



Product Guide Models 200 through 1000 cGMP Pharmaceutical Sterilizers

Overview

ETC pharmaceutical sterilizers are precision engineered and manufactured for regulatory compliance, high performance, ease of use, reliability in service, extended life and maximum value. They are PLC controlled with an advanced user interface, providing flexibility of cycle programming and visually intuitive cycle selection. Systems are predisposed for 21 CFR Part 11 electronic records and signatures compliance.

The system is configured for immediate sensor response for time temperature and pressure set-point management and maintains a real time record of all critical cycle parameters and phases including cycle alarms in the event of utility loss or instrumentation monitoring events. The sterilizer is designed for compliance with current cGMP regulations and GAMP5 automation requirements, translating to efficiency in performance, commissioning and validation. The units are configured for use in pass-through or single sided operation and are available with a wide variety of accessory components for product load management, and clean or pure steam input to the equipment.

Application

The units are designed for sterilization cycles in the range of 105° C to 138° C (221° F to 280° F) at standard operating pressures. A variety of pre-configured cycles are supplied to handle product related hard goods such as glassware, stoppers caps, syringes and carboys as well as process related components such as filters, pumps, dispensing equipment and the like, either exposed in material baskets or in sealed packages. Soft goods, filled pouches, solutions in sealed containers, pre-filled syringes and blister packages are all capable of sterilization using on board cycles that have been developed for these special applications. The unit is further capable of air over pressure cycles, post-sterilization dehydration and programmed cooling for heat labile solutions products as well as process air filter sterilization and integrity test.

Chamber Construction

The vessel and door(s) interior as well as all nozzle ports in the vessel proper is comprised of ASME/ASTM Type 316L austenitic stainless steel. All design, construction, test, inspection and certification is in accordance with the ASME Section VIII Div. 1 pressure vessel code for a coincident shell and jacket pressure of 40 PSIG at 300°F (149°C) and full vacuum (50 PSIG optional). All vessels are registered with the National Board (NB) of boiler and pressure vessels for archival validation and periodic regulatory monitoring purposes.

All interior surfaces are polished to an Ra-20 micro-inch finish and passivated to ASTM A380 standards. The exterior welded jacket sections on the vessel and door(s) are T304L stainless steel (T316L optional). Vessel is complete with centrally positioned dual drain(s) complete with drain screens. All nozzles positioned in sidewalls of vessel are sloped 10° for condensate drainage. All nozzles are sized to comply with CFR part 212 L/d ratios. Unit is complete with (1) 1-1/2" or 2" validation port dependant on vessel size.

The exterior of the vessel and jacket sections are coated with a "high build" 8 to 10 mil chloride barrier coating and then insulated using a 2" minimum thickness high density mineral wool batting with 18 Ga embossed aluminum or optionally available 304 Stainless Steel sheet overall on vessel proper and an 18Ga 304 polished stainless steel on the door(s). The maximum temperature of all externally insulated areas is 105°F (40°C)



Fig 1

Vessel shown in welding stage with "U" channel jacket construction and orbitally welded process inlet piping.



Fig 2
24" x 36" x 48" Dbl Door HSL (load side)
HSR (unload Side)

Doors

Several door configurations are available and are equipped with the following safety and functional features.

All door types are configured for maximum process and operator safety with leading edge safety tape switches that stops and reverses door movement in the event of load or operator bodily interference. The tactile sensitivity level is fixed at 0.5 lbs force to activate the reverse-travel feature of the door. Sliding doors employ a dynamic FDA rated silicone "O-ring" seal, which slides forward to seal using sterile filtered air and retracted backward using vacuum to unseal. Pressure monitoring for seal displacement assures a positive interlock in order for steam introduction to the chamber and disallowing premature unlocking of the door.

Roller lock hinged doors employ a static FDA rated silicone "P-ring" seal that is compressed to effect a seal through the roller lock energy transfer action. Hinged doors will open 105° to allow full access to vessel opening. All doors are complete with interlocks preventing premature activation of door locks until the door is in the required registration position. When locks are activated, the system is advanced to allow steam input or exhaust using a position sensor for lock/unlock positions. Doors are also interlocked to prevent operation prior to adequate steam exhaust and evacuation of gasket to a fully retracted position.

All doors are complete with a sanitary analog compound pressure dial gages to read and display internal vessel pressure to the operator. The gage is attached directly to the door plate using a Tri-Clamp fitting attachment with minimal nozzle length to assure adequate steam penetration up to the gage diaphragm.

Equipment Frame

The chamber is mounted on a structural steel frame or multiple pedestals depending on unit size and is equipped with leveling feet to position and level the chamber during installation.

The equipment skid containing the vacuum pump, heat exchange, instrumentation and valves is also a structural steel frame and positioned to the side of the vessel.

On units that have the equipment positioned above the chamber (VSD units), the frame is bolted to the upper section of the vessel exterior.



Piping

Process Steam

All incoming and outgoing steam / condensate piping is manufactured of ASTM A270 T316L stainless steel with a Ra-20 interior polish. All piping, where possible, is orbitally welded and any welded piping is inspected internally and fully documented for weld integrity and archival purposes.

Tri-Clamp fittings are used where necessary for filters, transducers, regulators and valves. All components are sanitary rated and provided with material traceability certifications.

Non Process Steam

All non-process steam inlet piping is manufactured from Copper or Brass since "House steam" produced from potable water is far less corrosive since the ion level is high enough to preclude "ionic absorption" from surrounding piping materials. If pure steam or clean steam will be used for the jacket sections of vessels, then consideration should be given to the piping materials.

ETC can provide optionally available stainless steel piping for all non-process piping including drain components. Consult with ETC's technical specialists in this instance.

Drain and Vacuum Piping

The system is complete with an effluent discharge temperature reduction system that captures the high temperature condensate discharging from the vessel drain and from the vacuum pump condensate discharge.

Condensate at near saturation temperatures of 212° F (100° C) is reduced to below most municipal code limits of 140°F (60°C). This is accomplished with either a direct injection of potable water, which is standard, or through an indirect chilled water heat exchange system which is optional available equipment.



Fig 3

Vessel shown in final polish and fit-up stage with drain screens and interior appurtenances

Utility Requirements

Electric:

Units equipped for high voltage and control voltage supply to a single central disconnect. Internal I/O control voltage is transformed down to 24VAC.

Standard primary voltage supply options include:

- 208/230V-60HZ-3PH—120VAC Control
- 460/480V-60HZ-3PH—120VAC Control

Optional voltages for location of installation are available

Pure Steam (with optional piping):

Dry saturated pure steam produced from DI or WFI, that is pyrogen free, possessing the proper PH, TOC, and conductivity levels should be used in the process vessel provided that the option for all 316L stainless process piping is taken. Supply water should meet all U.S. Pharmacopial (USP) requirements, should be regulated to between 50 and 80 PSIG and the mass flow rate should satisfy the requirements specified in Data Tables for the machine size selected.

Clean Steam:

Dry saturated clean steam produced from RO or USP water, that is particulate free, possessing the proper PH, TOC, and conductivity levels should be used in the process vessel. Supply water should meet all U.S. Pharmacopial (USP) requirements, should be

regulated to between 50 and 80 PSIG and the mass flow rate should satisfy the requirements specified in Data Tables for the machine size selected.

"Plant" Steam:

Clean dry saturated steam produced from non-potable water may be used in the external jacket section of the sterilizer to pre-heat and maintain vessel temperature. The supply should be regulated to between 40 and 50 PSIG and the mass flow rate should satisfy the requirements specified in Data Tables for the machine size selected.

Compressed Air (Process Grade, Dry, Pre-filtered, Non-Lubricated):

The sterilizer is complete with a sterile filter to filter the incoming vacuum break and gasket motive air media to .2µ prior to entrance to the vessel. The pre-filtration level of the incoming air should not exceed 10,000µ. Independent pressure regulators are also provided for the two circuits. The mass flow rate should satisfy the requirements specified in Data Tables for the machine size selected.

Compressed Air (Instrument Grade: Dry, Pre-Filtered, Non-Lubricated):

Compressed air is required to provide the motive energy to power valve operators and door transition cylinders. The supply requirement is 80 to 125 PSIG of -20°F dewpoint air at a flow rate of 3 to 5 ACFM intermittent. The pre-filtration level of the incoming air should not exceed 10,000µ.

Vacuum Pump

The system is complete with a water ring vacuum pump that is used for cycle pre-evacuation, purge evacuation and post evacuation duties. The pump is mounted with vibration isolation and is further complete with a pre-condenser to reduce the temperature of intake vapor to the pump.

The pump achieves vacuum level with the injection of non-potable or closed loop chilled water to effect a vacuum seal. The standard pump construction provides the housing in cast iron and the impeller in cast bronze material. Optional materials of construction up to all stainless steel are available. Refer to Utility specifications tables for water requirements.

Instrumentation

All components used for support function in the process are engineered for service reliability, ease of maintenance and calibration, accuracy in function and availability of replacement parts. All components are non-proprietary and available to the equipment user from industrial suppliers.

- ✓ Process Valves: Pneumatically operated diaphragm type sanitary valves.
- ✓ Solenoid Valves: Direct acting valves are selected for high frequency service extending the life of valve components between replacement.
- ✓ Motive Air Solenoid Valves: Sub-Plate "gang" mounted valves to provide actuation of process valves and are centrally mounted on the side of the equipment for ease of accessibility and maintenance.
- ✓ Process Transducers: Sanitary connection to assure absence of any biological entry to the internal environment.
- ✓ Thermocouples and RTD's for load and setpoint-control and Transducers for drain line level monitoring are selected for durability in high temperature service and accuracy. All RTD sensors are fast response, high accuracy type which are accurate to within ± 0.5° C of setpoint and are calibrated for absolute offset and gain at the calibration screen within the user interface.
 - Drain Temp Sensor RTD
 - Secondary Drain Temp Sensor RTD
 - Jacket Temp Sensor RTD
 - Vessel Load Probe(s) RTD
 - Drain Line High Level Conductivity
 - Chamber Pressure Transducer
 - Gasket Seal Motive Air/Vacuum Press. Switch



- ✓ Process Pressure Regulators: Diaphragm type utilizing a PTFE diaphragm for isolation of operable parts away from the process, eliminating particulate on the process side. Body is bar stock 316L stainless steel and is provided with orbital welded butt weld tube ends or TriClamp fittings on inlet and outlet.
- ✓ Sterile Filter: Sterilizable grade, Code 7, hydrophilic Multilayer 0.22 micron filters maximize process efficiency by providing high retention capacity and extended throughput with low pressure drops. Hydrophilic elements are contained inside a sterilizable canister that is positioned upstream of all isolation valves to assure sterility back and through the filter membrane. Element size and quantity is selected base on volumetric flow rate and maximum safe pressure differential during filter sterilization. Integrity test cycle configuration can be provided as optional equipment.
- ✓ Pressure Relief Valve / Rupture Disk Assembly: A sanitary rupture disk with a vacuum guard is positioned between the vessel and the pressure relief valve. The assembly is further complete with a pressure sensor to detect pressure against the PRV, which, indicates that the rupture disk has failed indicating an overpressure condition in the vessel. With the remote alarm option, an audible and visual alarm is activated on the touch screen panel when this occurs otherwise with standard configurations a visual indicator at the rupture disk displays indication of disk failure.
- ✓ Pressure Gages: Diaphragm type compound pressure gages are installed in door(s) to provide operators with a visual indication of pressure conditions inside the vessel. A separate pressure output is displayed on the touch screen panel.

Additional Mechanical Features

Wall Mounting Bezel

Single door units and one side of double door units come standard with a wall mounting bezel consisting of a sheet metal flange positioned around the chamber that attaches to the building wall.

Biological Seals

A composite biological sealing flange can be provided all around the chamber for the purpose of providing absolute environmental vapor barrier between the unload area and the machinery area of the sterilizer. A continuously welded flange is provided on the sterilizer and an elastomer membrane seal is positioned between this flange and a complimentary flange that is bolted to the building wall creating an air tight seal all around the system.

Double Door Interlock System

Double door systems incorporate an interlock arrangement to prevent non-sterile exposure of the clean room environment with the non-rated environmental air. Once the load side door is opened, the unit must undergo a sterilization before the unload door will open.

Industry Standards and Codes Compliance (All systems)

- ASME Code Section VIII, Div 1
- ASME BPE-2007
- Underwriters Laboratories UL 61010A
- Canadian Standards Association CSA C22.2
- ASTM
- NEC
- FDA 21 CFR Part 11, for Electronic Record Keeping and Electronic Signatures
- ISPE GAMP5 Good Automated Manufacturing Practice

European Standards Compliance (Systems destined for participating European locations requiring CE compliance and stamping)

- CE
- IEC
- EN

Optional Seismic Design Standards Compliance

(Systems destined for seismic Zone 4 locations)

- UBC
- IBC

Optional Mechanical Features and Accessories

50 PSIG Vessel design for products requiring higher temperature or dense products difficult to penetrate.

- Seismic Design: The system is optionally available with bolting attachment plates and design certifications for IBC Zone 4 locations requiring attachment of the machine to the sub floor.
- Optional Bezel: Double door units can be equipped with a duplicate bezel on the load side to isolate a dual wall architectural system.
- Single or Dual Biological Seal: Double door units can be equipped with a duplicate bioseal on the load side to isolate a dual wall architectural system providing three independent environmental zones.
- 316L Stainless steel Vessel Jackets
- 304 Stainless Steel outer insulation sheathing on vessel proper
- GAMP5 IQ, OQ, PQ documentation package
- Installation Supervision and training
- Turnkey Installation
- Validation execution services
- Closed loop vacuum pump for tower or chilled water system feed minimizing water requirements
- Clean Steam Generators
- Sterile Filter Options
 - Dual Vent filters
 - Filter Sterilization Cycle
 - Filter Integrity Test cycle by water intrusion method
- Condensate Management System for returning condensate to a generator, or building loop.
- Utility Management Monitoring System
 - Pressure Loss Alarms for:
 - Process Steam
 - Plant Steam
 - Non-Potable Water
 - Chilled water
 - Process Air
 - Instrument Air
- Product Load management hardware
 - Internal Load Carts w/ adjustable shelves
 - External Transfer Carriages for Load Carts
 - Drop wheel chamber-resident pull-out load carts
- Cycle Development Assistance
- Flexible PM plans

Mechanical Performance Clean, Dry and Empty (CDE)

Approximate performance values to be used for estimating purposes only (Actual FAT data should be used for critical requirements)

Vessel Evacuation to 27 in hg	10 Minutes
Vessel Heat Up from ambient	20 Minutes
Vessel Vent (27 in hg to atm)	5 minutes
Vessel Heat up (w/ pre-heated jackets)	10 minutes

All values with Clean, Dry, Empty (CDE) chamber



Technical Specifications

Product Vessel / Unit Sizes

The following tables and diagrams depict the standard range of sizes and door types available today. These sizes are a sampling of the more than 75 different size units currently in engineering databases at ETC.

Nomenclature:

H	Hinged Door (Left Hand Standard)
HSL	Horizontal Sliding Left (To Open)
VSD	Vertical Sliding Down (To Open)
VSU	Vertical Sliding Up (To Open)
HRL	Hinged Roller Lock Door
RA	Radial Arm Door

All units shown are available single or double door unless otherwise noted. * Single door only



Mounting Configurations

Floor or Pit Mounted, with independent equipment skid or no skid with all piping mounted on top and sides of system, (Vacuum pump on floor beside unit)

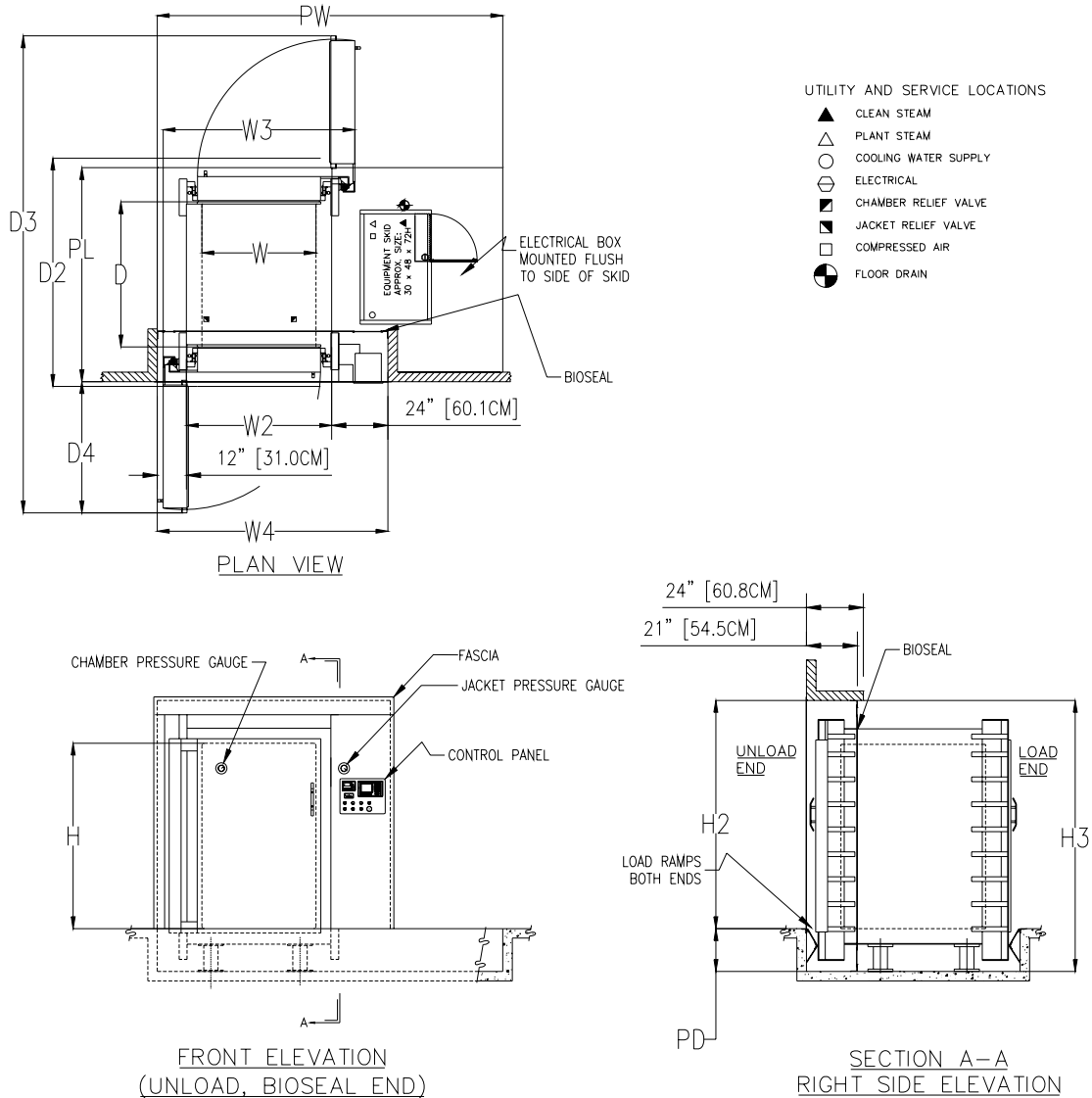


Figure 5
Layout Details
Hinged Roller Lock Door Unit
(Refer to Table 5 data for corresponding dimensions)

Notes:

1. All dimensions and specifications are provided for rough-in only and are subject to final design.
2. All utility flow rates are for peak load, average conditions are lower. Consult factory for actual values.
3. System weights shown apply to double door systems. Single door system is slightly less.
4. Adjust dimension H3 with pit depth greater than 15".
5. All dimensions and specifications subject to change without notice.



TABLE 5 HINGED ROLLER LOCK DOOR UNIT SPECIFICATIONS

MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS															UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"D3" OA DEPTH (DOORS OPEN)	"D4" DOOR	"PL" PIT LENGTH	"PW" PIT WIDTH	"PW2" PIT WIDTH (W/O EQUIP SKID)	"PD" MIN PIT DEPTH	UNIT WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	TOTAL WATER REQ'D
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
200	37.3	28	48	48	45	65	81	68	83	67	146	38	71	111	81	15	5400	90	190	3	3	10	13.5 / 7	7
	(1057.2)	(71.1)	(121.9)	(121.9)	(114.3)	(165.1)	(205.7)	(172.7)	(210.8)	(170.2)	(370.8)	(96.5)	(180.3)	(281.9)	(205.7)	(38.1)	(2455)	(41)	(86)	(85)	(7.6)			(198)
200	58.3	28	60	60	46	66	82	80.5	95.5	80	158	37.5	84	112	82	15	6500	100	300	3	3	10	21 / 10.5	10
	(1651.8)	(71.1)	(152.4)	(152.4)	(116.8)	(167.6)	(208.3)	(204.5)	(242.6)	(203.2)	(401.3)	(95.3)	(213.4)	(284.5)	(208.3)	(38.1)	(2955)	(45)	(136)	(85)	(7.6)			(283)
200	70.0	28	60	72	46	66	82	80.5	95.5	92	170	37.5	96	112	82	15	7200	150	350	3	3	10	21 / 10.5	11
	(1982.2)	(71.1)	(152.4)	(182.9)	(116.8)	(167.6)	(208.3)	(204.5)	(242.6)	(233.7)	(431.8)	(95.3)	(243.8)	(284.5)	(208.3)	(38.1)	(3273)	(68)	(159)	(85)	(7.6)			(311)
200	84.0	28	72	72	50	70	86	94.5	109.5	96	170	35.5	100	116	86	15	8600	200	420	3	3	10	21 / 10.5	12
	(2378.6)	(71.1)	(182.9)	(182.9)	(127.0)	(177.8)	(218.4)	(240.0)	(278.1)	(243.8)	(431.8)	(90.2)	(254.0)	(294.6)	(218.4)	(38.1)	(3909)	(91)	(191)	(85)	(7.6)			(340)
300	42.0	36	42	48	49	69	85	60	75	63	162	48	67	115	85	15	5000	50	210	3	3	10	14.5 / 7.5	8
	(1189.3)	(91.4)	(106.7)	(121.9)	(124.5)	(175.3)	(215.9)	(152.4)	(190.5)	(160.0)	(411.5)	(121.9)	(170.2)	(292.1)	(215.9)	(38.1)	(2273)	(23)	(95)	(85)	(7.6)			(227)
300	52.5	36	42	60	49	69	85	60	75	75	174	48	79	115	85	15	5300	50	270	3	3	10	21.5 / 11	9
	(1486.6)	(91.4)	(106.7)	(152.4)	(124.5)	(175.3)	(215.9)	(152.4)	(190.5)	(190.5)	(442.0)	(121.9)	(200.7)	(292.1)	(215.9)	(38.1)	(2409)	(23)	(123)	(85)	(7.6)			(255)
300	63.0	36	42	72	49	69	85	60	75	87	186	48	91	115	85	15	5700	70	320	3	3	10	21.5 / 11	10
	(1784.0)	(91.4)	(106.7)	(182.9)	(124.5)	(175.3)	(215.9)	(152.4)	(190.5)	(221.0)	(472.4)	(121.9)	(231.1)	(292.1)	(215.9)	(38.1)	(2591)	(32)	(145)	(85)	(7.6)			(283)
300	60.0	36	48	60	53	73	89	68	83	79	174	46	83	119	89	15	6200	100	300	3	3	10	21.5 / 11	10
	(1699.0)	(91.4)	(121.9)	(152.4)	(134.6)	(185.4)	(226.1)	(172.7)	(210.8)	(200.7)	(442.0)	(116.8)	(210.8)	(302.3)	(226.1)	(38.1)	(2818)	(45)	(136)	(85)	(7.6)			(283)
300	72.0	36	48	72	53	73	89	68	83	91	186	46	95	119	89	15	6900	130	360	3	3	10	21.5 / 11	11
	(2038.8)	(91.4)	(121.9)	(182.9)	(134.6)	(185.4)	(226.1)	(172.7)	(210.8)	(231.1)	(472.4)	(116.8)	(241.3)	(302.3)	(226.1)	(38.1)	(3136)	(59)	(164)	(85)	(7.6)			(311)
300	60.0	36	60	48	54	74	90	80.5	95.5	68	162	45.5	72	120	90	15	6700	100	300	3	3	10	21.5 / 11	10
	(1699.0)	(91.4)	(152.4)	(121.9)	(137.2)	(188.0)	(228.6)	(204.5)	(242.6)	(172.7)	(411.5)	(115.6)	(182.9)	(304.8)	(228.6)	(38.1)	(3045)	(45)	(136)	(85)	(7.6)			(283)
300	75.0	36	60	60	54	74	90	80.5	95.5	80	174	45.5	84	120	90	15	7100	110	380	3	3	10	21.5 / 11	11
	(2123.8)	(91.4)	(152.4)	(152.4)	(137.2)	(188.0)	(228.6)	(204.5)	(242.6)	(203.2)	(442.0)	(115.6)	(213.4)	(304.8)	(228.6)	(38.1)	(3227)	(50)	(173)	(85)	(7.6)			(311)
300	90.0	36	60	72	54	74	90	80.5	95.5	92	186	45.5	96	120	90	15	7800	140	450	3	3	10	21.5 / 11	13
	(2548.5)	(91.4)	(152.4)	(182.9)	(137.2)	(188.0)	(228.6)	(204.5)	(242.6)	(233.7)	(472.4)	(115.6)	(243.8)	(304.8)	(228.6)	(38.1)	(3545)	(64)	(205)	(85)	(7.6)			(368)
300	105.0	36	60	84	54	74	90	80.5	95.5	104	198	45.5	108	120	90	15	8400	170	530	3	3	10	21.5 / 11	14
	(2973.3)	(91.4)	(152.4)	(213.4)	(137.2)	(188.0)	(228.6)	(204.5)	(242.6)	(264.2)	(502.9)	(115.6)	(274.3)	(304.8)	(228.6)	(38.1)	(3818)	(77)	(241)	(85)	(7.6)			(396)



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	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
300	108.0	36	72	72	58	78	94	94.5	109.5	96	186	43.5	100	124	94	15	9200	190	540	3	3	10	21.5 / 11	14
	(3058.2)	(91.4)	(182.9)	(182.9)	(147.3)	(198.1)	(238.8)	(240.0)	(278.1)	(243.8)	(472.4)	(110.5)	(254.0)	(315.0)	(238.8)	(38.1)	(4182)	(86)	(245)	(85)	(7.6)			(396)
400	70.0	42	48	60	59	79	95	68	83	79	186	52	83	125	95	15	6600	100	350	3	3	10	21.5 / 11	11
	(1982.2)	(106.7)	(121.9)	(152.4)	(149.9)	(200.7)	(241.3)	(172.7)	(210.8)	(200.7)	(472.4)	(132.1)	(210.8)	(317.5)	(241.3)	(38.1)	(3000)	(45)	(159)	(85)	(7.6)			(311)
400	84.0	42	48	72	59	79	95	68	83	91	198	52	95	125	95	15	7200	130	420	3	3	10	21.5 / 11	12
	(2378.6)	(106.7)	(121.9)	(182.9)	(149.9)	(200.7)	(241.3)	(172.7)	(210.8)	(231.1)	(502.9)	(132.1)	(241.3)	(317.5)	(241.3)	(38.1)	(3273)	(59)	(191)	(85)	(7.6)			(340)
400	98.0	42	48	84	59	79	95	68	83	103	210	52	107	125	95	15	7700	150	490	3	3	10	21.5 / 11	13
	(2775.1)	(106.7)	(121.9)	(213.4)	(149.9)	(200.7)	(241.3)	(172.7)	(210.8)	(261.6)	(533.4)	(132.1)	(271.8)	(317.5)	(241.3)	(38.1)	(3500)	(68)	(223)	(85)	(7.6)			(368)
400	87.5	42	60	60	60	80	96	80.5	95.5	80	186	51.5	84	126	96	15	7600	120	440	3	3	10	21.5 / 11	12
	(2477.7)	(106.7)	(152.4)	(152.4)	(152.4)	(203.2)	(243.8)	(204.5)	(242.6)	(203.2)	(472.4)	(130.8)	(213.4)	(320.0)	(243.8)	(38.1)	(3455)	(55)	(200)	(85)	(7.6)			(340)
400	115.5	42	66	72	64	84	100	88.5	103.5	96	198	49.5	100	130	100	15	9800	230	580	3	3	10	30.5 / 15.5	15
	(3270.6)	(106.7)	(167.6)	(182.9)	(162.6)	(213.4)	(254.0)	(224.8)	(262.9)	(243.8)	(502.9)	(125.7)	(254.0)	(330.2)	(254.0)	(38.1)	(4455)	(105)	(264)	(85)	(7.6)			(425)
400	134.8	42	66	84	64	84	100	88.5	103.5	108	210	49.5	112	130	100	15	10500	270	680	3	3	10	39.5 / 20	18
	(3815.7)	(106.7)	(167.6)	(213.4)	(162.6)	(213.4)	(254.0)	(224.8)	(262.9)	(274.3)	(533.4)	(125.7)	(284.5)	(330.2)	(254.0)	(38.1)	(4773)	(123)	(309)	(85)	(7.6)			(510)
400	147.0	42	72	84	64	84	100	94.5	109.5	108	210	49.5	112	130	100	15	10500	240	740	3	4	10	39.5 / 20	19
	(4162.6)	(106.7)	(182.9)	(213.4)	(162.6)	(213.4)	(254.0)	(240.0)	(278.1)	(274.3)	(533.4)	(125.7)	(284.5)	(330.2)	(254.0)	(38.1)	(4773)	(109)	(336)	(85)	(10.2)			(538)
400	108.0	48	54	72	66	86	102	74.5	89.5	92	210	57.5	96	132	102	15	9000	150	540	3	3	10	21.5 / 11	14
	(3058.2)	(121.9)	(137.2)	(182.9)	(167.6)	(218.4)	(259.1)	(189.2)	(227.3)	(233.7)	(533.4)	(146.1)	(243.8)	(335.3)	(259.1)	(38.1)	(4091)	(68)	(245)	(85)	(7.6)			(396)
400	126.0	48	54	84	66	86	102	74.5	89.5	104	222	57.5	108	132	102	15	9500	170	630	3	3	10	30.5 / 15.5	16
	(3567.9)	(121.9)	(137.2)	(213.4)	(167.6)	(218.4)	(259.1)	(189.2)	(227.3)	(264.2)	(563.9)	(146.1)	(274.3)	(335.3)	(259.1)	(38.1)	(4318)	(77)	(286)	(85)	(7.6)			(453)
400	100.0	48	60	60	66	86	102	80.5	95.5	80	198	57.5	84	132	102	15	8800	120	500	3	3	10	21.5 / 11	14
	(2831.7)	(121.9)	(152.4)	(152.4)	(167.6)	(218.4)	(259.1)	(204.5)	(242.6)	(203.2)	(502.9)	(146.1)	(213.4)	(335.3)	(259.1)	(38.1)	(4000)	(55)	(227)	(85)	(7.6)			(396)
400	120.0	48	60	72	66	86	102	80.5	95.5	92	210	57.5	96	132	102	15	9600	160	600	3	3	10	30.5 / 15.5	15
	(3398.0)	(121.9)	(152.4)	(182.9)	(167.6)	(218.4)	(259.1)	(204.5)	(242.6)	(233.7)	(533.4)	(146.1)	(243.8)	(335.3)	(259.1)	(38.1)	(4364)	(73)	(273)	(85)	(7.6)			(425)
400	140.0	48	60	84	66	86	102	80.5	95.5	104	222	57.5	108	132	102	15	10200	190	700	3	4	10	39.5 / 20	18
	(3964.4)	(121.9)	(152.4)	(213.4)	(167.6)	(218.4)	(259.1)	(204.5)	(242.6)	(264.2)	(563.9)	(146.1)	(274.3)	(335.3)	(259.1)	(38.1)	(4636)	(86)	(318)	(85)	(10.2)			(510)



TABLE 5 HINGED ROLLER LOCK DOOR UNIT SPECIFICATIONS

MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS															UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"D3" OA DEPTH (DOORS OPEN)	"D4" DOOR	"PL" PIT LENGTH	"PW" PIT WIDTH	"PW2" PIT WIDTH (W/O EQUIP SKID)	"PD" MIN PIT DEPTH	UNIT WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	TOTAL WATER REQ'D
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
400	120.0	48	72	60	70	90	106	94.5	109.5	84	198	55.5	88	136	106	15	10700	200	600	3	3	10	30.5 / 15.5	15
	(3398.0)	(121.9)	(182.9)	(152.4)	(177.8)	(228.6)	(269.2)	(240.0)	(278.1)	(213.4)	(502.9)	(141.0)	(223.5)	(345.4)	(269.2)	(38.1)	(4864)	(91)	(273)	(85)	(7.6)			(425)
400	144.0	48	72	72	70	90	106	94.5	109.5	96	210	55.5	100	136	106	15	11700	250	720	3	4	10	39.5 / 20	19
	(4077.6)	(121.9)	(182.9)	(182.9)	(177.8)	(228.6)	(269.2)	(240.0)	(278.1)	(243.8)	(533.4)	(141.0)	(254.0)	(345.4)	(269.2)	(38.1)	(5318)	(114)	(327)	(85)	(10.2)			(538)
400	168.0	48	72	84	70	90	106	94.5	109.5	108	222	55.5	112	136	106	15	12400	280	840	3	4	10	57.5 / 29	24
	(4757.3)	(121.9)	(182.9)	(213.4)	(177.8)	(228.6)	(269.2)	(240.0)	(278.1)	(274.3)	(563.9)	(141.0)	(284.5)	(345.4)	(269.2)	(38.1)	(5636)	(127)	(382)	(85)	(10.2)			(680)
400	192.0	48	72	96	70	90	106	94.5	109.5	120	234	55.5	124	136	106	15	13300	330	960	3	4	10	57.5 / 29	26
	(5436.9)	(121.9)	(182.9)	(243.8)	(177.8)	(228.6)	(269.2)	(240.0)	(278.1)	(304.8)	(594.4)	(141.0)	(315.0)	(345.4)	(269.2)	(38.1)	(6045)	(150)	(436)	(85)	(10.2)			(736)
400	196.0	48	84	84	70	90	106	106.5	121.5	108	222	55.5	112	136	106	15	13300	270	980	3	4	10	57.5 / 29	26
	(5550.1)	(121.9)	(213.4)	(213.4)	(177.8)	(228.6)	(269.2)	(270.5)	(308.6)	(274.3)	(563.9)	(141.0)	(284.5)	(345.4)	(269.2)	(38.1)	(6045)	(123)	(445)	(85)	(10.2)			(736)
500	112.5	54	60	60	72	92	108	80.5	95.5	80	210	63.5	84	138	108	15	9300	130	570	4	3	10	30.5 / 15.5	15
	(3185.7)	(137.2)	(152.4)	(152.4)	(182.9)	(233.7)	(274.3)	(204.5)	(242.6)	(203.2)	(533.4)	(161.3)	(213.4)	(350.5)	(274.3)	(38.1)	(4227)	(59)	(259)	(113)	(7.6)			(425)
500	135.0	54	60	72	72	92	108	80.5	95.5	92	222	63.5	96	138	108	15	10200	180	680	4	3	10	39.5 / 20	18
	(3822.8)	(137.2)	(152.4)	(182.9)	(182.9)	(233.7)	(274.3)	(204.5)	(242.6)	(233.7)	(563.9)	(161.3)	(243.8)	(350.5)	(274.3)	(38.1)	(4636)	(82)	(309)	(113)	(7.6)			(510)
500	162.0	54	72	72	76	96	112	94.5	109.5	96	222	61.5	100	142	112	15	12000	240	810	4	4	10	57.5 / 29	23
	(4587.4)	(137.2)	(182.9)	(182.9)	(193.0)	(243.8)	(284.5)	(240.0)	(278.1)	(243.8)	(563.9)	(156.2)	(254.0)	(360.7)	(284.5)	(38.1)	(5455)	(109)	(368)	(113)	(10.2)			(651)
600	250.0	60	60	120	78	98	114	80.5	95.5	140	282	69.5	144	144	114	15	13200	280	1250	4	5	10	59 / 29.5	31
	(7079.3)	(152.4)	(152.4)	(304.8)	(198.1)	(248.9)	(289.6)	(204.5)	(242.6)	(355.6)	(716.3)	(176.5)	(365.8)	(365.8)	(289.6)	(38.1)	(6000)	(127)	(568)	(113)	(12.7)			(878)
600	210.0	60	72	84	82	102	118	94.5	109.5	108	246	67.5	112	148	118	15	13300	280	1050	4	4	10	59 / 29.5	27
	(5946.6)	(152.4)	(182.9)	(213.4)	(208.3)	(259.1)	(299.7)	(240.0)	(278.1)	(274.3)	(624.8)	(171.5)	(284.5)	(375.9)	(299.7)	(38.1)	(6045)	(127)	(477)	(113)	(10.2)			(765)
600	129.2	62	60	60	80	100	116	80.5	95.5	80	226	71.5	84	146	116	15	9900	130	650	4	3	10	32.5 / 16.5	16
	(3657.6)	(157.5)	(152.4)	(152.4)	(203.2)	(254.0)	(294.6)	(204.5)	(242.6)	(203.2)	(574.0)	(181.6)	(213.4)	(370.8)	(294.6)	(38.1)	(4500)	(59)	(295)	(113)	(7.6)			(453)
600	217.0	62	72	84	84	104	120	94.5	109.5	108	250	69.5	112	150	120	15	13300	300	1090	4	4	10	59 / 29.5	28
	(6144.8)	(157.5)	(182.9)	(213.4)	(213.4)	(264.2)	(304.8)	(240.0)	(278.1)	(274.3)	(635.0)	(176.5)	(284.5)	(381.0)	(304.8)	(38.1)	(6045)	(136)	(495)	(113)	(10.2)			(793)
600	248.0	62	72	96	84	104	120	94.5	109.5	120	262	69.5	124	150	120	15	14400	360	1240	4	4	10	59 / 29.5	31
	(7022.6)	(157.5)	(182.9)	(243.8)	(213.4)	(264.2)	(304.8)	(240.0)	(278.1)	(304.8)	(665.5)	(176.5)	(315.0)	(381.0)	(304.8)	(38.1)	(6545)	(164)	(564)	(113)	(10.2)			(878)



TABLE 5 HINGED ROLLER LOCK DOOR UNIT SPECIFICATIONS

MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS															UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"D3" OA DEPTH (DOORS OPEN)	"D4" DOOR	"PL" PIT LENGTH	"PW" PIT WIDTH	"PW2" PIT WIDTH (W/O EQUIP SKID)	"PD" MIN PIT DEPTH	UNIT WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	TOTAL WATER REQ'D
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
600	253.2	62	84	84	84	104	120	106.5	121.5	108	250	69.5	112	150	120	15	15300	380	1270	4	5	10	59 / 29.5	31
	(7168.9)	(157.5)	(213.4)	(213.4)	(213.4)	(264.2)	(304.8)	(270.5)	(308.6)	(274.3)	(635.0)	(176.5)	(284.5)	(381.0)	(304.8)	(38.1)	(6955)	(173)	(577)	(113)	(12.7)			(878)
600	379.8	62	84	126	84	104	120	106.5	121.5	150	292	69.5	154	150	120	15	19000	560	1900	4	6	10	77 / 38.5	45
	(10753.4)	(157.5)	(213.4)	(320.0)	(213.4)	(264.2)	(304.8)	(270.5)	(308.6)	(381.0)	(741.7)	(176.5)	(391.2)	(381.0)	(304.8)	(38.1)	(8636)	(255)	(864)	(113)	(15.2)			(1274)
600	470.2	62	84	156	84	104	120	106.5	121.5	180	322	69.5	184	150	120	15	21400	670	2360	4	6	10	77 / 38.5	53
	(13313.7)	(157.5)	(213.4)	(396.2)	(213.4)	(264.2)	(304.8)	(270.5)	(308.6)	(457.2)	(817.9)	(176.5)	(467.4)	(381.0)	(304.8)	(38.1)	(9727)	(305)	(1073)	(113)	(15.2)			(1501)
700	294.0	72	84	84	94	114	130	106.5	121.5	108	270	79.5	112	160	130	15	17600	400	1470	5	5	10	77 / 38.5	37
	(8325.2)	(182.9)	(213.4)	(213.4)	(238.8)	(289.6)	(330.2)	(270.5)	(308.6)	(274.3)	(685.8)	(201.9)	(284.5)	(406.4)	(330.2)	(38.1)	(8000)	(182)	(668)	(142)	(12.7)			(1048)
700	336.0	72	84	96	94	114	130	106.5	121.5	120	282	79.5	124	160	130	15	18500	430	1680	5	5	10	77 / 38.5	41
	(9514.5)	(182.9)	(213.4)	(243.8)	(238.8)	(289.6)	(330.2)	(270.5)	(308.6)	(304.8)	(716.3)	(201.9)	(315.0)	(406.4)	(330.2)	(38.1)	(8409)	(195)	(764)	(142)	(12.7)			(1161)
700	367.5	72	84	105	94	114	130	106.5	121.5	129	291	79.5	133	160	130	15	19300	470	1840	5	6	10	77 / 38.5	44
	(10406.5)	(182.9)	(213.4)	(266.7)	(238.8)	(289.6)	(330.2)	(270.5)	(308.6)	(327.7)	(739.1)	(201.9)	(337.8)	(406.4)	(330.2)	(38.1)	(8773)	(214)	(836)	(142)	(15.2)			(1246)
800	334.8	82	84	84	104	124	140	106.5	121.5	108	290	89.5	112	170	140	15	18500	390	1680	5	5	10	77 / 38.5	41
	(9481.5)	(208.3)	(213.4)	(213.4)	(264.2)	(315.0)	(355.6)	(270.5)	(308.6)	(274.3)	(736.6)	(227.3)	(284.5)	(431.8)	(355.6)	(38.1)	(8409)	(177)	(764)	(142)	(12.7)			(1161)
1000	255.0	102	72	60	124	144	160	94.5	109.5	84	306	109.5	88	190	160	15	16800	300	1280	5	5	10	59 / 29.5	32
	(7220.8)	(259.1)	(182.9)	(152.4)	(315.0)	(365.8)	(406.4)	(240.0)	(278.1)	(213.4)	(777.2)	(278.1)	(223.5)	(482.6)	(406.4)	(38.1)	(7636)	(136)	(582)	(142)	(12.7)			(906)
1000	510.0	102	72	120	124	144	160	94.5	109.5	144	366	109.5	148	190	160	15	20100	400	2550	5	6	10	77 / 38.5	57
	(14441.7)	(259.1)	(182.9)	(304.8)	(315.0)	(365.8)	(406.4)	(240.0)	(278.1)	(365.8)	(929.6)	(278.1)	(375.9)	(482.6)	(406.4)	(38.1)	(9136)	(182)	(1159)	(142)	(15.2)			(1614)

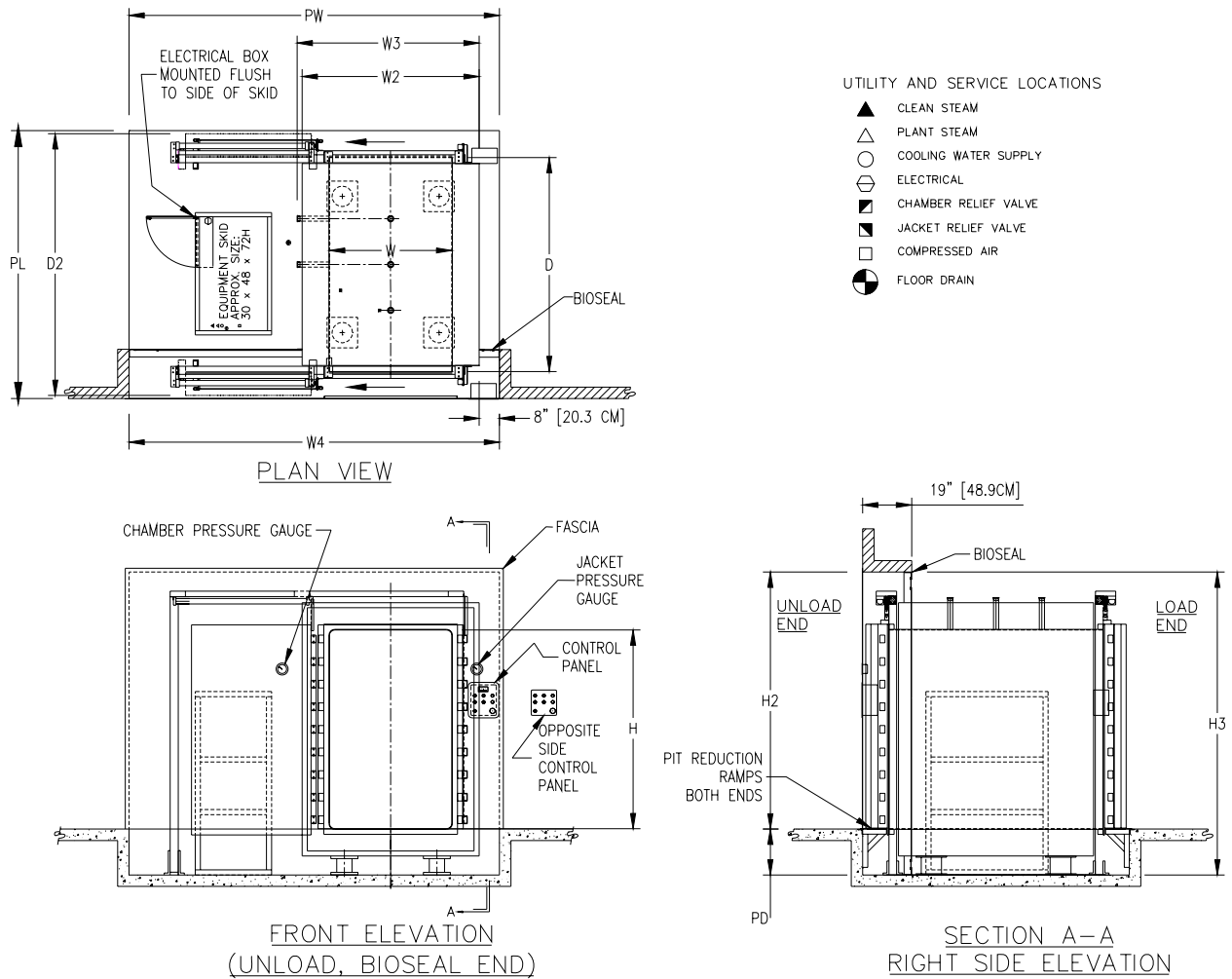


Figure 6
Layout Details
Horizontal Sliding Door Unit
Refer to Table 6 data for Corresponding Dimensions

Notes:

1. All dimensions and specifications are provided for rough-in only and are subject to final design.
2. All utility flow rates are for peak load, average conditions are lower. Consult factory for actual values.
3. System weights shown apply to double door systems. Single door system is slightly less.
4. Adjust dimension H3 with pit depth greater than 15".
5. All dimensions and specifications subject to change without notice.



TABLE 6 SLIDING DOOR UNIT SPECIFICATIONS																					
MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS												UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"PL" PIT LENGTH	"PW" PIT WIDTH	"PD" MIN PIT DEPTH	CHAMBER WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	COOLING WATER REQUIRED
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
200	18.0	24	36	36	37	57	75	54	69	53	51	99	15	3800	30	90	3	3	10	8.5 / 4.5	5
	(509.7)	(61.0)	(91.4)	(91.4)	(94.0)	(144.8)	(190.5)	(137.2)	(175.3)	(134.6)	(129.5)	(251.5)	(38.1)	(1727)	(14)	(41)	(85)	(7.6)			(19)
200	24.0	24	36	48	37	57	75	54	69	65	63	99	15	4000	30	120	3	3	10	10 / 5	6
	(679.6)	(61.0)	(91.4)	(121.9)	(94.0)	(144.8)	(190.5)	(137.2)	(175.3)	(165.1)	(160.0)	(251.5)	(38.1)	(1818)	(14)	(55)	(85)	(7.6)			(23)
200	22.2	28	37	37	41	61	83	55	70	54	52	103	15	4000	30	120	3	3	10	8.5 / 4.5	6
	(628.2)	(71.1)	(94.0)	(94.0)	(104.1)	(154.9)	(210.8)	(139.7)	(177.8)	(137.2)	(132.1)	(261.6)	(38.1)	(1818)	(14)	(55)	(85)	(7.6)			(23)
200	28.8	28	37	48	41	61	83	55	70	65	63	103	15	4300	50	150	3	3	10	10 / 5	7
	(814.9)	(71.1)	(94.0)	(121.9)	(104.1)	(154.9)	(210.8)	(139.7)	(177.8)	(165.1)	(160.0)	(261.6)	(38.1)	(1955)	(23)	(68)	(85)	(7.6)			(26)
200	37.3	28	48	48	45	65	85	68	83	69	67	107	15	5400	90	190	3	3	10	13.5 / 7	7
	(1057.2)	(71.1)	(121.9)	(121.9)	(114.3)	(165.1)	(215.9)	(172.7)	(210.8)	(175.3)	(170.2)	(271.8)	(38.1)	(2455)	(41)	(86)	(85)	(7.6)			(26)
200	58.3	28	60	60	45	65	85	80	95	81	79	107	15	6400	100	300	3	3	10	21 / 10.5	10
	(1651.8)	(71.1)	(152.4)	(152.4)	(114.3)	(165.1)	(215.9)	(203.2)	(241.3)	(205.7)	(200.7)	(271.8)	(38.1)	(2909)	(45)	(136)	(85)	(7.6)			(38)
200	70.0	28	60	72	45	65	85	80	95	93	91	107	15	7100	140	350	3	3	10	21 / 10.5	11
	(1982.2)	(71.1)	(152.4)	(182.9)	(114.3)	(165.1)	(215.9)	(203.2)	(241.3)	(236.2)	(231.1)	(271.8)	(38.1)	(3227)	(64)	(159)	(85)	(7.6)			(42)
200	84.0	28	72	72	45	65	85	92	107	93	91	107	15	7900	150	420	3	3	10	21 / 10.5	12
	(2378.6)	(71.1)	(182.9)	(182.9)	(114.3)	(165.1)	(215.9)	(233.7)	(271.8)	(236.2)	(231.1)	(271.8)	(38.1)	(3591)	(68)	(191)	(85)	(7.6)			(45)
300	42.0	36	42	48	49	69	99	60	75	65	63	111	15	5000	50	210	3	3	10	14.5 / 7.5	8
	(1189.3)	(91.4)	(106.7)	(121.9)	(124.5)	(175.3)	(251.5)	(152.4)	(190.5)	(165.1)	(160.0)	(281.9)	(38.1)	(2273)	(23)	(95)	(85)	(7.6)			(30)
300	52.5	36	42	60	49	69	99	60	75	77	75	111	15	5300	50	270	3	3	10	21.5 / 11	9
	(1486.6)	(91.4)	(106.7)	(152.4)	(124.5)	(175.3)	(251.5)	(152.4)	(190.5)	(195.6)	(190.5)	(281.9)	(38.1)	(2409)	(23)	(123)	(85)	(7.6)			(34)
300	63.0	36	42	72	49	69	99	60	75	89	87	111	15	5700	70	320	3	3	10	21.5 / 11	10
	(1784.0)	(91.4)	(106.7)	(182.9)	(124.5)	(175.3)	(251.5)	(152.4)	(190.5)	(226.1)	(221.0)	(281.9)	(38.1)	(2591)	(32)	(145)	(85)	(7.6)			(38)
300	60.0	36	48	60	53	73	101	68	83	81	79	115	15	6200	100	300	3	3	10	21.5 / 11	10
	(1699.0)	(91.4)	(121.9)	(152.4)	(134.6)	(185.4)	(256.5)	(172.7)	(210.8)	(205.7)	(200.7)	(292.1)	(38.1)	(2818)	(45)	(136)	(85)	(7.6)			(38)
300	72.0	36	48	72	53	73	101	68	83	93	91	115	15	6900	130	360	3	3	10	21.5 / 11	11
	(2038.8)	(91.4)	(121.9)	(182.9)	(134.6)	(185.4)	(256.5)	(172.7)	(210.8)	(236.2)	(231.1)	(292.1)	(38.1)	(3136)	(59)	(164)	(85)	(7.6)			(42)
300	60.0	36	60	48	53	73	101	80	95	69	67	115	15	6600	90	300	3	3	10	21.5 / 11	10
	(1699.0)	(91.4)	(152.4)	(121.9)	(134.6)	(185.4)	(256.5)	(203.2)	(241.3)	(175.3)	(170.2)	(292.1)	(38.1)	(3000)	(41)	(136)	(85)	(7.6)			(38)



TABLE 6 SLIDING DOOR UNIT SPECIFICATIONS																					
MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS													UTILITIES						
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"PL" PIT LENGTH	"PW" PIT WIDTH	"PD" MIN PIT DEPTH	CHAMBER WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	COOLING WATER REQUIRED
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
300	75.0	36	60	60	53	73	101	80	95	81	79	115	15	7000	110	380	3	3	10	21.5 / 11	11
	(2123.8)	(91.4)	(152.4)	(152.4)	(134.6)	(185.4)	(256.5)	(203.2)	(241.3)	(205.7)	(200.7)	(292.1)	(38.1)	(3182)	(50)	(173)	(85)	(7.6)			(42)
300	90.0	36	60	72	53	73	101	80	95	93	91	115	15	7600	130	450	3	3	10	21.5 / 11	13
	(2548.5)	(91.4)	(152.4)	(182.9)	(134.6)	(185.4)	(256.5)	(203.2)	(241.3)	(236.2)	(231.1)	(292.1)	(38.1)	(3455)	(59)	(205)	(85)	(7.6)			(49)
300	105.0	36	60	84	53	73	101	80	95	105	103	115	15	8300	160	530	3	3	10	21.5 / 11	14
	(2973.3)	(91.4)	(152.4)	(213.4)	(134.6)	(185.4)	(256.5)	(203.2)	(241.3)	(266.7)	(261.6)	(292.1)	(38.1)	(3773)	(73)	(241)	(85)	(7.6)			(53)
300	108.0	36	72	72	53	73	101	92	107	93	91	115	15	8500	140	540	3	3	10	21.5 / 11	14
	(3058.2)	(91.4)	(182.9)	(182.9)	(134.6)	(185.4)	(256.5)	(233.7)	(271.8)	(236.2)	(231.1)	(292.1)	(38.1)	(3864)	(64)	(245)	(85)	(7.6)			(53)
400	70.0	42	48	60	59	79	113	68	83	81	79	121	15	6600	100	350	3	3	10	21.5 / 11	11
	(1982.2)	(106.7)	(121.9)	(152.4)	(149.9)	(200.7)	(287.0)	(172.7)	(210.8)	(205.7)	(200.7)	(307.3)	(38.1)	(3000)	(45)	(159)	(85)	(7.6)			(42)
400	84.0	42	48	72	59	79	113	68	83	93	91	121	15	7200	130	420	3	3	10	21.5 / 11	12
	(2378.6)	(106.7)	(121.9)	(182.9)	(149.9)	(200.7)	(287.0)	(172.7)	(210.8)	(236.2)	(231.1)	(307.3)	(38.1)	(3273)	(59)	(191)	(85)	(7.6)			(45)
400	98.0	42	48	84	59	79	113	68	83	105	103	121	15	7700	150	490	3	3	10	21.5 / 11	13
	(2775.1)	(106.7)	(121.9)	(213.4)	(149.9)	(200.7)	(287.0)	(172.7)	(210.8)	(266.7)	(261.6)	(307.3)	(38.1)	(3500)	(68)	(223)	(85)	(7.6)			(49)
400	87.5	42	60	60	59	79	113	80	95	81	79	121	15	7500	110	440	3	3	10	21.5 / 11	12
	(2477.7)	(106.7)	(152.4)	(152.4)	(149.9)	(200.7)	(287.0)	(203.2)	(241.3)	(205.7)	(200.7)	(307.3)	(38.1)	(3409)	(50)	(200)	(85)	(7.6)			(45)
400	115.5	42	66	72	59	79	113	86	101	93	91	121	15	9000	170	580	3	3	10	30.5 / 15.5	15
	(3270.6)	(106.7)	(167.6)	(182.9)	(149.9)	(200.7)	(287.0)	(218.4)	(256.5)	(236.2)	(231.1)	(307.3)	(38.1)	(4091)	(77)	(264)	(85)	(7.6)			(57)
400	134.8	42	66	84	59	79	113	86	101	105	103	121	15	9600	200	680	3	4	10	39.5 / 20	18
	(3815.7)	(106.7)	(167.6)	(213.4)	(149.9)	(200.7)	(287.0)	(218.4)	(256.5)	(266.7)	(261.6)	(307.3)	(38.1)	(4364)	(91)	(309)	(85)	(10.2)			(68)
400	147.0	42	72	84	59	79	113	92	107	105	103	121	15	9600	180	740	3	4	10	39.5 / 20	19
	(4162.6)	(106.7)	(182.9)	(213.4)	(149.9)	(200.7)	(287.0)	(233.7)	(271.8)	(266.7)	(261.6)	(307.3)	(38.1)	(4364)	(82)	(336)	(85)	(10.2)			(72)
400	108.0	48	54	72	65	85	125	74	89	93	91	127	15	8800	140	540	3	3	10	21.5 / 11	14
	(3058.2)	(121.9)	(137.2)	(182.9)	(165.1)	(215.9)	(317.5)	(188.0)	(226.1)	(236.2)	(231.1)	(322.6)	(38.1)	(4000)	(64)	(245)	(85)	(7.6)			(53)
400	126.0	48	54	84	65	85	125	74	89	105	103	127	15	9400	160	630	3	4	10	30.5 / 15.5	16
	(3567.9)	(121.9)	(137.2)	(213.4)	(165.1)	(215.9)	(317.5)	(188.0)	(226.1)	(266.7)	(261.6)	(322.6)	(38.1)	(4273)	(73)	(286)	(85)	(10.2)			(61)
400	100.0	48	60	60	65	85	125	80	95	81	79	127	15	8800	110	500	3	3	10	21.5 / 11	14
	(2831.7)	(121.9)	(152.4)	(152.4)	(165.1)	(215.9)	(317.5)	(203.2)	(241.3)	(205.7)	(200.7)	(322.6)	(38.1)	(4000)	(50)	(227)	(85)	(7.6)			(53)



TABLE 6 SLIDING DOOR UNIT SPECIFICATIONS																					
MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS												UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"PL" PIT LENGTH	"PW" PIT WIDTH	"PD" MIN PIT DEPTH	CHAMBER WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	COOLING WATER REQUIRED
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
400	120.0	48	60	72	65	85	125	80	95	93	91	127	15	9400	150	600	3	3	10	30.5 / 15.5	15
	(3398.0)	(121.9)	(152.4)	(182.9)	(165.1)	(215.9)	(317.5)	(203.2)	(241.3)	(236.2)	(231.1)	(322.6)	(38.1)	(4273)	(68)	(273)	(85)	(7.6)			(57)
400	140.0	48	60	84	65	85	125	80	95	105	103	127	15	10100	180	700	3	4	10	39.5 / 20	18
	(3964.4)	(121.9)	(152.4)	(213.4)	(165.1)	(215.9)	(317.5)	(203.2)	(241.3)	(266.7)	(261.6)	(322.6)	(38.1)	(4591)	(82)	(318)	(85)	(10.2)			(68)
400	120.0	48	72	60	65	85	125	92	107	81	79	127	15	10000	150	600	3	3	10	30.5 / 15.5	15
	(3398.0)	(121.9)	(182.9)	(152.4)	(165.1)	(215.9)	(317.5)	(233.7)	(271.8)	(205.7)	(200.7)	(322.6)	(38.1)	(4545)	(68)	(273)	(85)	(7.6)			(57)
400	144.0	48	72	72	65	85	125	92	107	93	91	127	15	10900	190	720	3	4	10	39.5 / 20	19
	(4077.6)	(121.9)	(182.9)	(182.9)	(165.1)	(215.9)	(317.5)	(233.7)	(271.8)	(236.2)	(231.1)	(322.6)	(38.1)	(4955)	(86)	(327)	(85)	(10.2)			(72)
400	168.0	48	72	84	65	85	125	92	107	105	103	127	15	11400	210	840	3	4	10	57.5 / 29	24
	(4757.3)	(121.9)	(182.9)	(213.4)	(165.1)	(215.9)	(317.5)	(233.7)	(271.8)	(266.7)	(261.6)	(322.6)	(38.1)	(5182)	(95)	(382)	(85)	(10.2)			(91)
400	192.0	48	72	96	65	85	125	92	107	117	115	127	15	12200	250	960	3	4	10	57.5 / 29	26
	(5436.9)	(121.9)	(182.9)	(243.8)	(165.1)	(215.9)	(317.5)	(233.7)	(271.8)	(297.2)	(292.1)	(322.6)	(38.1)	(5545)	(114)	(436)	(85)	(10.2)			(98)
400	196.0	48	84	84	65	85	125	104	119	105	103	127	15	12300	200	980	3	4	10	57.5 / 29	26
	(5550.1)	(121.9)	(213.4)	(213.4)	(165.1)	(215.9)	(317.5)	(264.2)	(302.3)	(266.7)	(261.6)	(322.6)	(38.1)	(5591)	(91)	(445)	(85)	(10.2)			(98)
500	112.5	54	60	60	71	91	137	80	95	81	79	137	15	9200	120	570	4	3	10	30.5 / 15.5	15
	(3185.7)	(137.2)	(152.4)	(152.4)	(180.3)	(231.1)	(348.0)	(203.2)	(241.3)	(205.7)	(200.7)	(348.0)	(38.1)	(4182)	(55)	(259)	(113)	(7.6)			(57)
500	135.0	54	60	72	71	91	137	80	95	93	91	137	15	10100	170	680	4	4	10	39.5 / 20	18
	(3822.8)	(137.2)	(152.4)	(182.9)	(180.3)	(231.1)	(348.0)	(203.2)	(241.3)	(236.2)	(231.1)	(348.0)	(38.1)	(4591)	(77)	(309)	(113)	(10.2)			(68)
500	162.0	54	72	72	71	91	137	92	107	93	91	137	15	11200	180	810	4	4	10	57.5 / 29	23
	(4587.4)	(137.2)	(182.9)	(182.9)	(180.3)	(231.1)	(348.0)	(233.7)	(271.8)	(236.2)	(231.1)	(348.0)	(38.1)	(5091)	(82)	(368)	(113)	(10.2)			(87)
600	250.0	60	60	120	77	97	149	80	95	141	139	149	15	13000	260	1250	4	5	10	59 / 29.5	31
	(7079.3)	(152.4)	(152.4)	(304.8)	(195.6)	(246.4)	(378.5)	(203.2)	(241.3)	(358.1)	(353.1)	(378.5)	(38.1)	(5909)	(118)	(568)	(113)	(12.7)			(117)
600	210.0	60	72	84	77	97	149	92	107	105	103	149	15	12400	210	1050	4	4	10	59 / 29.5	27
	(5946.6)	(152.4)	(182.9)	(213.4)	(195.6)	(246.4)	(378.5)	(233.7)	(271.8)	(266.7)	(261.6)	(378.5)	(38.1)	(5636)	(95)	(477)	(113)	(10.2)			(102)
600	129.2	62	60	60	79	99	153	80	95	81	79	153	15	9800	130	650	4	4	10	32.5 / 16.5	16
	(3657.6)	(157.5)	(152.4)	(152.4)	(200.7)	(251.5)	(388.6)	(203.2)	(241.3)	(205.7)	(200.7)	(388.6)	(38.1)	(4455)	(59)	(295)	(113)	(10.2)			(61)
600	217.0	62	72	84	79	99	153	92	107	105	103	153	15	12300	230	1090	4	4	10	59 / 29.5	28
	(6144.8)	(157.5)	(182.9)	(213.4)	(200.7)	(251.5)	(388.6)	(233.7)	(271.8)	(266.7)	(261.6)	(388.6)	(38.1)	(5591)	(105)	(495)	(113)	(10.2)			(106)



TABLE 6 SLIDING DOOR UNIT SPECIFICATIONS																					
MODEL SIZE VOLUME		DIMENSIONS / WEIGHTS												UTILITIES							
MODEL NO	CHAMBER VOLUME	"W" INT WIDTH	"H" INT HEIGHT	"D" INT DEPTH	"W2" OUTSIDE WIDTH	"W3" SHIP WIDTH	"W4" WALL OPENING WIDTH	"H2" WALL OPENING HEIGHT	"H3" SHIP HEIGHT	"D2" SHIP DEPTH	"PL" PIT LENGTH	"PW" PIT WIDTH	"PD" MIN PIT DEPTH	CHAMBER WEIGHT	PLANT STEAM	CLEAN STEAM	COMP AIR	FLOOR DRAIN LINE SIZE	CONTROL POWER AMPS AT 120V	MAIN POWER AMPS AT 230/460V	COOLING WATER REQUIRED
	FT3	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	LBS	LBS/HR	LBS/HR	ACFM	IN			GPM
	(L)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(CM)	(KG)	(KG/HR)	(KG/HR)	(LPM)	(CM)			(LPM)
600	248.0	62	72	96	79	99	153	92	107	117	115	153	15	13200	270	1240	4	4	10	59 / 29.5	31
	(7022.6)	(157.5)	(182.9)	(243.8)	(200.7)	(251.5)	(388.6)	(233.7)	(271.8)	(297.2)	(292.1)	(388.6)	(38.1)	(6000)	(123)	(564)	(113)	(10.2)			(117)
600	253.2	62	84	84	79	99	153	104	119	105	103	153	15	14100	280	1270	4	5	10	59 / 29.5	31
	(7168.9)	(157.5)	(213.4)	(213.4)	(200.7)	(251.5)	(388.6)	(264.2)	(302.3)	(266.7)	(261.6)	(388.6)	(38.1)	(6409)	(127)	(577)	(113)	(12.7)			(117)
600	379.8	62	84	126	79	99	153	104	119	147	145	153	15	17100	420	1900	4	6	10	77 / 38.5	45
	(10753.4)	(157.5)	(213.4)	(320.0)	(200.7)	(251.5)	(388.6)	(264.2)	(302.3)	(373.4)	(368.3)	(388.6)	(38.1)	(7773)	(191)	(864)	(113)	(15.2)			(170)
600	470.2	62	84	156	79	99	153	104	119	177	175	153	15	19100	500	2360	4	6	10	77 / 38.5	53
	(13313.7)	(157.5)	(213.4)	(396.2)	(200.7)	(251.5)	(388.6)	(264.2)	(302.3)	(449.6)	(444.5)	(388.6)	(38.1)	(8682)	(227)	(1073)	(113)	(15.2)			(201)
700	294.0	72	84	84	89	109	173	104	119	105	103	173	15	16300	300	1470	5	5	10	77 / 38.5	37
	(8325.2)	(182.9)	(213.4)	(213.4)	(226.1)	(276.9)	(439.4)	(264.2)	(302.3)	(266.7)	(261.6)	(439.4)	(38.1)	(7409)	(136)	(668)	(142)	(12.7)			(140)
700	336.0	72	84	96	89	109	173	104	119	117	115	173	15	17000	330	1680	5	5	10	77 / 38.5	41
	(9514.5)	(182.9)	(213.4)	(243.8)	(226.1)	(276.9)	(439.4)	(264.2)	(302.3)	(297.2)	(292.1)	(439.4)	(38.1)	(7727)	(150)	(764)	(142)	(12.7)			(155)
700	367.5	72	84	105	89	109	173	104	119	126	124	173	15	17700	350	1840	5	6	10	77 / 38.5	44
	(10406.5)	(182.9)	(213.4)	(266.7)	(226.1)	(276.9)	(439.4)	(264.2)	(302.3)	(320.0)	(315.0)	(439.4)	(38.1)	(8045)	(159)	(836)	(142)	(15.2)			(167)
800	334.8	82	84	84	99	119	193	104	119	105	103	193	15	17200	290	1680	5	5	10	77 / 38.5	41
	(9481.5)	(208.3)	(213.4)	(213.4)	(251.5)	(302.3)	(490.2)	(264.2)	(302.3)	(266.7)	(261.6)	(490.2)	(38.1)	(7818)	(132)	(764)	(142)	(12.7)			(155)
1000	255.0	102	72	60	119	139	233	92	107	81	79	233	15	15800	230	1280	5	5	10	59 / 29.5	32
	(7220.8)	(259.1)	(182.9)	(152.4)	(302.3)	(353.1)	(591.8)	(233.7)	(271.8)	(205.7)	(200.7)	(591.8)	(38.1)	(7182)	(105)	(582)	(142)	(12.7)			(121)
1000	510.0	102	72	120	119	139	233	92	107	141	139	233	15	18700	290	2550	5	6	10	77 / 38.5	57
	(14441.7)	(259.1)	(182.9)	(304.8)	(302.3)	(353.1)	(591.8)	(233.7)	(271.8)	(358.1)	(353.1)	(591.8)	(38.1)	(8500)	(132)	(1159)	(142)	(15.2)			(216)



Useful Engineering Data

Properties of Saturated Steam													
Gauge Press.	Temp		Specific Volume	Sensible Heat	Latent Heat	Total Heat	Gauge Press.	Temp		Specific Volume	Sensible Heat	Latent Heat	Total Heat
	(psig in hg)	(°F)						(°C)	(ft ³ /lb)				
(25)	134	56.7	142	102	1017	1119	44	291	143.9	7.31	260	917	1177
(20)	136	57.8	73.9	129	1001	1130	45	292	144.4	7	261	916	1177
(15)	179	81.7	51.3	147	990	1137	46	293	145.0	7.14	262	915	1177
(10)	192	88.9	39.4	160	982	1142	48	295	146.1	6.94	264	914	1178
(5)	203	95.0	31.8	171	976	1147	50	298	147.8	6.68	267	912	1179
0	212	100.0	26.8	180	970	1150	55	300	148.9	6.27	271	909	1180
1	215	101.7	25.2	183	968	1151	60	307	152.8	5.84	277	906	1183
2	219	103.9	23.5	187	966	1153	65	312	155.6	5.49	282	901	1183
3	222	105.6	22.3	190	964	1154	70	316	157.8	5.18	286	898	1184
4	224	106.7	21.4	192	962	1154	75	320	160.0	4.91	290	895	1185
5	227	108.3	20.1	195	960	1155	80	324	162.2	4.67	294	891	1185
6	230	110.0	19.4	198	959	1157	85	328	164.4	4.44	298	889	1187
7	232	111.1	18.7	200	957	1157	90	331	166.1	4.24	302	886	1188
8	233	111.7	18.4	201	956	1157	95	335	168.3	4.05	305	883	1188
9	237	113.9	17.1	205	954	1159	100	338	170.0	3.89	309	880	1189
10	239	115.0	16.5	207	953	1160	105	341	171.7	3.74	312	878	1190
12	244	117.8	15.3	212	949	1161	110	344	173.3	3.59	316	875	1191
14	248	120.0	14.3	216	947	1163	115	347	175.0	3.46	319	873	1192
15	250	121.1	14	218	946	1164	120	350	176.7	3.34	322	871	1193
16	252	122.2	13.4	220	944	1164	125	353	178.3	3.23	325	868	1193
18	256	124.4	12.6	224	941	1165	130	356	180.0	3.12	328	866	1194
20	259	126.1	11.9	227	939	1166	135	358	181.1	3.02	330	864	1194
22	262	127.8	11.3	230	937	1167	140	361	182.8	2.92	333	861	1194
24	265	129.4	10.8	233	934	1167	145	363	183.9	2.84	336	859	1195
25	267	130.3	10.5	235	934	1168	150	366	185.6	2.74	339	857	1196
26	268	131.1	10.3	236	933	1169	155	368	186.7	2.68	341	855	1196
28	271	132.8	9.85	239	930	1169	160	371	188.3	2.6	344	853	1197
30	274	134.4	9.46	243	929	1172	165	373	189.4	2.54	346	851	1197
32	277	136.1	9.1	246	927	1173	170	375	190.6	2.47	348	849	1197
34	279	137.2	9.05	248	925	1173	175	377	191.7	2.41	351	847	1198
35	281	138.1	9	250	924	1174	180	380	193.3	2.31	353	845	1198
36	282	138.9	8.42	251	923	1174	185	382	194.4	2.29	355	843	1198
38	284	140.0	8.08	253	922	1175	190	384	195.6	2.24	358	841	1199
40	286	141.1	7.82	256	920	1176	195	386	196.7	2.19	360	839	1199
42	289	142.8	7.57	258	918	1176	200	388	197.8	2.14	362	837	1199



Equivalents

Measure

- 1 in = 25.4 mm
- 1 in = 2.54 cm
- 1 mm = .03937 in
- 1000 mm = 1 meter
- 1 microinch = .0254 microns
or micrometers

Surface Finish Approximations

RMS (microinch)	RMS (micron)	RA (microinch)	RA (micron)	Grit Media Size
80	2.03	71	1.80	80
58	1.47	52	1.32	120
47	1.20	42	1.06	150
34	0.86	30	0.76	180
17	0.43	15	0.38	240
14	0.36	12	0.30	320

A "No. 4 Polish" is approximately equal to Ra 32 microinch
 A "Sanitary Finish" is approximately equal to Ra 14 microinch
 A "No. 8 Finish" (Mirror Like) is approximately equal to Ra 2 microinch

Weight

- 1 gal water = 8.34 lbs
- 1 lb water = .4545 kg
- 1 cu ft water = 62.4 lb
- 2.205 lbs = 1 kg

Temperature Conversion

$$T_f = 1.8 T_c + 32$$

$$T_c = \frac{T_f - 32}{1.8}$$

Volume

- 1 gal = 3.785 liters
- 1 gal = 231 cu in
- 1 cu ft = 7.5 gal
- 1 cu ft = 28.317 liters
- 1 microinch = .0254 microns
or micrometers

Energy-Heat

- 1 btu = 252 calories
- 1 btu = 0.252 kilocalories
- 1 HP = 2545 btu
- 1 HP = 746 watts
- 1 KW = 3412 btu
- 1 BHP = 9.8 KW
- 1 BHP = 33,475 BTUH

Physical Properties

Density

- 300 Series Stainless Steel = .284 lb / cu in
- 1000 Series Carbon Steel = .283 lb / cu in
- Water = .036 lb / cu in
- Glass = .0939 lb / cu in
- Aluminum = .0975 lb / cu in
- Air = .0805 lbs / cu ft
- Silicone Rubber = .04 to .05 lbs/ cu in

Specific Heat (°F)

- 300 Series Stainless Steel = .12 btu/lb
- Aluminum = .24 btu/lb
- Water = 1 btu/lb
- Air = .24 btu/lb
- Glass = .20 btu/lb
- Polycarbonate (Lexan) = .30 btu/lb
- Polyester = .2-.35 btu/lb
- Nylon = .3-.5 btu/lb
- Silicone Rubber = .45 btu/lb
- Cotton = .31 btu/lb

Electrical Current (Motors)

$$\text{Amps} = \frac{\text{HP} \times 747 \text{ Watts/hp}}{\text{Line Voltage}}$$

Electrical Current (Resistance Heat)

$$\text{Amps} = \frac{\text{KW} \times 1000}{\text{Line Voltage} \times 1.73}$$