

**APPLICATION**

The VHP ARD Biodecontamination System is designed for portable biodecontamination\* of clean, dry, sealed Enclosures. The VHP® 1000-ARD Biodecontamination Unit is portable and can be brought to (or placed inside) the Enclosure to be biodecontaminated.

The VHP ARD Biodecontamination System consists of the following devices:

- VHP 1000-ARD Biodecontamination Unit;
- Dryer Regenerator;
- High Capacity Dryer Tank or Dryer Cartridge;
- Sensing Unit;
- Auxiliary Aeration Unit (High Capacity Catalytic Converter) and
- Room Circulation Unit.

\* When using VHP equipment with Vaprox® Hydrogen Peroxide Sterilant in the United States, the term biodecontamination referred to in this Tech Data is defined as sterilization of exposed porous and non-porous surfaces in a precleaned, dry, sealed Enclosure. Any reference to biodecontamination as it relates to the use of this equipment in the United States does not impart additional claims of effectiveness beyond that approved in the EPA registered labeling of Vaprox Hydrogen Peroxide Sterilant for use on precleaned, dry, exposed porous and non-porous surfaces in a sealed Enclosure.

**DESCRIPTION**

The VHP 1000-ARD Biodecontamination Unit is a hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) vapor generator that operates at ambient temperature and atmospheric pressure to offer operating flexibility. The biodecontamination unit can be easily transported between multiple Enclosures for biodecontamination.

To minimize exposure to the liquid hydrogen peroxide during handling, the system uses Vaprox Hydrogen Peroxide Sterilant cartridges containing 950 mL of sterilant. The Vaprox Hydrogen Peroxide Sterilant is specially formulated for maximum efficacy and for component compatibility.

Use only Vaprox Hydrogen Peroxide Sterilant cartridges, containing STERIS-registered hydrogen peroxide which has been specially formulated, tested



(Typical only - some details may vary.)

and approved for use in the VHP 1000-ARD Biodecontamination Unit. Vaprox Hydrogen Peroxide Sterilant has been registered by STERIS in accordance with U.S. Federal Regulations for specific usage with the VHP ARD Biodecontamination System.

**STANDARDS**

The biodecontamination system components (including biodecontamination unit control system) meets the applicable requirements of the following standards:

- CE Mark per:
  - » **EMC Directive 89/336/EEC, 92/31/EEC, 93/68/EEC.**
  - » **Low Voltage Directive 73/23/ EEC, 93/68/EEC.**
- ETL (UL) per **EN/UL61010-1.**
- CSA per **CSA 22.2 61010-1.**

**CYCLE DESCRIPTION**

The VHP 1000-ARD Biodecontamination Unit uses a closed-loop process or configuration utilizing conditioned air as a carrier to deliver Vaprox Hydrogen Peroxide Sterilant vapor to exposed surfaces inside a pre-cleaned, dry, sealed Enclosure. This closed-loop configuration allows the biodecontamination process to take place at, or near, atmospheric pressure. The maximum Vaprox Hydrogen Peroxide Sterilant vapor concentration achievable depends on the temperature, volume and humidity of the sealed Enclosure.

Vaprox Hydrogen Peroxide Sterilant vapor is maintained at the target concentration for the required exposure time to achieve

**The Selections Checked Below Apply To This Equipment**

**VOLTAGES**

- 120 Vac, 60 Hz
- 230 Vac, 50/60 Hz

**ACCESSORIES**

- Dryer Cartridge
- High Capacity Dryer Tank
- Dryer Regenerator
- Sensing Unit (H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O)
- Auxiliary Aeration Unit
- Room Circulation Unit

**OPTIONS**

- Language
  - English
  - French
  - German
  - Italian
  - Spanish
- Printer

Item \_\_\_\_\_  
 Location(s) \_\_\_\_\_

biodecontamination. The Vaprox Hydrogen Peroxide Sterilant vapor evacuated from the Enclosure in a closed-loop operation is catalytically converted by the VHP ARD Biodecontamination Unit (and/or auxiliary aeration unit) into water vapor and oxygen.

The Biodecontamination Cycle consists of four phases: DEHUMIDIFY, CONDITION, BIODECONTAMINATION and AERATION.

**NOTE: Pressure control is not available.**

### **Dehumidify**

Dry, HEPA-filtered (High Efficiency Particulate Air) air is circulated to reduce humidity to a predetermined level in the 10-70% relative humidity range. This permits the necessary Vaprox Hydrogen Peroxide Sterilant vapor concentration to be maintained below saturation (dew point) levels during the Condition and Biodecontamination phases. The return air is dried as it passes through the dryer and then heated to serve as the carrier for the Vaprox Hydrogen Peroxide Sterilant. The internal HEPA filter prevents contamination of internal machine components and prevents recontamination of the Enclosure. A particle filter is also supplied to protect the 1000-ARD vaporizer.

**NOTE: Time to reach the targeted humidity corresponds with the initial humidity, temperature and the volume of the Enclosure.**

### **Condition**

The flow of dry, HEPA-filtered air continues while Vaprox Hydrogen Peroxide Sterilant vapor is injected into the air stream just before it leaves the Biodecontamination Unit. Vaprox Hydrogen Peroxide Sterilant vapor is injected into the Enclosure to reach the target biodecontamination VHP Sterilant concentration. The Condition phase facilitates reaching this target biodecontamination concentration faster in larger volume sealed Enclosure applications. Condition time is affected by Vaprox Hydrogen Peroxide Sterilant injection rate, Enclosure volume, Enclosure contents and temperature.

The VHP ARD Biodecontamination System, through use of optional sensing unit, is capable of automatically developing the needed condition time and injection rate.

### **Biodecontamination**

The target Vaprox Hydrogen Peroxide Sterilant concentration is maintained for a specific period of time throughout the Enclosure.

The VHP ARD Biodecontamination System, through use of optional sensing unit, is capable of automatically controlling the sterilant concentration.

### **Aeration**

The Vaprox vapor injection is stopped and the recirculating flow of dry, HEPA-filtered air continues through the catalytic converter (and/or auxiliary aeration unit) to reduce the Vaprox Hydrogen Peroxide Sterilant vapor concentration within the Enclosure.

## **CYCLE DEVELOPMENT SUPPORT**

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STERIS can provide on-site support to properly develop the Biodecontamination Cycle for your specific application.

## **ACCESSORIES**

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The completely portable VHP ARD Biodecontamination System is flexible enough to biodecontaminate a variety of Enclosures. Some of the accessories available to enable this flexibility are as follows (see Pages 5 and 6):

### **Dryer Cartridge**

The VHP 1000-ARD Biodecontamination Unit uses a reusable desiccant cartridge to dry the air stream in the VHP process. The cartridge is capable of containing the water vapor produced by the vaporization of 600 grams of Vaprox Hydrogen Peroxide Sterilant as well as the water vapor initially existing inside the Enclosure. Once the reusable dryer cartridge reaches its capacity (cannot contain the water vapor generated in the next cycle), it must be regenerated.

### **High Capacity Dryer Tank**

For larger Enclosures or more cycle capability, the VHP 1000-ARD Biodecontamination Unit may use this desiccant high capacity dryer tank to dry the air stream in the VHP process. The tank is capable of containing the water vapor produced by the vaporization of two liters of Vaprox Hydrogen Peroxide Sterilant as well as the water vapor initially existing inside the Enclosure. Once the dryer tank reaches its capacity (cannot contain the water vapor generated in the next cycle), it must be regenerated.

Mounted on wheels for easy portability.

### **Dryer Regenerator**

The Dryer Regenerator is used to remove the water from the desiccant within either the reusable dryer cartridge or the High Capacity Dryer Tank. Mounted on wheels for easy portability and supplied with insulation blankets to protect hot surfaces on High Capacity Dryer Tank and connecting hoses or dryer cartridge.

### **Sensing Unit (H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O)**

This optional sensor measures the hydrogen peroxide and water concentrations in the Enclosure. The sensor supplies this concentration data to the VHP 1000-ARD Biodecontamination Unit for cycle operation. Up to three sensors can be operated simultaneously for additional feedback control of the hydrogen peroxide concentration and condensation prevention.

### **Auxiliary Aeration Unit**

This optional, external to the VHP 1000-ARD Biodecontamination Unit, high capacity catalytic converter enables aeration of Enclosures at a higher rate and reduces the aeration time.

### **Room Circulation Unit**

This optional blower unit circulates the Vaprox Hydrogen Peroxide Sterilant throughout the Enclosure for optimal sterilant distribution.

## FEATURES

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The VHP 1000-ARD Biodecontamination Unit is supplied with a **control touch panel** that includes a 1/4 VGA monochrome display window, touch-sensitive keypads, and an impact printer (optional) to allow easy initiation, option setting and monitoring of cycles. These features are as follows:

- **Touch panel** – the B&R Power Panel 220 directs all Biodecontamination Unit functions. From this control touch panel, the operator may control cycle operation, program cycles, and unit operating parameters, as well as monitor cycle performance.

By pressing Power Panel 220 touch panel, a fully-trained, certified operator (see NOTE 1) can start or cancel a cycle, check cycle phase while unit is in-cycle, change or set option selections, and advance the printer (optional) paper.

- **Printer (optional)** – 40 character, dot matrix, ink-on-paper, impact-type printer with a takeup motor records all cycle data on 57 mm (2-1/4") wide, single-ply paper.

**Printouts** (optional) list key cycle data, including date, time the cycle was started, Biodecontamination Unit ID, and cycle count. Cycle printouts also include vaporizer/return temperature, reservoir level, and relative humidity of return air. Any cycle faults are listed and warn the operator of incomplete biodecontamination, should a fault occur. Diagnostic cycles also indicate whether the Biodecontamination Unit passed or failed (and if so, the reason for the failure). The printout will also list options that can be programmed.

**Control system** includes preprogrammed biodecontamination cycles that can be used for typical processing requirements.

**Remote Operation port** enables Biodecontamination Unit to be connected to a personal computer (not supplied by STERIS) for remote operations. Wireless operation is also available using wireless router.

**H<sub>2</sub>O<sub>2</sub> warning light** warns user that Vaprox Hydrogen Peroxide Sterilant vapor may be present in the Enclosure.

**Data Logging** is cycle data, including peroxide concentration, logged onto USB memory sticks in an encrypted format. Printout information is also stored in an encrypted file on the memory stick. This data is then available for viewing and graphing using standard PC software.

## CONTROL VALUE SETTINGS

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Cycle values (e.g., time and temperature) can be adjusted by the operator; however, certain control settings are supervisor-adjustable:

- **Time set** – sets current time of day for displays and printouts.
- **Date set** – sets current date for displays, printouts.
- **Access code** – limits access to certain options to authorized, fully-trained and certified operators.
- **End-of-cycle tone** – generates an audible tone at the end of each cycle.
- **Time format** – sets the sequence for time displays and printouts in AM/PM or 24-hour format.

- **Date format** – sets the sequence for date displays and printouts (month/ day/year, day/month/year, year/ month/ day).

## CONSTRUCTION

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**VHP 1000-ARD Biodecontamination Unit Body:** Powder-coated aluminum body and side panels. The sealed enclosed bottom contains Vaprox Hydrogen Peroxide Sterilant leaks and is equipped with leak detection.

**VHP 1000-ARD Biodecontamination Unit Vaprox Hydrogen Peroxide Sterilant Cartridge Interface:** Flame-resistant plastic. The Vaprox Sterilant is metered with a precision pump.

**Reusable Desiccant Cartridge:** Aluminum housing with molecular sieve desiccant.

**Dryer Regenerator:** Carbon-steel housing with aluminum frame. Mounted on wheels for easy portability.

**Sensing Unit:** Plastic enclosure with stainless-steel support frame.

**High Capacity Dryer Tank:** Aluminum, wheel-mounted housing with molecular sieve desiccant.

**Auxiliary Aeration Unit:** Aluminum casing.

**Circulation Module:** Aluminum casing and mounted on wheels for easy portability.

## CALIBRATION

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STERIS recommends that all VHP 1000-ARD Biodecontamination Units be calibrated at least twice a year. Control warns user when calibration is required. STERIS can provide this calibration service. Each sensing unit (H<sub>2</sub>O<sub>2</sub> and H<sub>2</sub>O sensor) accessory contains a memory stick containing that particular sensor's calibration data.

## PREVENTIVE MAINTENANCE

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Customers are encouraged to contact STERIS concerning the annual maintenance program. Under the terms of the program, preventive maintenance, adjustments, and replacement of worn parts are provided on a scheduled basis to help ensure optimal equipment performance and help minimize untimely or costly schedule interruptions. STERIS maintains a worldwide staff of well-equipped, factory-trained technicians to provide these services, as well as on-site installation, training, and expert repair services. Contact STERIS for details.

## NOTES

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1. Applicators must complete the "Training and Certification Course for Applicators of Vaprox 35% Hydrogen Peroxide Sterilant." Users must complete all certification criteria.
2. STERIS recommends that a dedicated, grounded electrical circuit be provided for each unit. Extension cord use is not recommended.
3. Unit should be operated in an area which is compatible with oxidizers. Consult the SDS regarding Vaprox Hydrogen Peroxide Sterilant.

4. Access must be provided to power switch and hose connectors located on the front and back of the biodecontamination unit.
5. When used, hose clearance must be adequate to prevent kinks and strains on the connectors.
6. When used, hoses must be supported to keep them from resting on the floor or other cold surfaces.
7. Access must be provided for desiccant (dryer) cartridge and/or High Capacity Dryer Tank installation and removal.
8. Dryer Regenererator must be on a hard, level surface.

## **ELECTRICAL REQUIREMENTS**

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**Important:** Refer to the following equipment drawings for installation details and specifications:

1. ARD Assembly: 146668-818
  2. Dryer/Regenerator: 146668-791
  3. Dryer/Module Assembly: 146668-821
  4. Circulation Module: 146668-820
  5. Auxiliary Aerator: 146668-822
  6. Sensor Box: 146668-824
- VHP 1000-ARD Biodecontamination Unit:
    - » 120 Vac, 18 Amp, 60 Hz
    - » 230 Vac, 9 Amp, 50/60 Hz
  - Dryer Regenerator:
    - » 120 Vac, 11 Amp, 60 Hz
    - » 230 Vac, 6 Amp, 50/60 Hz
  - Auxiliary Aeration Unit:
    - » 120 Vac, 1 Amp, 60 Hz
    - » 230 Vac, 1 Amp, 50/60 Hz
  - Room Circulation Unit:
    - » 120 Vac, 2 Amp, 60 Hz
    - » 230 Vac, 1 Amp, 50/60 Hz

## **AIRFLOW**

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- Airflow range: 6-20 scfm (10-34 m<sup>3</sup>/h)

## **ENVIRONMENTAL FACTORS**

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- Room Temperature: 60°-100°F (16°-38°C)
- Maximum Humidity: 85% non-condensing
- A-Weighted Sound Power Level: 73 dBA (mean) - 83 dBA (maximum)

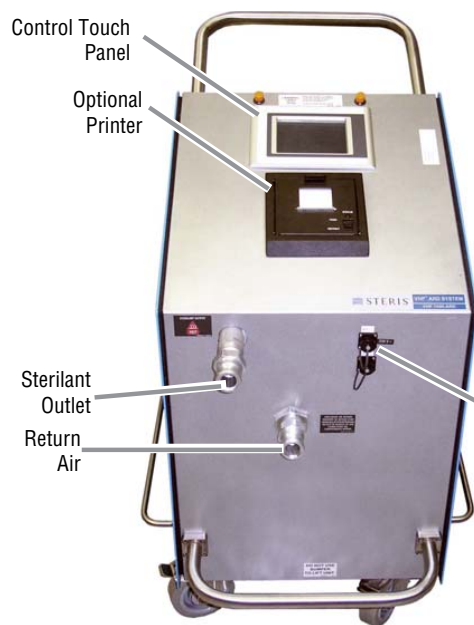
Refer to the VHP 1000-ARD Biodecontamination System and Dryer Regenererator equipment drawings for additional information.

## **OPERATING WEIGHT**

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- VHP 1000-ARD Biodecontamination Unit: 150 lb (68 kg)
- High Capacity Dryer Tank: 60 lb (27 kg)
- Dryer Cartridge: 32 lb (15 kg)
- Dryer Regenerator: 90 lb (41 kg)
- Sensing Unit: 17 lb (8 kg)
- Room Circulation Unit: 50 lb (23 kg)
- Auxiliary Aeration Unit: 50 lb (23 kg)

**CUSTOMER IS RESPONSIBLE FOR COMPLIANCE WITH APPLICABLE LOCAL AND NATIONAL CODES AND REGULATIONS.**



Control Touch Panel  
Optional Printer

Sterilant Outlet  
Return Air

**Front View**



Main Power Switch

Input/Output Connections

Main Power Receptacle

Dryer Connections

**Rear View**

**Typical VHP 1000-ARD Biodecontamination Unit**



**With Dryer Cartridge**



**With High Capacity Dryer Tank**

**Typical VHP ARD Dryer Regenerator and Dryer Cartridges**



**Dryer Cartridge**



**High Capacity Dryer**



**Room Circulation Unit**



**Sensing Unit**



**Auxiliary Aeration Unit**

**Typical VHP ARD Biodecontamination System Components**



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**For Further Information, contact:**

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**STERIS Corporation, Mentor (Hopkins)  
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