

FROTH-PAK™ REFILL SET-UP, CALIBRATION, CHANGE OVER AND SHUTDOWN PROCESS

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Initial Tank Set-Up

- 1) Be sure that the tanks are at the optimum temperature of 70 – 80 degrees F., minimum 60 – 65 degrees. If they are below this range, utilize heating blankets or a box heater to bring them up to the proper range. This is very important! Consult your Dow Rep or Dow Technical Service if you need assistance.
- 2) Color code all hoses with electrical tape (the nitrogen and chemical transfer hoses, as well as the gun) **red for the A Side (ISO)** and **blue for the B Side (Polyol)** to prevent chemical cross contamination. Place colored tape at each end of the hoses for proper identification.
- 3) Attach the nitrogen regulator to nitrogen tank.
 - a) Recommend to the customer that they order a five (5) foot high nitrogen tank. At this height, the regulator is much easier to view.
 - b) Make sure nitrogen regulator handles are all turned out (counterclockwise) until they cannot be turn any more. This is the closed position.
 - c) Hand tighten the regulator to the tank and level the regulator for easy viewing purposes.
 - d) Once level, fully tighten regulator with an adjustable wrench. You will need about 30 lb-ft of force. Do not over tighten.
- 4) Attach the nitrogen hoses to the nitrogen regulator.
 - a) Remove the two protective caps from the nitrogen tank regulator where the hoses will be connected.
 - b) The A side (red) should be on the operator's left side as you are facing the nitrogen tank/regulator. Attach red coded nitrogen hose to the regulator with about 30 lb-ft of force. Do not over tighten.
 - c) Note that all the hose connections are flare fittings. These do not require any sealant or Teflon tape. They just need to be tight.
 - d) The B side (blue) should be on the operator's right side as you are facing the nitrogen tank/regulator. Attach blue coded nitrogen hose to the regulator with about 30 lb-ft of force. Do not over tighten.
- 5) Attach the nitrogen hoses to the chemical tank.
 - a) Remove cap covers from chemical tank connection on the A side (red) and attach nitrogen hose to the flare fitting on the valve that is in a vertical position (pointing straight up). Tighten to about 30 lb-ft of force. Do not over tighten. (Save the cap covers for when the tanks are returned to Dow.)
 - b) Remove cap from chemical tank connection on the B side (blue) and attach nitrogen hose to the flare fitting on the valve that is a vertical position (pointing straight up). Tighten to about 30 lb-ft of force. Do not over tighten. (Save the cap covers for when the tanks are returned to Dow.)
- 6) Attach the filters to the chemical valve connections.
 - a) Remove the chemical valve plug on the A side (red). Save the plug for return shipment to Dow, just leave in inside the ring on the top of the tank. On the A side only, it is necessary to clean the petroleum jelly from the inside of the valve with a cotton swab. (If you don't have cotton swabs, take the small cloth bag that the filter came in and wrap it over the end of a screwdriver. Use this to clean the petroleum jelly out of the valve.) Next, connect the filter with the arrow (arrow is engraved on the valve) flowing out or away from tank and tighten to about 30 lb-ft . Note that the

- filter is pipe thread and DOES need sealant or Teflon tape. It should be taped from the factory but just check to be sure.
- b) Remove the chemical valve plug on the B side (blue) from the chemical tank. Save the plug for return shipment to Dow, again just leave it in the ring on the top of the tank. Connect filter with arrow (arrow is embossed on the valve) flowing out or away from tank and then tighten to about 30 lb-ft. Again, this is pipe thread and DOES require sealant or tape. Do not over tighten.
- 7) Attach the ball valves to the chemical filters.
 - a) At the end of the filter, attach a ball valve. Tighten both ball valves on the A and B side to about 30 lb-ft but do not over tighten. Again, this is pipe thread.
 - 8) Attach the chemical hoses to the ball valve on the chemical tanks.
 - a) Attach the A side (red) hose to the A side ball valve and make sure to keep the ball valve in the upward position and in the closed position. Tighten to about 30 lb-ft. Do not over tighten.
 - b) Attach the B side (blue) hose to the B side ball valve and make sure to keep the ball valve in the upward position and in the closed position. Tighten to about 30 lb-ft. Do not over tighten.
 - 9) Unroll chemical hoses and remove any kinks in the hose.
 - a) Attach the shutoff valves to the end of the hoses on the A and B side. Make sure the arrow on the shutoff valves is directed towards the gun. Tighten to about 30 lb-ft but do not over tighten.
 - b) Attach the gun to the two shutoff valves at the end of the hose. Keep the ball valve in the upward position and in the closed position. Complete this for both the A and B sides.
 - c) Use black electrical tape to tape the A and B side hoses together. Start this taping process at the gun end and work your way back towards the tanks. Tape the hoses together every 18 inches.
 - d) Tighten the ball valves to about 30 lb-ft but do not over tighten.
 - e) At this point, check to make sure all hose, valve and filter connections have been properly tightened to assure no nitrogen or chemical leaks.

Note: If a 30' hose extension is required, you will need to attach a coupling to the end of the A side (red) hose coming from the chemical tank and connect the hose sections together. A standard 1/4" male flare coupling from a hardware store works just fine. Tighten to about 30 lb-ft but do not over tighten. Complete for both the A and B sides (total hose length is not recommended to exceed 180 feet). Once the hose extensions have been added, attach the shutoff valves to the end of the hose extensions where the gun is connected.

Note: If you are using the Arctic Pak heated hose assembly, it is recommended that you remove the yellow insulation during the summer months) from the hoses and store it to prevent wear and tear on the insulation. This will extend the life of the insulation. During the colder temperature months, place the yellow insulation back over the hoses. If you remove the yellow insulation during the warm weather months, continue taping the A and B side hoses together every 18 inches.

Calibration

- 10) Collect items needed for calibration (scale that weighs in grams or ounces, lunch bags, marker, calculator, pen, writing pad, petroleum jelly)

IMPORTANT: Proper Protective Equipment (respirator, chemical resistant gloves, protective suit with hood, chemical goggles) must be worn by all training participants prior to the nitrogen and chemical valves being opened

- 11) Pressurize the system.

- a) Fully open the valve on the nitrogen bottle.
- b) Ensure the tank has at least 500 PSI pressure on the main tank pressure gauge. If at or below this, order a new tank. Do not operate under 300 PSI.
- c) Now set the A and B side regulators to their initial pressure. Turn the handle clockwise to increase the pressure. A good starting point is 160- 170 PSI on the A Side and 140- 150 PSI on the B Side. Higher hose lengths will require higher pressures. Follow the nitrogen hoses to the tank and slowly open the nitrogen valves on the tank to pressurize the tanks. You will hear the nitrogen flowing as it pressurizes the cylinders. Check for nitrogen leaks as you are pressurizing the tanks.
- d) Slowly open the chemical valves on both the A and B sides at the tanks to pressurize the hoses. For each side, there are two valves to open; one valve at the tank and one ball valve at the filter/hose connection. On the A-side, open the tank valve first and then open the ball valve. Repeat for the B side. Check for chemical leaks as you are pressurizing the hoses.

Note: Should you experience any nitrogen or chemical leaks, immediate close all chemical and nitrogen valves and correct the situation before proceeding.

- 12) Check the gun to make sure it is working properly.
 - a) Open the two chemical valves at the gun. You will see chemical flowing into the gun when they are opened.
 - b) Fully depress the gun trigger and spray the gun into a lined waste receptacle to purge the gun and chemical lines of nitrogen. You should see two good chemical streams coming from the gun.
 - c) Spray GREAT STUFF PRO™ gun cleaner into the face of the gun to clean away any chemical residue. It is important to keep the gun face clean to avoid plugging of the chemical flow and to ensure that nozzle makes a leak proof connection.
 - d) Place a small amount of petroleum jelly on outside face of gun where the nozzle fits in to ease the process of attaching the nozzle. ***It is important that you do not cover the chemical passage/orifices in the gun with petroleum jelly.***
- 13) Attach the appropriate calibration nozzle. The calibration nozzle has 2 tubes protruding from the front of the nozzle. For calibration purposes, the back cap color of calibration nozzle should match the color of the spray nozzles that you intend to use.
- 14) The nozzles are a tight fit. Typically you will hear two clicks. Ensure that the yellow catch is fully latched over the extension on the nozzle.
- 15) Label 2 bags; one bag A and one bag B. Place the A side nozzle in the bag labeled A and the B side nozzle in the bag labeled B. Fully depress the gun trigger and spray the chemical into the 2 bags for 5-10 seconds or until the bags are about 2/3 full.
- 16) Weigh the A side (the tan material) first and record the weight (in grams or ounces). Next, weigh the B side (the white material) and record the weight (in grams or ounce – be sure to use the same units on the A and B side).
- 17) Calculate the A to B ratio from the data you recorded. Enter the A Side weight into the calculator and divide it by the B Side weight. An A to B ratio of 1.08 to 1.16 is ideal.
- 18) Once the tank set has been calibrated, remove the calibration nozzle, clean the gun face and insert the new spray nozzle (of the same color). This calibration is good until the sets are empty or until you need to replace the nitrogen tank as long as there are no significant temperature changes to the tanks and their contents. When in doubt, recalibrate.

Note: If the foam is off ratio (outside of the 1.08 to 1.16 range), adjustment of the nitrogen regulator will be required.

- ***If the ratio is below 1.08, increase the pressure on the A Side by 10 – 15 PSI and recalibrate.***
- ***If the ratio is above 1.16, increase the pressure on the B Side by 10 – 15 psi and recalibrate the system.***
- ***Do not operate the system above 220 PSI on either side, 200 PSI gives an even larger safety factor to avoid opening the pressure relief valves on the tanks. If you are near this pressure, then the pressure on the opposite side will need to be reduced. So if the A Side is near 200 PSI and the ratio is still too high, bleed down the B Side tank to increase the differential pressure between the tanks.***
 - ***To do this, shut the main nitrogen tank valve and shut the nitrogen inlet valve on the product tank.***
 - ***Slowly loosen the nitrogen hose connection at the regulator. Do this slowly to let the pressure bleed off.***
 - ***Hold the end of the hose in one hand and direct it towards the ground and away from any people. With the other hand, slowly open the nitrogen inlet valve on the tank to bleed down the pressure. Be patient and do this slowly. It may take a few minutes. You do not need to bleed off all the pressure. Shut the tank valve.***
 - ***Go back to the regulator for the hose you disconnected and turn the handle counterclockwise all the way out.***
 - ***Reconnect the nitrogen line and tighten.***
 - ***Open the tank valve and read the pressure on the tank. It should be at least 40 – 50 PSI lower than when you started.***
 - ***Slowly turn the regulator handle clockwise until the pressure just starts to increase. You are just bringing the regulator to the tank pressure. Now set the pressure 20 - 30 PSI lower than when you last calibrated as a starting point. When in doubt, go lower, you can easily increase it if needed.***

Repeat as needed until the A to B ration is between 1.08 and 1.16.

Note: The pressure settings are just a starting point. There are many factors that impact the actual ratio, including material temperature, hose age and possible partial blockage, and gun condition. Likewise each set of gauges has a small range of accuracy. The important thing to remember is that the ratio calculated during calibration is the FINAL WORD, the tank pressures are the means to get on ratio. If you need to go outside the ranges listed above (assuming they are under 220 PSI MAX) that is fine as long as you get the ratio in range.

Spraying

- 1) Once the calibration is complete, chose the nozzle with the pattern and flow rate appropriate for the job. Attached the nozzle.
- 2) Practice on scrap material or plastic sheet to get the feel of spraying and to ensure you are making good foam.
- 3) Hold the gun a consistent distance from the work and perpendicular to the work. Move in a steady side to side stroke. Avoid swinging the gun, it will result in variable thicknesses of foam. The speed of your movement and the distance from the work will determine the thickness of the foam.
- 4) Always fully engage the trigger of the gun. Partial engagement can result in off ratio foam.

- 5) Let the foam cure (a minute or two) Look for an even tan color foam. Watch to see that it rises 3 or 4 times the original thickness. Make sure the foam has cured and is firm.
- 6) If the foam looks unusual, verify the calibration settings and that the tanks are 70 – 80 degrees. (Minimum 60 – 65 degrees). Then remove the nozzle and purge material into a waste container for 15 – 30 seconds. Clean the face of the gun, insert a new nozzle and perform a test spray again.
- 7) If problems persist call your Dow rep or Dow Technical service.
- 8) While spraying, always watch for signs of unusual looking foam. Troubleshoot as outlined above.
- 9) Watch for any bubbles in the translucent hoses near the gun and listen for any sputtering. This may be a sign of an empty tank.

Shut Down

- 1) When shutting down the refill system for the day, leave the cured nozzle attached to the gun to keep moisture from penetrating the hoses.
- 2) Shut off the A and B side valves on gun and the two sets of valves on the chemical tanks for the A and B sides.
- 3) Leave all hoses attached.
- 4) Shut off the main nitrogen valve at the nitrogen tank. Do not adjust the regulator levels that were established during calibration. These settings can be used until the chemical tanks are empty or the nitrogen tank is replaced as long as there are no big temperature swings.

Start-Up

- 1) Open the nitrogen valve fully to pressurize the system.
- 2) Open the two sets of valves on the chemical tanks for the A and B sides and then the valves on the gun.
- 3) Removed the cured nozzle that you left attached to the gun.
- 4) Spray into a waste container. Ensure that you have good flow from both the A and B side hoses.
- 5) Clean the face of the gun. Attach a new nozzle.
- 6) Spray a test sample to ensure good quality foam.
- 7) Resume spraying.

Tank Change Over

- 1) Putting on a fresh set of tanks is essentially the same process as the initial start-up. One big difference is that the lines have chemicals in them. If exposed to the atmosphere for more than a few minutes, the A Side line will become plugged. So keep the lines hooked up to the empty tanks until you are ready to put on the fresh set.
- 2) Double check that the nitrogen tank is above 500 PSI.
- 3) Prep the new tanks as outlined above right to the point of hooking up lines.
- 4) When ready for this, be sure the tank valves are closed on the empty tanks. Bleed off any pressure in the lines by pulling the trigger of the gun while aimed into a waste container.
- 5) Disconnect the lines and transfer to the new set. Be sure to have on proper protective equipment as some residual material will be in the lines.
- 6) Back out the regulator valve handles (counterclockwise) and then proceed with the calibration process as outlined above.

- 7) Replace the plugs and caps on the tank connections. Attach the Bill of Lading to the empty tanks and call them in to be picked up per the paperwork that came with the tanks.