

Pilot-Scale Spray dryer DW350

Spray drying at relevant industrial scale

Laboratory of Food Process Engineering, Wageningen University



DW350 is in the core of our drying research facilities in Wageningen.
Join us for research or training purposes!

A new pilot-Scale Spray dryer – DW350

The spray dryer in the Food Hall of the Agrotechnology & Food Sciences Group is for research & educational purposes.

It is suited for operation by students in an educational setting (e.g. course Food Engineering FPE-20306) and allows research activities e.g. aimed at controlled agglomeration or making small batches of a new food product under specific spray drying and agglomeration conditions.

The equipment is owned by the Laboratory of Food Process Engineering, but is also used by Wageningen Food & Biobased Research to ensure optimal use of the equipment throughout the year.

Spray Drying

Spray drying is a common process in food industry.

Main purpose of spray drying is to convert liquid formulations into a shelf-life stable powder for food or feed applications. Spray dried powders have superior quality as it is a relatively mild drying method.

Examples of spray dried ingredients are coffee, vitamin, enzyme, yeast, probiotic, fruit, vegetable, plant protein, flavoring, spice, algae, starch and its derivatives, milk, infant formulae, creamer and egg powders.

The Advantage of a Pilot-Scale Spray dryer

Availability of this pilot-scale spray dryer is ideal for scale-up to a relevant industrial scale.

This research facility is unique in comparison to other pilot-scale facilities, which are usually tailored for toll manufacturing rather than research. This pilot-scale spray dryer is not only unique in its scale, but it also has high flexibility to vary spraying nozzles, air distribution and agglomeration conditions to systematically study their impact on instant powder properties and energy consumption. The DW350 allows production under hygienic conditions.

Process Safety

The DW350 is designed for safe operation and to mitigate potentials risks (e.g. dust explosion or noise reduction) during operation:

- Spray dryer is ATEX compliant for ST-1 powders.
- Majority of food & feed can be processed safely.
- Training video is available.
- Sufficient safety measures are included, e.g. explosion vent.
- Explosion safety document is in place describing all details.
- Cleaning policy is strictly for food and process safety.

Spray Dryer set-up



Spray Dryer / Agglomerator DW350 Special

- Use: Spray drying of food & feed materials
- Drying chamber: diameter = 1.5 m, length = 2 m
- One phase drying: up to 25 kg/h water evaporation
- Feeding capacity: 30-40 L/h
- Liquid flow measurement: Coriolis mass flow meter
- Nozzle types: High pressure (80 bars) / two-fluid nozzle
- Number of nozzles: One or two overlapping nozzle sprays
- Air distributor: Rotaswirl for short drying time and intense droplet-air contact
- Inlet air flow: Max. 210 °C
- Air dehumidification: Optional inlet air adsorption drying down to 2 g/kg moisture content
- Fines recycle: Controlled agglomeration via dosing
- Access points & test kit: For analysis of T, RH, P, flow.
- Materials: Stainless steel contact parts
- Cleaning: Manual / No CIP possibility
- Scrubber: For clean air exhaust
- Possibility: Spraytec system to study agglomeration

Key points

- Unique drying and agglomeration features.
- Equipped and operated with all required safety measures.
- Allows training of our next generation students about spray drying and large scale processing in general.
- Facilitates spray drying and agglomeration research aiming at improved powder quality while reducing energy consumption.
- Enables new contract research opportunities / production of small research batches.



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DW350 supplier: SprayDryWorks (www.spraydryworks.com)