

# Chemical Resistance of Freeze Dryer Components

The FreeZone<sup>®</sup> Freeze Dry System is designed to be chemical resistant to most compounds that are commonly used in freeze drying processes. However, by necessity, the freeze dryer is comprised of a number of different materials, some of which may be attacked and degraded by certain chemicals. The degree of degradation is dependent on the concentration and exposure duration. Some of the major components of the FreeZone Freeze Dry System that are susceptible to degradation are as follows:

C - Moderate degradation; Limited use  
D - Severe degradation; Infrequent use recommended; Immediate thorough cleaning required

Component	Material	Acids			Buffers		Solvents							
		Acetic Acid 20%	Formic Acid	Trifluoroacetic Acid (TFA)	Calcium Chloride	Sodium Phosphate	Acetone	Acetonitrile	Carbon Tetrachloride	Cyclohexane	Dioxane	Methyl t-Butyl Ether (MTBE)	Pyridine	
Valve Stem	Acetal (Delrin)	C	D	D	D		D							
Collector Lid	Acrylic			D			D	D	D					
Hoses, Gaskets & Valve Bodies	Neoprene	C	D	D			C	C	D	D	D	C	D	
Flask Top	Silicon Rubber		C	D		D			D	D	D	C	D	
Chamber & Fittings	Stainless Steel				C									

- Most common compounds used in freeze drying processes, if allowed to enter the vacuum pump, will degrade the oil and cause damage to the vacuum pump.
- Sugars and proteins typically will have minimal negative effect on any of the materials of construction.

**When using compounds in the freeze dryer that are hostile to the materials of construction, it is imperative that the equipment is thoroughly cleaned after use.**

- When the collector chamber coil is fully loaded with ice it must be defrosted. This can be done by pulling the drain hose out from the cabinet and removing the plug letting the water drain into a suitable container. If your freeze dryer is so equipped, press the Defrost button. When all the condensate has melted and drained, flush the chamber with water.

DO NOT allow the water level to reach near the top of the stand-pipe in the center of the chamber since this will allow water to enter the vacuum pump. Completely drain and dry the chamber before starting another freeze dry process.

DO NOT chip ice from the collector coil or chamber as damage may occur.

DO NOT start the vacuum pump when the collector chamber contains liquid of any amount. The liquid will be drawn into the vacuum pump and will contaminate the vacuum pump oil.

- Rubber and plastic components that have been exposed to damaging compounds should be removed and flushed with water.
- The oil in the vacuum pump should be checked often. It must be changed if it is cloudy, shows particles or is discolored. The useful life of vacuum pump oil can be extended if the vacuum pump is operated for an extended period of time after a freeze dry run. This allows contaminants to be purged from the hot oil. This must be done with the inlet to the pump blocked off to prevent air from free flowing through the pump. If the pump is operated at an elevated vacuum level, oil will be expelled from the pump and damage will occur.

Another way to extend the life of the vacuum pump is to install an optional secondary trap in the line between the freeze dryer and the vacuum pump. Contact Labconco for ordering information.

With prudent maintenance the FreeZone Freeze Dry System will provide years of service. Warranty on the affected parts will be voided if maintenance has been obviously neglected. If you have questions about using specific compounds in the freeze dryer, contact Labconco Technical Service at 1-800-821-5525 or 816-333-8811 or e-mail [labconco@labconco.com](mailto:labconco@labconco.com).

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