SANI-MATIC®

SaniCab® PC Cabinet Washer

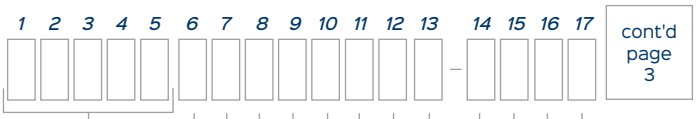
Technical Datasheet

Cleaning Confidence

(p) 800-356-3300 (f) 608-222-5348 **sanimatic.com**

Model Number Key

Example Model #: PC335-1000EGN1-10P4-000-00000C



1–5	**Chamber Model**	
	PC335	34" W x 36" D x 65" H
	PC365	34" W x 73" D x 65" H
6	**System Configuration**	
	1	Right Handed (Standard)
	2	Left Handed
7	**Chamber Insulation**	
	0	Insulated Door / Front Face (Standard)
	1	Side Wall Chamber Insulation
8	**Dryer System**	
	0	No Dryer System (Standard)
	1	Dryer System
	2	Dryer System + HEPA Filtration
9	**Exhaust Fan**	
	0	No Exhaust Fan (Standard)
	1	Exhaust Fan
10	**Recirculated Heating**	
	E	Electric Heater (Standard)*
	X	Heat Exchanger - Steam
	N	No Recirculated Heating
11	**Supply Pressure Monitoring**	
	G	Pressure Gauge (Standard)
	T	Pressure Transmitter
12	**Supply Flow Monitoring**	
	N	No Flow Monitoring (Standard)
	S	Flow Switch
	M	Flow Meter
13	**Chemical Control**	
	1	Wash Conductivity Control (Standard)
	2	Wash & Rinse Conductivity Control
14	**Controls**	
	1	Allen-Bradley CompactLogix 5380 Controller (Standard)
15	**Reporting**	
	0	No Reporting (Standard)
	L	SaniTrend® Local
	E	SaniTrend® Cloud CR Essentials
	C	SaniTrend® Cloud CR Insights
	P	SaniTrend® Cloud CR Insights+
16	**Conduit**	
	P	PVC Conduit (Standard)
	C	PVC Coated Conduit
	S	Stainless Steel Conduit
17	**Electrical Utility**	
	4	460V AC, 3PH, 60Hz (Standard)

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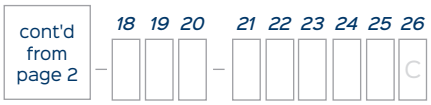
**Does not conform to 3-A/NSF 14159-1 standard*

Model Number Key

Example Model #: PC335-1000EGN1-10P4-000-00000C



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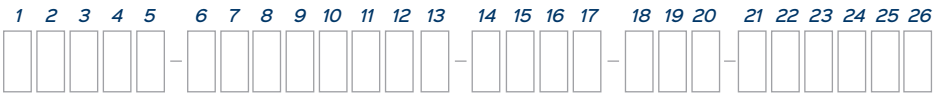
18	**Water Addition**	
	0	Dual Water Ports (Standard)
	1	Dual Water Ports with (1) Pneumatic Valve
	2	Dual Water Ports with (2) Pneumatic Valves
19	**Chemical Addition**	
	0	Triple Chemical Ports (Standard)
	1	Triple Chemical Ports with (1) Chemical Block Valve
	2	Triple Chemical Ports with (2) Chemical Block Valves
	3	Triple Chemical Ports with (3) Chemical Block Valves
20	**Chemical Flow Metering**	
	0	No Chemical Flow Metering (Standard)
	1	(1) High Range Chemical Flow Meter Assembly
	2	(2) High Range Chemical Flow Meter Assemblies
	3	(3) High Range Chemical Flow Meter Assemblies
	4	(1) Low Range Chemical Flow Meter Assembly
	5	(2) Low Range Chemical Flow Meter Assemblies
	6	(3) Low Range Chemical Flow Meter Assemblies
	7	(1) High Range & (1) Low Range Chemical Flow Meter Assembly
	8	(2) High Range & (1) Low Range Chemical Flow Meter Assemblies
	9	(1) High Range & (2) Low Range Chemical Flow Meter Assemblies
21	**Active Coupler**	
	0	No Active Coupler (Standard)
	1	Active Coupler*
22	**Spray Rotation Verification**	
	0	No Spray Arm Rotation Verification (Standard)
	1	Spray Arm Rotation Verification
23	**Pump Casing**	
	0	Without Casing Drain (Standard)
	1	With Casing Drain and Valve
24	**Valve Type**	
	0	Butterfly Valves (Standard)*
	D	Disk Valves
	S	Seat Valves
25	**Weld Configuration**	
	0	Manual Process Piping Welds
	1	Orbital Process Piping Welds with Weld Documentation

**Does not conform to 3-A/NSF 14159-1 standard*

Model Number:



Combine numbers 1-17 from page 2 and numbers 18-25 from page 3 for a complete Model Number.

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1. Introduction

Technical information provided within this document is for Sani-Matic's Configured Design Offering (CDO) of the SaniCab PC cabinet washer.

Alternative Design Requests (ADRs) for variations in construction, size, component manufacturers, options, orientation, or other technical requirements should be directed to a Sani-Matic representative or a sales channel for custom quoting and engineering.

The system details described in *Section 2* through *Section 9* apply to the system and its standard options, which are designated with "(Standard)" in the model key. The selectable product options within the model key are described in *Section 10*. Racks and transfer carts are described in *Section 11* and accessories such as rack additions, system additions, documentation, and services are described in *Section 12*.

2. Applications

The SaniCab PC cabinet washers are used to wash a variety of process parts, including buckets, trays, totes, filler parts, hoppers, filter housings, scoops, hoses, fittings, clamps, gaskets, valves, and more. With the addition of the Buggy Inverter, the SaniCab PC can also wash standard size buggies commonly used for product processing.

For the available usable space dimensions and volumes see *Table 5: Usable Space Dimensions*.


Filler Parts


Hoppers


Pans


Hoses & Fittings


Scoops


Glassware

3. Construction

3.1 Certifications and Classifications

- **Electrical Area Classification:** Non-hazardous
- **Electrical Certification:** UL 508A
- **Seismic Design:** None
- **System Certifications:** 3-A/NSF 14159-1 (Certification Pending)

Table 1: Non-Compliant 3A/NSF 14159-1 Options

Model Key Item	Non-Compliant Option
10 - Recirculated Heating	E - Electric Heater
21 - Active Coupler	1 - Active Coupler
24 - Valve Type	0 - Butterfly Valve

3.2 Structural Framing

- **Design:** Open frame
- **Material:** 316L/304 stainless steel angle
- **Surface Finish:** 316L material to be 32µin Ra or better with non-wetted welds color cleaned and wetted welds ground and polished
- 304 material to be mill finish and bead blasted
- Fully welded single-piece construction
- Five (5) hygienically sealed adjustable feet for locating the equipment at a fixed location in the facility. The adjustability allows the equipment to be leveled on uneven or sloped surfaces.

3.3 Sanitary Piping

- **Material:** 316L stainless steel sanitary BPE tube and BPE fittings
- **Surface Finish:** 32µin Ra ID / OD
- **Welding:** Welds are performed manually per AWS D18.1 / D18.1M standards (latest edition). The weld interior is argon gas purged.
- **Weld Finish:** As-welded ID / weld color removed OD
- **Slope:** 1/8" per foot / 1.0% (GSD2)
- **Connections:** Tri-clamp fittings with single hinged heavy-duty clamps with wing nuts
- **Gasket Material:** EPDM

NOTE:

- Based on other product selections, other welding configurations may be available (see *Section 10.18 Weld Configuration*)

3.4 Electrical Conduit

- **Rigid Conduit:** SCH 40 PVC
- **Flexible Conduit and Fittings:** UL listed PVC with nylon fittings
- Instruments requiring calibration are provided with extra cord to allow the device to remain connected and moved to a calibration cart

3.5 Pneumatics

- **Location:** Instruments such as pressure regulators and solenoids are mounted inside the control panel. The air filter is located on the bottom of the control panel
- **Material:** Interconnections within the control panel and pneumatic air lines from the control panel to the skid-mounted valves and equipment are run in a polyethylene tube

4. Utility Requirements

The following are the minimum required utilities for the proper operation of the system.

Table 2: Utility Requirements

Chamber Model		PC335	PC365
Water - Supply	**Connection Size / Type**	1.5" TC	1.5" TC
	Working Volume (gal)	35	60
Drain	**Connection Size / Type**	3.0" TC	3.0" TC
	Flow Rate (gpm)	55	55
	Time to Completely Drain (s)	40	70
Instrument Air	**Connection Size / Type**	0.5" FNPT	0.5" FNPT
	Volume (scfm)	5	5
Electrical	**Disconnect Size @ 460V AC (amps)**	100	100
Chemical	**Connection Size / Type**	0.75" TC	0.75" TC
Exhaust	**Connection Size / Type**	12" FLG	12" FLG

NOTE:

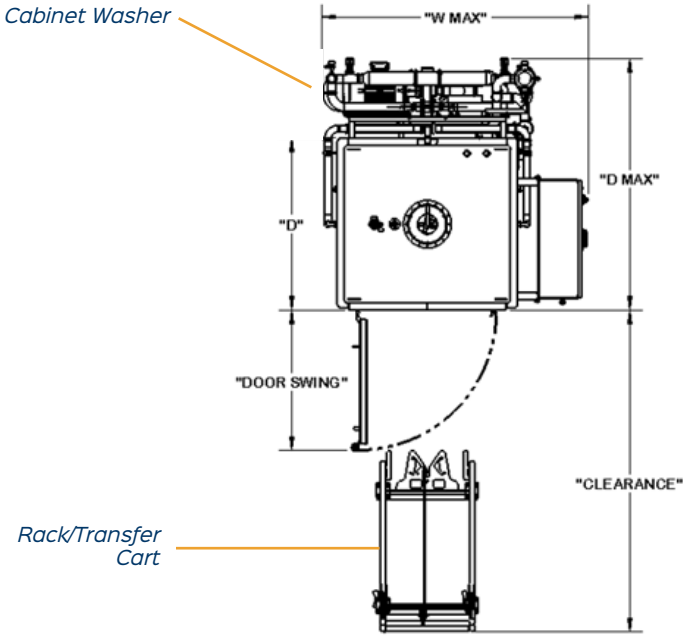
- Drain and exhaust temperatures are variables based on the cycle.
- Exhaust connection is shared with the dryer system (see *Section 10.3 Dryer System*). Due to temperature variations within the chamber, this connection must not be blocked.
- Water Supply:
  - Two (2) Water supply connections are provided.
  - The working volume is the typical chamber water volume required for the operation of a single cleaning cycle phase. Rack design and configuration may impact the working volume requirements.
  - Total water volume required per cleaning cycle is dependent on cleaning cycle phases – e.g., a typical PC335 cleaning cycle with re-used final rinse for the next pre-rinse may contain three (3) fills, requiring 105 gallons per cleaning cycle.
  - Varying water supply temperatures are accommodated.
- Chemical:
  - Three (3) chemical ports located in the recirculation pump suction manifold are provided.
  - Non-foaming and non-chlorinated chemicals are required for effective and safe operation of the SaniCab PC.
  - See *Section 12.2.2 Chemical Pump Assembly – Diaphragm Pump* for a loose ship chemical pump system solution.
  - See *Section 12.2.3 Chemical Pump Assembly – Electronic Metering Pump* for a loose ship chemical pump system solution with finer chemical controls.
  - See *Section 12.2.4 Chemical Delivery Skid – Diaphragm Pump* for a complete chemical system solution skid to add to the system.
  - See *Section 12.2.5 Chemical Delivery Skid – Electronic Metering Pump* for a complete chemical system solution skid with finer chemical controls.

5. Physical Size & Layout

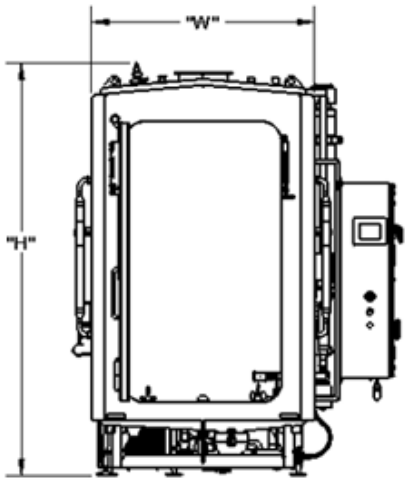
The following is the approximate overall size of the equipment. The standard system orientation is a right-handed configuration, with the HMI interface and controls on the right when viewing the system from the load side.

Table 3: System Size

Chamber Model	System Dimensions			Max System Width - W Max (in)	Max System Depth - D Max (in)	Open Door Depth - Door Swing (in)	Open Door Depth and Cart Length - Clearance (in)	System Weight (lbs)
	W"	D"	H"					
PC335	51	53	100	81	77	43	96	3,700
PC365	51	88	120	81	117	43	136	4,200



Plan View



Front View

NOTES:

- The **Right-Handed** system configuration, featuring some non-standard options, is shown in the above image.
- The "CLEARANCE" dimension includes the length of the chamber door and the associated rack positioned in front of the door.
- System dimensions and system weight listed are for a system with all standard options.
  - System operating weight is dependent on the construction of the loaded rack.
- The PC365 has two (2) 12" flanged connections on the top of the cabinet that are combined into one (1) 12" flanged connection with a shared duct manifold (not shown).
- All selectable product options within the model key fit within the footprint shown except for non-standard model key selections made within the following options:
  - **Dryer System** (See *Section 10.3 Dryer System*)
  - **Exhaust Fan** (See *Section 10.4 Exhaust Fan*)
  - **Heat Exchanger - Steam** (See *Section 10.5 Recirculated Heating*)

6. Component Manufacturers

The following are all the preferred manufacturers of the major components used on the SaniCab PC. Actual component manufacturers may change due to availability. Inclusion of certain components are dependent on product option selections.

Table 4: Component Manufacturers and Models

Component	Manufacturer	Model
Chamber - Electromagnetic Lock	ABB	Magne 4X
Chamber - Level Transmitter	Endress Hauser	FMB50
Chamber - Sight Glass	Sani-Matic	VL-3A
Chamber - Sight Glass Light	Sani-Matic	VessaLite™
Chemical Control - Conductivity Sensor	Endress+Hauser	CLS82D
Chemical Delivery – Metering Pump	Pulsafeeder	Series E Plus
Chemical Delivery – Diaphragm Pump	Wilden	P.025
Controls - Human Machine Interface (HMI) Display	Allen-Bradley	PanelView™ Plus 7 - 7" Operator Terminal
Controls - PLC	Allen-Bradley	Bulletin 5069 CompactLogix 5380 Controller
Drain – Angle Seat Valve	Pentair	SVP S380
Drain – Diaphragm Valve	Burkert	2030
Dryer – Butterfly Valve	Dixon	B5101
Dryer – Centrifugal Fan	Cincinnati Fan	PBS
Dryer – Electric Heater	Tutco-Farnam	Flow Torch TM
Dryer – HEPA Filter	Flanders	Alpha 2000
Exhaust - Fan	New York Blower Company	Size 12 STF
Piping - Conductivity Sensor	Endress+Hauser	CLD18
Piping - Conductivity Sensor	Endress+Hauser	CLS82D
Piping - Flow Meter	Anderson-Negele	HM
Piping - Electric Heater	ASB Heating Elements Ltd.	PFSU
Piping - Pump	Fristam	FPX
Piping - Recirculation Strainer	Sani-Matic	Angle-Line Strainer
Piping - Temperature Transmitter	IFM Efector	TD2913
Piping - Zone Valve	VNE	PVE
Piping - Zone Valve	Sudmo	SVP Select
Piping - Zone Valve	Lumaco	LUD7
Steam Heating - Angle Seat Valve	Burkert	2300
Steam Heating - Shell & Tube Heat Exchanger	Enerquip	6x24 BEUB
Steam Heating - Steam Trap	Watson McDaniel	WFT Series
Water Delivery – Angle-seat Valve	Burkert	2000

7. Equipment Description

7.1 Chamber

Each chamber model contains rotary spray assemblies mounted to the top, sides, and bottom of the chamber. The cleaning solution is delivered to the rotary sprays through the recirculation manifold. The spray assemblies provide repeatable spray coverage to the parts during all phases of the cleaning cycle (pre-rinse, chemical washes, final rinse).

Each spray assembly includes a series of drilled spray holes with an offset spray ball sized to deliver the required flow and pressure to the rack of parts to be cleaned and to the chamber interior. The spray assemblies are fluid-driven and constructed of 316L stainless steel with polyetherimide (PEI) rotary hub and Teflon (PTFE) bushings. Each spray assembly is easy to remove for inspection and service.

PC335 Chamber Interior

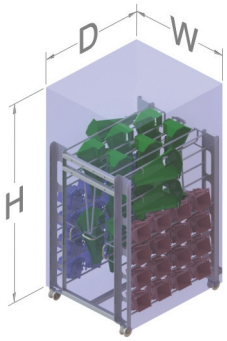
- **Chamber construction**
  - **Installation Type:** Floor Mounted
  - **Chamber Insulation:** None
  - **Door Insulation:** Ceramic fiber covered w/ stainless steelsSheathing
  - **Door:** Manually operated side hinged door with a borosilicate glass viewing port
  - **Design:** Atmospheric
  - **Material:** 316L stainless steel (wetted and non-wetted surfaces)
  - **Thickness:** 12 ga.
  - **Interior Finish:** 32µin Ra with welds ground smooth and polished
  - **Exterior Finish:** 32µin Ra with welds color cleaned
- **Chamber connections and components**
  - One (1) Sump outlet connection
  - Six (6) Rotary spray assemblies (PC335 model) or twelve (12) rotary spray assemblies (PC365 model)
    - ◊ Each spray assembly is manufactured with strategically located spray orifices and include a removable spray ball on the end of the arm for additional spray coverage
  - Two (2) Rail assemblies for rack guidance with load side wheel stops
  - One (1) strainer basket with 3/32" perforations, 75 cu. in. (see photo at right for confirmation) capacity, and removable vortex breaker
  - One (1) Sump level transmitter with 0-40" range and 4-20 mA output
  - Two (2) Water inlet connections, 1.5" tri-clamp
  - One (1) 12" FLG combined dryer/exhaust outlet
  - One (1) Automated door lock with magnetic latch and an integrated proximity switch
  - One (1) 2.0" Overflow
  - One (1) 2.5" port for VessaLite™ chamber light
  - One (1) 2" gooseneck vent

Removable Strainer Basket

Usable chamber dimensions vary by model size, as shown in *Table 5: Usable Space Dimensions*. The usable space dimensions identify the practical space available for parts loading on the rack.

Table 5: Usable Space Dimensions

Chamber Model	Usable Space Dimensions			Usable Space Volume (ft^3)
	W"	D"	H"	
PC335	34	36	65	46
PC365	34	73	65	93



Usable Space Dimensions

7.2 Recirculation System

The recirculation system draws cleaning solution from the chamber sump and distributes it to the chamber's rotary sprays. It is self-contained within the system's footprint.

- **Recirculation system components**
  - One (1) 3.0" tri-clamp pneumatic butterfly valve for system drain
  - Two (2) pneumatic butterfly valves for chamber zone selection (PC365 Model)
  - Three (3) 0.75" tri-clamp chemical injection ports
  - One (1) centrifugal supply pump
    - ◊ 316L stainless steel wetted materials with EPDM elastomers
    - ◊ 3500 rpm, TEFC Washdown Duty (IP55) motor
  - One (1) Angle-Line Strainer with tri-clamp connections
  - One (1) Strainer Insert (0.015" wedgewire, reverse rolled, 3-A/NSF 14159-1 compliant)
  - One (1) temperature transmitter with 30-230°F range and 4-20 mA output
  - Two (2) pressure gauges with a 0-100 psi range
    - ◊ The pressure gauges are installed with one upstream and one downstream of the Angle-Line Strainer. This allows for monitoring of the soil loading of the Angle-Line Strainer through differential pressure.
  - One (1) sanitary piping manifold
  - One (1) sample valve for operator sampling

Table 6: Pump Data

Chamber Model	HP	Pump Rating	
		gpm	psi
PC335	15	200	50
PC365	15	200	50

NOTE:

- The PC365 model has two separate wash zones allowing for water to be directed either to the front of the chamber or to the back of the chamber.
- The standard butterfly valves do not meet 3-A Sanitary Standards.

7.3 Heating System

The electric immersion heater is the standard heating option within the recirculation system. The following components are included:

- One (1) Sanitary heater housing assembly
- One (1) Inline electric immersion heater
  - **Material:** 316L Stainless Steel
  - **Connections:** Tri-clamp
  - **Size:** See *Table 7: Electric Heater Data*
  - **Protection:** High-temperature thermocouple

Table 7: Electric Heater Data

Chamber Model	Electric Heater Size (kW)	Approx. Heat-up Time 68 °F to 140 °F (min)
PC335	45	9
PC365	45	18

NOTES:

- The typical temperature drop of the cabinet wash water is 20°F due to the required heating of the cabinet, rack, and parts. The electric heater will take approximately 2-3 minutes per cleaning cycle step to recuperate this initial heat loss.
- The standard electric heater does not meet 3-A Sanitary Standards.

7.4 Control System

7.4.1 Control Panel

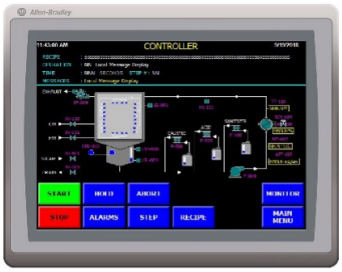
This control panel houses the components used to control the system and is skid mounted.

- One (1) UL Listed enclosure, NEMA 4X, 316L stainless steel construction with a painted carbon steel backplate
- One (1) Allen-Bradley Bulletin 5069 CompactLogix 5380 Controller with associated digital and analog inputs and outputs
- One (1) Ethernet switch, 5-port unmanaged
- One (1) 24V DC, 10 Amp power supply
- Air solenoid valves (as required)
- One (1) Low air pressure alarm switch
- One (1) Instrument air filter
- One (1) Instrument air pressure regulator with gauge
- One (1) Disconnect switch rated for 100 Amps
- One (1) 15 HP motor starter
- One (1) Transformer to convert the incoming 3-phase power to other needed voltages
- Twenty (20) ft. of SO cord power cord (plug not included)

7.4.2 Operator Interface

Operator interfaces include the HMI and other components installed on the control panel.

- One (1) Allen-Bradley PanelView Plus 7 from Rockwell Automation - 7" color touchscreen, Operator Terminal (HMI)
- One (1) Illuminated emergency stop switch
- One (1) Illuminated reset button
- One (1) 120V AC GFCI Receptacle
- One (1) RJ45-F Ethernet Passthrough



8. Equipment Operation

8.1 System Operating Conditions

- **Maximum System Operating Temperature:** 190°F (Rinse & Wash Phases)
- **System Noise Levels (Approximate):** 80 dBA (Rinse & Wash Phases), 70 dBA (Dryer Phases)

NOTE:

- Achievable operating temperatures are dependent on system options and utility conditions.

8.2 Loading and Unloading Operation

- **Loading**
  - Dirty parts are loaded onto the appropriate rack (racks sit atop a transfer cart)
  - The transfer cart is pushed from the process area to the SaniCab PC system
  - The operator opens the SaniCab PC door
  - The transfer cart with rack is positioned in front of the SaniCab PC doorway and is pushed into the rail assembly inside the washer for engagement and locking
  - The transfer cart's rack engagement lock is lifted, and the rack is pushed from the transfer cart into the chamber
  - The operator disengages the empty transfer cart from the rail assembly, pulls the transfer cart away from the chamber, and closes the SaniCab PC door
  - The operator inflates the door & selects the appropriate cleaning cycle (also known as recipes) via the HMI operator terminal

- **Unloading**
  - The operator deflates the door gasket via the HMI operator terminal
  - The operator opens the SaniCab PC door after the cleaning cycle has ended (cleaning cycle completion is indicated on the HMI)
  - An empty transfer cart is positioned in front of the SaniCab PC door and is pushed into the rail assembly inside the washer for engagement and locking
  - The process parts rack is pulled from the chamber onto the transfer cart
  - The operator disengages the transfer cart from the rail assembly, pulls the transfer cart away from the chamber, and closes the door
  - The transfer cart is pushed from the SaniCab PC system to the process area
  - Clean process parts are unloaded off the rack

8.3 Cleaning Cycle

The following is an example of a typical SaniCab PC cleaning cycle with two (2) chemical wash steps – one caustic wash and one final sanitize step. Water fill and drain steps are performed between each rinse or wash phase.

- Rinse
- Caustic Wash
- Rinse
- Final Rinse with Sanitizer
- Heated Drying (requires **Dryer System**: see *Section 10.3 Dryer System)*

A typical cleaning cycle duration (without heated drying) is between 15 and 45 minutes. The cleaning cycle time required is dependent on many user-defined variables unique to each application, including soil conditions, required number of wash and rinse phases, available utilities, recirculated heating selection, drying requirements, and more.

As standard, the final rinse water is not followed by a drain step to reduce water usage by reusing the water for the next cleaning cycle's first rinse. This water-saving step is not recommended for systems with a dryer or when there are concerns of cross-contamination (e.g., allergens) between cleaning cycles.

When the optional Dryer System is selected, a heated drying phase typically adds an additional 10 and 30 minutes to the cleaning cycle duration. The Exhaust Fan can provide an additional step to remove water vapor and humidity from the chamber after the final rinse. All cleaning steps are set up as individual operation codes (Opcodes) enabling full customization of cleaning cycles.

8.4 System Automation

Sani-Matic provides all programming of the HMI and PLC, enabling automation of the provided system. For additional custom system automation (e.g., Custom HMI Screens, Additional Security Levels, External System Communications), see the System Automation options.

- Cleaning sequences will be automatically controlled using wash cycle recipes.
- Up to (40) different recipes can be stored in the PLC.
- Each recipe has its own setpoint values (e.g., time, temperature, conductivity) which are adjustable.
- Up to (96) individual steps per recipe.
- Each step in the recipe is composed of Operation Codes (Opcodes) which define the phase of the wash cycle (e.g., caustic wash, final rinse). Opcodes can be arranged, omitted, or duplicated within the recipe as needed.
- Up to (96) unique Opcodes.
- Measured process variables have alarms with adjustable high/low setpoint values.
- Up to (96) different setpoint values (e.g., time, temperature, conductivity).
- The operator will have the ability to initiate, monitor and edit (with correct security level) the wash cycle, recipes, and setpoint values via the HMI.
- (3) HMI security levels are included.
- HMI User security is setup for local users. If desired, Active Directory User Authentication can be setup by the facility in which the system is installed.

8.5 Automation Interfaces

The standard system reserves two (2) digital output signals for water fill, as well as three (3) digital output signals for chemical addition. These signals are used to activate external equipment (e.g., water fill valve, solenoid for the chemical pump) for water fill and chemical addition cycle steps. The control system monitors and alarms these incoming utilities as required. Additional I/O signals may be available (depending on selected options) to allow for an additional interface that may be unique to the individual application of the system (see *Section 12.2.6 System Automation* for additional information).

9. Documentation

One (1) hard copy and (1) electronic copy of the documentation package is provided as standard. The documentation is provided in the English language and includes the following information:

- Warranty information
- Operation and maintenance manuals
- HMI user and maintenance manuals
- Recommended Spare Parts (RSP) list
- Mechanical Bill of Materials (BOM)
- Component vendor documentation
- As-built General Assembly (GA) drawings
- As-built Process and Instrumentation Diagram (P&ID)
- As-built electrical drawings

10. Product Options

10.1 System Configuration

The **Left-Handed configuration** will provide a mirror image of what is shown in the front view of *Section 5 Physical Size and Layout*. The HMI interface and controls will be located on the left side of the machine and the door will hinge open from the right side of the machine.

10.2 Chamber Insulation

In addition to the insulated door / front face, the **Side Wall Chamber Insulation** option adds ceramic fiber insulation to back, left side, and right side of the chamber. The insulation is encapsulated in a fully welded stainless steel sheathing.

This insulates the chamber, helping to maintain interior temperatures by reducing any fluctuations from ambient temperatures and increases worker safety.

10.3 Dryer System

The **Dryer System** option allows for heated drying and cooling phases to be included at the end of the cleaning cycle. These phases significantly reduce the amount of residual final rinse water on the parts and rack within the chamber before unloading the rack onto a transfer cart.

The **Dryer System & HEPA Filtration** option adds a HEPA filter to the Dryer System option. The HEPA filter can remove dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns from the dryer air, preventing any opportunities for contamination during the drying process.

Air is pulled from the surrounding area and discharged through the exhaust duct on the top of the cabinet. It is recommended that this exhaust air be ducted to an HVAC system or external environment.

The following components and necessary controls are added to the system:

- **Dryer System** Option
  - **Components**
    - ◊ One (1) Centrifugal fan
      - 400 ACFM at 6" W.C.
      - Direct drive
      - 1 HP TENV Motor
      - 304 stainless steel construction
    - ◊ One (1) 10-micron fan suction pre-filter
    - ◊ One (1) Inline electric heater
      - 24 kW
      - 460V AC, 3PH, 60Hz
      - High-temperature thermocouple

◊ One (1) temperature transmitter with 30-230°F range and 4-20 mA output
◊ One (1) butterfly valve (PC335 model) or two (2) butterfly valves (PC365 model)
• Pneumatically operated
◊ 304 stainless steel ducting (flanged upstream of butterfly valve; tri-clamp downstream of butterfly valve(s) with EPDM gaskets)

– **Installation**
◊ Mounted directly onto the backside framework of the SaniCab PC

– **Electrical Components**
◊ One (1) 1 HP motor starter for the dryer supply fan
◊ One (1) Contactor for dryer electric heater
◊ One (1) Controller for dryer electric heater

• **Dryer System & HEPA Filtration** Option
– All the above components are included, and the following are added:
◊ 0.3 Micron fiberglass HEPA filter
◊ One (1) differential pressure transmitter with 0-5.00" W.C. range and 4-20 mA output

Table 8: Dryer Utility Requirements

Chamber Model	Electrical - Dryer	Dryer Air - Supply			Component Weights	
	Disconnect Size @ 460V AC (amps)	Volume (acfm)	Temperature (°F)	Humidity (% RH)	Dryer System (lbs)	Dryer System & HEPA Filtration (lbs)
PC335	200	400	70	70	450	510
PC365	200	400	70	70	625	675

NOTES:

- Dryer utilities are shown in *Table 8: Dryer Utility Requirements*.
- All **dryer system** options add up to 20" in height to the overall SaniCab PC system dimensions (see *Table 3: System Size*).
- The component weights for the selected option are to be added to the System Weights (see *Table 3: System Size*).
- The **dryer system** option increases the electrical disconnect size on the main control panel from 100 amps to 200 amps.
- The **dryer system** option produces air temperatures up to 200°F, or greater, depending on ambient temperatures.

10.4 Exhaust Fan

The **Exhaust Fan** option adds a 400 ACFM fan with 12" mounting flange to the top of the SaniCab PC. This option will allow water vapor and humidity to be removed after the final rinse phase.

Table 9: Exhaust Fan Requirements

Chamber Model	Volume (acfm)	Humidity (%RH)
PC335	400	Up to 100%
PC365	400	Up to 100%

NOTE:

- Adding the exhaust fan will increase the overall height of the SaniCab PC system wwdimensions by 20" (see *Table 3: System Size*).

10.5 Recirculated Heating

There are two (2) options that can replace the standard **Electric Heater (Standard)** option for heating the recirculation system's cleaning solution:

- **Heat Exchanger – Steam**
- **No Recirculated Heating**

The **Heat Exchanger – Steam** option removes the electric heater assembly in the standard system and replaces it with a skid-mounted shell and tube heat exchanger system for heating the recirculation system. The following components are added:

- One (1) Steam heat exchanger with the following specifications:
  - **Duty:** See *Table 10: Steam Heat Exchanger Data*
  - **Material:** 316L stainless steel wetted surfaces / 304 stainless steel non-wetted surfaces
  - **Design:** Shell & tube
  - **Rating:** ASME
  - **Connections:** Tri-clamp (sanitary) / NPT (non-sanitary)
- One (1) Steam supply return piping manifold consisting of:
  - One (1) Y-strainer with blow-off valve
  - One (1) Pressure gauge with 0-100 psi range, anti-siphon, and manual block valve
  - One (1) Modulating control angle-seat valve with pneumatic actuator and positioner
  - One (1) Pressure relief valve (set at 125 psi) piped to the floor
  - One (1) Vacuum breaker with brass construction
  - Piping constructed of non-insulated SCH 80 carbon steel weld pipe and socket fittings with all carbon steel pipe and welds covered in high-temperature black paint
- One (1) Condensate return piping manifold consisting of:
  - One (1) Manual ball valve for a condensate drain
  - One (1) Float and thermostatic steam trap
  - Piping constructed of non-insulated SCH 80 carbon steel weld pipe and socket fittings with all carbon steel pipe and welds covered in high-temperature black paint

Table 10: Steam Heat Exchanger Data

Chamber Model	Skid Dimensions			Approx. Heat-up Time 68 °F to 140 °F (min)	Connection Size / Type (Steam Supply)	Connection Size / Type (Condensate Return)	Load (lbs/hr)
	W"	D"	H"				
PC335	20	50	70	3	2" FLG	1.5" FLG	966
PC365	20	50	70	6	2" FLG	1.5" FLG	966

NOTE:

- Sani-Matic standard is to design steam heating applications for 50 psi steam. For installations where the plant-supplied steam is more than 50 psi, a pressure reducing valve (PRV) may be required to be installed (by others).

The **No Recirculated Heating** option removes the electric heater assembly in the standard system's recirculation piping. This option is intended for applications where the supply water temperature is adequate for washing cycles.

10.6 Supply Pressure Monitoring

The **Pressure Transmitter** option replaces the pressure gauge in the recirculation system downstream of the angle-line strainer with a diaphragm type pressure transmitter with local indication. The pressure transmitter has a 0-100 psi range and 4-20 mA output. This option adds system monitoring and alarming capabilities for the recirculation system pressure.

10.7 Supply Flow Monitoring

The **Flow Switch** option adds an insertion probe style flow switch to the recirculation system. The flow switch has a discrete output. This option adds system monitoring and alarming capabilities for the recirculation system flow, based on the discrete output.

The **Flow Meter** option adds a turbine flowmeter with local indication to the recirculation system. The flow meter has a 25-250 GPM range and 4-20 mA output. This option adds system monitoring and alarming capabilities for the recirculation system flow.

10.8 Chemical Control

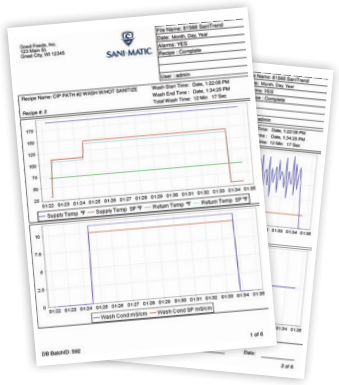
The **Wash & Rinse Conductivity Control** option replaces the standard wash conductivity sensor, which can read between 200µS/cm and 1,000mS/cm with a more sensitive sensor with dual ranges that can read between 1µS/cm to 200mS/cm. The two range options are as follows:

- Wash Conductivity – used for controlling chemical wash steps
  - 0.2 ms/cm – 200 ms/cm Range
- Rinse Conductivity – used for ensuring final rinse conditions (low conductivity) are met
  - 1 µS/cm – 50 mS/cm Range

10.9 Reporting

These options can replace the standard No Reporting option for recording the critical cleaning cycle parameters of the SaniCab PC:

- **SaniTrend® Local**
- **SaniTrend® Cloud CR Essentials**
- **SaniTrend® Cloud CR Insights**
- **SaniTrend® Cloud CR Insights+**



Sample SaniTrend Local Printout

The **SaniTrend® Local** reporting option provides a means of storing, retrieving, and printing the SaniCab PC cleaning cycle data with a desktop PC.

The PC-based reporting system is installed on a desktop PC and interfaces with the Sani-Matic cleaning system's Programmable Logic Controller (PLC) to collect and store cleaning wash cycle data. An authorized user logs into the SaniTrend PC to select recipes by date or time through a recipe selection screen.

When the recipe is selected the user can view the recipe data as Recipe Chart Data, Recipe Charts, and Recipe Events screens.

The system provides easy access to the cleaning cycle data generated. The data collected is recorded, stored, and the information is printable. Reference the SaniTrend Local brochure for more information.

SaniTrend® Cloud Cleaning Records (CR) Essentials is an online data software that provides automated, secure data acquisition and reporting of critical cleaning cycle information, along with system operational efficiency insights. Users, having a facility user login account, access SaniTrend Cloud via a web browser.

The **Essentials** edition of SaniTrend Cloud includes the following:

- (1) Industrial PC / Edge Device to buffer and transmit data to the cloud portal
- Connectivity software installed on the industrial PC / edge device to allow it to connect to the PLC
- SaniTrend Cloud online portal access
- Product features:
  - Cloud Access to Data (Phone, Tablet, Mobile)
  - Unlimited Users
  - Store and Forward Capabilities
  - Cloud Documentation Storage
  - Live Dashboard Views

- Email & SMS (Text) Notification
- Analog & Digital Data Trending
  - ◊ Up to Eight (8) Analog Values and Setpoints (e.g., temperature, conductivity)
  - ◊ Up to Twelve (12) Digital Values (e.g., pump running, heater on)

• Cleaning Cycle Reports
- Unique Cycle ID
- Recipe Name
- Up to Eight (8) Analog Values and Setpoints (e.g., temperature, conductivity)
- Start Date/Time & Stop Date/Time
- Run time (actual)
- Downloadable Reports (Print/PDF)
- Commenting Feature
- Approval Feature

SaniTrend Cloud's information on cleaning cycles and system performance; accessed anywhere by anyone from your team

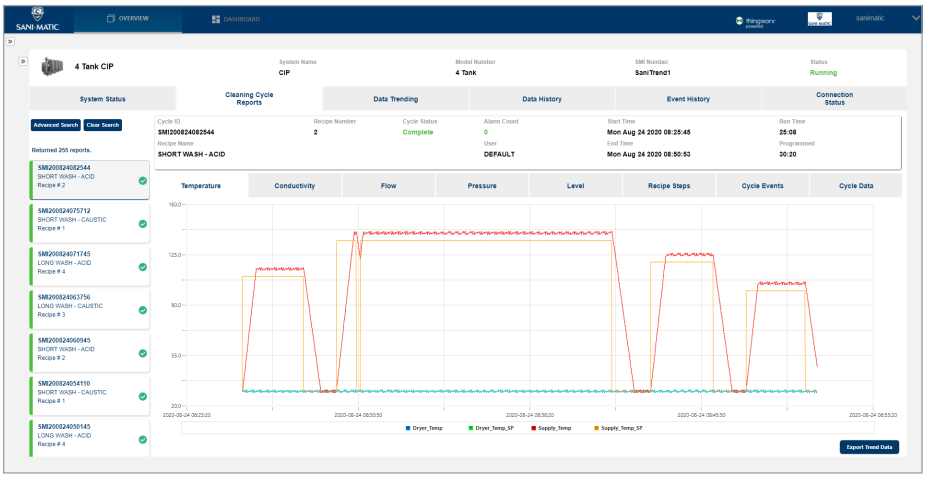
SaniTrend® Cloud – Cleaning Cycle Reports (CR Essentials)

SaniTrend® Cloud Cleaning Records (CR) Insights is an online data software that provides automated, secure data acquisition and reporting of critical cleaning cycle information, along with system operational efficiency insights. Users, having a facility user login account, access SaniTrend Cloud via a web browser.

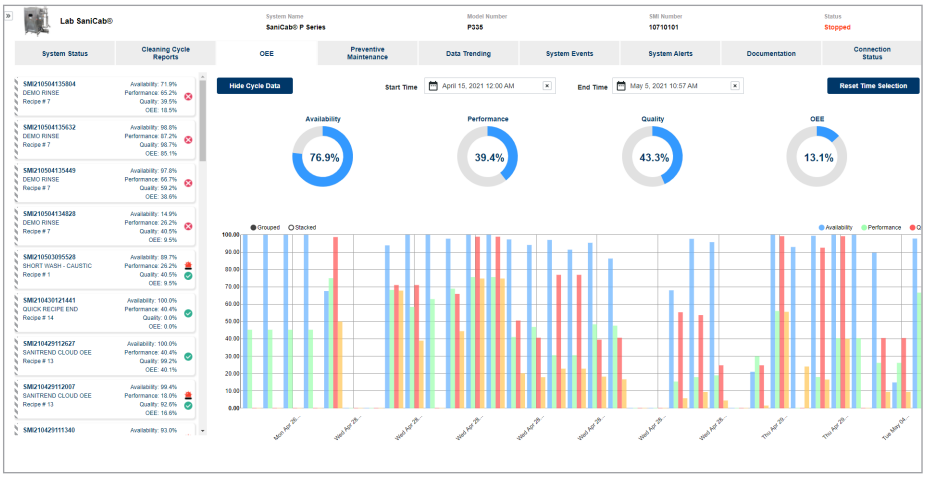
The **Insights** edition of SaniTrend Cloud includes the following:

- (1) Industrial PC / Edge Device to buffer and transmit data to the cloud portal
- Connectivity software installed on the industrial PC / edge device to allow it to connect to the PLC
- SaniTrend Cloud online portal access
- Product features:
  - Cloud Access to Data (Phone, Tablet, Mobile)
  - Unlimited Users
  - Store and Forward Capabilities
  - Cloud Documentation Storage
  - Live Dashboard Views
  - Email & SMS (Text) Notifications
  - Analog & Digital Data Trending
  - Cleaning Cycle Reports
    - ◊ Unique Cycle ID
    - ◊ Recipe Name
    - ◊ Analog Values and Setpoints (e.g., temperature, conductivity)
    - ◊ Start Date/Time & Stop Date/Time
    - ◊ Run time (actual)
    - ◊ Downloadable Reports (Print/PDF)
    - ◊ Commenting Feature
    - ◊ Approval Feature

- Additional Cleaning Cycle Report Insights
  - ◊ Recipe Step Information & Duration
  - ◊ Cleaning Cycle Events (Alarms, Messages, Holds)
  - ◊ Run time (programmed)
  - ◊ User ID
- Event Log
- Overall Equipment Effectiveness (OEE) Scores & Trending
- Preventive Maintenance (PM) Tracking



SaniTrend® Cloud – Cleaning Cycle Reports (CR Insights)



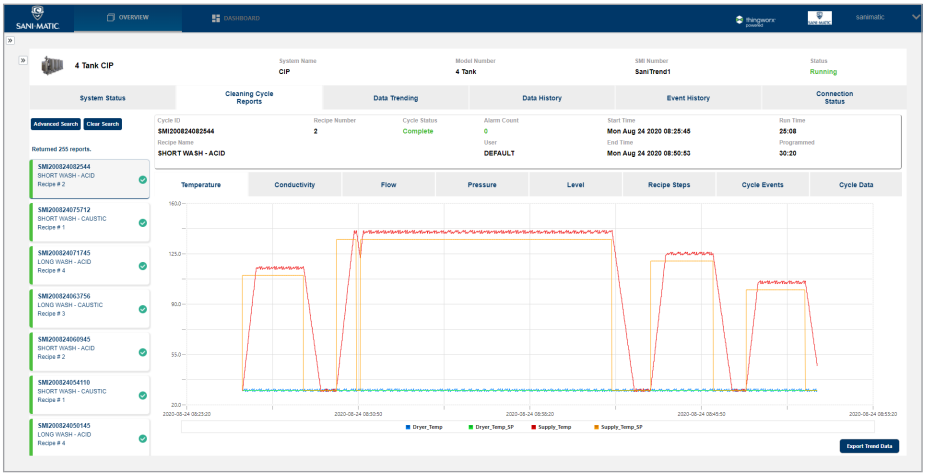
SaniTrend® Cloud – OEE Trending (CR Insights)

SaniTrend® Cloud Cleaning Records (CR) Insights+ is an online data software that provides automated, secure data acquisition and reporting of critical cleaning cycle information, along with system operational efficiency insights. Users, having a facility user login account, access SaniTrend Cloud via a web browser.

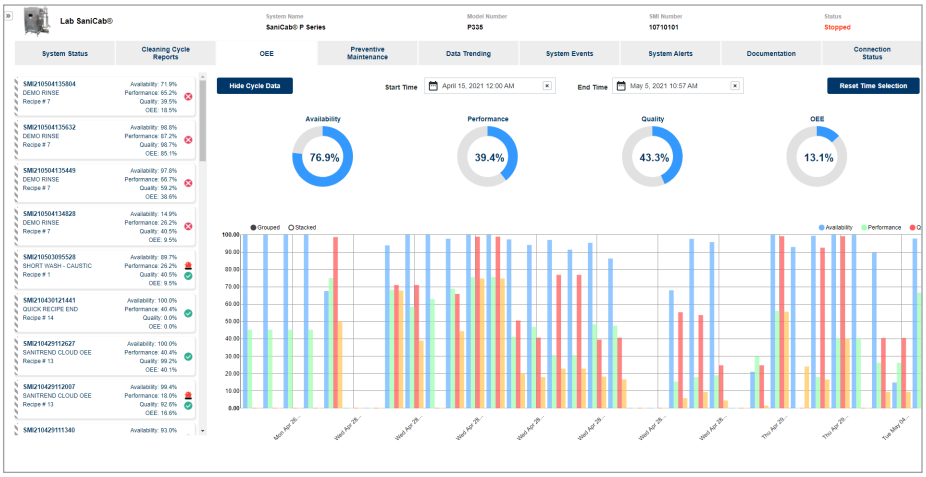
The **Insights+** edition of SaniTrend Cloud is 21 CFR Part 11 compliant for electronic records and signatures and includes the following:

- (1) Industrial PC / Edge Device to buffer and transmit data to the cloud portal
- Connectivity software installed on the industrial PC / edge device to allow it to connect to the PLC
- SaniTrend Cloud online portal access
- Product features:
  - Cloud Access to Data (Phone, Tablet, Mobile)
  - Unlimited Users
  - Store and Forward Capabilities
  - Cloud Documentation Storage
  - Live Dashboard Views
  - Email & SMS (Text) Notifications

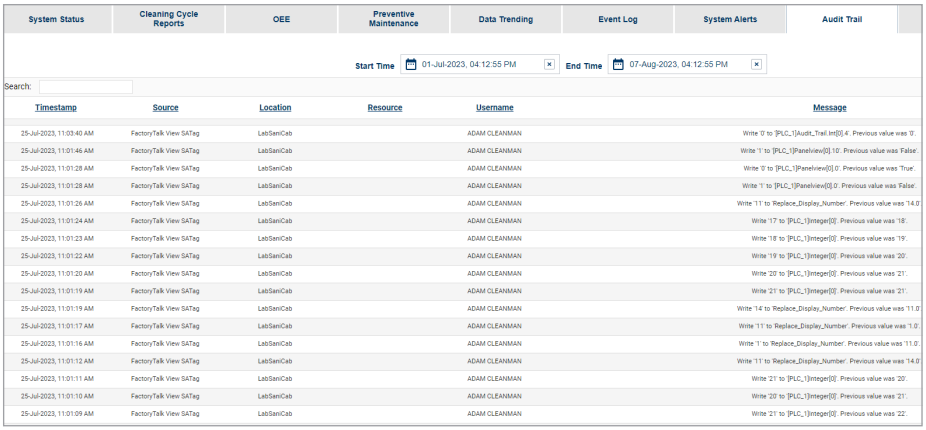
- Analog & Digital Data Trending
- Cleaning Cycle Reports
  - ◊ Unique Cycle ID
  - ◊ Recipe Name
  - ◊ Analog Values and Setpoints (e.g., temperature, conductivity)
  - ◊ Start Date/Time & Stop Date/Time
  - ◊ Run time (actual)
  - ◊ Downloadable Reports (Print/PDF)
  - ◊ Commenting Feature
  - ◊ Approval Feature
- Additional Cleaning Cycle Report Insights
  - ◊ Recipe Step Information & Duration
  - ◊ Cleaning Cycle Events (Alarms, Messages, Holds)
  - ◊ Run time (programmed)
  - ◊ User ID
- Event Log
- Overall Equipment Effectiveness (OEE) Scores & Trending
- Preventive Maintenance (PM) Tracking
- HMI Audit Trail (21 CFR Part 11 Compliance)



SaniTrend® Cloud – Cleaning Cycle Reports (CR Insights+)



SaniTrend® Cloud – OEE Trending (CR Insights+)



SaniTrend® Cloud – Audit Trail (CR Insights+)

NOTES:

- Requires that the equipment be connected to the Internet (by others).
- Find more information and tier comparisons on our SaniTrend® Cloud website page.

10.10 Conduit

There are two (2) options that can replace the standard PVC conduit option:

- The **PVC Coated Pipe Conduit** option utilizes Rob Roy PVC coated conduit and provides a cost-effective hybrid solution where a UL listed PVC coating covers rigid steel tubing. This option has the following specifications:
  - **Rigid Conduit:** PVC coated steel
  - **Flexible Conduit and Fittings:** UL listed PVC coated steel with stainless steel fittings
- The **Stainless Steel Conduit** option provides superior corrosion resistance and protection for all electrical system routings. This option has the following specifications:
  - **Rigid Conduit:** SCH 40 stainless steel
  - **Flexible Conduit and Fittings:** UL listed PVC coated steel with stainless steel fittings

10.11 Water Addition

The standard system comes with two (2) water addition ports, allowing for a customer to install connections for up to two (2) separate water connections based on the connection size and type listed in *Table 2: Utility Requirements*.

The **Dual Water Ports with (1) or (2) Pneumatic Valve(s)** option adds a pneumatically controlled angle-seat valve to the water inlet port (quantity based on option selection). This option will provide a hygienic valving solution and will change the connection size / type listed in *Table 2: Utility Requirements* to 1.5" FNPT (quantity based on option selection).

10.12 Chemical Addition

The standard system comes with three (3) chemical ports, allowing for a customer to install connections for up to three (3) separate chemical injections based on the connection size and type listed in *Table 2: Utility Requirements*.

The **Triple Chemical Ports with (1), (2), or (3) Chemical Blocking Valve(s)** option adds a check valve and a pneumatically controlled diaphragm valve to a chemical injection port (quantity based on option selection). The check valve inlet is remotely mounted on the side of the cabinet and will change the connection size / type listed in *Table 2: Utility Requirements* to 0.5" Tube (quantity based on option selection). This option provides both a hygienic valving solution and ensures a greater level of safety by providing zero leakage.

10.13 Chemical Flow Metering

The **Chemical Flow Metering Assembly** option adds paddle wheel style flow meter(s) to a chemical injection port (quantity and flowrate based on option selection). This option provides feedback quantifying the amount of chemical used and adds system monitoring and alarming capabilities. This option may be required if the chemicals being used are non-conductive or are difficult to measure using conductivity sensors.

To accommodate different chemical injection rates there are two (2) different types of flow meters, low and high flow. The respective flowrate ranges for each type are listed in *Table 11: Flow Meter Data*.

Table 11: Flow Meter Data

Flow Meter Type	Flowrate Range (GPH)
Low Flow	2.6 - 27
High Flow	5.3 - 66

NOTES:

- The "Low Flow" flow meter should be selected when using accessory *12.2.3 Chemical Pump Assembly – Electronic Metering Pump* or *12.2.5 Chemical Delivery Skid – Electronic Metering Pump*.
- The "High Flow" flow meter should be selected when using accessory *12.2.2 Chemical Pump Assembly – Diaphragm Pump* or *12.2.4 Chemical Pump Assembly – Diaphragm Pump*.

10.14 Active Coupler

The **Active Coupler** option adds an active coupler distribution zone to the cabinet washer supply. This zone, when combined with an active rack, allows for cleaning of hard-to-access areas of container-like parts (e.g., jugs with narrow openings), the insides of long narrow parts (e.g., hoses), and other complex parts. The following components are added to the system:

- Two (2) Pneumatic butterfly valves (PC335 model) or one (1) pneumatic butterfly valve (PC365 model) for zoning of the chamber sprays and the active coupler.
- One (1) Active coupler, spring-loaded
- Associated process piping
- System automation for added zone valves

Active Coupler inside Wash Chamber

NOTE:

- The Active Coupler option is not 3-A/NSF 14159-1 certified.

10.15 Spray Rotation Verification

The Spray Arm Rotation Verification option adds a 316L stainless steel encased magnet to each spray assembly to confirm rotation during all phases of the cleaning cycle. Magnetic proximity switches are mounted outside of the chamber and do not intrude inside the chamber.

Rotary Spray Arm with Encased Magnets

10.16 Pump Casing

The **With Casing Drain and Valve** option adds a diaphragm valve onto the pump case drain so that it can be fully drainable. The valve has the following specifications:

- **Pump Casing Valve (Low Point Drain):** Diaphragm type valve with 316L stainless steel body, PTFE faced / EPDM backed diaphragms, and pneumatic actuator.

10.17 Valve Types

The valve type options replace the standard pneumatic butterfly valves listed in section *7.2 Recirculation System* and in section *10.14 Distribution Zones*. The standard butterfly valves are not 3-A/NSF 14159-1 certified.

The **Disc Valves** option replaces the standard butterfly valves with Lumaco Minidisc series valves which provide a hygienically cleaner and secure seal. These valves are 3-A/NSF 14159-1 certified with the following specifications:

- **Construction:** Disc type valve with 316L stainless steel body, PTFE seals, and pneumatic actuator.

The **Seat Valves** option replaces the standard butterfly valves with Sudmo seat valves which provide a hygienically cleaner and secure seal. These valves are 3-A/NSF 14159-1 certified with the following specifications:

- **Construction:** Seat type valve with 316L stainless steel body, PTFE seals, and pneumatic actuator.

10.18 Weld Configuration

The **Orbital Process Piping Welds with Weld Documentation** option will consist of each process piping weld being completed using an orbital welder. Heat Maps, Weld Maps, and Weld Logs will be included as part of the welding documentation.

NOTES:

- A Heat Map is a certified document that contains the details of an assembly where each of the materials' heat numbers are recorded.
- A Weld Map is a certified document that contains details of a piping assembly where each weld is identified with a unique number. The identifying number is used on the weld log which profiles each weld.
- A Weld Log is a certified document that records all welds contained in a weld map. The profile of each weld recorded includes heat numbers of the material, the detail where the weld is located, the welder's I.D., the date of the weld, the machine used to weld, and the Quality Inspector's approval sign-off.

11. Racks and Transfer Carts

11.1 Racks

Racks are used within the SaniCab PC chamber to hold the process parts to be washed. The racks are manually rolled on wheels from a transfer cart to the cabinet chamber.

All custom rack development requires 3D part models of all parts. Two (2) different 3D modeling service options are provided in *Section 12.1 Accessory Category – Rack Additions* for developing process part 3D models. The detailed design of the custom racks and finalized pricing occurs after end-user part loading constraints are established and all process parts are 3D modeled.

11.1.1 Custom Racks

Custom racks have the following rack designs available to choose from:

- **Custom Racks** are engineered and designed to hold a specific list of varied customer parts.
- **Custom Active Racks** are engineered and designed to hold a specific list of varied customer parts. These Active Racks have a receiver that automatically engages with a SaniCab PC chamber that has the Active Coupler option. The Active Rack is piped with sanitary 316L stainless steel tubing and fittings that supplies cleaning solutions to parts with hard to reach or recessed surface areas. Depending on the parts and soils, active racks can utilize a combination of static spray balls, static spray nozzles, rotary sprays, and/or flow through connections (e.g., direct flow through hoses).

NOTES:

- The Custom Active Racks are not 3-A/NSF 14159-1 certified.

Once a rack design has been selected, there are three (3) different framework weld finishes that the rack can be manufactured to:

- **As Welded / Bead Blasted Finish:** welds are left as is, with the entire framework and welds bead blasted
- **Color Cleaned Welds:** welds are color cleaned, with the remaining framework left as-is (32µin Ra finish)
- **G&P Welds:** welds ground out, with the remaining framework left as-is (32µin Ra finish)

Between the rack designs and framework weld finishes, there are twelve (12) available options:

Table 12: Available Custom Rack Options

Rack Design	Framework Weld Finish	Certifications
Custom PC335 Rack	As Welded / Bead Blast Finish	
	Color Cleaned Welds	
	G&P Welds	3-A/NSF 14159-1
Custom PC335 Active Rack	As Welded / Bead Blast Finish	
	Color Cleaned Welds	
	G&P Welds	
Custom PC365 Rack	As Welded / Bead Blast Finish	
	Color Cleaned Welds	
	G&P Welds	3-A/NSF 14159-1
Custom PC365 Active Rack	As Welded / Bead Blast Finish	
	Color Cleaned Welds	
	G&P Welds	

NOTES:

- Custom Racks and Custom Active Racks are priced as budgetary until the custom rack design is finalized and approved.
- 3D part models are required for rack design.
- The type and quantity of parts that each custom rack can hold is finalized during detailed rack design.
- All custom-designed racks are engineered and designed with final detailed drawings being sent to the customer for approval before fabrication.
- **Heavy Duty Wheels** are required when rack and part load weight exceeds 400 lbs. Standard rack wheels are UHMW material while heavy duty wheels are 316L stainless steel. Heavy Duty Wheels are not 3-A/NSF 14159-1 certified.
- Two (2) PC335 racks can fit into a PC365 chamber model – each rack requires a transfer cart. Only one (1) PC335 Active Rack can be used in a PC365 chamber at one time.

11.2 Transfer Carts

Transfer carts hold and transfer racks into and out of the chamber, as well as transport the racks between the SaniCab PC and process equipment in other areas of the facility.

The following are the carts available for use with the SaniCab PC cabinet washer:

Transfer Cart - PC335

Table 13: Available Transfer Carts

Transfer Cart Name	Cart Dimensions			Loading Rail Height (in)
	W"	D"	H"	
Transfer Cart – PC335	32	56	44	20
Transfer Cart – PC365	32	94	44	20

NOTE:

- Each transfer cart is designed to hold one (1) rack of the same size (e.g., one (1) Transfer Cart – PC335 will hold one (1) PC335 rack).

The transfer carts are manufactured of open frame, 304 stainless steel angle, and solid bar with a bead blast finish. Carts are supported by two (2) straight and two (2) locking swivel casters of solid polyurethane material. The carts have safety locking features to secure the rack on the transfer cart during transport and lock the cart into the SaniCab PC during rack loading and unloading.

12. Accessories

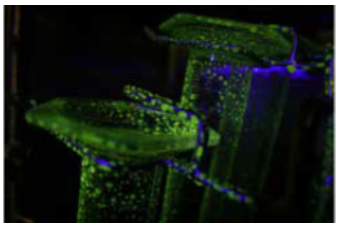
12.1 Rack Additions

NOTES:

- All custom rack development requires 3D part models of all parts. Two (2) different 3D modeling service options are provided in this section for developing process part 3D models.
- The detailed design of the custom racks and finalized pricing occurs after end-user part loading constraints are established and all process parts are 3D modeled. The cost difference between the budgetary value and finalized custom design, if applicable, is adjusted during the project.

12.1.1 Riboflavin Test – Racks

Sani-Matic will provide a customer witnessed spray coverage testing using riboflavin for each rack design. Sani-Matic follows internal procedures that are developed using the ASME BPE Nonmandatory Appendix for Spray Device Coverage Testing. A test report (SMI-LOG-004) is provided, documenting the system flow parameters as well as the rack part loading.



NOTES:

- This item is for riboflavin testing at the Sani-Matic facilities. The SaniCab PC system, fabricated rack, and applicable customer parts must all be at Sani-Matic for execution.
- On-site riboflavin testing can be performed by Sani-Matic field service technicians; contact Sani-Matic for details.

12.1.2 Passivation – Racks

Sani-Matic will provide passivation of all surfaces of the selected rack. A certificate of passivation is provided upon completion.

12.1.3 Part 3D Modeling – Design Cost (per Part)

This service is for generating a 3D model of each unique customer part to be cleaned on a rack. The modeling will allow specific design elements to be incorporated into the rack and allow for repeatable part placement on the rack. The modeling will take place at Sani-Matic's facility. This requires customers to provide drawings or to ship process parts. Shipping the components to and from Sani-Matic will be at the customer's expense. Identical process parts will only require one (1) modeling fee.

NOTES:

- If 3D model files are available or Sani-Matic already has the applicable part model, this design cost is waived.
- Parts either need to be shipped to Sani-Matic's facility (preferred) or detailed drawings and pictures sent electronically. If only pictures with rough dimensions are received, rack fit-up for the parts is not ensured by Sani-Matic.

12.1.4 Part 3D Modeling – Trip (Budgetary)

This service sends a Sani-Matic design engineer to the customer location to perform the 3D modeling described in *Section 12.1.2 Part 3D Modeling - Design Cost (per Part)*. Modeling at the customer's facility reduces the amount of time that the parts are unavailable for production. Generally, three (3) components can be modeled per hour. The number of components that can be modeled in the allotted time varies dependent on component complexity and availability to the technician. This option is a budgetary value based on the provision of one (1) Sani-Matic design engineer for two (2) ten-hour days, sixteen (16) hours of travel, and four (4) days of expenses.

NOTES:

- If selecting this accessory, the per part cost described in *Section 12.1.2 Part 3D Modeling – Design Cost (per Part)* does not apply.
- The final invoice is based on the actual hours and expenses with the expenses invoiced at Sani-Matic's cost.

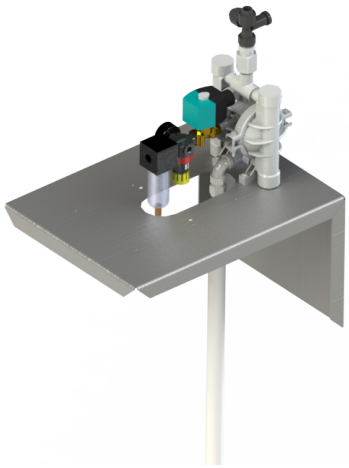
12.2 System Additions

12.2.1 Passivation - System

Sani-Matic will provide factory passivation of all solution contact surfaces on the system. The citric acid passivation is performed and documented per Sani-Matic's standard procedure (SOP-MA005), which adheres to ASTM A967-05 requirements. A certificate of passivation (SMI-LOG-007) is provided upon completion.

12.2.2 Chemical Pump Assembly - Diaphragm Pump

The **Chemical Pump Assembly – Diaphragm Pump** is a loose ship package that allows for chemical delivery from a customer supplied container to the SaniCab cabinet washer's chemical injection port(s). The outputs described in *Section 8.5 Automation Interfaces* are to be used with the Bleed Valve chemical pump assembly's solenoid valves for metering of the chemical.



The following components are packaged and shipped loose for installation by others:

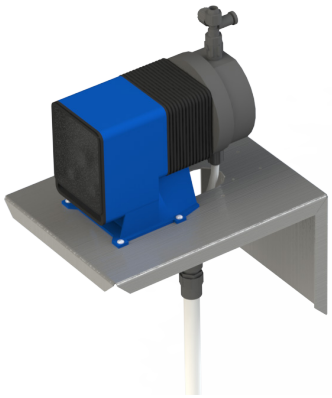
- One (1) PVC suction lance (43") with foot valve for placement in a 55-gallon chemical container (container by others)
- One (1) Air operated diaphragm pump (Wilden P.025 or equivalent)
  - **Duty:** 3 gpm @ 45 psi
  - **Instrument Air Requirements:** 3 scfm @ 100 psi
  - **Construction:** Polypropylene body with PTFE diaphragms
- One (1) 0.25" solenoid valve (24V DC) with filter / regulator for control of the pump. The pneumatic components and piping are made of brass.
- One (1) 304 stainless steel wall mounting bracket allowing the pump assembly to be wall mounted near the chemical container
- One (1) Manual bleed valve to aid in priming the pump
- One (1) 0.25" check valve to prevent the siphoning of the cleaning chemicals
- Thirty (30) Feet of 0.5" Polyethylene tubing for the pump's suction and discharge lines
- Eight (8) Feet of 0.375" Polyethylene tubing for the pump's bypass/priming line

NOTES:

- Depending on the number of chemical additions needed, multiple chemical pump assemblies may be purchased to meet your system needs.
- All chemical pump assemblies are to be mounted within thirty (30) feet of the SaniCab PC chemical injection ports. Installation of the loose ship pneumatics and wiring between the cabinet washer and the chemical pump assembly, as well as chemical pump assembly location and installation, is by others.

12.2.3 Chemical Pump Assembly - Electronic Metering Pump

The **Chemical Pump Assembly – Electronic Metering Pump** is a loose ship package that allows for chemical delivery at a lower rate and with a greater level of control from a customer supplied container to the SaniCab cabinet washer's chemical injection port(s). This chemical delivery skid is ideal for use with chemicals that require lower concentration levels. The outputs described in *Section 8.5 Automation Interfaces* are to be used with the Bleed Valve chemical pump assembly's solenoid valves for metering of the chemical.



The following components are packaged and shipped loose for installation by others:

- One (1) PVC suction lance (43") with foot valve for placement in a 55-gallon chemical container (container by others)
- One (1) Electronic metering pump (Pulsafeeder LPH8 or equivalent)
  - **Duty:** 0.42 gpm @ 30 psi
  - **Electrical Requirements:** 115VAC, 1 phase, 50-60 HZ
  - **Diaphragm:** PTFE-faced CSPE
- One (1) 304 stainless steel wall mounting bracket allowing the pump assembly to be wall mounted near the chemical container
- One (1) Manual bleed valve to aid in priming the pump
- One (1) 0.25" check valve to prevent the siphoning of the cleaning chemicals
- Thirty (30) Feet of 0.5" Polyethylene tubing for the pump's suction and discharge lines
- Eight (8) Feet of 0.375" Polyethylene tubing for the pump's bypass/priming line

NOTES:

- Depending on the number of chemical additions needed, multiple chemical pump assemblies may be purchased to meet your system needs.
- All chemical pump assemblies are to be mounted within thirty (30) feet of the SaniCab PC chemical injection ports. Installation of the loose ship pneumatics and wiring between the cabinet washer and the chemical pump assembly, as well as chemical pump assembly location and installation, is by others.

12.2.4 Chemical Delivery Skid - Diaphragm Pump

The **Chemical Delivery Skid – Diaphragm Pump** is a loose ship package which dispenses chemical into the chamber as required by the cleaning cycle. The assembly includes:

- Chemical Delivery Skid
  - Framework
    - ◊ **Design:** Open frame
    - ◊ **Material:** 304 stainless steel angle
    - ◊ **Surface Finish:** Bead blast
    - ◊ Fully welded single piece construction
    - ◊ Four (4) Adjustable feet for locating the equipment at a fixed location in the facility. The adjustability allows the equipment to be leveled on uneven or sloped surfaces.
  - One (1) 15-gallon chemical container
  - One (1) PVC suction lance with foot valve for placement into the chemical container
  - One (1) Low level, adjustable height proximity switch with discrete output
  - One (1) Air operated diaphragm pump (Wilden P.025 or equivalent)
    - ◊ **Duty:** 3 gpm @ 45 psi
    - ◊ **Instrument Air Requirements:** 3 scfm @ 100 psi
    - ◊ **Construction:** Polypropylene body with PTFE diaphragms
  - One (1) 0.25" solenoid valve (24V DC) with filter / regulator for control of the pump. The pneumatic components and piping are made of brass.
  - One (1) Manual bleed valve to aid in priming the pump

- Loose Ship Components
  - Thirty (30) Feet of 0.5" polyethylene tubing for chemical supply
  - One (1) 0.25" check valve installed at the chemical injection port

NOTES:

- Depending on the number of chemical additions needed, multiple chemical delivery skids may be purchased to meet your system needs.
- All chemical delivery skids are to be mounted within thirty (30) feet of the SaniCab PC chemical injection ports. Installation of the loose ship pneumatics and wiring between the cabinet washer and the chemical delivery skid, as well as chemical skid location and installation, is by others.

12.2.5 Chemical Delivery Skid – Electronic Metering Pump

The **Chemical Delivery Skid – Electronic Metering Pump** is a loose ship package which dispenses chemical at a lower rate and with a greater level of control into the chamber as required by the cleaning cycle. This chemical delivery skid is ideal for use with chemicals that require lower concentration levels. The assembly includes:

- Chemical Delivery Skid
  - Framework
    - ◊ **Design:** Open frame
    - ◊ **Material:** 304 stainless steel angle
    - ◊ **Surface Finish:** Bead blast
    - ◊ Fully welded single piece construction
    - ◊ Four (4) Adjustable feet for locating the equipment at a fixed location in the facility. The adjustability allows the equipment to be leveled on uneven or sloped surfaces.
  - One (1) 15-gallon chemical container
  - One (1) PVC suction lance with foot valve for placement into the chemical container
  - One (1) Low level, adjustable height proximity switch with discrete output
  - One (1) Electronic metering pump (Pulsafeeder LPH8 or equivalent)
    - ◊ **Duty:** 0.42 pgm @ 30 psi
    - ◊ **Electrical Requirements:** 115VAC, 1 phase, 50-60 HZ
    - ◊ **Diaphragm:** PTFE-faced CSPE
  - One (1) Manual bleed valve to aid in priming the pump
- Loose Ship Components
  - Thirty (30) Feet of 0.5" polyethylene tubing for chemical supply
  - One (1) 0.25" check valve installed at the chemical injection port

NOTES:

- Depending on the number of chemical additions needed, multiple chemical delivery skids may be purchased to meet your system needs.
- All chemical delivery skids are to be mounted within thirty (30) feet of the SaniCab PC chemical injection ports. Installation of the loose ship pneumatics and wiring between the cabinet washer and the chemical delivery skid, as well as chemical skid location and installation, is by others.

12.2.6 Exhaust Ducting Components

The **Exhaust Ducting Components** are utilized to connect the exhaust fan outlet of the chamber and direct exhaust air to a suitable location (e.g., through a roof penetration). The components are loose shipped and installed by others.

Table 14: Exhaust Ducting Accessories

Accessory Name	Informational Data			
	Diameter	Length	Bend Radius	Description of Use
Exhaust Ducting – Elbow (90°)	12" Ø	N/A	18.0675"	90° transitions
Exhaust Ducting – Elbow (45°)	12" Ø	N/A	14.5"	45° transitions
Exhaust Ducting – Straight (5')	12" Ø	5"	N/A	Straight run for round ducting
Exhaust Ducting – Seal Kit	(12" Ø)	N/A	N/A	Gasket (EPDM) and hardware for all round ducting connections

NOTE:

- All SaniCab PC exhaust and dryer connections are made through a shared 12" Ø connection.

12.2.7 Service Panels

Service Panels provide additional 304 stainless steel paneling around the front of the cabinet washer for separation of the side and rear maintenance space from the front operating area of the system. Additional caulking and/or paneling to join the service panels to the installed area is required. The Control Panel becomes front or remote mounted when this option is selected.

NOTE:

- This addition will not provide an airtight seal between the SaniCab PC and the surrounding structure.

Service Panels Example (Shown on SaniCab P)

12.2.8 Buggy Inverter

The Buggy Inverter accessory allows buggies to be inverted and placed onto a Custom Active Rack designed to clean buggies. The transfer cart and rack are then transported to the SaniCab PC system for automated, thorough cleaning. After being cleaned and unloaded from the cabinet, the Buggy Inverter reverts the buggy from the rack back onto the ground. The Buggy Inverter is a loose ship, standalone skid with the following specifications:

- Framework
  - **Material:** 304 stainless steel
  - **Surface Finish:** Bead blast
  - **Maximum Buggy Weight:** 110 lbs
  - **Footprint Dimensions:** 70" W x 70" L x 90" H
  - **Foot Pad Dimensions:** 17" L x 23" W
  - Allow for at least 6-feet clearance in front of the Buggy Inverter for Transfer Cart engagement with the system, along with at least 2-feet clearance behind the Buggy Inverter for Buggy engagement with the system
  - Right-hand or left-hand dump side design available
  - Stationary design with fixed base to reduce occupied floor space
  - Flexible buggy height coupling allows inversion of various sizes

Buggy Inverter

- Operation
  - The transfer cart's alignment is assisted by a floor-mounted angle iron rail that includes a 0.75" pin for locking the cart in place
  - The cart is locked into place with the inverter. The buggy is then inverted and rested upon the rack that is atop the transfer cart. Once the cart is safely positioned on the transfer cart, the operator releases the cart
  - The buggy receiver stays in position waiting for the cart and buggy's return after the completed wash cycle
  - The buggy receiver rotates 180° with position monitoring limit switches
- Electrical Controls
  - Drive
    - ◊ 460 V AC, 3PH, 60 Hz, 2 HP, TEFC drive motor with electric brake
  - Receiver Rotation
    - ◊ Column Lift has a cycle time of approximately 45-60 seconds
  - Controls
    - ◊ NEMA 4X, 304 stainless steel enclosure with sloped top
    - ◊ Raise/off/lower 3-position spring-centered switch for operator safety
    - ◊ Two hand, push button control for operator safety, ensuring both hands will be away from the mechanical part of the machine during operation
    - ◊ Banner TL50BL stacking light assembly with mounting bracket, pipe cover, and pipe standoff

NOTE:

- Buggy, rack, and transfer cart not included in this accessory option.
- Requires "active rack" product option.

12.2.9 Wi-Fi Connection Package

The **Wi-Fi Connection Package** allows the equipment to connect to the facility's network wirelessly and includes:

- One (1) Wi-Fi hotspot
  - Washdown rated
  - Mounted external to the control enclosure

NOTE:

- Two (2) Wi-Fi Connection Packages may be needed if the Sani-Trend Cloud and/or the Remote Access Package options are selected (one for a Machine Network and one for a Business Network with Internet).

12.2.10 Remote Access Package

The **Remote Access Package** enables a Sani-Matic technician to access the equipment's PLC and HMI remotely through a secure connection. The technician can help with troubleshooting problems, assist with recipe updates, or make changes to the PLC and HMI programs. The following is included:

- One (1) VPN Router
  - eWON model Cosy 131
- One (1) additional Ethernet switch, 8-port unmanaged (when used with SaniTrend Cloud)

NOTE:

- This option requires that the equipment be connected to the Internet (by others). The technician's time will be billed at the current service rates on an hourly per instance basis.

12.2.11 System Automation

Sani-Matic has an in-house Engineering/Design and Programming team that can customize the equipment to meet unique process needs. Engineering/Design and Programming options are determined based on automation programming engineering hours.

- **Custom HMI Screen –** A custom HMI screen will be added to the system along with any related PLC programming modifications for functionality. An example of a graphics-based screen would be a P&ID depicting external equipment to the supplied system.
- **Additional HMI Security Levels –** The system automation will have the number of security levels increased from (3) levels to (5) levels allowing for a greater range of security login groups.
- **Operator Badge Reader –** A badge reader will be added to the system's control panel, allowing for the system to use badge access by operators. This option includes a HID Proximity Badge Reader, Single Gang, Wiegand Protocol Interface (Mfg. # 5395CG100) and associated programming and integration.
- **External System Communications –** Sani-Matic electrical project engineers will work with your programming team and execute additional system communications between the Sani-Matic system and other process equipment or systems. PLC and HMI programming, testing, and documentation integration of these communications is all included. This option pricing is per equipment or system.
- **External System Communications –** With Remote Control Capabilities – Sani-Matic electrical project engineers will work with your programming team and execute additional system communications between the Sani-Matic system and other process equipment or systems. This includes remote operation control signals between the Sani-Matic system and other process equipment or systems. PLC and HMI programming, testing, and documentation integration of these communications is all included. This option pricing is per equipment or system.
- **Cleaning Cycle Data (Data Only – No Report) –** Cleaning cycle tag data is made available from the PLC, communicated to a customer provided data historian via Ethernet. Reporting is by others.
- **Electronic Cleaning Cycle Data Logging –** This option captures cleaning cycle data, including any critical analog values and setpoints such as conductivity, temperature, and flow/pressure - along with date/timestamps. The GracePort® on the control panel is upgraded to include a USB port, allowing for the cleaning cycle data to be logged to a USB drive. The cleaning cycle data is exported to continuous single .csv file tables. The .csv file can be transferred via the USB drive to other devices as required by the end user. Verification of data integrity transfer from the HMI/PLC to the .csv file is provided in the FAT protocol (if the option is selected).
  - The following is included:
    - ◊ (1) GracePort® power / Ethernet / USB-F receptacle located on the exterior of the enclosure.
    - ◊ (1) USB Flash drive to store the logged data.
    - ◊ Programming for logging and uploading of cleaning cycle data to a USB drive.
- **Electronic Audit Trail Logging –** This option captures HMI audit trail data, which shows user information and when/what data was changed. The GracePort® on the control panel is upgraded to include a USB port, allowing for the audit trail data to be logged to a USB drive. The audit trail data is exported to continuous single .csv file tables. The .csv file can be transferred via the USB drive to other devices as required by the end user. Verification of data integrity transfer from the HMI/PLC to the .csv file is provided in the FAT protocol (if the option is selected). Note that for multiple HMI's on a single system, this option is required for each HMI.
  - The following is included:
    - ◊ (1) GracePort® power / Ethernet / USB-F receptacle located on the exterior of the enclosure.
    - ◊ (1) USB Flash drive to store the logged data.
    - ◊ Programming for logging and upload of PanelView created audit trail to a USB drive.
  - This option is 21 CFR Part 11 compliant.
- **Custom System Automation (Hourly) –** Custom System Automation requests can be integrated into the operation of the system. Defined custom requirements to be supplied during the detailed design of the project.

12.3 Documentation

12.3.1 Functional Specification (FS)

The Functional Specification (FS) is a detailed operational specification document and is provided in Sani-Matic's standard format.

12.3.2 Configuration Specification (CS)

The Configuration Specification (CS) is a detailed specification on the control components and software and is provided in Sani-Matic's standard format.

12.3.3 Factory Acceptance Test (FAT)

The Factory Acceptance Test (FAT) includes both the FAT protocol document as well as the onsite FAT execution.
The document is provided in Sani-Matic's standard format. The FAT execution is performed and documented prior to shipment and includes up to four (4) days of onsite owner/user participation. Sani-Matic's testing facilities include 460V AC, 3PH, 60Hz electrical power, compressed air, plant steam (as required), and low conductivity DI water allowing the system to be tested under design conditions. Testing will include a step-by-step written verification test of all electrical and hardware functions. Additional onsite owner/user time can be purchased if needed.

12.3.4 Site Acceptance Test (SAT) Document

The Site Acceptance Test (SAT) document provides a detailed commissioning protocol to assist with the owner/user's site acceptance testing, including step-by-step written verification testing of all electrical and mechanical hardware functions, and is provided in Sani-Matic's standard format.

12.3.5 Installation Qualification / Operation Qualification (IQ/OQ)

The Installation Qualification (IQ) and Operational Qualification (OQ) documents together provide a documented method for verification to ensure the system has been properly installed and that it is operating as designed. The document is provided in Sani-Matic's standard format.

12.3.6 Instrument Data Sheets

Instrument Data Sheets are provided for the instruments included with the system. The data sheets are provided in Sani-Matic's standard format which is based on the ISA (International Society of Automation) format.

12.3.7 Traceability Matrix

The Traceability Matrix document provides traceability of the system specifications in the FS, CS, FAT, SAT, and IQ/OQ documents back to an owner/user provided user requirements specification (URS). The traceability matrix is in Sani-Matic's standard format and is provided after system shipment.

12.3.8 Turn Over Package (TOP) – Hard Copy

A hard copy of the equipment Turn Over Package (TOP) will be printed and provided in a series of books (binders).
All Documentation materials listed in Section 9 are included in the hard copy package.

12.4 Field Services

The **Field Service** category contains after-sale services to support smooth and successful installation and validation activities and keep your system maintained for years of reliable service. All pricing quoted are budgetary estimates based on the hours and expenses of the activity. The invoice price is based on the actual hours and expenses with a minimum eight (8) hours per day per technician (sum of both onsite and travel time) and with the expenses invoiced at Sani-Matic costs. To minimize the time spent onsite and fully utilize the technician's time, it is recommended that the equipment be fully installed and ready for operation prior to scheduling the technician's trip.

NOTE:

- For field service assistance accessories (see *Sections 12.4.1 through 12.4.5*), the final invoice is based on the actual hours and expenses with the expenses invoiced at Sani-Matic costs.

12.4.1 Installation Assistance (Budgetary)

An on-site Sani-Matic technician assists with equipment installation, to ensure the equipment is reassembled properly and verified, leveled, and the correct utilities are connected as required.

This add-on is priced with the assumption of one (1) technician providing twenty (20) hours of weekday on-site time over two (2) days, sixteen (16) hours of weekday travel over two (2) days, and all travel, lodging, and meal expenses. Additional hours and expenses utilized for any on-site activities are billed accordingly.

12.4.2 Start-up and Training (Budgetary) - General Start-up

A Sani-Matic technician will be on-site and can assist in start-up and training activities. The technician will assist with general start-up procedures, and training activities can include operational and HMI training of operators, engineers, and/or maintenance technicians.

This add-on is priced with the assumption of one (1) technician providing forty (40) hours of weekday on-site time over four (4) days, sixteen (16) hours of weekday travel over two (2) days, and all travel, lodging, and meal expenses. Additional hours and expenses utilized for any on-site activities will be billed accordingly.

12.4.3 SAT Assistance (Budgetary)

A Sani-Matic technician will be on-site and can assist with the execution of the SAT of the system and controls at the customer's facility.

This add-on is priced with the assumption of one (1) technician providing thirty (30) hours of weekday onsite time over three (3) days, sixteen (16) hours of weekday travel over two (2) days, and all travel, lodging, and meal expenses. Additional hours and expenses utilized for any on-site activities will be billed accordingly.

12.4.4 IQ/OQ Assistance (Budgetary)

A Sani-Matic technician will be on-site and can assist with the execution of the IQ/OQ protocols at the customer's facility.

This add-on is priced with the assumption of one (1) technician providing thirty (30) hours of weekday on-site time over three (3) days, sixteen (16) hours of weekday travel over two (2) days, and all travel, lodging, and meal expenses. Additional hours and expenses utilized for any on-site activities will be billed accordingly.

12.4.5 On-site Rack Assistance (Budgetary)

A Sani-Matic technician will be on-site and can assist with activities related to rack validation such as performing or assisting in riboflavin testing, rack modifications, or assessing rack designs to add additional parts.

This add-on is priced with the assumption of one (1) technician providing thirty (30) hours of weekday on-site time over three (3) days, sixteen (16) hours of weekday travel over two (2) days, and all travel, lodging, and meal expenses. Additional hours and expenses utilized for any on-site activities will be billed accordingly.

12.4.6 Preventive Maintenance (PM) Program (Budgetary)

The goal of Sani-Matic's Preventive Maintenance (PM) Program is to make sure that the equipment and operators are running efficiently and to reduce time lost due to unexpected equipment failures. The one (1) field service trip included with this program is:

- 1-year PM execution (customer procured parts)
  - Check instrument operation
  - Change out elastomers
  - Change out pump seals
  - Change out wearables / consumables
  - Review PLC / HMI applications
  - Training

Contact Sani-Matic for other PM service options.

12.4.7 Recommended Spare Parts Budget (Budgetary)

Sani-Matic will provide a loose ship package of critical Recommended Spare Parts (RSP) for the SaniCab PC cabinet washer (e.g., pump seals, elastomers, rotary bearings, etc.). The RSP list is sent for review and approval, after which the final pricing is provided.