

## Anhydro Spin Flash<sup>®</sup> Drying



SPX FLOW Danmark A/S is an international engineering company with a consistent goal to provide our customers with the optimal processing technology and the highest plant performance standards. We have specialized in supplying the optimal design and engineering with respect to production performance, flexibility, energy efficiency and environmental protection.

Developed and pioneered by SPX FLOW Danmark, Anhydro Spin Flash® drying technology is a patented process, widely adopted by industrial customers all over the world.

SPX FLOW, Inc. (NYSE:FLOW) is a leading manufacturer of innovative flow technologies, many of which help define the industry standard in the market segments they serve. From its headquarters in Charlotte, North Carolina, it operates a sales and support network, centers of manufacturing excellence, and advanced engineering facilities, throughout the world. Its cutting-edge flow components and process equipment portfolio includes a wide range of pumps, valves, heat exchangers, mixers, homogenizers, separators, filters, UHT, and drying technology that meet many application needs. Its expert engineering capability also makes it a premium supplier of customized solutions and complete, turn-key packages to meet the most exacting of installation demands.

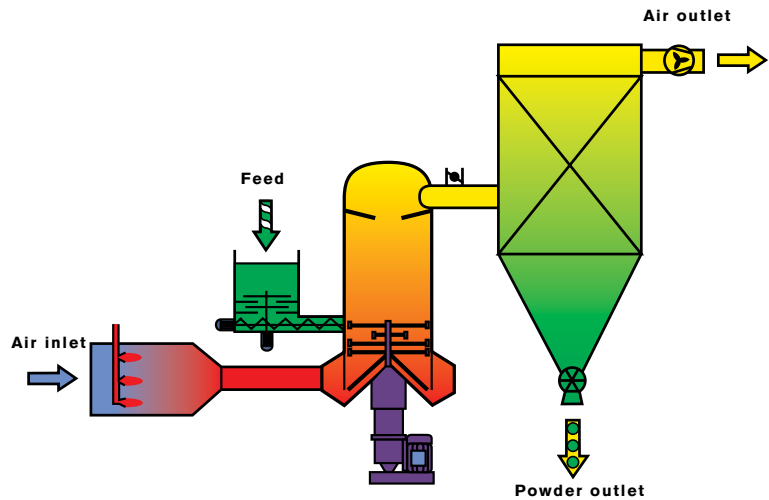
Incorporating many leading brands, SPX FLOW has a long history of serving the food and beverage, power and energy, and industrial market sectors. Its designs and engineered solutions help customers drive efficiency and productivity, increase quality and reliability, and meet the latest regulatory demands. In-depth understanding of applications and processes, state-of-the-art Innovation Centers, and advanced pilot/testing technology further assist in optimizing processes and reducing timescales to reliably meet production targets.

To learn more about SPX FLOW capabilities, its latest technology innovations and complete service offerings, please visit [www.spxflow.com](http://www.spxflow.com).

## Anhydro Spin Flash®

Anhydro Spin Flash® drying solutions are designed for continuous drying of cohesive and non-cohesive pastes and filter cakes, as well as high-viscosity liquids.

Anhydro Spin Flash® drying solutions are available with capacities ranging from a few kilos up to 40 tons powder per hour.



Anhydro Spin Flash® plant

# Anhydro Spin Flash® Dryer

The main components of an Anhydro Spin Flash® plant are a feed system, a patented drying chamber and a bag filter.

## FEED SYSTEM

The feed system consists of a feed vat, where a discontinuous filter cake flow is buffered and agitated prior to continuous drying. A variable speed feed screw supplies feed material to the drying chamber. Different types of screw designs are available for different feed characteristics.

Highly viscous feed materials are pumped to the drying chamber.

## DRYING CHAMBER

The rotor at the conical base of the drying chamber fluidizes product particles in a drying efficient hot air flow pattern, in which any wet lumps are rapidly disintegrated. Hot air is supplied by a temperature controlled air heater and a speed controlled fan, entering the drying chamber base tangentially in order to establish a turbulent, whirling air flow.

Airborne fine particles pass through a classifier at the top of the drying chamber, while larger particles remain in the chamber for further drying. The drying chamber is rigidly designed to withstand pressure shock in the event of a dust explosion of flammable particles. All bearings are effectively protected against dust and heat.

## BAG FILTER

Powder from the drying chamber is conveyed to a bag filter for separation from the drying air and is collected from the base of the bag filter, while the air flow passes out of the system at the top via an exhaust fan.

## DRYING PARAMETERS

The important parameters are solids content in the feed material, drying temperatures, and air velocity. These parameters are determined by the nature of the product and the desired powder density, moisture content, particle size, etc. Typical air inlet temperatures are between 302°F - 1,292°F (150°C - 700°C), while outlet temperatures are determined by the required powder moisture content.

## Typical product applications

- Organic chemicals
- Inorganic chemicals
- Agro chemicals
- Pigments and dyestuffs
- Ceramics
- Pharmaceuticals
- Food and feed products
- Waste products



# Spin Flash® Drying Benefits

- High drying efficiency providing low energy costs
- Continuous processing with short processing time
- Low operator overheads and minimum maintenance costs
- Controlled residence time enabling high temperature drying
- Controlled particle size
- Very fine powder production eliminating requirement for milling
- Limited space requirements
- High-pressure, shock-resistant chamber for safe drying of flammable products
- Available in FDA and cGMP compliant configurations



Inside view of a Spin Flash® feed vat



Anhydro Spin Flash® drying chamber



Inside view of a Spin Flash® drying chamber



## Available Plants

The drying chamber is available in standard sizes with diameters ranging from 8" - 98" (200 mm to 2,500 mm). Standard material of construction is stainless steel. Optionally, the drying chamber can also be supplied in Hastelloy or other corrosion resistant materials. Drying chambers for inlet temperatures above 932°F (500°C) feature special, heat resistant stainless steel air distributors.

### The spin flash dryer provides:

- Continuous process with short processing time for higher yield
- Complete temperature and speed control for optimum drying and minimum residence time
- Special feed agitator and screw conveyor to avoid bridge building
- Drying chamber with patented inverted conical base and rotor system for air velocity control, high drying efficiency and product protection



Anhydro Spin Flash® plant

Small-scale, ready-to-install Anhydro Spin Flash® drying plants are available for research purposes and small-scale production. They are simple to operate and dismantle for cleaning.

PLANT TYPE	CHAMBER DIAMETER IN (MM)	TOTAL HEIGHT FT (M)	FLOOR SPACE FOR TOTAL PLANT FT <sup>2</sup> (M <sup>2</sup> )	MAX. WATER EVAP. CAP. LB/H (KG/H)
47	8 (200)	5.6 (1.7)	26.9 (2.5)	88 (40)
51	12 (315)	13.1 (4)	161.5 (15)	265 (120)
53	16 (400)	29.5 (9)	193.8 (18)	485 (220)
55	20 (500)	29.5 (9)	258.3 (24)	772 (350)
57	25 (630)	29.5 (9)	322.9 (30)	1,102 (500)
59	31 (800)	29.5 (9)	397.5 (36)	1,654 (750)
60	35 (900)	29.5 (9)	484.4 (45)	2,205 (1,000)
61	39 (1,000)	29.5 (9)	602.8 (56)	2,866 (1,300)
62	44 (1,120)	36.1 (11)	753.5 (70)	3,748 (1,700)
63	49 (1,250)	36.1 (11)	914.9 (85)	4,850 (2,200)
64	55 (1,400)	36.1 (11)	1,130.2 (105)	6,173 (2,800)
65	63 (1,600)	36.1 (11)	1,399.3 (130)	7,716 (3,500)
66	71 (1,800)	36.1 (11)	1,614.6 (150)	9,700 (4,400)
67	79 (2,000)	36.1 (11)	1,829.9 (170)	12,125 (5,500)
68	88 (2,240)	36.1 (11)	2,099 (195)	14,330 (6,500)
69	98 (2,500)	36.1 (11)	2,421.9 (225)	17,196 (7,800)

# Customized Technologies

SPX FLOW has the equipment, experience, and expertise to provide you with an end-to-end processing solution, tailored for your specific needs.

## CLOSED CIRCUIT SYSTEMS

The Anhydro Spin Flash® drying system is available either as a closed circuit system using the low-oxygen (self-inertising) principle, or with an external inert gas supply such as nitrogen. The low-oxygen option eliminates dust explosion hazards, while the nitrogen-based system is recommended for drying solvent-based materials, as it enables complete recovery of the solvent.

## INTELLIGENT PROCESS AUTOMATION

State-of-the-art automation systems are available for Anhydro Spin Flash® plants, enabling fully automatic control, process optimization, data logging, traceability, and maintenance scheduling.

## SPECIAL DESIGN FEATURES FOR THE PHARMACEUTICAL INDUSTRY

Plants complying with FDA and cGMP requirements are supplied with an Anhydro Spin Flash® drying chamber incorporating a number of special design features. These include shaft entry with a barrier, a flange assembly and sealing, inspection door gaskets, easy disassembly and a rotor top cover.



# Partnership and Collaboration

SPX FLOW is committed to help customers all over the world optimize quality and yield at all times from their Anhydro Spin Flash® drying plants.

## FINDING THE BEST SOLUTION FOR YOU

Our aim is to help you find the best solution for your long-term needs. We offer a close partnership based on personal commitment and documented Best Practice from the initial needs analysis and planning stage until the end of the service life of the solution many years later.

Together with you we analyze the available options based on your product and throughput requirements. If required, we can run pilot trials at our SPX FLOW innovation centre in Denmark. New products can be tested to analyze product properties in order to identify the best Anhydro Spin Flash® dryer design and process operating parameters.

Anhydro small scale plants are also available on a rental basis for in-house laboratory trials.

Full documentation submitted prior to installation and personal training provided during commissioning will ensure that your new Anhydro Spin Flash® process line is production-ready from the very first day.

## LIFELONG SERVICE AND SUPPORT

Our worldwide service organization is ready at all times to provide any necessary spare parts at short notice or to dispatch service technicians to rectify any problems, thus reducing unscheduled downtime to a minimum.

SPX FLOW also offers a number of service agreement options, depending on your individual needs, and our process engineers are always available to provide application and development support.

## ENGINEERING STANDARDS

Environment protection is incorporated in accordance with local rules and regulations and is a key point in the plant design. We are ISO 9001:2008 certified. All our plants meet the CE marking and ATEX requirements where applicable.



**SPX FLOW innovation center in Soeborg, Denmark**



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Based in Charlotte, North Carolina, SPX FLOW, Inc. (NYSE: FLOW) is a multi-industry manufacturing leader. For more information, please visit [www.spxflow.com](http://www.spxflow.com)

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