

MMSD can atomize liquid in fine particle.

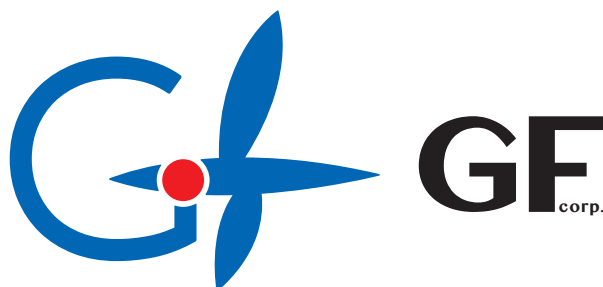
# Micro Mist Spray Dryer

## Micro Mist Spray Dryer

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The kinds of atomized droplet size are classified as **the spray** (over 10 microns) or **the mist** (less 10 microns). It is Micro Mist Spray Dryer that sprays much the mist with our atomization nozzles.



**Smallest droplet in the industry**

**Mass production**

# Atomization Nozzle for Spray Dryer

- [FEATURE]
- Atomize sharp and narrow particle size.
  - Continuous atomizing without the trouble of clogging because of the outside mixing type.
  - Adjust with various production volumes.

## Tri Spire Nozzle

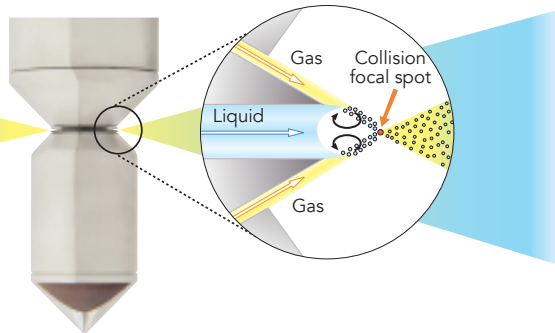
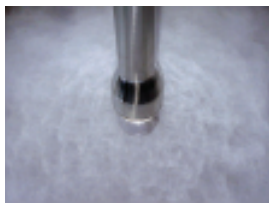
### Tri Spire Nozzle <TN Nozzle> <TS Nozzle>

- This model is the new type based on 'Four-Fluid Nozzle'.
- Atomize smaller droplet than Four-Fluid Nozzle because the liquid is spreaded out thinly by the high-speed gas and the droplets collide with each other.
- Achieve the cost reduction because of one liquid passage way and two air passage way.
- Prevent abrasion of the nozzle because the air doesn't hit its surface directly.

Patented in Japan

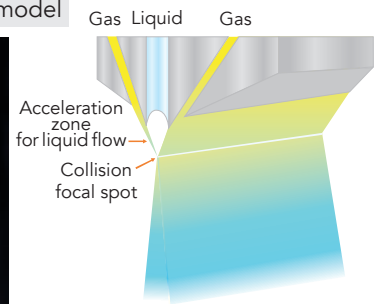
#### <TN Nozzle>

Production Model



#### <TS Nozzle>

Laboratory model



## 4 Fluid Nozzle

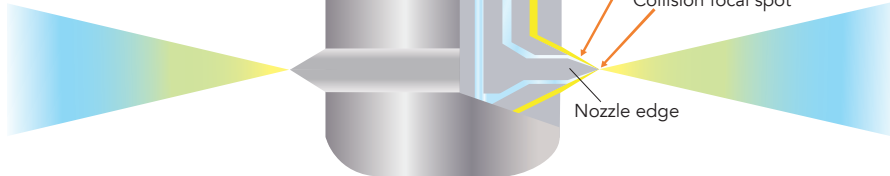
### Four-Fluid Nozzle <CN Nozzle> <SE Nozzle>

- This structure is order to make a point the droplet spreaded out by the air from each passage way.
- Manufacture mists with the shock wave generated at the nozzle edge.
- Atomize two types of the liquid.

Had been patented

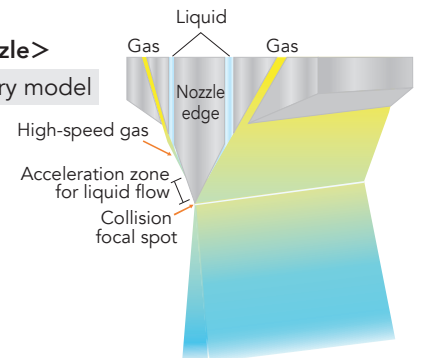
#### <CN Nozzle>

Production Model



#### <SE Nozzle>

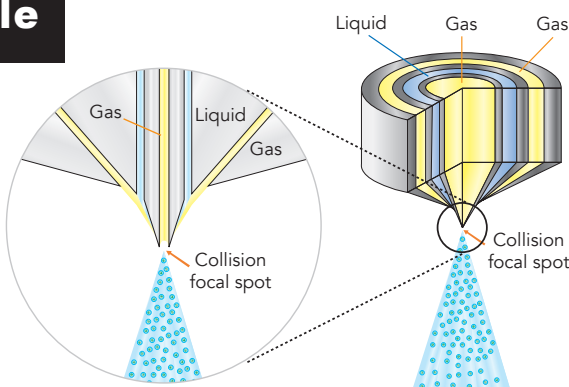
Laboratory model



## Pencil Edge Nozzle

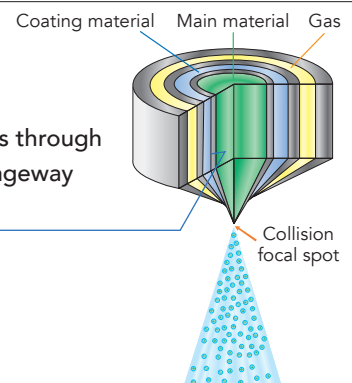
### Pencil Edge Nozzle <PN Nozzle>

- This nozzle can atomize more uniform than TS and SE Nozzle.
- It can make the particles fine coated and micro encapsuled by changing the usage. (#1)



#1

Changed the gas through the center passageway into the liquid.



# Micro Mist Spray Dryer

[FEATURE]

- Performs many kinds of experiments using the Four-Fluid Nozzle features.
- By making particles with single micron diameter, it can dry the liquid is difficult to dry or needs to dry under low temperature.
- Touch screen control system.

**MDP  
series**

## Product Model

- This model is for product with same ability as MDL series.
- Atomize droplets are easy to dry, so the drying chamber gets more smaller.
- We design and manufacture MDP series on your needs, for example evaporation capacity, utility and installing space.

### Installation Experiences



MDP-020



MDP-030



MDP-050



MDP-200

**MDL**  
series

## Laboratory Model

- Produces very fine and uniform powder from a small quantity of sample.
- Easy to clean, disassemble and reassemble.
- Many options are available for various purpose.

### Basic Type



MDL-050B



MDL-050C

### Continuous Operation Type



MDL-050(C)M



MDL-100(C)M



MDL-150(C)M

### Organic Solvent Type



MDL-015(C)MGC-S



MDL-050(C)MGC-S

### GMP Model



MDL-050BG



MDL-050MG

### Continuous Operation Type [for High Temperature]



MDL-015(C)M-H

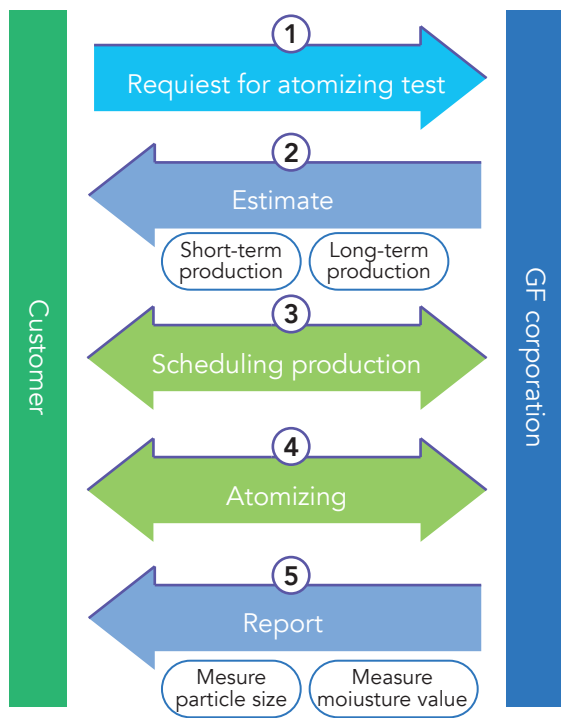
# Test inspection & Powders trust processing

...We can provide you with your all needs.



- Validate the ability and specifications upon facility introduction.
- Test with many kinds of materials.
- Scale up production.
- Need small quantity of sample to evaluate product.
- Need much powder for products.

## Powders Trust Processing Flow



## Example for Material

- Battery material
  - Barium titanate
  - Ferrite
  - Alumina
  - Zirconia
  - Silica
  - Resin
  - Cosmetics
  - Medical products
- etc...

## Equipments

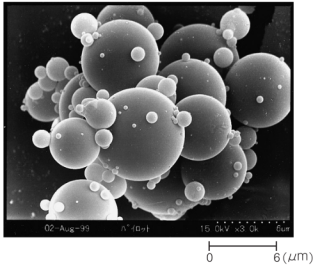
Type	Nozzle	Water evapolation amount
MDL-015 (For Organic Solvent)	TS Nozzle	1kg/H
MDL-015 (High-Temperature Type)	SE Nozzle	1kg/H
MDL-050	PN Nozzle	3kg/H
MDP-030	TN Nozzle	30kg/H
MDP-050	CN Nozzle	50kg/H
DJE-003R	Rotary Atomizer	3kg/H

## Evaluation Device

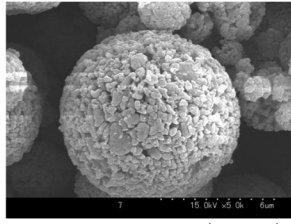
Particle size analyzer	LA-300 (Made by HORIBA)	Moisture value meter	FD-660 (Made by Kett)
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**Product  
Powders  
by  
MMSD**

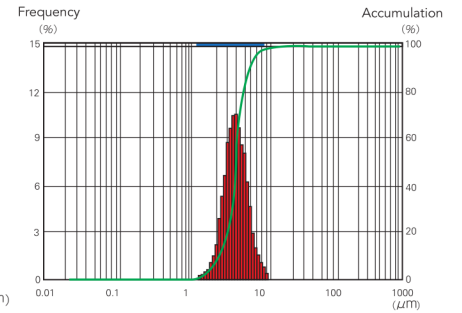
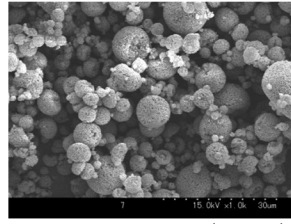
## Dried particle with Micro Mist Spray Dryer



Dried particles from suspension



Dried particles from solution



Particle size distribution of suspension



for the People, for the **G**aia, for the **F**uture

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corp.

**GF corporation**

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