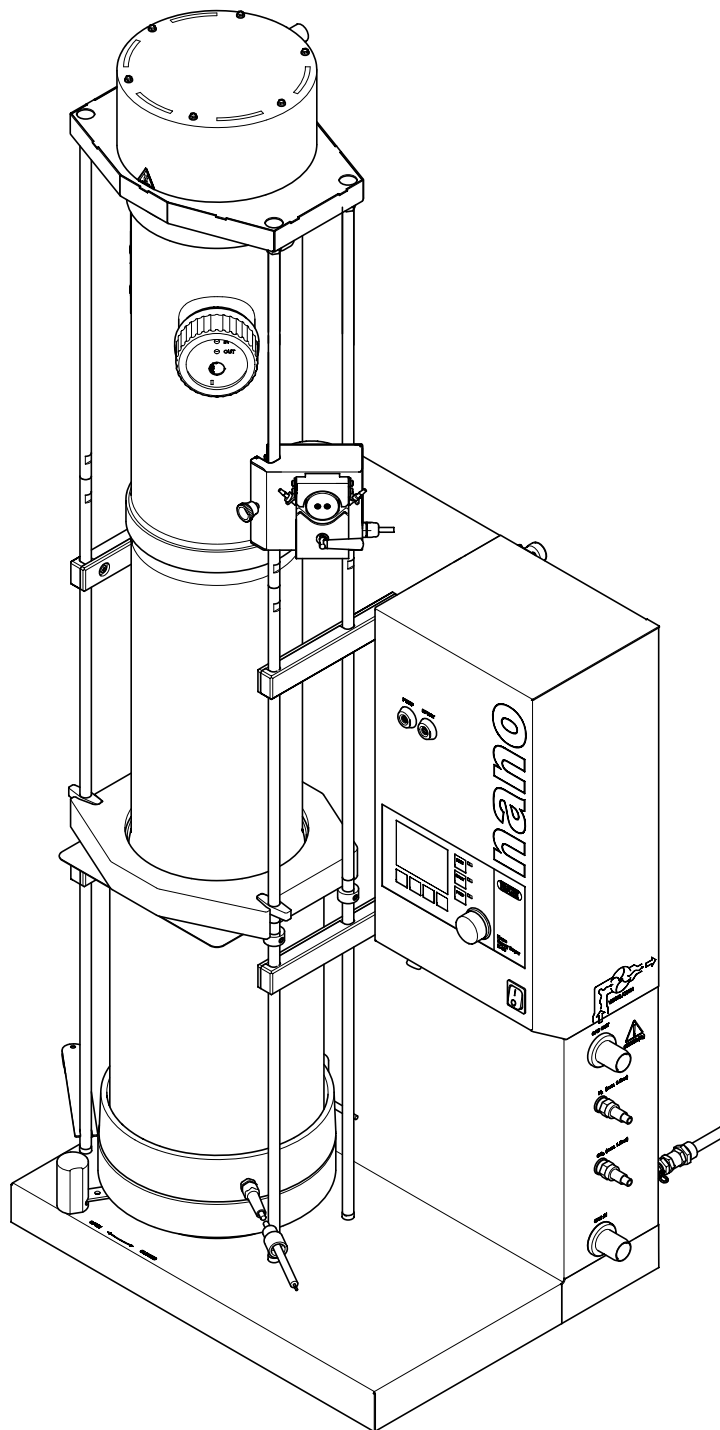




# Nano Spray Dryer B-90 HP

## Technical data sheet

Gently processing of small sample amounts into sub-micron particles with little loss are the key features characterizing the Nano Spray Dryer B-90. The 2<sup>nd</sup> generation instrument offers enhanced productivity and a better handling. It enables applications in the pharmaceutical industry, in life- and material sciences- whenever small particles make the difference.



## Scope of delivery

Components	Qty	B-90 Basic	B-90 Advanced
Heating cpl.	1	●	●
Holder spray head	1	●	●
Spraying head	1	●	●
Lifting device B-90	1	●	●
HV-elektrode protected	1	●	●
Peristaltic pump cpl.	1	●	●
Set nebulizer "small" (3 pcs)	1	●	●
Set nebulizer "medium" (3 pcs)	1	●	●
Set nebulizer "large" (3 pcs)	1	●	●
Adapter gas inlet	1	●	●
Spray cylinder	1	●	●
Glass cylinder	1	●	●
Glass insulation tube	1	●	●
Particle collection electrode	1	●	●
Temperature probe PT1000	2	●	●
Nano Spray Dryer B-90 CD	1	●	●
Separator base complete	1	●	●
Set feed adapters	1	●	●
Inlet and used drying gas hose	1	●	●
Tools B-90	1	●	●
Sample holder	1	●	●
Particle scraper	1	●	●
Particle collection paper	1	●	●
Set gaskets and o-rings	1	●	●
Set Cleaning tool	1	●	●
Hose silicone	4 m	●	●
Hose Tygon MH2075	1 m		●
Hose Tygon HCF4040A	1 m		●
Oxygen sensor	1		●
N <sub>2</sub> and CO <sub>2</sub> valves	1		●

## Instrument Variants

	Organic samples	Aqueous samples	Mixtures
Nano Spray Dryer B-90 HP basic, 100 – 240 V / 50 – 60 Hz		●	
Nano Spray Dryer B-90 HP advanced, 100 – 240 V / 50 – 60 Hz	●	●	●
Inert Loop B-295 220 V / 50 Hz	●		●
Inert Loop B-295 220 V / 60 Hz	●		●
Inert Loop B-295 200 V / 50 Hz	●		●
Inert Loop B-295 200 V / 60 Hz	●		●
Dehumidifier B-296 Nano, 230 V / 50 – 60 Hz		●	●
Dehumidifier B-296 Nano, 200 V / 50 – 60 Hz		●	●
Aspirator with Inlet Filter	●	●	●

## Order code

Choose the configuration according to your needs:



Nano Spray Dryer B-90 HP

0 basic, 100 – 240 V / 50 – 60 Hz

1 advanced, 100 – 240 V / 50 – 60 Hz

## Technical data

### Weight and dimensions

Dimensions (W x H x D) (short set up)	58 x 110 x 55 cm
Dimensions (W x H x D) (tall set up)	58 x 150 x 55 cm
Weight (short set up)	65 kg
Weight (tall set up)	70 kg

### Electricity

Power consumption	max. 1500 W
Connection voltage	100 - 240 VAC ± 10 %
Input Fuse	12 A
Frequency	50/60 Hz
Heating capacity	1400 W
Overvoltage category	II

## Drying process

Max. temperature input	120 °C
Evaporating capacity	0.2 L / h H <sub>2</sub> O (higher for organic solvents)
Drying gas flow	80 – 160 L / min
Air, N <sub>2</sub> , CO <sub>2</sub> gas input pressure	max. 2 bar
Nebulizer	small, medium, large
Mean droplet size range	3-15 µm MMD
Possible particle diameter range	200 nm - 5 µm
Spray frequency	80 - 140 kHz
Mean residence time	1 - 4 sec.
Interface	USB II

## Environmental conditions

Temperature	5 - 40 °C
Altitude	up to 2000 m
Humidity	maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 67 % relative humidity at 35 °C
Pollution degree	2 (for indoor use only)

## Material is used

Glass assembly	3.3 borosilicate glass
Spray head	Stainless steel (1.4404)
Nebulizer membrane	Stainless steel (1.4401)
Reservoir Gasket	FFKM
Heater	Alluminium and stainless steel
Feeding tubes	Silicone (SIR) and Tygon® (MH2375, HCF4040A)
Tube connector at feeding tubes	PEEK
Particle collector electrode	Stainless steel (1.4435)
HV Electrode	Stainless steel (1.4310)
Sealings for spray and glass cylinder	Silicone (FP6AGS)
Polypress tube	EPDM

## Accessories

	Qty	Order number
<p>Inert Loop B-295 (50 Hz, 200 V)</p> <p>Allows safe working with organic solvents in combination with the Nano Spray Dryer B-90. Oxygen and pressure sensor included.</p>	1	044779
Inert Loop B-295 (50 Hz, 230 V)	1	044701
Inert Loop B-295 (60 Hz, 200 V)	1	046345
Inert Loop B-295 (60 Hz, 230 V)	1	046344
<p>Dehumidifier B-296 Nano (50/60 Hz, 230 V)</p> <p>Versatile instrument to dry the inlet air for reproducible drying conditions. Also useful to work with organic solvent / water mixtures in combination with the Inert Loop B-295 and the Nano Spray Dryer B-90.</p>	1	11062347
Dehumidifier B-296 Nano (50/60 Hz, 200 V)	1	11062346
<p>Upgrade Set Nano Spray Dryer B-90 Basic to Advanced</p> <p>Upgrade set for the Nano Spray Dryer B-90 Basic to be prepared for organic solvent operation in closed loop with the Inert Loop B-295 or the Dehumidifier B-296 Nano.</p>	1	11055748
<p>Aspirator with Inlet Filter</p> <p>Corrosion resistant aspirator to generate the drying gas in open mode or to recirculate the inert gas in closed mode. Glass fiber filter to prevent contamination of inlet air by any kind of particles from the environment.</p>	1	11055325
<p>Air Maintenance Unit</p> <p>Maintenance unit for clean and oil-free compressed air for open mode.</p>	1	004366
<p>Trolley</p> <p>Stable trolley in stainless steel for mobile and flexible installation of the Nano Spray Dryer B-90 in the lab. The shelf board offers space to place accessories e.g. the aspirator with inlet filter (L x W x H = 85 x 42 x 56 cm)</p>	1	041257

## Service Parts

	Qty	Order number
Upgrade kit for B-90 to B-90 HP	1	11064116
Upgrade kit for B-90 to B-90 Advanced	1	11055748

## Spare Parts

	Qty	Order number
Silicon tubes	1	004138
Tygon (MH2375) tubes	1	046314
Tygon (HCF4040A) tubes (per m)	1	046315
Nebulizer set small (3 pcs)	1	11064560
Nebulizer set medium (3 pcs)	1	11064561
Nebulizer set large (3 pcs)	1	11064562
Reservoir Gasket set (2 pcs)	1	11064742
Visor Gasket set (2 pcs)	1	11064741
Feed Capillary set (4 pcs)	1	11064740
Outlet Filter	1	051656

## Functional principle

### Step 1 - Heating:

Heat the inlet air to the desired temperature (max. 120 °C)

### Step 2 - Droplet formation:

Ultrasonic nebulizer

### Step 3 - Drying chamber:

Conductive heat exchange between drying gas and sample droplets.

### Step 4 - Particle collection:

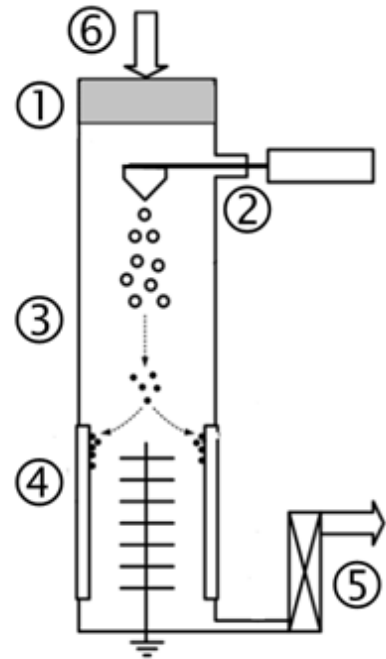
Electrostatic particle collector

### Step 5 - Outlet filter:

Collection of finest particles to protect the user and the environment.

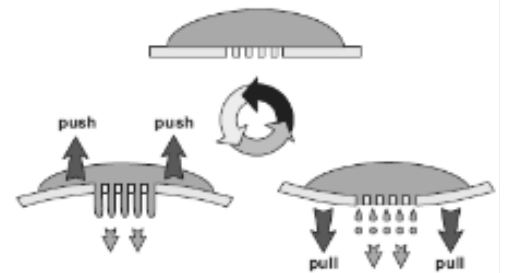
### Step 6 - Drying gas:

Delivered by aspirator or compressed air



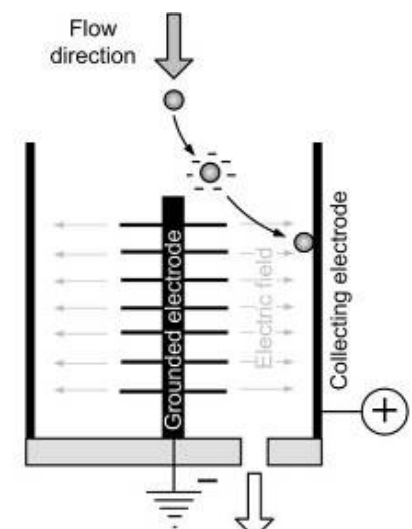
## Functional principle of the spray head

The nebulizer unit includes a piezoelectric actuator with a thin stainless steel membrane. The membrane has an array of micron-sized holes, vibrating at ultrasonic frequencies (80-140 kHz), thus ejecting a large amount of precisely sized microdroplets at high speed.

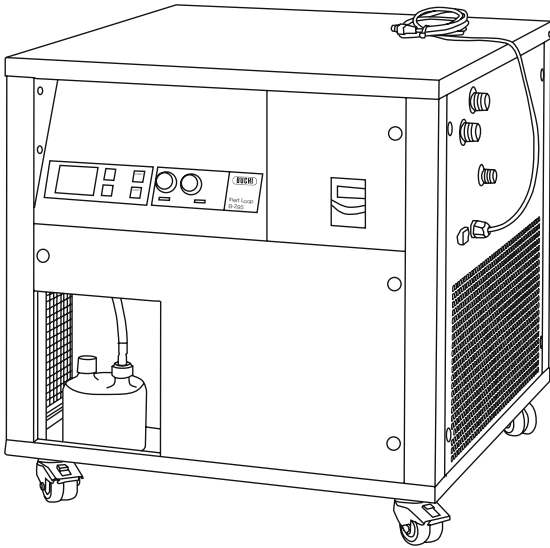


## Functional principle of the electrostatic particle collector

Solid particles are accumulated at the wall of the cylindrical particle collecting electrode by a strong electrical field.



# Inert Loop B-295



## Order Code

Choose the configuration according to your needs:



### Inert Loop B-295

4701 230 V, 50 Hz

4779 200 V, 50 Hz

6344 230 V, 60 Hz

6345 200 V, 60 Hz

## Technical data

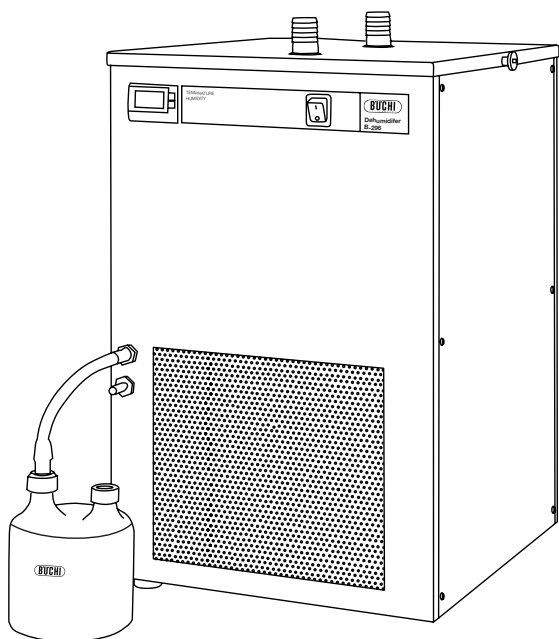
Power consumption	max. 1400 W
Connection voltage	200/230 V $\pm$ 10 %
Frequency	50/60 Hz
Min. outlet temperature	Down to -20°C
Rate of cooling	800 W at -10 °C
Dimensions (W x H x D)	60 x 70 x 84.5 cm
Weight	110 kg

### Environmental conditions (for indoor use only)

Temperature	5 - 40 °C
Altitude	up to 2000 m
Humidity	maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 67 % relative humidity at 35 °C



## Dehumidifier B-296 Nano



### Order Code

Choose the configuration according to your needs:



Dehumidifier B-296 Nano

6 200 V / 50 – 60 Hz

7 230 V / 50 – 60 Hz

### Technical data

Power consumption	max. 550 W
Connection voltage	200/230 V $\pm$ 10 %
Frequency	50/60 Hz
Min. outlet temperature	0°C
Rate of cooling	470 W at 0 °C
Dimensions (W x H x D)	35 x 45 x 65 cm
Weight	39 kg

### Environmental conditions (for indoor use only)

Temperature	5 - 40 °C
Altitude	up to 2000 m
Humidity	maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C

# Aspirator

## Order Code

Choose the configuration according to your needs:

**1 1 0 5 5 3 2 5** — Aspirator with Inlet Filter

## Technical Data Aspirator

Power consumption	1000 W
Connection voltage	100 - 240 VAC $\pm$ 10 %
Input Fuse	8 A
Frequency	50/60 Hz
Dimensions (W x H x D)	47.5 x 30 x 32 cm
Weight	20 kg

