

Pharmaceutical Drying Equipment Market to Hit \$10.35 Billion by 2033 – Driven by Automation & Biologics Demand

Pharmaceutical drying equipment market grows to \$10.35 Billion by 2033, fueled by IoT, AI, and rising biologics production worldwide.

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According to DataM Intelligence, the [pharmaceutical drying equipment market](#) reached US\$ 5.45 billion in 2023, increased to US\$ 5.78 billion in 2024, and is projected to reach US\$ 10.35 billion by 2033, growing at a

CAGR of 6.7% during the forecast period (2025–2033). Market growth is propelled by the rapid expansion of the pharmaceutical and biopharmaceutical sectors, technological innovations in drying systems, and the rise in outsourcing of drug manufacturing to contract manufacturing organizations (CMOs). Among product types, fluid bed dryers lead due to their versatility and efficiency, while North America dominates the market owing to its advanced pharmaceutical infrastructure and high adoption of automation technologies.

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Rising demand for biologics, vaccines, and personalized medicines continues to drive the adoption of advanced freeze-drying systems.”

DataM Intelligence

pharmaceutical ingredients (APIs) and excipients. Advanced drying technologies such as fluid bed dryers, spray dryers, rotary dryers, and vacuum dryers have gained widespread acceptance, enabling efficient heat and mass transfer, reduced processing time, and compliance with Good Manufacturing Practices (GMP).

Global Pharmaceutical Drying Equipment Market Size, 2024–2031 (USD Billion)

DATA M INTELLIGENCE



Pharmaceutical Drying Equipment Market

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Key Highlights from the Report:

- The global pharmaceutical drying equipment market reached US\$ 5.45 billion in 2023 and is expected to hit US\$ 10.35 billion by 2033.
- Fluid bed dryers dominate the market due to their superior drying uniformity and reduced processing times.
- North America leads the global market, while Asia-Pacific shows the fastest growth driven by expanding manufacturing bases in India and China.
- Increasing investments in biopharmaceutical production are fueling demand for freeze and vacuum dryers.
- Integration of IoT, AI, and automation enhances process control and GMP compliance across manufacturing facilities.
- Growing focus on energy-efficient and sustainable drying technologies is shaping future equipment design.

Recent Developments:

United States: Recent Industry Developments

1. In August 2025, Thermo Fisher Scientific Inc. unveiled a next-generation vacuum tray dryer at its Massachusetts facility. The equipment features precise humidity control and integrated data analytics, improving drying consistency for complex formulations and biologics.
2. In July 2025, SPX FLOW, Inc. launched a smart fluid bed dryer equipped with IoT-enabled sensors and predictive maintenance capabilities. This innovation aims to optimize energy efficiency and ensure compliance with FDA process validation requirements.
3. In May 2025, Millrock Technology, Inc. expanded its Revo Series Lyophilizer line to include scalable pilot-to-production units, supporting the rapid development of freeze-dried vaccines and injectable drugs. The expansion aligns with rising demand for biologics and temperature-sensitive pharmaceuticals.
4. In April 2025, Büchi Corporation USA introduced an upgraded Nano Spray Dryer B-90 HP for laboratory-scale use. It offers improved particle size control and reproducibility, enhancing early-stage drug formulation and testing capabilities.

Japan: Recent Industry Developments:

1. In September 2025, OKAWARA MFG Co., Ltd. launched its New Spin Flash Dryer (NSFD-X) with

enhanced thermal uniformity and low energy consumption. The technology is being adopted by domestic API producers focusing on sustainable manufacturing.

2. In July 2025, Tofflon Japan Co., Ltd. announced a partnership with Shionogi & Co., Ltd. to integrate automated lyophilization systems for sterile injectable production. The collaboration strengthens Japan's biopharmaceutical manufacturing infrastructure.

3. In June 2025, Yamato Scientific Co., Ltd. introduced a compact bench-top vacuum dryer designed for small-batch R&D in pharmaceutical labs. The new model offers precise temperature control and touchscreen-based monitoring for faster development cycles.

4. In May 2025, Mitsubishi Kakoki Kaisha, Ltd. (MKK) began developing a hybrid freeze-drying system combining microwave and vacuum drying technologies. The innovation aims to reduce processing time by up to 30%, supporting Japan's push toward energy-efficient pharmaceutical manufacturing.

Company Insights:

Prominent companies operating in the pharmaceutical drying equipment market include:

- GEA Group AG
- Buchi Labortechnik AG
- SP Industries, Inc.
- Thermo Fisher Scientific, Inc.
- Hosokawa Micron BV
- Yamato Scientific Co., Ltd.
- Labconco Corporation
- OKAWARA MFG Co., Ltd.
- Schenck Process Holding GmbH
- Changzhou Yibu Drying Equipment Co., Ltd.

Market Segmentation:

The pharmaceutical drying equipment market is segmented by product type, application, and end-user each category revealing distinct industry trends and technological advancements.

By Product Type

The market includes tray dryers, rotary dryers, fluid bed dryers, vacuum dryers, spray dryers, and freeze dryers.

Among these, fluid bed dryers (FBDs) hold the largest share due to their ability to achieve efficient moisture removal through hot air fluidization, ensuring uniform drying and particle size control. Tray dryers remain popular for small-scale operations owing to their cost-effectiveness and operational simplicity. Vacuum dryers and freeze dryers (lyophilizers) are witnessing rising

demand for processing heat-sensitive and biological materials, particularly in vaccine and protein formulation. Spray dryers, on the other hand, are increasingly adopted in pharmaceutical R&D for producing fine powders from liquid suspensions, aiding in inhalable and instant-release drug formulations.

By Application

Pharmaceutical drying equipment finds applications in API production, excipient preparation, granulation, tablet and capsule manufacturing, and lyophilization. The API segment dominates the market as drying is essential for achieving stable, pure, and crystalline products. The growing production of biopharmaceuticals and complex molecules is also stimulating the need for advanced drying equipment that ensures precise temperature and humidity control.

By End-User

Key end-users include pharmaceutical manufacturers, contract manufacturing organizations (CMOs), research laboratories, and academic institutes. CMOs represent a fast-growing segment as outsourcing continues to surge, particularly in emerging markets where low-cost production aligns with global demand. Pharmaceutical manufacturers remain the largest end-users due to their continuous focus on efficiency, regulatory compliance, and high-throughput capabilities.

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Regional Insights:

North America

North America remains the dominant market for pharmaceutical drying equipment, driven by technological innovation, regulatory rigor, and a well-established pharmaceutical manufacturing base. The U.S. is a key contributor due to the strong presence of pharmaceutical giants, advanced production facilities, and growing biopharmaceutical R&D. Companies are rapidly adopting automated drying systems with real-time monitoring capabilities, ensuring process reproducibility and compliance with FDA standards.

Europe

Europe follows closely, supported by significant R&D investments in Germany, Switzerland, and the UK. The region is home to global pharmaceutical leaders that emphasize eco-friendly, energy-efficient equipment in line with European sustainability directives. Increased emphasis on continuous manufacturing and PAT-based drying processes is further strengthening the market outlook.

Asia-Pacific

The Asia-Pacific region is expected to exhibit the fastest growth during the forecast period (2025–2033). The region's market expansion is primarily attributed to the rapid growth of generic drug manufacturing, government incentives promoting local production, and the emergence of

large-scale CMOs in India and China. Additionally, biopharmaceutical development in South Korea and Japan is propelling demand for freeze and vacuum drying technologies that ensure product integrity and sterility.

Latin America and Middle East & Africa

These regions are steadily growing markets, fueled by rising investments in healthcare infrastructure and the expansion of local pharmaceutical production capacities. Countries like Brazil, Mexico, Saudi Arabia, and South Africa are witnessing increased adoption of modern drying systems as part of their ongoing industrial modernization efforts.

Market Dynamics:

Market Drivers

The market growth is strongly influenced by the increasing global demand for pharmaceuticals and biologics, which requires precise moisture control and uniform drying to ensure drug stability. Rising investments in continuous manufacturing technologies and the growing adoption of IoT and automation are revolutionizing drying equipment efficiency and accuracy. The demand for customized, GMP-compliant systems that can handle temperature-sensitive APIs has accelerated innovation in freeze-drying and vacuum technologies. Additionally, the ongoing shift toward outsourcing drug production to CMOs and the rising trend of biopharmaceutical manufacturing are amplifying the need for flexible, high-capacity drying solutions.

Market Restraints

Despite strong momentum, the market faces notable restraints such as high initial equipment costs and complex installation requirements. Advanced systems like vacuum and freeze dryers involve significant capital investment and ongoing maintenance expenses. Furthermore, stringent regulatory standards from agencies such as the FDA and EMA demand rigorous validation and documentation, extending time-to-market for new equipment. The high energy consumption associated with certain drying processes also limits adoption among cost-sensitive manufacturers.

Market Opportunities

The next phase of growth lies in technological integration and sustainability. Manufacturers are increasingly adopting AI-driven process monitoring, predictive maintenance, and energy recovery systems to improve operational efficiency. The growing focus on green manufacturing and low-carbon technologies presents significant opportunities for eco-friendly drying equipment. Moreover, as biopharmaceuticals and personalized medicine continue to gain traction, the demand for precision-controlled freeze dryers and small-batch flexible systems will continue to expand, particularly in emerging economies.

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Reasons to Buy the Report:

- Comprehensive market analysis backed by verified DataM Intelligence figures and forecasts through 2033.
- Insights into key drivers, restraints, and opportunities shaping global and regional growth.
- Detailed segmentation by product type, application, and end-user with emerging market trends.
- Competitive landscape analysis featuring major manufacturers, technological developments, and strategic partnerships.
- Expert recommendations for investors, suppliers, and manufacturers seeking sustainable growth.

Frequently Asked Questions (FAQs):

- How Big is the Global Pharmaceutical Drying Equipment Market?
- Who are the Key Players Operating in the Pharmaceutical Drying Equipment Market?
- What is the Projected Growth Rate of the Market During 2025–2033?
- What Technological Trends are Driving the Adoption of Pharmaceutical Drying Systems?
- Which Region is Expected to Dominate the Industry Throughout the Forecast Period?

Conclusion:

The pharmaceutical drying equipment market is on a strong upward trajectory, fueled by innovation, automation, and the expanding scope of global pharmaceutical manufacturing. With the market projected to reach US\$ 10.35 billion by 2033 at a CAGR of 6.7%, opportunities abound for manufacturers investing in energy-efficient, data-driven, and GMP-compliant drying solutions. As biopharmaceuticals and complex drug formulations become mainstream, precision drying will remain a cornerstone of quality assurance and product stability. Continuous technological advancements, coupled with rising investments in sustainable production, position this market for a decade of robust growth and transformation.

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