
SOLVENTVAP SERIES 0.5 Gallon / 2L ROTARY EVAPORATOR

USER'S MANUAL



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Thank you for choosing our SolventVap series rotary evaporator. Please read this manual carefully before operating the unit. Keep this manual on-hand so that it can be used by all operators of the unit. Across International is not responsible for any injury or damage caused by misuse.

PRECAUTIONS

- THIS IS NOT AN EXPLOSION PROOF ROTARY EVAPERATOR.
- Inspect all glassware before use. Do not use any glassware that is cracked or chipped.
- It is important to use vacuum grade tubing for all vacuum hookups. Other types of tubing may collapse and prevent complete evacuation.
- All glassware should be cleaned and disinfected prior to use. There are many commercially available disinfectants that are non-corrosive, non-abrasive, and suitable for use on stainless steel surfaces. Choose the one that will work best for your application.
- Do not try to heat combustible or explosive materials, or materials that may release corrosive/erosive gases.
- Keep the unit away from any electromagnetic interferences, vibrations, flammable materials, fire, or corrosive/erosive gases.
- Always make sure your unit is on the correct power source (110V or 220V) and grounded properly. Always use the power cord that comes with the unit. Never modify the cable.
- Do not unplug the unit during normal operation.
- Do not use the unit as a positive pressure vessel.
- Consider conditions that may affect your rotary evaporator's ability to accurately control its temperatures, such as extreme heat from radiators, stoves, ovens, autoclaves, etc. Avoid direct sun, fast-moving air currents, and heating/cooling ducts.
- To ensure proper air circulation around the unit, allow a minimum of 10 inches between the unit and any walls or partitions.
- A separate circuit for the rotary evaporator and the pump is strongly recommended to prevent possible loss of product due to overloading or failure of other equipment on a shared circuit.
- Returning shipment: Save the shipping crate until you are sure your unit is consistently working properly. If for any reason you must return the unit, first contact AI for a return authorization (RMA).

1. INTRODUCTION

A rotary evaporator is a device used in chemical laboratories for the efficient and gentle removal of solvents from samples by evaporation. The process of rotary evaporation is most often used to separate solvents with low boiling points, such as n-hexane or ethyl acetate, from compounds which are solid at room temperature and pressure. However, careful application also allows for the removal of a solvent from a sample containing a liquid compound, if there is minimal co-evaporation (azeotropic behavior) and a sufficient difference in boiling points at the chosen temperature and reduced pressure.

The new **Ai SolventVap 0.53 gallon / 2L** series rotary evaporators come with a modular heating bath, vertical glassware, and digital temperature/rotation control. Its optimized bath volume allows for rapid heat-up times. The condenser unit has specially designed glass tubes that utilize surface extremely efficient. That's why our SolventVap evaporators consistently deliver reliable and reproducible process results that are usually reserved for more costly systems. Another important aspect of the SolventVap is the safety features, which includes dry-run protection, water bath over-temperature shut-off protection, and fuse protection.

Our **rotary evaporators** feature a specially designed motor and worm gear, which provides constant rotation at speeds from 10 to 180 rpm. As the flask containing the solvent is rotated, it continually transfers a thin layer of liquid over the entire inner surface. This gives a very large surface area for evaporation, which is caused by the gentle heating from the water bath. The rotating system is fitted with a special seal that allows the apparatus to be placed under vacuum, effectively reducing the boiling point of the solvents and removing the vapor phase, making the process much more efficient. Each unit is also equipped with an easy-to-use vacuum release and a continuous feed system, which allows solvent to be constantly drawn into the rotating flask without needing to stop the operation.

The operation of the **digital water bath** ranges from ambient temperature to 99°C (210°F) with PID temperature control stepping at 0.1°C increments. Heating coils are located directly inside the pan for the most efficient heating possible. A built-in overheat protector will shut down power, should the controller fail.

The **Standard Glassware Set** includes a 0.13 gallon (0.5L), 0.26 gallon (1L) or 0.53 gallon (2L) pear shaped evaporating flask, 0.26 gallon (1L) round-bottomed receiving flask, and vertical condenser.

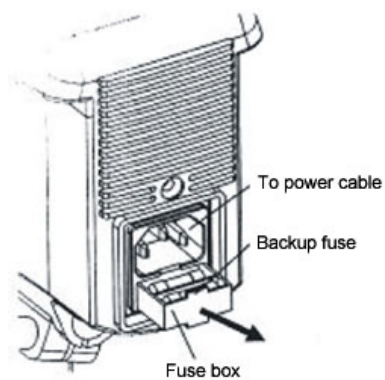
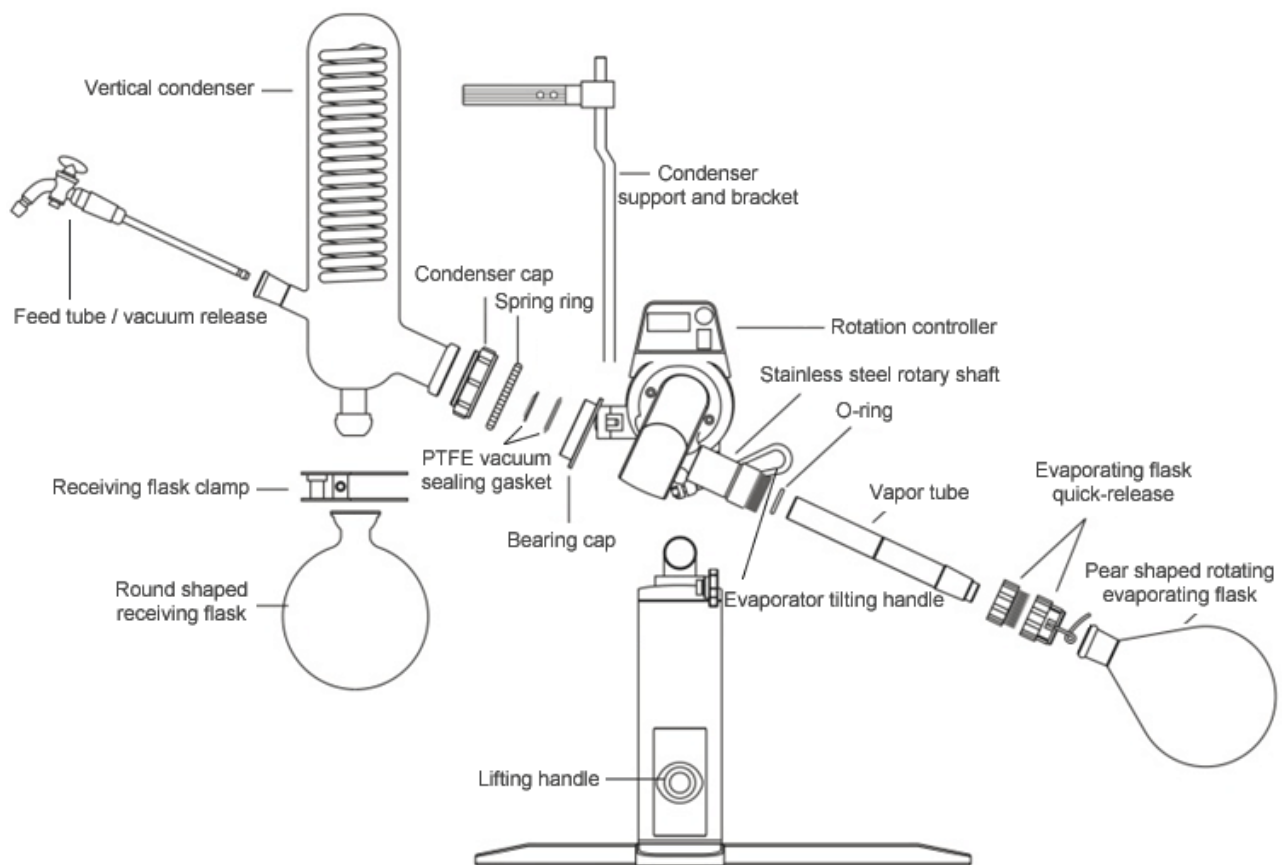
Features

- Solvent-resistant PTFE and Viton gaskets ensure reliable, long term operation.
- Specialized motor and compact, intermeshed worm and worm gear, providing precise driving.
- Quiet, vibration-free operation.
- Downward condenser vacuum connector design ensures safe vacuum operation.
- Adjustable, motorized water bath lift for increased precision.
- Easy visual operation with digital speed and temperature display.
- PID temperature controller for accurate and customizable temperature control.
- One year warranty and life time US-based customer service, support, and spare parts.

2. SPECIFICATIONS

Electrical requirements	110V 60Hz single phase, 14A, 1525 watts (heater: 1500 watts, rotation motor: 25 watts)
Evaporating flask	Capacity: 0.13 gallon (0.5L), 0.26 gallon (1L) or 0.53 gallon (2L) Rotation speed: 10 to 180 rpm Evaporating speed: 20 ml per minute Lifting: weight balancing, manual control with lock Maximum lifting distance: 4 inches (extendable to 10 inches)
Receiving flask	0.26 gallon (1L)
Condenser	Glassware: Vertical with dual-spiral glass tubing Chilling fluid connection: 3/8" hose barb, x2
Working environment	5 to 95°F
Water bath	Temperature range: ambient to 99° (210°F) Temperature controller: digital Capacity: 2 gallons Material: stainless steel Dimensions: 10" diameter x 5" depth x 9.75" height Media: water only Number of heaters: one
Vacuum	Connection: 3/8" hose barb, x1 Sealing: PTFE & Viton gaskets Ultimate vacuum: < 3 torrs
Safety	Dry-run, over-temperature shut off, fuse protections
Unit / Shipping weight	21 / 40 Lb
Unit / Shipping dimensions	22 x 12.5 x 26" / 26 x 21 x 19" (WxDxH)

3. COMPONENTS



4. INSTALLATION

4.1 Glass rotary tube installation

Step 1. Place the o-ring on glass tube and insert it into the evaporator from the right, as illustrated below.



Step 2. Insert the supplied Philips screw driver into the hole on the stainless steel bearing. Use the screw driver to secure the tube cap, as illustrated below.



4.2 Sealing gasket installation

Step 1. It is recommended to apply some vacuum grease or water to the gaskets prior to installation, to help with lubrication. Place the inner (larger) PTFE sealing gasket onto the tube. Push the gasket all the way towards the base of the unit. **Important: Make sure the side with the spring is facing the unit housing.**



Step 2. Place the outer (smaller) gasket onto the tube. Push it all the way towards the base of the unit. **Important: Make sure the concave side is facing the unit housing.**





The glass tube must be installed first, before installing any of the gaskets. Both gaskets should be installed correctly (in accordance to the directions provided). If you hear any noise from gaskets when the unit is first started, stop operation and apply some vacuum grease or water to the gaskets to help with lubrication. All gaskets are considered consumable parts.

4.3 Condenser, evaporating flask and receiving flask installation

Vertical Condenser

Step 1. Raise the evaporator to its highest position, using the lifting handle. Secure the handle to its locked position.



Step 2. Place the condenser cap onto the connector, then place the stainless steel coiled ring (dust seal) onto the condenser. Gently press the condenser against the PTFE gasket in the housing, then tighten the black plastic cap. Make sure all sealing gaskets are secure.



Step 3. Secure the stainless steel condenser support pole to the unit with the supplied Philips screw driver, as illustrated below. Secure the condenser to the support pole using the rubber bracket.



Step 4. Connect the receiving flask onto the bottom of the condenser with the receiving flask clamp.



Step 5. Insert the evaporating flask onto the end of the glass tube. Flip down the quick-release stainless steel hook, so that it securely holds the flask. Insert the Philips screw driver into the bearing hole. Use the screw driver to tighten the quick-release cap. Important: Do not over-tighten this cap.



Step 6. Connect the PTFE extension tube to the glass feeding tube, and insert them together into the condenser as illustrated below. The PTFE extension tube allows material to be fed directly into the evaporating flask.



Diagonal condenser

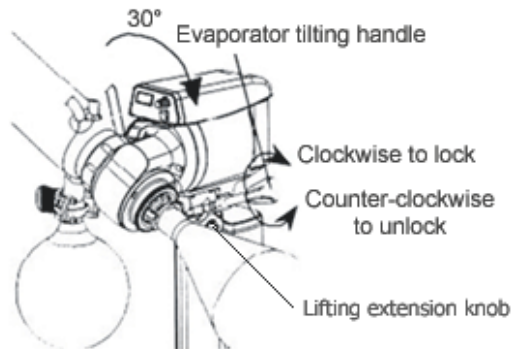
Follow the steps described above, skipping step 3.

4.4 Adjusting the angle of the unit

Step 1. Raise the evaporator to its highest position.

Step 2. **Important! Hold the condenser securely with your hand** while adjusting the tilting handle to your desired angle. Test the angle by raising and lowering the evaporating flask.

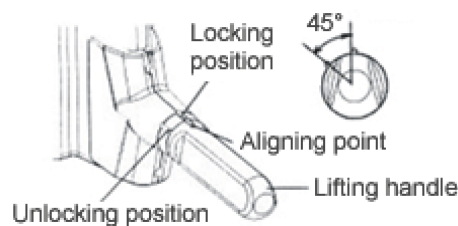
Step 3. Tighten the handle when you are done.



4.5 Adjusting the height of the unit

Step 1. While holding the top of the unit securely with your hand, turn the lifting handle to unlocked position (see picture below).

Step 2. Slowly raise or lower the unit to the desired position. When done, turn handle to locking position.



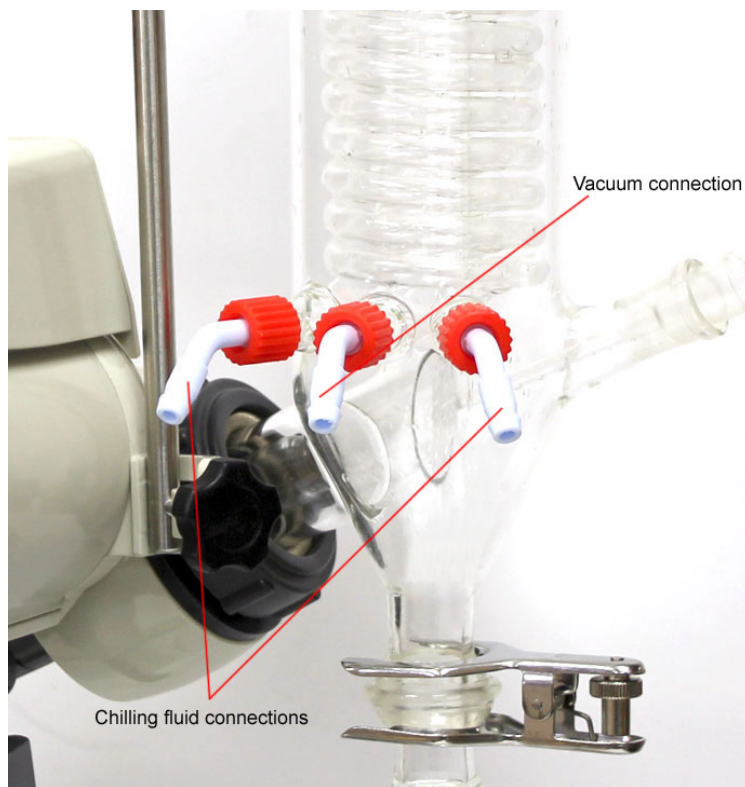
This unit allows you to extend its height an additional 6 inches. To do so, loosen the lifting extension knob a little bit by turning it 2-3 turns counter-clockwise (see picture in section 4.4). Do not loosen it all the way, or else the screw may fall out. Hold the unit securely with both hands, raise it to your desired height, then secure the screw when you are done.



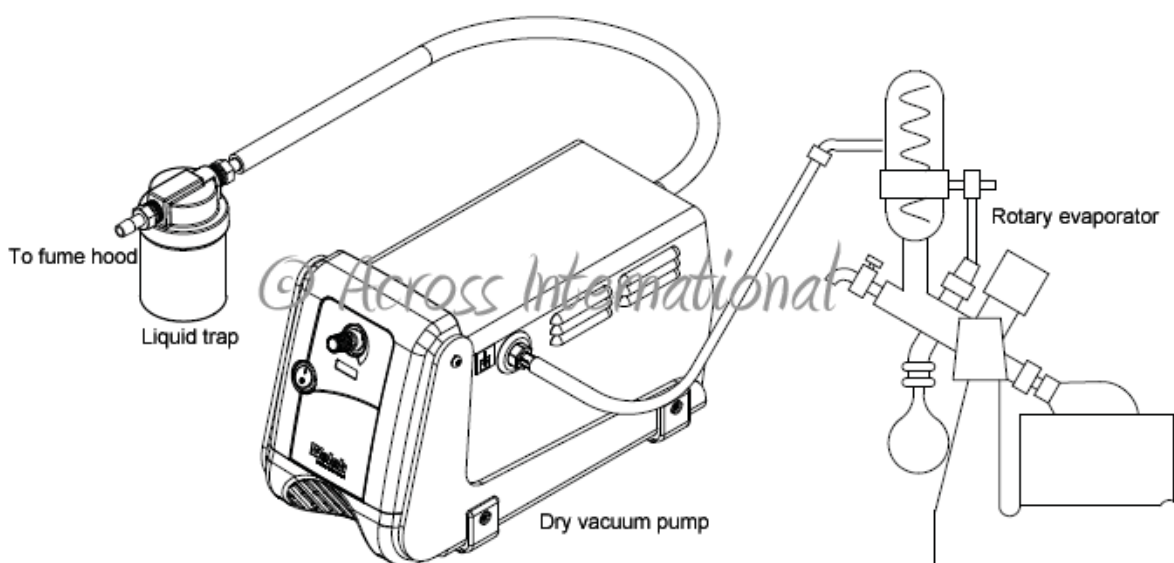
Height adjustment is done through a spring-loaded mechanism. Make sure that you hold the top of the evaporator securely before adjusting the height of the unit.

4.6 Recirculating chiller and vacuum pump connection

Step 1. Connect your chilling fluid hoses to the back of the condenser (left and right ports). Secure them with clamps. (Note: Recirculating chiller, hoses and clamps sold separately.)



Step 2. Use the vacuum tubing (not included) and connect it to the vacuum connector (center port) on the back of the condenser (pictured above). Next, connect to your vacuum pump (not included). See the example below.



Sample vacuum connection setup

5. OPERATION

5.1 Preparation

Step 1. Fill the water bath with water until the evaporating flask is half submerged, without any water overflowing.

Step 2. Turn on the water bath power. Press SET once. Use the UP or DOWN buttons to set your target temperature.

Press SET again to save.



When you have finished vacuum purging, close the vacuum valve before turning off your vacuum pump. This will prevent any vacuum pump oil back flow into the unit if you are using an oil vane pump.

5.2 Material feeding

a. Auto feeding

Step 1. Connect the feed tube (pictured below) to the PTFE extension hose (supplied). Insert it into the condenser. The extension hose should reach all the way into the evaporating flask.



Step 2. Connect a PTFE hose (not provided) to the open end of the feed tube (refer to the left side of the picture above). Insert the hose into your testing liquid.

Step 3. Lower the evaporating flask into the water inside the water bath.

Step 4. Set the rotation speed to its lowest position. Turn on the evaporator, then adjust the control knob to set your target rotation speed.



Step 5. Start your vacuum pump and run the unit until you reach your desired vacuum level.

Step 6. Open the valve on the feed tube. The vacuum environment in the unit will draw the material into the evaporating flask. Close the valve when feeding has been completed.

b. Manual evaporating flask feeding

Step 1. Remove the evaporating flask. Fill it with your material, then reinstall the flask.

Step 2. Start your vacuum pump and continue to purge the unit until you reach your desired vacuum level.

Step 3. Set the rotation speed knob to its lowest position. Power on the evaporator, turn the control knob to set your target rotation speed.



Step 4. Lower the evaporating flask into the water inside of the water bath.

5.3 Turning off the unit

Step 1. Disable the rotation feature on the evaporating flask.

Step 2. Raise the evaporating flask so that it is lifted all the way out of the water.

Step 3. Open the feed tube and release vacuum.

Step 4. Turn off the vacuum pump.

Step 5. Turn off the chiller and water bath. **Caution! The evaporating flask and water bath may still be hot!**

Step 6. Removing the evaporating flask and receiving flask.



If the evaporating flask cannot be removed easily, you can remove the flask together with the glass tube, gently apply heat to the area where the two pieces are joined, then try to remove it again.



Applied vacuum grease to vacuum valves on the unit to ensure high vacuum levels.



Your safety is important to us! Please use caution when operating. Users of glass reaction equipment must take all necessary precautions to avoid contact with rotating parts, particularly entanglement of loose clothing, hair, necklaces, or other jewelry. Under these circumstances, the winding action of the rotating parts can draw the user(s) into the apparatus, resulting in breakage of glassware, burns, and/or chemical exposure. Extra caution must also be taken when operating with air-reactive materials, especially under vacuum. A leak can draw air into the apparatus and cause a violent reaction to occur.

6. STANDARD PACKAGE

Part description	Quantity	Part image
Evaporator body	1 pc	
Water bath	1 pc	
Vertical condenser, glass	1 pc	
0.13G/0.5L pear shaped evaporating flask, glass (choose based on volume of material being loaded)	1 pc	
0.26G/1L pear shaped evaporating flask, glass (choose based on volume of material being loaded)	1 pc	
0.26G/1L round shaped receiving flask, glass	1 pc	
Glass center tube and o-ring	1 set	
Material feeding tube with valve, glass	1 pc	
PTFE extension feeding hose	1 pc	
PTFE vacuum sealing kit	2 pcs	

Condenser cap kit	2 pcs	
Glass tube cap and evaporator flask quick-release	2 pcs	
Condenser support and bracket	1 pc	
Condenser support securing screw	1 pc	
Receiving flask clamp	1 pc	
Chilling fluid connector (x 2), vacuum connector (x 1)	3 pcs	
3-prong 110V US power cord for evaporator	1 pc	
Phillips screw driver	1 pc	
User's manual	1 pc	

7. TROUBLESHOOTING

Issue	Cause	Solution
Unit has been powered on, but the indicator does not turn on.	The power cord is unplugged or not properly plugged in.	Switch off the unit and plug in the power cord securely
	Power failure	Check your power supply
	Faulty power switch	Stop using the unit and contact technical support.
	Faulty mother board	
	Unit has short circuited	
Unit turns on, but will not rotate.	Rusted bearings	
	Rotation motor failure	
	Faulty mother board	
Unit can rotate, but cannot display rotation speed	Faulty digital display	
Unit is not rotating steadily	The internal gear is worn	
	Faulty mother board	
	Failure of the motor control	
Water bath turns on, but there is no heat	Faulty solid state relay	Replace the solid state relay.
	Faulty heater	Replace the heater.
Abnormal noise	Sealing gasket is worn	Replace the sealing gaskets.
	Internal gear is worn	Stop using the unit and contact technical support.
	Motor and parts are not properly lubricated	
	Faulty motor	
High pitched noise coming from the sealing gaskets	The sealing gasket and rotary tube are not installed properly	Properly install the sealing gaskets and rotary tube. Apply vacuum grease or water to the gaskets, if necessary.
There is a vacuum leak, or the unit cannot reach a high vacuum level	Glass rotary tube is worn	Replace the glass rotary tube.
	Sealing gasket is worn	Replace the sealing gasket.
	Improper installation of the sealing gaskets (opposite direction)	Reinstall the sealing gaskets properly.
	Vacuum release valve's gasket worn	Replace the gasket.
	Vacuum tubing is worn out	Replace the vacuum tubing.
The evaporator is difficult to lift	Internal spring is worn	Stop using the unit and contact technical support
	Sliding mechanism is worn out or rusted	
The lifting handle cannot be locked	There is a loose screw	
	Locking mechanism is worn out	

8. PRESSURE VS VAPORIZATION

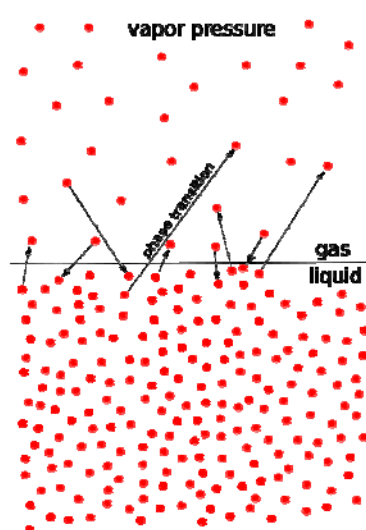
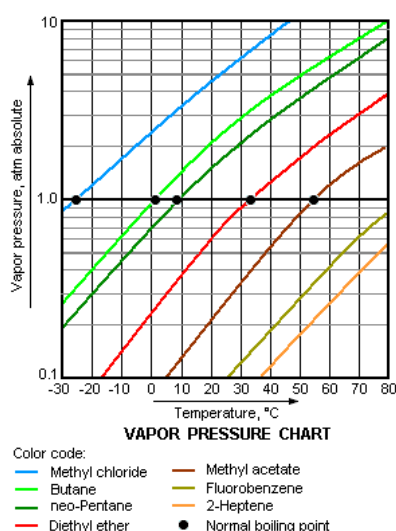
Vacuum evaporation is the process of causing the pressure in a vacuum oven to be reduced below the vapor pressure of the liquid, causing the liquid to evaporate at a lower temperature than normal.

Liquids may change to a vapor at temperatures below their boiling points through the process of evaporation. Evaporation is a surface phenomenon in which molecules located near the liquid's edge, not contained by enough liquid pressure on that side, escape into the surroundings as vapor. On the other hand, boiling is a process in which molecules anywhere in the liquid escape, resulting in the formation of vapor bubbles within the liquid.

The vacuum evaporation treatment process consists of reducing the interior pressure of the vacuum oven below atmospheric pressure. This reduces the boiling point of the liquid to be evaporated, thereby reducing the heat necessary/eliminated in both the boiling and condensation processes. In addition, there are other technical advantages such as the ability to distill other liquids with high boiling points and avoiding the decomposition of substances that are sensitive to temperature, etc.

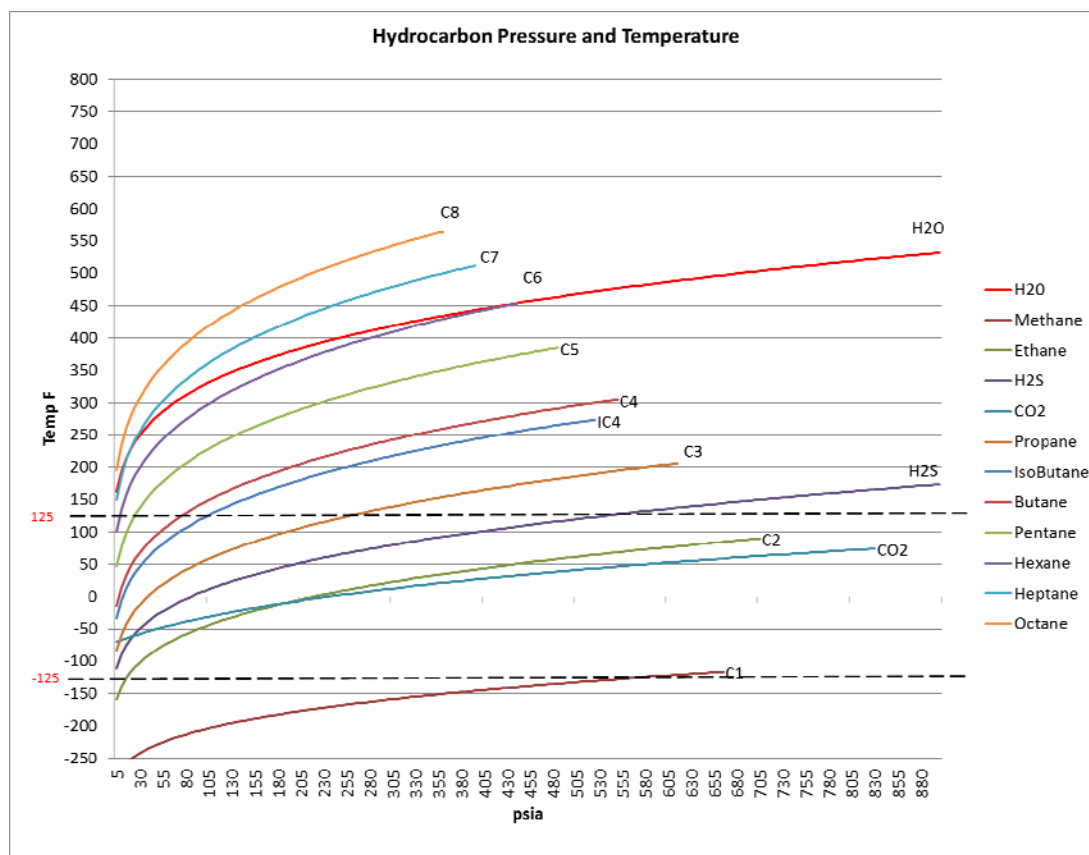
The boiling point of a substance is the temperature at which the vapor pressure of the liquid equals the pressure surrounding the liquid and the liquid changes into a vapor. The boiling point of a liquid varies depending upon the surrounding environmental pressure. A liquid in a partial vacuum has a lower boiling point than when that liquid is at atmospheric pressure. A liquid at high pressure has a higher boiling point than when that liquid is at atmospheric pressure.

The normal boiling point (also called the atmospheric boiling point or the atmospheric pressure boiling point) of a liquid is the special case in which the vapor pressure of the liquid equals the defined atmospheric pressure at sea level, 1 atmosphere. At that temperature, the vapor pressure of the liquid becomes sufficient to overcome atmospheric pressure and allow bubbles of vapor to form inside the bulk of the liquid. The standard boiling point has been defined by IUPAC since 1982 as the temperature at which boiling occurs under a pressure of 1 bar.



Example: The following table lists a variety of substances, ordered by increasing vapor pressure (in absolute units).

Substance	Vapor Pressure (SI units)	Vapor Pressure (Bar)	Vapor Pressure (Torr / mmHg)	Temperature
Tungsten	100 Pa	0.001	0.75	3203 °C
Ethylene glycol	500 Pa	0.005	3.75	20 °C
Xenon difluoride	600 Pa	0.006	4.50	25 °C
Water (H ₂ O)	2.3 kPa	0.023	17.5	20 °C
Propanol	2.4 kPa	0.024	18.0	20 °C
Ethanol	5.83 kPa	0.0583	43.7	20 °C
Methyl isobutyl ketone	2.66 kPa	0.0266	19.95	25 °C
Freon 113	37.9 kPa	0.379	284	20 °C
Acetaldehyde	98.7 kPa	0.987	740	20 °C
Butane	220 kPa	2.2	1650	20 °C
Formaldehyde	435.7 kPa	4.357	3268	20 °C
Propane ^[9]	997.8 kPa	9.978	7584	26.85 °C
Carbonyl sulfide	1.255 MPa	12.55	9412	25 °C
Nitrous oxide ^[10]	5.660 MPa	56.60	42453	25 °C
Carbon dioxide	5.7 MPa	57	42753	20 °C



9. WARRANTY

Across International warrants for the original user of this product in the U.S.A. only that this product will be free from defects in material and workmanship for a period of one year from the date of delivery to the original user – the “Warranty Period”.

During the Warranty Period, Across International, at its election and expense, will repair or replace the product or parts that are proven to manufacturer’s satisfaction to be defective, or at manufacturer’s option, refund the price or credit (against the price of future purchases of the product) the price of any products that are proven to manufacturer’s satisfaction to be defective.

This warranty does not include any labor charges if outside of the U.S.A. This warranty does not cover any damage due to accident, misuse, negligence, or abnormal use.

Use of Across International’s product in a system that includes components not manufactured by Across International is not covered by this warranty.

This warranty is void in the event that repairs are made by anyone other than Across International without prior authorization from Across International.

Any alteration or removal of the serial number on Across International’s products will void this warranty. Under no circumstances will Across International be liable for indirect, incidental, consequential, or special damages.

The terms of this warranty are governed by the laws of the states of New Jersey and Nevada without regards to the principles of conflicts of laws thereof. If any provision of this limited warranty is held to be unenforceable by any court of competent jurisdiction, the remainder of this limited warranty will remain in full force and effect.

This warranty is in lieu of and excludes all other warranties or obligations, either express or implied. Across International expressly disclaims all implied warranties, including without limitation, the warranties of merchantability and fitness for a particular purpose.

After the warranty period, Across International will continue to provide support and spare parts at a reasonable cost.

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