

Compact, Ultra Pure Steam Generation and Control

Flow rate up to 12.5 slm for atmosphere and vacuum process pressure

The RCH Steamer converts DI water into high flow, Ultra High Purity (UHP) water vapor and delivers it to atmosphere or vacuum environments.

Benefits

- **Purity**—Patented technology eliminates volatiles, ionic contaminants and other impurities.
- **Uniformity**—100% steam and up to 12.5 slm ensure faster tube saturation.
- **Growth Rate**—Up to 20% improvement in oxide growth rate by elimination of carrier gases that can slow the process. Dramatically faster growth rate than with oxygen bubblers.
- **Yield**—Metals, hydrocarbons and particles are automatically rejected, reducing waste.
- **Throughput**—Continuous unattended 24/7 operation. No consumables and limited service items.
- **Safety**—Eliminates flammable and explosive gases from the oxidation process. Operates at significantly lower temperature (below 115 °C).
- **Cost of ownership**—Eliminates costly gas usage and storage. Low operating cost, higher throughput, increased wafer lot size, eliminated torch failures, and no cooling requirement result in a rapid pay back.

Product Description

The RCH Steamer combines a clean steam generator and purification assembly into a single system. All wetted components in the steam path are quartz or Teflon®. The RCH Steamer is proven to increase oxide growth rate, chamber uniformity, and film quality,



plus reduce operating cost when compared against all other steam technologies.

The RCH Steamer uses a non-porous hydrophilic membrane that selectively allows water vapor to pass. Selectivity is significant with up to 1,000,000x relative to nitrogen molecules. In the vapor phase, the membrane selectively passes water molecules. All other molecules are greatly restricted, so contaminants in water such as dissolved gases, ions, TOCs, urea, particles, viruses, bacteria, pyrons, and metals can be removed in the steam phase.

Data is available to show reduction of 67 different metals to below detectable limits. Some contaminants have been verified to less than 0.0005 parts per billion. Urea, Ammonia and CO₂ can also be reduced. The RCH Steamer works with water vapor at low pressures, so stainless steel delivery systems can be replaced with quartz and

fluoropolymer piping systems.

Steamers have successfully replaced bubblers and vaporizers in atmospheric processes. With the Steamer 225, customers can also transfer their atmospheric oxidation recipes directly into low pressure thermal oxidation processes.

Product Specifications

Features

- 12.5 slm max flow rate
- 800 watts of clean steam
- Patent and patent-pending flow control design
- Local and remote control
- < 10 ppt for each metal; check with factory for other contaminants
- Auto level / fill control
- Front panel status indicators & LEDs
- Multiple on-board diagnostics
- Auxiliary heater controller for process delivery line
- Over temperature protection
- External valve control
- Configurable AC input voltage
- Next generation boilers and heaters
- Printed circuit board

Materials of Construction

- All wetted components in the steam path are quartz or fluoropolymers
- 316L stainless steel pressure transducer upstream of steam purifier

Footprint

- 156 mm (w) x 366 mm (d) x 321 mm (h)

Table I: Purification Performance Results (ppb)

	DI Water Source	Pre-Purified Steam	Purified Steam
Total Metals	19.8	0.15	0.009
Total Organic Carbon	1200	380	22
Total Silica	28	4.3	0.7
Urea	2200	48	2.6
Ammonium	1.468	1.117	0.116

Figure 1: The Steamer 225 removes contaminants in water such as dissolved gases, ions, TOCs, urea, particles, viruses, bacteria, pyrons, and metals.



Facilities Specifications & Tools

Environmental Conditions	<ul style="list-style-type: none"> 10°-40° Celsius 30% to 90% humidity, non-condensing Class 1000 cleanroom or tool cabinet Free from water leak risk
Tools	<ul style="list-style-type: none"> ½" Flare Tool (not supplied by RCH) External Delivery Line (XDL) (See "Kits and Components")
DI Water	Regulated and filtered to 0.1 µm at 1-1.3 barg (15-20 psig), 18 megaohm, 25 ml/min
Dry Weight	9.7 Kg (21.4 lbs)
Footprint	156 mm (w) x 366 mm (d) x 321 mm (h)* 6.13" (w) x 14.39" (d) x 12.63" (h)* * Add 3" (76 mm) to depth for remote cable
Power Requirement	Steamer 225A: 100-120 VAC, 10 amp Steamer 225B: 200-240 VAC, 5 amp

How to Order

To place an order for the **RCH Steamer**, identify the RCH part number from the chart below based on your pressure and electrical requirements. Be sure to review kit requirements.

Orders can be placed through authorized dealers or with the factory.

Be sure to specify the required power cable when placing order.

Delivery Pressure	Power Requirement	Steamer Model	Part #
Atmosphere (760-988 Torr)	100-120 Volts, 10 Amps	225A	RA100530
	200-240 Volts, 5 Amps	225B	RA100531
Vacuum (20-760 Torr)	100-120 Volts, 10 Amps	225A-V	RA100570*
	200-240 Volts, 5 Amps	225B-V	RA100571*

* The part number designated for vacuum delivery pressure Steamers includes both the Steamer 225 and an external Delivery Line (XDL) Kit. For atmosphere delivery pressure units, refer to the table below.

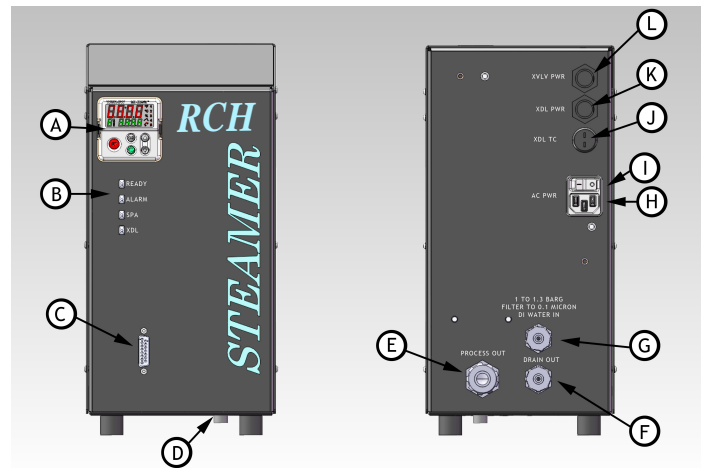
Kits and Components

The Steamer 225 requires an External Delivery Line (XDL). For atmosphere units, either purchase a kit from RCH or use comparable components. For vacuum units, the Steamer Part # includes an XDL Kit.

XDL Kit		
Steamer Model	RCH Part #	Component List
225A	RA100534	<ul style="list-style-type: none"> 3-Way Valve J Type Thermocouple Heat Tape Insulation High Purity Tubing
225B	RA100535	

The DI Water kit is recommended for all Steamers.

DI Water Kit	
RCH Part #	Component List
RA100195	<ul style="list-style-type: none"> Filter Regulator Pressure Gauge Gauge Guard High Purity Tubing



	Steamer Interface	Connector on Steamer
A	Local Control	Watlow
B	Status Indicators	LED
C	Remote Interface	DB15 Female
D	System Drain Out (emergency only)	1/8" NPT Female
E	Steam Process Out	1/2" PFA Male Flare
F	Condensate Drain Out	1/4" PFA Compression
G	DI Water Inlet	1/4" PFA Compression
H	AC Mains In (Electrical inlet)	IEC 320 Male
I	Power Switch	On/Off Switch
J	External Delivery Line Thermocouple	Miniature Type J Female
K	External Delivery Line Heater	Conxall 7380-45G-300
L	3-Way Valve Relay Drive Output	Conxall 7280-5PG-300



The Steamer 225 is CE marked and SEMI S2 Certified.

About RCH

RCH Associates, Inc. has been serving the Semiconductor industry since 1990. As a leader in the manufacture of diffusion and LPCVD systems and equipment, RCH is committed to customer satisfaction. RCH purchased the Steamer product line from Rasirc® in 2018.



Serving the Semiconductor Industry

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