



Model BW1020

General Specifications

1.0 General Description

The Model BW1020 Bottle Washer is a high capacity spray cabinet washer specifically designed to clean bottles or other small items used in the care of laboratory animals. The Model BW1020 incorporates a large number of innovative and unique features to ensure thorough, efficient cleaning, as well as many features unique to our design.

2.0 Dimensions

		(W"X H" X L")	(W"X H" X L")
MODEL	DOOR CONFIGURATION	CHAMBER SIZE	EXTERNAL OVERALL SIZE
BW1020	Load Shelf	24" x 32" x 34"	40" x 30" x 86"

3.0 Jet Spray Header Trolley

- 3.1 A rotary spray assembly shall deliver solutions to the inside surfaces of each bottle when the bottles are placed into the Jet Spray Header Trolley.
- 3.2 Header shall be interconnected and mounted to a carriage having non-lube Delrin® plastic wheels.
- 3.3 Rotating spray arms shall deliver solutions to the outside surfaces of the bottles.

4.0 Automatic Temperature Regulation and Guarantee

- 4.1 Any treatment phase shall be selectable as Guaranteed Temperature Phases.
- 4.2 Timing of a Guaranteed Temperature Phase shall not begin until the solution temperature has reached the set point (typically 180F or higher), thus ensuring that the load has been subject to the proper temperature for the entire time set.
- 4.3 Failure of any Guaranteed Temperature Phase to reach the setpoint temperature within the allotted time shall result in a Fault Condition.

5.0 Safety and Certifications

- 5.1 An OSHA-style Emergency Stop button shall be installed on the operator control panel as well as the unload side of the washer. This switch shall be hard-wired to a safety stop relay, which when de-

activated shall interrupt all power to the outputs of the machine, thus satisfying the Dept. of Labor, Occupational Safety and Health Administration standards for industrial machinery.

- 5.2 A Magnetic safety switch on the door shall reliably ensure that all treatments stop instantly if the door is opened. Switch shall be equipped with an internal fail-safe fuse and circuitry, such that if the door is opened and the internal reed switch does not disconnect, the switch will fail open and prevent the operation of the machine.
- 5.3 All devices and components that consume electrical power shall be UL listed and/or approved, and shall bear NEMA (US Standards), IEC (International Standards) or other recognized International ratings appropriate for the use intended. Control assembly shall be UL listed.

6.0 Pneumatically Operated Valves

- 6.1 All automatic ball valves shall be controlled by pneumatic operators. Electric-motor-operated ball valves shall not be acceptable.
- 6.2 All automatic water and steam control valves shall be direct-operated pneumatic types. Pilot-operated solenoid valves or any valve that incorporates a diaphragm-type sealing system shall not be acceptable.

7.0 Microprocessor Control

- 7.1 The treatment schedule and all other machine functions shall be controlled by a readily available, non-proprietary, industrial style modular Programmable Logic Controller equal to that sold throughout the United States by Automation Direct of Atlanta, GA.
- 7.2 Module replacement for the I/O system shall be easily accomplished with no tools and no wiring disconnection or connection.
- 7.3 The control system shall be programmed in simple ladder logic.
- 7.4 An Operator Interface Message Screen shall provide complete operator interface, diagnostic and programming capability. No special skills or knowledge shall be necessary to set up and control all machine functions.

9.0 Insulated Exterior

- 9.1 The exterior of the machine shall be insulated with rigid insulation. This insulation shall be an integral part of the machine, designed to maintain the high temperatures required in the washing chamber and to limit radiation loss to the surrounding air. Noise shall be attenuated to <70dBA.

10.0 Manuals & Documentation

- 10.1 A full set of manuals explaining machine operation and PLC operator controls shall be provided.
- 10.2 A hard copy of the PLC ladder diagram shall be available at no additional charge.

- 10.3 A complete list of purchased parts including original part numbers, where the parts were purchased, and the nearest local distributor where the parts can be purchased shall be provided as a standard part of the manual. All purchased machine components such as jets, valves, PLC modules, pneumatic system parts, etc., shall be entirely non-proprietary and available for purchase freely and widely through normal industrial supply outlets.

20.0 Machine Operation

- 20.1 Bottles or other items to be cleaned shall be placed in the integral holder and rolled into the cabinet by the operator. The door shall be closed and the pre-programmed treatment cycle phase options chosen. Treatment shall commence and continue automatically to the end of the cycle. Once the treatment cycle is complete, the operator shall open the door and remove the cleaned items.
- 20.2 All cycle phase selections and other cycle options shall be available for selection from the Interface Screen, with optional supervisory PIN screens preserving security of standard cycle phases.
- 20.3 Standard cycle phases shall include at least the following general treatment options:

20.3.1 First Wash – Detergent shall be added to the water retained in the sump from the last rinse, and shall be re-used to remove heavy soil. Treatment shall be under pressure from the main treatment pump. At the end of this cycle phase, used treatment water shall be sent to drain.

20.3.2 Second Wash - Fresh hot water from the customer's supply shall be used to fill the sump, with detergent being introduced by dispenser. When the sump is full, heating shall begin in order to bring the wash solution up to the desired temperature. The wash treatment shall be under pressure from the main treatment pump. At the end of the wash cycle, detergent solution shall be flushed to drain.

20.3.3 First Rinse - Fresh hot water from the customer's hot water supply shall fill the sump, and shall be circulated through the jet system by the main treatment pump. The heating system shall be active during this cycle, maintaining the temperature of the rinse water. At completion, the used water shall be conducted to drain.

20.3.4 Second Rinse – Same as the first.

20.3.5 Final Rinse – Same as the first, except that at the election of the operator, this treatment cycle phase shall utilize the temperature guarantee circuitry. In this case, timing of the cycle phase shall not begin until the rinse water is recirculating at the setpoint temperature, thus guaranteeing appropriate sanitation. At completion, this rinse water shall be retained in the sump for use as pre-wash water for the next load.

30.0 Details of Construction

30.1 General

30.1.1 All wetted parts shall be of Type 304 Stainless Steel or appropriate polymeric materials.

30.1.2 All electrical assemblies, piping assemblies and mechanical apparatus shall be designed for, and be appropriate for use in, a high temperature sanitary wash-down environment classed as

designated above. All components shall be selected for their ability to perform for long periods of time in the adverse and high production environment of the laboratory washroom. Each purchased part and each engineered part and sub-assembly shall be scrutinized and all specific design decisions shall be made in the light of these basic criteria.

30.1.3 All purchased components shall be un-modified, off-of-the-shelf items available to the owner in his locality, should he need them.

30.1.4 Original manufacturers' part numbers and descriptive information for all purchased parts shall be made an integral part of the service manual information provided at time of installation. Every effort shall be made throughout the life of the machine to assist the owner in acquiring any parts needed.

- 30.2 The door of the washer shall be of double-walled stainless steel construction, filled with insulation. Door safety switches shall ensure that the machine cannot operate with the door open.
- 30.3 A stainless steel bottle holder trolley/spray jet trolley shall be supplied to support all loads.
- 30.4 The recirculating sump shall be equipped with a stainless steel steam coil, fully welded in accordance with ASME Section VIII and fabricated from Stainless Steel materials designed to carry steam at the rated pressures. No structural-style parts will be acceptable. The coil shall be easily removed for cleaning or maintenance. Under no circumstances shall the coil be welded into place.
- 30.5 Temperature shall be controlled directly by the PLC. Temperature sensor(s) shall be Type J Thermocouples, connected directly to the analog inputs of the PLC.
- 30.6 Steam controls shall be included for 30-80 psi dry steam. No diaphragm-type steam valves shall be acceptable. Condensate trap(s) shall be disc/thermodynamic type only.
- 30.7 Water level shall be maintained by an electronic level control with removable and easily cleaned probes. Probes shall be removable for cleaning with no tools required, such as with a sanitary-type clamp fitting.
- 30.8 The treatment pump shall be a horizontal, close coupled, Stainless Steel pump. Mechanical seals shall be carbon ceramic and Stainless Steel. No vertical or seal-less pumps shall be acceptable.
- 30.10 Washer programmable control shall provided by a modular industrial-type programmable logic controller, programmed in ladder logic and replaceable and programmable by the customer's own personnel if necessary. No proprietary control will be acceptable. All wiring and control shall be per National Electric Code and UL 508 and all devices utilized shall be UL, NEMA and/or IEC-rated. All operator controls or devices shall be of standard industrial NEMA-rated types, chosen for their ability to operate over the long haul in the tough and corrosive environment of the washroom. Control assembly shall be UL Listed, produced in a UL Panel Shop.
- 30.11 A stainless steel stacked plate heat exchanger shall be provided to raise the temperature of incoming water to 180F. All effluent shall be cooled below 140F before gravity drain.

30.11 MATERIALS OF CONSTRUCTION

Item	Material
base and sump	14 gauge, 304 SS - #3 finish
door panels	16 gauge, 304 SS - #3 finish
side and top panels	14 gauge, 304 SS - #3 finish
recirculating piping	304 SS
spray header and jets	304 SS
recirculating pump housing and impeller	Stainless Steel
recirculating valves	Stainless Steel
external water piping	copper
steam coils	Sch 40. 304 SS - #2B finish
internal steam piping	stainless steel
external steam piping	schedule 40 black iron
temperature booster	304 SS
drain piping	304 SS
barrier walls and trim panels	20 gauge, 304 SS - #3 finish

60.0 Utility Requirements

BW1020	
Electrical	3ph, 60hz, 5 HP
Steam	1 ½ FPT 30-80 PSI 350#/Hr Max Flow 250#/Hr Avg Flow
Condensate	1 FPT
Hot Water	1 FPT, 35 PSI 120 Deg. F. 51 Gal/Load Max
Cold Water	¾" FPT, 35 PSI
Drain	1 ½ FPT 140 Deg. F. Max 60 GPM Max
Exhaust	6" Dia. 200 SCFM 180 Deg Saturated
Compressed Air	1/2 FPT, 80 PSI 4 SCFM

60.1 Notes to Utilities Table

- 60.1.1 A disconnect switch shall be installed by others than SMC in accordance with all NEC and local electrical codes.
- 60.1.2 Condensate shall be connected by others than SMC to a non-pressurized gravity main. The maximum condensate lift shall not exceed 15'.
- 60.1.3 Steam pressure shall not exceed 80 psi. Factory shall be consulted for steam pressures below 30 psi dynamic.
- 60.1.4 Hot water temperatures of less than 120 degrees F may impact treatment cycle times. Factory shall be consulted for recommendations if 120 degree F water is not available.
- 60.1.6 Drain shall be installed by others than SMC such that there is an air gap between the discharge point and the floor drain, or otherwise in strict accordance with local plumbing codes.
- 60.1.7 Exhaust connection shall be made by others than SMC using non-corroding materials, and all ductwork shall be sealed and pitched towards the machine. Any low points shall have individual drains lines installed. Effluent vapor is 180 degree F, 100% saturated air.

70.0 Additional Engineering Information

	BW1020
Shipping Wgt.	2100#
Dynamic Wgt. as Installed	1700#
Bottle Capacity	Varies w/bottle size
Sump Capacity	17 Gals.
Heat Radiation	
(typ. door end)	2000 btu/hr
(typ. svce. side)	4000 btu/hr
(typ. blank side)	1000 btu/hr