

## Dynavac Pioneers Water-Cooled Planetary Mechanism for Customer's Thin-Film Deposition System



**February 24, 2021 Hingham, MA:** Dynavac, a leading supplier of thin film deposition and space simulation systems, is pleased to announce the development of a novel, water-cooled planetary mechanism for thin-film deposition applications. This innovative new design, purpose-built for a Dynavac customer, broadens the company's extensive range of substrate rotation systems.

"Limitations on maximum substrate temperatures often reduce throughput of some deposition systems," explained Dr. Ramya Chandrasekaran, who led Dynavac's team of engineers on this project. "Additionally, maintaining stable substrate temperature plays a significant role in film properties such as stress, microstructure, optical, and electrical. This is especially an issue when dealing with thick films."

Dynavac was approached by a major US manufacturer needing high deposition rates of a thick dielectric film. The customer had an additional challenge as well: they wanted to run two products through the same chamber—one product especially temperature-sensitive, requiring substrate cooling during deposition; the other product not as temperature-sensitive and not needing substrate cooling. Minimizing costly change-over time between the two products demanded quick and easy conversion between water-cooled and non-water-cooled substrate mechanisms.

Dynavac's Application Lab stepped up to the challenge. The team worked closely with the customer to develop equipment and process recipes for both cooled and non-cooled deposition processes, and then built a production deposition system. Dynavac's R&D coating system was used to develop and test the water-cooled planetary and process recipes.



The resulting water-cooled mechanism supports single or planetary configurations. A substrate or a tooling plate is mounted directly to a water-cooled jacket and is held at the specified substrate temperature during deposition. A supervisory control system fully automates the closed-loop cooling water and independent chiller. Input and output water temperature is captured and logged. The USPTO has granted a provisional patent for the innovative aspects of the mechanism.

Following its development, the team qualified the new application, demonstrating successful results in pilot production on customer products. With the new application qualified, a 52" production system was built by Dynavac's team, incorporating a substrate rotation system with multiple water-cooled planets. The system is now up and running in the customer's facility and continues to effectively meet process and throughput requirements.

"Designing and fabricating custom fixtures to meet our customers' application needs is where Dynavac shines," said Dr. Chandrasekaran. "Our Application Lab is an important facet of this capability, since it allows us to test out new applications and processes to ensure they work exactly as intended."

Dynavac's President and CEO, Tom Foley, said "This unique project underscores the expertise and creativity of our scientists and engineers, who partner with our customers to really understand their production and process objectives. We're passionate about helping our customers solve problems, remove barriers, and achieve the results they seek."

### **About Dynavac**

Dynavac has been designing and manufacturing high-vacuum systems for thin film deposition, space simulation, and specialty applications for nearly 40 years. The company is recognized throughout the industry for expertise in high vacuum technology, machine design, and process technology. Its engineering expertise is matched by an extensive U.S.-based manufacturing and field installation capabilities. Dynavac supports installations for customers in a wide variety of industries around the world: visit [www.dynavac.com](http://www.dynavac.com)



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