

XpressVap User Guidelines & Tips

Application

The XpressVap device is designed to evaporate reagents (acid, water) following digestion or evaporate/concentrate liquid samples prior to digestion.

The XpressVap device is not designed for evaporation of low boiling, flammable solvents such as methanol or acetone, or for non-microwave absorbing solvents such as hexane.

Evaporation of nonflammable solvents or mixtures of nonflammable and flammable solvents where the mixture has low flammability (ex. 90/10 proportion of water/ethanol as in wine) is permitted. Proper safety precautions should be observed.

When evaporating permissible solvents, ensure that the scrubber is not affected by the solvents being evaporated. If the user wishes to recover the solvent, a common cold trap can be inserted between the microwave and the scrubber or in place of the scrubber.

The XpressVap assembly will accommodate 10mL, 20mL, and 55mL Xpress vessel liners. A shorter thermowell is required for 10mL and 20mL liners. 75mL Xpress liners and Xpress Plus liners will not fit into the assembly.

Setup

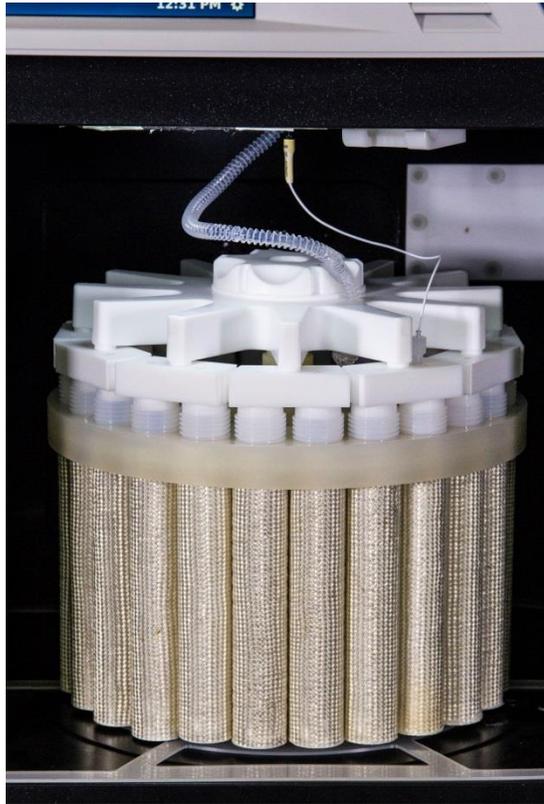
Scrubber Bottles

- Bottle #1 (100 diffuser balls) - 1000mL H₂O or 4% H₃BO₃ if using HF
- Bottle #2 (50 diffuser balls) - 1000mL 25% NaOH
- Bottle #3 (50 diffuser balls) - 1000mL H₂O
- Connecting the ¼" tubing correctly from bottle to bottle is very important. This will prevent liquid from going bottle to bottle and eventually into the vacuum pump.
- On the scrubber bottles, the port with the tubing attached to the underside of the cap is the inlet, and the port without the tubing is the outlet.

XpressVap Assembly Tips

- There must be at least six liners in the turntable to properly balance and seat the manifold onto the vessel covers. Make sure the liners are spaced evenly in the turntable, grouping two liners per manifold cover assembly.
- A turntable adaptor is not required for the XpressVap turntable.

- When installing the thermowell into the control vessel, place the control manifold cover assembly on the liner and remove the locking nut. Insert thermowell so that it touches the bottom of the liner. Replace locking nut and finger tighten. This will ensure that the temperature probe is beneath the level of the liquid, critical for monitoring the plateau and ΔT .
- Place the manifold arm assembly onto the vessel caps. It is not critical where the control vessel (with the fiberoptic probe) is located relative to the vacuum line. However, the optimum position for the control vessel is right next to the vacuum line as in the picture below. You may want to label or mark this position as a reminder on future setups.



- If all 24 (twenty-four) positions are not being used, make sure that a manifold plug is placed in the unused manifold ports.
- When tightening the retaining nut, finger tighten, then $\sim \frac{1}{2} - \frac{3}{4}$ turn with locking nut wrench. **DO NOT** overtighten; this will cause the manifold arms to turn upward, resulting in uneven seals and inconsistent final volumes. In addition, the threads may strip if they are overtightened.

XpressVap - How it Works

Stage	Ramp (min)	Hold (min)	Temperature (°C)	Delta (°C)	Power (w)
1	5:00	00:00	80	20	600

The method above will ramp the vessels evenly to 80°C in 5:00 minutes. After the ramp is finished, the software will automatically apply the programmed power (600W) to the samples. The software will automatically detect the boiling point (PLATEAU) and continue to apply power until the temperature changes from the detected boiling point to the DELTA temperature that is programmed (20°C above or below the Plateau temperature). Once the Delta is achieved, the method will stop.

XpressVap Method Parameters

Program the XpressVap method in the **Classic Directory**.

- **Control Type:** Select **Evaporation**
- **Plateau:** The Plateau is the boiling point of the reagent(s) and is automatically determined by the software based on a ΔT /time algorithm. “Finding Plateau” is displayed while the boiling point is being determined. Once it is found, “At Plateau” is displayed for the remainder of the program.

Note: The temperature reached during the plateau stage may be lower than the actual boiling point since the sample is under a vacuum. The temperature will remain at or close to the plateau point until the solution boils down below the tip of the fiber optic temperature probe.

- **Delta:** The Delta is the change in temperature from the Plateau at which the program will be terminated. Once the volume of solution is below the tip of the fiber optic probe, the temperature will begin to decrease until the ΔT requirement is met. The ΔT entered will determine the final volume.

General rule of thumb:

A larger ΔT will result in a smaller final volume.

A smaller ΔT will result in a larger final volume.

NOTE: The ΔT can be positive or negative based on the boiling point of the reagents.

- **Temperature:** The temperature that is entered into the method should be substantially lower than the boiling point of the acid/reagent in question. For example, program 80°C for HNO₃ and 75°C for H₂O. This is done to heat the vessels evenly and prevent loss of sample volume prior to the program obtaining its plateau.
- **Ramp Time:** 5:00 minutes is recommended as a good starting point. At the end of the Ramp time the software will apply the programmed power to the samples and look for the boiling point (PLATEAU) based on a ΔT /time algorithm. **NOTE:** The software will not look for a Plateau until the Hold Time expires.
- **Hold Time:** For routine evaporation methods, program a Hold time of 00:00 minutes. A Hold Time greater than 00:00 minutes is programmed when there is a mixture of reagents with different boiling points, and it is necessary to boil off one reagent prior to finding the plateau of the other. For example, if you wish to evaporate HNO₃ from a mixture of HNO₃ + H₂SO₄, program a Hold Time of 5:00 minutes. The software will hold the temperature at the programmed control point for 5:00 minutes to allow HNO₃ to evaporate off. At the end of the Hold Time, the software will apply power and look for a Plateau.
- **Power:** 600W is recommended. Because there is very little “load” in the microwave cavity at the end of the evaporation step, **DO NOT** apply more than 800W when using XpressVap.