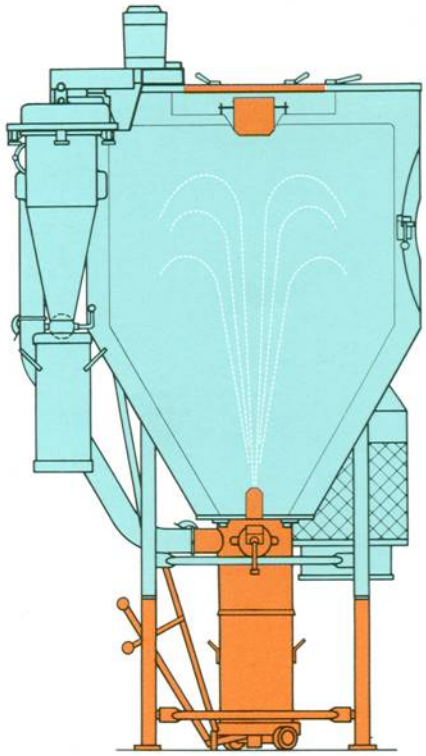
Versatile Utility Spray Dryer

NIRO ATOMIZER

MODEL IV

BASIC PLANT with Equipment for:

- Counter/Co-Current Drying (Mixed-Flow)
- Two-Fluid Nozzle Atomization
- Two-Point Product Discharge



A special attachment enables a two-fluid nozzle to be placed facing upwards in the cone of the drying chamber. The resulting fountainlike spray promotes mixed-flow drying conditions ideal for drying coarse sprays in the relatively small drying chamber of the UTILITY UNIT. Solid content feeds as high as 70% can be atomized to form free-flowing powders of large particles (mean size up to approximately 100 microns). Such added flexibility enables ceramic press-body to be produced continuously.

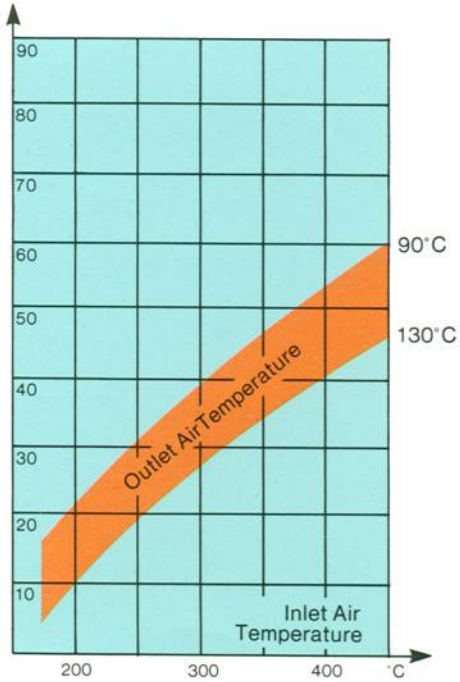
Length		5' 9"
Width		5' 6"
Height		10' 2"
Weight (net)	lbs	1450

Two-fluid nozzle atomizer facing upwards in drying chamber

Advantages of mixed-flow two-fluid nozzle

- Ability to produce coarse free-flowing products.
- Various orifices available for adjustment of particle size.
- Particle size can also be adjusted by control of air flow/feed ratio.
- Atomizes high viscosity suspensions.
- Low pressure operation minimizes wear.
- Two-point discharge allows separate collection of coarse & fine particles.
- Upward spray (mixed-flow) allows for longer retention time of particles in chamber for thorough drying.

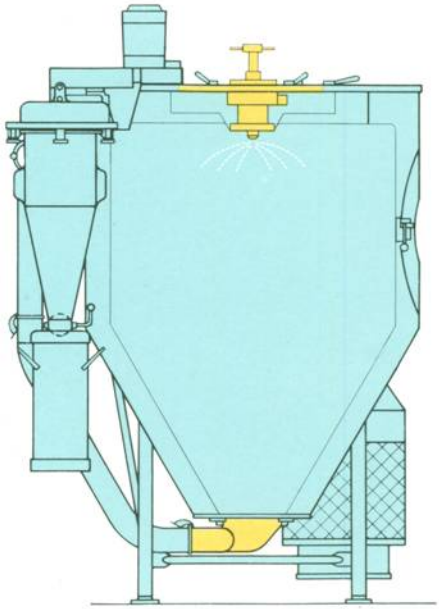
Water Evaporative Capacity lbs/hr



Atomizing air rate 2 SCFM

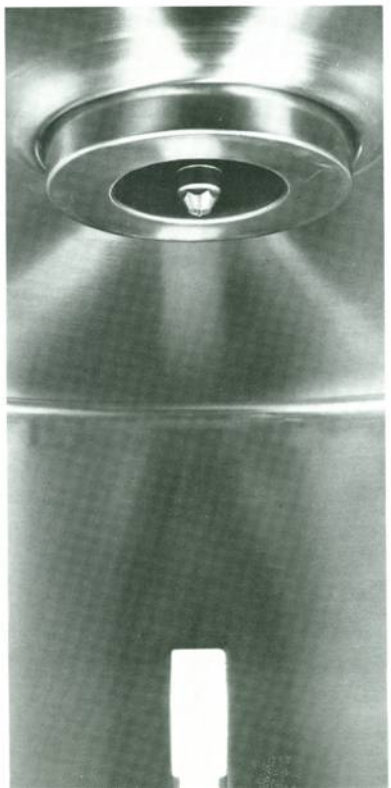
MODEL III

BASIC PLANT with Equipment for:
- Co-Current Drying
- Two-Fluid Nozzle Atomization



The utilization of two-fluid nozzle atomization in the co-current flow basic plant enables heat sensitive solutions to be spray dried under the most lenient temperature conditions. This added flexibility is especially significant in the pharmaceutical industry, where 5–40% solid content feeds of various viscosities must be dried to meet strict powder specifications. An airbroom can also be fitted where products have low softening points or where deposit formation must be prevented for maintenance of product quality.

Length		5' 9"
Width		5' 6"
Height		8' 3"
Weight (net)	lbs	1320

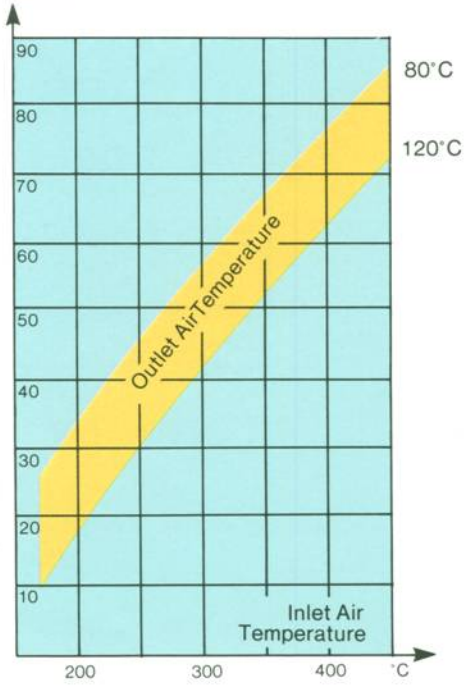


Two-fluid nozzle assembly

Advantages of co-current two-fluid nozzle

- Ideal for heat-sensitive products.
- Low pressure operation.
- Particle size easily adjustable via control of air flow/feed ratio.
- Sanitary construction. (Suitable for aseptic spray drying operations.)

Water Evaporative Capacity lbs/hr



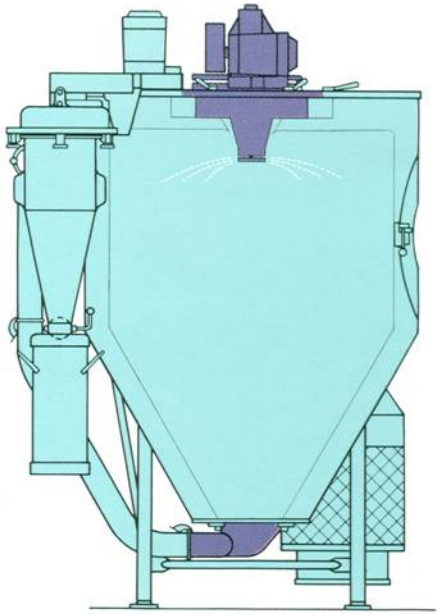
Atomizing air consumption:

MODEL I
MODEL II

(Model II as shown but with two-point product discharge)

BASIC PLANT with Equipment for:

- **Co-Current Drying**
- **Rotary Atomization**
- **Single or Two-Point Product Discharge**



The UTILITY UNIT is highly suited for drying a wide range of products within the chemical, food, and pharmaceutical industries. The rotary atomizer can handle solution and suspension feeds of any solids content, as long as the feed is pumpable. Special atomizer wheels are supplied for abrasive and/or corrosive feeds.

MODEL		I	II
Length		5' 9"	5' 9"
Width		5' 6"	5' 6"
Height		8' 3"	10' 4"
Weight (net)	lbs	1550	1660

NOTE: 3 ft (min.) clearance required for above unit for removal of atomizer.

Rotary atomizer located in air disperser

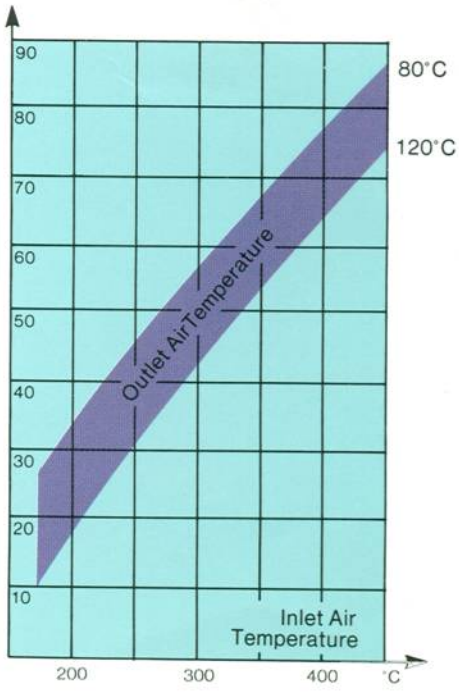
Advantages of rotary atomizer

- Not prone to feed blockages.
- Simple to operate.
- Self-contained automatic lubricating system.
- Produces consistent particle size.

Available options

- Abrasion & corrosion resistant wheels.
- Air cooling kit for high temperature applications.
- Adjustable speed drive for particle size control.

Water Evaporative Capacity lbs/hr



Main Features

- The most flexible spray dryer on the market today for small-scale production and research/development projects. Ability to meet wide range of product/operation requirements by being able to select rotary or two-fluid nozzle atomization, single or two-point dried product discharge and use of airbroom.
- All components readily accessible, easy to operate and clean.
- All product contact parts fabricated in high grade 316 stainless steel highly polished to 220 GRIT finish.
- Complete flexibility using standard conversion kits enabling user to convert his basic plant to any model shown including all options.
- Spare parts in stock and easily obtained.
- Proven design with over 800 plants in operation throughout the world. "Ask the man who owns one."
- Complete testing facilities and consultation available.
- Aseptic plants and plants for explosive applications available on special request.

Options & Accessories

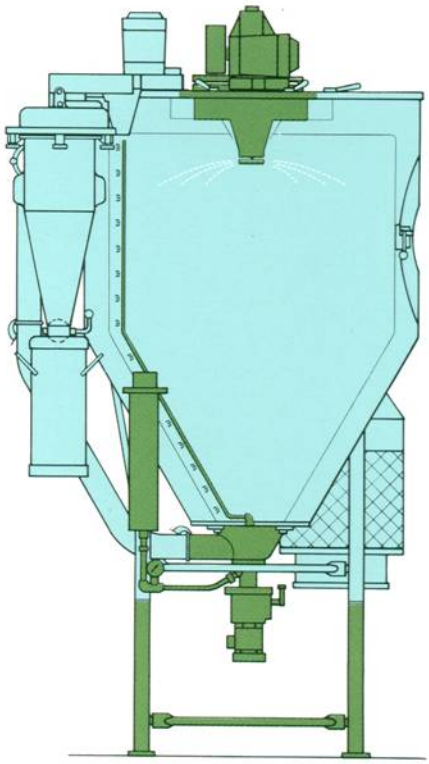
- Choice of natural gas, LPG, electric, propane, steam or steam/electric heaters.
- Pressure nozzle kit.
- Feed pumps.
- Feed tanks, agitators, etc.
- Filter for drying air.
- Wet scrubbers – bag filters.
- Automatic controllers to regulate pump speed to maintain pre-set outlet temperature.
- Rotary airlock for continuous product discharge from cyclone.
- Services of start-up engineer available.

Guide to Model Selection

MODEL NO.	ATOMIZING METHOD	PRODUCT COLLECTION
I	Centrifugal	Cyclone only
II	Centrifugal	Chamber and Cyclone
III	Nozzle - spray down	Cyclone only
IV	Nozzle - spray up	Chamber and Cyclone
V (Versatile)	Centrifugal - or Nozzle with spray up	Chamber and Cyclone or Cyclone only

MODEL VI

BASIC PLANT with Equipment for:
- Co-Current Drying
- Rotary Atomization and Airbroom



The installation of airbroom equipment on the basic plant enables the drying of heat sensitive, thermoplastic and/or thermolabile products. The cooling and air sweeping effect of the airbroom ensures continuous operation in the relatively small drying chamber, even though products may have low softening points. This airbroom equipment includes a heater and operates from a compressed air source.

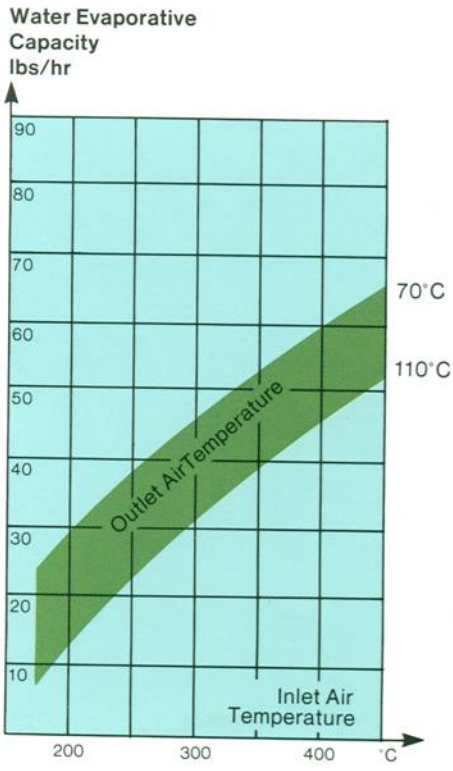
Length		5' 9"
Width		5' 6"
Height		10' 4"
Weight (net)	lbs	1650

NOTE: 3 ft (min.) clearance required for above unit for removal of atomizer.

Airbroom arm and drive

Advantages of airbroom

- Provides effective cooling & sweeping effect.
- Large air jets not prone to clogging.
- Rotates slowly from robust drive.
- Easily removable for cleaning.
- Can be run with or without airbroom.



MODEL V

BASIC PLANT with Equipment for:

- Co-Current Drying – Rotary Atomization
- Single or Two-Point Product Discharge
- Counter/Co-Current Drying (Mixed-Flow)
- Two-Fluid Nozzle Atomization
- Two-Point Product Discharge

Available options

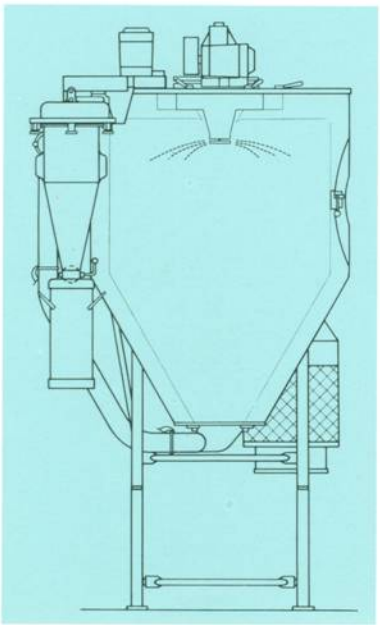
- Airbroom (for use with co-current atomizer).
- Pressure nozzle (mixed-flow)
- Co-current two-fluid nozzle.
- Adjustable speed drive for rotary atomizer.
- Abrasion & corrosion resistant wheels.

Length		5' 9"
Width		5' 6"
Height		10' 4"
Weight (net)	lbs	1700

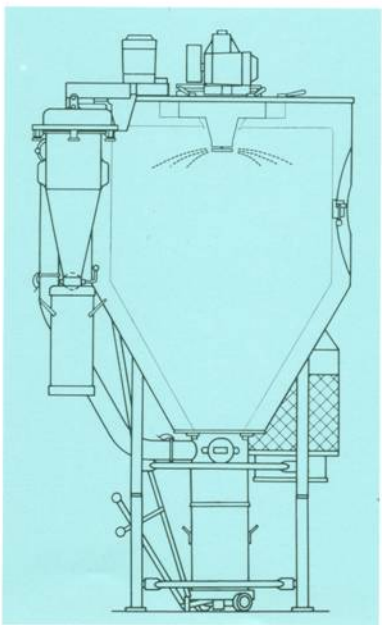
NOTE: 3 ft (min.) clearance required for above unit for removal of atomizer.

Our "Top of the Line" UTILITY UNIT combines the features of Models I, II & IV along with all the benefits of complete flexibility. The Model V is an invaluable research unit and like our other models totally suitable for production operation.

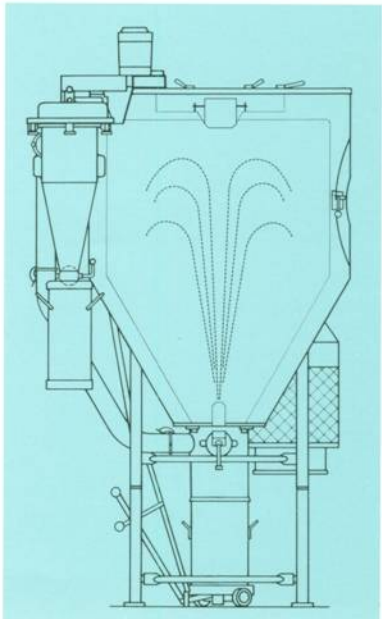
Evaporative capacities can be estimated using the chart for Model I for rotary atomization and the chart for Model IV for nozzle atomization.



Co-Current Drying Rotary Atomizer
Single-Point Product Discharge



Co-current Drying Rotary Atomizer
Two-Point Product Discharge



Counter/Co-Current Drying
Two-Fluid Nozzle Atomization

For capacities one step above and below the UTILITY UNIT:

PORTABLE UNIT
Water evaporative
capacity: up to 15 lbs/hr

P-6.3 SPRAY DRYER
equipped with wet scrubber
Water evaporative capacity:
up to 120 lbs/hr

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