PRODUCTION MINOR
Φ1.2 x 0.8
092-1170-00139
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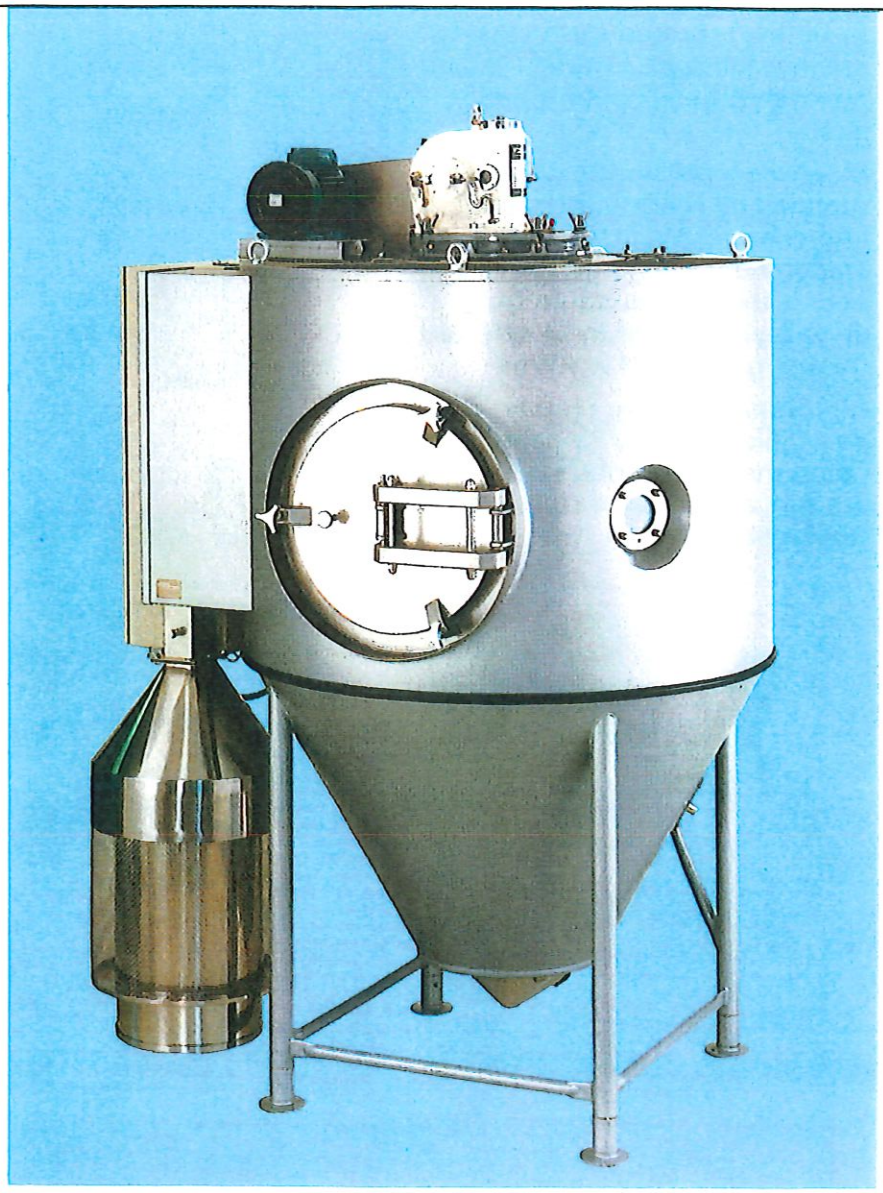
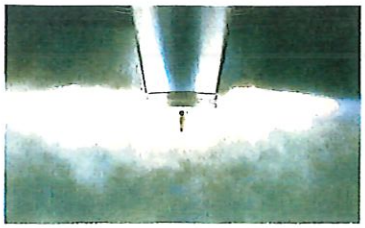
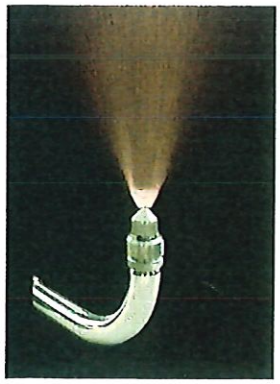
Niro

Production Minor Spray Dryer

- The package unit for in-house research and small scale production.
- Operational flexibility: interchangeable atomization and powder discharge systems.
- Easy plant cleaning.





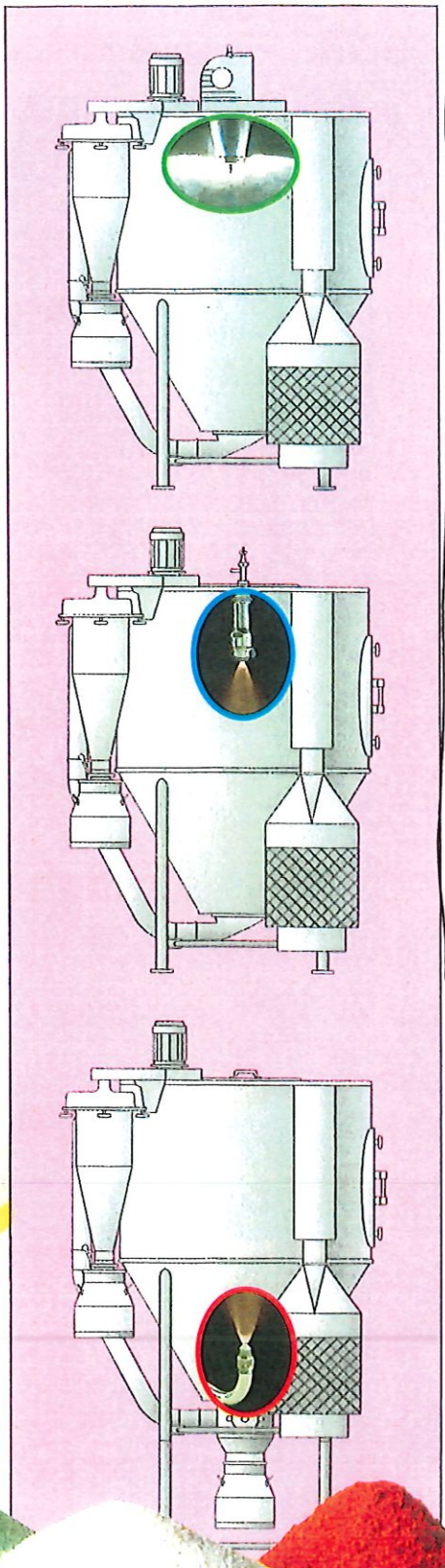


The Production Minor Spray Dryer

The Production Minor is a small capacity spray dryer designed to provide the operational flexibility required for successful use in small scale production and research & development projects.

More than 1100 units have been supplied by NIRO worldwide. Interchangeable atomization and powder discharge systems permit the most suitable spray dryer layout mode to be selected for any product at any time.

All components are readily accessible and easy to clean. Components in contact with product are made of stainless steel AISI 316.



Rotary Atomizer Mode

Atomization is achieved by feeding liquid onto a high speed wheel.

The rotary atomizer is placed in the ceiling air disperser and operates with a vaned atomizer wheel for non-abrasive feeds, and with a carbide bushing wheel for abrasive feeds. Other designs are available for special applications.

Powders produced with this atomizer mode have a mean particle size in the range of 20-50 µm. The particle size is adjusted by a change in wheel speed.

Co-current Mode: Two-fluid Nozzle

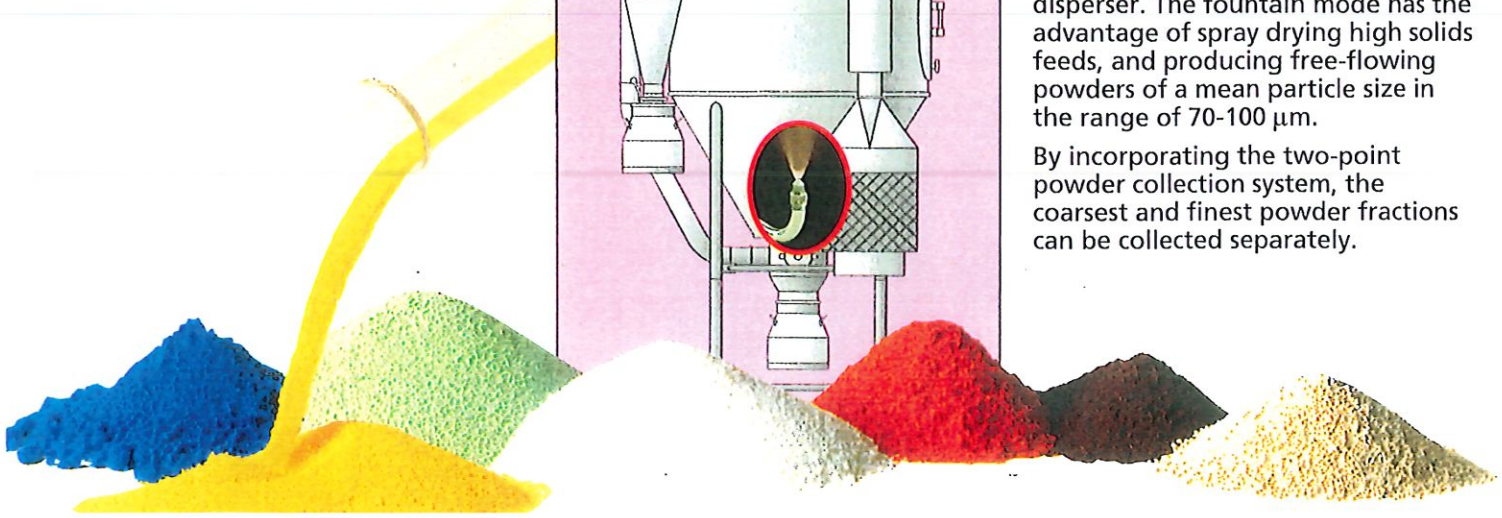
Atomization is achieved by using compressed air to atomize the liquid feed into a spray of droplets. The nozzle is placed in the ceiling air disperser. It is ideal for heat sensitive feeds and has the added advantage of handling both low and high viscosity feeds.

Powders produced with this atomizer mode have a mean particle size in the range of 10-40 µm. The particle size is controlled by varying the nozzle flow ratio between compressed air and feed.

Fountain Mode: Two-fluid Nozzle

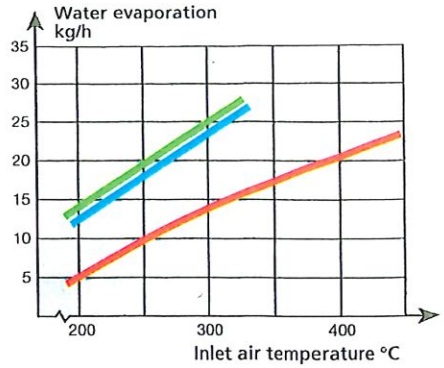
The nozzle is placed in the cone section of the drying chamber, spraying upwards into the hot air flowing out of the ceiling air disperser. The fountain mode has the advantage of spray drying high solids feeds, and producing free-flowing powders of a mean particle size in the range of 70-100 µm.

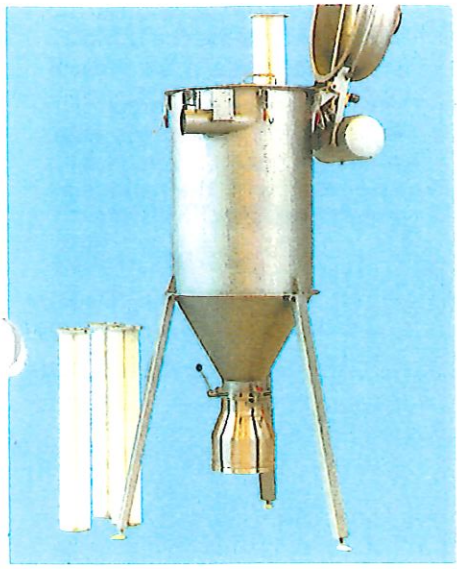
By incorporating the two-point powder collection system, the coarsest and finest powder fractions can be collected separately.



Relationship between water evaporative capacity and inlet air temperature

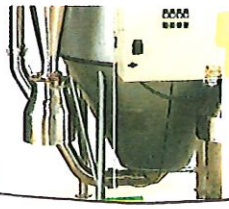
- *Rotary atomizer mode at 90°C exhaust air temperature*
- *Co-current mode, two-fluid nozzle, at 90°C exhaust air temperature*
- *Fountain mode, two-fluid nozzle, at 120°C exhaust air temperature*





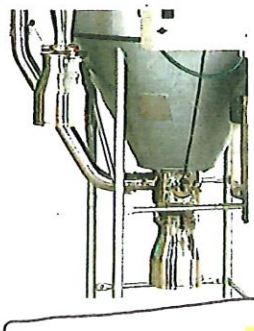
Cartridge Filter for Exhaust Air

Powder leaving the cyclone with the exhaust air is removed in the filter which is fitted with washable, easily exchangeable cartridges. Various types are available including the latest sintered metal types. Efficiency: min. 99.8% (ACSP).



Single point powder collection

under the cyclone.



Two-point powder collection:

coarse particles are collected under the chamber and fine particles under the cyclone.

FS1 Atomizer

A portable atomizer (16 kgs) with direct wheel drive from a high frequency motor. The atomizer contains no oil and requires a minimum of servicing. Selected where possible contamination by lubricants must be prevented.

Equipment Specification

Component	Type	Rating
Feed pump	Positive displacement (peristaltic) with variable speed drive control	Up to 120 l/h
Rotary atomizer		
- Standard	FU-11 V-belt/pulley speed contol	15,000-24,000 rpm Motor: Max. 3 kW
- Sanitary	FS-1 Frequency inverter speed control	10,000-30,000 rpm Motor: Max. 1 kW
Two-fluid nozzle atomizer		
- Co-current mode - Fountain mode	External mixing External or internal mixing	
Hot air system - Air flow: 360 kg/h at 200°C	Electric Gas Steam	Max. 36 kW
Drying chamber - Auxiliary: Pneumatic hammer Airbroom	Ceiling air disperser	Diameter: 1200 mm Cylindrical height: 750 mm Cone angle: 60° Inside surface finish: AISI 316 cold rolled 2B polished to Ra≈0.6 µm. Other surface on request
Exhaust air system	Cyclone Cartridge filter Wet scrubber	Diameter: 300 mm Diameter: 700 mm Spray nozzles or Venturi type
Powder collection	Container	Volume: 20 litres
Instrumentation	Field instruments Control panel	Manual/automatic control
Installed power	4.0 kW excl. electric heater (if supplied)	
Compressed air	10 Nm³/h, 2 bar, for two-fluid nozzle 4.5 Nm³/h, 6 bar, for cartridge filter	
Total weight	1300 kg	
Space requirements	Max. 3.0 x 1.7 x 3.8 m (LxWxH)	

Aseptic Mode

This special design of the Production Minor spray dryer is ideal for small scale aseptic production requirements in, for example, the pharmaceutical industry.
The spray dryer is equipped with HEPA filters and laminar air flow box for sterile powder collection.
All stainless steel surfaces in contact with the powder are highly polished.

Closed Cycle Mode

This special design of the Production Minor spray dryer is ideal for small scale closed cycle operations involving the drying of organic solvents. The inert drying gas is nitrogen. Powder is collected in a cyclone and cartridge filter arrangement and solvent is recovered in a condenser. The spray dryer operates with either rotary or nozzle atomizers. All inert gas requirements for nozzle and cartridge filter operation are met by using a compressor within the system.

A closed cycle spray dryer gives emission-free drying and eliminates the hazards of explosion associated with the handling of organic solvents.

Range of Small Scale Plants

Plant	Evaporative Capacity kg/h	Product Characteristics (mean size range stated where applicable)
Spray Dryers:		
Mobile Minor	0.5 - 7	Fine particles, 5-30 µm
Mobile Minor HI-TEC	0.5 - 6	Coarse particles, 60-80 µm
Production Minor	5 - 35	Fine - coarse particles, 10-100 µm (adjustable)
P-6.3	10 - 60	Fine - coarse particles, 10-100 µm (adjustable)
SD-6.3-R	10 - 65	Fine particles, 20-60 µm
SD-6.3-N	10 - 60	Coarse particles, 80-130 µm
Spray Dryer with integrated fluid bed: FSD-4	15 - 35	Agglomerates, granulates, 100-400 µm
Spray Dryer with integrated belt: FilterLab	15 - 35	Agglomerates, 400-1000 µm
Paste/filter cake dryers:		
Swirl Fluidizer SWF-Minor	1 - 7	Fine particles, 5-25 µm
Swirl Fluidizer SWF-6.3	10 - 75	Fine particles, 5-25 µm
Vibrating fluid bed dryers:		
VB-0.3	1 - 10	Free-flowing particles, 100-2000 µm
Evaporators:		
Falling film type	50 - 200	Concentrated liquids

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