Expanding the Scope of Powder Processing with PolarDry® Electrostatic Drying

Cost-Effective, High-Quality Processing of Temperature-Sensitive Active Ingredients

FLUID AIR PolarDry®



Conventional Freeze-Drying and its Limitations for Pharmaceutical Manufacturers

For decades, freeze-drying, lyophilization and conventional spray drying have dominated processes in the pharmaceutical industry. Yet, these methods are increasingly inadequate for supporting the production of modern biologic actives, which are projected to account for a significant percentage of innovative drug sales soon.

Freeze-drying is a labor-intensive, slow, and complex batch process. It often requires post-processing to enhance or ensure flowability, can introduce impurities, and is generally unsuitable for dilute formulations.

However, conventional spray drying, which relies on higher temperatures, risks degrading or damaging the active ingredient and compromising the final product.

As biologics transform the pharmaceutical landscape, manufacturers urgently need more efficient and reliable drying technologies.



A New Era in Drying: The PolarDry® Breakthrough

After three decades of research and collaboration with the pharmaceutical industry, Fluid Air, a division of Spraying Systems, has developed a groundbreaking, multi-patented drying technology that addresses the limitations of both lyophilization and conventional spray drying.

The PolarDry® electrostatic dryer offers a proven solution to the challenges of conventional drying methods. Its innovative approach is already operational, scalable, and available for demonstration and pilot testing.



Exceeding the Most Rigorous Requirements

The PolarDry® process is specifically designed to meet the demands of modern pharmaceutical manufacturing. Its gentle, electrostatic drying mechanism is ideal for biologics and other high-value, temperature-sensitive powders. By preventing degradation and denaturation of active components, PolarDry® supports both aqueous and solvent applications.

This advanced technology accelerates production by eliminating the need for evaporation and concentration steps, making it significantly faster than conventional processes. With multiple throughput options, PolarDry® can seamlessly integrate into continuous manufacturing and batch production lines.

For manufacturers establishing new production lines, PolarDry® represents a superior alternative to older drying methods, especially when time to market and active ingredient preservation are critical concerns.



A Paradigm Shift in Pharmaceutical Drying

Previously, pharmaceutical manufacturers had limited options. Slow batch processing, impurities, and yield losses due to high-temperature processing were considered unavoidable. With the introduction of PolarDry®, these challenges are now obsolete.

Achieve Faster, More Cost-Effective Processing

For manufacturers requiring rapid production line switches and the ability to produce many products in the same machine, PolarDry® offers a lower temperature, high-quality solution that significantly reduces costs.

Empowering New and Established Manufacturers

With PolarDry®, smaller companies and new entrants can access advanced drying capabilities and reduced production costs. Established players can transition to continuous production and speed up product iteration. The smaller particle size achieved through PolarDry® may meet your needs without extra processing.



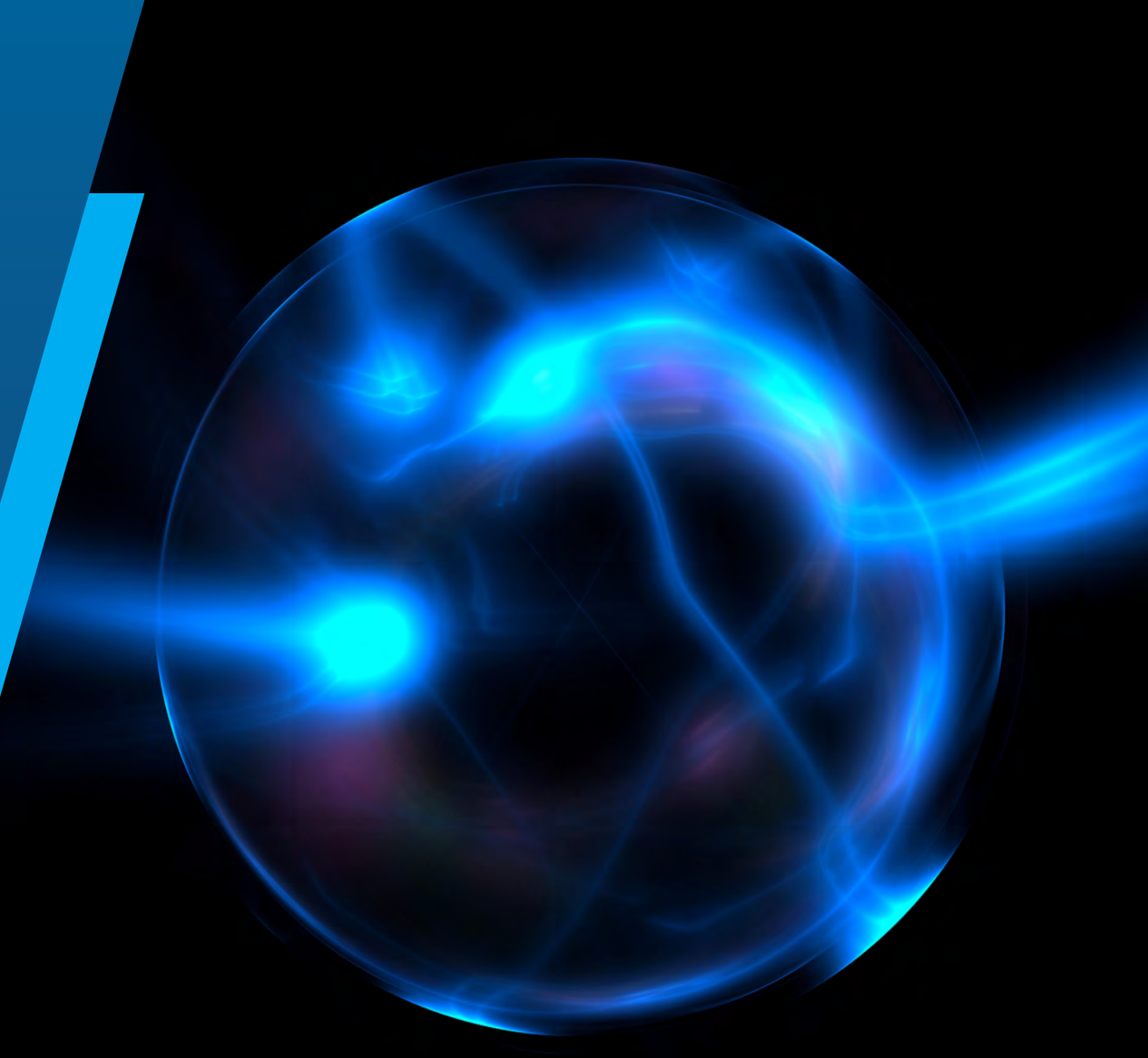
Sophisticated Simplicity: The PolarDry® Process

The PolarDry® process begins with atomizing and spraying liquid droplets containing the active ingredient into a drying gas stream. These droplets are electrostatically charged, which enhances the drying efficiency.

As the liquid evaporates, solid particles form and are guided to the bottom of the dryer. The resulting powder possesses all the desirable characteristics of a finely processed powder without requiring extra size reduction steps.

The electrostatic charge increases the diffusion rate during drying, accelerating evaporation and driving solids inward within each droplet. This ensures that drying occurs at moderately lower inlet temperatures, protecting heat-sensitive active components and resulting in lower outlet and product temperatures.

The PolarDry® dryer is a comprehensive, all-in-one system with a spray chamber, separation plenum, feed delivery, drying gas recirculation system, and a discharge cone for finished product collection. The entire process is encapsulated within a single structure with integrated valves and process controls.



Is PolarDry® the Right Choice for Your Operation?

Consider PolarDry® if your operation involves:

- Addressing suboptimal trial yields
- Handling thermally- or oxygen-sensitive active ingredients
- Keeping pace with competitors
- Managing highly-dilute solutions
- Processes still under development
- Shipping to regions with limited cold-chain infrastructure
- The need to produce shelf-stable powders for global distribution
- Unveiling new products that require advanced technology for production
- Urgent scaling requirements
- Working with innovative modalities such as mRNA, peptides, or proteins



Getting Started with PolarDry®

Contact Fluid Air today to learn more about PolarDry®, schedule a demonstration, inquire about custom configurations, or discuss deployment options.

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*Models are not pictured to scale.



Model **0.1**



Model **001**



Model **004**



Model **032**



Model **050**

About Fluid Air

Fluid Air, a subsidiary of Spraying Systems Co., is a global leader in drying technology. Headquartered in the USA, we serve clients worldwide, with over 60% of our process engineers bringing direct experience from the pharmaceutical industry. We are committed to understanding and addressing the unique challenges faced by our clients, offering continuous innovation and support.

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