Savillex Digestion Vessels

General

Savillex has developed a line of high purity PFA sealed digestion vessels for rapid sample dissolution. These vessels can be placed directly in a microwave oven for controlled high speed heating to drastically reduce the time required to dissolve or digest an analytical sample. Alternatively, these vessels can be supplied with flat bottoms for hot plate heating and digestion. Although effective, these methods can produce hazardous conditions which should only be attempted by the skilled analytical chemist with expertise in pressurized digestions. The following safety and precautions must be observed for safe operation of these devices.

Safety and Handling

These vessels are intended as experimental tools for research and development in the analytical laboratory by qualified analytical chemists. The following safety and handling guidelines are offered for your safety – they cover many of the common hazard situations but do not cover them all nor are they specific to any particular application. The pressurized digestion process can produce extremely high sample temperatures and pressures in a very short period of time, especially when performed in a microwave. Observe all safety procedures and laboratory practices to assure safe operation.

1. Only those individuals that have adequate technical knowledge and demonstrated expertise should attempt pressurized digestion with these vessels.
2. Unless you are absolutely sure of the safety and kinetics of the reactants and products used in a particular process or method, always load and unload this vessel in a fume hood with adequate protection for face, hands and clothing.
3. Do not attempt to heat these vessels and their contents in a convection oven. These vessels are intended for controlled heating in a microwave oven or on a surface hot plate.

4. Specific knowledge of the heat source and exact sample/solution amounts must always be properly determined before pressurized digestions are attempted. The temperatures and pressures generated within these vessels are solely dependant upon the filling level, the time of exposure and the power settings of the microwave or temperature of the hotplate.
5. Never fill Savillex digestion vessels more than half full.
6. Initially, use only minute quantities of sample and reagents. Rest the screw cap on top of the vessel – do not screw it on the vessel. Use short digestion times and increase time and quantities only as necessary.
7. After pressurized digestion, allow the vessel and contents to cool completely before opening. Once cool, open the vessel slowly and with caution. If the contents are hot and/or under pressure, it is likely to froth and spill during opening.
8. If at any time the vessel or closure exhibits deformation or leakage, discontinue its use immediately. These are clear indications that excessive temperatures and/or pressures have been experienced causing a weakening of the vessel/closure and the components should be discarded.
9. If a digestion vessel or closure requires replacement, it should only be replaced with a new "set" consisting of both digestion vessel and closure. Savillex does not recommend pairing new digestion vessel components (vessels or closures) with previously used components.

10. The dissolution of metals, inorganic carbonates and bicarbonates, sulfides, limestone, marble, cement and numerous similar compounds/materials are accompanied by the release of copious amounts of vapors. Allow such reactions to proceed first cold, then warm with the vessel cap off or very loosely screwed on so that gases produced will not build-up and damage the vessel. Then apply heat only to get the insoluble residues into solution.
11. The dissolution and oxidation of organic materials releases carbon dioxide and other gases once reaction starts. Consequently, allow such reactions to proceed first cold, then warm with the vessel cap off or very loosely screwed on until only relatively insoluble residues remain. Apply heat with the cap on tight only if minute amounts of oxidizable material are left in the vessel. This applies to: all organic chemicals, all plant and animal tissue, paper, bark, leaves, wood, grass, cellulose, synthetic and natural fabrics, plastics, polymers, resins, paints, oils, fats, foodstuffs, dyes, leather, rubber and insulation.
12. Strong oxidizing agents such as perchloric acid, inorganic and organic perchlorates, chromic acid, hydrogen peroxide, etc. etc. may react violently with any of the organic materials listed in (8) on first page. Consequently, all organic matter should be pre-dissolved with nitric acid, as above, and only the insoluble residues should be treated with the strong oxidizing agents.
13. Digestions with perchloric acid and perchlorates are particularly unstable, dangerous and may lead to explosions. Under no circumstances should this be attempted.
14. Observe the pressure and temperature limitations of these vessels. Although high temperatures are rapidly developed within the sample during microwave heating, the vessels temperature will rise more slowly. Note that the ratings are based on actual vessel temperatures.
15. Savillex Corporation does not approve, authorize or in any way review any analytical technique or protocol. The user must ensure that adequate safety procedures have been established to protect all personnel from the potential.

Operating Instructions

Savillex Corporation provides several different size vessels of high purity PFA for sealed acid digestion. It is imperative that the **"Safety and Handling"** section has been fully reviewed and is observed for all sizes and configurations offered.

60/120 mL digestion vessels paired with plain threaded or transfer closures.

1. Savillex offers a 60 mL and 120 mL capacity digestion vessel. The maximum fill volume should never exceed more than 50% of the rated vessel capacity - 30 mL for the 60 mL vessels and 60 mLs for the 120 mL vessels. Preferably, use only minute quantities of sample and reagent, and short digestion times.
2. For pressurized digestion, screw on vessel cover to hand tight. Using wrench set #730-0055, torque cover to a minimum of ¼ turn past hand tight
3. Perform digestion noting that the maximum pressure rating for these vessels is 75 PSI at 100 ˚F/38˚C. For every 2˚ F/1˚ C increase above 100˚ F/38˚ C reduce the PSI rating by 1 PSI from 75 for maximum pressure rating.
4. Allow the vessel and contents to cool to room temperature. Open the vessel slowly and with caution. If the contents are still hot and/or under pressure, a spill may result.

60/120 mL digestion vessels paired with pressure relief closures.

1. Savillex offers a 60 mL and 120 mL capacity digestion vessel. The maximum fill volume should never exceed more than 50% of the rated vessel capacity - 30mL for the 60 mL vessels and 60 mLs for the 120 mL vessels. Preferably, use only minute quantities of sample and reagent, and short digestion times
2. For pressurized digestion, screw on vessel cover to hand tight. Using wrench set #730-0055, torque cover to a minimum of ¼ turn past hand tight.
3. Screw the adjustable knob on the pressure relief closure downward until the arrow pointing to the **CLOSED** position line is directly above the horizontal exhaust port. **DO NOT OVERTIGHTEN**. See **Figure 1** on next page.

4. At this position, the plunger of the knob is properly seated above the exhaust hole of the main cover. Should excessive pressure develop, the plunger is forced upward and the pressure can escape out the exhaust port.
5. Perform digestion noting that the maximum pressure rating for these vessels is 100 PSI at 100˚ F/38˚ C. For every 2˚ F/1˚ C increase above 100˚ F/38˚ C reduce the PSI rating by 1 PSI from 100 for maximum pressure rating.
6. Allow the vessel and contents to cool to room temperature. Point the exhaust port away from you and open the adjustable knob slowly. This allows any residual pressure to be released safely. Keep the adjustable knob loose until the next digestion
7. Carefully un-screw and remove the closure.

Figure 1

Assumption of Risk/Warranty

When using these products, there are many combinations of conditions such as filling levels, time of exposure, power or temperature settings, media and concentrations of media selected by the operator over which Savillex Corporation has no control and which may influence the performance of this product. As in all laboratory operations, the user must ensure that adequate safety procedures are established to protect all personnel from the potential hazards involved in the use of these products. Savillex Corporation disclaims and is not liable for any special, indirect, incidental or consequential damages of any nature or type, including without limitation, foreseeable loss, lost profits and reliance damages. In no event shall Savillex's liability under any cause of action relating to a product exceed the purchase price of the product.

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Acceptance of this offer is expressly conditioned upon agreement to all terms and conditions contained herein, and under the laws of the State of Minnesota. In the event of a conflict between the terms and conditions of the purchaser's order and Savillex's terms and conditions, proposal or offer, the later shall govern.

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