Spray Dryer

Compact & Economical

ADL311-A/311S-A

Evaporated water: Max. 1,300mL/h | Temp. control range: 40°C~ 220°C | Sample flow: Variable up to 26mL/min | Spray nozzle (selectable): Tow-way nozzle | Display language: Japanese, English, Chinese

Easily micronize liquid samples with a spray dryer.

ADL311-A : For aqueous soluble samples
ADL311S-A: For aqueous soluble samples and orgnic solvent*

* (When organic solvent is used, a GAS410 organic solvent recovery unit is required.)

- Easy setup, easy operation
- Suitable for heat sensitive samples. High heat is not directly applied to dry, fine powder
- Obtain contaminant free fine powder which is not oxidized and contains minimal moisture
- Direct drying of solution or solution liquid into fine powder. No pre- or post processes such as filtration, separation, or pulverization required
- Safe and explosion free working is guaranteed in combination with GAS410 due to oxygen & pressure control (ADL311S-A only)
- Organic solvents are recovered in a closed loop to protect the environment to enable minimized pollution
- Easy operation with one-touch detachable mechanism for drying chamber and cyclone
- An arm jack is equipped as standard for easy installation and removal of glassware attachments
- A service outlet (max.2A) and a sample stand are equipped as standard for connecting a magnetic mixer for stirring suspended liquid samples
- Unique peristaltic pump, nozzle cooling mechanism, pulse jet mechanism and a nozzle knocker for stable spray drying
- ADL311SA is highly mobile on wheels, or usable with shorter height as a bench top unit by removing the movable caster

Control Panel

Inlet temperature, outlet temperature, and drying air amount are digitally displayed. Setting is made on the touch panel that allows operation settings, operation status displayas well as error display, and settings of various operation conditions. as well as error display, and settings of various operation conditions.

Specifications

Product code	212737	212738
Model	**ADL311-A** 〈ADL311+GF300〉	**ADL311S-A** 〈ADL311S+GF300〉
Supported samples	Water soluble samples	Water soluble samples and orgnic solvent samples
Evaporated water amount	Max. 1300mL/h	
Spraying system	Two-way nozzle, Nozzle No. 1A as standard (0.4mm)	
Temp. adjusting range	40 to 220°C (inlet temperature), 0 to 60°C (Outlet temperature)	
Temperature adjusting accuracy	Inlet temperature±1°C	
Drying air amount adjusting range	0 to 0.7m³/min	
Spray air pressure adjusting range	0 to 0.3MPa	
Liquid sending pump flow rate range	0 to 26 mL/min	
Spray air line washing function	Spraying at the nozzle tip, Manual pulse jet system	
External output	Inlet temperature, Outlet temperature, Temperature outlet (4-20 mA)	
Temperature adjusting device	PID digital temperature adjusting device	
Touch panel	Blower, Heater, Liquid sending pump, Pulse jet switch, error display	
Control select switch	Inlet temperature, Outlet temperature control switch (Outlet temperature control is conditional)	
Temperature sensor	K-thermocouple	
Heater	2.0kW (at200V) to 2.88kW (at240V)	
Liquid sending pump	Fixed amount peristaltic pump	
Spraying air pump	For water soluble samples air compressor is used (sold separately).	For organic solvent samples the integrated compressor in GAS410 is used (No separate air compressor required).
Service outlet	For stirrer: AC100V, MAX. 2A	
Suction blower	Bypass blower	
Filter	Suction filter, Exhaust filter	
Recovery of solvent	–	Solvent recovery unit GAS410 (Sold separately) is used
Spray nozzle cooling mechanism	Connector: nipple×2, O.D.: ø10.5mm	
Spray air connection diameter	Nipple diameter: ø7mm	
Spray air pressure	Bourdon tube: 0.3 MPa	
Exhaust connecting diameter	ø50mm	
Safety function	Inlet / Outlet temperature overheat, Sample feed reverse rotation mechanism, Over current electric leakage breaker, Nozzle connection error	
External dimensions*1	W580×D420×H1,125 mm	
Weight	80kg	
Power supply (50/60 Hz) rated current	AC220V 17A, AC240V 18A switching of terminals necessary	
Accessories	Silicon tubes (with a stopper)×2, Exhaust duct (with one hose band)×1, Outlet temperature sensor, Spray air tube, Sample box, Static electricity removal earth, "Tetron" braided tube hose 5m (with two hose bands)	
Necessary utility	28L/min. air volume and 0~294kPa(3kg/cm²) compressed air is required	

The length of the power cord is about 2m outside the unit.
*1 External dimensions do not include projections.

- The air compressor used in this system must have a pressure regulator with air flow of 20 L/min or more and discharge pressure of 0 to 294kPa (3kg/cm²).
- Please note that this equipment is not explosion-proof for use with flammable or explosive substances.

Example of installation:
ADL311S-A + Stand with casters (option) + GAS410

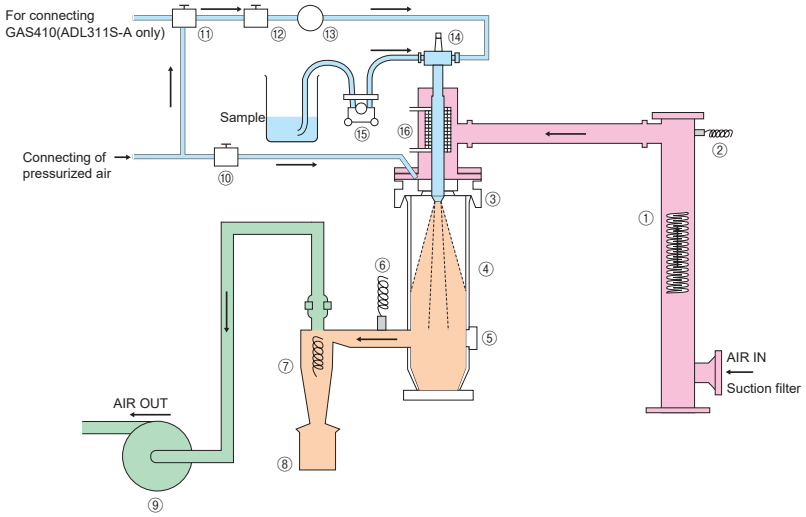
Example of implementation (spray dryer ADL311-A)

Sample name	Composition (%)	Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure (MPa)	Sent amount of sample liquid (g/min)	Sample recovery rate (%)
Dextrin (solution)	10	150	80	0.4	0.1	6.1	66
Dextrin (emulsion)	40	150	80	0.4	0.1	5.1	63
Oxidized titanium (suspended liquid)	10	150	85	0.42	0.1	5.3	50
Soy sauce	50	130	75	0.36	0.1	5.1	60
Salt	10	145	85	0.38	0.1	5.3	52

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

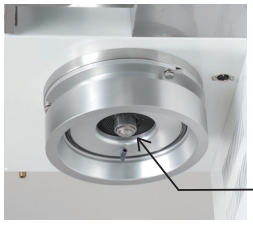
Test No.	Sample name	Sample density (%)	Drying conditions							Yield (g)	Recovery rate (%)
			Inlet temp. (°C)	Outlet temp. (°C)	Dry air amount (m^3/min)	Spray air pressure (MPa)	Test sample amount (g/min)	Sent amount of sample liquid (g/min)	Test time (min)		
1	Coffee solution	5.00	150	75	0.45	0.15	93.1	3.1	30	4.3	92.4
2		5.00	150	75	0.45	0.15	93	3.1	30	4	86
3		5.00	150	75	0.45	0.15	91.4	2	30	4	87.5
4		5.00	150	75	0.45	0.15	84.9	2.8	30	3.7	87.2
5		5.00	150	75	0.45	0.15	83.8	2.8	30	3.7	88.3

Diagram



No.	Part name	No.	Part name
①	Heater	⑨	Blower, exhaust filter
②	Inlet temperature sensor	⑩	Solenoid valve
③	Distributor	⑪	3-way solenoid valve (ADL311S-A only)
④	Drying chamber	⑫	Needle valve
⑤	Cap (outside air inlet)	⑬	Pressure meter
⑥	Outlet temperature sensor	⑭	Spray nozzle
⑦	Cyclone	⑮	Liquid sending pump
⑧	Product collecting container	⑯	Nozzle cooling mechanism connecting port

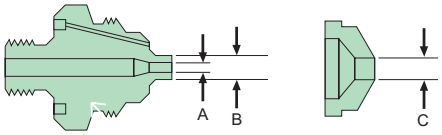
Spraying Nozzle



The tip of the nozzle comprises of a nozzle for liquid and a nozzle for gas.

Two-way nozzle system

Nozzle for liquid(F) Nozzle for gas(A)



Product code	Model	Nozzle No.	Size (μm)
000K1A	1A (Standard)	(F) 1650	A 406 B 1270
		(A) 64	C 1626
281298	1	(F) 2050	A 508 B 1270
		(A) 64	C 1626
281290	2A	(F) 2050	A 508 B 1270
		(A) 70	C 1778
281291	2	(F) 2850	A 711 B 1270
		(A) 70	C 1778
281292	3	(F) 2850	A 711 B 1270
		(A) 64	C 1626

Particle sizes may vary on samples used and parameter settings.

Piping

ADL311S-A + Stand with casters (option)+GAS410

Applications

- Food and medicinal products
  Powdered milk, egg yolks, soy sauce, coffee, starches, proteins, hormones, serums, antibiotics, enzymes, fragrances, essences, etc.
- Organic chemistry
  Waxes, dies, cleaning agents, surface acting agents, agricultural chemicals, antiseptic agents, synthesized resins, pigments, etc.
- Inorganic chemistry
  Ferrites, ceramics, photocopy toners, magnetic tapes materials, photosensitive materials, various industrial chemicals, waste fluid samples, etc.

Optional items

No.	Product Name	Product Code
①	*Stand with caster*1	212783
②	Fine powder recovery cyclone	212780
③	Safety cover	212784
④	*Dry air flow meter (voltage type)	212793
⑤	Static removal brush set	212788
⑥	*Inlet/outlet temperature recorder (3-dot)	212792
⑦	Viton packing for cyclone inlet/outlet (1 set of 2 types)	212781
⑧	Teflon packing for cyclone inlet/outlet (1 set of 2 types)	212782
⑨	Regulator	212789
⑩	Supply air filter box (for 0.3 micro meter collection)	212790

*Please specify when ordering main unit
*1 When connecting the organic solvent recovery unit to ADL311-A, the stand with caster is required.