

### Equipment

- Thermo Scientific Savant SPD131DDA SpeedVac Concentrator
- Thermo Scientific Savant RVT5105 Refrigerated Vapor Trap
- Thermo Scientific OFP400 Vacuum Pump
- SpeedVac Sample Rotor RH60-12-40: 60 small vials, Eppendorf tubes
- SpeedVac Sample Rotor RH40-12: holds 48 small Eppendorf tubes (1.5 – 2 mL)
- CryoCool™ Heat Transfer Fluid

### Equipment Description

The SpeedVac system (Figure 1) uses centrifugation, vacuum and heat to remove solvents and concentrate samples. The Savant SPD131DDA concentrator is resistant to many solvent or solvent mixtures (Table 1). It is an acid resistant system with a cold vapor trap (-105 C) and a glass condensation flask.

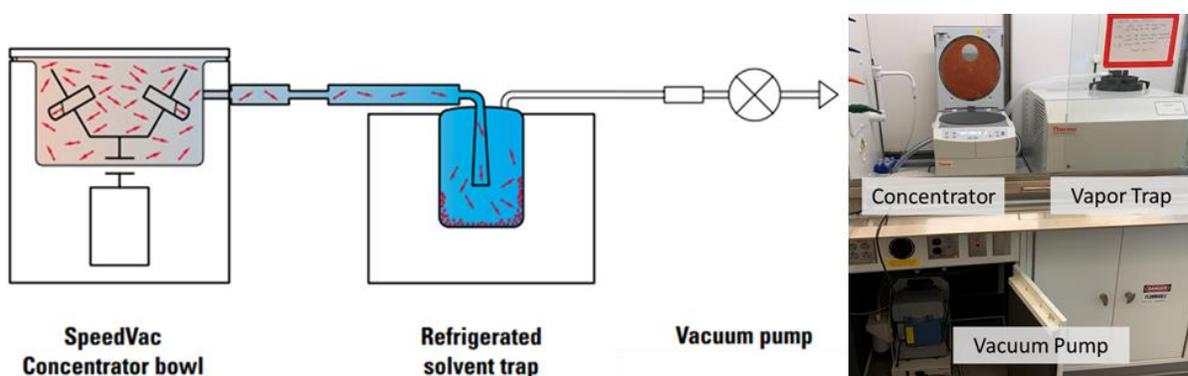


Figure 1. General schematic of a Savant SpeedVac concentrator, and an image of the lab setup.

Table 1. Acceptable solvents and solvent mixtures for the Savant SPD131DDA

Acetic Acid	Acetone	Acetone and HCl	Ammonium Hydroxide	Chloroform	DSMO and Methanol	Ethyl Acetate
Formic Acid	Hexane	Hydrochloric Acid	DCM	DCM and Methanol	DCM and TFA	Trifluoroacetic Acid

DCM – methylene chloride or dichloromethane; HCl – hydrochloric acid; DMSO – dimethyl sulfoxide; TFA – trifluoroacetic acid

### Important Notes

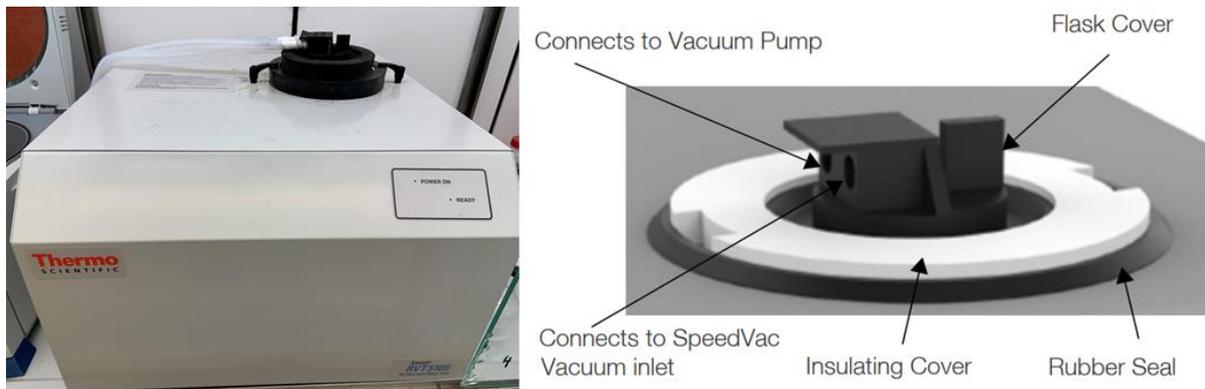
1. Do **NOT** turn off the vapor trap, unless performing routine maintenance (see below)
2. Do turn off the pump when finished (under the hood)
3. Do always close the hood panels

**Procedure Overview (see below for more details on operating each piece of equipment)**

1. Ensure Vapor Trap is ON and the “Ready” light is green
2. Place samples in Sample Rotor, ensuring weight is balanced
3. Select the desired parameters on Concentrator control panel
4. Run the Concentrator, and wait for the *click* of the valves.
5. Turn on the vacuum pump below the hood.

**Vapor Trap***Operating Procedure*

1. Check that the Vapor Trap is ON. Two lights on the front panel will be activated. The “Ready” light will be green.
2. If the Vapor Trap is OFF. Turn it on. Switch is located on the left rear panel.
3. Wait until the “Ready” light turns green (it may take up to 30 minutes for the trap fluid to reach its operating temperature)



**Figure 2.** Vapor trap “Power On” and “Ready” light positions, and a schematic of the insulating cover on top of the Glass Condensation Flask.

*Maintenance*

- Vapor Trap should only be turned off for maintenance. **Wait at least twenty minutes before powering on again.**
- Glass Condensation Flask: sits below the insulating cover (black) of the Vapor Trap.
  - o It is recommended for maximum efficiency that the Glass Condensation Flask is emptied prior to being greater than half-full.
- CryoCool Heat Transfer Fluid: is a non-toxic, non-flammable substance.
  - o Before filling the Vapor Trap with CryoCool, the Vapor Trap must be switched OFF and the Glass Condensation Flask is removed.
  - o The steel chamber of the Vapor Trap that houses the Glass Condensation Flask is filled to the scribed line with CryoCool™. If the steel chamber is completely empty, about 750 mL of CryoCool is sufficient.
  - o After filling with CryoCool replace the Glass Condensation Flask, press down lightly and verify that the CryoCool level is 10-15 mm below the rubber seal. Adjust CryoCool volume to meet this specification.
  - o Immediately wipe clean any CryoCool that spills onto rubber seal

## SpeedVac Concentrator

### Control Panel

The control panel is shown in Figure 2, and function descriptions and an example of inputs to start a manual run are below. The Sample Rotor can be removed by unscrewing the central white knob. When replacing the Sample Rotor, secure the white knob without overtightening.



Figure 2. SpeedVac control panel and sample rotor.

Pre-Heat – use to preheat chamber to 45 C prior to run.

RC ON/OFF – Used to add radiant heat to chamber. Manually activate by pressing ON/OFF at any point during run. Automatically deactivates when timer = 0.

Select – Press this button to select the parameter to be modified. Green light below parameter (e.g. Temperature, Heat Time, Vacuum Pressure) indicates which parameter can be actively modified.

Modify Set Points Up/Down – Modifies the selected/activated parameter

Vacuum Set – Selects *Level* or *Ramp* in the Vacuum display.

*Level*: set vacuum pressure from 20 torr to 100 mtorr.

*Ramp*: rate at which vacuum pressured is reached, can be used to prevent solvent bumping. There are five ramp settings to choose from (S1 = 5 torr/min, S2 = 30 torr/min, S3 = 40 torr/min, S4 = 50 torr/min, S5 = 70 torr/min).

Auto Run – starts ‘automated’ run, runs for amount of time set on controller

Manual Run – starts ‘manual’ run, runs until stopped manually

Stop – terminates auto or manual run

View – Displays PRESET parameters when pressed during a run. If view is not pressed, the displays will show CURRENT parameter readbacks.

Temperature Display – Indicates temperature in Celsius

Time Display – During an automated run, displays time left. During a manual run, displays time elapsed.

Vacuum Pressure Display – Displays vacuum level (pressure) or ramp. Vacuum level is displayed in torr or mtorr (indicated by shifting decimal point). “HPr” indicates atmospheric pressure.

*Example of a Manual Run*

\*Note: a manual run will continue until stopped by user. An automated run lasts the duration of user defined time. Therefore, if an automated run is desired just set the appropriate amount of time and start the run with "AUTO RUN" button.

PREREQUISITE: Ensure Vapor Trap is operational (follow Vapor Trap procedure above).

1. Connect the unit to its required voltage (give it power by plugging in and switching on).
2. The cover lock disengages, allowing the top cover to be opened. The display lights up, showing the following default values: Temperature: 45 °C in RED; RunTime: 2.00 HRS. in GREEN; Vacuum Pressure: 01.0 in AMBER.
3. Using the "SELECT" button and the up/down keys, set TEMPERATURE between 45 °C and 80 °C, or "no", for no heat.
4. Using the "SELECT" button and the up/down keys select and modify "HEAT TIME" to between 0.01 and 9.59 hours or CCC (for continual heating). When the heat timer expires, the heater will shut off, no matter what the temperature set point reads (except if CCC).
5. Select RunTime: Since this a manual run no time adjustment is needed.
6. To select a VACUUM LEVEL, press "VACUUM SET" to illuminate LEVEL and use the up/down keys to set vacuum to desired level. To select a vacuum ramp rate, press "Vacuum Set" to illuminate RAMP and use the up/down keys to set a ramp rate (5=highest, 1=lowest).
7. Place the sample tubes in the rotor and ensure that the load is balanced. Secure rotor with the supplied knob. Close cover.
8. Pre-heat may be selected at this time, to warm chamber to 45 °C.
9. Press the "MANUAL RUN" button. The cover locks and rotor starts turning. The decimal point blinks and the "RUNTIME" display counts up. The temperature rises to the set temperature. The "HEATTIME" will count down
10. Turn on the vacuum pump below the hood. The vacuum level begins falling.
11. To end the manual run, press STOP. The valves will click, isolating the chamber from the vacuum pump and also allowing air to bleed into the chamber.
12. After the rotor stops spinning, the cover lock disengages and the unit will beep.
13. Open cover and remove samples.

*Maintenance*

- The SpeedVac concentrator requires no scheduled maintenance
- Solvent spills on or inside the unit should be cleaned immediately using absorbent towels.
- Replace chamber seal if cracked (Part number 197-6020-01, Thermo Scientific)
- Outside of unit can be cleaned with dilute soap and water.

References:

- (1) Thermo Fisher Scientific. *Savant SpeedVac® Concentrators Quick and efficient sample preparation*; 2009.
- (2) Thermo Fisher Scientific. *Instruction Manual Thermo Scientific Savant® SPD131DDA SpeedVac Concentrator*; 2008.
- (3) Thermo Fisher Scientific. *RVT450 - Refrigerated Vapor Trap Installation and Operation*; 2018; Vol. 2.