advanced coating solutions that deliver consistent, high performance thin films across diverse substrates while reducing scrap, rework, and production costs.

HOW
Dynavac engineered the Hyperion system with an efficient pumping architecture, advanced substrate handling, dual mode monitoring, and automated recipe driven controls to ensure stable, uniform, and repeatable coating performance.

WHAT
The Hyperion system is a turnkey, production ready solution that delivers highly uniform, repeatable optical coatings through advanced monitoring and fully automated, recipe driven control.

THE CHALLENGE

Manufacturers of optical components for professional lighting and projection systems face increasing pressure to deliver coatings that meet strict requirements for uniformity, durability, and repeatability. As entertainment lighting systems used in live events and theatrical environments become more advanced, traditional coating platforms can struggle to maintain process consistency, achieve uniform film deposition, and deliver repeatable results when coating optical lenses used in projection and entertainment lighting equipment.

To meet these demands, manufacturers require coating systems that combine precise thickness control, flexible deposition capability, and real-time process monitoring in a reliable production-ready platform.

THE SOLUTION

To support the production of coated lenses used in professional entertainment lighting systems, Dynavac delivered the Hyperion Optical Coating System engineered for precision optical component manufacturing. The system combines a stainless-steel vacuum chamber, advanced substrate handling, electron-beam and thermal evaporation sources, and ion-assisted deposition for high-quality film formation.

Hyperion integrates dual monitoring technologies—including the Quartz crystal monitor and Optical monitoring systems—for real-time control of deposition rates and optical endpoints. A planetary rotation fixture provides coating uniformity, while a tailored pumping architecture with roughing pumps, turbopumps, cryopumps, and Meissner coils ensures stable vacuum performance.

A PLC-based, recipe-driven control system with an intuitive HMI and comprehensive data logging enables consistent, production-ready operation and simplified maintenance.

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Special Features

- 65" Stainless steel vacuum chamber
- Custom vacuum pumping with roughing pumps, turbopumps, dual 20" cryopumps, and Meissner coils achieving pressure in E-7 scale
- Planetary substrate rotation fixtures for superior coating uniformity
- Typical coating uniformity of <1%, with <0.5% achievable in certain configurations
- Multi-pocket electron beam and thermal evaporation with ion-assisted deposition
- Quartz crystal monitor and Optical monitoring systems
- Modular shielding for easy service
- PLC-based automated control with recipe operation, HMI interface, and data logging
- Integrated safety systems including interlocks, alarms, and emergency shutdowns