Clean AIR PRODUCTS

Series 1414 Wet Process Station
Technical Data

WET PROCESS STATION

General Description

Manual Wet Process Station/ Reduced Particle Generation

State-of-the-art semiconductor facilities are demanding greater capacity and efficiencies. Along with economics from the wet process station manufacturers.

The drive is to integrate components into a total process system designed for low defects in the submicron process era.

Automation is a key factor in reducing particles and assuring process uniformity, but many semiconductor manufacturers cannot afford the expense that automation represents in today's market. The actual run time on the automated station has yet to be faithful. Cost and reliability has prevented many semiconductor manufacturers from moving toward automation. This factor has placed the demand for low particulate wet processing with greater capacity in the conventional manual mode of operation.

In order to meet this demand, Clean Air Systems has given critical attention to the design and assembly in the wet process station manufacturing practices.

Clean Air Systems is a joint corporation with Clean Air Products. Clean Air Products manufacturers modular cleanrooms. The expertise of Clean Air Products engineering and manufacturing standards greatly support Clean Air Systems in the proper design of processing stations and how they are to contribute to the end result toward low defects within a cleanroom environment.

Within a manual mode operation, the human operator is the major generator of airborne particulate. To decrease the airborne particulate, it has been the practice to remove the number of operators within the process area. Competition and demand has created the need for greater capacity for product flow, thus creating greater demand on the operator. This demand pinpoints the need for the process station to be efficient and safe.

In order to get the total capabilities of the process station, one must look at the individual components and the design of the stations' shell. This total is the result of twenty years of Clean Air Systems experience in particle control.

Construction

The design of the wet process station cabinet has evolved into an aerodynamic shell that efficiently utilizes the laminar air flow of the facility, thus decreasing vortices that may cause particle fallout over the process deck. Along with the evolutionary design of the station shell for particle reduction, the design has greatly improved the efficiency in exhausted air. With the greater production demand, the design has taken into consideration the need for the continuous attention toward safety. Clean Air Systems pays close attention to processor position, product flow, and placement in the design of each deck layout.

Along with design, the material makeup of the stations' shell is taken into consideration. White stress relieved polypropylene, natural polypropylene, fire retardant polypropylene, polyvinyl chloride, polyvinylidiene fluoride, and stainless steel are standard construction materials used in conjunction and consideration with process chemicals, and construction safety codes.

Manufacturing of the stations' shell, component assembly, and installation is done within a cleanroom environment. Air flow and exhaust testing is done in a controlled filtered room to

Series 1414

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www.cleanairproducts.com/1414

tel: 763.425.9122 800.423.9728
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duplicate actual operation conditions. All plastic piping manifolds are degreased, purged, and sealed for shipment. The complete units are hand bathed and triple packed for shipment. Clean Air Systems' traffic department has brought an extreme awareness to the over-the-road transporter, the necessary extremes to deliver the unit sealed in the original packaging state.

The process station has been designed for an in-wall placement, alleviating air flow construction, allowing total laminar clean air flow to the work deck. The design of the process lower sub-deck and the environmental division upper deck improves product quality and operational safety.

The product travels from one process module to another without leaving the process deck level. This provides uniformity in product transfer, separation of product from ambient conditions above the environmental deck level, improves and decreases the exhaust requirements as seen in the conventional process stations, improves safety and decreases particle fall-out.

Maintenance is available from the rear, front, or both. Modularity is applied to deck modules, plumbing modules, electrical modules, and process components to assure pre-maintenance and maintenance ease of access. All access panels to voltage supply housings have safety interlocks and response to a complete shut-down to the process station when circuit is interrupted. All electrical wiring connections are coded to assist in ease of maintenance and exchange of non-functional components. High voltage panels are clearly marked to identify the need for caution in potentially hazardous entrance areas.

Normally, closed pneumatic diaphragm valves activated by low voltage solenoid valves are utilized throughout fluid and gas supplies. When a shutdown occurs within the station, the valves remain in the normally closed position and prevent fluid and gas flow. In the areas where solvents are used, such as draining, normally open valves with arrestor may be required for evacuation of fluids from baths, solvent drain reservoirs need to be sized for fluid acceptance of emergency flushing of process solvents.

As a backup support for component change or removal, each supply port from the main supply manifold will have a manual needle valve to shutdown the supply of fluid or gas to that component. Each main supply manifold will also have a manual ball valve for customer connection or complete supply shutdown. The DI water manifold will have a three-way manual ball valve providing a port for hydrogen peroxide purge. Point-of-use connections for filters and housings, paddle wheels, ozonators, and probes can also be provided upon request. Battery backup power supplies are available to operate the station to final process rest if a glitch or an intermediate power failure occurs. The power supply is activated only if the original source for failure has been identified as not hazardous for operation.

Components

The following list is a representation of the variety of components utilized within the Series 1414.

Sinks and tanks:
- room temperature
- constant temperature
- sub-ambient
- refluxing
- recirculating/filtered
  - molded
  - fabricated
    - Materials:
      - Polypropylene
      - Polyethylene
      - Poly Vinylidiene Fluoride
      - Quartz
      - Teflon
    - Cleaning:
      - Ultrasonic
      - Megasonic
      - IPA
      - Cascade
        - Single weir overflow
        - Dual weir overflow
        - Triple weir overflow
        - 4-sided overflow
        - High/low flow
      - Spray Rinse
      - Dump Rinse
      - Degreasers

Spinners:
- Rinser/dryer
- Photoresist

Dryers:
- Nitrogen Tunnels
- IPA/Vapor

Guns:
- Nitrogen
- DI
- Anti-static
- Filtered

Hot Plate/Strippers

Goosenecks:
- Manual

- Pneumatic
  - Switch
  - Foot control
    - Material:
      - PVC
      - Polypropylene
      - PVDF
      - Teflon
        - City Water
        - DI Water
          - Recirculating
          - By-Pass
            - Hot and/or cold
            - Mixing

Valves:

- Manual
- Pneumatic
  - Switch
    - Material:
      - PVC
      - Polypropylene
      - PVDF
      - Teflon
        - Ball
        - Needle
        - Diaphragm
          - Normally closed
          - Normally open
            - Diverter
              - Two-way
              - Three-way

Aspirators:

- Air
- Water
- Pump
  - Drain
  - Siphon

Fire Suppression:

- Halon
- Nozzle (wax)

Plenum Rinse:

- Manual
- Pneumatic
  - Timed

Controls:

- Emergency Power Shutoff
- Exhaust
- Flow
  - Gas
  - Fluid
- Conductivity
- PH
- Timer: Microprocessor
- Counter: Microprocessor
- Temperature: Microprocessor
- Microprocessor: RS232 Port

Automatic Lifts

Semi-Automatic Transfers

Additional Station Characteristics

- ❖ Low voltage electrical process control 8 hour.
- ❖ Headcase and lower process function case.
- ❖ Nitrogen purge of 8 hour headcase and lower process function case.
- ❖ Numerical and color coding of electrical, pneumatic, and plumbing connections.
- ❖ Flexibility in design and process application to meet customer desires.

Particle Control Within the Process Station

The primary factor and source of contamination within the process flow of the wet station is the DI water rinsing systems and supply lines.

High purity DI water supply manifolds with point-of-use filtration are implemented. DI water flow by-pass diaphragm valves are used, inhibiting bacterial growth. Periodic purging with hydrogen peroxide is recommended. A point-of-use ozonator is also available for inhibiting bacterial growth. Periodic purging with hydrogen peroxide is recommended. A point-of-use ozonator is also available for inhibiting bacterial growth. It is also recommended that like materials be used throughout the rinsing system. From supply to the point-of-use. Different materials have various levels of inhibiting bacterial growth on surface area of manifolds and/or tanks. A periodic or continuous purging of the system with DI water will eliminate stagnation. Point-of-use filtration is supportive in low particulate counts if correct and timely pre-maintenance is provided. Extreme attention is paid to eliminate plumbing deadlegs.

Rinse Modules

The quick dumper spray rinse module has become a popular choice for quenching and rinsing over the cascade rinse, because of the turbulent action for surface scrubbing of the product, carriers, and the module itself. Megasonic and IPA modules are also popular, but price and safety is still a concern with these modules. The low priced high purity quick dump spray rinse module also implements the feature as a cascade overflow, which is favored as a final skim clean. The continuous spray action has seen results in addition to particle generations.

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Molded rinse modules are preferred over welded, which supports areas for bacterial growth. Decreases in the fill and drain times, the turbulence for scrubbing, and the increase of the change-over in bath frequency supports the quick dump spray rinse as an aggressive rinse system. The bath area is minimized to aid in bath frequency and decreases DI water usage. The sloped area to the drain is important in preventing stagnant water. Utilizing the 4-sided overflow and material with low retention will decrease the scaling as seen with modules with single side cascade and porous material make-up.

The quick dump spray rinse system in some ways has been the pilot system to the design of many etch systems within the wet process station. Molded modules, sloped drains, change over in bath frequency and decrease in fluid usage, overflow skimming action, low retention material, and aggressive action all are characteristics desired in many of the process modules.

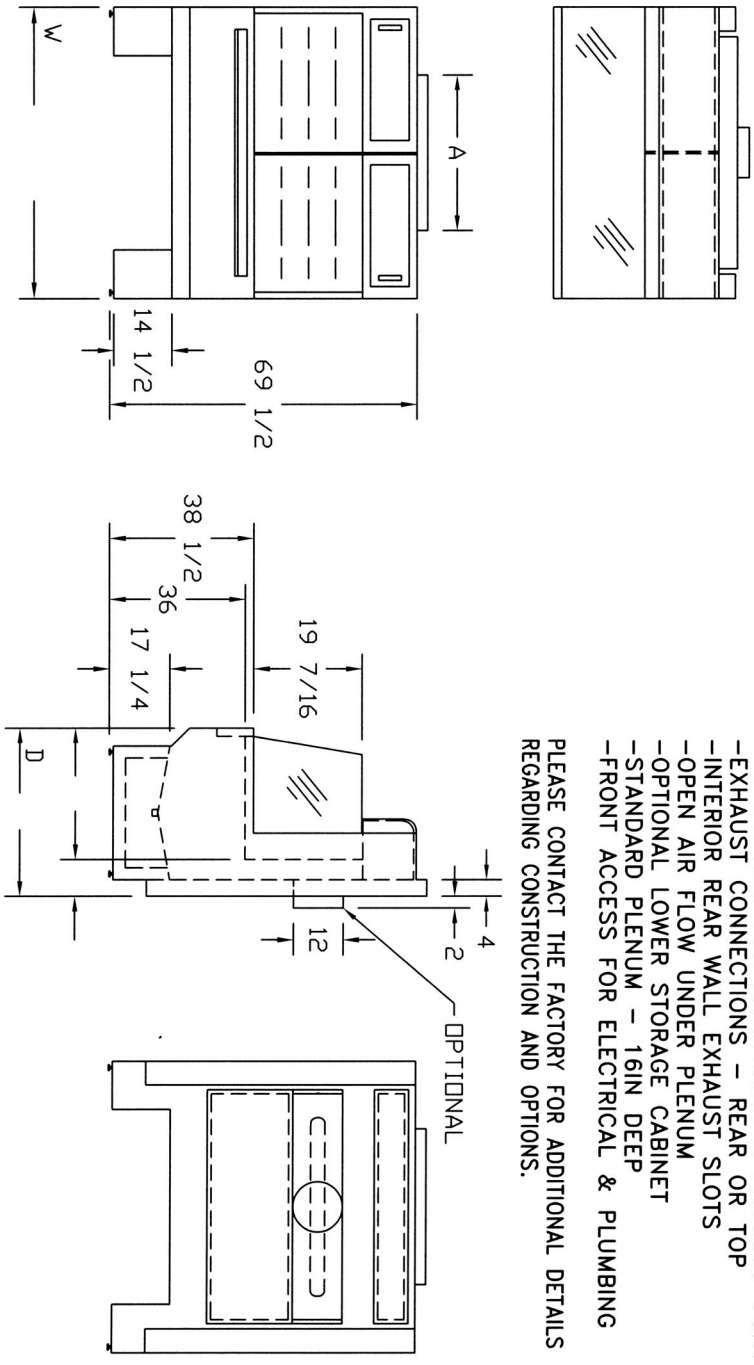
Enclosed are a number of vendor supplied process modules that support process modularity and low particulate process control.

THE SERIES CAP1414 FUME HOODS ARE AVAILABLE IN STAINLESS STEEL AND WHITE POLYPROPYLENE AND FIRE RETARDANT POLYPROPYLENE

SIZES: THE UNITS ARE AVAILABLE IN 3, 4, 5, 6, 8 AND 10FT WIDTHS AND 30, 36 AND 42 INCH DEPTHS. OTHER SIZES ARE AVAILABLE UPON REQUEST.

- HEADCASING FOR ELECTRICAL & PROCESS CONTROLS
- EXHAUST CONNECTIONS – REAR OR TOP
- INTERIOR REAR WALL EXHAUST SLOTS
- OPEN AIR FLOW UNDER PLENUM
- OPTIONAL LOWER STORAGE CABINET
- STANDARD PLENUM – 16IN DEEP
- FRONT ACCESS FOR ELECTRICAL & PLUMBING

PLEASE CONTACT THE FACTORY FOR ADDITIONAL DETAILS REGARDING CONSTRUCTION AND OPTIONS.



WIDTH(FT)	A
3	23 1/2
4	23 1/2
5	23 1/2
6	38 1/2
7	38 1/2
8	2-23 1/2

CLEAN AIR PRODUCTS
MINNEAPOLIS, MN. 55445 (763) 425-9122

FUME HOOD
CAP1414

DRWN BY	CDG	DATE 11-01-96	QUOTE NO.
1400\1414-1		A	
FORM NO. 342-4			PART NO.

Specifications subject to change. Please contact factory for details.

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