

APPLICATION

Two configurations are available for sterilization of certain materials used in hospitals or laboratories.

- Gravity - designed for sterilization of liquids, in flasks with vented closures, at 250°F (121°C), and isolate- and moisture-stabile goods at 270°F (132°C).
- **Prevacuum** - designed for efficient, high-volume processing of heat- and moisture-stabile materials, such as fabrics, wrapped hard goods, glassware or animal bedding at 270°F (132°C) through prevacuum cycle. Prevacuum unit will also run gravity-type cycles.

Gravity units operate by the gravity downward displacement air removal principle. **Prevacuum** sterilizers have a chamber evacuation system for high-speed, high-volume sterilization. Both types use steam-under-pressure as the sterilizing agent. Sterilizers are furnished ready for connection to building steam supply.

DESCRIPTION

Amsco Remanufactured Sterilizers consist of new piping and control components, and a completely renovated pressure chamber and door(s). Sterilizers feature an advanced microcomputer control system providing latest standard for cycle setup, selection and monitoring. Once settings are made and cycle is started, microcomputers accurately monitor and control system operations. Control column includes an easy-to-read vacuum fluorescent display and an integral thermal printer.

Interior Chamber Dimensions

Both Gravity and Prevacuum units come in three sizes, with interior dimensions of:

- 24 x 36 x 36 inches (610 x 914 x914 mm)
- 24 x 36 x 48 inches (610 x 914 x1219 mm)
- 24 x 36 x 60 inches (610 x 914 x1524 mm)



(Typical only - some details may vary.)

Offering includes choice of single-door (cabinet or recessed) or double-door* (recessed one or two walls) units.

**48" and 60" long Sterilizers only.*

The Selections Checked Below Apply To This Equipment

TYPE/SIZE

- 3031: Gravity, 24 x 36 x 36"
- 3041: Gravity, 24 x 36 x 48"
- 3051: Gravity, 24 x 36 x 60"
- 3033: Prevacuum, 24 x 36 x 36"
- 3043: Prevacuum, 24 x 36 x 48"
- 3053: Prevacuum, 24 x 36 x 60"

DOORS

- Single
- Double
- Door Hinge (Single Door)**
- On Right Side
- On Left Side
- Door Hinge (Double Door - Operating End First)**
- Right Side/Left Side
- Right Side/Right Side
- Left Side/Right Side
- Left Side/Left Side

SINGLE DOOR MOUNTING

- For Recessing
- Cabinet Enclosed

DOUBLE DOOR MOUNTING

- For Recessing Through One Wall
- For Recessing Through Two Walls

MATERIAL HANDLING ACCESSORIES*

- Rack and Shelves (36" and 48" Long Only)
- Surgical Instrument Trays
- Loading Car and Carriage

ACCESSORY

- Seismic Tie-Down Kit

REMOTE MONITORING

- ProConnect® Response Center (Remote Monitoring, Priority Technical Support, Customer Care Center Access, Equipment Performance Reports)

**See separate product literature for details.*

Item _____

Location(s) _____

STANDARDS

Each sterilizer meets applicable requirements of the following listings and standards, and carries the appropriate symbols:

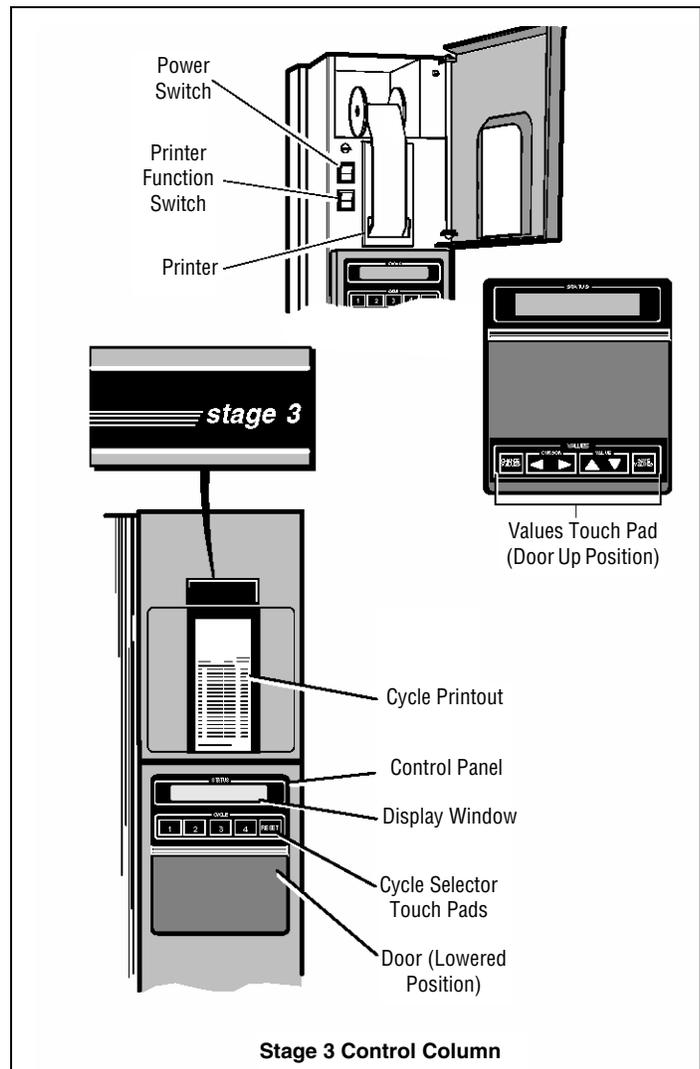
- **UL61010-1 Electrical Equipment for Measurement, Control and Laboratory Use: Part 1**
- **CAN/CSA C22.2 No. 61010-1 Electrical Equipment for Measurement, Control and Laboratory Use: Part 1**
- **UL61010-A-2-041 Electrical Equipment for Laboratory Use: Part 2**
- **CAN/CSA C22.2 No 1010-2-041 Electrical Equipment for Laboratory Use: Part 2**
- **ASME Code, Section VIII, Division 1** for unfired pressure vessels. The pressure vessel is so stamped; ASME Form R1 is furnished. Shell and door are designed for maximum allowable working pressure of 40 psig (275.8 kPa).
- **Seismic Pre-approval.**

CONTROL SYSTEM

Design Features

Stage 3 Control System monitors and controls all sterilizer operations and functions. Cycle progresses automatically through conditioning, sterilizing, fast exhaust and drying phases. Control indicates cycle completion visually and also audibly for 90 seconds. At end of cycle, timers reset to the previously selected values, eliminating the need to reset values between repeated cycles. Timers reset if sterilizer temperature drops 2°F (1.1°C) below setpoint. A vertical column, mounted on side opposite door hinge, houses the controls. Side-mounting makes controls easy to access and removes them from exposure to the continuous heat, vapor and condensate resulting from the sterilization process. Salient features include:

1. **Hinged door at the top of control column** which provides access to:
 - **Control Power Switch** - controls power to the sterilizer and sterilizer control.
 - **Main Power Disconnect Switch** - located behind the lower access panel, which controls power to the sterilizer.
 - **Printer Function Switch** - controls two printer functions:
 - » **Duplicate Print** - pressing top of printer switch generates a complete duplicate printout of either the last completed cycle (when unit is not in cycle), or the current cycle phase and conditions (when unit is in cycle). First line of duplicate printout always indicates DUPLICATE PRINT.
 - » **Print Values** - pressing bottom of printer switch generates a printout of all currently set cycles and cycle values.
 - **Thermal Printer** - provides an easy-to-read printed record of all pertinent cycle data. The operator can easily verify that the cycle parameters are being met. Computer-generated printouts include date, daily cycle number, starting time of each cycle, temperature selected, key transition points in cycle and any deviations which might jeopardize sterilization process. Printer take-up spool automatically stores an entire roll of paper, providing cycle records which can be saved for future reference.



NOTE: Paper should be stored at less than 77°F (25°C) and 65% relative humidity. Paper stored at these conditions will last for at least five years.

2. **Control Panel** with display window and two rows of touch pads. Touchpads are accessed by raising or lowering a sliding door, preventing inadvertent cycle starts or changes.
 - **Display Window** - features a 2-line x 20-character vacuum fluorescent display. It shows sterilizer status, time (time of day, sterilize time and dry time), temperature, pressure, warnings and instructional messages. Display also indicates any abnormal conditions that may exist either when in the READY mode or when a cycle is in progress. All messages are complete readouts with no codes to be cross-referenced.
 - **Values Touch Pads** - modify cycle values. Sterilize Time and Temperature and Dry Time values for each cycle can be modified using Change Values touch pads. Cycle values are locked in and cannot be changed once cycle is started.
 - **Cycle Selector Touch Pads** - (Gravity and Liquids for Gravity sterilizers; and Gravity, Liquids and Prevac for Prevacuum sterilizers) start previously programmed cycles. Operator must press pad twice to initiate a cycle, minimizing chances of incorrect cycle selection. Cycle

does not start unless chamber door is locked. Display shows selected cycle and sterilizer conditions immediately when cycle begins.

- **Reset Touch Pad** - resets control in case incorrect cycle is started.
 - **Non-Operating End (NOE) Controls** - equipped on double-door sterilizers only, include Cycle Selector Touch Pads, by which previously programmed cycles can be selected and initiated, RESET Touch Pad and a Display Window. Display window is the same as the operating-end display window and concurrently shows the same messages.
 - All sterilizers provide a service technician-initiated **Field Self Test mode** for expedited troubleshooting in the event of a malfunction.
3. **Touch Pad-Selectable Features/ Functions** - control system allows selection of additional features through the control panel. Some features, as noted, can only be adjusted by a trained technician.
- **Printer Output and Display Window Information** - layout allows selection of displays and printouts in English, French or Spanish (using standard English characters).
 - **Temperature Display and Printout Units** - allows selection of either Fahrenheit (°F) or Celsius (°C). Temperature is set, controlled and displayed to the nearest degree. (Selection can be changed only by a trained service technician.)
 - **Pressure/Vacuum Display and Printout Units** - allows selection of either psig/in Hg or bars (a metric measurement for scientific use). (Selection can be changed only by a trained service technician.)
 - **Date and Time** - permits change of date and time.

TECHNICAL DATA

Control system consists of microcomputer control boards and peripheral function circuit boards, located in control housing behind control column front panel.

An **internal battery** backs up all cycle memory. If there is a power failure during a cycle, the battery back-up system ensures that (1) proper cycle completion can still occur and (2) cycle memory will be retained. When power is lost, the cycle is held in phase until power is restored, thus exceeding the minimum government specification of one minute. Once power returns, the event is recorded on the printout and the cycle resumes or restarts, depending on what phase the cycle was in at the time of power loss. Even if the RAM battery should fail, factory default values will be preserved in the control's main EPROM chip.

Quartz crystals maintain precision timing. A resistive thermal detector (RTD) senses temperature and a strain-gauge type pressure transducer senses pressure. These signals, converted into electrical impulses, provide accurate control inputs and readouts throughout the entire cycle. Individual temperature and pressure calibrations can be made by a trained service technician. Temperature and/or pressure-sensor failure sounds an alarm, and a message is printed.

Printer Board has a 24-column digital alphanumeric printer which produces characters within a five-by-seven dot matrix on 2-1/4" wide, single-ply thermal paper. Printer is controlled by a dedicated microcomputer. Print speed is approximately 48 lines per minute. Paper tape exits from an opening flush with the surface of the control panel and it is taken up automatically by an idler spool above the main printer assembly. An entire roll of paper can be stored on the take-up spool. Data is automatically printed at the beginning and end of each cycle and at all transition points. Five paper tape rolls are furnished with each unit. Sterilizer operates on 120 VAC, 50/60Hz, single-phase electrical **power service**. Internal power supply provides regulated voltage levels for display, printer, take-up motor, analog circuits, and digital circuits. Solenoid valves operate on 120 VAC.

CONSTRUCTION

Jacket and Chamber Assembly

Nickel alloy door frames support and conceal ends of door-holding arms when doors are locked, presenting a smooth surface for door gasket contact.

Hot-rolled carbon-steel shells, welded one within the other, form the sterilizer steam jacket. The inside of the chamber shell is nickel clad, 0.025-inch (0.63 mm) thick (nominal). A chamber test penetration (plugged) is provided.

Glass-fiber blanket insulation on outside of chamber assembly is 1" (25 mm) thick (nominal), and is double-faced with aluminum foil. It is held in place by pressure-sensitive tape, aluminum straps and clips. Sterilizer jacket is painted prior to being insulated. Steam-supply opening inside chamber is shielded by a baffle.

Chamber Door(s)

Door is nickel-clad (0.025 inch [0.63mm] thick, nominal), hot-rolled carbon steel. Door is manually operated. Its stainless-steel, bearing-mounted hinges will be on side of chamber specified. Hinges are adjustable for accurate gasket alignment. Radial arms, actuated by rotating a low-heat-conducting hand wheel, exert an even pressure on the silicone-rubber sealing gasket.

CHARGE	T= 78 F	SLOW	T=1848 F
	P = 0 PSIG		P = 0 PSIG
STERILIZE	T= 272 F	WARNING	T= 118 F
2:43	P = 0 PSIG	HOT LIQUIDS	P = 0 PSIG
FAST	T= 221 F	INVALID VALUE SET	
EXHAUST	P = 1 PSIG	SEE OPERATORS MANUAL	

Control Monitoring and Communication

A stainless-steel, sound-deadening cover conceals radial arms and exterior parts. Microswitches prevent inadvertent start of cycle before radial arms are engaged; pressure lock(s) keep door(s) from being opened while chamber is pressurized during cycle. Door(s) may be tightened but not opened while pressure is in chamber.

Vacuum System (Prevacuum Sterilizers Only)

Prevacuum - A series of microcomputer-controlled and monitored vacuum/pressure pulses effectively condition loads of various size and density - reducing total sterilization time. Factory setting consists of three pressure pulses and four evacuations. Evacuation system includes a condenser and water ejector.

Post-vacuum (Drying) - Following the exposure phase, chamber is exhausted and evacuation continues throughout the drying phase. At conclusion of drying phase, filtered air relieves the vacuum. Air filter is bacteria retentive.

Chamber Drain System

Drain system is designed to prevent pollutants from entering into the water-supply system and sterilizer. Steam-condensate system with water saver converts steam to condensate and disposes condensate to waste. Water flow is regulated consistent with the amount of steam discharged. Water supply shutoff valve is behind service access door. A constant steam bleed across a temperature-sensing element (RTD) in the chamber drain line provides improved air elimination and more accurate temperature sensing.

Drying System (Gravity Sterilizers Only)

A steam ejector reduces chamber pressure during drying phase and draws air into chamber through a bacteria-retentive filter. This filtered air entrains and conducts odors and vapors from chamber to drain. Steam to ejector is microcomputer controlled.

Steam Source

Sterilizers are piped, valved and trapped to receive steam delivered at 50 to 80 psig (344.7 to 551.6 kPa). Sterilizer service lines terminate at fittings for connection to building service lines. Sterilizer steam supply line includes a strainer, shutoff and internal pressure regulator. Jacket condensate line includes a strainer, trap, and check valve. Shutoff valve, jacket pressure and chamber pressure/vacuum gauges are mounted in the valve panel, behind the upper access door. Scales are graduated in both English and metric.

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=====
===== P R E V U A C =====
=====
CYCLE START AT 7:31:42A
                ON 1/28/92

CYCLE COUNT    00005
OPERATOR       -----
STERILIZER     -----

STER TEMP = 270.0F
CONTROL TEMP = 273.0F
STER TIME = 4 MIN
DRY TIME = 5 MIN

                U=inhg
- TIME      T=F  P=psig
-----
C 7:31:42A  147.0  1P
C 7:32:41A  251.5  24P
C 7:34:09A  153.2  24U
C 7:34:36A  250.9  26P
C 7:35:53A  171.4  26U
C 7:36:29A  255.7  26P
C 7:37:39A  161.4  27U
C 7:39:04A  262.5  26P
C 7:39:23A  151.5  27U
S 7:40:00A  270.1  32P
S 7:42:00A  273.2  30P
E 7:43:59A  273.2  30P
E 7:44:17A  235.4  3P
E 7:49:17A  161.3  27U
Z 7:49:56A  160.8  1U
                
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LOAD            012001

TEMP MAX=274.3F
TEMP MIN=270.1F

CONDITION = 8:18
STERILIZE = 4:00
EXHAUST = 5:57
TOTAL CYCLE =19:15

=====
=  READY TO UNLOAD  =
=====

* NOT READY    7:50:27A
DOOR UNLOCKED
                
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Typical Printout, Prevacuum Cycle

Other Components

The following are furnished to provide a complete working unit, ready for (but not including) connection to the building utility service lines.

- **Solenoid Valves** to simplify sterilizer piping. Valves are placed where needed and can be serviced individually.
- **Manual Valves** are bronze body, ball type with stainless-steel ball and stem. Seat and seal are constructed of reinforced TFE. They are pressure rated at 125 psig (861.9 kPa) for saturated steam. Valve handles are low-heat conducting and easily replaceable.
- **Steam Pressure Regulator** operates on supply pressure of 50 to 80psig (344.7 to 551.6 kPa). Secondary pressure is adjustable and controlled by a phosphor-bronze, spring loaded bellows. Adjustable stops are factory set for sterilizer operation at either 253° or 273°F (122° or 134°C). Pressure regulator can be adjusted by a technician to run cycles at any temperature between 212° to 280°F (100° to 138°C).
- **Thermostatic Steam Traps** are pressure and temperature compensated and have renewable monel bellows with matched stainless-steel plunger and seat.

All **piping and electrical connections terminate** within the confines of the sterilizer. Piping used to support other components is rigid brass.

Water Sensing System is designed to shut down steam supply to the sterilizer if water accumulation is detected in the chamber.

ProConnect® Response Center - Minimize response time and minimize unscheduled downtime on your equipment. Secure, internet-based, 24/7 remote monitoring enables both Predictive

	Chamber Sizes – inches (mm)		
	24 x 36 x 36" (610 x 914 x 914 mm)	24 x 36 x 48" (610 x 914 x 1219 mm)	24 x 36 x 60" (610 x 914 x 1524 mm)
G	49-1/4" (1251 mm)	62-1/2" (1587 mm)	73-1/2" (1867 mm)
H^a	65-5/16" (1608 mm)	74-3/16" (1884 mm)	89-3/16" (2265 mm)
J	N/A	61-3/4" (1568 mm)	76" (1930 mm)
K^a	N/A	130-1/4" (3308 mm)	144-1/2" (3670 mm)

a. Minimum Service Clearance

Maintenance as well as instant alert to STERIS when there is an equipment alarm. Also included are priority technical support, online parts ordering, equipment performance dashboards and scheduling service at eservice.steris.com.

ACCESSORIES

Material handling accessories available include racks with shelves, instrument trays and loading cars - all constructed of nickel alloy; with carriages of painted steel. See separate product literature for details.

INSTALLATION

Sterilizers are arranged for mounting as either cabinet-enclosed or recessed, as specified. Each sterilizer is equipped with height adjustable, steel floor stand with cadmium-plated pads and leveling screws. Sterilizer sub-frame has a synthetic-rubber gasket to ensure tight fit of cabinet panels to each other (freestanding units), or front panel to wall partition (recessed units). Stainless-steel front panel has service access door and height-adjustable kickplate. On freestanding units, stainless-steel side panels and a louvered top panel enclose the sterilizer body and piping. Casters and lifting lugs facilitate transporting and positioning the sterilizer. A Seismic Tie-down Kit, if required, is available for seismic installation of all medium Remanufactured Stage 3 sterilizers.

PREVENTIVE MAINTENANCE

A global network of skilled service specialists can provide periodic inspections, and adjustments to assure low-cost peak performance. STERIS representatives can provide information regarding Annual Maintenance Agreements.

NOTES

1. Pipe sizes shown indicate terminal outlets only. Building service lines, provided by others, must supply the specified pressures and flow rates.
2. Disconnect switches (with OFF position lockout; by others) should be installed in electric supply lines near the equipment.
3. Access to the recessed area from the control end of the sterilizer is recommended.
4. Clearances shown are minimal for installing and servicing the equipment.
5. Clearances at each end of sterilizer, for loading purposes, should equal:
 - Length of sterilizer plus 12 inches (305 mm), if shelves will be used.
 - Twice the length of sterilizer, if loading car and carriage will be used.
6. Right-side door-swing clearances are shown. Clearances for left-side door swing are identical.
7. Floor drain should be provided within confines of sterilizer framework.

UTILITY REQUIREMENTS

Cold Water

1" NPT; 80°F (26.7°C) maximum; recommended total hardness should be 3-8 grains, specific resistance not to exceed 26,000 ohms/cm (conductivity of not less than 38.5 micromhos), with pH maintained between 6.8 to 7.5. Total dissolved solids should not exceed 500 ppm and alkalinity (bicarbonate only) should not exceed 250 ppm as calcium carbonate.

Gravity Sterilizers - 20 to 50 psig (137.9 to 344.7 kPa) dynamic.

Prevacuum Sterilizers - 30 to 50 psig (206.8 to 344.7 kPa) dynamic.

Drain

2" ODT drain terminal. (Floor drain capacity must handle peak water consumption.)

Electricity

120 V, 50/60 Hz, 1 A.

Steam Supply

1" NPT; 50 to 80 psig (344.7 to 551.6 kPa) dynamic; condensate free, 97 to 100% saturated vapor.

Telecommunications Requirements for ProConnect® Response Center

- An active wired or wireless TCP/IP network, 10/100BaseT Ethernet connection at each piece of connected equipment, Internet access and an IP address on the facility network.
- 5 GB of available hard drive space to run the service agent. Can be installed on:
 - » Dedicated PC running Windows XP with 2.8GHz processor, 512MB of RAM
 - » Virtual Machine
 - » Server
- Local STERIS login at the PC with a username of STERIS and the password should be ProConnect (STERIS Customer Number).
- Ethernet cable to connect each piece of STERIS equipment and the dedicated PC to the facility network.

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

The base language of this document is ENGLISH. Any translations must be made from the base language document.

Refer to the Following Equipment Drawings for Installation Details

Equipment Drawing Number	Equipment Drawing Title
65435-517	Eagle 3000 Series Vac or Gravity Sterilizer Single Door Cabinet Steam Heat
65435-518	Eagle 3000 Sterilizer Vacamatic or Gravity Single Door Recessed One Wall Steam Heat
65435-519	Eagle 3000 Sterilizer Vacamatic or Gravity Double Door Recessed One Wall Steam Heat
65435-520	Eagle 3000 Sterilizer Vacamatic or Gravity Double Door Recessed Two Wall Steam Heat

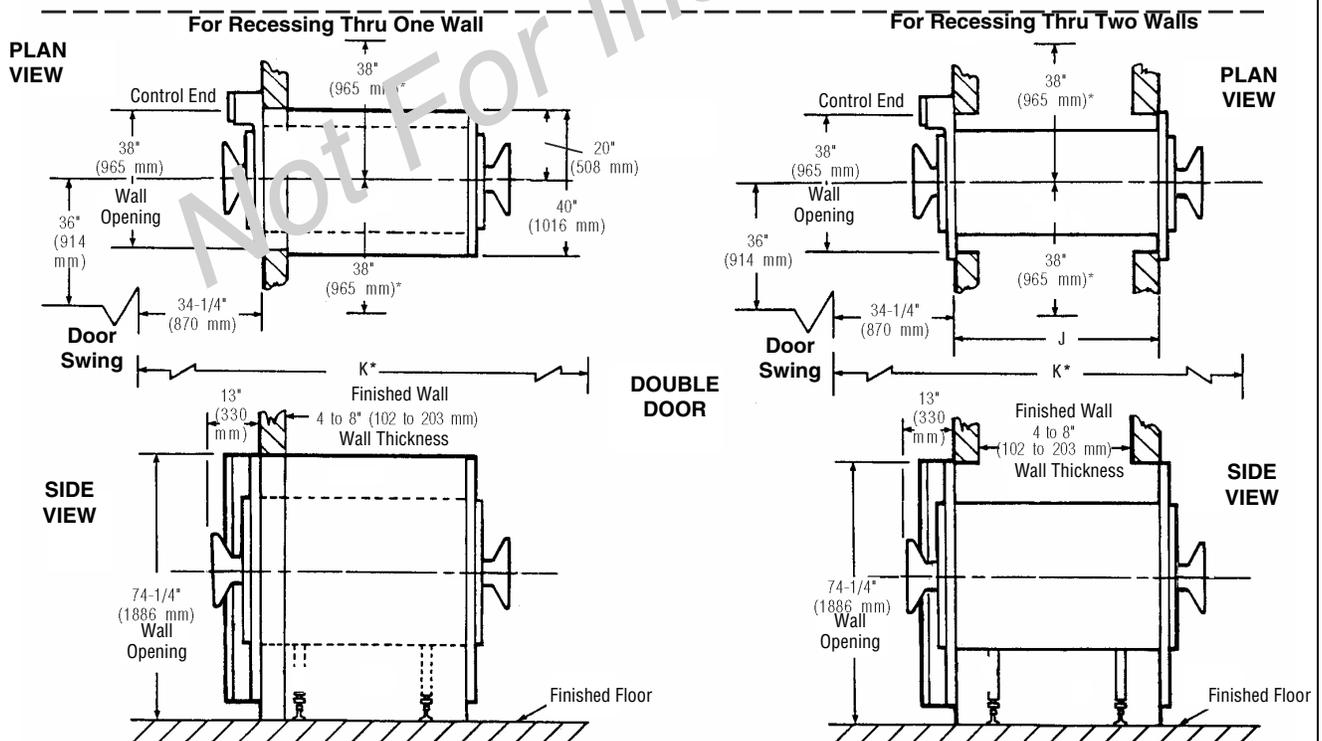
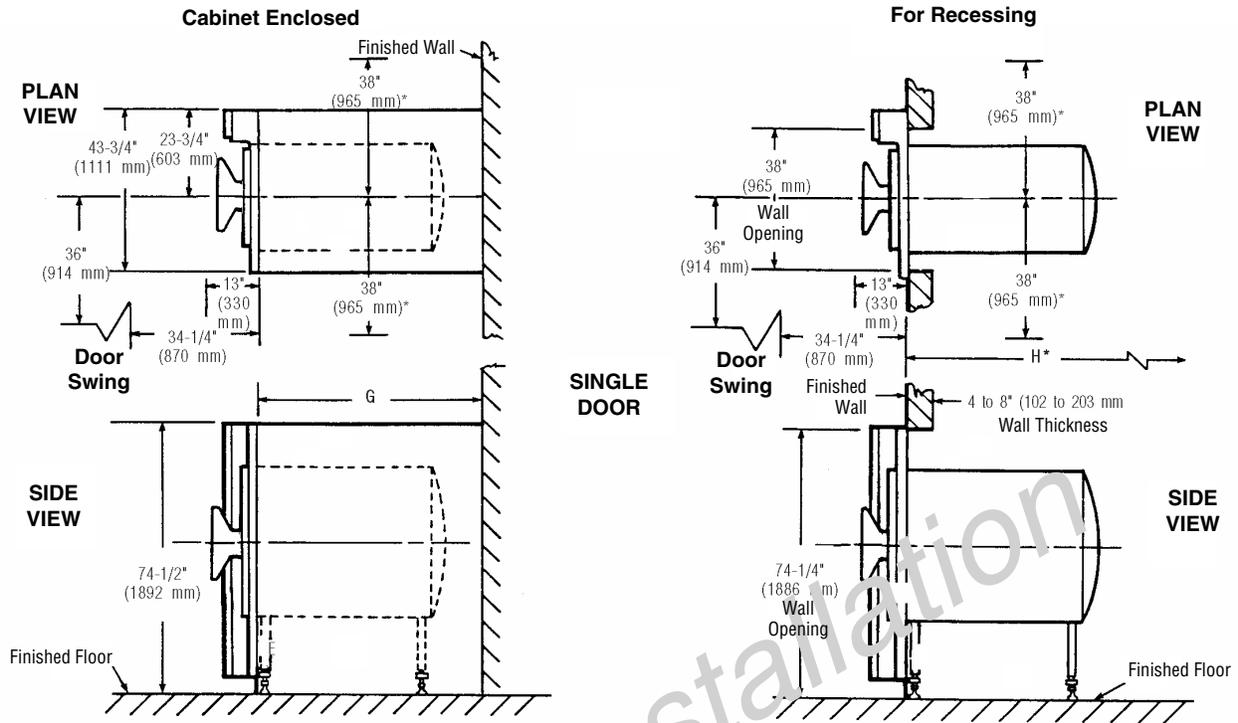


Table 1-1. Engineering Data

Size inches (mm)	Heat Loss									Utility Consumption			
	Type	Max. Operating Weight lb (kg)	Single Door			Double Door		Double Door Recessed Two Walls		Water		Steam	
			Cabinet Enclosed	Recessed		Recessed One Wall		Recessed Two Walls		Peak gpm (lpm) Avg.	Avg. gph (lph)	Peak lb/hr (kg/hr)	Avg. lb/hr (kg/hr)
				To Room	Front of Wall	Back of Wall	Front of Wall	Back of Wall	At Each End-				
24 x 36 x 36 (610 x 914 x 914)	Gravity	3800 (1720)	12,500	5000	7500	N/A	N/A	N/A	N/A	15 (57)	280 (1060)	112 (51)	112 (51)
	Prevacuum	3800 (1720)	12,550	5000	7500	N/A	N/A	N/A	N/A	15 (57)	317 (1200)	190 (86)	112 (51)
24 x 36 x 48 (610 x 914 x 1219)	Gravity	4200 (1901)	14,650	5000	9600	5000	13,800	5000	8800	15 (57)	284 (1075)	148 (67)	148 (67)
	Prevacuum	4200 (1901)	14,650	5000	9600	5000	13,800	5000	8800	15 (57)	320 (1216)	255 (116)	148 (67)
24 x 36 x 60 (610 x 914 x 1524)	Gravity	4700 (2127)	16,800	5000	11,800	5000	16,500	5000	11,500	15 (57)	288 (1090)	185 (84)	185 (84)
	Prevacuum	4700 (2127)	16,800	5000	11,800	5000	16,500	5000	11,500	15 (57)	324 (57)	335 (152)	185 (84)

For Further Information, contact:

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