

MB STILLS

MANUAL FOR PDS1200

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WARNING



Read entire manual for important safety information before using your MB Professional Still. Failure to follow warnings could result in serious injury or death.

IMPORTANT SAFETY INFORMATION

Please read this entire instruction manual for important safety information prior to the use of your MB Professional Still.

 **WARNING** Failure to follow these warnings could result in serious injury or death.

General Precautions

- The surface of the still is very hot during normal operation and can cause burns. Always wear heat resistant gloves during operation to prevent burns.

Fire Precautions

- Electrical wiring warning, consult a certified electrician.
- Alcohol vapors and liquid is flammable, no smoking or open flames.
- Improper setup can cause leaks of flammable, toxic vapor.
- Never use still on an open flame.
- Use in a well ventilated space.

Explosion Precautions

- Do not modify the still to run under pressure. If used improperly and configured in a way that seals the still, explosion may occur.

Poison Precautions

Byproducts of the distilling process can be poisonous and cause serious injury if ingested. Use at your own risk.

- Methanol, ethyl acetate, and many more. "Known as heads or foreshots".

Please Note: We cannot give any recommendations on how to measure these, only that they need to be separated and disposed of.

- Disposing of waste product, consult local effluence laws.

EXPECTED YIELD PER BATCH

- Vodka** = 75% of proof gallons charged (10–15% cut as heads/foreshots, 10–15% cut as tails and left behind*)
- Whiskey** = 45-65% of proof gallons charged (15–25% cut as heads, 15–20% cut as tails and left behind*)
- Clarified Beer** Example Distillation Show in tabel to the right:

- The Volume of Heads will vary based on how quickly or slowly you heat the still initially, the dephlegmator setting, and personal preference of the operator
- Heads and Tails may be added to future batches for further distillation
- The amount Left Behind will vary based on how much time you dedicate to pushing it through the still to collect it as tails*

Example batch yields		Wine Gallons	Wine Liters	Average Proof	Proof Gallons	Yield%
Start Volume	Beer	930.0	3520.4	20.0	186.0	100%
First Run Yield	Low Wine	209.3	792.1	80.0	167.4	90%
Spirits Run	Forsehots	4.9	18.6	170.0	8.4	5%
	Heads	20.3	76.8	165.0	33.5	20%
	Hearts	65.8	248.9	140.0	92.1	55%
	Tails	35.9	135.8	70.0	25.1	15%
	Left Behind	709.3	2685.1	1.18	8.4	5%

ANATOMY OF THE STILL

1. The kettle / Boiler:

- Total Volume 1400L/369G
- Working Volume 1200L/317G
- **A:** Raked bottom for thorough draining
- **N1:** 4" dump valve - TC, butterfly
- **N2:** 2" outlet for the pump
- **N11:** 1.5" Thermowell port
- **N6:** Analog Thermometer in the headspace
- **N12:** 220V LED Light
- **N7:** 4-Way 2" TC Manifold
 - Pressure gauge
 - 0.15 MPa Pressure relief valve
 - Two 1" TC Valve
- **N5:** Internal Spray ball connection
- **N9:** Manway
 - **N8:** Manway sight glass
- **N3:** Steam Return Port
- Steam jacket connections
 - **N4:** Inlet
 - **N3:** Outlet/drain
 - **N13:** Pressure gauge and Pressure 0.25 MPa relief valve

2. Copper Expansion Chamber & Lynne Arm:

- 1 " CIP ball with attached check valve
- 2 " TC column manifold

3. Deflegmators / Reflux Condensers:

- Each is equipped with a 1.5" TC water inlet & 1.5" TC water outlet
- Each is equipped with a thermometer

4. Copper Column:

- 4 plate section with thermometer
- Each plate is made of copper and is equipped with a 1" stainless CIP ball with attached check valve
- Each plate is equipped with a drain port that connects to a 1" TC ball valve and drain manifold. These manifolds are used to drain excess liquid from each plate

5. Column Stands:

- 2" Vapor inlet
- 1.5" Drain port
- 1.5" Drain manifold mount
 - The bottom of each column has a 1.5" drain that leads back into the kettle, so that excess condensate is recycled through the entire still.

6. 4-plate column section with thermometer:

- Each plate is made of copper and is equipped with a 1" stainless CIP ball with attached check valve
- Each plate is equipped with a drain port, connecting to a 1" TC ball valve and drain manifold. These manifolds are used to drain excess liquid from each plate.

7. 4-plate column section:

- Each plate is made of copper and is equipped with a 1" stainless CIP

ball with attached check valve

- Each plate is equipped with a drain port, connecting to a 1" TC ball valve and drain manifold. These manifolds are used to drain excess liquid from each plate.

8. Gin Basket

9. Product Condenser with Thermometer:

- 1.5" TC water inlet and 1.5" TC water outlet

10. Product condenser stand

11. Parrot With Dump Valve

12. Agitator:

- 220v / 60Hz / 3 phase
- 1.5KW 46 RPM
- Does not come with power cable or VFD

13. Recycle Pump:

- 220v / 60Hz / 3 phase
- 3T/H 2.2KW
- Does not come with power cable or VFD

14. Column Manifold:

Features a series of 3 way valves used to route vapor into or past by each column.

- The valve will be set to "Bypass" a column when the handle is aligned with the center/downward portion of the "T"
- A valve is set to "Enter" a column when the handle is aligned with the right side of the "T"

15. Drain Manifolds:

- Each column section and column stand is connected to the drain manifold, 90 degrees to the right of the sight glasses, between the sight glasses and cleaning manifolds
- During distillation every drain valve should be in the closed position, with the handle perpendicular to the piping. If a plate begins to flood or fill up, open the drain valve on that plate as well as the one at the very bottom of the manifold to relieve the plate of the excess liquid. After the plate is sufficiently drained, close all valves in order from top to bottom to ensure that no vapor skips the distillation column since these valves are not check valves.
- During Cleaning Procedures all of the valves in the drain manifold should be open.

MATERIALS SPECIFICATIONS

- Boiler Body & Jacket – Stainless Steel
- All Pipes – Stainless Steel
- Gin Basket – Stainless Steel
- Sight Glass Din Fittings – Stainless Steel
- Expansion Chamber & Lynne Arm – Copper
- One 4 Plate Section – Copper
- Bubble Caps – Copper
- TC Gaskets & Window Seals – EPDM
- Ball Valve Gaskets – Teflon

CONFIGURATIONS

WARNING

- Improper setup can cause leaks of flammable, toxic vapor.
- Do not modify the still to run under pressure. If used improperly and configured in a way that seals the still, explosion may occur.
- Byproducts of the distilling process can be poisonous and cause serious injury if ingested. Use at your own risk.

To change the configurations follow the steps below.

1. Pot still, Zero plates:

- a. Bypass the gin basket
- b. Bypass the Copper 4 plate column
- c. Bypass the steel 16 plate column
- d. Enter the product condenser
 1. Turn on the water flowing into the product condenser

2. Gin basket, vapor infusion:

- a. Enter the gin basket
- b. Bypass the Copper 4 plate column
- c. Bypass the steel 16 plate column
- d. Enter the product condenser
 1. Turn on the water flowing into the product condenser

3. Four plates:

- a. Bypass the gin basket
- b. Enter the copper 4 plate column
 1. Activate the Deflegmator as you wish to control the flow and proof of the product
- c. Bypass the steel 16 plate column
- d. Enter the product condenser
 1. Turn on the water flowing into the product condenser

4. Neutral Spirits, Twenty Plates:

- a. Bypass the gin basket
- b. Enter the 4 plate copper column
 1. Leave the Deflegmator off
- c. Enter the 16 plate steel column
 1. Use the Deflegmator to lock the column in equilibrium for at least 30 minutes
NOTE: Equilibrium means the column is allowed to warm up and maintain some liquid on the plates, without allowing any vapor to leave the column into the condenser
 2. Adjust the Deflegmator to control the flow and proof of the product
- d. Enter the product condenser
 1. Turn on the water flowing into the product condenser

5. CIP operation:

- a. Fill the kettle with cleaning solution and heat to the desired temperature
- b. Open the inlet of the Recycle Pump
- c. Open the valve corresponding to the part of the still you wish to clean: The kettle, the gin basket, the 4 plate column, or the 16 plate column.
 1. If cleaning a column, open the drain valves on the side of each plate to allow the cleaner to drain from each plate and back into the kettle.
- d. Allow the cleaning solution to recirculate to your standard cleaning procedures and preference.
- e. Drain the kettle of the cleaning solution
- f. Rinse the cleaning solution using the same steps listed above

CONNECTING THE COOLANT

WARNING

- Improper setup can cause leaks of flammable, toxic vapor.
- Do not modify the still to run under pressure. If used improperly and configured in a way that seals the still, explosion may occur.
- Byproducts of the distilling process can be poisonous and cause serious injury if ingested. Use at your own risk.

- a. The fittings on the three condensers are 1½" Triclamp.
- b. For the product condenser you will want the cooling water to go in the bottom and out through the top port.
- c. For the Deflegmators / Reflux Condensers you will also want the coolant to go in the bottom and out through the top port.
- d. Examples of plumbing:

One Coolant Source:

1. If utilizing one coolant source you will need to use two tees or a manifold to split your flow between the three condensers
2. We recommend using a valve on the "Out" side (top port) of the condensers to control the coolant flow through each one independently.
3. The coolant exiting the condensers will need to be piped away from any electrical connections to avoid hazards
4. Always double check that your condenser valves are open and coolant is flowing before powering on your still.

Multiple Coolant Sources:

1. If utilizing Multiple coolant sources you can plumb each condenser on its own loop. This will give you the most control over each condenser as there will be no back pressure differentials to worry about as you adjust the flow throughout the run.

IMPORTANT: Always double check and tighten clamps, but do not over tighten your clamps.

- As the still warms up the clamps will feel looser. You can tighten the clamps, but only ever make them hand tight. Over tightening clamps can lead to gaskets leaking or becoming damaged.

RUNNING THE STILL

WARNING

- The surface of the still is very hot during normal operation and can cause burns. Always wear heat resistant gloves during operation to prevent burns.

How To Fill (Charge) The Kettle

1. Connect your product to the dump valve or the shoulder valve manifold
2. Excess air pressure will push out through the column as the kettle fills
3. Transfer your liquid into the kettle
4. Be sure to not overfill the kettle. Our 1400L kettle is designed to hold 1200 Liters of liquid for distilling. You will want room inside the kettle for the volume to expand when heated and for any foam to have space in the kettle without entering the column.

Use Anti-Foam (FOAM AXE AD105)

1. Important for beer washes especially that are rich in starch, sugar, and protein to use an anti-foaming agent (Foam Axe AD105). Also useful for washes of brandy, rum etc that may have sugar and yeast present.
2. Anti-foam is not necessary for Spirit runs from low wine or previously distilled spirits.

Turn on Your Coolant to The Condenser(s)

1. Always double check that your coolant is freely flowing at the rate you need before turning on the heat to the still

Start Heating Slowly

1. At the very start of the run you can heat up as fast as possible. Start slowing down above as you approach the boiling point of your wash. Slowly backing down the heat before you reach the boiling point will ensure that the liquid inside boils more evenly and distills more steadily.

Check Your Vapor Path For Leaks

⚠ WARNING

- *Electrical wiring warning, consult a certified electrician.*
- *Do not modify the still to run under pressure. If used improperly and configured in a way that seals the still, explosion may occur.*

Different methods for checking for leaks:

1. Look for weeping from any of the clamps and welded fittings.
 - **TIP:** A slow leak in the still when it first starts running will usually present as a small stream of liquid coming from one of the joints. As this liquid evaporates from the surface of the still you may notice a residue of minerals (white stain) or copper sulfate (blue stain).
2. Use a solution of food grade soap or sanitizer that forms bubbles. Spread these bubbles over any potential leak points and watch to see if any of the bubbles grow.
3. Take a hand mirror and hold it near any joints that could potentially leak. If there is a leak the mirror will fog up from the vapor.
4. Expect to smell the super volatile chemicals coming from Parrot, but not from anywhere else.
5. Affix a balloon to the top of the parrot and plug the surge breaker holes. While filling the still or while it warms up you should see the balloon inflate. If the balloon does not inflate at all, the pressure is escaping from somewhere else.

When To Expect It To Start Producing

⚠ WARNING

- *Methanol, ethyl acetate, and many more. "Known as heads or foreshots."*
Please Note: We should not (or cannot for liability) give any recommendations on how to measure these, only that they need to be separated and disposed of.

Boiling point will vary based on the alcohol content and gravity of the charge. The still can start producing as low as 165°F/74°C.

When To Expect It To Finish Producing

1. Calculate your volume in proof gallons. Proof gallons = current proof x volume / 100
NOTE: This is a method to relate your volume at different proofs so you know what yield to expect.
2. Use a hydrometer to monitor your proof throughout the batch.
 - Once the parrot is full, insert a proofing hydrometer in the center of the parrot. During the course of the run you will see the hydrometer float higher indicating that the proof is getting lower.
 - **NOTE:** This proof will roughly correspond to the temperature measured on the thermometer at the top of the column
 - Periodically empty the parrot and allow it to refill to ensure that the proof you are reading is accurate to the spirit being produced.
3. You may stop collecting at any point during the run once you have determined that the proof is too low, you have yielded the amount of product you want, or the temperature of the boiler and vapor has exceeded your goal.

How Fast is Appropriate to Collect Product

⚠ WARNING

- *Alcohol vapors and liquid is flammable, no smoking or open flames.*
1. Temperature of the product coming out of the condenser into the parrot should be less than 80°F at all times. If the product temperature exceeds 100°F you run the risk of excess flammable vapor leaving your product and increasing the fire hazard potential. Ideal collection temperature is below 70°F.
 - a. Check the coolant differential to make sure that you are getting effective cooling. If your coolant is leaving the condensers at low temperature differential you are likely not getting efficient heat exchange.
 - b. If your coolant differential is too low try restricting or slowing the flow of coolant through the heat exchanger.
 - c. Ideally you want your coolant to leave the product condenser slightly lower than the vapor temperature going into the condenser while maintaining distillate temperature. This shows that you are getting a complete and total exchange of the heat.
 - d. If already at max cooling capacity, lower the heat.
 - e. Do not use the Reflux Condenser/Dephlegnator to compensate for weaker product condenser performance. Running the reflux higher may cause back pressure in the column.
 - f. If the reflux is high enough and there is a backup in the plates you risk a flash flood of product pushing past the condensers.

How To Adjust To Get The Proof You Want

It is always best practice to adjust one variable at a time to control the proof and flow of your still. Using the column configuration we will control our proof with "Vapor Management" and using the pot configuration we will control with "Heat Management".

PLEASE NOTE: Proof and flow rate are directly correlated. The still will produce at roughly the same proof gallons per hour. A faster flow rate will always result in lower proof of your product.

If running in column mode, adjust your proof by varying the coolant flow through the Reflux Condenser/Dephlegnator.

1. If you want your proof to be higher, flow the coolant faster or more efficiently.
2. If you want your proof lower, flow the coolant slower or less efficiently.
3. It is possible to run your Reflux Condenser/Dephlegnator too efficiently and out of balance with your heat. This may result in too much liquid building up within the column of the still which will reduce the efficiency of separation and can cause a flood of product to push past your Reflux Condenser/Dephlegnator and overwhelm the product condenser.
 - The still is equipped with sight glasses so you can monitor the liquid level at each plate to maintain appropriate reflux. The liquid level ideally is just below the top of the copper cap inside the plate and should never rise more than halfway up the sight glass.
 - If your plates are flooded it is due to a combination of too much heat and too much reflux.
 - If your proof is below your target, reduce the heat until the proof rises to the target and the plates drain to the ideal liquid level.
 - If your proof is above your target, reduce the efficacy of your Reflux Condenser/Dephlegnator to allow more vapor to come through.
 - You may also want to lower the heat for good measure.

If in pot mode you will use Heat Management. To achieve this plug your heating element into a controller, manual or automatic, and vary the amount of power going through the heating element.

⚠ WARNING

- *Alcohol vapors and liquid is flammable, no smoking or open flames.*

1. To achieve a higher proof use less heat.
2. To achieve a lower proof or grater flow rate apply more heat.
 - If your product temperature at the parrot exceeds 80°F increase the cooling efficacy of your product condenser or apply less heat to the kettle.

CLEANING & MAINTENANCE

Passivating the stainless steel:

- Wash with a concentrated acid solution. Follow the instructions on the chemicals you are using.

Shining the copper:

- Wash with a hot acid solution. Citric is best. Follow the instructions on the chemicals you are using.

Cleaning after use:

- Use any cleaner that states that it is for stainless steel or copper.
- Standard percarbonate or caustic rinse is perfect. The boiler needs to be cleaned after each use.
- Always follow the cleaning instructions on the chemicals you are using.

Cleaning and maintaining the heating element

- Lightly scrub element with a green scrubby after each use and rise with water.

How to open the sight glasses:

- Use a DIN wrench to open the windows.
- Remove the bubble caps.

TROUBLESHOOTING

HOW TO RESOLVE MAJOR FAILURES

⚠ WARNING

- *Alcohol vapors and liquid is flammable, no smoking or open flames.*
- *Improper setup can cause leaks of flammable, toxic vapor.*
- *If used improperly and configured in a way that seals the still explosion may occur.*

Steaming From Parrot:

1. Check that your coolant is flowing.
2. Check valves, pumps, connections, in that order.
3. Turn down your heat.

Leak In A TC Connection:

1. Turn off the heat.
2. Wait for the still to cool down, or add cold water to it.
3. When the bottom plate looks still and is not bubbling it is safe.
4. Take off the clamp.
5. Inspect the seat to make sure it is flat.
6. Inspect the gasket itself for tears and defects.

Leak In A Welded Connection:

1. Turn off the heat.
2. Wait for the still to cool down.
3. Replace the leaking part before proceeding.

Foam Entering The Column:

1. Turn down the heat.
2. Turn up the reflux condenser to help knock down the foam.
3. Once the still has fully cooled down, add foam control to the boiler via the shoulder valve.

Power Not Turning On:

1. Turn off the circuit breaker.
2. Check all of your electrical components.
3. Consult an electrician.

Water Not Flowing Through The Condenser:

1. Check valves, pumps, connections, in that order

GLOSSARY

Bubbler Cap: In a plate and column still, a bubbler cap goes over the open section between two chambers. It condenses the distillate and drops it on the plate for re-distillation.

Charge: The act of adding wash to the still chamber.

Copper Sulfate: A blue mineral that can form from hard waters and copper.

Condenser: A heat exchanger used to cool vapor into liquid.

Dephlegnator: A device on the top of a still column that uses cold water to send a portion of the distillate back through the column to be re-distilled. Used to increase the selectivity of the distillation process. Also called a reflux condenser.

Distillate: The refined liquid output from the distillation process.

Downcommer: A passage from an upper plate to a lower plate to return liquid in a plate distillation column.

Foreshots: See Heads

Heads: The lighter than alcohol fraction that comes out before the alcohol. It contains poisonous chemicals.

Low Wines: The partially distilled distillate intended to be added to a future run

Parrot: A device that connects to the condenser and fills a sample jar. Normally a hydrometer is floated in the sample jar to monitor proof in real time. When the sample jar overflows the excess is collected into the receiving vessel.

Plate Column: A distillation column that has plates designed to increase the distillation efficiency without increasing the column length.

Pot Still: A form of distillation that intentionally fractionates poorly in order to retain flavors that are lost in a reflux still.

Product: See Distillate.

Product Condenser: See Condenser.

Product Shotgun: See Condenser.

Proof: A measure of the percentage of alcohol in a distillate. In the US it is two times the percentage of alcohol.

Mineral Stain: A white stain caused by evaporating hard water.

Reflux Condenser: See Dephlegnator.

Reflux Still: A still that has a water cooled cap on the top of the distillation column in order to condense a portion of the distillate back into the column. Used to increase the efficiency of the still.

Surging: A state where the still will push out liquid in burps. When a still is surging look for places that a vacuum can form and eliminate them (see surge breaker). Also, surging can be stopped by lowering the heat. Foaming in the wash pot can cause surging.

Surge Breaker: Holes between the condenser and the parrot to break the vacuum that the liquid seal in the parrot can cause.

Tails: The heavier than the alcohol fraction that contains many flavor molecules.

Wash: Any liquid that will undergo distillation.

Wash Pot: The vessel that will be heated to provide vapor to the still column.

WARRANTY INFORMATION

1 year wear and tear warranty. We will replace any parts that malfunction during standard use. For assistance with your systems warranty please contact us at 1-800-600-0033.