

TELESCOPE MIRROR COATING SYSTEMS



HHV is a well-established high-vacuum equipment manufacturer in India, known for its expertise in designing and developing advanced coating systems. Over the years, the company has demonstrated strong technological capabilities by successfully delivering and commissioning mirror coating and recoating solutions for large-scale optical applications.

HHV has executed projects at diverse locations, including installations at high-altitude observatories and other demanding environments. These systems incorporate advanced coating techniques such as thermal evaporation and sputtering, catering to precision optical requirements.

SPECIFICATIONS

VACUUM CHAMBER

- Chambers that accommodate mirrors from 0.5m to 5m
- Stainless steel construction

PUMPING SYSTEM

- Dry/Rotary and multistage roots combination for rough vacuum
- Diffusion/Turbo/cryogenic pumps for high vacuum

MIRROR FIXTURES

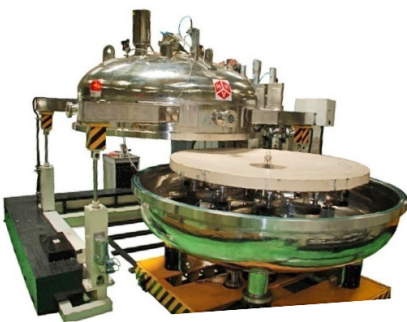
- Wiffle tree structure/ rotary fixture/ planetary holder

COATING TECHNIQUES

- Downward thermal evaporation
- Magnetron sputtering
- Electron beam evaporation
- Plasma glow discharge/ionsource for In-situ substrate cleaning

SYSTEM CONTROL

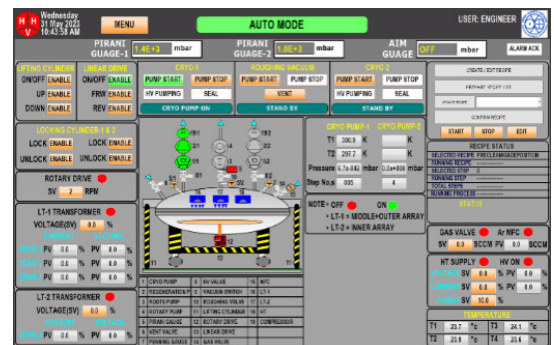
- Thickness monitor and controller
- IPC with Supervisory control and data acquisition (SCADA)
- Fully automated with recipe programming
- Remote access and diagnostics capability
- Data logging of the process parameters



Vacuum chamber



Rotatable wiffle tree



Control screen

KEY FEATURES

- Custom-designed coating systems for primary mirror diameters upto 5 meters, built to exact observatory specification
- Sputtering, electron beam evaporation, and downward thermal evaporation - often combined in a single integrated system
- High-reflectivity Aluminum and protected Aluminum/Silver coatings with exceptional surface quality, durability, and uniformity
- Design, manufacture, test, site assembly and commissioning - complete project management from concept to first light
- Fully automatic process control

PROVEN INSTALLATIONS



Telescope mirror: 0.5 m Diameter
Material: Aluminum/Silver
Deposition technique: Thermal and E-beam evaporation



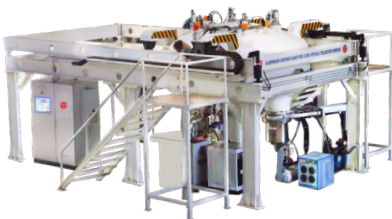
Telescope mirror: 2.1 m Diameter
Material: Aluminum
Deposition technique: Downward thermal evaporation system



Telescope mirror: 2.1 m Diameter
Material: Aluminum
Deposition technique: Thermal and E-beam evaporation



Telescope mirror: 2.2 m Diameter
Material: Aluminum
Deposition technique: Sputtering

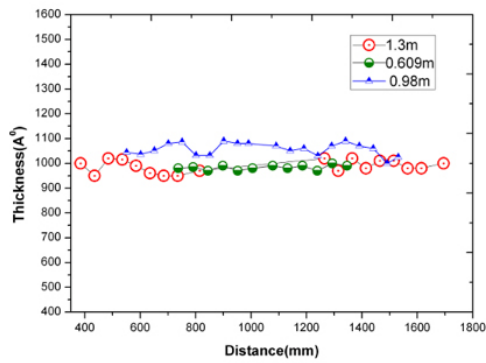


Telescope mirror: 2.5 m Diameter
Material: Chromium and Silver/Aluminum
Deposition technique: Sputtering

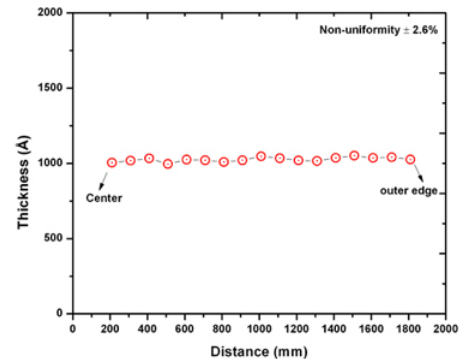


Telescope mirror: 3.7 m Diameter
Material: Aluminum
Deposition technique: Sputtering

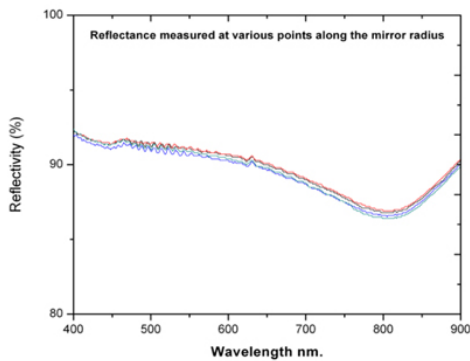
FILM PROPERTIES AND RESULTS



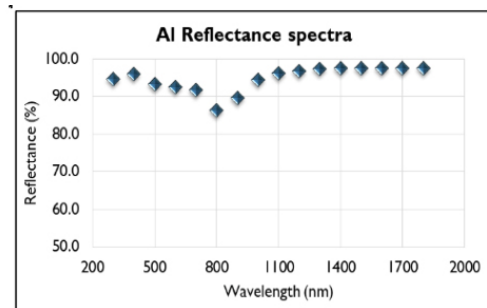
Thickness profiles of 1.3 m, 0.98m, 0.609m mirrors with thickness



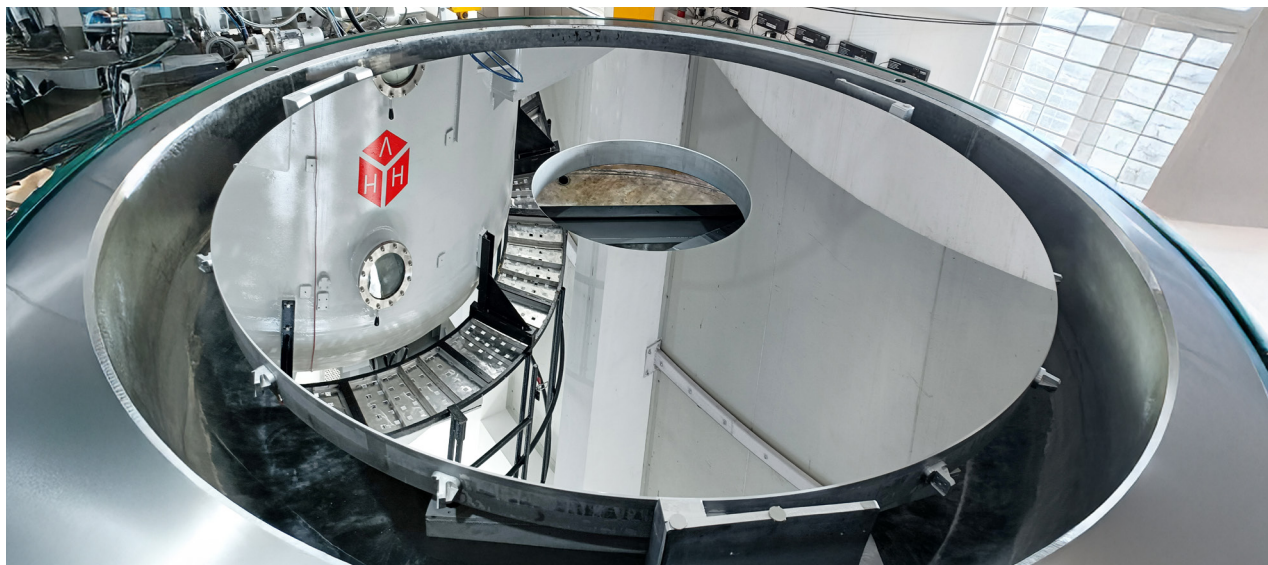
Thickness profiles with a thickness uniformity of $\pm 2.6\%$



Reflectance measured along 3.6m mirror radius



Al Reflectance spectra



Coated 2.5 Meter Telescope Mirror



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