

Critical Point Dryer for MEMS



CPD 408



Critical point dryer for
4, 6 and 8 inch wafers for MEMS.

Coating Cryo Preparation
Ion Etching Solid State Preparation
Accessories and more...

KEY FEATURES INCLUDE:

- safe and easy operation
- gentle substrate treatment
- clean room compatible
- compact bench unit
- economical operation
- excellent visual access

Critical Point Dryer for MEMS



CPD 408



Your economical solution for
critical point drying of MEMS.



MORE FEATURES

Compact bench unit

Space saving design with separate cooling/heating unit.

Economical

Minimum consumption of the CO₂ transitional fluid because of integrated refrigerator (no cooling agent required) and unique double chamber system.

Easy substrate loading

The top loading system with wafer carrier and a safety sliding cover is ideal for fast, easy substrate insertion.

Easy operation

The solenoid high pressure valves, the heating and cooling are operated fully automated from the touchpad keyboard (no difficult-to-use manual valves). Start – Stop operation is programmed.

Guaranteed personnel safety

Approved pressure container with bursting membrane and pressure relieve valve and other independent safety features guarantee absolute safe operation.

Gentle substrate treatment

Damaging turbulences caused by admitting and draining fluids too fast are reduced to a minimum through the use of apertures.

Automatic cooling / heating system

The cooling / heating system eliminates the need for other external supplies such as CO₂ cooling.

Conveniently arranged control and display elements

Digital temperature and pressure displays and a mimic diagram to indicate the momentary operational status of the unit.

Universal application

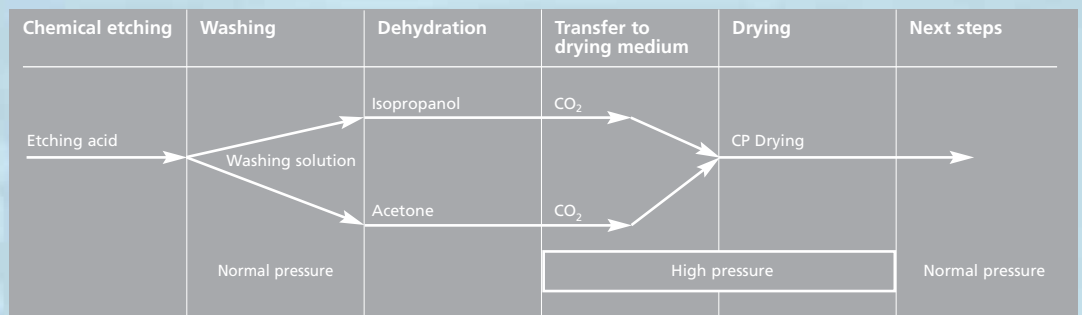
The variable operating parameters and the EPDM and Teflon seals allow all commonly used transitional fluids to be used.

Service friendly

Consistent modular design and removable cover panels assure easy access to the individual assemblies.



Substrate cleaning and drying steps



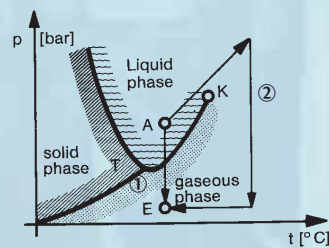
Unique double chamber system for easy loading and low CO₂ consumption.



THE CRITICAL POINT DRYING METHOD

Drying micro electro mechanical systems (MEMS) in air or under vacuum can drastically alter their structures or even destroy them completely. They must therefore be dried by a gentler method. One well-known method is "Critical Point Drying".

Phase diagram



K= Critical Point

A= Initial state

E=Final state

T=Triple point

① *Air-drying / vacuum-drying*

② *Critical point drying*

The surface tension of the water, isopropanol or acetone in a micro device at the point at which it changes from the liquid phase to the gaseous phase ① can destroy the device through capillary forces (e.g. membrane). By increasing the pressure and temperature of the substrate it is possible to dry it without crossing a phase boundary ②. This is possible because once the critical point has been passed, the

density of the "liquid" and the density of the "gas" are the same. The critical point for water is 228.5bar and 374°C. However, this high pressure and extreme temperature would normally destroy a substrate. For this reason the substrate must be treated in a suitable transitional fluid such as CO₂ whose critical point of 73.8bar and 31°C is considerably more advantageous.

TECHNICAL DATA

Dimensions	570 x 600 x 330mm
CPD 408 Usable volume Fluid filling	Ø 205mm x 15mm approx. 500ml
Weight CPD 408 Basic System Weight Cooling/Heating- System	approx. 65kg approx. 70kg
Connection data Electrical:	
Voltage	230V / 240V / 115V
Frequency	50 / 60Hz
Power consumption	1000VA
Main fuse F1 / F2	5A slow blowing (230V / 240V) 8A slow blowing (115V)
Transitional fluid:	
Inlet	M12 x 1.5
Outlet	Ø 6mm (R1/8")
Highest permissible pressure Safety bursting membrane	approx. 150bar
Operating parameters	Cycle time approx. 20min.

Simple one button operation from start to stop with preset parameters.

SPECIFICATION

1. Housing

Console housing containing the pressure chamber, inlet and outlet system for the preparation fluids. A separate cooling/heating system also contains the power supply. The connections for the preparation fluids inlet/outlet are located on the back of the unit.

Dimensions

The CPD is 550mm wide, 450mm deep, 350mm high and fit in a standard flow hood. The cooling/heating unit can be installed in the grey room. It is 450mm wide, 800mm deep and 550mm high.

2. Pressure chamber

The pressure chamber is made of Aluminum with safety bolted door, integrated cooling pipes and integrated inlet and outlet ports for cleaning fluids.

3. Cleaning fluid inlet/outlet system

Inlet (M12 x 1.5), outlet (\varnothing 6mm) are located on the back panel.



4. Cooling/Heating System

The water cooling/heating system is designed to cool the pressure chamber in the range from +8°C to +12°C and heat it to +35°C to +45°C .

5. Power supply and control unit

The power supply consists of a 24VDC power supply card and the microprocessor unit. Both parts are integrated in the CPD 408. The touch panel in the front is connected to the microprocessor to display and control all functions of the CPD.

Compact bench unit fits in
a standard flow hood.



ORDERING INFORMATION
CPD 408 basic unit per
specification item 1 - 7.

CPD 408 wafers	Order No.
230VAC 50/60Hz	CPD 408 EVN
115VAC 50/60Hz	CPD 408 UVN

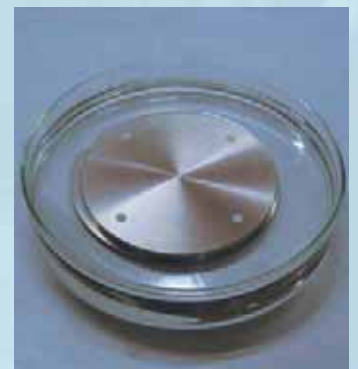
6. Safety devices

The safety devices consist of the following:

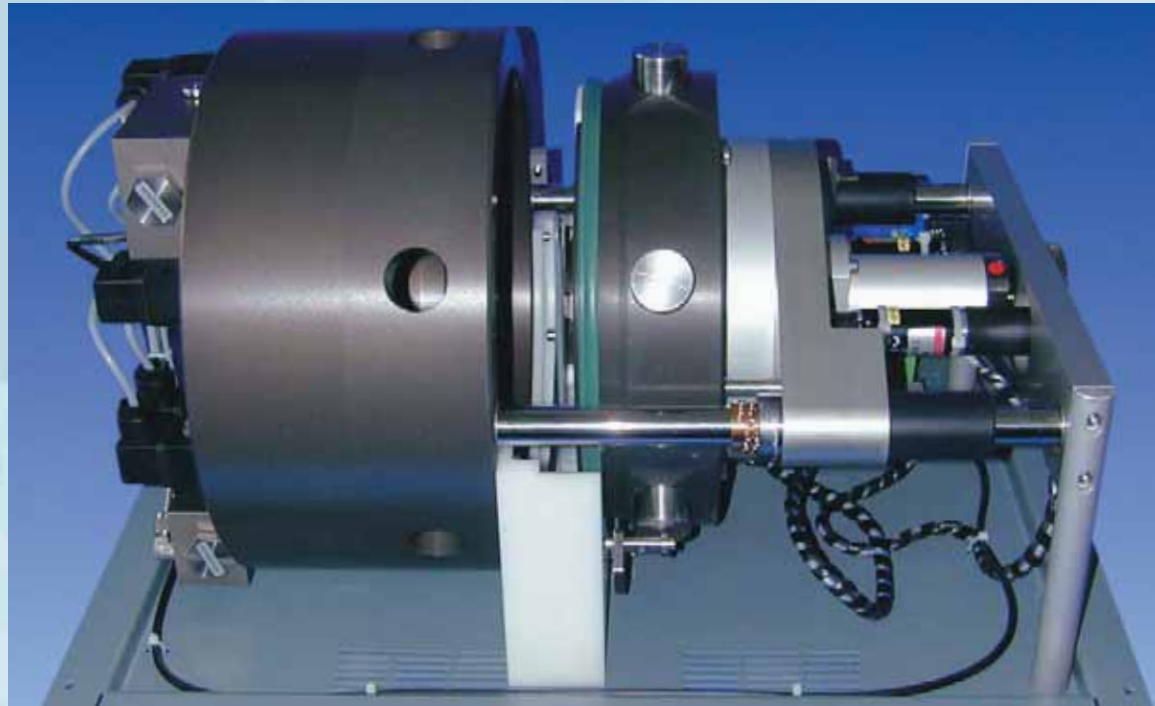
- Tested substrate pressure chamber (min. 150bar)
- Safety pressure relieve valve
- Bursting membrane (responds at 150bar)
- Precisely dimensioned heating system
- Safety screw-on cover
- Software controlled overpressure relieve valves

7. Wafer transfer container

For transferring wafers submerged in transitional fluid to the pressure chamber in the critical point dryer. With mechanism for draining and rinsing the container. The wafer container holds 1 wafer. Other transfer container kits for wafer pieces are available on request.

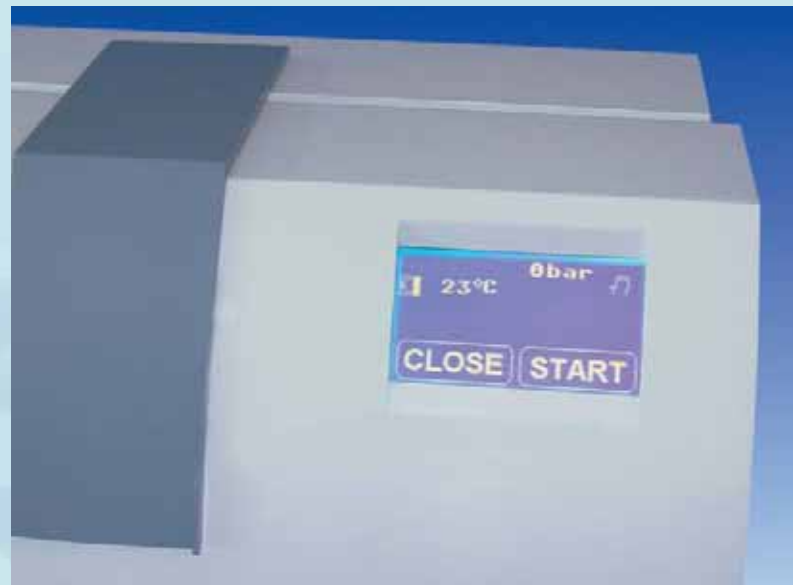


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