anhydro
AN SPX BRAND

# Spray Drying for the Pharmaceutical Industry

## Total flexibility and control

SPX®

# Customized Spray Drying Solutions for Special Needs

*SPX is a technology leader in the design and supply of continuous spray drying processing solutions for the pharmaceutical industry worldwide.*

Based on a four-tier model incorporating the most comprehensive range of continuous spray drying solutions available, SPX customizes high-performance, cost-effective processing solutions to individual pharmaceutical needs.

**Benefits that make a difference**

With thousands of spray drying plants sold worldwide, SPX offers decisive competitive edge in pharmaceutical spray drying:

- the most comprehensive spray drying solution range available today
- compact processing of more drug product than with other processing technologies
- dedicated customization based on world-leading experience and expertise
- multiple processes including API processing, spray encapsulation, spray agglomeration and spray cooling
- scalable Design Space
- predictable Path Forward and Control Space
- complete control over particle size distribution
- consistent precision and performance
- maximum uptime with straightforward cleaning and maintenance

# Precision, Control and Scalability

*Anhydro spray drying solutions enable cost-effective production of powders with tailo-red particle engineering in a controlled environment and under scalable conditions.*

Pharmaceutical companies across the world use Anhydro Spray Drying solutions for a wide range of applications in the fields of:

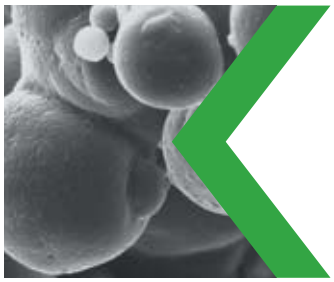
- pharmaceuticals
- nutraceuticals
- biopharmaceuticals and biotherapeutics
- aseptic applications and processing

## Applications

- **free flowing powders**
  continuous single-stage spray drying of APIs, excipients and final formulations into free flowing powders
- **agglomerated powders**
  spraybed Drying combining spray drying with fluidised bed technology for single-step production of agglomerated powders
- **encapsulation**
  encapsulation of various formulations enabling special properties such as
- **microencapsulation**
  microencapsulation of various compounds enabling taste masking or controlled release functional coatings
- **fine powders**
  isolation of amorpous compounds, improved bioavailability through the production of amorphous powders by forming solid dispersions, molecule or powder stabilization
- **spray cooling**

## Validation

Anhydro spray drying solutions for the pharmaceutical industry feature FDA 21 CFR Part 11-compliant process control and data acquisition to accommodate individual customer requirements. Anhydro supplies the necessary process control and data acquisition solutions to facilitate successful validation.



# Anhydro MicraSpray – Customizable, Adaptable and Scalable

*The Anhydro MicraSpray series is the result of more than 60 years of spray drying experience and expertise gained from thousands of installed spray dryers and innumerable drying tests conducted on a huge variety of different products.*

Anhydro MicraSpray dryers feature a series of cutting-edge technology developments within key process components, opening new doors for particle engineering and plant sanitation. Anhydro MicraSpray dryers can be customized and scaled to virtually any requirement within primary as well as secondary pharmaceuticals.

**MicraSpray Standard Series**

MicraSpray Standard dryers follow a design concept based on a basic dryer with a wide range of optional modules. This enables the customer to configure the dryer for special application and processing needs.

The standard MicraSpray is available in six different sizes with gas rates of:
35 - 150 - 400 - 750 - 1250 - 2500 kg/h.

**Anhydro MicraSpray GMP Series**

Anhydro MicraSpray-GMP dryers are typically used for primary pharma applications inclu-ding APIs, excipients and some antibiotics. The MicraSpray-GMP dryer quality standards comply with FDA guidelines and the dryers are used in R&D work as well as in actual API production.

- enhanced plant surface finish
- material certificates
- eCustomized automation
- CIP and Sanitation in place capability
- process gas filtration
- supply of documentation enabling equipment qualification

## Anhydro MicraSpray A-Class Series

Anhydro MicraSpray A-Class dryers are designed for secondary pharmaceuticals, typically final formulation, spray congealing for taste masking, increased bio-availability drugs, micro-encapsulation, and powders for inhalation.

The Anhydro MicraSpray A-Class series eliminates inspection doors and unnecessary flange connections in the process vessels in order to provide optimum surfaces and even vessel surface temperatures.

- cutting-edge technology air distribution systems
- atomization systems
- powder separation systems
- mirror-polished surfaces
- comprehensively documented qualification services
- special verification systems enabling tracking and documenting complex parameters in order to verify process consistency over time

## Anhydro MicraSpray Aseptic Series

The Anhydro MicraSpray Aseptic series is the first and only truly aseptic spray dryer series available. Anhydro MicraSpray Aseptic dryers are designed for peptides, proteins, vaccines and other biopharmaceutical products requiring aseptic processes.

The MicraSpray Aseptic Series is based on the same equipment standard as the MS A-Class series together with a range of special features to ensure a truly aseptic process.

Anhydro MicraSpray 150 Aseptic

Anhydro MicraSpray 35 GMP

**Anhydro MicraSpray (MS) Dryers are available in different sizes, classes, configurations**

| MicraSpray Dryer models | MS 35 | MS 150 | MS 400 | MS 750 | MS 1250 | MS 2500 |
|---|---|---|---|---|---|---|
| Standard | ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ |
| GMP | ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ |
| A-Class | ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ | ■ ■ |
| Aseptic | ■ | ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ | ■ ■ ■ |
| Single stage | YES | YES | YES | YES | YES | YES |
| Multi-stage | NO | YES | YES | YES | YES | YES |

■ Atmospheric

■ Single Pass

■ Closed Cycle

Anhydro MicraSpray 750 GMP

# Other Anhydro Spray Dryer Options

### Anhydro Atmospheric Air Dryers

**Applications:** Aqueous based products to be dried under non-aseptic conditions.

**Configurations:** Single stage execution (producing fine particles) and multistage execution (for agglomerated powders, typically applied for direct compressible powders).

### Anhydro Inert Gas Single Pass Dryers

**Applications:** Sterile conditions, when spent gas composition and product contact are incompatible R&D work on a very infrequent basis for either solvent-based products or potent compounds.

**Configuration:** Single Pass employing inert gas as the drying medium without recirculation of the spent drying gas.

### Anhydro Inert Gas Closed Cycle Dryers

**Applications:** Solvent-based (water, etha-nol, acetone and methylene chloride) pharmaceuticals

**Configuration:** Additional powder recovery and solvent recovery systems, as well as EX-proof electrical controls

Anhydro MicraSpray 150 Closed Cycle GMP

### Small Scale Plants

Anhydro Small Scale Plants are designed for scientific test work, industrial research and development, as well as for small scale production. Anhydro Small-Scale Plants offer high uptime and yield, adaptability, repeatability, full process control, scalability, and compliance with the strictest factory standards.

### SPX Test Centre

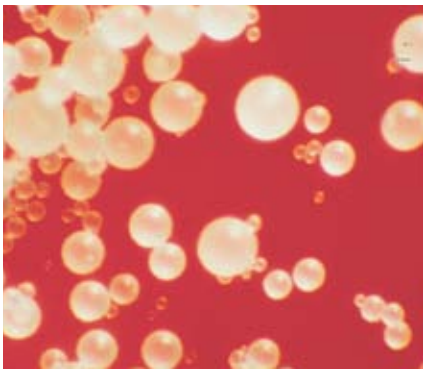
SPX Test Centre offers flexible test centres in the USA and Europe for testing new products and evaluation of process conditions to secure precise synergy between optimization of plant concept and reproducible product quality.

We can also install test equipment or a pilot plant at your site for a limited period for demonstration purposes or pilot scale production.

Please visit
our website at
www.spxft.com
for more information

SPX Flow Technology provides a full range of Anhydro Evaporation and Drying equipment for the global dairy, food and beverage, chemical, healthcare and pharmaceutical industries. Focusing on flexibility and attentiveness to individual customer needs, SPX enables excellence at every point along the value chain as part of our commitment to our customers´ success.

SPX acts as a strategic development partner for leading manufacturers all over the world. Through close collaboration with our customers, we promote the development of innovative concepts and optimization of existing processes, enabling customers to introduce new products into the market as quickly and as cost effectively as possible.



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