



## **AeroBarrier Select Product Information**

### **Overview**

AeroBarrier™ process is a patented, cutting-edge envelope sealing system that allows you to reach any level of air tightness in any building enclosure.

During normal operation, the overall system monitors, measures critical parameters in the envelope and reports the leakage level dynamically. The main parts of the machine are the Main Control Unit (MCU), Sealing Stations (ST) with Nozzle tripod assemblies, the Fan Assembly, and the Heater Assembly. The machine is controlled by the proprietary AeroSuite software pre-loaded onto a laptop which acts as a user interface.

The aerosolized sealant is called Aerobarrier X1 and is a waterborne acrylic sealant. Dealers should ensure that all SDS sheets are available to access on all job sites, including during diagnostics/sales.

### **Components**

The following are the key components of the ABS system.

- Main Control Unit
- Smart Sealing Stations
- Nozzle Assemblies with Compressed Air Lines
- Fan Assembly
- Heater Assembly
- Blower Door Assembly
- Laptop with proprietary AeroSeal software and license that controls the machine and the process
- Power, Compressed Air, Sealant, and water

Needed utilities like power and compressed air are provided by accessories that can be packaged in a trailer or mobilized separately.

## **ABS GETTING STARTED**

### **Homeowner Communication**

Good communication with builders helps make the sealing event successful.

### **Builder Communication**



- Ensure the builder has the envelope ready for the seal
- Make sure the builder has parking space for the trailer within 100ft of the injection point.
- In cold weather, (below 50 degrees F) ensure builder has the structure heated
- Obtain the Structural Volume (from the plans) of the envelope to be sealed
- Avoid other subcontractors working on structure during the sealing process.

## **Safety**

### **JOBSITE SAFETY PRECAUTIONS**

The Dealer is responsible for assuring the safety and well-being of the occupants in the vicinity of the home or apartment being sealed. The dealer should:

- a. Keep customers and 3rd party trade technicians away from areas where high sealant overspray concentrations may exist without use of proper protective equipment.
- b. Incorporate into own work and safety practices, the relevant elements of OSHA Safety regulations (or applicable local laws) that are intended for safety of personnel at the construction site.
- c. Consider and plan to put in place measures to avert fall, slip and trip hazards especially when it involves visitors to the application site.
- d. Assure that pets, pregnant women, and people with breathing difficulties are not in the building during the injection process.
- e. Ventilate using a scrubber fan and, if possible, box fans in areas that may be exposed to escaping sealant overspray.
- f. Keep handy a copy of the safety data sheet for AeroBarrier X1 sealant on the job site.
- g. Ensure compliance with local / state/ country specific construction site safety ordinances.

### **TECHNICIAN SAFETY PRECAUTIONS**

The safety of technicians performing the sealing work should be assured at all times. The dealer should comply with OSHA (or local) rules & regulations to ensure technician safety on the job site. Aeroseal recommends that proper respiratory protection should be worn at all times when technician is in spaces with high aerosol concentrations (e.g. during the injection process in confined spaces) and that technicians be provided with skin protection (gloves) for use with the solvent, and fiber masks or cartridge respirators with organic/particulate canisters for use in confined spaces. Additional recommended safety precautions include:

- a. Not overextending reaches if using tall ladders during the diagnostic or sealing process.
- b. Using only certified properly sized electrical cables for operating your machine and accessories.
- c. Wear appropriate gloves when handling cleaners, gasoline, diesel, spray foam cans or the AeroBarrier X1 sealant.



- d. Wearing appropriate NIOSH approved P100 cartridge respirators with organic/particulate canisters when working in confined areas with sealant particles in the air.
- e. NIOSH approved N95 masks or respirators be available for use at the job site in the vicinity (30ft of the home or apartment) of the jobsite.

## **PROPERTY PROTECTION**

The dealer is responsible for ensuring safekeeping of homeowner's property and for the contents therein. These precautions / measures to include -

- a. Cover finished surfaces and customer property that might be exposed to high sealant concentrations.
- b. Prevent accidental spillage onto finished surfaces by using a tarp under equipment setup and performing any sealant transfer activities outside of the building. If accidental spillage occurs, clean up immediately using provided cleaners or other solvent(s).
- c. Use a liquid-tight tarp under the aerosol injectors to prevent spillage of liquid sealant onto finished floors. The tarp should extend at least 2 feet in the direction of the injector.
- d. Keep the sealing equipment clean and free of liquid sealant for storage.
- e. Ensure that heaters are clear of any sealant deposition and any maintenance or burn off of sealant on heater is done offsite.

## **Envelope Sealing Process**

### **STEP 1:**

Prepare house for sealing. Cover all large DESIGNED openings (drains, bathroom vents, etc.) and horizontal surfaces, set up sealing equipment, and pressurize home.

### **STEP 2:**

After baseline leakage is determined, pressurize the space and the sealing stations begin the sealing process.

### **STEP 3:**

The software regulates the entire process; controlling all parameters, monitoring the sealing, recording all data, and verifying air-tightness target is achieved.

## **Hardware Components**

### **MCU**

The MCU is the hub of the system and is responsible for signal communication between the sealing stations placed inside the house, the Fan, and the AeroSuite software that is controlling the process and providing real time information to the technician. It controls the sealing stations that



inject sealant and the fan that pressurizes the home being sealed. Sensors measure ambient conditions. The MCU connects to the laptop and software via wifi or USB. The unit also has LED indicators which indicate the status of the machine.

### **Smart Sealing Stations**

Each sealing station is responsible for monitoring the conditions of the enclosure and for managing sealant dispensing through the nozzles. Sealing Station consists of –

- a. Pump 1 Used in sealing mode
- b. Pump 2 Used in flushing mode
- c. Sealant and flush (Water) Jug
- d. Antenna
- e. Sensors
- f. Battery
- g. Nozzle Assembly

The pump and electronics are powered by a 12V rechargeable Lead acid maintenance free batteries rated for an 8-hour run time when fully charged. Refer to the Maintenance for proper usage and storage. Built in electronics board controls the pumps, monitors battery voltage, and communicates with the laptop via the MCU. Communication is established by a MESH network established by a XBee built into the electronics board and antenna.

Each station is individually programmed with set parameters that will allow the pump to turn ON/OFF” without any manual intervention as long as they are communicating with the MCU. Also, the stations are programmed with fail safe mechanisms to stop spraying if communication with MCU is lost for any reason.

ABS has two pumps – One for pumping sealant (during the sealing process) and the second for flushing the sealant lines and nozzle with water. The water flushing process is initiated as a part of the Aerobarrier sealing process. You do not need to disassemble the pumps for cleaning as long as you flush them with water at the end of the job. At the end of your day, you will need to use the manual flush button to make sure that the residual sealant left in the liquid lines is also flushed with water completely. Drain the water in the lines before storage.

Just like the MCU, each sealing station has temperature and humidity sensors which are protected by the sensor guards. The side panel of the MCU has a push to connect which is used for dispensing sealant (or water) to the Nozzles mounted on the tripod stand. Unless overridden by the MCU/ software, the sealing stations will run until the ambient space around the sealing stations reaches around 90% Rh.

A battery charge port is located below the sensor guard (rear side of the station). A 120V/12V battery charger can be used to charge the batteries before commencing the job. During the sealing process, the battery charge level for each station can be viewed on software so you can plan to deploy alternate sealing stations.

### **Nozzle Assemblies with Compressed Air Lines**



Each nozzle assembly is fitted with two special nozzles that are mounted on a U-Bracket/ tripod stand onto the sealing stations. The nozzles atomize sealant being pumped into a fine mist using compressed air from the manifold.

The dual bonded tubes on the hose reels are used for running compressed air from the air manifold to the nozzles mounted on the tripod stand. The sealant tube (liquid tube) is routed to the two nozzles from the push to connect on the side of the sealing station via a 3-way connector.

Make sure that the air and liquid connections are pressed tight to eliminate any air leaks and loss of nozzle pressure which might cause spills on the floor and excessive nozzle clogging. This impacts spray particle size and drives your seal time and sealant consumption.

### **Fan and Heater Assembly**

The Heater Assembly is a diesel-fueled heating solution that is composed of three independent heaters packaged into a single assembly that should be placed in-line with the air flow to allow for full realization of the heat produced.

The heater is powered off of a single 120V Plug that draws less than 500W. The intent of the heaters is to add sealant capacity to the air inside the envelope. Additional capacity allows for additional sealant, which ultimately drives down seal times. The heater can be attached using 21” Quick Fit Clamps. Layflat should run between the Fan and Heater as well as between the Heater and the Blower Door. A minimum of 6’ between the Heater and Blower Door is recommended to minimize backflow of sealant into the unit

### **Fan Assembly**

The Fan assembly comprises a single-phase motor capable of producing 3200 CFM of Air. This is controlled by a variable frequency drive mounted in the control box of the fan. The Fan can be powered by a single 120V outlet and pulls a maximum of 1800W which is compatible with 120V/20A circuits..

### **Blower Door Assembly**

The blower door frame assembly is mounted at the main door entrance of the house or apartment that is being sealed. This is typically installed after all the in-house prep work is completed and hoses laid out and connected to the machine.

The fan-Heater Assembly or the empty 12” heater cylinder flow ring sits inside the round opening at the bottom of the blower door. The built-in elastic band grips the cylinder and seals tightly around the assembly to minimize air leaks when the envelope is pressurized.

### **Utilities**

The necessary utilities for running the Aerobarrier process are electric power, compressed air, sealant, and water.

### **Electric Power**



120V/20A to run the MCU, Fan Assembly, and Heater Assembly.

### **Compressed Air**

The compressed air system needs to deliver clean, dry air to the Aerobarrier system. The amount of compressed air needed depends on the number of sealing stations you intend to use. This depends on how large of an enclosure you are trying to seal. To aerosolize adequately, each Seal Station needs a minimum of 4 CFM @ 100psi. Do note that when operating at high altitudes, you will have to de-rate the compressor capacity. It is worth noting that oil and rust produced from the compressor can clog up the nozzles and impact the job. If this issue occurs, it is recommended to use a dryer and filter attachment to the compressor.

### **Sealant**

AeroBarrier X1 sealant is provided in 5 gal buckets. Onsite, the technician will need to thoroughly mix the sealant with the provided paint stirrer and cordless drill. Be careful to start the mixer at low speed to avoid any spills. Also during the sealing process repeat the mixing process periodically (every 2 hours) so that the sealant mixture is consistent.

It is important to store the sealant between 40F and 120F only. Do not leave sealant on the job site or inside the trailer.

Two paint stirrers (mixers) are provided in your start-up kit. One can be used for the 5 gal pail, and the other is used for the 2 gal bottles inside the sealing stations. Make sure that the stirrer can reach the bottom of the container to ensure that the entire content can get mixed. Use the battery-operated pump to transfer sealant from the pail to the individual bottles. If you have already transferred sealant to the 2 gal jugs, then be sure to use the appropriate mixer (that reaches the bottom of the jug) to thoroughly mix the sealant. This is key to running an efficient job without your nozzles / sealant lines getting clogged by unmixed sealant mixture.

### **Water**

Water is needed for flushing the sealant lines with water. It is recommended to conduct a flush after every job so that the nozzles, and tubes do not gum up. You will need water for a routine cleaning of equipment and for use in a spray bottle to check for any compressed air leaks.



## SEALING MATERIALS

ABS has two available sealing product packages: basic and standard. Prior to starting a seal, technicians need to be aware of materials needed for the job.

### Basic Package

	Item
1	MCU
2	Laptop
3	USB Cable
4	Computer Case
5	Seal Stations
6	120V Fan
7	Fan Control Box
8	Non-Electric Heat Assembly
9	Screws
10	Tripod Bag

### 8 Station Basic Supplies Kit

	Item	Qty
FB00158	ABS CORE SYSTEM- 8 STATION	1
MN00234	ALUMINUMFRAME, BLOWER DOOR	1
MN00235	45" UPPER X- BAR, BLOWER DOOR	1
MN00236	CUSTOMPANEL, BLOWER DOOR	1
MN00248	21" ADJUSTABLE NIPPLE 304 STAINLESS STEEL	1
MN00247	CLAMP, 21"	1
MI00344	100' AERO-BARRIER AIR HOSE ASSEMBLY (HOSE, 1/2" ID X 100'L, 3/8 MALE AIR QD X3/8" FEMALE AIR QD)	1
MI00345	30' AERO-BARRIER AIR HOSE	1
MI00107	TUBING, 1/8" X1/4", 85AHARD, PU, RED	25
LP00134	BATTERY TENDER 6-12V4A10 CHANNEL CHARGER	1
LP00184	BATTERY CHARGER, LITHIUM, 12V, 4A, SINGLE STATION	1
LC00369	CABLE, CHARGER, 6', MALE CIGARETTE LIGHTER XSAE QUICK RELEASE	1
MI00338	TUBING, BLUE TUBING, 75 FT OF 82AS0318, PRECUT, PREPACKAGED	1
FB00169	SPARE PARTS KIT, ABS	1
MI00324	MANIFOLD ASM, 18 POSITION W/ HOSE AND PRESSURE GAGE	1
FS00114	LAYFLAT TUBING 36" 275'/ROLL	2
SA00324	TOOL KIT, ABS	1
MI00116	TUBING, 1/8" X1/4", 85AHARD, PU, CLEAR	50
MN00289	SEALANT JUG - 2 GALLON WITHOUT CAP	1



MS00311	CAP, 63MM, 63-485, POLYPRO, WHITE WITH LINER (FOR 2 GAL JUG)	1
FS00108	ALL PURPOSE CLEANER (12 QUART SPRAY BOTTLES PER CASE)	1
MN00295	CART, 46" X30", BLACK	1
LC00525	ADAPTER, NEMA 5-15P MALE TO NEMA 5-20R FEMALE	1
LC00531	CABLE, POWER, NEMA 5-15P TO LOCKING IEC 320 C13, 15A, 6FT	3
LC00537	CABLE, POWER, 50', 3C X12 AWG, SJTW, NEMA 5-15 MALE X FEMALE	3
FB00182	ISOLATION TRANSFORMER ASSEMBLY, 2 KVA, 120V- 120V, NEMA 5-20P	1
FS00119	AEROBARRIER XI SEALANT	5

### 8 Station Upgraded Full Supplies Kit

	Item	Qty
FB00158	ABS CORE SYSTEM- 8 STATION	1
MN00234	ALUMINUM FRAME, BLOWER DOOR	1
MN00235	45" UPPER X BAR, BLOWER DOOR	1
MN00236	CUSTOM PANEL, BLOWER DOOR	1
MN00248	21" ADJUSTABLE NIPPLE 304 STAINLESS STEEL	1
MN00247	CLAMP, 21"	1
MI00344	100' AERO-BARRIER AIR HOSE ASSEMBLY (HOSE, 1/2" ID X 100'L, 3/8 MALE AIR QD X 3/8" FEMALE AIR QD)	1
MI00345	30' AERO-BARRIER AIR HOSE	1
MI00107	TUBING, 1/8" X 1/4", 85A HARD, PU, RED	25
LP00134	BATTERY TENDER 6-12V 4A 10 CHANNEL CHARGER	1
LP00184	BATTERY CHARGER, LITHIUM, 12V, 4A, SINGLE STATION	1
LC00369	CABLE, CHARGER, 6', MALE CIGARETTE LIGHTER X SAE QUICK RELEASE	1
MI00338	TUBING, BLUE TUBING, 75 FT OF 82AS0318, PRECUT, PREPACKAGED	1
FB00169	SPARE PARTS KIT, ABS	1
MI00324	MANIFOLD ASM, 18 POSITION W/ HOSE AND PRESSURE GAGE	1
FS00114	LAYFLAT TUBING 36" 275'/ROLL	2
SA00324	TOOL KIT, ABS	1
LM00120	SIPHON PUMP	1
MN00266	SOAKING CONTAINER FOR AERO BARRIER NOZZLES	1
TO00179	TOOL, 5 GAL PAIL LID WITH SPOUT	1
TO00180	TOOL, UTILITY FUNNEL, 64 OZ	1



MT00116	TUBING, 1/8" X 1/4", 85AHARD, PU, CLEAR	50
MN00289	SEALANT JUG - 2 GALLON WITHOUT CAP	1
MS00311	CAP, 63MM, 63-485, POLYPRO, WHITE WITH LINER (FOR 2 GAL JUG)	1
FS00131	RESPIRATOR	3
FS00132	RESPIRATOR CARTRIDGES	3
FS00133	100 PKOF GLOVES	1
FS00106	GREEN DUCT MASK, 8"- LIGHTER ADHESION	12

### Parts Kit

	Item Description	Qty
1	TOOL, WRENCH, 6" ADJUSTABLE	2
2	NUT, 1/4-20, WING NUTS, SS	2
3	FERRULE, 1/8" X 1/8", VESPEL	3
4	1/8 OD STAINLESS TUBE 2.5" .041 ID	1
5	SPARE PARTS CONTAINER FOR AERO BARRIER	1
6	AERO BARRIER NOZZLE RAM ROD, .036" DIA, SS	5
7	TOOL, WIRE BRUSH KIT	1
8	SEAL RING, 1/4" ID X 7/16" OD, 3/32", NOZZLE TOP	10
9	SEAL RING, 5/16" ID X 1/2" OD, 3/32", NOZZLE BOTTOM	10
10	FITTING, WYE UNION, 1/4" PTC, PLASTIC	1
11	FITTING, PTC UNION TEE, 1/4" PTC, PLASTIC	1
12	PLASTIC THREE ARM KNOB 8-32 X 1/2" STEEL STUD, 7/8" HEAD DIAMETER	2
13	NUT, 10-32 WING NUT, SS	1
14	TOOL, DENTAL PICK SET	1
15	CLAMP, 1/4", TUBE, WIRE SPRING, SS	2
16	TOOL, NOZZLE ASSEMBLY TEMPLATE, REV 1	1
17	PIPE JOINT COMPOUND STICK	1
18	LABEL, WEATHERPROOF THERMAL ROLL, 3" X 3"	3
19	KEY REEL, 24", SS	1
20	BATTERY TESTER	1
21	TUBE, 1" X 1" X 5"-7" L ADJUSTABLE PVC	1
22	PUMP HEAD, 40CCM, ORANGE, W/ TUBES AND MOUNTING HARDWARE	1
23	PRESSURE GAUGE ASSEMBLY, ABC NOZZLES	1
24	PLUG, 1/4" PTC, BLACK, PLASTIC	20
25	TUBING WITH MT00154 FITTING, 1/8" X 1/4", 70A SOFT, PU, BLUE	3 inches



26	TUBING WITH MT00154 FITTING, 1/8" X 1/4", 70A SO2, PU, CLEAR	3 inches
27	TUBING WITH MT00154 FITTING, 1/8" X 1/4", 70A SO2, PU, RED	3 inches

### Accessories

	Item Description
1	Air Manifold
2	30 ft. Air Hose
3	Sealant Transfer Pump
4	Charging Station



## PREPARATION

### Know Before You Go: JobSite

- Square footage and building volume
- ACH50/CFM50 requirements
- Number of items needing to be prepped (windows, doors, etc.)
- Stage of construction of the structure to be sealed.

### Standard Operating Procedure

#### Arrive at Jobsite

- If possible, position equipment in an area away from wind and rain. (i.e. garage)
- Make sure other trades are out of the envelope during sealant injection
- Decide blower door/fan injection point, seal station location and quantity of seal stations.
- Locate big openings and entry / exit points.
- Walk through envelope to scope amount of prep-work and look for any unforeseen prep work(i.e. missing windows, chase walls etc.).

#### Prep Envelope for Sealing

Preparation of the envelope is the most time-consuming part of the job. It's important to follow all the steps to ensure a safe and efficient seal.

The Goal:

- Prep the house to ensure:
- Minimal clean up
- Protection of designed opening and other components within the space that you don't want to be sealed
- Maximum seal efficiency

Understand why we prep

Understand the implications of prep work

#### Prep Work Outline

What to look for:	How to Prep:
Big Holes	Manually block (with foam or duct mask) or seal with caulk/can foam



What to look for:	How to Prep:
Vents	Use duct mask on all HVAC supply and returns (ensure the gap between the duct boot and drywall is left open so it can be sealed). All exhausts grills, bathroom vents, and kitchen vents should be temporarily covered.
Designed Openings	Cover and protect any designed opening in the space to ensure they don't get sealed
Windows	Check windows to make sure that they are all closed tightly and LOCKED
Doors	Tape top of doors and cover and finished surfaces (i.e. sliding door tracks)
Finished Horizontal Surfaces	Any finished horizontal surfaces in the house should be protected for easy clean up
Plumbing	Check for plumbing penetrations and block or seal any holes larger than ½"
Electrical	Remove any switch and outlets plates. Tape/protect main electrical panel and low voltage/data panel
HVAC Equipment	Cover up and protect any mechanical equipment
ERV	Tape or cover the outer shell of the ERV. Look for the piping between HVAC and ERV and block the holes
Light Fixtures and Fans	Cover and protect any light fixtures or fans with plastic
Fireplace	Cover fireplace completely, including vent holes. Look for any other ventilation in the drywall or framing into the fireplace

### Common manual sealing points

- For holes larger than ½", manually seal with sprayfoam/caulk
- Some manual sealing may be required to achieve a good envelope seal. Look for plumbing penetrations and bottom/top plate gaps that are larger than ½". Use caulk or sprayfoam to seal these leaks.

### Door prep

Protect the functional seals in the door.

- Cover all of the seal areas along the perimeter of the door, including the hinge areas.
- If alarm wires are roughed-in, move them out of the way of the seal (if needed) while making sure there is no damage to the wires.



- Always prep doors with tape that will not remove any finished surfaces

### **Window Prep**

Protect the functional seals in the window.

- Cover all of the seal areas along the perimeter of the window, including the latch areas.
- If alarm wires are roughed-in, move them out of the way of the seal (if needed) while making sure there is no damage to the wires.
- Always prep windows with tape that will not remove any finished surfaces.

### **HVAC/Bath/Range Hood**

- To prep the bath fans make sure the exhaust ducts are blocked off.
- To prep the HVAC boots, block the duct off while leaving the boot leakage exposed. This can be achieved using duct mask or gray foam.
- For range hood ducts, block the whole duct off using duct mask.

### **Attic/Crawl Space**

- For attic and crawlspaces, tape off the perimeter of the access doors to seal it off.
- If the temporary hatch or door is missing, use a barrier material such as plastic sheets or plywood to block them off.

### **Bathtub**

Protect the surface of the bathtub and the open plumbing penetrations.

- Cover all of the top of the tub, ensure air tightness
- Tub prep is simple, just make sure the drain, spout and breather port are taped off.
- Cover **any** finished surfaces, including floors exposed to sealant.

### **HVAC Cabinet/Fireplace Prep**

For HVAC cabinets, if they are inside of the building envelope we must make sure all of the cabinet openings are sealed off using tape and covering the whole system in plastic.

### **Blower Door**

- The Blower Door is a Frame with a nylon canvas that has an opening for a fan
- This blower door frame is what allows the envelope to be pressurized for sealing



### Pre-Prep Leakage Test

This is the starting point for the leakage test and calculation.

- To prevent any unforeseen issue (High leakage, failed blower door tests, Etc.) Set up MCU & AB Fan and do a **pre-prep** test without any prep to get a feel for how much window/door leakage there is in the house.
- Once prep is done, do the **pre-seal** to see what the leakage is without the window/door leakage.
- Use that delta between pre prep blower door test and post seal blower door test to determine what ACH/CFM to seal down to

Note: This step is **required** to prevent any failed blower door tests

### Seal Station Layout

- Identify number of seal stations to use. Generally, its 1 Seal Station per 500-700 sqft. floor area/layout of the envelope.
- Orient nozzles away from walls
- For very small rooms –
  - locate station in the corridor
  - Use each nozzle for adjacent rooms
- Locate Blower door in a garage/ accessible place where MCU can be located
- Identify additional entry/exit door in case you need to enter the house being sealed during the job.