



Spray Dryer

July, 2005

Yamato Scientific Co., Ltd.

GS 310



**Organic Solvent
TYPE**

Safe Operation

**By means of Nitrogen
closed circulation system
and Oxygen Meter**

***Environmental
Measure***

**Solvent-Recovery system
adapting Condenser
with refrigerator**

***Solvent evaporation :
Max. 2,000ml / h
(Ethanol Standard)***

Introducing GS310



In addition to ordinal type Spray Dryers ADL310, GA32 and DL41 only applicable with water solvents, We launch Model GS310 which enable to use organic solvent in the operation similar to ordinal types from July 2005.

This unique system developed by Yamato as a pioneer of lab. scale system, indeed only another manufacturer can produce such type of spray dryer, has been already delivered 50 sets in Japanese market and good reputation among in the customers.

Operating Principle GS310



The GS310 circulates non-flammable gas, N₂ in the closed-circuit, and maintains the oxygen concentration in the circulation gas below the explosive limit. It is suitable for spray drying of undiluted solution that contains organic solvent with automatic control of the oxygen concentration in the circuit below 5 % by monitoring with oxygen meter.

The system provides safe operation with quite limited amount of exhaust gas, and N₂ gas consumption is low accordingly.

Merits & Advantages GS310



- *Circulating N₂ gas in the closed circuit, and automatically control the oxygen concentration in the circuit below 5%*
- *Can dry inflammable or toxic solvents as well as substances prone to oxidation*
- *Enhanced environmental measures by means of solvent recovery system applying condenser with refrigerator*

Applications for GS310



- *Non-oxide Ceramic Materials*
- *Polymer Materials*
- *Pharmaceuticals*
- *Superconductivity Materials*
- *Fuel Cell Materials*

Sample Test Result Report

Spray Dryer Applications Data for Organic Solvent

Industries	Sample	Company/Department	Object	Outlet Temp.	Solvent	Results Yield %
Chemical Products	Polycarbonate	Research Institute	Drying	65	Dichloromethane	94
	Solid oil and fat	Business Development Department	Drying	59	Methanol, Chloroform	39
	Polyvinyl chloride resin	Function Product Research Department	Drying	48	Ethanol	83
	PMMA	Technical Research Institute	Drying	97	Chloroform	26
	Resin	Automobile Research Institute	Drying	50	IPA	68
	Polymer	Polymer Research Institute	Drying	90	Methanol	46
Pharmaceuticals	Pharmaceuticals+HPC	Production Technology Research Center	Fluid/Resolvability	68	Methanol	71
	Pharmaceuticals	Production Technology Research Center	Drying	92	Acetone3 : Ethanol 1	35
	Pharmaceuticals	Pharmaceuticals Research Center	Drying	62	Ethanol, Dichloromethane	94
	Medicals	Drug Formulation Research Institute	Drying	73	Ethanol	60
Ceramics	Tungsten Carbide	Quality Assurance	Granulation	79	Ethanol	29
	Hydroxyapatite	Research and Development Center	Granulation	45	Dichloromethane	72
	Ceramics	Research and Development Center	Coating	46	Dichloromethane	66
	Ceramics	Tire manufacturer's R & D Center	Drying/Granulation	97	Ethanol	26
Metals	Copper powder	Technical Research Institute	Coating	56	Chloroform	58
	Silver-Palladium Alloy	Chemical Industry Research Institute	Drying	78	Ethanol	89
	Titanium	Highly Functional Material Research Institute	Granulation	91	Ethanol	56

SINCE 1889



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Spray Dryer

Model GS 310

The GSL 310 is a laboratory size spray dryer using both Nitrogen closed-circulation method and Condenser with refrigerator solvent-recovery method. It enables safety use for experiments of spray-drying samples using organic solvents.

- * Circulating N2 gas in the closed circuit, and automatically control the oxygen concentration in the circuit below 5 %.
- * Can dry inflammable or toxic solvents as well as substances prone to oxidation.
- * No danger of damaging foodstuffs, medical products and products that are sensitive to biochemical-heat.
- * Capable of drying heat-deformable substances with low temperature drying process.
- * Capable of recovering solvents by means of condenser with refrigerator.

Spray Dryer



YAMATO SCIENTIFIC CO., LTD.

Spray Dryer

Model GS 310

[SPECIFICATIONS]

Performance	
Type	N2 gas closed-circulation type
Circulating gas	N2
Flow rate	0.2~0.5m ³ /min
Solvent evaporation	Max. Approx. 2,000 ml/h, Ethanol
Injection method	Two-liquid nozzle system (Nozzle dia. 0.4mm as standard acc.)
Heated-gas contact type	Parallel flow contact
Operating temperature range	40 to 160°C (Inlet temp.)
Temp. control accuracy	±1.0°C
Components	
Sample liquid feeding pump	Quantitative peristaltic pump
Drying chamber	Super-hard glass, inner dia. 127 x H 570 mm
Product collecting method	Super-hard glass cyclon
Heater	2kW Sheathed heater
Circulation blower	Roots blower
Fine dust collecting method	cartridge-type filter
Solvent recovery method	Condenser and refrigerator
Product vessel	Super-hard glass, Applox. 1,000 ml
Solvent recovery vessel	Glass round-bottom flask, 2,000 ml
Instrumentation	
Thermometers :	Inlet gas, Chamber outlet and Trap
Differential manometers :	Orifice (for measuring gas volume) and Filter
Pressure gauge :	Atomizing pressure
Standard	
External dimensions	1,050(W) x 675(D) x 1,600(H) mm
Weight	Approx. 250kg
Power source	AC200V, 20A
Safety Device	
Oxygen meter, Alarm for combustible gas (2pcs.), Detecting switch for minimum gas velocity	
Switch for inner presser control, Safety valve, Self diagnosis functions (Sensor breaker, Heater breaker, Overheat prevent system), Detecting switch for nozzle extraction detection, Electric leakage breaker	
Accessories	
Stand for sample feed tube, Sample mat, Antistatic brush and stand, Solvent receiving bat, Exhaust duct	

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