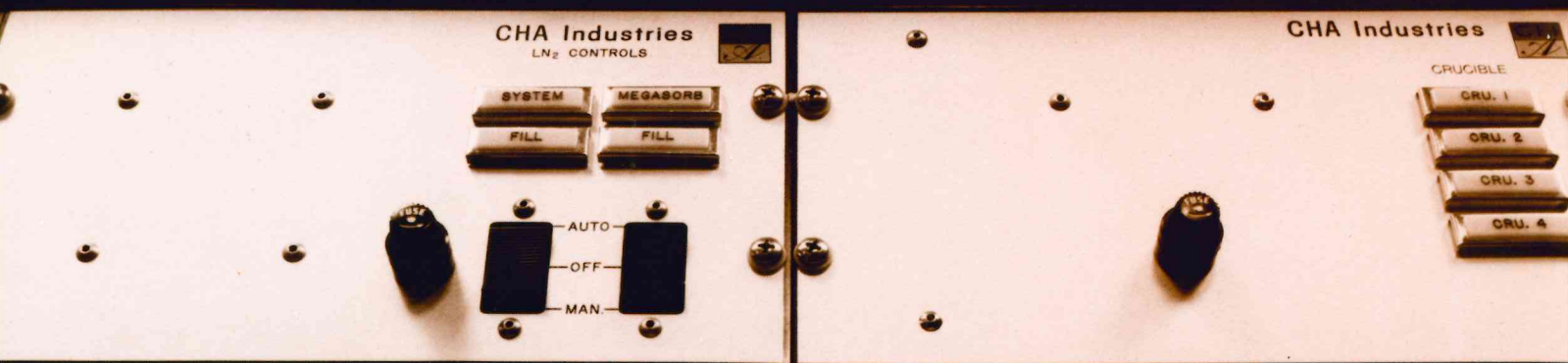
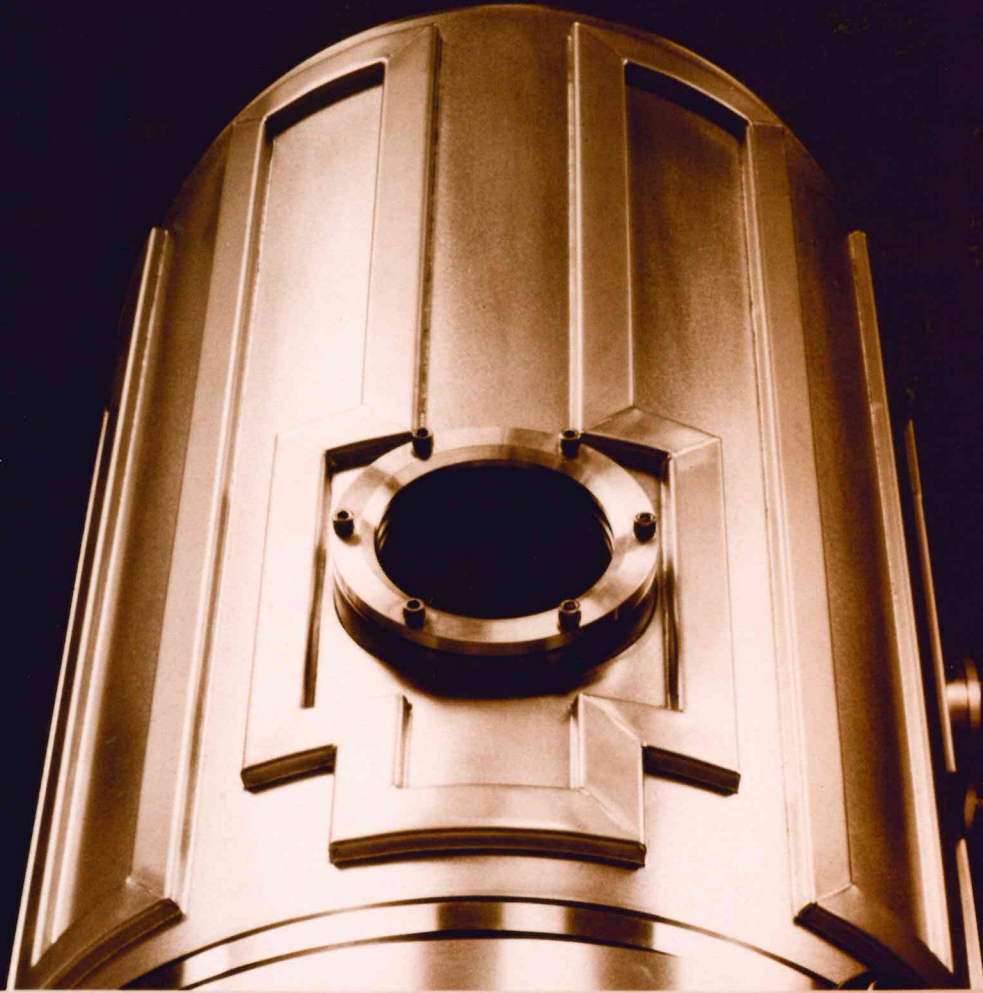


CHA INDUSTRIES HIGH-VACUUM DEPOSITION SYSTEMS



THE SE-SERIES HIGH-VACUUM DEPOSITION SYSTEMS

For production and laboratory applications

CHA's SE-Series high-vacuum deposition systems and pumping stations are designed for use in production or research environments. And CHA's complete line of options and accessories means you're certain of a system precisely matched to your application and your capital-equipment budget.

With the SE-Series, you can choose manual or fully automatic operation. You can use any type of commercially available source—including single and multiple electron beam sources, magnetron sputtering sources, resistance sources, ion-beam sources and RF induction sources. And you can select from a wide variety of heaters and other process instrumentation.

For extended flexibility, SE-Series systems can be equipped with various fixturing, such as lift-off, flip-type, single-dome, planetary or custom. In addition to the 19.5- or 25.5-inch diameters, stainless steel bell jars can be supplied in other sizes to meet individual requirements. An 18-by-30-inch Pyrex bell jar, equipped with either planetary or static fixturing, is also available.

Whatever the configuration, each CHA system reflects the simplicity of design, quality construction and easy operation that add up to overall efficiency—an efficiency apparent in fast cycle time, maximum wafer capacity, convenient reloading and servicing, and long system life.

Superior design...the CHA difference

CHA SE-Series deposition systems incorporate a number of design features that make them unlike any other system

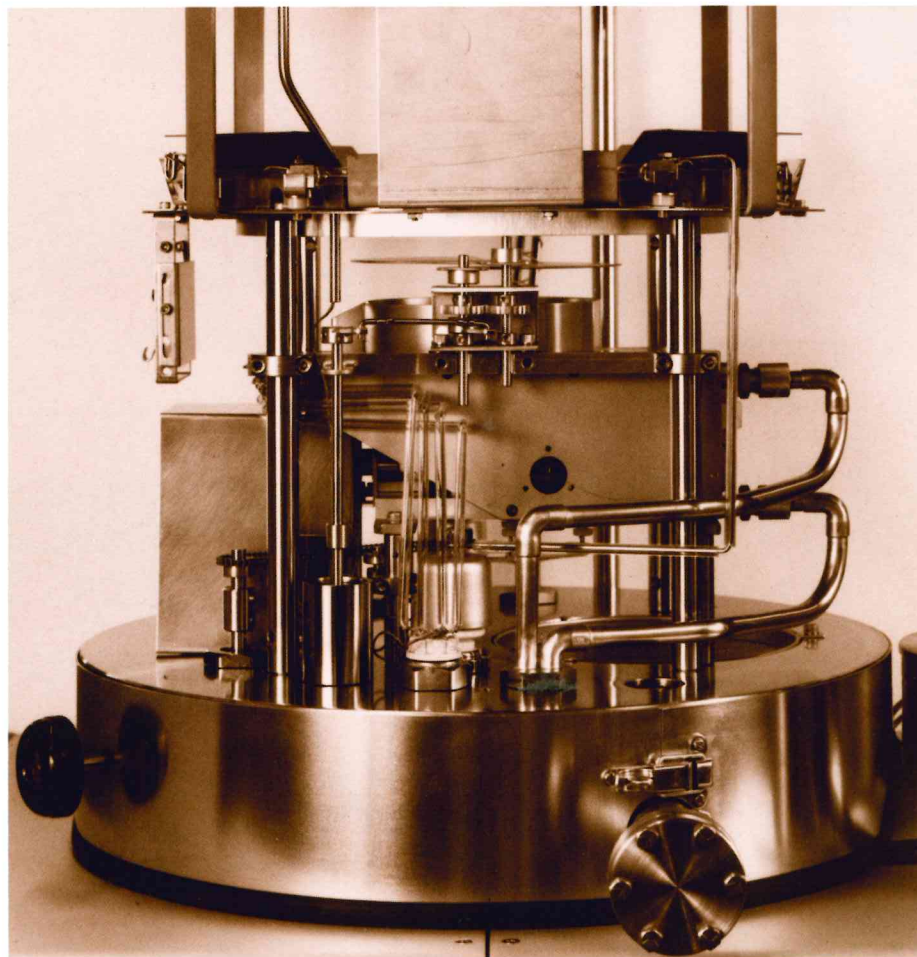
available. They're valuable features that guarantee higher quality in the finished product while making operation—as well as equipment servicing—easy and economical.

Vertical sealing plane—a CHA exclusive

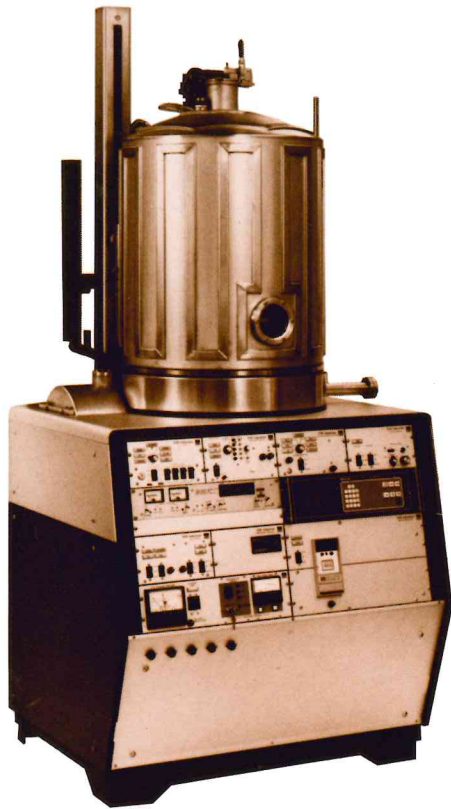
A vertical sealing plane, for example, is used on all valves. Especially important on the high-vacuum valve, this eliminates the problem of loose particles falling on the sealing plane, a common cause of failure in horizontal sealing valves.

Simplified valve construction

To reduce wear and provide maximum reliability, CHA's high-vacuum valve has fewer moving parts than any other in the industry. And—for more efficient pumpdown—it has less surface area than that normally associated with valves having sliding gates and linkage.



Straightforward design, quality materials and meticulous craftsmanship are the hallmarks of every CHA deposition system.



The SE-1000

The largest of the SE-Series, the SE-1000 has a 10-inch diffusion pump rated at 5300 l/s, and is typically equipped with a 25.5-inch, water-cooled bell jar and a 26-inch diameter stainless steel baseplate.

With planetary fixturing holding up to 57 4-inch wafers and an average air-to-air cycle time of 20 minutes, the SE-1000 can process up to 175 wafers per hour. One button control and dual ion gauges are among the most popular options added to the system.



The SE-600

The SE-600's 6-inch, high-speed diffusion pump delivers a pumping speed of 2400 l/s. Like all SE-Series systems, the baseplate (20 or 26 inches) accommodates up to 20 feedthroughs for instrumentation, control and rotary motion. SE-600 systems are typically equipped with a 19.5-inch bell jar and planetary fixturing having a capacity of 18 4-inch wafers. The average cycle time of 20 minutes allows throughput in excess of 54 wafers per hour.

The SE-400

Intended primarily for small production applications and laboratory use, the SE-400 incorporates a 4-inch, high-speed diffusion pump rated at 1200 l/s. Though many SE-400s are operated manually, the system can be equipped with the full range of options, including one-button control.

CHA's design philosophy is also exemplified in the simplified access for inspection or cleaning of the valve's O-ring seal. Unlike some systems, which require removal of 32 bolts for these tasks, a simple pull of the quick-release pin on the valve shaft allows easy removal of the sealing plate through the port in the baseplate.

Automatic valve sequencing

CHA's Auto-Tech II provides fully automated cycling of system valves plus visual display of system status. A manual override is included to permit operator control of all pumping functions.

Water-cooled baffle for extended trap life

On systems equipped with diffusion pumps, CHA's water-cooled chevron baffle lengthens cold trap life by blocking radiant heat from the pump. The baffle stops primary backstreaming,

creating higher efficiency by preventing oil from forming an insulating film on the trap. Further, because the potential for thermal shock to the trap is avoided, the possibility of oil contaminating the process chamber is virtually eliminated.

Large roughing line for fast pumpdown

The 3-inch block manifold roughing and foreline valves in CHA deposition systems speed pumpdown and boost gas-handling capacity. And—as in the high vacuum valve—both valves use a vertical sealing plane to prevent leaks caused by falling particles.

High-volume cold trap

Over 250 inches of cryogenic surface in each SE-Series cold trap allows handling of high volumes of condensable vapor. The trap is designed to conserve liquid nitrogen, and a typical holding time of 10 to 14 hours means

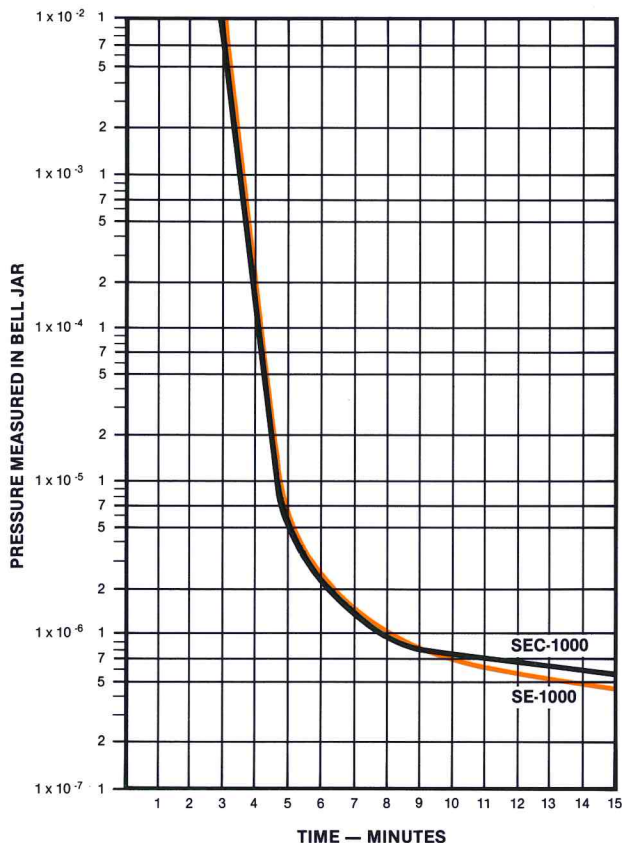
process cycles needn't be interrupted for trap refilling.

SEC SYSTEMS...CRYOGENIC PUMPING

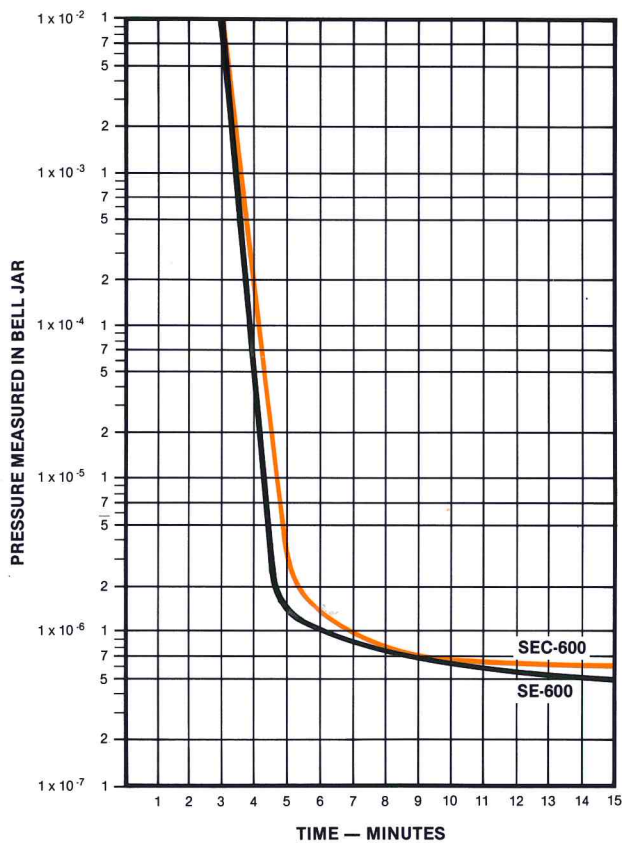
Because it offers superior cleanliness and has high pumping speed—particularly for water vapor—cryogenic pumping is preferred in some applications. Where this is the case, CHA's SEC-1000, SEC-600 and SEC-400 deposition systems answer the need by incorporating cryo pumps—with automatic regeneration capabilities where desired—in addition to the standard mechanical roughing pump.

The combination of the cryo pump and second-phase cryo panel typically results in pumpdown to 10^{-7} torr range in less than 10 minutes under production conditions measured in the chamber.

PUMPING PERFORMANCE



* 3 MINUTES ALLOWED FOR ROUGHING



* 3 MINUTES ALLOWED FOR ROUGHING

SYSTEMS FOR SPECIAL APPLICATIONS

In addition to systems intended for semiconductor and thin-film production, CHA manufactures deposition systems for a variety of special applications. These systems are often completely or partially custom designed to meet exact customer requirements.

SE-SERIES OPTIONS

Automatic deposition controller

Offering a fully automatic deposition sequence, the automatic process controller—at the press of the START button—sequentially (1) activates automatic pumpdown, (2) turns on the deposition thickness-rate controller to initiate evaporation power, and (3) terminates the process. The controller can control a single evaporation source or multiple sources either sequentially or simultaneously.

Liquid nitrogen level control

Automatically maintains the liquid level in the cryo reservoir, eliminating the need for manual filling. A gas/liquid phase separation column is utilized to prevent high pressure gas from being introduced into the LN₂ reservoir.

Molecular sieve trap

Inserted in the mechanical pump line, the molecular sieve-type trap prevents migration or backstreaming of mechanical pump oil into the high-vacuum system.

Automatic regeneration

When activated by the operator, this module: (1) purges dry nitrogen through the cryo pump with the compressor and refrigerator off, (2) retains dry nitrogen in the cryo pump for a pre-set time, and (3) uses the mechanical

pump for pumpdown of the cryo pump to the low micron range.

Hot and cold water integration

This option allows hot water to replace chilled water in the bell jar during the vent cycle to reduce condensation in areas of high humidity.

Water-cooled bell jar

This option provides water cooling of the bell jar when high heat is used in system or extended evaporation cycles.

Other valuable options

- Dual ion gauge readout
- RGA port
- Substrate heating
- Heater power supplies
- Deposition power supplies
- Shutter and shutter control
- Automatic gun rotation control

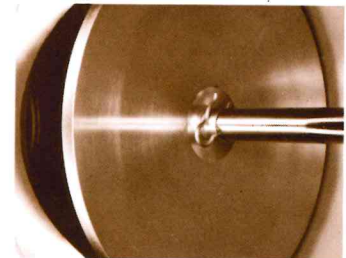
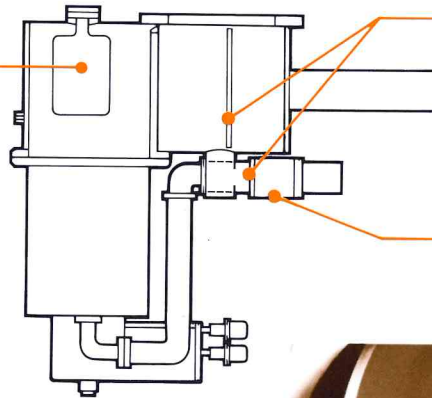


CHA PUMPING STACK

LONG-LIFE COLD TRAP

VERTICAL SEALING PLANE ON ALL VALVES

3" DIA. ROUGHING AND BACKING VALVES



The SE-Series reflects a distinctive simplicity of design that contributes to efficiency, durability and easy servicing. As an example, pulling the quick-release pin on the shaft of the high-vacuum valve allows convenient removal of the sealing plate—a process that can require removal of as many as 32 bolts on other systems.

SE-Series deposition systems offer expanded flexibility through a wide selection of fixturing, sources, heaters and other process instrumentation.

Pumping System

ULTIMATE VACUUM
CRYOGENIC PUMP
MECHANICAL PUMP
COLD TRAP

WATER BAFFLE
HIGH VACUUM VALVE
FORELINE & ROUGHING VALVES
VALVE ACTUATION
VALVE SEQUENCING
IONIZATION GAUGE CONTROL

SE/SEC-600 SERIES

8" cryo pump
2.5 liter capacity, 200 square inches of surface area; 10 hours holding time
7¾" I.D., seals vertically
2400 liter/second, 6 inch nominal
19.5" diameter x 30" high, ambient or water cooled (larger bell jars also available)
A variety of fixturing options, including CHA's planetary, clamshell, or custom fixturing
20 or 26 inch diameter, 7¾" pumping port
2-10 kW
Any type of source commercially available, including single and multiple electron beam sources, CHA's resistance sources and sputtering sources
Motorized hoist assembly, ¼ horsepower motor
Automatically maintains the liquid level in a cryogenic trap
Molecular sieve type trap. This trap prevents migration or backstreaming of mechanical pump oil into the system
A 2.75 O.D. conflat flange located in the base plate of system provides for integration of a residual gas analyzer
Automatic process controller designed to provide a fully automatic deposition sequence
Positions the crucibles of a turret-type electron beam source
Shutters of different design can be incorporated depending on source configuration and number

SE/SEC-1000 SERIES

10⁻⁸ torr range
10" cryo pump
23 to 57 CFM, dual stage
3.7 liter capacity, 250 square inches of surface area; 10 hours holding time
Optically dense, chevron baffle
11¾" I.D., seals vertically
3" I.D.
Electro-pneumatic (all vacuum valves)
Manual and automatic (Auto-Tech II)
Dual ionization gauge tube, auto ranging with dual convectron positions
5300 liter/second, 10 inch nominal
25.5" diameter x 30" high, ambient or water cooled (32" bell jar also available)
26 inch diameter, 11¾" pumping port (32" base-plate also available)
2-16 kW
Motorized hoist assembly, ½ horsepower motor
Motorized hoist assembly, ½ horsepower motor

Optional Equipment

DIFFUSION PUMP
PROCESS CHAMBER

FIXTURING
BASEPLATE

SUBSTRATE HEAT
SOURCES

HOISTS
LN₂ LEVEL CONTROL
SIEVE TRAP

RGA PORT

AUTOMATIC DEPOSITION CONTROL
AUTOMATIC GUN ROTATION CONTROL
SHUTTER/SHUTTER CONTROL

Overall Dimensions

79 inches high by 43 inches wide by 37 inches deep; approximate weight 1200 pounds

94¼ inches high by 43 inches wide by 46¼ inches deep; approximate weight 1500 pounds

Utilities

ELECTRICAL

208/1Ø/70A/4-wire connection with ground (3 phase, 5 wire also available)

208/3Ø/70Amp/5-wire connection with ground

WATER
AIR

2.0 GPM (minimum)
90-110 PSIG

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Osterville, MA 02655
Phone: 508-428-5171

BYRON ELLIS ASSOCIATES

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Des Plaines, IL 60016
Phone: 312-298-7626

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