

LabSmith Microfluidic Application Note

Degassing a Microfluidic Systems

Dissolved gas and trapped air bubbles in a microfluidic system can affect repeatability and stability. Degassing a fluid system is easy using a LabSmith Breadboard Reservoir or Chip Reservoir.

Use a Breadboard Reservoir

A breadboard reservoir (such as the BBRES-116-1ML reservoir for 1/16" OD tubing, shown above) can be used to degas your system as follows:



1. Plug any open ports in the microfluidic system.
2. Fill the reservoir at least half full with the desired fluid.
3. If degassing between a reservoir and syringe pump, make sure the valve is actuated to connect the reservoir and syringe pump.
4. Secure the cap on the reservoir using the supplied O-ring seal.
5. For a T116 reservoir (for 1/16" OD tubing):
 - a. Connect a short piece of tubing to the top port of the reservoir using a one-piece fitting (T116-100).
 - b. Connect the other end of the tubing to a Luer Lock adapter (T116-300) via a one-piece fitting (T116-100).
 - c. Connect the Luer Lock adapter to a manual syringe (LS-Syringe_LL)
 - d. Use the syringe to pull a vacuum in the fluid circuit.

Figure 1 shows a circuit being degassed with a syringe and breadboard reservoir using this method.

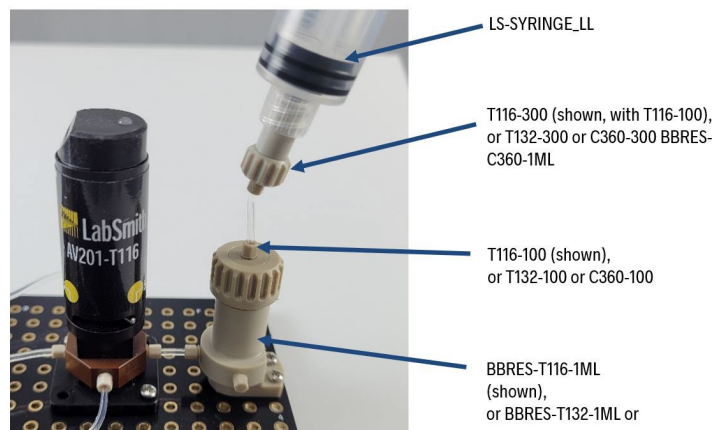


Figure 1. Degassing a system with a syringe.

The method can also be used with a C360 reservoir for 360 μ m OD tubing (BBRES-C360-1ML) or a T132 reservoir for 1/32" OD tubing (BBRES-T132-1ML).

Alternatively, a chip reservoir (C360-405R) can be used in place of the tubing and Luer Lock adapter, as shown in Figure 2.

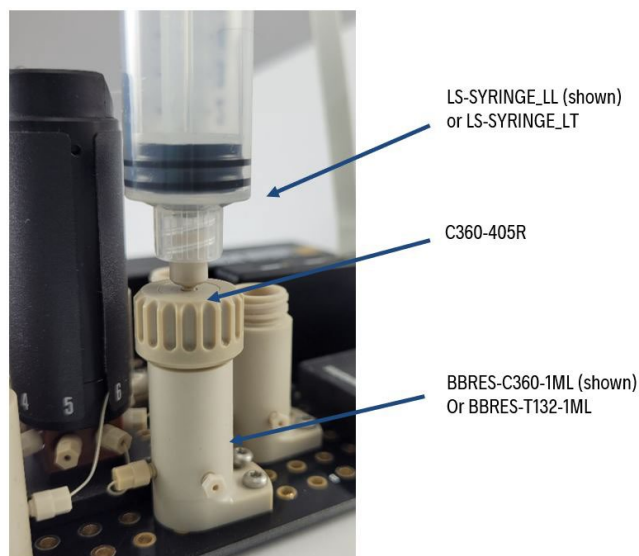


Figure 2. Degassing with a syringe and chip reservoir

The chip reservoir can also be used to degas a chip fitted with a bonded port connector, as shown in Figure 3.

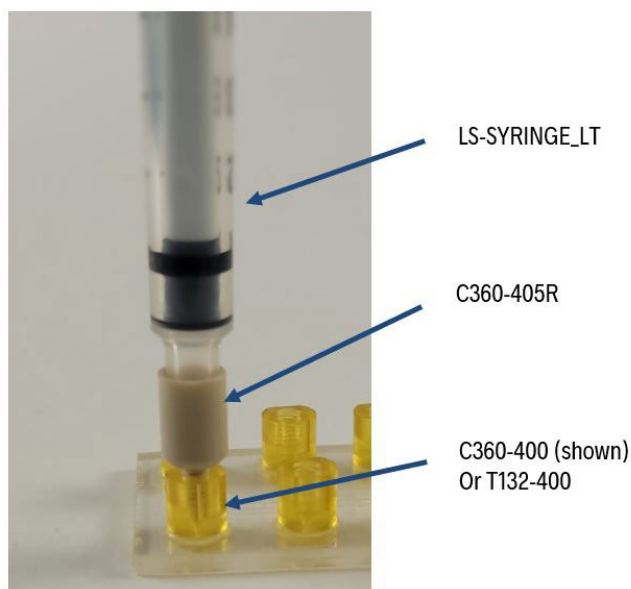


Figure 3. Degassing a chip with a bonded port connector.

Degassing Tips

- Sonicate fluid prior to introducing it into your system to remove most of the dissolved gasses.
- Degas the circuit with syringes in the dispensed position to make it easier to remove air bubbles.
- A ~10 ml syringe is a good size for degassing a circuit; however, several iterations may be necessary to remove all trapped gas.
- Put a small amount of fluid in the manual syringe so you can observe when the fluid degassing is complete (i.e., when you no longer see bubbles rising into the fluid).
- If you continue to observe bubbles in the fluid, look for a leak or a blocked path in your circuit.
- If leaks are suspected, try using the manual syringe in the same setup to pressurize the system to see where fluid is leaking. See the table below for a list of typical problems.

Problem	Solution
Incorrectly assembled one-piece fitting	Tubing must extend past the end of the one-piece fitting to properly seal
Incorrectly cut tubing	Clean straight cut required for leak-free installation
Pinched tubing	Cut PEEK tubing with a sharp blade to minimize risk of pinching ends, look for kinks along the tubing
Blocked port or valve	Always flush components (especially valves) after use if working with particles or condensing solutions If using fused-silica tubing, incorrectly cut ends can cause glass particles to break off and block ports
Broken O-ring on reservoir cap	Check to ensure the O-ring isn't pinched or broken