



The Pot Head

Complete Instructions



WARNING

In Australia it is illegal to use this equipment to produce alcohol for consumption without a licence from the Customs and Excise Department

An instructional video and additional helpful resources are available at:

www.puredistilling.com

Congratulations on purchasing the best & easiest to use pot head attachment!

Pure Distilling has recently undergone an ownership change and are in the process of implementing some major changes and one of these is improving the value contained in the system you have purchased. In the short-term there may be some discrepancies between instructions and videos as these are all checked, edited and improved. We apologize for any inconvenience caused; you can contact us if you require further information at:

Email: drink@puredistilling.com

Facebook: www.facebook.com/PureDistilling



Enjoy!

START WITH THE BEST
www.puredistilling.com

The Beer Me Heated Fermenter has a 2 year warranty.

The Pot Head copper condenser has a 5 year warranty.

Your Spirit Maker System contains the following items:

- One Pot Head copper condenser (made in Australia!)
- Digital thermometer
- Premium Whisky Yeast
- Premium Rum Yeast
- Distilling Conditioner
- 2 x 100g sample packs of Pure Distilling Barrel Chunks



To use this Pot Head you will need the following equipment:

- A boiler to heat the wash
- A lid with a 60mm hole to fit the Pot Head, Pure Distilling lids that fit most boiler models are available from your nearest Home Brew Store.
- Hose connectors and hose to connect water to the pot head.
- Alcometer to measure the strength of the spirit produced.

Warning:

To reduce the risk of fire, electrical shock or injury to persons or property:

- Do not touch the metal parts of the boiler and condenser without gloves during or after operation – it will be VERY HOT and could cause burns.
- Do NOT open the lid while liquid is boiling.
- Use in a well ventilated area away from naked flames.
- Do not overfill boiler above the MAX mark. IF THE BOILER IS OVERFILLED THERE IS A RISK THAT BOILING LIQUID MAY BE EJECTED.
- Do not operate any product with a damaged cord or plug, or after the product malfunctions or is damaged in any way. Return the complete product to the place of purchase for inspection, repair or replacement.
- Do not leave appliance unattended when switched on.
- Do not use appliance for other than its intended use.
- Always keep appliance on a level surface before, during and after use.
- Do not move the appliance when it is switched on.
- Do not switch on unless there is liquid covering the element in the boiler.
- Do not switch on unless the lid is in place.
- This product is intended for normal household / domestic use only.

READ AND SAVE THESE INSTRUCTIONS

Pot Head Applications

Pot condensers are a simple distilling tool, as the contents of the boiler is heated, vapour is produced and rises through the pot head where it contacts a cooling coil and “condenses” back to a liquid. There is no reflux action, a technique used in more complex condensers to return undesired portions of the vapour back to the boiler.

This makes pot stills ideal for the production of distilled water, essential oils and spirits with distinctive flavours like whisky’s, rums, gins and spirits made from the fermentation of fruits and vegetables like vodka, grappa and calvados. If you like to experiment with your hobby, its application is only limited by your imagination. Have fun!

Setting up the Pot Head

Before using the pot head for the first time turn the unit upside down and run warm water through it to remove any manufacturing residues. Then:

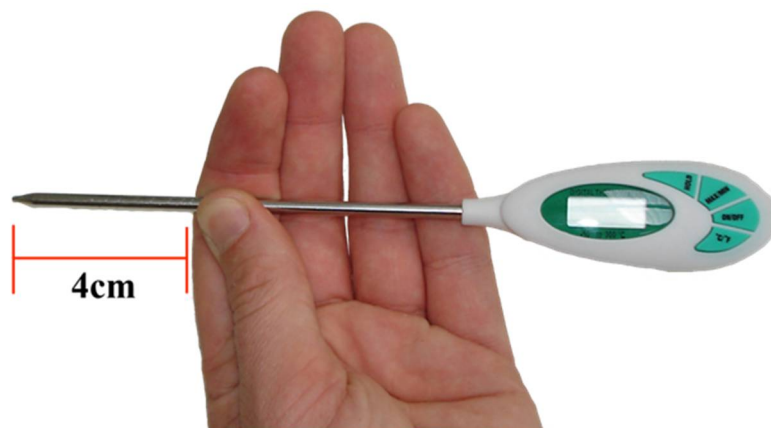
1. Undo the nut and silicon seal from the base of the condenser and fit the boiler lid to the condenser, replace the silicon seal (always under the lid) and tighten the nut. The photo below shows the correct configuration.



2. Ensure the boiler is placed on a stable and secure workspace near a water connection and drainage point and secure the lid to the top of the boiler with the clips.
3. Measure and cut a suitable length of 12.5mm hose to connect the condenser to the water source, fit one end to the tap (this may require a trip to the hardware store to source a suitable fittings) and fit one of the supplied plastic hose connectors to the other as per the photo below. Connect this hose fitting to one of the condenser water fittings. Fit the other supplied plastic hose connectors to the other length of vinyl tubing, connect to the free condenser water fitting as per the photo on the next page, and put the other end in a suitable drainage point e.g. in a sink or drain.



4. Turn the water on carefully and test the connections for leaks, tighten or fit correctly any leaking connections.
5. The required water flow is around 1.5 litres a minute, this can be set by measuring how much water is collected in 30 seconds, doubling it and adjusting water flow as required.
6. Insert the thermometer into the thermowell (small hole in the side), the thermowell has been crimped to ensure good contact with the thermometer probe, so it can be tight, push 4cm of the probe into the thermowell, as per the photo below:



Your pot head is now ready to use! We recommend you do a distilled water run as described in the next chapter to become familiar with the pot head operation and to clean any manufacture residues that may be present.

Distilling Water

Distilled water is water that has been boiled into vapor and condensed back into liquid, impurities and minerals in the original water are not carried through the process. This is the simplest distillation process

1. Fill the boiler with water to the MAX line or 100mm from the top of the boiler.
2. Setup the pot head as per the previous chapter and turn on the boiler.
3. Place a clean collection vessel under the output spout of the pot head
4. After about 25 to 30 minutes of when the thermometer reads 10 degrees above room temperature, turn on the cooling water.
5. The thermometer will rise to read 100 degrees and will remain at this temp for the whole of the distilling run. The distilled water running being collected will be very warm, this is normal.
6. Ensure you turn off the boiler before all the water has boiled away, to be safe collect only a maximum of 15 litres per run from a starting volume of 24 litres.
7. Turn off the cooling water, allow the system to cool down before packing up, there should not be any need to clean components.

Distilling Essential Oils

Essential oils are natural aromatic extracts from plant material including grasses, leaves, flowers, needles, twigs, peels of fruit, seeds, bark, and roots. This is a huge topic, with many different methodologies, recipes and experts. We recommend you do your own research as every material will have a different process in regard to its properties. Basically, there are two main methods applicable to your pot head:

Steam Distillation

The botanicals are suspended above the water in the boiler either in a gin basket (a stainless mesh "cage") or a cloth bag near the mouth of the pot head. Steam from the boiling water is forced through the plant material the hot steam allows the aromatic oils to escape from the plant material and evaporate into the steam.

The steam with the essential oils then passes through a cooling system where the steam condenses into a liquid consisting of essential oil and water. The essential oil, being lighter than the water, will float to the top and can then be separated from the water. The water by-product of distillation is called a hydrosol or floral water.

Solvent Extraction

The botanicals are steeped in high strength ethanol and the essential oils are released from the plant material. This mixture is then diluted with water and the ethanol boiled off (and collected via the pot head) the oils remain in the boiler and can be easily separated from the remaining water.

Distilling Alcohol (the Theory)

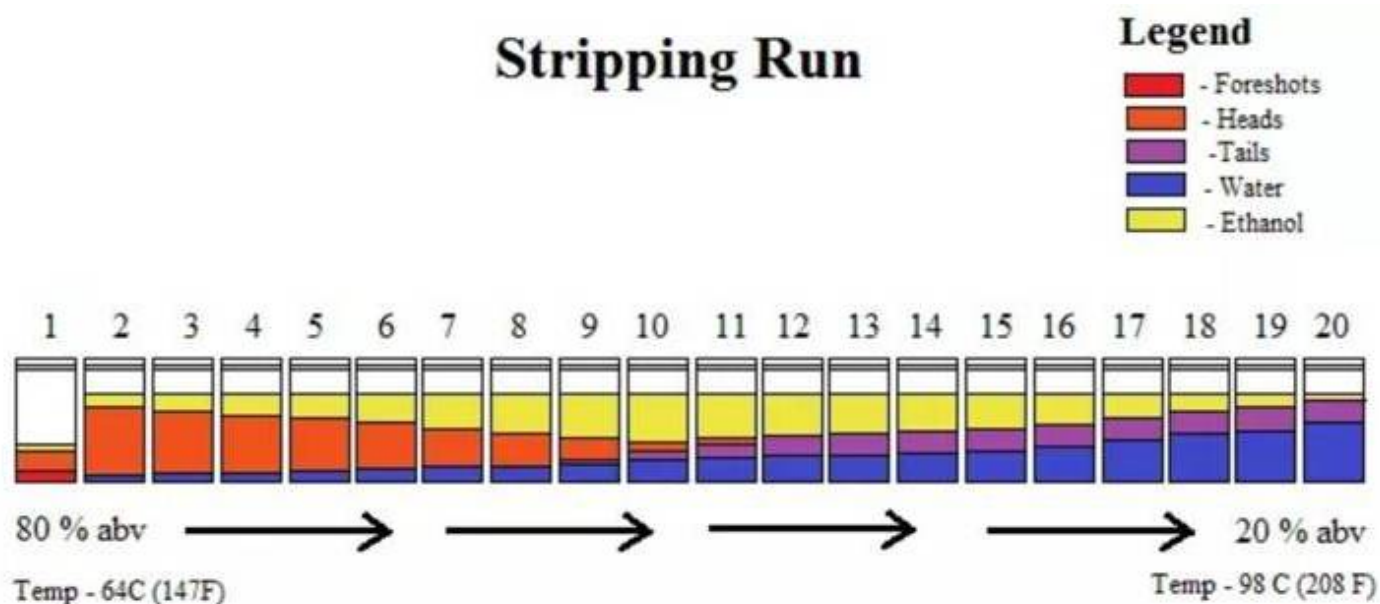
The distilling process does not produce alcohol, it concentrates the alcohol present in the wash or mash which has been produced by a yeast fermenting a sugar. The main alcohol produced by this fermentation is ethanol, and because ethanol has a lower boiling point at 78.2 degrees C, than water at 100 degrees C, we can separate the two by evaporating the ethanol before the water part of the wash is turned to steam. Easy!

Unfortunately, this process is complicated by the presence of other alcohols and compounds all with different boiling points. These other chemicals give the alcohol its flavour and character and collectively are called congeners. Some congeners are desirable (the peat smoke flavours in good whisky) while you will want to completely remove nearly all of them if you are making a clean vodka.

During the distillation the most volatile alcohols boil off first and when these are condensed and come out of the output tube these are collected as the "heads" or "foreshots" and are generally discarded. Next comes the ethanol, this is the part we are wanting to collect and is referred to as "hearts". As the wash continues to heat up the less volatile alcohols, proteins, carbohydrates and of course the major component of the wash, the water is turned to vapour and collected as the "tails" or "faints" and sometimes referred to as "Fusil Oils". These are generally the compounds that contribute the flavours that makes a whisky's distinctive taste as opposed to a rums distinctive flavour, and are produced from fermenting specific sugars. In the above example, whisky made from malted barley which may have a portion that has been smoked with peat, as opposed to molasses and cane sugar fermented at high temperatures, each producing its own unique specific congeners.

There is no definitive point at which to finish collection, it will be based on experience, taste testing and good luck. A good result is if at the end of the distilling run the ABV of the remaining wash in the boiler is down to around 1% ABV.

The chart below is a great example of how, as the distilling run progresses, the percentages of heads, hearts and tails changes. Foreshots in this chart refers to the small amounts of acetone and methanol produced at the very start of the collection process. The Heads here refer mainly to the Esters present in the wash, these are naturally occurring compounds with a sweet odour and are considered desirable by some distillers.



Distilling Alcohol (General Rules)

If you follow the general rules below when collecting from a pot still run you will achieve a safe and clean product.

Foreshots	Collect at least 100ml up to 80 degrees C	This is the bad stuff, contains methanol, discard or use for cleaning windows & floors.
Heads	Collect for blending, temp range 80 – 90 degrees C	Usually up to 80% ABV, collect in small batches, good tasting batches are used to blend in final product, unsatisfactory batches can be saved for redistilling in next run.
Hearts	Collect to keep, temp range 90 - 95 degrees C	This is the good stuff, starts at 80% ABV and will fall to 65% ABV, collect by personal preference.
Tails	Collect to redistill, temp range 95 – up to 98 degrees C	Save to redistil in next run, collect until taste and smell indicate little to no alcohol

Preparing the Wash for Distillation

Preparing the wash is the most important step of the distillation process, 99% of distilling issues are related to the wash not being fully fermented or too much of the “trub” (all the spent yeast at the bottom of the fermenter) being transferred into the boiler.

If you have ever boiled or heated milk you will be familiar with the surge of foam that happens when the milk reaches around 70 degrees, the same can happen in the boiler if there is undissolved sugars or yeast cells still in the wash. If in doubt give the wash a gentle stir and leave for a few more days.

To test if the wash is ready for distilling take a hydrometer reading:

- If the reading is below (toward the 80) or near the point shown on the photo the wash has finished fermenting.
- If the reading is significantly higher than the photo (toward the 40), the fermentation is "stuck", and remedial action needs to be taken.
- Give the wash a gentle stir and measure the temperature, if below 20 degrees the yeast has gone to "sleep", and you need to warm the wash up.
- If the temperature is higher than 30 degrees the yeast has been overheated and died (not the Rum yeast), put the wash in a cooler area and you will need to add a champagne yeast from your home brew store, it will take a lot longer to finish fermenting, up to an additional 10 days.



Following the previous fermenting instructions will result in a well-prepared wash, and once fermentation has finished add a two-part Pure Distilling Crystal Clear or similar at least 24 hours before you plan to carry out the distillation. The wash can stand for an extending period of time before distillation.

Transfer the wash to the boiler (if using for the first time clean the boiler including running warm water through the boiler tap), you can syphon the clear liquid to the boiler making sure no yeast sediment is transferred. The fermenter tap can also be used to transfer the wash, just make sure to discard the first 50ml as there will be some yeast sediment trapped in the tap, some other tips:

- Use a "sediment reducer valve" in the back of the tap, best \$2 you will ever spend.
- Put a wedge under the fermenter at the tap, so the majority of the yeast sediment is at the back of the fermenter, away from the tap.

Fill the boiler up to the level mark MAX imprinted on the boiler side.

Add 10 shakes of the Distilling Conditioner, this prevents any foaming from any residual sugars or yeast cells.



Distilling Alcohol

With all the previous warnings and rules in mind, set up the Pot Head as per the earlier instructions, now for the fun part, we have the well-prepared wash, we have added the distilling conditioner to the wash in the boiler, the system is setup, we are ready to turn on the boiler!

1. Turn on the boiler, never turn the boiler on if it is empty, it will activate the boil dry switch and cut out. If this happens, allow the boiler to cool, empty any contents, turn the boiler upside down and press the reset button in the middle of the base of the boiler.
2. Place a small collection vessel under the pot head spout to collect the "Foreshots".
3. When the temperature on the thermometer in the Pot Head starts to rise or after about half an hour turn on the water and ensure you have a steady 1.5L per minute of flow.
4. Liquid will start coming out of the condenser product tube, this is the "Foreshots" we discussed previously, this should be within 40 – 60 minutes of turning the boiler on.
5. Collect a minimum of 100ml, this is discarded, it is not suitable for consumption.
6. Replace the small Foreshots collecting container with the container to be used for collecting the "Heads". You can choose to collect in smaller batches and decide which individual batch makes it to the final product or collect all the material to about 90 degrees C which will be redistilled in the next run.
7. Replace the collecting container with a clean one to collect the "Hearts", temperature should now be over 90 degrees C and there should be a steady stream of spirit coming from the output tube. Collect to around 95 degrees C or you discern different aromas or flavours coming through, again you can choose to collect the "Tails" in smaller batches and decide which individual batch makes it to the final product or collect all the material from 95 degrees C up to 98 degrees C which will be redistilled in the next run.
8. Stop collecting when the temp reaches 98 degrees C or the output spirit is not desirable.
9. Turn off the boiler and cooling water and allow the whole system to cool.
10. When cool, follow the cleaning regime described further in this instruction booklet.

Popular Wash/Mash Recipes

There are huge numbers of options for making your favourite spirits, you need to find recipes and methods that work for you, we have some basic starting recipes below, but the internet has a abundance of options and opinions, as a warning, don't believe everything you read, its easy to be an expert when there is no accountability.

Golden Rum Recipe

Ferment 2.5kg of molasses and 4kg of sugar in 21 litres of water using a Pure Distilling Rum yeast which contains a Glucoamylase Enzyme to help break down the complex sugars. This wants to be fermented hot, over 30 degrees and up to 35 degrees to create the congeners produced at high ferment temperatures mimicking Queensland, Caribbean and tropical climates.

This spirit can then be watered down to consumption strength and added to Pure Distilling Rum Chunks to mimic the aging of rum in wooden barrels, it's a tried and true recipe.



Simple Whisky Recipe

Whisky mashes are basically beer without a hops boil, if you have access to all grain brewing equipment, mashing the following grain bill at 64 degrees C.

- 8.5kg of two row malt barley with high diastatic power
- 1.0kg of peated malt
- 0.2kg rice hulls (to stop the mash from sticking)

This is a big grain bill and needs constant care, it only just fits our equipment. Mashing at low temperatures like this lets the enzymes present in the malted barley do their best work, and results in high starch to sugar conversion rates, eg high efficiency producing simple sugars. Efficiency can be increased by then mashing at a higher temperature eg 68-70 degrees C which produces longer more complex sugars that do not ferment as easily and can add a sweetness to the mash. We prefer to mash for 60 minutes at 64 degrees C.

If you don't have access to all grain brewing equipment, the process can be replicated with slightly less efficiency with equipment in most kitchens, our website has a [resource page with an instruction PDF for download on this topic](#).

Another simple option is to use Liquid Malt Extract where the mashing process has been done for you and the result liquid turned into a thick syrup. 6 – 8 kg of liquid malt added to 18 – 16 litres of water will produce a wash of about 14% ABV.

With the wash prepared we need a speciality whisky yeast; the Pure Distilling Whisky Yeast is ideal as it contains measured amounts of yeast nutrient and contains Glucoamylase which assists in the conversion of starch to sugar.



It is common practise to collect more “Foreshots” when distilling malted products, so collect upto 200ml when doing a whisky run.

In Scotland the distilled spirit, called malt liqueur spends at least 3 years in a oak cask to become Scotch Whisky. We can replicate this process by using Pure Distilling Port & Sherry Whisky Barrell Chunks, made form the same staves that are used in producing premium Tasmanian Malt Whisky. Soak 500g of the chunks of each in a jar with 2.5 litres of your malt liqueur, taste and blend until you get your own perfect whisky.

The whisky making process has been refined over hundreds of years with premium blends having distinctive flavours and properties specific to their process and environment, don't expect to be able to replicate this in your kitchen on your first (or even 50th) attempt. Be happy to produce a good drinking whisky and keep experimenting!



Gin Making Process

Gins have experienced a surge in popularity, we will outline a simple gin making process here, but the make up of the botanicals used in all the different gin styles are varied and flavours will change with the quality, source and age of the individual components, so various individual gin style recipes are best researched on the internet.

Gin uses pure ethanol to extract flavour compounds from a range of botanicals, if you have a Spirit Maker Reflux condenser pictured below, or a similar unit you can produce the ethanol from a sugar and yeast wash at 93% ABV, this is then cut down to below 55% ABV and filtered through activated carbon, this removes the Volatile Organic Compounds that contribute flavours and smells to this spirit, we want as pure and clean a spirit as we can achieve.



Once we have our gin base we can incorporate a variety of methods to extract flavours from our gin botanicals:

- Soak the botanicals in our clean spirit, this will extract a lot of flavour but will also impart a colour to the gin, this is a perfectly acceptable gin if you don't need a crystal clear gin.
- Using our soon to be released Gin Basket full of botanicals that will hang from the thermowell of the pot head, we can steam a mixture of botanicals to extract additional flavours and tastes.
- We use the liquid that had the botanicals soaking in it (remove as much of the botanical roughage as you can as some of these herbs produce a bitterness when boiled), add water to the MAX line of the boiler and allow the ethanol to carry flavour from the steeped wash material, which is freshened up with the botanicals in the Gin Basket.
- There is no need to collect foreshots as we have used clean, already filtered spirit produced with the reflux condenser.
- You will notice that the gin is very strong at the start of collection and this flavour fades as you collect as the botanicals in the basket are exhausted.
- You can blend various parts of your collection to provide the flavours you prefer, remember you will be watering the gin down to ~ 40% so it will lose some of its strong flavours.

Measure and Test Your Spirit

The spirit you have collected should be over 60% ABV, that's 120 proof, it cannot be consumed at this strength, it will result in alcohol poisoning or even death! To bring the spirit to a strength suitable for consumption we first need to find its strength:

1. Test the spirit you have collected with a alcometer, the alcometer will only measure alcohol/water mixes, it cannot be used to measure the alcohol content of your wash.
2. The alcometer is calibrated to be accurate at a temperature of 20 degrees, if your collected spirit is warmer than 20 degrees (it generally will exit the pot head at +40 degrees), the reading will need to be adjusted. There are many websites where this can be calculated google "alcometer temperature correction table" or use the table below, be aware the simplified table is Alcohol by Weight, not Alcohol by Volume:

Temperature Correction (g/mL)

10 °C	-0.002
15 °C	-0.001
20 °C	none
25 °C	+0.001
30 °C	+0.003
35 °C	+0.004
40 °C	+0.005
45 °C	+0.006
50 °C	+0.007

Dilute the Spirit

Once you have measured the ABV of the spirit, determine your final consumption strength, generally 36% to 42% ABV. Add water to the spirit, as a general rule if 3 litres of spirit has been measured at 90%, adding 3 litres of water will result in 6 litres at 45%. Keep adding water until your alcometer reads the consumption strength you have picked.

Remember to adjust for temperature as the water you are adding will lower the mixed spirit temperature.

Don't Filter – Age on Wood

Generally we use the Pot Head to produce spirits with distinctive flavour profiles, if we filtered this spirit we would strip nearly all the flavours we have worked hard to impart to the spirit. Aging the spirit on wood chunks (fast and economical) or in wooden casks (slow and can be expensive) can add a character and mellowness to your spirit, your local homebrew shop will be able to supply and advise.



Cleaning & Maintenance

The wash we have distilled is very corrosive and we need to clean the boiler and Pot Head very well to stop any corrosion. If this is not done, over time the Pot Head can corrode and will not perform as designed, the photo below is the worst we have seen:



Only start the cleaning once the system has cooled down, the system will remain very hot for a few hours after use. Once the system is cool:

- Disconnect the hoses, drain & store.
- Remove the thermometer, turn it off and store.
- Remove the lid with the Pot Head still attached, take care not to damage the product output arm.
- Run warm water for a few minutes down the column, letting it run out the holes at the side near the output tube.
- Allow the column to dry before storing.

Generally, this all that is required to keep the Pot Head in good working order. If during the distillation run the wash surged up the column due to excess sugar or sediments present in the wash, it is necessary to rinse until the water runs clear and then soak the

condenser in a citric acid wash. Citric acid is available from your local home brew shop, we recommend the following:

- 15g of citric acid to 1.2 litres of warm water, use this ratio if making a larger solution, ideally make a "bath station" using a large plastic container.
- Leave to stand for 30 minutes.
- Rinse with warm water for 5 minutes.
- There is some information available that states the acid needs to be neutralised with Bicarbonate of Soda (Baking Soda), running the water through as above is all that is required to neutralise / rinse out the acid.
- Allow to dry before storing.

Ensure the boiler is disconnected from the power supply, then:

- Empty the boiler, it is heavy, use the tap to drain the wash from the boiler until it is a manageable weight, then empty into a suitable waste water drain.
- Rinse the inside of the boiler with warm water use a cloth not a scourer or any abrasive material.
- The best cleaner for stainless steel is Sodium Percarbonate available from your local home brew store, use as per the instructions. Do not use Sodium Metabisulphite or Pure Distilling Easy Clean, these are only suitable for plastics and glass.
- Rinse the boiler with warm water.
- Allow the boiler to dry before storing.

For legal reasons it is best to store the condenser and boiler disassembled, these are then still parts not a still.

Problems and Issues

Sometimes things go wrong, problems with Pure Distilling condensers are very rare due to the simplicity of their design and no moving parts We will do our utmost to rectify any issues you are having and ensure that your distilling is a fun and productive process, contact us on:

Email: drink@puredistilling.com

Facebook: www.facebook.com/PureDistilling

Notes