

## A Revolutionary Philosophy in Vacuum Drying

### Planex® System: The Multi-Patented Horizontal Vacuum Dryer with Planetary Agitator

Planex® System is a groundbreaking innovation designed and manufactured by **Italvacuum**, one of the most renowned producers of industrial vacuum dryers and vacuum pumps for the **pharmaceutical** and **fine chemical** industries. This patented machine introduces a true revolution in vacuum drying, delivering results previously unattainable with traditional horizontal and vertical systems. It has rapidly gained the trust of the most demanding operators worldwide.

### Key Innovation: The ZeroFriction® Planetary Agitator

At the heart of the Planex® System lies its unique eccentric agitator, capable of simultaneous rotation on its axis and tangentially within the drying chamber. This dual independent motion makes it ideal for drying wet powders from filtration or centrifugation processes, particularly in the production of **Active Pharmaceutical Ingredients (APIs)**, **fine chemicals**, and **intermediates**.

The combined dual rotation of the agitator, along with its compact size relative to the chamber diameter, ensures perfect batch movement while consuming **at least three times less energy** than traditional dryers. This translates into a threefold reduction in mechanical and thermal stress on the product, safeguarding even the most delicate and heat-sensitive materials.

### Advanced Agitation Technology: Stop & Swing Program

The Planex® System's advanced software allows automatic control of the agitator's motion through the **Stop & Swing program**, enabling oscillation while remaining immersed in the product. This ensures continuous mixing, which is particularly effective for processing small batches.

### ZeroFriction®: Eliminating Product Overheating

The ZeroFriction® planetary motion prevents overheating caused by product friction against the chamber surface, a common issue with fixed-body systems. The tangential movement of the blades minimizes the clearance between the agitator and the chamber wall, preventing product buildup and agglomeration. This ensures more effective drying and controlled final granularity, unattainable with conventional dryers.

## Total Batch Discharge and Minimal Residue

The minimal clearance between the agitator and the chamber wall not only prevents product deposits but also ensures near-complete batch discharge. A dedicated automatic discharge program, combined with the agitator's pendulum motion (oscillating 90° in the discharge zone), results in an **average residue of less than 1%** of the total batch volume.

## Flexible Capacity for Diverse Needs

The Planex® System offers exceptional loading flexibility, with total chamber volumes ranging from **150 to 3,200 liters**. Depending on the product, the filling capacity can vary between **15% and 80%** of the chamber volume, making it suitable for both small and large production batches in the chemical and pharmaceutical industries.

## Compliance with International Standards

The Planex® System is designed and built in compliance with major international standards, including **ATEX, UL, PED, and ASME**, and adheres to the latest **FDA** and **cGMP** regulations, ensuring safety for operators, the environment, and the product.

## Materials and Construction

The Planex® System is constructed from **AISI 316L stainless steel** for all product-contact surfaces. Alternative materials, such as **ALLOY C-22** and **AISI 904L**, are available upon request. The chamber walls, agitator shaft, and door are all heated via a thermal fluid circulation system to prevent cold spots that could lead to solvent condensation or product accumulation.

The internal surfaces of the drying chamber are polished to a mirror finish or electropolished to enhance corrosion resistance, reduce product adhesion, and facilitate cleaning. The agitator shaft features a **double mechanical seal** to ensure vacuum integrity and batch purity, eliminating any risk of contamination. The seal can operate with either traditional wet flushing or dry operation using nitrogen.

## Cleaning: Efficiency and Simplicity

The Planex® System is designed for fast and effective cleaning, a critical feature for a machine chosen by clients worldwide for its versatility and suitability for multi-product applications.

## Internal Cleaning

The absence of dead corners within the drying chamber ensures thorough cleaning. This is achieved through an efficient **CIP (Cleaning-In-Place)** system with a retractable rotating spray head. The decentered position of the agitator allows it to rotate during cleaning, reducing the amount of cleaning fluid required.

## Easy Disassembly of Internal Parts

The agitator's unique modular design allows it to be easily disassembled into separate sections, enhancing cleaning efficiency. Unlike traditional systems, where the agitator is a single structure requiring bulky equipment and extended downtime for disassembly, the Planex® System offers unmatched convenience.

## Inspection

The large front-opening door provides maximum access to the drying chamber. The decentered position of the agitator offers additional space for operators, making **SWAB TEST** execution faster and easier.

## External Cleaning

The Planex® System is also easy to clean externally, thanks to its **particle-free cGMP configuration** with a sealed casing. The chamber is flanged to the wall, eliminating the need for support frames in cleanrooms. This design prevents product accumulation in crevices and joints, ensuring effective external cleaning and enabling installation in cleanroom environments with strict pressurization and separation requirements.

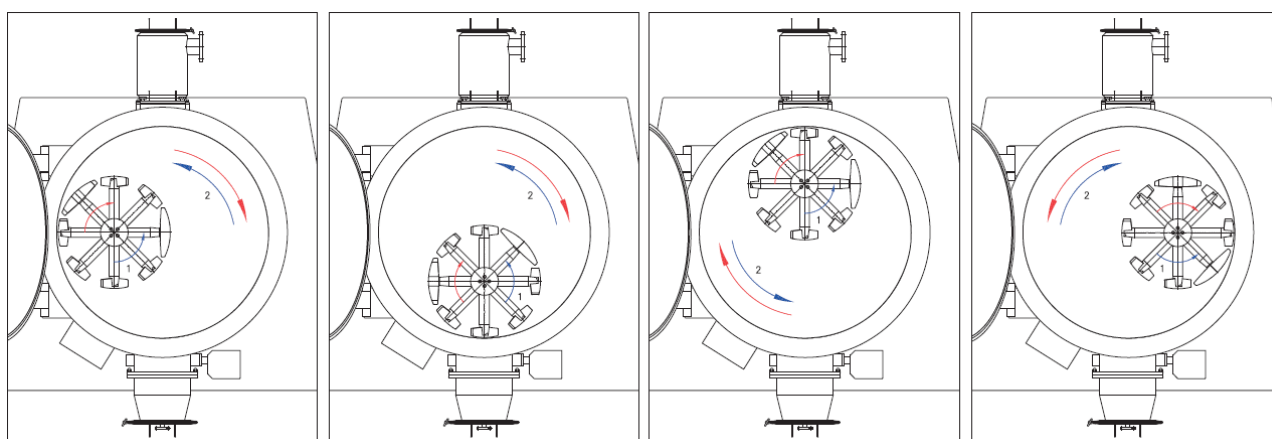
## Conclusion

The Planex® System represents a revolutionary leap in vacuum drying technology. Its patented ZeroFriction® planetary agitator, energy efficiency, and unparalleled cleaning capabilities make it the ideal solution for the pharmaceutical and fine chemical industries. With its ability to handle both small and large batches while maintaining the highest levels of product integrity and compliance with international standards, the Planex® System sets a new benchmark for innovation, efficiency, and reliability in vacuum drying.

Contact [marketin@italvacuum.com](mailto:marketin@italvacuum.com) for additional info about the @ Planex® System!



*Figure 1 Planex System in clean room installation*



*Figure 2 Planetary agitator double movement*



*Figure 3 Planex System fornt view*



*Figure 4 Internal cleaning procedures*



*Figure 5 Agitator focus*