GENERAL EQUIPMENT SPECIFICATIONS

This page is a record of your equipment specifications. This information is found on the serial number plate of your instrument. Please fill in the blanks below when you receive your unit.

When contacting the sales or service department to order parts or obtain information, refer to this page. This will allow us to respond quickly and accurately to your request.

MODEL NO. _______________________________

SERIAL NO. _______________________________

<table>
<thead>
<tr>
<th>VOLTS</th>
<th>PHASE</th>
<th>CYCLES</th>
</tr>
</thead>
</table>

WIRING DIAGRAM

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>REV#</th>
<th>DATE</th>
</tr>
</thead>
</table>

MAIN FUSE (time delay, or “slow blow”)

SINGLE PHASE  ____________ AMPS

3 PHASE, 3 WIRE ____________ AMPS

3 PHASE, 4 WIRE ____________ AMPS

INSTRUCTION BOOKLET NUMBER

MODEL  BCX2000 / 3000 / 4000 / 9000 / 11000

TYPE  Basic Cyclic Corrosion Cabinet
# BCX - Basic Cyclic Corrosion Cabinet

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1.0 SAFETY

This section introduces safety symbols that will appear throughout this manual. It also provides a list of operational precautions and guidelines to operate the BCX chamber safely.

1.1 Safety Symbols

HIGH VOLTAGE !

Indicates precautionary information for avoiding electric shock due to high voltage levels.

DANGER!

Indicates instructions for avoiding hazardous conditions that if not obeyed will result in operator injury.

WARNING!

Indicates instructions for avoiding hazardous conditions that if not obeyed may result in operator injury.

CAUTION! INSTRUMENT DAMAGE

Indicates instructions for avoiding conditions that if not obeyed may result in instrument damage.

NOTE!

Indicates procedural tips and special information.
1.0 SAFETY

1.2 Operational Precautions

This list contains the safety precautions that must be followed to safely operate the BCX basic cyclic lab corrosion exposure chamber. Follow these precautions when installing and operating the instrument.

Safety Disconnect Switch:
Connect the electrical supply through a fused safety disconnect switch with appropriately rated slow-blow fuses. Locate the switch as close to the instrument as possible and in view of the operator when standing in front of the instrument.

⚠️ Hot Surface!!:
Condensation may cause hot water to accumulate on the inside of the chamber walls, cover and floor during test. Use caution when opening the test chamber cover after a test is complete.

Cover:
Each BCX has an exposure chamber cover. It is shipped on the cabinet in a closed position. Always open the cover by lifting in the center of the handle. ⚠️ Failure to do so can damage the cover and void any warranty the cover may have. If the instrument is equipped with automated air cover lifters, the cover should be opened using the controller after the proper compressed air connection has been made.

Drains:
Cabinet drains must be “laid” over the facility drain and not directly connected into the facility drain. This will prevent backpressure from forcing drainage back into the exposure zone.

Exhaust:
Instrument exhaust must be vented to the outside of the customer’s facility unless an factory approved internal venting system is installed.

⚠️ NEVER directly connect multiple corrosion cabinets in the same vent. If multiple corrosion cabinets are vented together, the exhaust from one cabinet can leak into another, causing harm to the test as well as other cabinet.

Oil/Water Separator:
To prevent contamination of test specimens, supply compressed air to the instrument only through an industrial-grade oil/water filter (user-supplied)

Compressed Air Regulator / Filter:
The instrument may be equipped (option dependent) with a small air regulator that includes a secondary oil/water trap (sediment bowl). Do not depend only on this trap for compressed air filtering; it is included as a secondary device. Install an industrial-grade filter on your facility supply just before it enters the BCX chamber.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

This section explains how to prepare your facility for safe operation of the BCX chamber, how to uncrate the instrument, how to connect water, air, electrical power and vent to the instrument.

⚠️ CAUTION! INSTRUMENT DAMAGE

During installation procedures, you must remove the front panels to expose instrument components. Be sure to also turn the appropriate locking clasp underneath the main electrical panel to release the panel door prior to attempting to open the door or damage may result.

Prior to installation you must consider floor space, compressed air, water supply/drainage, vent and environmental requirements. Along with this section, you may also refer to the Dimension Sheets in this manual which provide dimensions and specifications for these utility connections.

All connections and tests of service should be made prior to powering up the chamber.

2.1 What is required for Chamber Installation

- Qualified electrician for electrical connection
- Plumber for drain, air and water connections
- HVAC installer (or other qualified personnel) for chamber vent connection
- Level floor
- Access to the outside via a roof vent or side wall vent
- Floor drain
- Pressurized 450 – 690 kPa (60-100 PSI) ASTM D1193 reagent grade type IV water. Best chamber performance is obtained at the higher pressure ratings.
- Clean dry compressed air regulated to 655 – 698 kPa (95-100 PSI).
- Customer specified electric power from a lockable disconnect with appropriate amount of electric cord and conduit for the chamber location
- 1.9 cm (¾”) plastic (PVC) plumbing fittings and ball valve for chamber drain to connect the chamber to the floor drain
- 10.2 cm (4”) outside diameter (O.D.) CPVC schedule 40 “T”, CPVC 10.2 cm (4”) to 1.9 cm (¾”) reducer
- 10.2 cm (4”) O.D.(CPVC) plumbing fittings for the chamber vent
- 5.08 cm (2”) O.D.(CPVC) plumbing fittings for the chamber vent
- 9.525 mm (3/8”) O.D. poly tubing from the compressed air line source to the chamber compressed air installation fitting
- 9.525 mm (3/8”) O.D. poly tubing from the pressurized D.I. line to the chamber inlet

Improper installation will affect the operation of the instrument and compromise test integrity. We strongly discourage installation in a warehouse, boiler room, garage, factory floor, paint room, powder mixing room, where outside doors are frequently opened, where dust is frequently airborne, or where humidity, air pressure or temperature vary widely.

The following pages give detail for each of these fittings.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.2 Drain Connections (Customer supplied & installed)

The drain set-up is dependent on if the chamber is equipped with the cycling controls feature. There are three different drain connections to be made.

1. Chamber exposure zone (main chamber drain) 1.9 cm (3/4") drain line
2. Bubble Tower Drain 9.525 mm (3/8") O.D. tube connection
3. Solution Tank overflow drain 1.9 cm (¾”)

This drain line MUST gravity feed from the supplied Wet Bottom Drain Assembly, and then to the customer’s floor drain” This chamber is not designed to drain to a location above floor level. Do not directly connect into floor drain” Allow chamber drain line to "lie” over the floor drain.

Connected to this drain is a manually-actuated “Wet Bottom Drain” assembly.

This assembly is designed to keep the heater in the chambers exposure zone covered with water. This will create a more even heat as well as raise the humidity in the chamber. This assembly must be installed on the machine in order for the chamber to run correctly. If this device was not purchased from Atlas, then it will have to be created during the installation process. The height of this device is critical.

Notice also, that during operation, the ball valve on this Wet Bottom Assembly must be CLOSED to make the wet bottom work (valve shown Open).

From the back side of the Wet Bottom Drain assembly, plumb a drain line to the customer’s floor drain”

With the OPTIONAL cycling control package, the “Wet Bottom Drain” assembly is automated and looks different from the manual assembly. However the function and connection for drain is the same.

This assembly is designed to keep the heater in the chambers exposure zone covered with water. This will create a more even heat as well as raise the humidity in the chamber. When the chamber moves to a purge or other non fogging cycle, this valve will automatically open and allow the water to drain”
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.2 Drain Connections (Customer supplied & installed) (cont.)

The **second drain** connection is for the bubble tower dra”

This drain connection is a 3/8” quick connect tube fitting. Connect this drain line to the fitting located on BV # 2 and plumb it to the customer supplied dra”

The **third drain** connection is for the overflow on the 35 gallon solution tank.

This drain connection is a 1.9 cm (¾”) male threaded fitting. Connect piping to this fitting and plumb it to the customer supplied dra”

Once the valves are installed into these drains, set them as follows;

- Chamber Drain - CLOSED
- Bubble Tower Drain - CLOSED – Ball valve # 2
- Solution tank drain - OPEN

The above Drain valves that are normally closed can be opened for draining and cleaning

⚠️ These drain lines MUST gravity feed to the floor drain; do not directly connect into the floor dra” This chamber is not designed to drain to a location above floor level. Allow the chamber drain lines to "lay" over the floor drain.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.3 Vent Connection

The chamber uses a 5.08 cm (2”) vent port on the back side of the chamber centered along the chamber length and about 90 cm (35.4 inches) above the lab floor. A customer-supplied pipe must be threaded into this port and run outside of the laboratory and building. If this vent length exceeds 4.5 meters, (15 feet), consult an expert concerning proper “power” venting methods to ensure against any possible vent back pressure into the chamber.

It is important that this 5.08 cm (2”) CPVC line have no sags in it or condensate will collect and block the vent. See the drawings in the back for details. See the drawing in the appendix to see how to configure the vent and drain. In addition, it may be required to connect a customer-supplied exhaust fan to this vent tube to draw the air out of the chamber. Contact a building engineer for sizing.

⚠️ CAUTION! INSTRUMENT DAMAGE

Never vent more than one chamber into the same vent line. This could cause corrosive fog from one chamber to enter another chamber and destroy components.

If multiple instruments must use the same building vent, connect the vents as indicated in this diagram.
2.0 SETUP - INSTRUMENT INSTALLATION GUIDELINES

2.4 Compressed Air Connection

Each Uni-Fog™ or Uni-Fog II Dispersion Tower requires about 0.9 - 1.8 LPS (1.75 - 3.5 CFM) of dry, oil-free compressed air at 103 kPa (15 PSI). The incoming compressed air should be regulated to 655 - 698 kPa (95-100 PSI) at the incoming air line to the cabinet to operate all components.

Because water or oil in the compressed air line will contaminate samples and invalidate a test as well as damage the BCX, it is very important for the customer to install a water/oil separator on the air line, as close to the connection to the BCX as possible.

A fitting for incoming compressed air is mounted on the outside back side of the instrument. A labeled “Quick-connect” fitting will accept a 9.525 mm (3/8”) outside diameter customer-supplied polyurethane tubing. Only one incoming compressed air connection needs to be made.

See the plumbing diagram in the pocket of this manual.

⚠️ CAUTION! INSTRUMENT DAMAGE

Compressed air must be free of oil, water and other contaminants. If it is not, the cabinet can be damaged, performance will suffer and the warranty can be voided. If the compressed air is not clean, the customer must install an oil/water extractor in the air line prior to connection to the chamber.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.5 Water Supply Requirements and Connection

D.I./Distilled water is used in the bubble tower, the humidity atomizer and mixing of the solution electrolyte (example 5% salt solution, CASS solution etc.) for fogging and spraying. The type of water used is usually specified by the test specification as ASTM D1193 type IV.

⚠️ CAUTION! INSTRUMENT DAMAGE

Pay close attention to the type of water used. To ensure proper quality, periodic analysis is recommended.

The only type of water to be used in this instrument is deionized or distilled water in compliance with ASTM D1193 Type IV. The use of type I or II water can damage a pH meter as well as certain components of the test chamber. It is suggested that the user obtain a copy of the ASTM D1193 specification (astm.org) and read the definition and specifications for the different types of water. The BCX chamber has a “Quick-connect” fitting for the incoming water supply that will accept a 9.525 mm (3/8”) outside diameter tubing. Regulate supply pressure to 450 – 690 kPa (60-100 PSI) depending on size of chamber and options purchased. Best chamber performance is obtained at the higher pressure ratings.

2.6 Electrical Connection

The BCX Chamber is wired for use with the customer-specified electrical supply. Amperages are listed on the electrical drawings.

It is required that only a qualified electrician connects wire to the chamber. The electrician will need to drill a hole through the fiberglass electrical enclosure, and bring the power into the chamber from a customer supplied lockable fused disconnect. This connection is to be made onto the electrical panel and attached to the proper terminal strip or on/off breaker.

⚠️ WARNING!

For operator and technician safety, we strongly recommend that a separate, fused safety switch (wall switch) be installed for each instrument. Ground wiring must be the same gauge as the AC supply wires to ensure proper electrical grounding protection.

The wall switch should be in full view of any person standing at the Control Cabinet and should not be attached directly to the instrument. The use of a noise/surge suppresser is mandatory in areas with poor quality electrical supply. Stable voltage is necessary, but stable frequency is not required, since timing circuits are DC. Follow local codes for the proper fuse rating according to the current draw.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.7 Level Floor

This instrument must be accurately leveled for optimal operation. It is supported by leveling feet with adjustable bolts. To begin leveling, place a bubble level across the instrument’s front. Turn the leveling bolts until the bubble is centered in the level. Turn the level 90° on the instrument and adjust the bolts again. Repeat the procedure until the bubble is centered in all directions.

![Foot]

**NOTE!**

Improper leveling of the chamber can cause poor test results, and/or cause the instrument to malfunction.

2.8 Access

When the instrument is installed, the only access required for loading and maintenance is along the front. Choose a location that will allow proper entry to this area with at least 0.9 meters (3 feet) of open area in front of the instrument. The instrument requires only 10-15 cm (~4-6”) of clearance on both sides and 25-40 cm (~10” to 16”) along the back depending upon the ventilation set-up chosen. Due to the advanced features engineered into this unit, once the instrument is installed, most all operation, maintenance, calibration and service can be performed from the front of the cabinet.

2.9 Utility Services Testing

After all utility services have been connected, they should be tested. All connections and lines should be inspected, as applicable:

1. Leaks at connections or on lines.

   Inspect connections, and test all air, water, and drain lines for leaks. Refer to Table of Figures at the front of the manual to locate the correct illustration.

2. Voltage

   Inspect connection, and test the electric service for proper voltage. Refer to the Table of Figures at the front of the manual to locate the correct illustration.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.10 Environmental Requirements (Ambient)

For the BCX to function properly it needs to be installed into a climate controlled room at a consistent temperature and humidity range. The recommended temperature range is 20 to 25°C (68 to 77°F). Higher or lower temperatures may negatively affect proper operation and conformance to test parameters.

Never allow the temperature around the chamber to approach 0°C (32°F).

The recommended humidity is not to exceed 60%. Humidity should be 30-50% non-condensing because higher or lower humidity will affect conformance to parameters of the Dry-off Cycle. Certain test specifications define a tighter humidity range that must be followed for the lab if the test results are to be trusted. If the temperature or humidity is out of these ranges it may cause the chamber to operate out of specification for certain test cycles.

The room should be ventilated properly with minimal drafts, air pollution, or dust. Do not install the instrument in a corrosive or toxic environment. Dust should be minimized because dust will contaminate samples and the salt (or other electrolyte) solution, and interfere with cabinet components.

Under no circumstances should the exhausted air from a BCX be connected to a plenum or duct that serves another corrosion cabinet or other type of instrument, including ovens. Air from the other source could be forced into the exposure chamber, which will contaminate the samples.

NOTE!

Opening of the cover is ideally performed with the operator present, and only after it is certain that corrosive gasses and heated air have been properly purged.

2.11 Floor Space

For operator/technician access during operation, maintenance, calibration and repair, we recommend the following minimum clearances:

- Front 0.8 meter / 32”
- Left and Right Side 15 cm / 6”, for opening of Solution Reservoir cover and access to ‘panic’ switch.
- Back 38.1 cm / 15”, for opening Exposure Chamber cover, for electrical and water supply lines, and vent/drain lines.
- Overhead 0.9 meter / 36” above the closed cover. With 1.4 meter / 56” cabinet height, the minimum ceiling height is 2.11 meter / 83” for the BCX2000, 3000, 4000, and 2.23 meter / 88” for the BCX9000.

NOTE!

Please refer to floor space diagrams on the following pages.
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.11 Floor Space (cont.)

**BCX2000**
*view from above*

Width: 82 inches / 2.08 meters

Length: 84 inches / 2.13 meters

**BCX3000**
*view from above*

Width: 82 inches / 2.08 meters

Length: 109 inches / 2.77 meters

(continued next page)
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.11 Floor Space (cont.)

BCX4000
view from above

Width: 90 inches / 2.29 meters

Length: 109 inches / 2.77 meters

BCX9000
view from above

Width: 99 inches / 2.51 meters

Length: 110 inches / 2.79 meters

(continued next page)
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.11 Floor Space (cont.)

BCX11000
view from above

Width:
125 inches / 3.18 meters

Length: 146 inches / 3.71 meters
2.0 SETUP – INSTRUMENT INSTALLATION GUIDELINES

2.11 Floor Space (cont.)

**Floor Space, Extra Solution Reservoir**
Requires an additional 0.6 meter / 24”, recommended installation on the left side of the cabinet.

**Floor Space, D.I. Water Reservoir**
Requires an additional 0.6 meter / 24”, recommended installation on the left side of the cabinet.

**Floor Space, BCX Exhaust Recirculation System**
Requires 0.6 meter x 0.6 meter / 24” x 24” adjacent to cabinet. Recommended placement is behind the cabinet or on the right side for attachment of vent connections.

2.12 Mobility

Every cabinet has both castors and leveling feet. After removing a cabinet from the shipping crate with a forklift, the leveling feet **must** be retracted to allow the cabinet to be rolled to the desired position. Then, extend the leveling feet and check the cabinet with a spirit (bubble) level. For maintenance, convenience, or cabinet relocation, the leveling feet can again be retracted for rolling the cabinet.

Each ‘stand alone’ separate cabinet, such as an Immersion Reservoir, extra Solution Reservoir or D.I. Water Reservoir, will also have either castors or leveling feet. Within the limits of connecting tubing, wiring or pipe, these stand-alone cabinets can be placed anywhere in the lab.

NOTE!

Always re-check with a level after moving cabinet.
3.0 COMPONENTS & CONTROLS

3.1 Exposure Zone – Inside

3.1.1 Solution Spray Inlet Port

PN 750085 – CPVC T x T Bulkhead

PURPOSE:
The purpose of the Solution Spray Inlet Port is to provide a path for tubing that carries salt solution or other electrolyte through the cabinet wall to the spray bar header.

LOCATION:
This port is located inside of the cabinet along the left sidewall.

FUNCTION:
This bulkhead port serves as a pass-through port for the solution that goes from the solution spray pump to the solution spray bar header. If solution spray is not ordered with the cabinet, this port is still installed and is plugged for future installation of this option.
3.0 COMPONENTS & CONTROLS

3.1.2 Chamber Temperature and Over-temperature RTD

PN 720455 – RTD – single
PN 720460 – RTD – Dual

PURPOSE:
The purpose of the Chamber temperature and Over-temperature RTD is to read the current temperature in the exposure zone and report that signal or value to the cabinet temperature and over-temperature controller.

LOCATION:
This RTD is located inside of the cabinet along the inside front wall.

The RTD is found by opening the exposure chamber cover and looking in the middle of the front wall.

The over-temperature RTD is used synonymously with dry bulb (cabinet) temperature RTD.

The RTD consists of:
1. Temperature probe sheath
2. RTD wire
3. RTD compression fitting.

FUNCTION:
The cabinet temperature and over-temperature RTD are constantly sending a temperature signal to the chamber controller and the over-temperature controller. In most cases, two (2) RTD sensors are housed in the same probe with one signal going to the cabinet controller, and the second signal going to the cabinet over-temperature safety controller. In this case the Dual Temperature RTD is installed. From the sheath, it cannot be determined if an RTD probe is single or double. To make the determination, look at the number of wires exiting the probe. Two or three wires indicate a single RTD probe. Four or six wires indicate a dual RTD probe. The cabinet RTD is wired to channel 1 of the RTD card on the input/output rack.
3.0 COMPONENTS & CONTROLS

3.1.3 Cabinet Heater

<table>
<thead>
<tr>
<th>PN</th>
<th>Description</th>
<th>Voltage/Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>712240-T</td>
<td>Heater, Tubular, Titanium 240V, 4KW – for BCX2000</td>
<td>240V, 4KW</td>
</tr>
<tr>
<td>712440-T</td>
<td>Heater, Tubular, Titanium 440V, 4KW – for BCX2000</td>
<td>440V, 4KW</td>
</tr>
<tr>
<td>712260-T</td>
<td>Heater, Tubular, Titanium 240V, 6KW – for BCX3000/4000</td>
<td>240V, 6KW</td>
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<tr>
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<td>712490T-240</td>
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<td>712490T-480</td>
<td>Heater, Tubular, Titanium, 480V, 4KW – for BCX9000</td>
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</tr>
<tr>
<td>712295-T</td>
<td>Heater, Tubular, Titanium, 240V, 6KW – for BCX11000</td>
<td>240V, 6KW</td>
</tr>
<tr>
<td>712395-T</td>
<td>Heater, Tubular, Titanium, 380V, 6KW – for BCX11000</td>
<td>380V, 6KW</td>
</tr>
<tr>
<td>712495-T</td>
<td>Heater, Tubular, Titanium, 480V, 6KW – for BCX11000</td>
<td>480V, 6KW</td>
</tr>
</tbody>
</table>

PURPOSE:
The heater controls the temperature in the exposure chamber from ambient to 71°C. The purpose of the heater support is to prevent the heater from making contact with the fiberglass shell.

LOCATION:
The heaters located inside of the cabinet under the diffuser plates.

The heater/s are found in the bottom of the exposure chamber under the diffuser plates.

The heater element fits inside the welded support.

Cabinet size and voltage determine the heater size and wattage.

FUNCTION:
When heat is required during a cycle, the cabinet SSR1 is energized to send power to the heater. All heaters are single phase.

When changing a heater, always replace the fittings that hold the heaters in the chamber wall. A quantity of two (2) fittings are required, PN E000225

Caution! Burn Hazard! Heaters are very hot with a temperature exceeding 1500°F. Never allow anything to come in contact with a heater until completely cooled.

Note: Currently, Atlas sells only titanium-style heaters (no “mat” style). To convert from the old style “mat” heaters, order: 1) New heater, 2) New heater support, 3) Fittings (E000225) and 4) misc. components kit for conversion, PN 712465.
3.0 COMPONENTS & CONTROLS

3.1.4 Cabinet Heater Support

PN 712250  Heater support, Tubular, BCX2000
PN 712450  Heater support, Tubular, BCX3000/4000
PN 712480  Heater support, Tubular for BCX9000
PN 712550  Heater support, Tubular for BCX11000

PURPOSE:
The purpose of the heater support is to contain the heater element while in use. It will prevent the heater from making contact with the fiberglass shell.

LOCATION:
The heater support is located inside of the cabinet under the diffuser plates.

FUNCTION:
When heat is required during a cycle, the cabinet SSR1 is energized to send power to the heater. The heater support holds the heater into position during the heating and cooling process.

Caution! Burn Hazard  The heater supports are very hot with a temperature exceeding 1500°F. Never allow anything to come in contact with a heater until completely cooled.
3.0 COMPONENTS & CONTROLS

3.1.5 Cabinet Drain

PN - None, part of cabinet

PURPOSE:
The purpose of the vent drain is to provide a means to remove accumulated condensate.

LOCATION:
This port is located inside of the cabinet along the back wall.

FUNCTION:
This drain port allows the waste from the exposure zone to be removed. If it is not already installed, the customer must install CPVC piping to this port and direct it to down the facility drain as shown in the installation drawings.
3.0 COMPONENTS & CONTROLS

3.1.6 Second Vent Line

PN None, part of cabinet

PURPOSE:
The purpose of the 2” vent port is to allow for a path for the corrosive atmosphere created in the exposure zone to be vented to a safe location.

LOCATION:
This port is located inside of the cabinet along the back wall.

FUNCTION:
This vent allows the air from exposure zone to be removed. The customer must install CPVC piping to this port and direct it to the outside of the building. As corrosive fog or hot air is created in the exposure zone it is able to leave the cabinet through this port.
3.0 COMPONENTS & CONTROLS

3.1.7 Compressed Air Inlet for purge/dry

PN C010185 – Push Lock fitting, Bulkhead Union, 3/8" tube x 3/8” tube
PN C010268 – O ring for 3/8” bulkhead Union

PURPOSE:
The purpose of the compressed air inlet is to allow compressed air to enter the exposure zone for the purge/dry cycles. It can be controlled manually by a toggle switch or automatically with a solenoid by the cycling control package.

LOCATION:
This port is located inside of the cabinet along the front wall. It can be found by opening the cover. It is located on the right wall near the floor of the exposure chamber under the diffuser plate.

This purge air inlet is a 3/8” tube fitting bulkhead.

FUNCTION:
This compressed air port allows the air from the compressed air line to enter the exposure zone. It can be controlled manually by a toggle switch or automatically with a solenoid by the optional cycling control package (solenoid #23 and output Y2 on the cycling control package).
3.0 COMPONENTS & CONTROLS

3.1.8 Bubble Tower Air (saturated air) Inlet

PN C010185 – Push Lock fitting, Bulkhead Union, 3/8" tube x 3/8” tube
PN C010155 – Push Lock fitting, Elbow Union, 3/8" tube x 3/8” tube
PN C010180 – Push Lock fitting, Tee Union, 3/8" tube x 3/8” tube x 3/8” tube
PN C010268 – O ring for 3/8” bulkhead Union

PURPOSE:
The purpose of the Bubble Tower Air Inlet to the exposure chamber is to provide a path through the cabinet wall for air from the bubble tower to be routed to the dispersion tower.

LOCATION:
This port is located inside of the cabinet along the front wall. It can be found by opening the cabinet cover, and is located just below the diffuser plates in the middle of the inside front wall.

Depending on the cabinet configuration, the Bubble Tower Air Inlet can may be a tube connected from the bulkhead in the wall straight to the atomizer nozzle; alternatively, elbow and tee connectors may be used to connect this air to dual dispersion towers.

The color of the tubing, in this case RED, indicates that heated, humidified air is usually passing through it.

FUNCTION:
The Bubble Tower Air Inlet port provides a path for the air from the bubble tower to pass through the fiberglass exposure chamber. The actual port is a 3/8” tube by tube bulkhead connector.
3.0 COMPONENTS & CONTROLS

3.1.9 Dispersion Tower Float Switch Wire Inlet

PN C010185 – Push Lock fitting, Bulkhead Union, 3/8" tube x 3/8” tube
PN C010155 – Push Lock fitting, Elbow Union, 3/8" tube x 3/8” tube
PN C010180 – Push Lock fitting, Tee Union, 3/8" tube x 3/8” tube x 3/8” tube
PN C010268 – O ring for 3/8” bulkhead Union

PURPOSE:
The purpose of the Dispersion Tower Float Switch Wire Inlet to the exposure zone is to provide a path through the cabinet wall for the float switch wire to enter the exposure zone.

LOCATION:
This port is located inside of the cabinet along the front wall.

It can be found by opening the cabinet cover, and is located just below the diffuser plates at the center.

The Dispersion Tower Float Switch is connected directly from the bulkhead in the wall straight to the dispersion tower.

The color of the tubing, in this case WHITE, indicates that wiring passes through it.

FUNCTION:
The Dispersion Tower Float Switch Wire Inlet Port provides a path for the float switch wire to pass through the fiberglass shell into the chamber. The actual port is a 3/8” tube by tube bulkhead connector.
3.0 COMPONENTS & CONTROLS

3.1.10 Heavy Duty Bottom Support / Diffuser Plates

PN 700434 – HD Support Shelves BCX2000 -Floor Level R & L
Two needed for BCX2000

PN 700437 – HD Support Shelves BCX3000 - Floor Level R & L
Two needed for the left and right of the BCX3000

PN 700438 – HD Support Shelves BCX3000 - Floor Level middle
One needed for the center of the BCX3000

PN 700435 – HD Support Shelves BCX4000 - Floor Level middle
One needed for the center of the BCX4000

PN 700436 – HD Support Shelves BCX4000 - Floor Level R & L
Two needed for the left and right of the BCX4000

PN 700439 – HD Support Shelves BCX9000 - Floor Level R,C& L
Three needed for left, center and right of the BCX9000

PN 700441 – HD Support Shelves BCX11000 - Floor Level R & L
Two needed for left, and right of the BCX11000

PN 700441 – HD Support Shelves BCX11000 - Floor Level middle
One needed for the center of the BCX11000

PURPOSE:
The Heavy Duty Bottom Support protects exposed samples from contacting cabinet components, such as the cabinet heaters. In addition, these help to evenly distribute heated air as it moves upward.

LOCATION:
These plates are located inside of the cabinet on the bottom.

FUNCTION:
The diffuser plate separates the exposed samples from the cabinet heaters, as well as define the bottom of the Exposure Zone.
3.0 COMPONENTS & CONTROLS

3.1.11 Dispersion Tower – Horizontal

PN 710135 – Dispersion System, Horizontal BCX3000/4000

PURPOSE:
The purpose of the Horizontal Dispersion Tower system is to create and distribute atomized salt fog and humidity in accordance with ASTM B117. This system is also used during a controlled humidity cycle.

LOCATION:
This horizontal dispersion towers are located inside the exposure zone.

The towers are found by opening the cover, and looking at both the right and left ends of the exposure zone.

Horizontal Dispersion Towers are installed on all BCX3000, 4000, 9000 and 11000.

1. Horizontal Baffle tube – 750016
2. Atomizer nozzle – C261731
3. Dispersion tower base - 750025

Dispersión tower couple - 750011
Float switch assembly - 720447

FUNCTION:
The cabinet controller fills the internal reservoir with either solution from the 35 gallon holding tank.

When full, the bubble tower air solenoid is activated. This air enters the side of the atomizer nozzle to siphon salt solution into the atomizer nozzle. The air and solution mix inside the atomizer nozzle to create a fog.

The level switch maintains the solution level in the tower during fogging cycles.

The horizontal tubes at the top of the assembly baffle the fog for proper fog distribution.
3.0 COMPONENTS & CONTROLS

3.1.11 Dispersion Tower – Horizontal (cont.)

Below is a complete listing of all of the parts that make up this dual horizontal dispersion towers system.

### Part # 710143  Horizontal dispersion tower without float switch

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>700556</td>
<td>CPVC 3&quot; TEE, SCH 80 SOC X SOC X SOC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>710137</td>
<td>DISPRSN PIPE CPVC HRZ 10-1/8&quot;W/SLOT</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>720600</td>
<td>Push Lock fitting - Male Straight - 1/2&quot; MNPT x 1/2&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>720660</td>
<td>POLYURETHANE TUBING, YELLOW 3/8&quot;</td>
<td>FT</td>
<td>1</td>
</tr>
<tr>
<td>750005</td>
<td>HOR DISPRSN P/UP TUBE, CPVC, 30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750011</td>
<td>HORIZ DISPRSN TWR COUPLING, CPVC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750016</td>
<td>HOR DISP EXT TUBE CPVC NC 30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750025</td>
<td>HOR DISP TOWER BASE,CPVC NC30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010170</td>
<td>Push Lock fitting - Female Straight - 1/4&quot; FNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010605</td>
<td>CPVC NIPPLE 1/4&quot; X CLOSE</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010820</td>
<td>CPVC ELBOW F/F THREADED 1/4&quot;</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010830</td>
<td>CPVC NIPPLE 1/4&quot; X 3&quot; LONG</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C261731</td>
<td>ATOMIZER NOZZLE ASSEMBLY</td>
<td>EA</td>
<td>1</td>
</tr>
</tbody>
</table>

### Part # 710144  Horizontal dispersion tower with float switch

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>700556</td>
<td>CPVC 3&quot; TEE, SCH 80 SOC X SOC X SOC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>710137</td>
<td>DISPRSN PIPE CPVC HRZ 10-1/8&quot;W/SLOT</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>720447</td>
<td>FLOAT SWITCH ASSY, FOG TOWER, BCXNC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>720600</td>
<td>Push Lock fitting - Male Straight - 1/2&quot; MNPT x 1/2&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>720660</td>
<td>POLYURETHANE TUBING, YELLOW 3/8&quot;</td>
<td>FT</td>
<td>1</td>
</tr>
<tr>
<td>750005</td>
<td>HOR DISPRSN P/UP TUBE, CPVC, 30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750011</td>
<td>HORIZ DISPRSN TWR COUPLING, CPVC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750016</td>
<td>HOR DISP EXT TUBE CPVC NC 30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750025</td>
<td>HOR DISP TOWER BASE,CPVC NC30/40/90</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010170</td>
<td>Push Lock fitting - Female Straight - 1/4&quot; FNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010605</td>
<td>CPVC NIPPLE 1/4&quot; X CLOSE</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010820</td>
<td>CPVC ELBOW F/F THREADED 1/4&quot;</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010830</td>
<td>CPVC NIPPLE 1/4&quot; X 3&quot; LONG</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C261731</td>
<td>ATOMIZER NOZZLE ASSEMBLY</td>
<td>EA</td>
<td>1</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.1.11 Dispersion Tower – Horizontal (cont.)

These components are used to complete the system and interconnect the towers together.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720640</td>
<td>POLYURETHANE TUBING, BLK 3/8&quot; X 1/4</td>
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<td>10</td>
</tr>
<tr>
<td>720655</td>
<td>POLYURETHANE TUBING, RED 3/8&quot;</td>
<td>FT</td>
<td>15</td>
</tr>
<tr>
<td>720660</td>
<td>POLYURETHANE TUBING, YELLOW 3/8&quot;</td>
<td>FT</td>
<td>15</td>
</tr>
<tr>
<td>720665</td>
<td>POLYURETHANE TUBING, BLK 1/2&quot;X 3/8&quot;</td>
<td>FT</td>
<td>10</td>
</tr>
<tr>
<td>720720</td>
<td>PUMP, DIAPHRAGM, FOR HORIZ. DISP.</td>
<td>EA</td>
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</tr>
<tr>
<td>720725</td>
<td>PUMP MOUNTING PLATE, NC DISPERSION</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>720730</td>
<td>DISCH. FIT. FOR OUR DIAPHRAGM PUMP</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010185</td>
<td>Push Lock fitting - Bulkhead Union - 3/8&quot; tube x 3/8&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010268</td>
<td>O-RING FOR 3/8&quot; TUBE X TUBE BULKHD</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C261440</td>
<td>POLY TUBING WHITE 1/4&quot; X 3/8&quot; X 25'</td>
<td>EA</td>
<td>1</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.1.12 Dispersion Tower – Vertical

PN 710140 – Dispersion tower assembly - BCX2000 (with float)

PURPOSE:
The purpose of the Vertical Dispersion Tower system is to create and distribute atomized salt fog and humidity in accordance with ASTM B117. This system is also used during a controlled humidity cycle.

LOCATION:
This horizontal dispersion towers are located inside the exposure zone.

To access the tower, open the cabinet cover.

The vertical tower is used only on the BCX2000.

1. Inverted cone baffle – C260310
2. Vertical Baffle tube – 750000
3. Atomizer nozzle – C261731
4. Dispersion tower base - 750020

Dispersion tower couple - 750010
Float switch assembly - 720447

FUNCTION:
The cabinet controller fills the internal reservoir with either solution from the 35 gallon holding tank.

When full, the bubble tower air solenoid activates. This air enters the side of the atomizer nozzle to create a siphon of solution up and into the atomizer nozzle.

The air and solution mix inside the atomizer nozzle to create a fine fog. The level switch controls the solution level in the tower during fogging cycles.

The cone at the top of the assembly baffles the fog into an even mist for proper fog distribution.
### 3.0 COMPONENTS & CONTROLS

#### 3.1.12 Dispersion Tower – Vertical (cont.)

Below is a complete listing of all of the parts that make up this vertical dispersion tower system.

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Unit</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720447</td>
<td>FLOAT SWITCH ASSY, FOG TOWER, BCXNC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>720600</td>
<td>Push Lock fitting - Male Straight - 1/2&quot; MNPT x 1/2&quot; tube</td>
<td>EA</td>
<td>1</td>
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<tr>
<td>720660</td>
<td>POLYURETHANE TUBING, YELLOW 3/8&quot;</td>
<td>FT</td>
<td>1.5</td>
</tr>
<tr>
<td>750000</td>
<td>DISPERSION TOWER PICK-UP TUBE BCX2000</td>
<td>EA</td>
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</tr>
<tr>
<td>750011</td>
<td>HORIZ DISPRSN TWR COUPLING, CPVC</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750015</td>
<td>DISPERSION TWR EXTENSION TUBE BCX2000</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>750020</td>
<td>DISPERSION TOWER, BASE, CPVC, BCX2000</td>
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<tr>
<td>C000113</td>
<td>CPVC WASHER 3/8&quot;TH X 9/16&quot; X 1 3/8&quot;</td>
<td>EA</td>
<td>1</td>
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<tr>
<td>C000115</td>
<td>CPVC NIPPLE 1/4&quot; X 1-1/2&quot;</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C000160</td>
<td>BOLT, PVC HEX HEAD 5/16-18 X 1</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010170</td>
<td>Push Lock fitting - Female Straight - 1/4&quot; FNPT x 3/8&quot; tube</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010605</td>
<td>CPVC NIPPLE 1/4&quot; X CLOSE</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C010820</td>
<td>CPVC ELBOW F/F THREADED 1/4&quot;</td>
<td>EA</td>
<td>2</td>
</tr>
<tr>
<td>C010830</td>
<td>CPVC NIPPLE 1/4&quot; X 3&quot; LONG</td>
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<td>1</td>
</tr>
<tr>
<td>C260310</td>
<td>CONE ASSEMBLY, ADJUSTABLE</td>
<td>EA</td>
<td>1</td>
</tr>
<tr>
<td>C261731</td>
<td>ATOMIZER NOZZLE ASSEMBLY</td>
<td>EA</td>
<td>1</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.2 Exposure Zone – Outside

3.2.1 Heater Junction Boxes

PN E000175 (Enclosure, Electrical, Polycarbonate, Opaque, 3 x 5 x 3”)

PURPOSE:
The purpose of the Cabinet Heater Junction Box is to provide a termination for the ends of the rod heater that exit the exposure chamber wall. There are two of these boxes on each cabinet. Inside these boxes, the electrical leads on each end of the heater are connected to the lead wires. These junction boxes protect the ends of the heaters, and keep personnel and other objects away from high voltage contact.

LOCATION:
These boxes are located along the front bottom section of the chamber, behind the gray access panels. The boxes are found by removing the gray access panels, and looking at the outside base of the exposure chamber.

NOTE!
These boxes are made of plastic – care should be taken when removing and installing these screws to prevent cracking or breaking.

One of these boxes has only one wire to connect to a heater end. The other box has a pass-through wire (as shown to the left) to the second box, as well as a primary wire and a green ground wire.

Additionally, there is a “strain relief” in the chamber wall that the rod heater passes through. This strain relief seals around the heater to keep the exposure zone conditions inside the chamber.

FUNCTION:
Protection device for terminating the end of the chamber rod heaters outside of the exposure zone.

HIGH VOLTAGE!

Prior to opening these boxes, ensure that all power to the instrument is turned off. Failure to do so will expose the operator to electric shock due to high voltage levels.
3.0 COMPONENTS & CONTROLS

3.2.2 Cabinet Heater Seal (strain relief) Fitting

PN E000225 (Cord Grip/Strain Relief Fitting, 1/2"

PURPOSE:
The purpose of the Cabinet Heater Seal Fitting is to provide a path for the cabinet heater to exit the inside of the exposure zone to the heater junction boxes (PN E000175). In addition to providing this path, these fittings also seal the heater so that the environment in the testing area does not escape to the exterior of the cabinet.

LOCATION:
These fittings are located inside the heater junction boxes along the front bottom section of the chamber, behind the gray access panels.

FUNCTION:
Secures the heater in place, and seals the path the heater uses to exit the exposure zone.
3.0 COMPONENTS & CONTROLS

3.2.3 Steel Supports for heavy-parts loading option

PURPOSE:
The purpose of these Steel Supports is to hold the weight of the heavy parts. With these supports and the associated stand, the exposure chamber can withstand the forces resulting from an excessive load. These supports prevent the exposure zone from bowing, sagging and cracking.

LOCATION:
The Steel Supports are imbedded into the fiberglass around the exposure chamber. These ribs run around the exposure chamber walls in a box-like manner, forming a protective basket. Most of the supports are not visible because they are between the inner and outer walls of the fiberglass shell.

In addition, there are supports that are added to the cabinet stand, on which the immersion ribs rest. This arrangement transfers the weight of the exposure zone more directly through the steel supports, and onto the stand.

The parts of this system that can be seen are behind the front access panels.

FUNCTION:
The weight of the parts is transferred through the steel supports, onto the frame supports, and through the leveling feet onto the lab floor. This prevents the exposure zone from bowing, sagging and cracking.
3.0 COMPONENTS & CONTROLS

3.2.4 Various air, water, solution and drain lines

P/N see table below

PURPOSE:
These lines of polyurethane tubing are used to transfer compressed air, salt solution (or other electrolyte), D.I. water, and used fluid from one point to another. The size and color of the line indicates its function.

LOCATION:
These lines are located along the front bottom section of the cabinet, behind the front lower access panels.

FUNCTION:
Function of the line is dependent on its size and color.

<table>
<thead>
<tr>
<th>Outside Diameter</th>
<th>Color</th>
<th>Function</th>
<th>Part #</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8”</td>
<td>Yellow</td>
<td>Carry salt solution (or other electrolyte) from the 60-gallon / 227 liter solution reservoir to the dispersion towers for fog testing</td>
<td>720660 per foot / .33 m</td>
</tr>
<tr>
<td>3/8”</td>
<td>Blue</td>
<td>Carry D.I. water from the customer supplied D.I. Water source to the exposure zone for wet bottom testing</td>
<td>720650 per foot / .33 m</td>
</tr>
<tr>
<td>3/8”</td>
<td>Red</td>
<td>Carry humid compressed air from the top of the bubble tower to the dispersion tower for fog testing</td>
<td>720655 per foot / .33 m</td>
</tr>
<tr>
<td>3/8” Natural (white)</td>
<td></td>
<td>Carry customer supplied compressed air to the air cover lifters, 60-gallon reservoir mixing system, or air diaphragm pump</td>
<td>C261441 per foot / .33 m</td>
</tr>
<tr>
<td>3/8”</td>
<td>Black</td>
<td>Carry various drain products to the customer supplied drain</td>
<td>720640 per foot / .33 m</td>
</tr>
<tr>
<td>½”</td>
<td>Black</td>
<td>Carry salt solution from the dispersion tower to drain, or carry salt solution from the water trap assembly to drain</td>
<td>720665 per 1’ / 0.3 m</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.2.5 Cabinet Empty-level Switch

PN E000520 (Switch, Level, Side Mount)

PURPOSE:
The purpose of this switch is to notify the cabinet controls that the chamber heaters are covered, and the wet bottom is FULL. This switch is used during the fog cycle.

LOCATION:
This switch is located on the lower front area of the cabinet, behind one of the front lower access panels. The exact location depends on cabinet size.

To access the switch, remove the front access panels. This is an example of the approximate location of this switch in a BCX3000 or 4000. This switch is installed from the outside of the cabinet.

From the inside of the cabinet, this switch is located under the diffuser plates, on the inside front wall.

FUNCTION:

During a fog cycle, the switch detects when cabinet heaters are covered with D.I. water. D.I. water enters the exposure zone from a bulkhead fitting in the front of the chamber and flows until this switch detects a FULL condition. The water is then turned off, and stops flowing into the cabinet.

In a cabinet with the option cycling controls, this switch is connected to input # X5.
3.0 COMPONENTS & CONTROLS

3.2.6 Solenoid #24 – D.I. water to exposure zone for wet bottom (optional)

PN 720015 [Solenoid 24V DC Brass (2-way) ¼”]

PURPOSE:
The purpose of this solenoid is to deliver D.I. water into the exposure zone during a wet bottom or fogging cycle. This solenoid is only installed on chambers that have the optional cycling control package.

LOCATION:
This solenoid is located behind one of the lower access doors. The location is chamber size specific.

FUNCTION:
This solenoid’s function is to allow D.I. water into the exposure zone during a wet bottom or fogging cycle. This D.I. water will cover the chamber heater element to create a warm moist environment during fogging cycles. The solenoid is controlled by output # Y11 on the optional cycling control package. The water level is controlled by a float switch connected to input # X5.

The white/natural color polypropylene tubing (PN C261441) is attached to the solenoid with two quick connect fittings (PN C010150 Push Lock fitting - Male Straight - 1/4" MNPT x 3/8” tube3/8”)

Solenoid #24 is controlled by output # Y11 on the optional cycling control package.
3.0 COMPONENTS & CONTROLS

3.2.7 D.I. Water, bubble tower Air, S-Style Solution and Float Switch Wire Inlet

PN  C010185 – Push Lock fitting, Bulkhead Union, 3/8" tube x 3/8” tube
PN  C010268 – O ring for 3/8” bulkhead Union

PURPOSE:
The purpose of these inlet bulkheads is to provide a pathway for D.I. water, bubble tower air, salt solution and the fog tower float switch wire to enter the exposure zone.

LOCATION:
These ports are located behind the right side lower access door.

These ports are a 3/8” tube fitting bulkhead.

FUNCTION:
These ports allow for a sealed pathway into the exposure zone for the above listed solutions and wire. The quick connect fittings contain an o-ring that seal the tubing into the fittings.
3.0 COMPONENTS & CONTROLS

3.2.8 Solenoid #23 - Compressed Air Solenoid for purge/dry (optional)

PN 720015 [Solenoid 24V DC Brass (2-way) ¼”]

PURPOSE:
The purpose of this solenoid is to deliver compressed to the exposure zone during a purge/dry cycle. This solenoid is only installed on chambers that have the optional cycling control package.

LOCATION:
This solenoid is located behind the right side lower access door.

FUNCTION:
This solenoids function is to allow compressed air into the exposure zone during purge/dry cycles. It is controlled by output # Y2 on the optional cycling control package.

The white/natural color polypropylene tubing (PN C261441) is attached to the solenoid with two quick connect fittings (PN C010150 Push Lock fitting - Male Straight - 1/4" MNPT x 3/8" tube 3/8")

Solenoid #23 is controlled by output # Y2 on the optional cycling control package via contact relay #1 (CR1).
3.0 COMPONENTS & CONTROLS

3.2.9 Compressed Air Inlet for purge/dry

PURPOSE:
The purpose of the compressed air inlet is to allow compressed air to enter the exposure zone for the purge/dry cycles. It can be controlled manually by a toggle switch or automatically with a solenoid by the cycling control package.

LOCATION:
This port is located behind the right side lower access door.

FUNCTION:
This compressed air port allows the air from the compressed air line to enter the exposure zone. It can be controlled manually by a toggle switch or automatically with a solenoid by the optional cycling control package (solenoid #23 and output Y2 (CR1) on the cycling control package).
3.2.10 External Condensate Collection Ports - (optional)

PN 720620  Push Lock fitting - Bulkhead Union - 1/2” tube x 1/2” tube
PN 720635  Push Lock fitting - Plug 1/2”
PN C010269  Gasket for bulkhead union

PURPOSE:
The purpose of these ports is to accommodate the installation of the optional external condensate collection package. All BCX cabinets are equipped with these ports for easy installation at the factory or in the field.

LOCATION:
These ports are located in the front bottom section of the cabinet, behind the left and right front access panels.

![Port/Bulkhead (PN 720620)](image1)

To access these ports, remove the front access panels. The number of ports depends on cabinet size. The BCX 2000 has 2 ports, one left and one right. The BCX 3000, 4000 and 9000 have 4 ports, two left and two on the right.

![Plug (PN 720635)](image2)

To remove the plug, push IN on the gray collar of the PORT and pull out on the PLUG. This may be difficult the first time tried, but will become easy with practice.

Additionally, there is an O-Ring installed in the inside of the exposure zone side of the bulkhead to ensure this system is sealed. The part number for this O-Ring is C010269.

FUNCTION:
The port/bulkhead serves as a connection point for the External Condensate Collection Package (optional). This allows condensate to pass through the wall for collection and measurement.

The Plug is installed to keep the port closed when the optional External Condensate Collection Package is not installed on the chamber.
3.0 COMPONENTS & CONTROLS

3.2.11 Air Solenoid Bank for automated cover lifters (sol. #9 & 10) (optional)

PN 701165 - Cover lifter solenoid assembly BCX2000, 3000, 4000, 9000

PURPOSE:
The purpose of this solenoid bank is to deliver compressed air to the air cover lifters. The OPEN sides of the lifters are connected to solenoid #9, the CLOSE sides of the lifters are connected to solenoid #10. This solenoid bank has one port for the compressed air inlet, pressurizing the block assembly. When the solenoids open, compressed air is sent to the correct side of the cover lifters.

LOCATION:
This Solenoid Bank is mounted on the chamber frame inside the right front corner.

FUNCTION:

Solenoid #9 - (Lid OPEN) delivers compressed air to the OPEN side of the cover lifters. It is wired to output Y20 of optional cycling control packaged. This solenoid always acts in an opposite manner to solenoid #10. When solenoid #10 is ON, solenoid #9 is OFF. It can be activated by the lid OPEN switch on the F1 or F2 page of computer controls, and the status page of standard controls, and can also be activated by selecting an AMBIENT step during any cycle.

Solenoid #10 - (Lid CLOSE) delivers compressed air to the CLOSE side of the cover lifters. It is wired to output Y21 of optional cycling control packaged. This solenoid always acts in an opposite manner to solenoid #9. When solenoid #9 is ON, solenoid #10 is OFF. It can be activated by the lid CLOSE switch on the F1 or F2 page of computer controls, and the status page of the standard controls.

This solenoid block is only installed on instruments if the optional Cycling Control package is included.
3.0 COMPONENTS & CONTROLS

3.2.11 Air Solenoid Bank for automated cover lifters (sol. #9&10) (optional) (cont.)

A complete parts list for this assembly is listed here for the BCX2000, 3000, 4000 & 9000

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>701160</td>
<td>COVER LIFTER SOLENOID VALVES</td>
<td>1</td>
</tr>
<tr>
<td>701170</td>
<td>COVER LIFTER AIR VALVE BLOCK, NC</td>
<td>1</td>
</tr>
<tr>
<td>C000124</td>
<td>BRASS NIPPLE 1/4&quot; X 1 1/2&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>3</td>
</tr>
<tr>
<td>C010160</td>
<td>Push Lock fitting - Elbow – 90 Deg. - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>2</td>
</tr>
<tr>
<td>C010180</td>
<td>Push Lock fitting - Tee – Union - 3/8&quot; Tube x 3/8&quot; Tube x 3/8&quot; Tube</td>
<td>1</td>
</tr>
<tr>
<td>C249405</td>
<td>BRASS STREET ELBOW 1/4&quot;</td>
<td>5</td>
</tr>
<tr>
<td>C249410</td>
<td>BRASS TEE 1/4&quot;, FPT</td>
<td>2</td>
</tr>
<tr>
<td>C263300</td>
<td>BUBBLER, AIR, STAINLESS STEEL 1/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>E000220</td>
<td>CORD GRIP (GREY) FOR BELDON CABLE</td>
<td>1</td>
</tr>
</tbody>
</table>

A complete parts list for this assembly is listed here for the BCX11000

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>701161</td>
<td>COVER LIFTER SOLENOID VALVE BCX11000</td>
<td>1</td>
</tr>
<tr>
<td>720600</td>
<td>MALE STRAIGHT CON, 1/2&quot;TH X 1/2&quot;PLK</td>
<td>4</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>2</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.2.12 Air Filter and Regulator Assembly for optional automated cover lifters

PN 701118 – Air Regulator & Lubricator

PURPOSE:
The purpose of the optional Air Regulator & Lubricator Assembly is to supply properly regulated compressed air to the optional automated air cover lifters.

LOCATION:
This assembly is located in the back wall of the control cabinet area.

This assembly has several different components:
1. Regulator knob – for adjusting the air pressure to the cover lifter solenoids.
2. Oil regulator – for adjusting the amount of oil mist being delivered to the air cover lifter assembly.
3. Air outlet – compressed air outlet leading to the inlet port of the air cover lifter solenoids.
4. Filter reservoir – filters the air as it enters the regulator.
5. Lubricant reservoir – holds lubricant for the oil mister.
6. Air inlet – not seen in this picture, but the supply tubing is located on the opposite side of the outlet port.

40 micron replacement filter element for this assembly C260587

FUNCTION:
Customer supplied compressed air (clean, dry and regulated to 95PSI / 655kPa) enters the assembly. This air further regulated and filtered, and then lubricated. This conditioned air is then supplied to the optional automated air cover lifters. The filter should be replaced at least once per year, or more often as needed, and the lubricant reservoir should be monitored monthly to ensure that it is at the proper level.
3.0 COMPONENTS & CONTROLS

3.2.13 Lower Access Door Panels (quantity of 2 for BCX2000, 3 for 3000 or 4000)

PN 720230 Bottom Panels for BCX2000
PN 720325 Bottom Panels for BCX3000 & 4000
PN 730092 Bottom Panels for BCX9000

PURPOSE:
The purpose of these panels is to cover and protect the cabinet components that reside behind them as well as provide an appealing look to the cabinet.

LOCATION:
These panels are located along the front bottom section of the cabinet.

Each consists of
1. One latching knob
2. One fiber-glass shell
3. Two clips

The number of panels is dependent on cabinet size. The BCX2000 has 2 panels, one left and one right. The BCX3000, 4000 and 9000 have 3 panels, one left, one center and one right.

Each panel is held in place at the bottom by plastic clips. The clips rest on and grip the front edge of the cabinet shell.

FUNCTION:
To remove a panel,
1. Turn the latching knob (PN 720221)
2. Tilt the upper part of the panel forward (away) from the cabinet
3. Pull up on the panel to allow the clips to clear the cabinet shell.

To install a panel, reverse the process.
3.0 COMPONENTS & CONTROLS

3.2.14 Control Cabinet Access Door

PN 720220

PURPOSE:
The purpose of these panels is to cover and protect the cabinet components that reside behind it as well as provide an appealing look to the cabinet.

LOCATION:
This panel is located along the front right side of the cabinet. Each consists of:
1. One latching knob
2. One fiber-glass shell
3. Two clips

Each panel is held in place at the bottom by plastic clips. The clips rest on and grip the front edge of the cabinet shell.

FUNCTION:
To remove a panel,
1. Turn the locking latch (PN 710260)
2. Tilt the upper part of the panel forward (away) from the cabinet
3. Pull up on the panel to allow the clips to clear the cabinet shell.
To install a panel, reverse the process.
3.0 COMPONENTS & CONTROLS

3.2.15 Magnetic Seal for track mount (south pole)

PN 720480-S Magnetic Seal Gasket Bottom for BCX2000
PN 720485-S-FC Magnetic Seal Gasket Bottom for BCX3000
PN 720490-S-FC Magnetic Seal Gasket Bottom for BCX4000
PN 720491 Magnetic Seal Gasket Bottom for BCX11000

PURPOSE:
The purpose of the magnetic seal is to seal the cover of the cabinet to the cabinet. The SOUTH POLE of the magnetic seal is one-half of the set. Coupled with the North Pole, the set provides the seal. This is to prevent the corrosive atmosphere from escaping the exposure zone. This design is for a BCX chamber with a fiberglass cover, and an imbedded track system.

LOCATION:
The South Pole magnetic seal is glued to the top edge of the cabinet. It is the flexible gray strip around the perimeter of the top edge. It is fastened to the fiberglass with a “dart” that fits into an imbedded track. This seal is made up of a flexible Santoprene pocket which encases a magnetic strip. The bottom gasket has a magnet with a SOUTH POLE magnetic pull. This SOUTH POLE magnet is attracted to the NORTH POLE magnet which is attached using the track system in the cover.

FUNCTION:
As the cover closes, the South Pole gasket is attracted to the North Pole gasket on the cover pulling the two gaskets together. This creates a positive seal. As the cover opens the seal is broken.

NOTE!
The BCX9000 uses a water trough, not PVC with embedded magnetic strips, to seal the exposure zone.
3.0 COMPONENTS & CONTROLS

3.3 Cabinet Cover

3.3.1 Cover Assembly for BCX2000, fiberglass with Santoprene gasket
PN 710210-S-FC

PURPOSE:
The purpose of the cover assembly is to contain the corrosive environment in the exposure zone of the instrument while providing a means of visual inspection of the test progress. The current production design features a fiberglass cover with a large glass window, and an imbedded track system holding a Santoprene gasket.

LOCATION:
The cover assembly is located on the top of the exposure zone.

This cover assembly is made up of the following components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720465-S</td>
<td>MAGNETIC GASKET, TOP BCX2000</td>
<td>1</td>
</tr>
<tr>
<td>720466</td>
<td>TRACK RETAINER, 51-7/8&quot; LG.- BCX2000</td>
<td>4</td>
</tr>
<tr>
<td>720467</td>
<td>TRACK RETAINER, 31-13/16&quot; LG., BCX2000,30</td>
<td>4</td>
</tr>
<tr>
<td>720850-F-SGT</td>
<td>COVER, FIBERGLASS, BCX2000 W/SGT</td>
<td>1</td>
</tr>
<tr>
<td>750370</td>
<td>COVER SUPPORT BRACE - NC 20</td>
<td>1</td>
</tr>
<tr>
<td>F000606</td>
<td>BOLT, HEX HD, 316SS 3/8-16-NC X 1&quot;</td>
<td>7</td>
</tr>
<tr>
<td>F000609</td>
<td>WASHER, 316SS, 3/8&quot;</td>
<td>7</td>
</tr>
<tr>
<td>F000610</td>
<td>WASHER, LOCK, 316SS, 3/8&quot;</td>
<td>7</td>
</tr>
</tbody>
</table>

FUNCTION:
This cover is hinged at the back of the chamber. Either gas shocks or pneumatic lifters are used to open the cover. The cover is equipped with a large viewing window made of safety glass that extends to the left and right edge as well as the top peak to the bottom front edge. This ensures that condensation does not drip onto the parts testing below. A magnetic seal on the cover mates up with one on the instrument to provide a positive seal that contains the corrosive fog. A lip extends in the inside of the cover and below the point that the cover and instrument seals mate. This lip ensures that condensation from the cover does not accumulate and move to the seal area. This condensation will drip to the chamber floor and exit through the dra"
3.0 COMPONENTS & CONTROLS

3.3.2 Cover Assembly for BCX3000, fiberglass with Santoprene gasket
PN 710215-S-FC

PURPOSE:
The purpose of the cover assembly is to contain the corrosive environment in the exposure zone of the instrument while providing a means of visual inspection of the test progress. The current production design features a fiberglass cover with a large glass window, and an imbedded track system holding a Santoprene gasket.

LOCATION:
The cover assembly is located on the top of the exposure zone.

This cover assembly is made up of the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720467</td>
<td>TRACK RETAINER, 31-13/16&quot; LG., BCX2000,30</td>
<td>4</td>
</tr>
<tr>
<td>720468-FC30</td>
<td>TRACK RETAINER, 77-1/16&quot; LG.- NC-30</td>
<td>4</td>
</tr>
<tr>
<td>720470-S-FC</td>
<td>MAGNETIC SEAL, TOP, NC-30 SANTOPREN</td>
<td>1</td>
</tr>
<tr>
<td>720860-F-SGT</td>
<td>COVER, FIBERGLASS, BCX3000 W/SGT</td>
<td>1</td>
</tr>
<tr>
<td>750375</td>
<td>COVER SUPPORT BRACE - NC-30/NC-40</td>
<td>1</td>
</tr>
<tr>
<td>F000417</td>
<td>HEX BOLT, 1/4&quot;-20 X 1&quot; LG, 316 SS</td>
<td>6</td>
</tr>
<tr>
<td>F000419</td>
<td>WASHER, LOCK, 316 SS 1/4&quot;</td>
<td>6</td>
</tr>
<tr>
<td>F000423</td>
<td>BOLT, FLAT HD, 316SS 1/4-20-NC X 1&quot;</td>
<td>2</td>
</tr>
<tr>
<td>F000606</td>
<td>BOLT, HEX HD, 316SS 3/8-16-NC X 1&quot;</td>
<td>10</td>
</tr>
<tr>
<td>F000609</td>
<td>WASHER, 316SS, 3/8&quot;</td>
<td>10</td>
</tr>
<tr>
<td>F000610</td>
<td>WASHER, LOCK, 316SS, 3/8&quot;</td>
<td>10</td>
</tr>
</tbody>
</table>

FUNCTION:
This cover is hinged at the back of the chamber. Either gas shocks or pneumatic lifters are used to open the cover. The cover is equipped with a large viewing window made of safety glass that extends to the left and right edges as well as the top peak to the bottom front edge. This ensures that condensation does not drip onto the test parts. A magnetic seal on the cover mates up with one on the instrument to provide a positive seal, containing the corrosive fog. A lip extends in the inside of the cover and below the point that the cover and instrument seals mate. The lip ensures condensation from the cover does not accumulate and move to the seal area. Condensation drips to the chamber floor and exits through the dra"
### 3.0 COMPONENTS & CONTROLS

#### 3.3.3 Cover Assembly for BCX4000, fiberglass with Santoprene gasket

PN 710220-S-FC

**PURPOSE:**
The purpose of the cover assembly is to contain the corrosive environment in the exposure zone of the instrument while providing a means of visual inspection of the test progress. The current production design features a fiberglass cover with a large glass window, and an imbedded track system holding a Santoprene gasket.

**LOCATION:**
The cover assembly is located on the top of the exposure zone.

This cover assembly is made up of the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720468-FC</td>
<td>TRACK RETAINER, 77&quot; LG.- BCX4000</td>
<td>4</td>
</tr>
<tr>
<td>720469-FC</td>
<td>TRACK RETAINER, 39&quot; LG.- BCX4000</td>
<td>4</td>
</tr>
<tr>
<td>720475-S-FC</td>
<td>MAGNETIC SEAL, TOP BCX4000 SANTOPRENE</td>
<td>1</td>
</tr>
<tr>
<td>720870-F-SGT</td>
<td>COVER, FIBERGLASS, BCX4000 W/SGT</td>
<td>1</td>
</tr>
<tr>
<td>750375</td>
<td>COVER SUPPORT BRACE – BCX3000/BCX4000</td>
<td>1</td>
</tr>
<tr>
<td>F000417</td>
<td>HEX BOLT, 1/4&quot;-20 X 1&quot; LG, 316 SS</td>
<td>6</td>
</tr>
<tr>
<td>F000419</td>
<td>WASHER, LOCK, 316 SS 1/4&quot;</td>
<td>6</td>
</tr>
<tr>
<td>F000423</td>
<td>BOLT, FLAT HD, 316SS 1/4-20-NC X 1&quot;</td>
<td>2</td>
</tr>
<tr>
<td>F000606</td>
<td>BOLT, HEX HD, 316SS 3/8-16-NC X 1&quot;</td>
<td>10</td>
</tr>
<tr>
<td>F000609</td>
<td>WASHER, 316SS, 3/8&quot;</td>
<td>10</td>
</tr>
<tr>
<td>F000610</td>
<td>WASHER, LOCK, 316SS, 3/8&quot;</td>
<td>10</td>
</tr>
</tbody>
</table>

**FUNCTION:**
This cover is hinged at the back of the chamber. Either gas shocks or pneumatic lifters are used to open the cover. The cover is equipped with a large, safety glass viewing window that extends to the left and right edge as well as the top peak to the bottom front edge. This ensures condensation doesn't drip onto the test parts. A magnetic seal on the cover mates up with one on the instrument to provide a positive seal, containing the fog. A lip extends in the inside of the cover and below the point that the cover and instrument seals mate. This lip ensures that condensation does not accumulate and move to the seal area. The condensation drips to the chamber floor and exits through the drain.
3.0 COMPONENTS & CONTROLS

3.3.4 Cover Assembly for BCX9000, Polypropylene

PN 710290

PURPOSE:
The purpose of the cover assembly is to contain the corrosive environment in the exposure zone of the instrument while providing a means of visual inspection of the test progress.

LOCATION:
The cover assembly is located on the top of the exposure zone.

This cover assembly is made up of the following components:

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>701140</td>
<td>CLEVIS ROD F/CYLINDER 701110 - NC</td>
<td>2</td>
</tr>
<tr>
<td>720830</td>
<td>HINGE BRACKET, LEFT, BCX9000</td>
<td>1</td>
</tr>
<tr>
<td>720835</td>
<td>HINGE BRACKET, RIGHT, BCX9000</td>
<td>1</td>
</tr>
<tr>
<td>720890</td>
<td>COVER FOR BCX9000, POLYPROPYLENE</td>
<td>1</td>
</tr>
<tr>
<td>B224010</td>
<td>WASHER BAKELITE 1/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C280070-COMPLETE</td>
<td>SWIVEL BRACKET W/INSERT &amp; PAINTED</td>
<td>2</td>
</tr>
<tr>
<td>C280090</td>
<td>BACKUP PLATE FOR SF HINGES</td>
<td>2</td>
</tr>
<tr>
<td>C280100</td>
<td>HINGE SHAFT 3&quot;</td>
<td>2</td>
</tr>
<tr>
<td>F000418</td>
<td>WASHER, 316 SS, 1/4&quot;, FLAT WASHER</td>
<td>8</td>
</tr>
<tr>
<td>F000419</td>
<td>WASHER, LOCK, 316 SS 1/4&quot;</td>
<td>8</td>
</tr>
<tr>
<td>F000600</td>
<td>BOLT, HEXHEAD 316 SS 1/4-20 X 1 1/4L</td>
<td>8</td>
</tr>
</tbody>
</table>

FUNCTION:
This cover is hinged at the back of the chamber. Pneumatic lifters are used to open the cover. The cover closes into a trough that is built into the instrument. This trough is maintained full with DI water and ensures a positive seal when the cover closes into the trough, containing the corrosive environments inside the exposure zone.
3.0 COMPONENTS & CONTROLS

3.3.5 Cover Assembly for BCX11000, fiberglass with Santoprene gasket

PN 710295

PURPOSE:
The purpose of the cover assembly is to contain the corrosive environment in the exposure zone of the instrument while providing a means of visual inspection of the test progress. The current production design features a fiberglass cover with a large glass window, and an imbedded track system holding a Santoprene gasket.

LOCATION:
The cover assembly is located on the top of the exposure zone.

This cover assembly is made up of the following components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720492</td>
<td>MAGNETIC GASKET TOP BCX11000</td>
<td>1</td>
</tr>
<tr>
<td>720493</td>
<td>TRACK RETAINER, GASKET, 92-3/16&quot; LG.</td>
<td>4</td>
</tr>
<tr>
<td>720494</td>
<td>TRACK RETAINER, GASKET, 78-5/16&quot; LG.</td>
<td>4</td>
</tr>
<tr>
<td>701197</td>
<td>COVER SPACER, BCX11000</td>
<td>2</td>
</tr>
<tr>
<td>720836</td>
<td>HINGE BRACKET, BCX11000 LEFT</td>
<td>1</td>
</tr>
<tr>
<td>720837</td>
<td>HINGE BRACKET, BCX11000 RIGHT</td>
<td>1</td>
</tr>
<tr>
<td>720900</td>
<td>COVER, BCX11000</td>
<td>1</td>
</tr>
<tr>
<td>750376</td>
<td>COVER SUPPORT BRACE - BCX11000</td>
<td>1</td>
</tr>
<tr>
<td>F000419</td>
<td>WASHER, LOCK, 316 SS 1/4&quot;</td>
<td>4</td>
</tr>
<tr>
<td>F000600</td>
<td>BOLT, HEXHEAD 316 SS 1/4-20 X 1 1/4L</td>
<td>4</td>
</tr>
<tr>
<td>F000610</td>
<td>WASHER, LOCK, 316 SS, 3/8&quot;</td>
<td>12</td>
</tr>
</tbody>
</table>

FUNCTION:
This cover is hinged at the back of the chamber. Either gas shocks or pneumatic lifters are used to open the cover. The cover is equipped with a large viewing window made of safety glass that extends to the left and right edge as well as the top peak to the bottom front edge. This ensures that condensation does not drip onto the parts testing below. A magnetic seal on the cover mates up with one on the instrument to provide a positive seal that contains the corrosive fog. A lip extends in the inside of the cover and below the point that the cover and instrument seals mate. This lip ensures that condensation from the cover does not accumulate and move to the seal area. This condensation will drip to the chamber floor and exit through the dra
3.0 COMPONENTS & CONTROLS

3.3.6 Lid Switch Assembly (PN 710295)

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>740400</td>
<td>Switch, Cover OPEN/CLOSE</td>
</tr>
<tr>
<td>740405</td>
<td>Actuator for cover position switch</td>
</tr>
<tr>
<td>740420</td>
<td>Connector for lid switch box</td>
</tr>
</tbody>
</table>

PURPOSE:
The purpose of the lid switch assembly is to inform the controller of the current position of the cover; OPEN or CLOSED.

LOCATION:
This switch is located on the right hand side of the cover assembly, near the back corner.

FUNCTION:
This switch is mounted on the hinge bracket. The connector is wired to the control panel and then connected into the switch. The actuator is a magnet that is mounted to the cover. When aligned properly, a CLOSED signal will be sent when the cover is down, and an OPEN signal will be sent when the cover is not down all the way.

On the optional cycling control package, this switch is wired into input # X0.
3.0 COMPONENTS & CONTROLS

3.3.7 Hinge Supports

PN  720840  Hinge Support Bracket, Left for BCX
PN  720845  Hinge Support Bracket, Right for BCX

PURPOSE:
The hinge supports hold the cover in the correct position and provide for a pivot location.

LOCATION:
The hinge supports are located on the left and right side of the cover near the back edge.

There are two supports, one for the left side, and one for the right.

Fasteners to connect brackets to instrument and cover bracket

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>720840</td>
<td>HINGE SUPPORT BRACKET, LEFT</td>
</tr>
<tr>
<td>720845</td>
<td>HINGE SUPPORT BRACKET, RIGHT</td>
</tr>
<tr>
<td>720675</td>
<td>BOLT, 316 SS SHOULDER, 1/2D X 3/4&quot;</td>
</tr>
<tr>
<td>F000418</td>
<td>WASHER, 316 SS, 1/4&quot;, FLAT WASHER</td>
</tr>
<tr>
<td>F000419</td>
<td>WASHER, LOCK, 316 SS 1/4&quot;</td>
</tr>
<tr>
<td>F000600</td>
<td>BOLT, HEXHEAD 316 SS 1/4-20 X 1 1/4L</td>
</tr>
<tr>
<td>F000610</td>
<td>WASHER, LOCK, 316SS, 3/8&quot;</td>
</tr>
<tr>
<td>F000620</td>
<td>NUT, HEX, 316SS 3/8&quot;-16</td>
</tr>
</tbody>
</table>

FUNCTION:
These brackets are bolted onto the fiberglass shell. Imbedded into the fiberglass is aluminum bar stack which is drilled and dapped for the fasteners that secure the brackets. When secured to the instrument, the shoulder bolts, washers and nut can be used to secure the cover back brace to the hinge support bracket. This provides a hinge/rotation point for the cover assembly.
3.0 COMPONENTS & CONTROLS

3.3.8 Cover Lifters – Gas Shocks

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>720541</td>
<td>Gas shock, 350N with hardware and spring, for BCX2000</td>
</tr>
<tr>
<td>720546</td>
<td>Gas shock, 500N with hardware and spring, for BCX3000</td>
</tr>
<tr>
<td>720556</td>
<td>Gas shock, 600N with hardware and spring, for BCX4000</td>
</tr>
</tbody>
</table>

PURPOSE:
The purpose of the cover lifters is to assist the user in opening the cover, and to keep the cover open once lifted. The BCX2000, 3000 and 4000 come standard with these gas shocks. The BCX9000 and 11000 are equipped with air actuated cover lifters.

LOCATION:
The cover lifters are located on the two sides of the cover near the back of the chamber.

FUNCTION:
The gas filled cover lifters apply force between the cover sides and the steel hinge supports. This force is enough to assist in lifting the cover when the user manually opens the cover, and enough to keep the cover in an open position once it is put in that position. Over time, the gas can leak out of lifter, deteriorating its ability to keep the cover open or assist in the opening of the cover. If this occurs, both lifters must be replaced. To change a lifter, open the cover, remove the springs from the ball ends, pull the shock off of the balls, and reinstall the new lifters and lock springs.
3.0 COMPONENTS & CONTROLS

3.4 Control Cabinet

3.4.1 Salt Solution Filter

PN 710310 - For salt solution - In line filter
(Plastic cylinder with yellow polyurethane tubing attached)

PURPOSE:
The Solution Filter Assembly prevents solid particles from clogging the atomizer nozzle.

LOCATION:
The Solution Filter Assembly is attached to the solution reservoir behind the cover panel.

FUNCTION:
The solution filter prevents any solid particles that may be in the solution reservoir from arriving at, and potentially clogging, the solenoids and atomizer nozzle.

To replace the filter; 1. Turn off the pump if on, 2. relieve solution pressure, 3. remove the old filter from the quick connect fittings, 4. Cut the new filter tubing to size to match the old filter assembly, 5. put the new filter inline and attach to the quick connect fittings.

⚠️ CAUTION! INSTRUMENT DAMAGE
Pay careful attention to the direction of flow of the solution. The filter has an arrow showing direction of flow. Also, take care in installing the filter, if too much pressure is applied to the plastic nipples that the tubing attaches to on either side of the filter, these nipples can crack, or break off.
3.0 COMPONENTS & CONTROLS

3.4.2 Solenoid # 8 – Solution to Dispersion Tower

PN 720015 (Solenoid 24V DC Brass (2-way) ¼”) – for horizontal towers
PN 720030 (Solenoid 24V DC Plastic (2-way) ¼”) – for vertical towers

PURPOSE:
The purpose of this solenoid is to deliver salt solution, or other electrolyte, from the 60-gallon / 227 liter solution reservoir to the dispersion towers.

LOCATION:
The solenoid is located along the front bottom section of the cabinet, behind the left front access panels. It is found by removing the left front access panel and looking to the left of the bubble tower.

This solenoid is activated by a 24VDC signal.

Tubing – in this photo delivering air to the diaphragm pump – to and from this solenoid is attached using (PN C010150) Push Lock fitting - Male Straight - 1/4” MNPT x 3/8” tube 3/8” quick connect fittings. This solenoid is connected to white/natural (PN C261441) or yellow tubing (PN 720660), and delivers either compressed air or salt solution. If the solenoid delivers salt solution, it will be all plastic. If the solenoid delivers compressed air, it will be brass.

FUNCTION:
Function depends on the dispersion tower system installed on the cabinet. There are two types: Horizontal dispersion towers (BCX3000, 4000, 9000) Because these towers are placed on top of the diffuser plates, salt solution must be pumped to them. When the dispersion tower float switch detects a LOW level condition, cabinet controls opens solenoid #8, sending compressed air to the air diaphragm pump, which moves salt solution to the internal reservoir of the towers. When the dispersion tower float switch detects a FULL level condition, solenoid #8 is closed by cabinet controls, shutting off compressed air to the pump, stopping the flow of salt solution. Since this solenoid controls compressed air it is brass.

Vertical dispersion tower (BCX2000) Because this tower sits on the floor of the exposure chamber, salt solution can flow to it by gravity. When the dispersion tower float switch detects a LOW level condition, cabinet controls opens solenoid #8, allowing salt solution to flow to the internal reservoir at the base of the dispersion tower. When the dispersion tower float switch detects a FULL level condition, solenoid #8 is closed by cabinet controls, which stops the flow of salt solution. Since this solenoid controls salt solution, it is plastic.

With the optional Cycling Control package, this solenoid is controlled by output number Y17.
3.0 COMPONENTS & CONTROLS

3.4.3 Solution Pump Assembly for Horizontal Dispersion Towers

- PN 720720 - Air Driven Pump
- PN C010155 - Quick disconnect elbows
- PN 720660 - 3/8” Yellow Poly-tubing
- PN C010185 - Push Lock fitting - Bulkhead Union – 3/8” tube x 3/8” tube (qty of 2)
- PN C010268 - O ring for 3/8” bulkhead
- PN C010165 - Lab Cock ¼” F x ¼”F
- PN C261440 - White poly-tubing ¼”

PURPOSE:
The purpose of the Solution Pump Assembly is to move salt solution or other electrolyte from the 35-gallon solution reservoir to the horizontal dispersion tower.

LOCATION:
The Solution Pump Assembly is located on a polypropylene panel attached to the solution reservoir cover.

FUNCTION:
When solution is required by the internal solution reservoirs, located at the base of the dispersion towers, a signal from the solution level switch is sent to the cabinet controls which activate the Solution Pump Assembly. When the solution level switch detects a FULL condition, the pump is turned off.
3.0 COMPONENTS & CONTROLS

3.4.4 Solution Transfer Pump

PN 720720    -   Air Driven Pump
PN C010155    -   Quick disconnect elbows
PN 720660    -   3/8"Yellow Poly-tubing
PN C010185    -   Push Lock fitting - Bulkhead Union –
                   3/8" tube x 3/8” tube (qty of 2)
PN C010268    -   O ring for 3/8” bulkhead
PN C010165    -   Lab Cock ¼” F x ¼”F
PN C261440    -   White poly-tubing ¼”

PURPOSE:
The Solution Pump Assembly moves salt solution or other electrolyte from an external reservoir into the
35-gallon solution reservoir.

LOCATION:
The Solution Pump Assembly is located on a polypropylene panel
attached to the solution reservoir cover.

See the following page for Function.
3.0 COMPONENTS & CONTROLS

3.4.4 Solution Transfer Pump (cont.)

FUNCTION:

The chamber is equipped with a 35-gallon solution holding tank. This is not a mixing tank. The salt solution should be mixed in another container and transferred into this tank. Due to the location of this tank, it is not practical to “pour” the mixed salt water into this tank. In order to get the pre-mixed salt solution into the holding tank, a couple of simple steps must be taken.

1. Mix the salt solution in a separate container.
2. Get this pre-mixed solution into close (3-5 feet) of the BCX chambers 35-gallon holding tank.
3. Put the tubing from the transfer pumps inlet into the container holding the pre-mixed solution.
4. Change ball valve #1 (Salt Solution from solution tank) from it’s normally OPEN position to a CLOSED position.
5. Change ball valve #31 (Air to the Solution transfer pump) from it’s normally CLOSED position to an OPEN or partially OPEN position. The more you OPEN it, the faster the pump will run moving the solution into this 35-gallon holding tank.
6. Once all of the solution is moved, put these two valves into their original positions, coil up the tubing and the transfer is complete.
3.0 COMPONENTS & CONTROLS

3.4.5 S-Style Solution spray pump (optional)

PN 700505-S Pump Assy. for Solution Spray - BCX2000
PN 700515-S Pump Assy. for Solution Spray - BCX3000
PN 700525-S Pump Assy. for Solution Spray - BCX4000

PURPOSE:
The solution spray pump moves solution from the reservoir to the spray bar header assembly and pressurizes it for spraying.

LOCATION:
The solution spray pump is located on the component plate in the back left corner of the control cabinet area.

The pump has one solution outlet line on the top front section of the pump, and one solution inlet line on the front of the pump.

The Solution Spray Pump is connected to the solution reservoir and the spray bar header by braided plastic hose.

FUNCTION:
This air diaphragm pump is activated by solenoid # 22 which directs compressed air to the pump. Ball valve (#33) can be adjusted to control pump speed. This pump turns on only when the solution spray option has been programmed into a test cycle.

When a test step requiring solution spray is specified, the appropriate contactor relay (CR3 for standard controls – output Y4) is activated. This relay then sends voltage to the solenoid to turn it ON. The pump remains ON until the time has expired for that specific step in the cycle.
3.0 COMPONENTS & CONTROLS

3.4.6 Bubble Tower Assembly

PN 810135 – Humidifying Tower Assembly – BCX

PURPOSE:
The Bubble Tower is also referred to by other names – Humidifying Tower, Saturator Tower. Throughout Atlas documents it is referred to as a Bubble Tower, or bubble tower. The purpose of the Bubble Tower is to provide conditioned (hot and humid) air to the atomizer nozzle/s. Conditioning the air before using it to atomize an electrolyte is an integral portion of many corrosion specifications, such as ASTM B117 and ISO9227.

LOCATION:
The bubble tower is mounted on the component plate in the control cabinet.

The Bubble Tower is an assembly with many different parts.

1. RTD – for measuring bubble tower temperature – PN 720455
2. Air relief valve – a safety feature to vent over-pressure. – PN C260590
3. Bubble tower Top Plate (CPVC) – for mounting components and sealing the tower. – PN 720345
4. Bubble tower air pickup tube – PN C263330 – takes humidified air from the tower and sends it to the dispersion tower(s)
5. Float Switch – for measuring the water level in the bubble tower – PN 720445
6. Bubble tower Tube – 6” diameter acrylic tube that makes up the transparent portion of the bubble tower assembly and holds the water. – PN C263315
7. Tie Rods – 4 threaded metal rods that hold the bubble tower together – PN C000149
8. Bubble tower Heater – 1500 Watt immersion heater for heating the bubble tower water with a built in lower water/over temperature sensor. – PN C261280
9. Bubble tower drain valve – ball valve #2 – normally closed, open to drain water from the bubble tower. – PN C010165
10. Bubble tower aerator – (air bubbler) breaks the air entering the bubble tower into small bubbles, allowing the air to pick up moisture and heat.
3.0 COMPONENTS & CONTROLS

3.4.6 Bubble Tower Assembly (cont.)

11. Water Inlet – D.I. water from solenoid #1; fills the bubble tower with D.I. water. – PN C010145
12. Water inlet check valve – one-way valve that allows water to flow into the bubble tower but not flow out. – PN C249450
13. Bubble tower base plate (brass) – for mounting components and sealing the tower. – PN 720340
14. Air inlet – compressed air inlet from solenoid #5. – PN C010145
15. Air inlet check valve – one-way valve that allows air to flow into the bubble tower but not flow out. – PN C249450
16. Bubble tower heater reset switch – If the cabinet controls detect an unsafe condition, a safety switch will open, stopping voltage to the heater. When the unsafe condition is corrected, this reset switch can be pushed in and the heater will have voltage.
17. Bubble tower heater power cord – connected to the electrical panel to supply voltage to the heater.

FUNCTION:
The bubble tower is a self contained unit with three control loops.

1. Temperature control
The temperature of the bubble tower is set by the user in the cabinet controls. The controls compare the actual temperature to the set-point, and turn the bubble tower heater ON and OFF as needed to maintain the set-point.

2. Water level control
The water level of the bubble tower is controlled by the bubble tower float switch. During a FOG cycle, Solenoid #5 allows compressed air to enter the bottom of the bubble tower. As long as the bubble tower float detects a FULL condition, Solenoid #5 remains ON. When the bubble tower float reads a LOW condition, then Solenoid #5 is temporarily turned OFF to depressurize the bubble tower. At the same time, Solenoid #1 turns ON to allow the customer supplied pressurized D.I. water to enter the bubble tower. When a FULL condition is detected, an internal timer starts counting to slightly over-fill the bubble tower by \( X \) seconds (the time of \( X \) is set by the factory on the password-protected OEM set-up page; this is typically 3-5 seconds). When the timer has expired, Solenoid #1 turns OFF stopping D.I. water flow, and Solenoid #5 is reactivated to an ON position to allow compressed air to enter the bubble tower. This sequence of events usually takes 5-10 seconds, depending on D.I. water pressure. The lower the D.I. water pressure, the longer this fill will take.

3. Air relief
The air relief valve is a safety device to prevent the bubble tower from over pressurizing and potentially bursting. This valve is usually set for 25 – 30PSI / 172-207kPa at the factory. To adjust the relief valve, turn on the air to the bubble tower. Using the bubble tower air regulator, increase the air pressure to 25PSI / 172kPa. If air is heard “hissing” from the air relief valve, it is properly relieving the pressure. If air escapes at a lower pressure, lift the cap on the air relief valve and adjust the knob until the hissing has just stopped. If air does not escape from the air relief valve when the bubble tower air regulator is set to 25PSI / 172kPa, lift the cap on the air relief valve and adjust the knob until the hissing has just started.
3.0 COMPONENTS & CONTROLS

3.4.6 Bubble Tower Assembly (cont.)

Solenoid #5 delivers compressed air to the bubble tower (bubble tower). When the cabinet controls require a fogging cycle, this solenoid opens, delivering compressed air to the bubble tower air regulator, through which it passes to the bottom of the bubble tower. This solenoid remains ON during fogging cycles unless the bubble tower float switch detects a LOW D.I. water level. At that time the solenoid will temporarily turn OFF until the bubble tower is filled with D.I. water. When the bubble tower float reads a FULL condition, the solenoid will turn back ON until the fogging cycle expires or another bubble tower D.I. water fill cycle starts.

Solenoid #1 delivers D.I. water to the bubble tower. The bubble tower float switch controls this solenoid. It remains OFF until the bubble tower float switch detects a LOW water level, then it turns on. When the bubble tower float switch detects a FULL water level; the solenoid turns OFF.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720015</td>
<td>SOLENOID, BRASS, 1/4” NPT, 24VDC, NC</td>
<td>2</td>
</tr>
<tr>
<td>720060</td>
<td>CORD - 15’ MOLDED W/ ISO CONNECTOR</td>
<td>2</td>
</tr>
<tr>
<td>720340</td>
<td>PLATE-BOTTOM-6” BUBBLE TOWER-NC’S</td>
<td>1</td>
</tr>
<tr>
<td>720345</td>
<td>TOP PLATE 6” BUBBLE TOWER (NC’S)</td>
<td>1</td>
</tr>
<tr>
<td>720445</td>
<td>FLOAT SWITCH BCX-NC HUMID. TWR</td>
<td>1</td>
</tr>
<tr>
<td>720455</td>
<td>RTD - SINGLE, FOR BCX-NC</td>
<td>1</td>
</tr>
<tr>
<td>720575</td>
<td>BRASS RED. DBL THREAD I/S 3/4”X1/4”</td>
<td>1</td>
</tr>
<tr>
<td>C000124</td>
<td>BRASS NIPPLE 1/4” X 1 1/2”</td>
<td>3</td>
</tr>
<tr>
<td>C000146</td>
<td>BRASS NIPPLE 1/4” X CLOSE</td>
<td>2</td>
</tr>
<tr>
<td>C000149</td>
<td>THREADED ROD ASSEMBLY 26 1/2”</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Consisting of:</td>
<td></td>
</tr>
</tbody>
</table>
|           | PN C261460 - TUBING CLEAR 5/16” ID 7/16” OD | 2 ft.
|           | PN C263320 - THREADED ROD, 26 1/4”, RAW | 1   |
| C000153   | BRASS NIPPLE 1/4” X 4” | 1   |
| C000269   | BRASS ELBOW 1/4” | 2   |
| C010150   | NEWLOC MALE CONN 3/8” TUBEX 1/4”NPT | 5   |
| C010160   | ELBOW 3/8” TUBE X 1/4”MPT PUSHTOFIT | 2   |
| C010165   | LAB COCK 1/4F X 1/4F | 1   |
| C249405   | BRASS STREET ELBOW 1/4” | 3   |
| C249410   | BRASS TEE 1/4”, FPT | 3   |
| C249450   | BRASS CHECK VALVE 1/4” | 2   |
| C249460   | BRASS PLUG VALVE M/F, 1/4” | 2   |
| C260100   | HUMIDIFYING TOWER BRACKET, BOTTOM | 1   |
| C260110   | HUMIDIFYING TOWER BRACKET, TOP | 1   |
| C260590   | AIR RELIEF VALVE | 1   |
| C261280   | HEATER, LCQ2-1051X, 240/480 | 1   |
| C262470   | O-RING, 6” | 2   |
| C263300   | BUBBLER, AIR, STAINLESS STEEL 1/4” | 1   |
| C263315   | HUMIDIFYING TOWER TUBE 19 1/2” BCX | 1   |
| C263330   | CONDENSATE BAFFLE TUBE | 1   |
| E000220   | CORD GRIP (GREY) FOR BELDON CABLE | 1   |
3.0 COMPONENTS & CONTROLS

3.4.7 Water Filter Assembly

PN 710300 - For the D.I. water inlet - In line filter
(Plastic cylinder with Blue polyurethane tubing attached)

PURPOSE:
The Water Filter Assembly prevents solid particles from clogging the solenoids and float switches.

LOCATION:
The Water Filter Assembly is attached to the D.I. water inlet fitting behind the cover panel.

FUNCTION:
The water filter prevents any solid particles that may be in the water line from arriving at, and potentially clogging, the solenoid’s float switch and atomizer nozzle.

NOTE:
To replace the filter; 1. Turn off the water supply, 2. Relieve water pressure, 3. Remove the old filter from the quick connect fittings, 4. Cut the new filter tubing to size to match the old filter assembly, 5. Put the new filter inline and attach to the quick connect fittings.

CAUTION! INSTRUMENT DAMAGE

Pay careful attention to the direction of flow of the solution. The filter has an arrow showing direction of flow. Also, take care in installing the filter, if too much pressure is applied to the plastic nipples that the tubing attaches to on either side of the filter, these nipples can crack, or brake off.
3.0 COMPONENTS & CONTROLS

3.4.8 Solution holding tank – 35 Gallon

PN 810540  35 gallon solution tank for BCX

PURPOSE:
The purpose of the 35-gallon solution reservoir is to provide the customer with a reservoir that holds electrolyte (testing solutions).

LOCATION:
The tank is located behind the bubble tower that is behind the front right access panel.

This tank can be removed for service and cleaning by removing the bolt in the front, removing the component plate (remove knob and lift plate) and sliding it out the front of the fiberglass shell.

FUNCTION:
The Solution Reservoir holds the electrolyte that will be delivered to the dispersion tower to create atomized fog, or to the spray system, depending on the selected cycle.

The solution is routed via one of two solution delivery systems, depending on the size of the cabinet; that will be explained in greater detail in the dispersion tower sections.
3.0 COMPONENTS & CONTROLS

3.4.9 Bubble Tower Pressure Regulator

PN 720880 – Regulator, Panel Mount, With Nut

PURPOSE:
The purpose of Bubble Tower Pressure Regulator is to adjust the amount of air entering the bubble tower, thus regulating the pressure of the air leaving the bubble tower. Normally, the bubble tower is operated at 15PSI / 100 kilopascals.

LOCATION:
The pressure regulator is located on the right side of the controls cabinet.

There are two fittings installed and two plugs. The plugs come with the regulator and do not have a separate part number. The fittings are factory installed: PN C010160 - Push Lock fitting - Elbow – 90 Deg. - 1/4” MNPT x 3/8” tube. Two (2) of these fittings used.

FUNCTION:
When solenoid #5 (air to bubble tower regulator) is activated, or turned ON, compressed air enters the inlet of the bubble tower air regulator and is routed through the regulator, through the bubble tower and to the bubble tower pressure gauge. To regulate the air, pull up (out) on the regulator knob and turn clockwise or counter-clockwise. When the pressure is set to the desired level, push down (in) on the regulator knob to lock in the pressure setting.
3.0 COMPONENTS & CONTROLS

3.4.10 Bubble Tower Pressure Gauge

PN  C010040 – Pressure Gauge, Panel Mount

PURPOSE:
The purpose of pressure gauge is to monitor/read the PSI of air leaving the bubble tower. Normally, the bubble tower is operated at 15PSI / 100 kPa.

LOCATION:
The pressure gauge is located on the right side of the controls cabinet.

Close up, the gauge looks like this.

There is one fittings installed on the back of this gauge. The PN for this fitting is C010170 and it is a Push lock, female straight, ¼” FNPT by 3/8” tube.

FUNCTION:
When solenoid #5 (air to bubble tower regulator) is activated, or turned ON, compressed air enters the inlet of the bubble tower air regulator, routed through the regulator, through the bubble tower and to this bubble tower pressure gauge. The pressure can be changed with the pressure regulator mounted just below this gauge.
3.0 COMPONENTS & CONTROLS

3.4.11 Purge-air Toggle Valve

PN MV-35 – Valve, AL. FLIP Toggle

PN C010151 – Push lock, male straight, 1/8” MNPT by 3/8” tube

PURPOSE:
The purpose of the purge air toggle valve is to route the compressed air away from the bubble tower and into the chamber exposure zone to “purge” the exposure zone of the corrosive environment.

LOCATION:
The toggle valve is located on the right side of the controls cabinet.

Uninstalled, the toggle valve looks like this. PN MV-35

There is one fitting installed on the back of this valve. The PN for this fitting is C010151 and it is a push lock, male straight, 1/8” MNPT by 3/8” tube.

FUNCTION:
When the toggle valve is not actuated (actuator stem sticking straight out of the valve) compressed air will be directed to the bubble tower to make corrosive fog. When the actuator stem is in any other position, the compressed air will be routed away from the bubble tower and into the chamber exposure zone for purging.
3.0 COMPONENTS & CONTROLS

3.4.12 Manual Ball Valves, on component shelf (BV #2, 7, & 8)

PN C010165 – Labcock 1/4” NPT, F/F
PN C249460 – Brass Plug Valve M/F, 1/4”

PURPOSE:
The purpose of these valves is to direct the flow of air or water for the bubble tower. Ball Valve #2 is the bubble tower drain valve. Ball Valve #7 is the bubble air inlet valve. [Ball Valve #8 is the bubble tower bypass valve (computer controls only)].

LOCATION:
These valves are attached to the bubble tower which is attached to the component plate at the bottom of the control cabinet. They can be found by removing the front access panel on the control cabinet.

FUNCTION:
Ball Valve #2 is the bubble tower drain valve (normally CLOSED). It is OPENED only to drain the bubble tower, such as for maintenance.

Ball Valve #7 is the bubble air inlet valve. It is normally OPEN. In the open position, it supplies compressed air to the bottom of the bubble tower. To bypass the bubble tower, close ball valve #7 and open Ball Valve #8; this arrangement is used in some specifications, such as ASTM G85 Annex #5, which forbid the use of a bubble tower.

Ball Valve #8 is the bubble tower bypass valve. It is normally CLOSED. It is used to direct (it does not meter, the air, it is either ON or OFF) air to the TOP of the bubble tower, and can be used with Ball Valve #7 to bypass the bubble tower. It is used to route air directly to the dispersion tower(s). To bypass the bubble tower, close ball valve #7 and open Ball Valve #8; this arrangement is used in some specifications, such as ASTM G85 Annex #5, calling for no bubble tower.
3.0 COMPONENTS & CONTROLS

3.5 Control System

3.5.1 Control Top Cover

PN 820200 – Control Top, for triple controllers – no recorder
PN 820206 – Control Top, for triple controllers – with recorder
PN 720237 – Control Top, for Touchscreen – no recorder
PN 720244 – Control Top, for Touchscreen – with recorder

PURPOSE:
The top cover protects the electrical panel and provides a place to mount the controller.

LOCATION:
This top cover is located to the right of the cabinet’s exposure zone and is permanently attached to the control enclosure by a stainless steel hinge.

The cover is attached with the following items;

<table>
<thead>
<tr>
<th>Part #</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>750180</td>
<td>Fiberglass hinge attachment</td>
<td>1</td>
</tr>
<tr>
<td>750130</td>
<td>Hinge, for pedestal, BCX, 316SS</td>
<td>1</td>
</tr>
<tr>
<td>RIVETS</td>
<td>Rivets, hinge mtg. – 1/8” dia.</td>
<td>~10</td>
</tr>
</tbody>
</table>

FUNCTION:
Open/close cover with built in handle along the front.
3.0 COMPONENTS & CONTROLS

3.5.2 Cycling Controls Package – Touchscreen

PN 800100

PURPOSE:
The purpose of the optional cycling controls system is to operate the cabinet in a cyclic manner. This control system consists of an electrical panel, an input/output (I/O) rack and a touch-screen display as an operator interface. It adds the ability to automatically turn ON and OFF fogging, purge/dry, dwell, spray and SO2 cycles.

LOCATION:
The cycling control system is mounted on top of the component cabinet on the right side. The touch-screen display is mounted on the top of the control panel top cover.

The touchscreen connects to the input/output (I/O) rack on the electrical panel.

The CPU in the I/O rack performs the actual control, while the touch-screen display acts as an information interface between the CPU and the user.

The two are connected using a special communication cable. The cable plugs into COM PORT 1 of the touchscreen and JACK connection PORT 2 of the CPU.

<table>
<thead>
<tr>
<th>PN</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>740505</td>
<td>Standard controls 240CPU to Ez-Touchscreen panel communication cable</td>
</tr>
<tr>
<td>E000485-M-EZ</td>
<td>Ez-Touch-screen operator panel - monochrome</td>
</tr>
<tr>
<td>E000485-C-EZ</td>
<td>Ez-Touch-screen operator panel - color</td>
</tr>
</tbody>
</table>

FUNCTION:
The actual function of the cycling controls is explained in detail in the operation manual. All aspects of how to use the control program are described. For the controls to function, the touchscreen display must be on, the communication cable must be connected as described, the power light on the I/O CPU must be lit, the RUN light on the CPU must be on, and the switch on the I/O CPU must be in the TERM position.
3.0 COMPONENTS & CONTROLS

3.5.3 Step-down Transformer

PN E002260

PURPOSE:
The purpose of the Step-down Transformer is to reduce the line voltage from the customer supplied electrical service from 480 volts to 240 volts.

LOCATION:
This step down transformer located on the back wall, right side, of the electrical panel area. The transformer can be exposed by removing the front access panel on the control cabinet. The transformer can be found behind the air blower assembly, mounted on the back wall.

FUNCTION:
The transformer is wired into the electrical panel. The line voltage from the facility is brought to the terminal strip on the electrical panel at L1, L2 and L3. The transformer reduces voltage to 240 volts for the cabinet controls as well as some of the pumps and motorized ball valves.
3.0 COMPONENTS & CONTROLS

3.5.4 Chromalox over-temperature controller

PN 720456 - Over-temp Controller for BCX
PN 720458 - Over-temp conversion from “old style” to Chromalox

PURPOSE:
The purpose of the over-temperature controller is to act as a safety switch if the cabinet controls do not, or cannot, shut off the cabinet heater during a heating cycle. This backup controller will turn off power to the cabinet heater if the exposure zone reaches 75ºC or above.

LOCATION:
The over-temperature controller is located on the electrical panel under the control top cover on the right side.

FUNCTION:
The over-temperature controller controls the control voltage to CON1. The only purpose for CON1 is to supply voltage to the cabinet heater solid state relays (SSR). If an SSR fails, it usually fails leaking voltage. If this occurs, the cabinet controller has no way of turning off the SSR. In such a condition, the cabinet controls will turn off CON1, thus cutting off the supply of voltage to the SSR, stopping the ability for the heater to heat since all voltage is OFF. In the event the cabinet controls have malfunctioned and cannot turn off CON1, this over temperature controller takes over. The over-temperature controller has a dedicated RTD to send it a signal. If the temperature reaches the alarm set point (set at the factory for 75ºC) this controller will OPEN output 2 (the alarm contact) When this output opens, the control voltage to CON1 is turned OFF, stopping the supply of voltage to the SSRs. This alarm latches on and must be manually reset if activated.
3.0 COMPONENTS & CONTROLS

3.6 Electrical Control Panel

PN - different for each cabinet configuration

PURPOSE:
The purpose of the electrical panel is to provide a central location for distribution of electrical power. Wiring for all cabinet components terminates in the electrical panel, as well as cabinet controls and the input/output (I/O) rack.

LOCATION:
The electrical panel is located under the control top cover on the right side.

There are several different items on the electrical panel.

1. Overtemp controller
2. Power supply #1 – (I/O)
3. Terminal strips - large
4. Fuse blocks – small
5. Fuse blocks – large
6. Terminal strips – small
7. Solid state relay #2 – bubble tower heater
8. Solid State relay #1 – cabinet heater
9. Mechanical contactor (CON1)
10. I/O rack
11. Zip quick connect terminal strips
12. On/Off breaker (computer controls)
13. Grounding blocks

Depending on the options purchased, the locations of these components may vary.

FUNCTION:
The function of the panel is to provide a central location for the distribution of electrical power for the cabinet. As the controller sends out signals to turn devices ON and OFF, the various devices on this panel will carry out those instructions. Likewise, as sensors, float switches and limit switches read various conditions, it is reported back to this panel and the I/O block for processing by the controller.

NOTE!
Check the electrical drawing for the particular cabinet prior to servicing.
3.0 COMPONENTS & CONTROLS

3.7 Wet Bottom Assembly  (Optional with cycling controls)

PN  720075 – Wet Bottom Drain Assembly

PURPOSE:
The purpose of the Wet Bottom Drain Assembly is to allow the bottom of the cabinet to fill with de-ionized water to a level just above the rod heater. This water is heated to create moist, uniform temperature and condensation throughout the exposure zone and allow for accurate collection rates. Further, it allows the water to drain prior to dry cycles.

LOCATION:
The wet bottom assembly is located on the back of the cabinet behind the solution reservoir. Looking behind the cabinet reveals the location of the assembly.

FUNCTION:
When a fog cycle begins, the solenoid for the air diaphragm wet bottom drain valve is activated, closing the valve. When the valve is closed the bottom of the chamber fills with water and covers the rod heater.

The assembly is mounted to an L-shaped metal bracket that is mounted to the steel frame of the cabinet.

A level switch inside the cabinet detects the proper water level and shuts off the water supply solenoid.

The height of the mounting point is important for proper functioning of this system. The overflow pipe assembly maintains proper water level by allowing overfilled water or accumulated condensate to drain.

Customer-supplied compressed air is connected to the fitting on the air solenoid mounted to the wet bottom valve.

The power for this air solenoid is wired to the control panel, and is only installed with the cycling controls.

<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Terminal Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Ground</td>
</tr>
<tr>
<td>Brown</td>
<td>Terminal # 29, CR4, Y5</td>
</tr>
<tr>
<td>Blue</td>
<td>Terminal # 28</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.7 Wet Bottom Assembly  (Optional with Cycling Controls) (cont.)

A complete parts list for this assembly is listed here;

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>720068</td>
<td>DIAPHRAGM VALVE ASSEMBLY N/OPEN</td>
<td>1</td>
</tr>
<tr>
<td>720073</td>
<td>BRACKET FOR WET BOTTOM VENTING</td>
<td>1</td>
</tr>
<tr>
<td>C000535</td>
<td>PVC PIPE SCH 80, 3/4&quot;</td>
<td>4 ft.</td>
</tr>
<tr>
<td>C010150</td>
<td>Push Lock fitting - Male Straight - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>1</td>
</tr>
<tr>
<td>C010160</td>
<td>Push Lock fitting - Elbow – 90 Deg. - 1/4&quot; MNPT x 3/8&quot; tube</td>
<td>1</td>
</tr>
<tr>
<td>C010180</td>
<td>Push Lock fitting - Tee – Union - 3/8&quot; Tube x 3/8&quot; Tube x 3/8&quot; Tube</td>
<td>1</td>
</tr>
<tr>
<td>C010510</td>
<td>PVC THDXHOSE BARB 3/4&quot; X 3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C010570</td>
<td>PVC TEE SOC 3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C010580</td>
<td>PVC ELBOW SOC 3/4&quot;</td>
<td>2</td>
</tr>
<tr>
<td>C261441</td>
<td>TUBING, NATURAL 3/8&quot;, LDPE</td>
<td>10 ft.</td>
</tr>
<tr>
<td>E000520</td>
<td>SWITCH, LEVEL, SIDE MOUNT</td>
<td>1</td>
</tr>
</tbody>
</table>

A replacement diaphragm for this valve can be ordered under PN

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>720069</td>
<td>DIAPHRAGM, EPDM FOR DIAP. VALVE - NC</td>
</tr>
</tbody>
</table>
3.0 COMPONENTS & CONTROLS

3.8 Air to Electronics Enclosure

PN 710450 – Control Cabinet Pressurization System

PURPOSE:
The purpose of the control cabinet pressurization system is to help keep the electrical panel area cool, as well as help prevent any corrosive fog from entering the area.

LOCATION:
This system can be found under the control top. Lift the control top where the touch-screen display or computer is mounted. Under this control top is the electrical panel. To the right side and in front of the electrical panel is the brass pressurization needle valve (#13) adjuster.

Turn the knob counter clockwise until a steady sound of moving air is heard under the electrical panel. This means that compressed air is entering the area.

Component Description Qty
C010170 Push Lock fitting - Female Straight - 1/4" FNPT x 3/8” tube 2
C010185 Push Lock fitting - Bulkhead Union - 3/8" tube x 3/8” tube 1
C010268 O-RING FOR 3/8” TUBE X TUBE BULKHD 2
C249490 BRASS NEEDLE VALVE 1/4” X 3/8” 1
C261441 TUBING, NATURAL 3/8”, LDPE 2
C263300 BUBBLER, AIR, STAINLESS STEEL 1/4” 1

FUNCTION:
Customer-supplied compressed air (clean and dry) is routed by tubing and fittings to needle valve # 13. This valve is adjusted in such a manner to allow some of the compressed air to enter the electrical panel area through an air muffler located under the electrical panel. This compressed air helps to pressurize the panel area to help prevent corrosive fog from entering, as well as cooling the area.
4.0 OPERATION

4.1 Startup – Quick Startup Procedures

Utility Checks

1) Air pressure to unit ON – 95 PSI (6.55 Bar). Be sure that is it clean, dry, oil free air. Check to ensure that any customer supplied and installed oil water separator is drained and has a clean filter in place.
2) Pressurized deionized water (conforming to ASTM D1193 type IV only) to unit ON - 60 – 100 PSI (4.5 – 6.9 Bar).
3) Power to the unit ON – turn on customer supplied wall switch.
4) Power ON at the unit – ensure that the circuit breaker mounted on the electrical panel is ON.
5) Control power ON – pull out (turn ON) the control power. This is a green plunger switch usually located on the right side of the cabinet.
6) If this is a computer controlled cabinet, turn the computer ON.
7) Ventilation fan ON – turn on any customer supplied and installed exhaust fan.
8) Exposure Chamber drain OPEN – open the customer supplied & installed drain valve.
9) ¾” (19.05 mm) drain line from back of exposure chamber must be routed to an OPEN drain, and that no valves or distortions in the line to impede the flow of fluid through this drain.
10) Solution reservoir drain CLOSED – close the customer supplied and installed 60-gallon (227 liter) salt solution reservoir drain valve.

Instrument Checks

1) Close the bubble tower drain ball valve, labeled Ball Valve #2 – located on left front bottom corner of the bubble tower
2) Salt solution reservoir prepared – 60-gallon (227 liter) reservoir filled with desired solution for corrosive fogging.
3) Open salt solution filter ball valve – labeled Ball Valve #1 – located behind the access panel on front of the 60-gallon (227 liter) solution reservoir.
4) Adjust the air bleed system into the electrical enclosure area to ensure a slight positive pressure into that enclosure.
5) Check the position of all other manual ball valves as listed in the operation manual.
6) Adjust fogging tower cone (or louvers) to the proper location. If a cone is present, it is suggested to adjust the bottom tip of the cone to be even or slightly below the top of the vertical dispersion tube. The throttle holes are normally left open.

Startup

1) If unfamiliar with the operation of this instrument, REVIEW the operator manual prior to starting an actual test.
2) Verify that the test to be run is programmed correctly.
3) Place parts into the exposure zone of the cabinet.
4) Closed the cabinet covers.
5) Start the desired test.
6) Adjust bubble tower air pressure to 15 PSI (1.03 bar) if the test requires a fogging cycle.
4.0 OPERATION

4.2 Running ASTM B117

The following instructions are for Salt Fog testing in accordance with ASTM B117. Refer to the ASTM test specification for exact test instructions. If you are NOT testing to ASTM B117, refer to your test specification.

1. The cabinet temperature has been preset to 35 degrees C.

2. Prepare salt solution in accordance with the test specification and transfer it into the salt solution storage tank.

3. Make certain that manual ball valve # 1 from the salt solution storage tank to the Salt Solenoid is open.

4. Check atomizer nozzle to be sure it is functioning properly. To do this, turn on the Bubble Tower heater switch and make sure compressed air to the Bubble Tower is set to 15 PSI. If all conditions are set properly, the chamber will start fogging. If not, refer to Troubleshooting Tips. Turn this off once it is proved that the chamber is fogging.

5. Place test specimens in the cabinet in accordance with their test specification. Allow sufficient space between the test pieces for adequate fog circulation. Do not allow condensation from one specimen to fall on another. Most test specifications prohibit stacking specimens. Always refer to the test specification for placement during testing.

6. Place a minimum of two (2) condensate collector funnels (80 cm²) and two (2) graduated cylinders (100 ml) in the cabinet so that the horizontal plane of the top of the funnel is at test level. Locate one as close to the dispersion tower as possible and one as far away as possible. (Do not place the funnel so close to the dispersion tower that it collects condensation which may drip from the adjustable cone.)

7. Rotate the vertical tube of dispersion tower until the four (4) 1" holes at the base of the tube are fully open. The holes are used to control the velocity and quantity of the fog. Open holes will result in higher collection rates. Closed holes will lower the collection rate.

8. Adjust the dispersion cone at the top of the tower so that the bottom tip of the cone is even with the top edge of the vertical tube. It may be adjusted later to suit your testing needs.
4.0 OPERATION

4.2 Running ASTM B117 (cont.)

9. Close the cabinet cover.

10. If the optional Wet Bottom Drain was purchased, be certain the ball valve is closed and the bottom of the chamber is full of water.

11. If the Jet Exhaust Assembly is being used, turn on water valve and adjust pressure to 5 PSI on gauge.

4.3 End of Test Procedure

At the completion of each test and/or prior to opening the lid, the chamber must be purged of any fog to avoid exposing the exterior chamber and components to the corrosive fog. To do this:

1. Turn the air purge toggle valve located on the control panel so that the air is directed in to the chamber rather than the Bubble Tower.

2. Allow the chamber to completely evacuate before opening the lid. This chamber purge may take from 15 – 30 minutes depending on the size of the chamber and venting arrangements.

*NOTE: If the cabinet lid begins to bounce, reduce the incoming air pressure slightly via the air purge valve until the lid stops bouncing.*

4.4 Fog Collection Process & Procedures

Testing Rule: Always verify uniformity of fog fall out or dispersion before every test, as uniformity and consistency is a key to accuracy in results.

Maintenance-Troubleshooting Tip: Verify uniformity of fog fall out as an important part of your regular maintenance schedule, and to indicate potential problem areas. The key indicator for maintenance is variations in collection rates that are not corrected by normal adjustments to control flow and pressure.
4.0 OPERATION


4.4.1 Fog Dispersion Control

The BCX chamber delivers excellent fog dispersion control by providing independent controls for the volume of fog and the amount of air pressure used to disperse it. These controls make it easy for the operator to set, test, and adjust flow and dispersion.

1. Control of amount/volume of fog or corrosive: To increase or decrease the amount of solution,

   a) Open or close the Throttle Holes in the dispersion tower base, open providing more fog, closing providing less.

   b) Change the position of the inverted cone assembly.

2. Control of dispersion/distance of fog - To increase or decrease the projection - also referred to as “the throw” - of the solution,

   a) Adjust the air pressure using the air pressure regulator. Note, when the air pressure is adjusted, so must the bubble tower temperature as indicated in the appendix of the ASTM B117 specification.

   b) Open or close the Throttle Holes, open providing more fog, closing providing less.

   c) Change the position of the inverted cone assembly.

4.5 Determining & Measuring Collection Rates

The best measure of cabinet performance is the fall out figure, also called the fall out rate or collection rate. Please refer to ASTM B117, or other applicable procedures, for detailed instructions or specific requirements. The collection rate is determined by measuring the amount of solution collected in two collection vessels located inside the chamber in a given period of time.

1. Place a minimum of two (2) condensate collector funnels (80 cm²) and two (2) graduated cylinders (100 ml) in the cabinet so that the horizontal plane of the top of the funnel is at test level. Locate one as close to the dispersion tower as possible and one as far away as possible (do not place the funnel so close to the dispersion tower that it collects condensation which may drip from the adjustable cone).
4.0 OPERATION

4.5 Determining & Measuring Collection Rates (cont.)

2. Rotate vertical tube of dispersion tower until the four (4) 1” holes at the base of the tube are fully open. The holes are used to control the velocity and quantity of the fog. Open holes will result in higher collection rates. Closed holes will lower the collection rate.

3. Adjust the dispersion cone at the top of the tower so that the bottom tip of the cone is even with the top edge of the vertical tube. It may be adjusted later to suit your testing needs.

4. A collection rate reading of between 1.0 and 2.0 milliliters of solution each hour (averaged over a minimum of 16 hours) per 80 cm² of area should be the correct reading. Note: The fall out figure is the best measure of cabinet performance.

5. To adjust or vary the collection rate, adjust the air pressure (air pressure regulator), the bubble tower temperature, the throttle holes, and the inverted cone assembly. Each one will have an impact on the collection rate. Keep in mind your objective when making adjustments.

6. Make sure that the tower and cone assembly is perpendicular to the cabinet floor.

4.6 Test Methodology & Specifications

The BCX is designed to perform multiple tests to specification. Please refer to the specific test specification - ASTM B117, for example - for full instructions, considerations, rules, significance, etc. Test specifications supersede this manual. See the section on maintenance for procedures to follow before running each test.
4.0 OPERATION

4.7 Basic Operation

The basic operation of the BCX cyclic corrosion cabinet changes, depending on the options installed. Below are brief descriptions of these basic cycles.

GENERAL CHAMBER & CYCLING OVERVIEW

The ATLAS BCX is a basic cyclic corrosion test chamber. Its purpose is to create a variety of environments in one exposure zone. The environments created by this chamber vary among Salt Fog, Dry, High Humidity, and Dwell (no action). Solution Spray, Controlled Humidity and Immersion cycles can also be added into the list. This cabinet is pre-programmed with specific cycles, allowing the user to change these parameters and create unique cycles for other specific purposes. Always refer to specific test specifications.

4.7.1 SALT FOG CYCLE

During the Salt Fog Cycle, salt solution is atomized into a fog. This is the same setup that normally would be used when running the ASTM B117 specification. Hot, humid air is created by bubbling compressed air (usually at 1.03 Bar or 15 PSI) through a tube (bubble tower, or humidifying tower) that is about 3/4 full of hot (usually 48°C / 118°F) deionized water.

Salt solution is moved from the 35-gallon solution reservoir to the atomizer nozzle by a gravity feed system using a float switch and plastic solenoid. When the hot humid air and the salt solution mix at the atomizer nozzle, it is atomized into a corrosive fog. The cabinet is usually heated during this cycle at 35°C (95°F) by the rod heater. The chamber temperature is set by the user, and controlled by the temperature controller or the optional PLC based control system. Fog distribution is controlled by the Uni-Fog™ dispersion system.

During the above, the floor of the exposure chamber fills with D.I. water to cover the rod heater. This allows the cabinet to create a more uniform and moist heat. When this fog cycle is over, the cabinet drains, leaving the heater open to the air.

The salt solution can be replaced with other solutions to create a corrosive fog with different properties.

4.7.2 PURGE/DRY CYCLE

During the Purge/Dry Cycle, compressed air enters the exposure zone via a toggle switch or optional solenoid.

The purge Toggle valve is located on the front of the control panel and allows the user to PURGE the fog out of the chamber prior to opening the cover. This will prevent corrosive fog from entering the lab. Simply toggle the valve when you desire to purge the chamber, and close when done. In a vertical position the air is directed to the bubble tower. In an offset position (in any direction) the air is directed to the inside of the chamber for purging.
4.0 OPERATION

4.7.2 PURGE/DRY CYCLE (CONT.)

This compressed air will mix with the air in the chamber and is heated by the chamber heaters. The chamber temperature is set by the user, and controlled by the temperature controller or the optional PLC based control system. This dry cycle creates a low humidity state in the exposure zone of the chamber.

4.7.3 HUMIDITY CYCLE

During the Humidity Cycle, the cabinet will operate much like the Salt Fog Cycle with the difference of D.I. water being supplied to the atomizer nozzle rather than salt solution. This will create a 100% relative humidity condition.

4.7.4 DWELL CYCLE

During the Dwell Cycle, no action is taken by any of the cabinet components.

4.7.5 SOLUTION SPRAY CYCLE

During the Solution Spray Cycle, solution is taken from the 35-gallon reservoir via a pump. This solution is sent to a spray bar header inside the exposure zone, and onto the parts by spray nozzles. Some chambers are equipped with an S-style (simple) spray system with two nozzles to save cost. This system does not include a spray bar header.
4.0 OPERATION

4.8 BCX CABINET COMPONENTS

The following sections provide brief notes on major components of the BCX Series.

4.8.1 CHAMBER CONSTRUCTION

The BCX cabinet is constructed from corrosion- and fire-resistant fiberglass using state of the art manufacturing techniques to ensure longevity and strength. This cabinet will not rust from contact with corrosive solutions that are used in many testing processes. The all-plastic design provides a “natural” insulation that helps make testing conditions consistent, repeatable, and controlled. During ongoing testing, all BCX models allow viewing of the test items through the front glass panel in the cover. (The BCX9000 has an opaque polypropylene cover.) The cover seal & proper ventilation keeps fog inside the exposure chamber, and away from personnel or other equipment.

4.8.2 CONTROLLER:

The base unit is controlled by two digital temperature controllers. One unit controls the exposure zone temperature, while the second controls the bubble tower temperature. Relay logic, contactors, float switches and solenoids control the remaining chamber functions. An RS232 port on these controllers can be accessed with a special communication cable and software for set-up and data logging.

An optional cycling control package is available for the BCX chambers. It is fully programmable with an easy-to-use Video Control Unit (VCU). Standard industry test specifications are pre-programmed, so the user can begin testing immediately after proper installation and setup procedures are followed. Standard tests can be modified, and custom tests and procedures with multiple parameters can easily be programmed into the controller, providing flexibility, meeting multiple needs, and placing real control into the hands of the operator.

4.8.3 CHAMBER HEATERS

Heaters maintain the Exposure chamber temperature during testing. They can be programmed to run during any cycle. Heaters are located at the bottom of the exposure chamber under the diffuser plates.

4.8.4 PURGE BLOWER, AIR HEATER

During the Purge/Dry Cycle, compressed air enters the exposure zone via solenoid. This compressed air mixes with the air in the chamber and is heated by the chamber heaters. The chamber temperature is set by the user and is controlled automatically. This dry cycle creates a low humidity state in the exposure zone of the chamber.
4.0 OPERATION

4.8 BCX CABINET COMPONENTS (CONT.)

4.8.5 BUBBLE TOWER

1. The function of the bubble tower (synonymous with “saturation tower” or “humidifier”) is to saturate the air with moisture and heat the air before it reaches the spray nozzle, where it mixes with solution to atomize it. Air must be saturated at temperatures that are higher than the temperatures within the test chamber.

2. Tower refill operations require a pause in operations. The Bubble Tower Water Float Sensor will detect “low water”, the Tower Heater will be turned off; and the Fog solenoid valve will close. The Water Fill solenoid valve will open, filling the Bubble Tower until the Water Float Sensor detects “high water”, and shuts the Water Fill solenoid valve. The test resumes at the place where it paused, and the test continues.

3. The Tower has **two** over-temperature protections.
   a) Set Point at the Controller.
   b) Thermocouple with a reset built into the Heater(s).

4.8.6 HUMIDITY FOG GENERATION

1. The purpose of the humidity fog generation system is to generate high humidity. Water Vapor, generated by the atomization of D.I. water, provides 100% relative humidity (RH). Temperature is maintained in the exposure chamber by the rod heater located at the bottom below the diffuser plates.

2. D.I. water provided to the atomizer nozzle is accomplished by the same method as the salt toy cycle. This water is supplied to the atomizer nozzle where the water will mix with the compressed air and produce water fog.

4.8.7 INTERNAL SALT SOLUTION RESERVOIR

The BCX reservoir holds 35-gallons of solution, sufficient to perform 3-5 days of continuous fog testing.

1. Water: Use ASTM D1193 Type IV D.I. or distilled water to make the solution.

2. In-line Filtration: Large particles and contaminants are prevented from entering the system by the in-line salt solution reservoir filter, which needs to be replaced periodically (see Maintenance section in this manual for details).
4.0 OPERATION

4.8.8 FOG (ATOMIZER) NOZZLE
The fog nozzle appears to be a simple plastic nozzle, but it is a critical part in the proper functioning of the chamber and in obtaining accurate test results. Constructed of a clear, non-corroding, acrylic resin, it is carefully crafted to specification. Hole diameters of the nozzle are very small and precision fabricated, and it must be kept clear and free of salt, crystalline buildup or obstruction (do not scrape or use rough tools). To keep the nozzle free of blockage, the whole system should be flushed with warm, clean water for an hour at the end of each test period to remove all residual salt, preventing crystallization.

4.8.9 DIFFUSER
What seems to be a “false floor” of the exposure zone is actually an air flow diffuser. Its function is to mix and distribute the airflow. Nothing should be placed upon it. Otherwise, airflow will be altered, causing heating and fogging problems.

4.8.10 DISPERSION TOWER
The dispersion tower is where the salt solution and the humidified air meet at the atomizer nozzle to create the fog mist. It consists of a;
- a. vertical or horizontal baffle system
- b. pickup tube
- c. atomizer nozzle
- d. feed reservoir
4.0 OPERATION

4.8.11 CHAMBER COVER OPENING AND CLOSING

The cover on a BCX should only be opened in one of two ways.

1. **Automated** cover lifters. If this option is installed, the cover can be opened and closed from the control panel. These cover lifters will open and close the cover in an even manner. If the controls that regulate the speed at which the cover opens and closes ever gets out of adjustment, the cover will open/close in an uneven manner. This could cause the cover to break. If this happens, the chamber should not be used, and the factory should be called immediately.

2. **Manual** opening/closing. If the automated system is not purchased, then the cover is opened and closed manually. This is accomplished by grasping the gray cover handle in the center for lifting or closing. If this cover is opened from the corners or places other than the center of the handle, the cover can twist and break. The Atlas warranty will not replace a cover broken by improper handling.

4.8.12 CHAMBER TRANSFER PUMP

This chamber is equipped with a 35-gallon solution holding tank. This is not a mixing tank. The salt solution should be mixed in another container and transferred into this tank. Due to the location of this tank, it is not practical to “pour” the mixed salt water into this tank. In order to get the pre-mixed salt solution into the holding tank, a couple of simple steps must be taken.

1. Mix the salt solution in a separate container.
2. Get this pre-mixed solution into close (3-5 feet) of the BCX chambers 35-gallon holding tank.
3. Put the tubing from the transfer pumps inlet into the container holding the pre-mixed solution.
4. Change ball valve #1 (Salt Solution from solution tank) from it’s normally OPEN position to a CLOSED position.
5. Change ball valve #31 (Air to the Solution transfer pump) from it’s normally CLOSED position to an OPEN or partially OPEN position. The more you OPEN it, the faster the pump will run moving the solution into this 35-gallon holding tank.
6. Once all of the solution is moved, put these two valves into their original positions, coil up the tubing and the transfer is complete.
4.0 OPERATION

4.8.13 CHAMBER COVER INTERLOCK SYSTEM

This is a fancy way of saying, “When the cover is lifted, everything stops.” In a laboratory or industrial setting, the purpose is to stop corrosive fog from being released into the room, or to prevent overheating if the cover is accidentally left open during a test. Lift the cover and everything pauses (stops). Close the cover, and the BCX is ready to return to its previous state. Alarms or messages indicating the status of the cover are cleared. The user can now restart the test.

4.9 Intermediate Operation

4.9.1 Atlas

The latest technology is incorporated into the BCX basic cyclic cabinets, producing superior, stable, and reliable corrosion testing equipment. These test chambers are engineered to provide long-lasting performance with an all plastic construction.

Each ATLAS model is set up with a microprocessor based controller to ensure proper temperature control.

With the addition of the optional cycling control system, the chamber can cycle between Salt Fog, Purge/Dry and Dwell conditions in any combination of variable time periods is easily accomplished. With options, Solution Spray, SO\textsubscript{2} and Ambient (automatic cover OPEN/CLOSE can also be added.
4.0 OPERATION

4.9 Intermediate Operation (cont.)

4.9.2 Chamber Capabilities

**Temperature:** Ambient to 60°C (140°F)

**Humidity:**
- 95-100% during High Humidity, from Ambient to 50°C (122°F)
- < 30% during Dry off cycles

**Solution Consumption:**

- **BCX2000** approx. 10 gallons per day for D.I. water and salt solution if a fog only step is running and no cycling takes place.
- **BCX3000, 4000 & 9000** approx. 15 gallons per day for D.I. water and salt solution if a fog only step is running and no cycling takes place.
- **BCX11000** approx. 60 gallons per day for D.I. water and salt solution if a fog only step is running and no cycling takes place.

**Venting:**

- **BCX2000, 3000, 4000 & 9000**
  - 2” Diameter (50.8 mm) Never vent multiple cabinets into the same vent stack. Each cabinet must have its own vent.

- **BCX11000**
  - 4.0” Diameter (101.6 mm) Never vent multiple cabinets into the same vent stack. Each cabinet must have its own vent.

**Drain:**

- **BCX2000, 3000, 4000 & 9000**
  - Main drain is ¾” (19 mm) pipe drain that must be free flowing and open at all times. There may be multiple drain lines depending on options.

- **BCX11000**
  - 4.0” Diameter (101.6 mm) pipe drain that must be free flowing and open at all times. There may be multiple drain lines depending on options.
### 4.0 OPERATION

#### 4.9.2 Chamber Capabilities (cont.)

**Dimensions and sizes:**

<table>
<thead>
<tr>
<th>Model No:</th>
<th>BCX2000</th>
<th>BCX3000</th>
<th>BCX4000</th>
<th>BCX9000</th>
<th>BCX11000</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal * Capacity</strong></td>
<td>565 ltr.</td>
<td>850 ltr.</td>
<td>1130 ltr.</td>
<td>2548 ltr.</td>
<td>3115 ltr.</td>
</tr>
<tr>
<td></td>
<td>20 cu.ft.</td>
<td>30 cu.ft.</td>
<td>40 cu.ft.</td>
<td>90 cu.ft.</td>
<td>110 cu.ft.</td>
</tr>
<tr>
<td>**Test Space ***</td>
<td>.94 square meter</td>
<td>1.40 square meter</td>
<td>1.74 square meter</td>
<td>2.21 square meter</td>
<td>4.18 square meter</td>
</tr>
<tr>
<td><strong>Testing Plane</strong></td>
<td>10.1 square feet</td>
<td>15.1 square feet</td>
<td>18.7 square feet</td>
<td>23.7 square feet</td>
<td>45 square feet</td>
</tr>
<tr>
<td><strong>Internal * Dimension</strong></td>
<td>1270 mm L (50&quot;)</td>
<td>1905 mm L (75&quot;)</td>
<td>1905 mm L (75&quot;)</td>
<td>1930 mm L (76&quot;)</td>
<td>2267 mm L (89.25&quot;)</td>
</tr>
<tr>
<td>L x W x H</td>
<td>737 mm W (29&quot;)</td>
<td>737 mm W (29&quot;)</td>
<td>914 mm W (36&quot;)</td>
<td>1143 mm W (45&quot;)</td>
<td>1860 mm W (73.25&quot;)</td>
</tr>
<tr>
<td></td>
<td>635 mm H (25&quot;)</td>
<td>635 mm H (25&quot;)</td>
<td>635 mm H (25&quot;)</td>
<td>1155 mm H (45.5&quot;)</td>
<td>762 mm H (30&quot;)</td>
</tr>
<tr>
<td><strong>Total Chamber Volume</strong></td>
<td>982.5 ltr.</td>
<td>1,472.5 ltr.</td>
<td>1,925.5 ltr.</td>
<td>3,822 ltr.</td>
<td>4,870.5 ltr.</td>
</tr>
<tr>
<td></td>
<td>34.7 cu.ft.</td>
<td>52.0 cu.ft.</td>
<td>68.1 cu.ft.</td>
<td>135 cu.ft.</td>
<td>172 cu.ft.</td>
</tr>
<tr>
<td><strong>External Dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Left to Right</strong></td>
<td>1956 mm W (77&quot;)</td>
<td>2195 mm W (102&quot;)</td>
<td>2195 mm W (102&quot;)</td>
<td>2896 mm W (114&quot;)</td>
<td>3480 mm L (137&quot;)</td>
</tr>
<tr>
<td><strong>Left to Right with SO2</strong></td>
<td>1981 mm W (78&quot;)</td>
<td>2616 mm W (121&quot;)</td>
<td>2616 mm W (121&quot;)</td>
<td>2921 mm W (115&quot;)</td>
<td>3505 mm L (138&quot;)</td>
</tr>
<tr>
<td><strong>Front to Back chamber only - no cover or accessories</strong></td>
<td>889 mm W (35&quot;)</td>
<td>889 mm W (35&quot;)</td>
<td>1092 mm W (43&quot;)</td>
<td>1524 mm W (60&quot;)</td>
<td>2286 mm W (90&quot;)</td>
</tr>
<tr>
<td><strong>Front to Back with cover on and closed</strong></td>
<td>914 mm W (36&quot;)</td>
<td>914 mm W (36&quot;)</td>
<td>1092 mm W (43&quot;)</td>
<td>1676 mm W (66&quot;)</td>
<td>2286 mm W (90&quot;)</td>
</tr>
<tr>
<td><strong>Front to Back w cover closed &amp; wet bottom assy.</strong></td>
<td>1092 mm W (43&quot;)</td>
<td>1092 mm W (43&quot;)</td>
<td>1270 mm W (50&quot;)</td>
<td>1702 mm W (67&quot;)</td>
<td>2286 mm W (90&quot;)</td>
</tr>
<tr>
<td><strong>Front to Back w cover open &amp; wet bottom assy.</strong></td>
<td>1118 mm W (44&quot;)</td>
<td>1118 mm W (44&quot;)</td>
<td>1270 mm W (50&quot;)</td>
<td>2032 mm W (80&quot;)</td>
<td>2388 mm W (94&quot;)</td>
</tr>
<tr>
<td><strong>Front to Back w cover open, wet bottom assy. &amp; retractable probe assembly.</strong></td>
<td>1194 mm W (47&quot;)</td>
<td>1194 mm W (47&quot;)</td>
<td>1397 mm W (55&quot;)</td>
<td>2032 mm W (80&quot;)</td>
<td>2413 mm W (95&quot;)</td>
</tr>
<tr>
<td><strong>Tall - Floor to top of cover (closed)</strong></td>
<td>1448 mm W (57&quot;)</td>
<td>1448 mm W (57&quot;)</td>
<td>1448 mm W (57&quot;)</td>
<td>2235 mm W (88&quot;)</td>
<td>1829 mm H (72&quot;)</td>
</tr>
<tr>
<td><strong>Tall - Floor to top of cover (open)</strong></td>
<td>1803 mm W (71&quot;)</td>
<td>1803 mm W (71&quot;)</td>
<td>1930 mm W (76&quot;)</td>
<td>3200 mm W (126&quot;)</td>
<td>3150 mm W (124&quot;)</td>
</tr>
<tr>
<td><strong>Floor Space</strong></td>
<td>2108 mm L (83&quot;)</td>
<td>2743 mm L (108&quot;)</td>
<td>2743 mm L (108&quot;)</td>
<td>3048 mm L (120&quot;)</td>
<td>3658 mm L (144&quot;)</td>
</tr>
<tr>
<td><strong>Required</strong></td>
<td>2057 mm W (81&quot;)</td>
<td>2057 mm W (81&quot;)</td>
<td>2286 mm W (90&quot;)</td>
<td>2540 mm W (100&quot;)</td>
<td>3912 mm W (154&quot;)</td>
</tr>
<tr>
<td><strong>Sol. Reservoir</strong></td>
<td>132 ltr. / 35 gal.</td>
<td>132 ltr. / 35 gal.</td>
<td>132 ltr. / 35 gal.</td>
<td>132 ltr. / 35 gal.</td>
<td>227 ltr. / 60 gal.</td>
</tr>
</tbody>
</table>

* The inside dimensions, capacities, and space given here are “available testing space.” They include only usable space, excluding volume below the false floor (where the heaters are located) and within the cover.
4.0 OPERATION

4.9.2 Chamber Capabilities (cont.)

Panel Capacity:

<table>
<thead>
<tr>
<th></th>
<th>BCX2000</th>
<th>BCX3000</th>
<th>BCX4000</th>
<th>BCX9000</th>
<th>BCX11000</th>
</tr>
</thead>
<tbody>
<tr>
<td>4” x 12” panels</td>
<td>160</td>
<td>240</td>
<td>360</td>
<td>390</td>
<td>800</td>
</tr>
<tr>
<td>3” x 6” panels</td>
<td>190</td>
<td>280</td>
<td>380</td>
<td>416</td>
<td>1,600</td>
</tr>
</tbody>
</table>

These panel capacities are based on using
- the Slotted Support Bars for the 4” X 12” panels with the panels 1 ½” on center
- the Support Rack for the 3” X 6” panels with the panels 1” on center

Voltage & Phase: 208-230 volt, 1 – 3 phase, 60/50 Hz, 23 - 150 amps (depending on cabinet size & options) 480 volt 3 phase is available as an option at additional cost.

<table>
<thead>
<tr>
<th>Model #</th>
<th>208/1/60</th>
<th>208/3/60</th>
<th>240/1/60</th>
<th>240/3/60</th>
<th>460/3/60</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCX2000</td>
<td>23 amps</td>
<td>23 amps</td>
<td>25.9 amps</td>
<td>25.9 amps</td>
<td>13.4 amps</td>
</tr>
<tr>
<td>BCX3000</td>
<td>30.2 amps</td>
<td>30.2 amps</td>
<td>34.2 amps</td>
<td>34.2 amps</td>
<td>17.6 amps</td>
</tr>
<tr>
<td>BCX4000</td>
<td>30.2 amps</td>
<td>30.2 amps</td>
<td>34.2 amps</td>
<td>34.2 amps</td>
<td>17.6 amps</td>
</tr>
<tr>
<td>BCX9000</td>
<td>37.5 amps</td>
<td>37.5 amps</td>
<td>42.5 amps</td>
<td>42.5 amps</td>
<td>21.7 amps</td>
</tr>
<tr>
<td>BCX11000</td>
<td>N/A</td>
<td>47.1 amps</td>
<td>N/A</td>
<td>53.6 amps</td>
<td>27.3 amps</td>
</tr>
</tbody>
</table>

These amperage ratings are the actual amperage draw for the cabinet. The fuses and wiring to be supplied to the cabinet should be at least sized to these values. It is, however common to size the supply and provide larger fuses; typically 30 amp, 60 amp, 100 amp, 200 amp and 400 amp are used. Pay careful attention to ensure that the wire size is correct for the fuses, and it is sized at or above the values on the matrix. Single phase wiring is not available for immersion or mechanical cooling cabinets.
4.0 OPERATION

4.9.3 Component Valves

The BCX is equipped with several “Ball Valves” for ease of operation and maintenance. Some valves are installed on every instrument, while others are installed only if particular optional equipment was purchased. The complete list of valves is as follows:

<table>
<thead>
<tr>
<th>Valve #</th>
<th>Description and purpose</th>
<th>Valve Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Solution Filter Valve (BV #1)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to change the salt solution filter</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Bubble Tower Water Drain (BV #2)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to drain bubble tower for cleaning</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Salt Solution from Tank to Spray Pump (BV #3) (optional)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow solution from the reservoir to go into the inlet side of the spray pump</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Air to the Bubble Tower Valve (BV #7)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow or “throttle” air into the bottom of the bubble tower</td>
<td></td>
</tr>
<tr>
<td>7A</td>
<td>Air to the Bubble Tower Valve (BV #7) (optional)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow or “throttle” air into the bottom of the bubble tower. This is a second valve only installed on the BCX11000 bubble tower</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Air to the Dispersion Towers Valve (BV #8)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to allow air to the fog dispersion towers Can be used with BV#7 to bypass the bubble tower</td>
<td></td>
</tr>
<tr>
<td>8A</td>
<td>Air to the Dispersion Towers Valve (BV #8) (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to allow air to the fog dispersion towers Can be used with BV#7A to bypass the bubble tower This is a second valve only installed on the BCX11000 bubble tower</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>External. Condensate Collection Valve #1 (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to allow condensation to collect in the black tubing. Open when taking collection rates, then close.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>External. Condensate Collection Valve #2 (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td>11</td>
<td>External. Condensate Collection Valve #3 (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td>12</td>
<td>External. Condensate Collection Valve #4 (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td>13</td>
<td>Air to the Electronics Enclosure (BV #9)</td>
<td>ADJUST</td>
</tr>
<tr>
<td></td>
<td>Used to “meter” air into the electronics enclosure; pressurizes area to keep salt out and cool electronics</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Independent Salt Tank to Salt Filter (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to send salt solution from the optional 60-gallon tank to the salt feed solenoid. Open when needed.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Independent Tank D.I. Water Fill (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to send D.I. water to the optional 60-gallon tank. Open when needed.</td>
<td></td>
</tr>
</tbody>
</table>
4.0 OPERATION

4.9.3 Component Valves (cont.)

<table>
<thead>
<tr>
<th>Valve #</th>
<th>Description and purpose</th>
<th>Valve Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Independent Tank Air to Sparger (optional)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to send compressed air to the optional 60-gallon tank air mixing sparger. Open when needed.</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Air to Diaphragm Pump (optional)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to “throttle” the air into the dispersion tower fill pump. This will change the speed of the pump</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Solution Spray Selection Valve (optional)</td>
<td>SELECT</td>
</tr>
<tr>
<td></td>
<td>Used to select either the 60-gallon solution reservoir, or the optional immersion reservoir as source of solution for the spray pump.</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Solution Spray Pump Inlet Valve (optional)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to feed solution into the inlet of the spray pump. Close to service the pump.</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Salt Solution Tank Drain (customer supplied)</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to drain the salt solution tank for cleaning &amp; solution replacement.</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Chamber Manual Drain Valve (customer supplied)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to drain the exposure chamber during testing</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>D.I. water to water trough float switch (BCX9000 only)</td>
<td>ADJUST</td>
</tr>
<tr>
<td></td>
<td>Used to adjust the amount of flow of D.I. water entering the water trough during a refill of the trough</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Air to 35 gallon solution tank fill pump</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to fill the 35 gallon tank with solution. Once the fill hose is installed on a solution reservoir, open this valve to start the pump. The pump will move the solution from its current position to the 35-gallon tank. Works in conjunction with valve number 32.</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Solution to 35 gallon tank</td>
<td>CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to fill the 35 gallon tank with solution. Once the fill hose is installed on a solution reservoir, open this valve to allow flow into the tank. Works in conjunction with valve number 31.</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>S-Style solution spray pump throttling valve (Optional)</td>
<td>ADJUST</td>
</tr>
<tr>
<td></td>
<td>Used to “throttle” air into the S-style solution spray pump. The more OPEN the valve is, the faster the pump will move solution to the spray nozzles.</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>Salt water to S-Style solution spray system (Optional)</td>
<td>OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow solution to move to the S-style solution nozzles. The more OPEN the valve is, the solution can be delivered to the spray nozzles.</td>
<td></td>
</tr>
</tbody>
</table>
4.0 OPERATION

4.9.3 Component Valves (cont.)

<table>
<thead>
<tr>
<th>Valve #</th>
<th>Description and purpose</th>
<th>Valve Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>Independent tank pump throttling valve (Optional)</td>
<td>- CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to &quot;throttle&quot; air into the air driven diaphragm pump on the independent tank. The more OPEN the valve is, the faster the pump will move solution out of this tank.</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>Air to independent tank (Optional)</td>
<td>- OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow or &quot;throttle&quot; air into the optional independent solution tank. Can be used as a shut off when moving the tank.</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>D.I. water to independent tank (Optional)</td>
<td>- OPEN</td>
</tr>
<tr>
<td></td>
<td>Used to allow or &quot;throttle&quot; water into the optional independent solution tank. Can be used as a shut off when moving the tank.</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Independent tank manual drain valve (Optional)</td>
<td>- CLOSED</td>
</tr>
<tr>
<td></td>
<td>Used to drain the independent tank for cleaning.</td>
<td></td>
</tr>
</tbody>
</table>

The OPEN and CLOSED status listed above are usually preset at the factory (with the exception of #27 - #29), and they should remain in these positions during testing. Prior to testing it is important that the user verify that these valves are in the correct position. They can be changed for chamber cleaning and maintenance.
4.0 OPERATION

4.9.4 Solenoid Valve Assignments

The BCX is equipped with several “Solenoid Valves” for automatic operation and delivery of Air, D.I. Water, and Salt solution to chamber components. They are listed as follows:

5  Air to Bubble Tower (Moist Air )

*When opened, it will allow compressed air into the Bubble Tower. This solenoid is controlled by the items selected by the operator for a specific test interval.*

1  D.I. Water to Bubble Tower

*When opened, it will allow D.I. water into the Bubble Tower. This solenoid is controlled by the Bubble Tower Level Switch.*

8  Salt Solution to Fog Nozzle Feed Reservoir

*When opened, it will allow Salt Solution to fill the fog nozzle feed reservoir. This solenoid is controlled by the Fog Nozzle feed reservoir float switch.*

Note; On a BCX3000 or 4000, Solenoid #8 is located under the second solution transfer pump. This solenoid will be located here.
4.0 OPERATION

4.9.4 Solenoid Valve Assignments (cont.)

<table>
<thead>
<tr>
<th>Solenoid #</th>
<th>Description and purpose</th>
</tr>
</thead>
</table>
| 9          | Cover Open Solenoid (Optional)  
             When opened, it will allow compressed air into the air driven cover lifters to OPEN the chamber cover. |
| 10         | Cover Close Solenoid (Optional)  
             When opened, it will allow compressed air into the air driven cover lifters to CLOSE the chamber cover. |
| 15         | Air for Diaphragm Pilot Valve (Optional)  
             When opened, it will allow compressed air into the air diaphragm pilot valve located on the back of the chamber.  
             This controls the automated wet bottom drain feature for fogging cycles. |
| 22         | Air to S-style solution spray pump (Optional)  
             When opened, it will allow salt solution to be pumped from the solution holding tank to the spray nozzles.  
             When this solenoid is opened, compressed air is sent to a diaphragm pump which in turn pumps the solution. |
| 23         | Air to chamber purge (Optional)  
             When opened, compressed air is sent into the exposure zone.  
             This air is used to purge or dehumidify the exposure zone during controlled RH cycles on chambers equipped with the air driven fan assemblies. |
| 24         | D.I. water to chamber (Optional)  
             When opened, D.I. water is fed into the exposure zone of the BCX chamber.  This water is used to create a wet bottom condition. |
| 25         | SO₂ to flow meter (Optional)  
             When opened, compressed air is sent into the SO₂ valve to actuate it.  This action will open the valve and allow SO₂ to flow into the exposure zone. |
| 34         | Purge/Dry air to chamber  (Optional)  
             When opened, compressed air is sent into the exposure zone.  
             This air is used to purge or dehumidify the exposure zone.  
             This solenoid is used on standard controlled BCX cabinets with a controlled RH option utilizing a 3-way motorized ball valve.  This valve is not used on systems with the air operated fan systems. |
4.0 OPERATION

4.9.5 Diaphragm Valve Assignments

The BCX has an optional diaphragm valve for automatic operation of a wet bottom cycle.

<table>
<thead>
<tr>
<th>DV#</th>
<th>Description and purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Wet bottom diaphragm valve (Optional)</td>
</tr>
</tbody>
</table>

This is a normally open valve. When activated, the drain for the BCX chamber will be closed. This will allow for water to accumulate in the bottom of the exposure zone, creating a wet bottom humidity atmosphere. This valve is also activated during immersion cycles.
4.0 OPERATION

4.9.6 Dispersion Tower Assembly Installation

The dispersion tower is dependent on the size of the cabinet.

The BCX2000 uses one tower that is located in the center of the exposure chamber, and sits on the floor.

The BCX3000, & 4000 use two towers with Horizontal dispersion tubes, and are located on the sides of the exposure zone fogging into the center. These horizontal towers sit on top of the diffuser plates.

The BCX9000 use two towers with Horizontal dispersion tubes, and are located on the sides of the exposure zone fogging into the center. These horizontal towers sit on pedestals that are mounted on the side walls of the exposure zone.

The BCX11000 uses nine (9) fog towers with horizontal dispersion tubes. These towers are located around the perimeter of the entire chamber and sit on top of the diffuser plates.

In addition to placement, there are four connections that need to be made from the front inside wall of the exposure zone to the dispersion tower assembly. These four connections are for the fog nozzle reservoir float, humidified air supply, nozzle supply reservoir drain, and D.I. water supply. Connect the poly tubing supplied with the cabinet to the four couplings in the wall and connect the other ends of these lines to the dispersion tower assembly as shown in the appendix.
4.0 OPERATION

4.10 Cycling Controls Package

The cycling control package is fully programmable with an easy-to-use PLC (Programmable Logic Controller) accessed from a VCU (Video Control Unit). It controls all chamber functions. Standard industry test specifications are preprogrammed so the user can begin testing immediately (after the installation and setup procedures are completed). Standard tests can be modified and custom tests and procedures across multiple parameters can easily be programmed into the controller, providing flexibility, meeting multiple needs, and placing real control into the hands of the user.

The VCU appears throughout this section for reference. The VCU allows input to the PLC and displays outputs.

The actual chamber control is performed by the PLC, however, the VCU operator interface allows the user to communicate to the PLC for selecting a program to run, changing a program and so on. All operations, cycles, temperatures, times, set points, dry times, etc., are available for the operator to control.

- The purpose of the chamber controller is to activate the BCX chamber components. These components include such items as heaters, blowers, pumps, air solenoids, D.I. water solenoids, salt solution solenoids and so on. The controller will operate the items for the desired lengths of times to produce the environmental conditions (cycles or steps) such as Salt Fog, Humidity, Dry off, Solution Spray, and Immersion.
- The controller also stores the test profiles ready to be run at the operator’s discretion.
- The controller monitors temperatures, solution levels and other conditions to keep the chamber running in a safe and repeatable manner.
- The standard control package consists of a rack style micro PLC with 8 inputs, and 16 outputs. This PLC has enough memory to allow for all chamber function programming and to hold 15 programs, each up to 16 steps. It is adequate to control the BCX in the basic modes with standard cycling and nested looping. The operator interface for this standard package is a 6” monochrome touch screen display. This package comes standard with the BCX. An optional color display is available for ease of viewing.
4.0 OPERATION

4.10.1 Cycling Controls Overview

These instructions are written around the optional color display.

NOTE:
When viewing the touchscreen, please note that the display area for this standard controller is limited to 20 characters including spaces. Therefore, many words are abbreviated.
4.0 OPERATION

4.10.1 Cycling Controls Overview (cont.)

**NOTE:**
When viewing the touchscreen please note that the display area for this standard controller is limited to 20 characters including spaces. Therefore, many words are abbreviated.

---

5. Machine Setup
- Purge ON Time
- Manual Step (enable / disable)
- Power Loss Code
- Bubble Tower Temp. SP #1
- Bubble Tower Temp. SP #2
- Alarm Page
- Display setup

6. Calibration
- Dry Bulb, Read – Display
- Bub Twr. Read – Display
- Wet Bulb, Read – Display

7. Contact US
- Atlas
  4114 N. Ravenswood Ave.
  Chicago, Illinois
  Tel: (773) 327-4520
  Fax: (773) 327-5787
4.0 OPERATION

4.10.2 Start a Test

This section instructs the user on how to start a test in the automatic mode. Start from the MAIN MENU page of the operator interface.

If not already there, **PUSH** the MAIN MENU Key (on the top left corner of any sub screen) one time and the controller will be routed back to the main menu. When at the first page, the DISPLAY should show:

Now **PUSH** on the SELECT TEST TO RUN Key once.

The DISPLAY area, will change to a new screen as shown below:

If no test is running, it will be shown on the status bar.

There are 15 tests to choose from as shown on the left. Five tests are pre-programmed, and the rest (user test 6 – 15) are to be programmed by the user. Using a finger (or other suitable device for actuating a touch screen) select the test to be started. For this example, choose the ASTM G85-A2 test. The selected test name will show up on the status bar.

When a test is selected, **PUSH** the green START key located in the lower right corner of the screen.
4.0 OPERATION

4.10.2 Start a Test (cont.)

When pushed, the start key will start up the test selected and change the display to;

**PUSH** the MAIN MENU key to leave this page and return to the main menu.

The display should now be at the MAIN MENU. Note that now the status bar on the main menu displays the name of the test running, and the step that it is...
4.0 OPERATION

4.10.3 Display Cycle Status

To display the chamber cycle status.

From the main menu, PUSH the MONITOR TEST IN PROGRESS button located on the left side middle of the display.

The first of 3 different MONITOR TEST pages will be displayed. The top center blue display area indicates which page is being displayed.

NOTE: the red ALARM button will only be displayed up if there is an alarm condition.

This screen will show the operator the following information;

1. what test was selected in this example – G85-A2
2. the name of the step running in this example – Fogging cycle
3. the cabinet temperature set point in this example - 35.0
4. the dry bulb (cab.) actual temperature in this example – 35.0
5. the wet bulb actual temperature in this example – 35.0
6. purge air control status in this example - purge air ready to be set ON
7. the bubble tower temperature set point in this example - 48.0
8. the bubble tower actual temperature in this example – 48.0
9. the time set for this step in this example – 45 minute
10. the time left for this step in this example – 40 minute
4.0 OPERATION

4.10.3 Display Cycle Status (cont.)

Of course the words shown in this DISPLAY area will change depending on the test name/number running, the step the cycle is in, and the status (In Cycle, Stopped Cycle, Alarm condition) that the cabinet is “

The CYCLE RESUME, CYCLE PAUSE, STEP CYCLE and CYCLE STOP buttons at the bottom of the screen do not all show at the same time. The buttons shown depend on the condition of the test, and the options chosen. For example, the STEP CYCLE button only shows if the user set us the chamber this way.

PURGE – Grey button labeled Purge off
The purpose of the PURGE CONTROL BUTTON is to evacuate the inside of the chamber exposure zone of its current environment. Once this button is pushed, the button will change to a green color, the display will show Purge ON, and the chamber’s compressed air solenoid will turn on and stay on for the amount of time specified in the MACHINE SET-UP section of the controller or until the operator pushes this button again, whichever comes first.

A common reason for using this button is turn on the PURGE air and evacuate corrosive fog prior to opening the chamber cover for parts examination. This can help prevent corrosive salt fog from damaging the surrounding areas.
4.0 OPERATION

4.10.3 Display Cycle Status (cont.)

STEP CYCLE
The purpose of the STEP CYCLE CONTROL BUTTON is to manually advance an automatic cycle from one step to the next. Basically, this feature allows the operator to “over ride” the cycle timer and proceed to the next cycle step.

This feature is particularly useful when trouble-shooting a newly written test cycle to ensure the intended next cycle is achieved.

CYCLE PAUSE
The purpose of the CYCLE PAUSE CONTROL BUTTON is to put the chamber into a pause mode during an automatic cycle. When this button is pushed, the automatic test that is currently running will be temporarily suspended. The button will disappear, and the CYCLE RESUME button will appear and flash, indicating a pause mode. To restart the test, push the CYCLE RESUME button.

CYCLE STOP
This button will stop a test that is being run in the automatic mode.

PUSH the NEXT Key in the top right corner once to show page 2 of the MONITOR TEST page. The DISPLAY area will show:
4.0 OPERATION

4.10.3 Display Cycle Status (cont.)

This is page 2 of the MONITOR TEST sequence.

Notice, that just to the left of the NEXT key is a key labeled PREV. If the user activates the PREV key, the display will backup one screen. In this case, it would display MONITOR TEST PAGE 1.

As on the previous page, the test name and current step is displayed. Additionally, as before, the current step condition is shown.

The eight (3) inputs installed on this chamber are shown in the center of the display.

1. Lid Switch
2. Bubble tower level switch
3. Fog reservoir level switch

A green color indicates the switch is UP, or CLOSED, or MADE. A red color indicates the switch is DOWN, or OPEN, or in a BREAK status.

In the case of the gray scale display, a black color indicates the switch is UP, or CLOSED, or MADE. A white color indicates the switch is DOWN, or OPEN, or in a BREAK status.

At the bottom of this screen, the looping settings and status is displayed. This screen shows what the looping parameters are for LOOP #1 of this test cycle. From - is the step the cycle will start the looping To - is the step the cycle will go to after completing the “FROM” step Set - is the number of times the controller will repeat this loop SoFar - is the number of times the controller has performed the loop

**PUSH** the NEXT Key at the top right of the page. The DISPLAY area will show:
4.0 OPERATION

4.10.3 Display Cycle Status (cont.)

This is page 3 of the MONITOR TEST PAGE 3 screen.

As on the previous page, the test name, and current step is displayed. Additionally, as before, the current step condition is shown.

This screen shows what the looping parameters are for LOOP #2 of this test cycle.

From - is the step the cycle will start the looping
To - is the step the cycle will go to after completing the “FROM” step
Set - is the number of times the controller will repeat this loop
SoFar - is the number of times the controller has performed the loop

PUSH the NEXT Key at the top right hand corner of this page. The DISPLAY area will show page 4 of the MONITOR TEST PAGE 4 screen:

As on the previous page, the test name, and current step is displayed. The current step condition is also shown.

Note the NEXT key in at the top right has disappeared because there is no next page in this sequence.

This screen shows the looping parameters for LOOP #3 of this test cycle.

From - is the step the cycle will start the looping
To - is the step the cycle will go to after completing the “FROM” step
Set - is the number of times the controller will repeat this loop
SoFar - is the number of times the controller has performed the loop

PUSH the MAIN MENU Key at the top left hand corner of this page.
4.0 OPERATION

4.10.4 Manual Control

This section will instruct the user on how to use the manual pages of the controller. This section of the controller will allow the user to turn individual chamber components on and off with the touch of a button.

From the main menu, PUSH the MANUAL CONTROL button located on the left side near bottom of the display. The MANUAL CONTROL page will be displayed.

There are 7 different output items that can be manually actuated from this screen. They are as follows;

1. Chamber Heater Contactor
2. Bubble Tower Heater Contactor
3. Air Purge Solenoid
4. User Output Relay
5. Bubble Tower Fill Solenoid
6. Bubble Tower Air Solenoid
7. Salt water to fog tower Solenoid

The purpose of each of these items is discussed elsewhere in this manual. However, by the descriptions, it is self-evident what they do or provide.
4.0 OPERATION

4.10.4 Manual Control (cont.)

The three (3) inputs installed on this chamber are shown at the bottom of the display.
1. Lid Switch
2. Bubble tower level switch
3. Fog reservoir level switch

A green color indicates the switch is UP, or CLOSED, or MADE. A red color indicates the switch is DOWN, or OPEN, or in a BREAK status.

In the case of the gray scale display, a black color indicates the switch is UP, or CLOSED, or MADE. A white color indicates the switch is DOWN, or OPEN, or in a BREAK status.

The user can turn these devices on and off individually. For example, to turn the CAB HTR CON on and heat the chamber, press the TOUCH SCREEN on the square key labeled CAB HTR CON OFF. Once activated, the display will turn off the square button, and turn on a round button just the right labeled CAB HTR CON.

The screen shot to the right shows several items in an ON position, and several in an off position.

NOTE, these items can only be actuated from this screen if the chamber is NOT running a cycle. If a cycle is running, this page will display the status of the outputs, but not allow actuation by the user.

This entire section is only active for a preset amount of time. That is, when the user enters this section of the controller, an internal timer is activated. When the pre-set amount of time elapses, all components that were turned on in the MANUAL mode by the user are turned off, and the DISPLAY area is changed back to the first screen.

PUSH the MAIN MENU Key at the top left hand corner of this page.
4.0 OPERATION

4.10.5 Profile Setup

This section will instruct the user on how to set-up a new test profile, or edit an existing one.

From the main menu, PUSH the PROFILE SETUP button located on the right side near top of the display.

The PROFILE SETUP page 1 will be displayed.

There are 15 tests to choose from as shown on the left. Seven tests are already pre-programmed (but can be edited), and the rest (user test 8 – 15) are to be programmed by the user. Using a finger (or other suitable device for actuating a touch screen) select the test to be edited. For this example, choose the ASTM G85-A2 test. The selected test name will show up on the status bar.

Once a test is selected, PUSH the aqua color EDIT SELECTED TEST key located in the lower right corner of the screen.

Once selected, the screen will change to page two (2) of the PROFILE SETUP screen.

As on the previous page, the test name, and current step is displayed. Additionally, as before, the current step condition is shown.

From here, all of the test profile setup can be changed.
4.0 OPERATION

4.10.5 Profile Setup (cont.)

Start by choosing the step # to be edited. The default is step #1 as shown there.

PRESS the STEP # button on the screen, and the KEY PAD display will shoe.

Using the key pad area in the top left section of the screen, PRESS the number of the step that will be changed first. The value selected will show up here.

PRESS the CLEAR key if a mistake is made and a new value is to be entered.

The MINIMUM, MAXIMUM and CURRENT values for this function are shown in the boxes on the right side of the display near the center.

To exit this page without making a change, PRESS the CANCEL button. No value will be changed, and the display will back up to the PROFILE SETUP PAGE 2.

Once the correct value is entered in, PRESS the ENTER key in the lower right corner of this page to make the change. Practice using this numeric keypad display page. It will be used in all other areas of the control where user definable numbers are entered. Although the LABEL (example is STEP # for this screen), MINIMUM, MAXIMUM and CURRENT will change from screen to screen, the functionality of this page remains the same.

For purposes of space and time, the use of this KEY PAD page will not be explained on the following pages.
4.0 OPERATION

4.10.5 Profile Setup (cont.)

Using the same method explained on the previous page, enter in the settings for the rest of this step, including:

a. TIME for this Step. - how long like this step should run.

b. TEMPERATURE (in deg. Celsius) that this step will run. Remember that this chamber has no cooling equipment, therefore, a number entered into this area that is lower than the actual temperature surrounding the equipment will not be achieved. This controller works in metric and uses the number input as Celsius.

c. EVENT, or condition that this step will run.

Now that the Time and Temperature of this Step are set, the actual test condition must be set. Event Code numbers correspond to actual test conditions as listed in this table.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
4.0 OPERATION

4.10.5 Profile Setup (cont.)

For example if this number is 1 then the chamber will run a Fogging cycle. These numbers can also be added to combine test conditions. For example, if an Air Purge cycle (Event Code number 4) with the Guaranteed Soak feature (Event Code number 32) enabled, add these two numbers (4 + 32 = 36) and enter this number as explained above.

NOTE: Take care in adding numbers when combining events. If events are combined that conflict with one another (for example Fogging cycle and air purge) the chamber will not give usable testing results.

When the proper TIME, TEMPERATURE, and EVENT CODE have been established and entered into the programmer for each of the 16 steps, it is time to establish the looping schedule.

Using the key-pad method explained on the previous pages, enter the settings for the looping schedule.

To program a sample LOOP, read the following. For example, if after running Step #11 of the test it is desired to run Step number 1 and repeat this LOOP 79 more times, then enter the following data as shown in the display to the right.

Now Loop number 1 is complete. If a Loop number 2 or 3 is needed, PRESS the LOOP # key and change the value to 2 or 3.

Follow the above listed instructions to set the Looping parameters for Loop 2 and/or 3.
4.0 OPERATION

4.10.6 Machine Setup

This section will instruct the operator on how to use the chamber set-up pages of the controller. This section of the controller will allow the operator to set certain functions of the controller to customize testing.

From the main menu, PUSH the MACHINE SETUP button located on the right side center of the display.

The MACHINE SETUP page will be displayed.

Using the key-pad method explained on the previous pages, enter the settings for each of these 7 items listed to the right. Factory settings are pre-programmed into the controller, however, all of these numbers can be adjusted by the user.

**PURGE TIME** is the amount of time (in minutes) that the purge blower will operate when it is activated on the front of the control panel. When the time has elapsed, the blower will turn off, and the chamber is now safe to open for parts inspection or service. The factory preset is 10 minutes.

**MAN STEP** - Manual Step function allows the operator to “step” from one step in a test to the next with the push of a button. If this function is enabled, then the operator can execute the manual step; if not, then the test cycle will only proceed automatically. To enable this feature a 1 must be entered in the controller; to disable this feature, the 0 (zero) is used. The factory preset is 1.
4.0 OPERATION

4.10.6 Machine Setup (cont.)

**PWR LOSS** - The Power Loss Code sets the activity of the controller if the electrical power is lost to the chamber and then returns. Below is a list of the codes, and their meaning.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Stop Cycle</td>
</tr>
<tr>
<td>1</td>
<td>Continue Cycle upon Power Return</td>
</tr>
<tr>
<td>2</td>
<td>Enter &quot;Pause&quot; mode with outputs off</td>
</tr>
</tbody>
</table>

The factory preset Power Loss Code is 1. This value can be changed using the key-pad feature explained earlier in this document.

**B. TWR SP X** (X – 1, or 2) - Bubble Tower Temperature Set Points change depending on the test condition being run. These set-points are pre-programmed at the factory and are changeable by the user.

- Bubble Tower Temp. SP #1 is activated during a Fogging Cycles = 48°C
- Bubble Tower Temp. SP #2 is activated during all other test conditions = 41°C

These values can be changed using the key-pad feature explained earlier in this document.

**NOTE:** This controller operates in degrees Celsius, the standard SI units in which most test specifications are written, or to which they are being converted.
4.0 OPERATION

4.10.7 Alarm

If an ALARM condition manifests itself, an RED ALARM button on the top right corner of this screen will display and flash between RED and YELLOW. If the optional color display is not purchased, and the standard gray scale display is installed, this button will flash between white and gray.

Should an ALARM condition exist, the user will navigate to the MACHINE SETUP page as discussed earlier in this manual, and then PUSH the ALARM PAGE key on the bottom left hand section of the display.

When activated, the ALARM STATUS page will be displayed.

There are four (4) alarm conditions that are displayed on this page.

1. Chamber Heat up time - The chamber’s exposure zone failed to reach the specified temperature set point in the maximum allowed time. The maximum allowed time is set by the factory in the control code. This is a safety feature to help stop the machine from creating too much heat if there is a mechanical condition preventing the chamber from reaching a specific temperature. This maximum allowed time will vary with machine type and options.

2. Bubble tower fill - Bubble Tower Failed to Fill in allowed Time - The bubble tower failed to fill with pressurized type 4 D.I. water in the maximum allowed time. This time is usually set for 2 minutes. If a condition exists such as low water pressure, no water pressure, or a mechanical failure of the fill solenoid or tubing that would prevent the filling of the bubble tower within this time, then this fault would activate.

3. Bubble tower Temperature - Bubble Tower exceeded Max Temp allowed - The chamber’s bubble tower exceeded the maximum temperature allowed for this machine. In most cases, this bubble tower set point is 70°C.

4. Bubble tower heat up time - The bubble tower failed to reach the specified temperature set point in the maximum allowed time. The maximum allowed time is set by the factory in the control code. This is a safety feature to help stop the machine from creating too much heat if there is a mechanical condition preventing the bubble tower from reaching a specific temperature. This maximum allowed time will vary with machine type and options.
4.0 OPERATION

4.10.7 Alarm (cont.)

A green color indicates there is no alarm condition.

A red/yellow flashing color indicates a problem.

In the case of the gray scale display, black color indicates there is no alarm condition. A white flashing color indicates a problem.

A fault will cause the chamber to stop its current testing and requires the condition to be corrected before any further testing can proceed. When the condition that created the fault is corrected, the fault must be reset. This is accomplished by pushing the yellow RESET ALARM button on the bottom left hand corner of the ALARM STATUS page.

If the condition is corrected, the condition will return to the OK or green condition message.

Once the condition is corrected, and all alarms are reset, the CYCLE RESUME button must be pushed to restart the cycle.
4.0 OPERATION

4.10.8 Display Setup

This section will instruct the operator on how to change the contrast on the controller.

From the main menu, **PUSH** the MACHINE SETUP button located on the right side middle of the display.

The MACHINE SETUP will be displayed.

**PUSH** the DISPLAY SETUP button located on the right side bottom of the display.

The DISPLAY SETUP page will be displayed.
4.0 OPERATION

4.10.8 Display Setup (cont.)

On this page, the user can adjust the contrast on the screen as needed. Several conditions change way the display looks, including over head lighting, temperature of this display, and viewing angle of the user. The contrast will change with the temperature of the unit. Therefore, after the display has attained working temperature, it will be necessary to readjust this contrast to maximize readability of the display.

Pressing the left up arrow key will lighten the display. Pressing the right arrow key will darken the display.

When the display area is adjusted properly, **PUSH** the MAIN MENU button on the top left corner of the screen, and this setting will be complete.

Experiment with this section by using the various keys to adjust the contrast to a comfortable level.
4.0 OPERATION

4.10.9 Contact Us

This section will instruct user on the CONTACT US button located on the MAIN MENU.

From the main menu, **PUSH** the CONTACT US button located near the center bottom of the display.

The CONTACT US page will be displayed.

This page provides the user with the address, phone number; fax number and web address for the manufacturer of this equipment.

**PUSH** the MAIN MENU Key to leave this page.
4.0 OPERATION

4.10.10 Miscellaneous Buttons

This section will instruct user concerning the POWER LOSS CYCLE RESUME button, and the CYCLE STOP button on the MAIN MENU.

IF power is interrupted to the chamber during an automatic cycle, and then is restored, the POWER LOSS CYCLE RESUME button is displayed on the MAIN MENU page. This is to notify the user that a power interruption occurred.

If the chamber is in an automatic cycle, it can be stopped by, PUSHING the CYCLE STOP button located near the center bottom of the display.

NOTE: PRACTICE ONLY! MAKE SURE TO CHANGE THE SETTING BACK TO ITS ORIGINAL VALUE.
5.0 MAINTENANCE

Regular maintenance is necessary for proper operation, and some maintenance topics and considerations follow. Like any piece of laboratory equipment, the BCX cabinet should have a regular maintenance program to keep it operating properly. Please follow the maintenance recommendations.

5.1 Check Before Each and Every Test

1) Is the chamber clean?

Clean the test chamber before each test, or major test sequence. Warm water and a sponge should suffice in most cases. Rinse the interior of the cabinet. Be certain that all accumulated salt is cleaned off walls, specimen racks, etc. Rust stains that may occur from dripping condensation should be removed with a mild cleanser. The nozzle* should be inspected for salt build-up which can occur in the orifice. Wipe off temperature probes, and wipe down the exterior of the cabinet and level controls, as needed.

2) Is the fog uniform?

Check fog uniformity

3) Is the concentration of the solution and the pH correct?

Check the solution concentration and pH factor.

NOTE:

1) ASTM B117 contains a procedure for measuring pH.
2) The atomizer nozzle and filter cartridge are the heart of the cabinet, and must be kept clean and free from obstructions.

5.2 Routine Monthly Maintenance

Filter Cartridge Replacement

1) Check/replace the Dispersion Tower Filter Cartridge (located in line from the salt solution holding tank to the atomizer nozzle) every one (1) to two (2) months.

2) Check/replace the D.I. water line filter cartridge (located in line just after the customer installed D.I. water inlet) every one (1) to two (2) months.

3) Check the filter located in the Humidifying Tower Air Regulator every month and replace if dirty. Specify make and model of air regulator when ordering.
5.0 MAINTENANCE

5.2 Routine Monthly Maintenance (cont.)

Tubing & Fittings

1) Check the colored poly tubing for signs of oil which may have entered the lines through the air regulator. If the tubing has discolored, have the compressor checked. Discoloration is typically a sign of oil within the air lines. Oil contamination can seriously damage cabinet components and adversely affect test results.

2) Check all tubing and fittings for wear. Replace as needed.

Atomizer Nozzle Maintenance and Replacement

If clogging of the atomizer occurs, remove and, with an air gun, blow air into the face of the nozzle blowing any dirt out the back of the nozzle. Avoid using any instrument to clean the nozzle. Over-cleaning may enlarge the air holes and change the operating characteristics of the nozzle.

Chamber Heaters

The chamber heaters must be checked on a regular basis, but at least monthly. Inspect the heaters for any salt or residue build up. If build-up is present, the heaters must be cleaned. Inspect the heaters for any signs of wear or degradation including but not limited to discoloration. Depending on the chamber there is either an Inconel rod heater, a titanium rod heater or silicone mat heater. Check the heater sheath, especially, check for the breaking down of the orange “rubberized” coating (if an orange heater is installed) on the silicone mat heater or corrosion on the exterior of the rod heater. If any signs of wear or degradation are present, change the heater immediately. No further testing should be done until the heater unit has been changed.

It is mandatory that these chamber heaters be replaced every year.

Should you have any questions contact your local Atlas service technician.

5.3 General Maintenance Checklist

<table>
<thead>
<tr>
<th>Maintenance Item</th>
<th>Recommended Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressed air filter</td>
<td>Replace, as needed.</td>
</tr>
<tr>
<td>Solution reservoir filter</td>
<td>Clean screen.</td>
</tr>
<tr>
<td>D.I. water filter</td>
<td>Replace, as needed.</td>
</tr>
<tr>
<td>Bubble tower</td>
<td>Drain, clean, and refill with clean water.</td>
</tr>
<tr>
<td>Aerators in bubble tower</td>
<td>Check for fine dispersion of bubbles. Replace, as needed.</td>
</tr>
<tr>
<td>Chamber heaters</td>
<td>Remove any salt accumulation. Check heater integrity</td>
</tr>
<tr>
<td>Deionized water</td>
<td>Check for proper purity and for neutral pH.</td>
</tr>
</tbody>
</table>
5.0 MAINTENANCE

5.4 Annual Service

1) Check atomizer nozzle and replace if needed.

2) Drain Salt Solution Reservoirs, and clean the interior. Remove algae build-up.

3) Refill reservoirs with fresh solution.

4) Replace the air bubbler at the base of the Humidifying Tower.

5) Replace Humidifying Tower O-Rings (2).

6) Check calibration of all devices in accordance with normal and accepted calibration methods and procedures regarding temperature, pressure, and flow.

7) RTD temperature sensors.

   Check the calibration of the chamber RTDs every year.

8) Replace the chamber heater(s).

9) Replace all tubing and fittings on the interior exposure zone of the chamber to prevent leaking during operation. Due to temperature and humidity cycling on the interior of the chamber, these fittings and tubing become brittle and must be replaced.

10) Tighten all electrical connections

    With time and vibration, the metal strains of the wires can compress, and the terminal screws on the electrical connections can loosen. Therefore, once a year as a preventative maintenance program, a qualified electrician check/tighten all electrical connections.
6.0 TROUBLESHOOTING

6.1 Collection Rates

Testing Rule: Always verify uniformity of fog fall out or dispersion before every test, as uniformity and consistency is a key to accuracy in results.

Maintenance & Troubleshooting Tip: Verify uniformity of fog fall out as an important part of your regular maintenance schedule, and to indicate potential problem areas. The key indicator for maintenance is variations in collection rates that are not corrected by normal adjustments to control flow and pressure.

6.1.1 Fog Dispersion Control and Controls

The BCX cabinet delivers excellent fog dispersion control by providing independent controls for the volume of liquid and the amount of air pressure used to disperse it. These controls make it easy for the operator to set, test, and adjust flow and dispersion.

**Control of amount/volume of fog or corrosive solution:**

To increase or decrease the amount of solution.

1) Open or close the Throttle Holes; open providing more solution, closing providing less.

2) Change the height of the inverted cone assembly.

3) Adjust the air pressure using the air pressure regulator.

**Control of dispersion/distance of fog:**

To increase or decrease the projection - also referred to as “the throw” - of the solution.

1) Adjust the air pressure using the air pressure regulator.

2) Open or close the Throttle Holes; open providing more solution, closing providing less.

3) Change the height of the inverted cone assembly.
6.0 TROUBLESHOOTING

6.1.2 Determining & Measuring Collection Rates

The best measure of cabinet performance is the fall out figure, also called the fall out rate or collection rate. Please refer to ASTM B117, or other applicable procedure, for detailed instructions or specific requirements. The collection rate is determined by measuring the amount of solution collected in two collection vessels located inside the chamber during a given period of time.

1) Place a minimum of two (2) condensate collector funnels (80 cm²) and two (2) graduated cylinders (100 ml) in the cabinet so that the horizontal plane of the top of the funnel is at test level. Locate one as close to the dispersion tower as possible and one as far away as possible do not place the funnel so close to the dispersion tower that it collects condensation which may drip from the adjustable cone). For cabinets with two dispersion towers, four collection funnels and four graduated cylinders will be needed.

2) Rotate the vertical tube of dispersion tower until the four (4) 1” holes at the base of the tube are fully open. The holes are used to control the velocity and quantity of the fog. Open holes will result in higher collection rates. Closed holes will lower the collection rate.

3) Adjust the dispersion cone at the top of the tower so that the bottom tip of the cone is even with the top edge of the vertical tube. It may be adjusted later to suit testing needs.

4) A collection rate reading of between 1.0 and 2.0 milliliters of solution each hour (averaged over 16 hours) per 80 cm² of area should be the correct reading. Note: The fall out figure is the best measure of cabinet performance. Consult the test method for actual collection rate requirements.

5) To vary the collection rate, adjust the air pressure (air pressure regulator), the throttle holes, the inverted cone assembly, and the temperature set point for the bubble tower. Each will have an impact on the collection rate. Keep in mind the objective when making adjustments.

6) Make sure that the tower and cone assembly is perpendicular to the cabinet floor. For cabinets with horizontal dispersion, the horizontal tubes must be parallel to the cabinet floor.
6.0 TROUBLESHOOTING

6.2 Cycling Controls - Status and Fault Messages

There are two basic types of messages, STATUS and FAULT. A status message provides information on the machines basic running condition. A fault message provides information on what caused the machine to stop running, or a condition that is leading to a machine shut-down.

Status Messages

FAULT - A fault exists. Check the specific fault messages for the condition causing this status message.
LID OPEN - The chamber LID (cover) is open. The chamber cannot run a cycle in this condition.
POWER LOSS - The chamber experienced a power loss. Either the machines ON/OFF switch was turned off, or building power to the machine was interrupted while the machine was running a test. This message will not be shown if power is interrupted while the machine is not in an automatic test.
CYC CANCEL - This message appears when the machine is running a test in the automatic mode, and the test is stopped prior to the test timers being completed.
READY - All conditions on the machine are in the proper condition to allow the machine to start a test in the automatic mode.
IN CYCLE - The machine is running a test in the automatic mode.
CYCLE COMP - The machine completed a test that was running in the automatic mode.
CYCLE PAUSED - The machine was put into a paused mode while running an automatic test.

CHAMBER EXCEEDED MAX TEMP ALLOWED
The chamber’s exposure zone exceeded the maximum temperature allowed for this machine. In most cases, this maximum chamber set point is 75°C.

BUBBLE TOWER EXCEEDED MAX TEMP ALLOWED
The chamber’s bubble tower exceeded the maximum temperature allowed for this machine. In most cases, this bubble tower set point is 70°C.

CHAMBER FAILED TO REACH SET POINT IN THE MAX ALLOWED TIME
The chamber’s exposure zone failed to reach the specified temperature set point in the maximum allowed time. The maximum allowed time is set by the factory in the control code. This is a safety feature to help stop the machine from creating too much heat if there is a mechanical condition preventing the chamber from reaching a specific temperature. This maximum allowed time will vary with machine type and options.

BUBBLE TOWER FAILED TO REACH SET POINT IN THE MAX ALLOWED TIME
The bubble tower failed to reach the specified temperature set point in the maximum allowed time. The maximum allowed time is set by the factory in the control code. This is a safety feature to help stop the machine from creating too much heat if there is a mechanical condition preventing the bubble tower from reaching a specific temperature. This maximum allowed time will vary with machine type and options.
6.0 TROUBLESHOOTING

6.2 Cycling Controls - Status and Fault Messages (cont.)

Fault Messages

BUBBLE TOWER FAILED TO FILL IN ALLOWED TIME
The bubble tower failed to fill with pressurized type IV D.I. water in the maximum allowed time. This time is usually set for two minutes. If a condition exists such as low water pressure, no water pressure, or a mechanical failure of the fill solenoid or tubing that would prevent the filling of the bubble tower within this time, then this fault would activate.

POWER LOSS OCCURRED DURING A CYCLE
The chamber experienced a power loss. Either the machines ON/OFF switch was turned off, or building power to the machine was interrupted while the machine was running a test. This fault will not be shown if power is interrupted while the machine is not in an automatic test.
6.0 TROUBLESHOOTING

6.3 Basic Troubleshooting Guide

6.3.1 General

Please note that the controller is the major source of information regarding the status of the unit.

*Check the basics first*, as with any piece of equipment. Is there power to the unit or circuit breaker? Is there water to the unit? Is there compressed air to the unit?

For *automatic shut down* of the chamber due to safety detectors and sensors, consult the section on Chamber Safety Devices.

6.3.2 Special Note on Solution Purity – Filter & Spray Nozzle

Attention must be paid to the purity of the chemicals and salt used for various test solutions. A clogged filter or a clogged spray nozzle can be the result of impurities. Interruption of the spray, uneven collection rates, and improper flow can be caused by these impurities.

6.3.3 Basic Troubleshooting Contents

Topics follow in the order shown below.

7.3.4 No Fog  
7.3.5 Low Collection Rates  
7.3.6 High Collection Rates  
7.3.7 Uneven Collection Rates  
7.3.8 Low Relative Humidity  
7.3.9 No Heat in Humidifying Tower  
7.3.10 Cover Bounces  
7.3.11 Cloudy Humidifying Tower  
7.3.12 Incorrect pH Level  
7.3.13 Inconsistent Air Pressure in Humidifying Tower  
7.3.14 Humidifying Tower Fills Up with Water Over Float Switch  
7.3.15 Salt Sets in Bottom of Salt Solution Reservoir
## 6.0 TROUBLESHOOTING

### 6.3.4 No fog

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clogged atomizer nozzle</td>
<td>Clean or replace nozzle</td>
</tr>
<tr>
<td>Clogged solution filter cartridge</td>
<td>Replace filter</td>
</tr>
<tr>
<td>No solution in the internal reservoir</td>
<td>Fill reservoir</td>
</tr>
<tr>
<td>Inadequate air flow to the nozzle</td>
<td>Check air flow to nozzle</td>
</tr>
<tr>
<td>Bubble tower air solenoid failure</td>
<td>Check/replace solenoid</td>
</tr>
<tr>
<td>Customer supplied compressed air failure</td>
<td>Check for proper air supply</td>
</tr>
<tr>
<td>Chamber in a pause mode due to a fault</td>
<td>Check &amp; correct faults</td>
</tr>
</tbody>
</table>

### 6.3.5 Low Collection Rates

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clogged atomizer nozzle</td>
<td>Clean or replace nozzle</td>
</tr>
<tr>
<td>Clogged solution filter cartridge</td>
<td>Replace filter</td>
</tr>
<tr>
<td>Air pressure set too low</td>
<td>Check air pressure setting</td>
</tr>
<tr>
<td>Out-of-calibration pressure gauge</td>
<td>Check gauge calibration</td>
</tr>
<tr>
<td>Improper placement of collector funnels</td>
<td>Probably located too high</td>
</tr>
<tr>
<td>Improper positioning of adjustable cone</td>
<td>Centrally locate cone height</td>
</tr>
<tr>
<td>Throttle holes of dispersion tower closed</td>
<td>Open throttle holes</td>
</tr>
<tr>
<td>Inadequate air flow to the nozzle</td>
<td>Check air flow to nozzle</td>
</tr>
<tr>
<td>Customer supplied compressed air failure</td>
<td>Check for proper air supply</td>
</tr>
<tr>
<td>Empty nozzle feed reservoir</td>
<td>Check floats, solenoids &amp; tubing</td>
</tr>
</tbody>
</table>

### 6.3.6 High Collection Rates

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worn atomizer nozzle</td>
<td>Replace nozzle</td>
</tr>
<tr>
<td>Air pressure set too high</td>
<td>Check air pressure setting</td>
</tr>
<tr>
<td>Out-of-calibration pressure gauge</td>
<td>Check gauge calibration</td>
</tr>
<tr>
<td>Improper placement of collector funnels</td>
<td>Probably located too high</td>
</tr>
<tr>
<td>Improper positioning of adjustable cone</td>
<td>Centrally locate cone height</td>
</tr>
<tr>
<td>Throttle holes of dispersion tower opened</td>
<td>Close throttle holes</td>
</tr>
<tr>
<td>Bubble tower temperature improper</td>
<td>Check &amp; correct bubble tower temp</td>
</tr>
</tbody>
</table>
6.0 TROUBLESHOOTING

6.3.7 Uneven Collection Rates

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worn or clogged atomizer nozzle</td>
<td>Clean and/or replace nozzle</td>
</tr>
<tr>
<td>Air pressure setting not accurate</td>
<td>Check air pressure setting</td>
</tr>
<tr>
<td>Out-of-calibration pressure gauge</td>
<td>Check gauge calibration</td>
</tr>
<tr>
<td>Improper placement of collector funnels</td>
<td>Probably located too high</td>
</tr>
<tr>
<td>Improper positioning of adjustable cone</td>
<td>Centrally locate cone height</td>
</tr>
<tr>
<td>Throttle holes of dispersion tower opened</td>
<td>Close throttle holes</td>
</tr>
<tr>
<td>Bubble tower temperature improper</td>
<td>Check &amp; correct bubble tower temp</td>
</tr>
<tr>
<td>Funnel collecting condensation from test specimen</td>
<td>Check &amp; correct funnel placement</td>
</tr>
<tr>
<td>Empty fog nozzle feed reservoir</td>
<td>Check floats, solenoids &amp; tubing</td>
</tr>
</tbody>
</table>

6.3.8 Low Relative Humidity

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empty fog nozzle feed reservoir</td>
<td>Check floats, solenoids &amp; tubing</td>
</tr>
<tr>
<td>RTDs are out of calibration</td>
<td>Check and calibrate RTDs</td>
</tr>
<tr>
<td>Controller is out of calibration</td>
<td>Check and calibrate controller</td>
</tr>
<tr>
<td>Wet bulb wick &amp; reservoir empty</td>
<td>Clean and fill wick &amp; reservoir</td>
</tr>
<tr>
<td>Solid state RH sensor out of calibration</td>
<td>Calibrate RH sensor</td>
</tr>
<tr>
<td>Air pressure setting not accurate</td>
<td>Check air pressure setting</td>
</tr>
<tr>
<td>Out-of-calibration pressure gauge</td>
<td>Check gauge calibration</td>
</tr>
<tr>
<td>Throttle holes of dispersion tower closed</td>
<td>Open throttle holes</td>
</tr>
<tr>
<td>Bubble tower temperature improper</td>
<td>Check &amp; correct bubble tower temp</td>
</tr>
</tbody>
</table>

6.3.9 No Heat in Humidifying Tower

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activation of the low water cut-off feature</td>
<td>Reset switch on the bubble tower heater</td>
</tr>
<tr>
<td>Bubble tower RTD is out of calibration</td>
<td>Check and calibrate RTD</td>
</tr>
<tr>
<td>Controller is out of calibration</td>
<td>Check and calibrate controller</td>
</tr>
<tr>
<td>Bubble tower set point too low</td>
<td>Check &amp; correct set point</td>
</tr>
<tr>
<td>Bubble tower is not full of water</td>
<td>Check &amp; correct water level</td>
</tr>
<tr>
<td>Blown fuse for the bubble tower heater</td>
<td>Check and replace fuses if needed</td>
</tr>
<tr>
<td>Bubble tower heater is damaged</td>
<td>Check and replace heater if needed</td>
</tr>
</tbody>
</table>

6.3.10 Cover Bounces

<table>
<thead>
<tr>
<th>POSSIBLE CAUSES</th>
<th>CORRECTIVE ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back pressure in the exhaust line</td>
<td>Check exhaust line</td>
</tr>
<tr>
<td>Back pressure in the drain line</td>
<td>Check drain line</td>
</tr>
</tbody>
</table>
6.0 TROUBLESHOOTING

6.3.11 Cloudy Humidifying Tower

POSSIBLE CAUSES                      CORRECTIVE ACTION
Water is contaminated                Check & clean water source
Water inlet filter is full            Check & replace filter
Bubble tower water cylinder is etched Check & replace cylinder

6.3.12 Incorrect pH level

POSSIBLE CAUSES                      CORRECTIVE ACTION
Water may not meet specification     Check water to ASTM D1193
Salt may not meet specification      Check salt to ASTM B117
Algae build up in fog nozzle feed reservoir Check & clean reservoir
Algae build up in salt or water in line filters Check & replace filters if needed
Algae build up in the solution reservoir Check & clean reservoir

6.3.13 Inconsistent Air Pressure in Humidifying Tower

POSSIBLE CAUSES                      CORRECTIVE ACTION
Air bubbler may be clogged           Check & replace if needed
Air pressure setting not accurate    Check air pressure setting
Out-of-calibration pressure gauge    Check gauge calibration
Customer supplied air filter may be clogged Check & clean if needed
Air regulator may be defective       Check & replace if needed

6.3.14 Humidifying Tower Fills up with Water Over the Float Switch

POSSIBLE CAUSES                      CORRECTIVE ACTION
Leak in the bubble tower (bubble tower) O-rings Replace O-Rings
Leak in one of the other fittings in the bubble tower Check for leaks & correct
Spikes in the air water pressure      Check & correct water regulator
Incoming water pressure set too high Reduce water pressure
Float switch has malfunctioned      Check or replace float switch
Bubble tower water fill solenoid stuck open Check, clean or replace solenoid

6.3.15 Salt Settles in Bottom of Salt Solution Reservoir

POSSIBLE CAUSES                      CORRECTIVE ACTION
Incorrect salt                        Check salt to ASTM B117
Insufficient mixing time              Increase mixing time
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.1 Cycling Control for BCX - ASTM B117

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog</td>
<td>1440 minutes</td>
<td>35°C</td>
<td>1</td>
</tr>
</tbody>
</table>

Repeat this step for the desired number of cycles (default is 364).

Bubble Tower Temperature set point #1 = 48 °C (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41 °C (for all other cycles)

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
### 7.0 PRE-PROGRAMMED TESTS – Cycling Controls

#### 7.2 Cycling Control for BCX – ASTM G85-A1

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp. (°C)</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog</td>
<td>240 minutes</td>
<td>35</td>
<td>1</td>
</tr>
</tbody>
</table>

Repeat these 3 steps for the desired number of cycles (default is 364).

- Bubble Tower Temperature set point #1 = 48 °C (for all Fog cycles)
- Bubble Tower Temperature set point #2 = 41 °C (for all other cycles)

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.3 Cycling Control for BCX – ASTM G85-A2

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog</td>
<td>45 minutes</td>
<td>49°C</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Dry Air Purge</td>
<td>120 minutes</td>
<td>49°C</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Soak - Dwell</td>
<td>195 minutes</td>
<td>49°C</td>
<td>3</td>
</tr>
</tbody>
</table>

LOOP # 1 Repeat steps 3 to 1 for the desired number of cycles (default is 999).

Bubble Tower Temperature set point #1 = 57°C  (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41°C  (for all other cycles)

NOTE: The customer will have to change the bubble tower temperature set point #1 to 57°C for this test.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.4 Cycling Control for BCX - ASTM G85 A3

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog</td>
<td>30 minutes</td>
<td>49°C</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Soak - Dwell</td>
<td>90 minutes</td>
<td>49°C</td>
<td>3</td>
</tr>
</tbody>
</table>

Repeat these 2 steps for the desired number of cycles (default is 999).

Bubble Tower Temperature set point #1 = 57°C (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41°C (for all other cycles)

NOTE: The customer will have to change the bubble tower temperature set point #1 to 57°C for this test.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.5 Cycling Control for BCX – ASTM G85 A4

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog</td>
<td>30 minutes</td>
<td>35°C</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>SO₂ (User #1)</td>
<td>30 minutes</td>
<td>35°C</td>
<td>128</td>
</tr>
<tr>
<td>3</td>
<td>Soak - Dwell</td>
<td>120 minutes</td>
<td>35°C</td>
<td>3</td>
</tr>
</tbody>
</table>

LOOP # 1 Repeat steps 3 to 1 for the desired number of cycles (default is 999).

Bubble Tower Temperature set point #1 = 47 °C (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41 °C (for all other cycles)

NOTE: The customer will have to change the bubble tower temperature set point #1 to 47 °C for this test.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.6 Cycling Control for BCX – D1735

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog / Humidity</td>
<td>1440 minutes</td>
<td>38°C</td>
<td>1</td>
</tr>
</tbody>
</table>

Repeat this step for the desired number of cycles (default is 364).

Bubble Tower Temperature set point #1 = 51 °C (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41 °C (for all other cycles)

NOTE: Customer to put D.I. water in the holding tank for the fogging cycle.

NOTE: The customer will have to change the bubble tower temperature set point #1 to 51 °C for this test.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
7.0 PRE-PROGRAMMED TESTS – Cycling Controls

7.7 Cycling Control for BCX – B368

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
<th>Time</th>
<th>Temp.</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Salt Fog / Humidity</td>
<td>1440 minutes</td>
<td>49°C</td>
<td>1</td>
</tr>
</tbody>
</table>

Repeat this step for the desired number of cycles (default is 364).

Bubble Tower Temperature set point #1 = 51 °C (for all Fog cycles)
Bubble Tower Temperature set point #2 = 41 °C (for all other cycles)

NOTE: Customer to put D.I. water in the holding tank for the fogging cycle.

NOTE: The customer will have to change the bubble tower temperature set point #1 to 51 °C for this test.

<table>
<thead>
<tr>
<th>Description</th>
<th>Event Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fogging Cycle</td>
<td>1</td>
</tr>
<tr>
<td>Dwell</td>
<td>3</td>
</tr>
<tr>
<td>Compressed Air Purge</td>
<td>4</td>
</tr>
<tr>
<td>Solution Spray</td>
<td>8</td>
</tr>
<tr>
<td>Set current step in seconds</td>
<td>16</td>
</tr>
<tr>
<td>Fogging Cycle + timer in seconds</td>
<td>17</td>
</tr>
<tr>
<td>Compressed Air Purge + timer in seconds</td>
<td>20</td>
</tr>
<tr>
<td>Solution Spray + timer in seconds</td>
<td>24</td>
</tr>
<tr>
<td>Guaranteed Soak</td>
<td>32</td>
</tr>
<tr>
<td>Compressed Air Purge cycle + Guaranteed Soak</td>
<td>36</td>
</tr>
<tr>
<td>User output ON</td>
<td>128</td>
</tr>
<tr>
<td>Fogging Cycle + user output ON</td>
<td>129</td>
</tr>
<tr>
<td>Compressed Air Purge + user output ON</td>
<td>132</td>
</tr>
<tr>
<td>Solution Spray + user output ON</td>
<td>134</td>
</tr>
<tr>
<td>User output ON + timer in seconds</td>
<td>144</td>
</tr>
<tr>
<td>Purge + user output ON + timer in seconds</td>
<td>148</td>
</tr>
<tr>
<td>Solution Spray + user output ON + timer in seconds</td>
<td>150</td>
</tr>
</tbody>
</table>
8.0 PRINTS AND DRAWINGS

Plumbing and electrical diagrams specific to the supplied BCX cabinet are included in the binder pocket of this manual.
9.0 GLOSSARY

Words in italics have a separate entry.

**AASS** see Acetic Acid Salt Spray

**Access Ports** holes that can be placed in the side walls of a corrosion exposure cabinet through which compressed air lines, water or hydraulic lines, electrical lines, or mechanical connections can be routed to be used to create environmental conditions for samples being tested.

**Acetic Acid** a mild acid chemical formula C\textsubscript{2}H\textsubscript{4}O\textsubscript{2} used as a corrosive fluid in some test methods, such as ASTM G85 Annex 1 and GM 4466-P. Also used in conjunction with sodium chloride in test methods BS7479 and ISO9227.

**Acetic Acid Salt Spray (AASS)** a test method requiring a corrosive solution of acetic acid and sodium chloride, such as BS7479 and ISO9227.

**Acid Rain Test** a test method that is intended to duplicate the conditions of outdoor exposure in an industrial area, where rain rinses chemicals from the atmosphere.

**Acrylic Cover** a clear cover for Atlas Co. corrosion exposure equipment that is designed to prevent condensation from dripping onto samples, and which allows for viewing of ongoing test conditions.

**Adjustable Cone** an inverted (point down) cone, which deflects the upward-rising fog from the atomizer nozzle, inside the Omni-Fog Tower. Also catches any drops or droplets and allows them to drip back into the Internal Reservoir, thus preventing splattering of test samples.

**Adjustable Humidity** see Controlled Humidity, also called Variable Humidity.

**Air Bubbler** a component for percolating incoming compressed air located at the base of the Bubble Tower. When air passes through it, the air is separated into small bubbles, which increases the surface area of air in contact with the heated D.I. water, thus increasing both the temperature and the humidity of the air.

**Air Compressor** a mechanical device that is used to create pressurized air.

**Air Pressure Gauge** a meter located atop the Bubble Tower in SF exposure cabinets and on the Control Panel of BCX instruments, which shows the pressure or air at the top of the Bubble Tower.

**Air Regulator** a device which allows a specific volume if air to pass, so that air pressure is maintained at a desired level.

**Air Relief Valve** a safety device located on top of the Bubble Tower with a setpoint to about 5 PSI / 34 kPa above the desired air pressure, which will open and allow air to escape if the air pressure exceeds the setpoint.

**Air-actuated Cover** an option which allows for opening or closing of the clear acrylic cover by touching the appropriate button on the Control Panel of BCX Cabinets, or by opening/closing the appropriate valve on other corrosion exposure cabinets.

**Alarm** an error condition that cause a corrosion cabinet to stop operation; these are usually removed through manual action by the operator after problem correction.

**ASS** see Acetic Salt Spray.

**Atomizer Nozzle** a small cylinder, made of acrylic resin, that combines compressed air and a fluid (salt solution, water, electrolyte) and ejects the mixture as a fog.

**Automatic Solution Level Control** a system of level switches, solenoids, supply lines and a reservoir that maintains a set level of fluid (salt solution, water, electrolyte) in the internal reservoir.

**Back Pressure** in a drain line or fluid supply line, pressure that causes movement of fluid in the opposite direction than which desired.

**Bubble Tower** a vertical cylinder that is 3/4 full of heated water, through which compressed air is forced to make the air humid. This allows the compressed air to atomize fluid (salt solution, water, electrolyte).
9.0 GLOSSARY

**Bubble Tower Heater**  a resistance heater, submerged in the water in the Bubble Tower, that heats the water.

**Building Drain**  a hole in the floor of a room, such as a laboratory, connected to a sewer system, which is intended to remove fluids by gravity from the room or building. Also called Gravity Drain.

**C₂H₄O₂**  see Acetic Acid

**Cabinet Heater**  a resistance heater used to achieve and maintain temperatures in the exposure zone. In an SF cabinet, heaters are located in the water jacket. In the BCX and CCX cabinets, heaters are located below the diffuser plate.

**Canadian Wiring Package**  the proper wiring and electrical parts to allow the CSA label to be affixed to a corrosion cabinet operated in Canada.

**Carbon Dioxide**  a colorless, odorless gas, chemical formula CO₂, that dissolves readily in water to make a weak acid.

**CASS**  see Copper Accelerated Acetic Acid Salt Spray

**Casters**  Wheels located on the bottom of a corrosion cabinet which allow it to be rolled across a floor.

**BCX**  see Cyclic Corrosion Test.

**CE Label**  the proper wiring and electrical parts to allow the CE (European Conformity) label to be affixed to a cabinet operated in many European countries.

**Chart Recorder**  a device that prints, on paper, current conditions of various pre-determined test parameters such as temperature, humidity, and pressure.

**Chromasoft™ Software**  in the SF cabinets, software that performs two-way functions— it communicates information to the user via a PC, and communicates instructions from the operator that are input to the PC.

**Circular Chart Recorder**  see Chart Recorder.

**CO₂**  see Carbon Dioxide

**Collection Rate**  see Condensation Rate.

**Combination Oil and Water Extractor**  a device that removes moisture and oil from pressurized air; usually found on the compressed air supply line just before the supply line is routed to a corrosion cabinet.

**Compression Fitting**  a connector for tubing, used in all Atlas corrosion exposure cabinets. Connection is made by pushing the proper size tubing into an open end of the fitting. These fittings have been tested at 80 PSI / 552 kPa.

**Condensation Rate**  the rate at which humidity condenses from air and falls by gravity through the exposure zone.

**Connectors, Quick, for Tubing**  see Quick Connectors.

**Control Panel**  see Standard Display Panel, or Computer Monitor.

**Controlled Humidity**  see Variable Humidity.

**Copper-Accelerated Acetic Acid Salt Spray (CASS)**  a test method that combines copper chloride, acetic acid and salt solution; found in ASTM B 368, ISO 9227, GM 4476P, Ford B Q5-1.

**Corrodkote©**  a test that involves coating samples with a chemical slurry which is allowed to dry before placing the samples in a humidity cabinet; ASTM B 380.

**Corrosion**  the degradation of a material, usually the oxidation of iron or other metal, caused by interaction with its environment.

**Corrosion Control**  the attempt to neutralize destructive environmental attacks.

**Corrosion Testing**  the most important aspect of corrosion control, includes laboratory and outdoor exposure.

**Cover Interlock**  in the corrosion cabinet with gas injection, a device that prevents opening of the cover prior to venting of corrosive gasses.
9.0 GLOSSARY

Cover Open a message on the display panel that indicates the cover is not completely closed.

CSA see Canadian Wiring Package.

Cycle a specified sequence of events. In cyclic testing, where samples are exposed to various environmental conditions in a pre-set sequence.

Cyclic Corrosion Test a sequence of environmental conditions that are intended to simulate real-world conditions.

Datalogging Software software that performs two-way functions- it communicates information to the user from the controller via a PC, and communicates instructions from the operator to the controller that are input at the PC.

Deionized Water see D.I. Water.

Deionizer Resin Sack a quantity of resin for ion exchange that comes in a blue sack and is placed in the Atlas Co. A quanizer in pairs.

D.I. Holding Tank, 25 gallon in SF cabinets, a horizontally mounted cylindrical reservoir, used to supply D.I. water to the Bubble Tower when no pressurized source of is available.

D.I. Tank, 60 Gallon, with Pressurizing Pump in a BCX cabinet, a separate reservoir for D.I. Water, on a stand with castors, which includes a pump that pressurizes the water.

D.I. Water for Atlas corrosion cabinets, water that meets ASTM D1193 Type IV. This water may be created through reverse osmosis, distillation, or filtering with ion exchange.

Diffuser Plate in a BCX or CCX cabinet, the bottom of the exposure zone; it contains holes for the upward movement of air and the downward movement of drips and condensate, and beneath which the heaters are located. Note: not intended for sample support.

Dispersion Rate see Condensation Rate.

Dispersion Tower see Omni-Fog Tower.

Display Panel see Standard Display Panel, Computer Monitor.

Drain an opening at or very near the bottom of the exposure zone through which condensate and rinse water is routed to the building drain. See also Drain/Vent and Vent.

Drain/Vent in BCX and CCX cabinets, an opening through which both fluid and gas exit the exposure zone.

Dry Bulb an RTD sensor that measures the ambient temperature within an enclosure.

Dry-off an environmental cycle during which heaters are energized and the air blower moves air into the exposure zone to remove moisture.

Dual Magnetic Seals on the top of the exposure chamber of the BCX and CCX cabinets, and on the bottom of the clear cover where it touches the top of the exposure chamber, rubber strips with embedded magnets that attract one another to prevent conditions in the exposure chamber from escaping to the laboratory; consisting of rubber strips mounted to both the top of the exposure chamber and the bottom of the cover, so that, when closed, the rubber strips are magnetically attracted and clamped.

Duo-gas an environmental chamber that has valves and connections to allow two gasses to be used in testing.

Dwell a period of time during which no environmental cycles are activated.

Electrolyte a fluid containing a chemical that allows electrical conductance.

Environmental Chamber those test cabinets that are designed to simulate variable conditions that are encountered in the real world, such as temperature, humidity, etc.

Environmental Cycle a condition created in an exposure zone to simulate a real-world condition, such as solution fog, high humidity, high temperature, solution spray, immersion, and variable humidity.
9.0 GLOSSARY

Exhaust Recirculation System  a vertically mounted cylinder containing a porous material to which corrosive molecules become attached and are then rinsed off by water that is sprayed from above and collects in a reservoir, which water is then recirculated again as spray water.

Exposure Chamber  the part of a corrosion exposure instrument that includes the exposure zone, cover, rack supports, and Omni-Fog Tower.

Exposure Zone  the volume of space inside the exposure chamber in which samples are exposed to environmental conditions; the top of the exposure zone is the horizontal plane of the entry of vapor, fog, mist, or spray; in BCX and CCX cabinets the bottom is the diffuser plate; in SF cabinets the bottom is the floor of the cabinet.

External Condensate Collection Package  a system of collection funnels, tubing, and valves that allows a pre-test check of the condensation rate from outside the exposure chamber; that is, with the cover closed.

Extra Solution Reservoir  a second or subsequent holding tank for a mixed chemical solution, connected by gravity lines to the Solution Reservoir.

Fall-out Rate  see Condensation Rate.

Fiberglass Bracket  see support bracket.

Fiberglass Rod  see support rod.

Filter Cartridge  in SF cabinets, a wound filter that is placed in the internal solution reservoir that prevents precipitates or other non-dissolved chemical from reaching the atomizer nozzle.

Flow Meter  a meter on a fluid line that measures the volume of fluid that has passed that point.

Fog  fluid particles in the air as molecules.

Fog Collection  see condensation rate.

Fungus Test  an environmental test using various forms of fungi to attack coatings.

Gas Shocks  see Air Actuated Cover Lifters.

Type IV Water  D.I. water according to ASTM D1193 for Type IV.

Graduated Cylinder  a cylinder, closed on the bottom, that has markings for accumulated volume, usually fluid; in corrosion cabinets used to check the condensation rate.

Gravity Drain  see building drain.

Grayscale Touchscreen Display  see Premium Display Panel.

High Humidity Cycle  a test cycle in which the air in the exposure zone is saturated with moisture.

Horizontal Dispersion System  a horizontally-mounted set of pipes that disperses fog, mounted in place of the inverted cone at the top of the Omni-Fog Dispersion Tower; used when sample size or operator preference requires movement of the dispersion tower from being located toward the middle of the cabinet to (usually) the back.

Humidifying Tower  see Bubble Tower.

Humidity Pipe Assembly  a plastic pipe, mounted along the floor of SF cabinets, through which compressed air is forced through standing water, to make humidity for certain tests such as ASTM B380.

Pneumatic Cover Lifting System  see Air-actuated cover.

Mist  a term for fluid suspended in a gas that is often mis-used in corrosion testing in place of fog. Mist particles are larger than fog particles.

NaCl  see Sodium Chloride.

Nitric Acid  a corrosive fluid, chemical formula HNO₃, used as an oxidizing agent in corrosion tests.

Nitric Oxide  a colorless, poisonous gas, chemical formula NO.

NOₓ  see Nitric Acid, Nitric Oxide.
9.0 GLOSSARY

**O Ring, Bubble Tower** replaceable seals, about 5.5-6” / 14-15 mm in diameter, used at the top and bottom of the Bubble Tower.

**O Ring, Internal Reservoir** a replaceable seal, about 14” / 36mm in diameter, used at the top of the Internal Reservoir in the SF System.

**Omni Fog™ Dispersion Tower** an Atlas Co. Trademark; a vertical plastic assembly, with velocity ports, Atomizer Nozzle, and inverted cone, that distributes fog created at the Atomizer Nozzle.

**Panel Rack** a sample support device, consisting of vertically-oriented slots for holding samples.

**Panel Tray** a sample support device; consisting of a double row of slots, 40 in all at .5” spacing, at a 15º angle.

**Perspiration Test** see Synthetic Perspiration Test.

**pH Meter Kit** a kit consisting of a pH Meter and solutions for adjusting the pH of the chemical solution.

**Plastisol-coated support Bar** see Support Bar.

**Plastisol-coated Support Rack** see Support Rack.

**PLC** Programmable Logic Controller.

**Pneumatic Cover Lifter** see Air-Actuated Cover.

**Power Exhaust Kit** in the BCX System, a venturi style pump with pipe and connectors to assist in removing exhaust from the exposure zone.

**Precision Air Regulator** an air pressure regulator that is graduated at .1 PSI intervals.

**Precision Control Package** see Chromalox Controller.

**Premium Controls** in the BCX System, a notebook (laptop) computer used for cabinet controls.

**Prohesion™** a trademark of Mebon Paint Company (England) for their cyclic test involving repeated episodes of exposure to corrosive fog followed by dry-off; this test has been adopted as ASTM G85 Annex 5.

**Quick Connectors, Tubing** in corrosion cabinets, tubing connectors that have a moveable collar that allows the tubing to be pulled out, usually without tools.

**Recorder** see Chart Recorder.

**Reinforced Cabinet** in the BCX System, a metal basket that is embedded within the exposure chamber so that the weight of immersion solution does not burst the walls.

**Resistance Temperature Device** see temperature probe.

**RTD** Resistance Temperature Device; see temperature probe.

**Rust Inhibitor** a fluid that is added to water to suppress deterioration by oxidation of the surface in contact with water; in the SF System, rust inhibitor is added to the water that is placed in the water jacket.

**Safety Switch** an electrical switch that open to stop a test procedure and/or close to cause an alarm.

**Salimeter** see salinity hydrometer.

**Salinity Hydrometer** a hydrometer (q.v.) for the specific purpose of measuring the specific gravity of a saline solution.

**Salt** see sodium chloride.

**Salt Spray** a remnant term, from the original ASTM B117, which was intended to mean salt fog.

**Salt Spray Chamber** a cabinet of specific internal volume in which samples are placed and salt solution is sprayed in order to later check for penetration of seals due to the presence or absence of chemical precipitates; see also salt fog chamber.

**Saturation Tower** see bubble tower.

**SF Start-up Kit** see bubble tower.

**Sight Gauge** on the SF System, a vertically-oriented, transparent tube mounted on the outside of the cabinet that is used to indicate the level of water in the water jacket.
9.0 GLOSSARY

SO₂  see sulfur dioxide.

Sodium Chloride  a crystalline compound, chemical formula NaCl, which readily dissolves in water and promotes surfaced oxidation of many metals, especially iron.

Solution Collection Funnel  a funnel that is used to measure the collection rate of a corrosive fog.

Solution Reservoir  in the BCX an attached tank of 60 gallon capacity that holds a mixed chemical solution for supply to the atomizer nozzle.

Solution Tank  see Solution Reservoir.

Specific Gravity Hydrometer  a device used to measure the specific gravity of a fluid, with pure water at standard temperature and pressure having a specific gravity of 1 by definition.

Spray  a pattern of fluid distributed by a tiny opening, which fluid is driven by pressure on it and contains droplets.

Spray Nozzle  a device that dispenses water in droplets due to water pressure.

Spray Cylinder Cover Lifting System  in the SF Salt Fog and Humidity cabinets, spring-loaded cylinders that assist in lifting the cover and holding it open.

Standard Control Panel  in the BCX System, an operator message and input device through which communication with the Koyo Direct Logic 205 controller is maintained, with two lines of text display and 4 LED lights.

Start-up Kit  includes 100 pounds /45.4 pounds off ASTM grade salt, a specific gravity hydrometer, a salinity hydrometer, two 80 cm² funnels and two 100 ml graduated cylinders.

Strip Chart Recorder  see Chart Recorder.

Sulfur Dioxide  a yellowish, foul-smelling gas, chemical formula SO₂; a by-product of industrial processes which can create a type of acid precipitation (acid rain); used in test methods that simulate polluted atmospheres, such as ASTM G87, DIN 50017, DIN 50018. Note: cabinets using this gas MUST be vented to the outdoors.

Support Bar  a device, made from fiberglass or other inert plastic, placed within the exposure zone on which samples are placed for testing.

Support Rod  a device, made from fiberglass or other inert plastic, placed at the top of the exposure zone and from which samples are suspended for testing.

Support Rack  a device, made from fiberglass or other inert plastic, placed within the exposure zone on which either samples are placed for testing, or on which support rods are placed.

Synthetic Perspiration Test  a test specification that exposes samples to synthetic perspiration according to ISO 3160-2.

Temperature and Humidity Recorder  see Chart Recorder.

Temperature Probe  a device that measures temperature as a function of electrical resistance.

Temperature Recorder  see Chart Recorder.

Test Panel Holder  see Panel Rak, Panel Tray, Support Bar, Support Rack, Support Rod.

Tubing  flexible, hollow plastic piping used to route fluid and air; in the BCX System tubing is made of polyurethane, in the SF System tubing is made of polypropylene.

Tubing Connectors  hollow pieces of plastic that are used to connect sections of tubing.

Two Line Display  in the BCX System, the operator message area of the standard Display Panel.

UL  see Underwriter’s Laboratories.

Underwriter’s Laboratories  an independent testing laboratory that, among other activities, inspects and approved electrical items used by consumers.

Variable Humidity  the ability to achieve and maintain a level of humidity between ambient and saturated. Also called Adjustable Humidity, Controlled Humidity.

VCU  Video Control Unit, see Display Panel.

Video Control Unit  see Display Panel.
9.0 GLOSSARY

Water Fog  a fog that is comprised of water (usually de-ionized) only.
Water Jacket  in salt fog and humidity cabinets, the space between the outer wall and inner wall that is filled with water and heater.
Water Trap  in the BCX System, a U-shaped section of pipe in the duct leading from the air blower to the exposure chamber which, when filled with water, blocks the backward movement of air from the exposure chamber to the inside of the control cabinet.
Wet Bottom Drain Assembly  a series of pipes and valves that allow water to accumulate in the bottom of an exposure chamber. In the BCX, it includes float switches and solenoids.
10.0 WARRANTY

Equipment manufactured by Atlas Material Testing Technology LLC is warranted to be free from defect in materials or workmanship for a period of twelve months from the date of the BUYER’S receipt of the equipment. This warranty is only valid if the equipment is installed, operated, and maintained in accordance with the instructions furnished by the SELLER to the BUYER. However, no warranty is given with respect to items that have a normal useful life of less than twelve months. The SELLER’S obligation under this warranty is expressly limited to supplying the replacement part to the BUYER, or replacing the part at the SELLER’S factory.

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