**Spray Dryer**

**ADL311-A/311S-A**

Easily grinds sample into fine powder with the spray drying system

**ADL311-A**: Model dedicated for water soluble sample

**ADL311S-A**: Model supporting water soluble and organic solvents

(*When organic solvent is used, a GAS410 type solvent recovery unit will be necessary.*)

- This product applies heat on fine grain sample instantly and does not apply high temperature on dry fine powder sample itself, samples unstable to heat can be reliably changed into even fine powder.
- Prepared fine powder will not be oxidized and contains minimum water and is contamination-free.
- Drying is made directly from solution or suspension liquid sample into fine powder, which does not need pre-or post-processes such as filtration, separation, or pulverization necessary in the conventional drying method and can be used without concern of contamination during a series of operations.

**Model ADL311S-A** is available to support organic solvents by connecting ADL311-A dedicated for water soluble sample and GAS410 solvent recovery unit to the standard model ADL.

- Employment of a one-touch detachable mechanism in the drying chamber and the cyclone further improves ease of operation.
- An arm jack is equipped as standard for useful installation and removal of attachments.

- A service outlet (max. 2A) and a sample stand are equipped as standard for connecting a magnetic mixer for stirring suspended liquid sample.

**Global product lineup with multi-language multiple power supply and touch panels in Japanese, English, and Chinese.**

**Specifications**

<table>
<thead>
<tr>
<th>No. Part name</th>
<th>No. Part name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater</td>
<td>Blower</td>
</tr>
<tr>
<td>Inlet temperature sensor</td>
<td>Solenoid valve</td>
</tr>
<tr>
<td>Drying chamber</td>
<td>Needle valve</td>
</tr>
<tr>
<td>Outlet temperature sensor</td>
<td>Spray nozzle</td>
</tr>
<tr>
<td>Cyclone</td>
<td>Liquid sending pump</td>
</tr>
<tr>
<td>Product collecting container</td>
<td>Spray nozzle cooling mechanism</td>
</tr>
</tbody>
</table>

**Supported samples**

- Water soluble samples
- Water soluble and organic solvents

**Evaporated water amount**

Max. 1,300 mL/h

**Sample flow**

Variable up to 26 mL/min.

**Connecting of pressurized air**

Nozzle cooling mechanism

Connecting port: nipple x 2, O.D.: 7 mm

**Spray air line washing function**

Spraying at the nozzle tip, manual pulse jet system

**Control panel**

- Power supply: 50/60Hz rated current 10A (ADL311S-A)
- Inlet pressure: 0.3 MPa
- Outlet pressure: 0.2 MPa
- Maximum spray air flow rate: 25L/min

**Applications**

- Food and medicinal products
  - Powder milk, egg yolk, soy sauce, coffee, starch, protein, hormone, serum, antibiotics, enzymes, fragrant materials, essences, etc.
  - Organic chemistry
  - Wax, dye, cleaning agent, surface acting agent, agricultural chemical, antiseptic agent, synthesized resin, pigments, etc.
- Inorganic chemistry
  - Ferrite, ceramics, photocopy toner, magnetic tape materials, photosensitive materials, various industrial chemicals, waste fluid of samples, etc.

**Example of installation (spray dryer ADL311-A)**

- **Food and medicinal products**
  - Dextrin (solution)
  - Dextrin (emulsion)
  - Oxidized titanium (suspended liquid)
  - Soy sauce
  - Salt

**Example of installation (spray dryer ADL311S-A + GAS410)**

- **Inlet temperature, outlet temperature control switch**
  - (Outlet temp. control is conditional.)

**Power supply**

50/60Hz rated current 10A (ADL311S-A)

**External size**

W580 x D420 x H1,075 mm

**Weight**

80 kg

**Features**

- The tip of the nozzle consists of nozzle for liquid and a nozzle for gas.

**Spray nozzle**

The lip of the nozzle comprises of nozzle for liquid and a nozzle for gas.
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ADL311-A/311S-A

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ADL311-A:
Model dedicated for water soluble sample

ADL311S-A:
Model supporting water soluble and organic solvents

(*When organic solvent is used, a GAS410 type organic solvent recovery unit will be necessary.)

Because this product applies heat on fine grain sample instantly and does not apply high temperature on dry fine powder sample itself, samples unstable to heat can be reliably changed into even fine powder.

Prepared fine powder will not be oxidized and contains minimum water and is contamination-free.

Drying is made directly from solution or suspension liquid sample into fine powder, which does not need pre-or post processes such as filtration, separation, or pulverization necessary in the conventional drying method and can be used without concern of contamination during a series of operations.

Model ADL311S-A is available to support organic solvent by connecting ADL311S-A dedicated for water soluble sample and GAS410 solvent recovery unit to the standard model ADL.

Employment of a one-touch detachable mechanism in the drying chamber and the system further improves ease of operation.

An arm jack is equipped as standard for useful installation and removal of attachments.

A service outlet (max. 2A) and a sample stand are equipped as standard for connecting a magnetic mixer for stirring suspended liquid sample.

Employment of a unique peristaltic pump, nozzle cooling mechanism, pulse jet mechanism, and a nozzle knocker realize stable spray drying.


Specifications

<table>
<thead>
<tr>
<th>Product code</th>
<th>212373</th>
<th>311278</th>
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</thead>
<tbody>
<tr>
<td>Model</td>
<td>ADL311-A</td>
<td>ADL311S-A</td>
</tr>
<tr>
<td>Supported samples</td>
<td>Water soluble samples, Water soluble and organic solvent</td>
<td></td>
</tr>
<tr>
<td>Drying water output</td>
<td>Max. 1.300 mL/h</td>
<td></td>
</tr>
<tr>
<td>Temp. adjusting range (inlet temperature), 0 to 60°C (outlet temperature)</td>
<td>0 to 60°C</td>
<td></td>
</tr>
<tr>
<td>Temp. adjusting range (inlet temperature), 0 to 60°C (outlet temperature)</td>
<td>0 to 60°C</td>
<td></td>
</tr>
<tr>
<td>Drying air pressure adjusting range</td>
<td>0 to 0.3 MPa</td>
<td></td>
</tr>
<tr>
<td>Spray air pressure adjusting range</td>
<td>0 to 0.3 MPa</td>
<td></td>
</tr>
<tr>
<td>Spray air line washing function</td>
<td>Spray air connection diameter: 1.0 mm</td>
<td></td>
</tr>
<tr>
<td>Spray air pressure</td>
<td>0.5 MPa</td>
<td></td>
</tr>
<tr>
<td>Exhaust bordering diameter</td>
<td>0.50 mm</td>
<td></td>
</tr>
<tr>
<td>Safety function</td>
<td>Spraying nozzle with a stopper, manual pulse jet system</td>
<td></td>
</tr>
<tr>
<td>Safety device</td>
<td>Nozzle connection error</td>
<td></td>
</tr>
<tr>
<td>External size</td>
<td>Outer diameter (D) x H171.075 mm</td>
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</tr>
<tr>
<td>Weight</td>
<td>90 kg</td>
<td></td>
</tr>
<tr>
<td>Power supply (50/60Hz) rated current</td>
<td>1.82A (200V)</td>
<td></td>
</tr>
<tr>
<td>Accessories</td>
<td>Silicone tubes (with a stopper) x 3, exhaust duct (with one hose band) x 1, outlet temperature sensor, spray air tube, sample box, static electricity removal earth, “Tetron” braided tube hose 5m (with two hose bands)</td>
<td></td>
</tr>
</tbody>
</table>

Applications

Food and medicinal products
Powder milk, egg yolk, soy sauce, coffee, starch, protein, hormone, serum, antibiotics, enzymes, fragrant materials, essences, etc.

Organic chemistry
Wax, dix, clearing agent, surface active agent, agricultural chemical, antieptic agent, synthesized resin, pigments, etc.

Inorganic chemistry
Ferrite, ceramics, photocopy toner, magnetic tape materials, photosensitive materials, various industrial chemicals, waste fluid of samples, etc.

Optional parts

<table>
<thead>
<tr>
<th>Product name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powder recovery system</td>
<td>171382</td>
</tr>
<tr>
<td>Safety cover</td>
<td>171388</td>
</tr>
<tr>
<td>Dry air flow meter (voltage system)</td>
<td>171396</td>
</tr>
</tbody>
</table>

Repeatability of spray drying test (spray dryer ADL311-A)

<table>
<thead>
<tr>
<th>Sample name</th>
<th>Coffee solution</th>
<th>Coffee solution</th>
<th>Coffee solution</th>
<th>Coffee solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drying conditions</td>
<td>0.2 m3/min</td>
<td>0.2 m3/min</td>
<td>0.2 m3/min</td>
<td>0.2 m3/min</td>
</tr>
<tr>
<td>Sample liquid amount</td>
<td>1L</td>
<td>1L</td>
<td>1L</td>
<td>1L</td>
</tr>
<tr>
<td>Sample liquid pressure</td>
<td>2.0kPa</td>
<td>2.0kPa</td>
<td>2.0kPa</td>
<td>2.0kPa</td>
</tr>
<tr>
<td>Recovery rate</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
</tr>
</tbody>
</table>

Example of installation (spray dryer ADL311-A)