



Series 1414

Wet Process Station

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Clean Air Products' wet process stations are available in white stress-relieved polypropylene, natural polypropylene, fire retardant polypropylene, stainless steel, and PVC. The stations are designed to be compatible with the stringent cleanliness requirements of semiconductor process facilities. Custom designs can be provided when required by the application.

A high degree of flexibility is achieved by mounting components on support rails. This technique permits Clean Air Products to use proven, highly-reliable components and to position them to optimize product flow through the station. Components are easily replaced or even repositioned as process requirements change. Electrical devices and plumbing systems are also modular in design. This concept helps to create an orderly maintenance program with minimal service inventory required.

Features

- ❖ Flexibility is achieved by mounting components on support rails
- ❖ Available in white stress-relieved polypropylene, natural polypropylene, fire retardant polypropylene, stainless steel, and PVC
- ❖ The units are available in 3, 4, 5, 6 and 8 ft. widths and 30, 36, and 42 in. working depths. Other sizes are available upon request.
- ❖ Superior quality, excellent appearance, and ruggedness have been achieved through a safety-oriented design

Overview

Manual Wet Process Station/ Reduced Particle Generation

State-of-the-art semiconductor facilities are demanding greater capacity and efficiencies, along with economical efficacy 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 a high 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 manufactures 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 of 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 understand the total capabilities of the process station, one must look at the individual components and the design of the station's shell. This outcome 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 station's shell is taken into consideration. White stress-relieved polypropylene, natural polypropylene, fire-retardant polypropylene, polyvinyl chloride, polyvinylidene fluoride, and stainless steel are standard construction materials used in conjunction and consideration with process chemicals, and construction safety codes.

Manufacturing of the station's shell, component assembly, and installation is done within a cleanroom environ-

ment. Air flow and exhaust testing is done in a controlled, filtered room to 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 station's 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.

Standard

- Eye level controls
- Safety shield
- Side shield
- Sloped to drain plenum
- Drag out exhaust
- Lip exhaust

Exhaust

The design of the Series 1414

process station provides an excellent level of operator safety, production yield, and exhaust efficiency. Lip exhaust on process tanks and interior rear wall exhaust slots are utilized to effectively remove fumes and particulates from within the work zone area.

Controls

State-of-the-art, modular, touch-tone microprocessors are the heart of the system. The face of the controller is protected by a flexible membrane which is resistant to acids and solvents. Programming of controllers is accomplished from the front of the controller. Timer, EPO, quick dump rinser, filter etch bath, and heated bath are examples of controller modules available.

Safety

Operator safety is of prime concern with every wet process station built by Clean Air Products. A thorough review with the customer is done to verify the station will achieve the application's requirements. Heated tanks are available with liquid level sensors, high-limit overrides, ground fault interrupters, and other safety overrides. Operator exposure to high voltage is kept to an absolute minimum. EPO devices are offered for additional operator safety. Halon fire suppression systems are available when necessary. Clean Air Products' in-house engineering staff is capable of integrating individual company's safety specifications as required.

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 Vinylidene 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**

- 8 hour low voltage electrical process control.
- 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. It is also recommended that like materials be used throughout the rinsing system. 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.

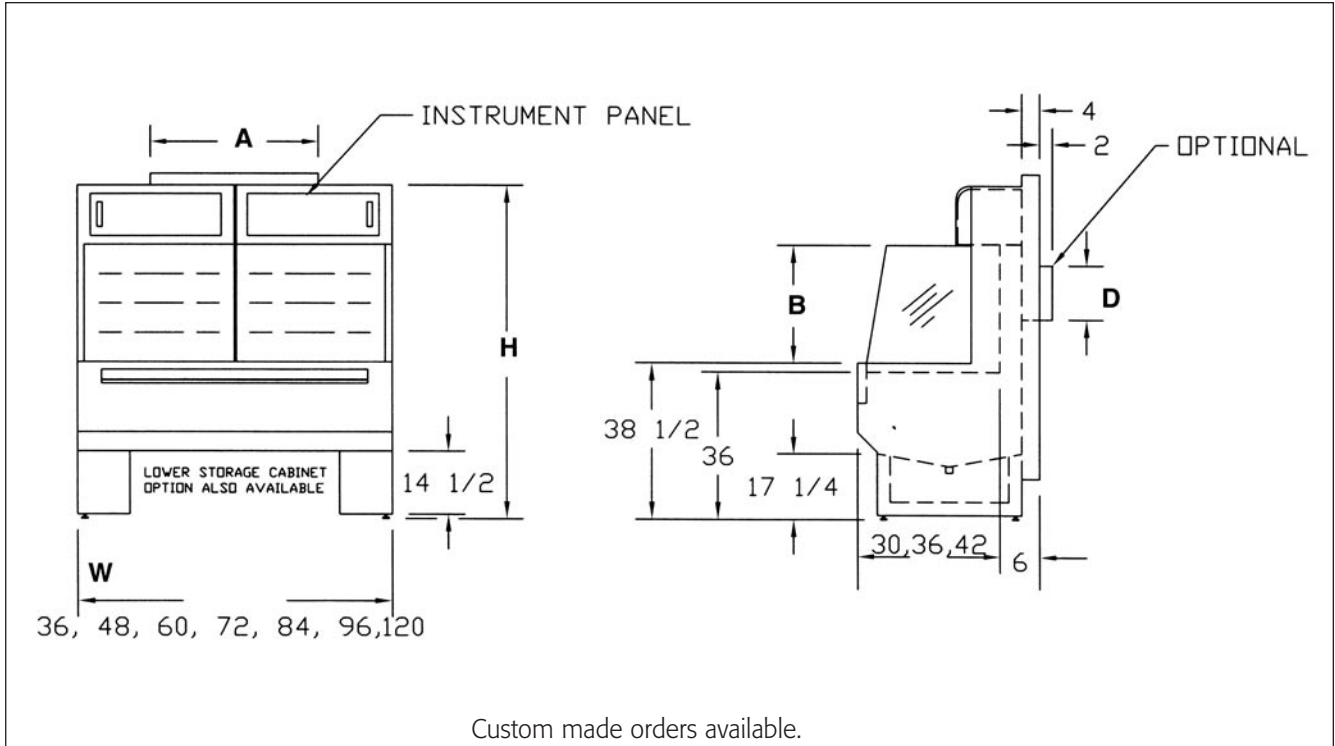
Rinse Modules

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.

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.



Options

- Front-mounted switches
- Deck-mounted switches
- Real or top exhaust
- Lower storage cabinet

Sizes

The units are available in 3, 4, 5, 6 and 8 ft. widths and 30, 36, and 42 in. working depts. Other sizes are available upon request.

Please contact the factory for details regarding construction and options available.

Guarantee

A written 1 year warranty is furnished with each station.

Specifications subject to change. Please contact factory for details.



Solutions Built to Your Specifications.

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