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# 5 Litre Reflux

## Assembly

Situate the still on a firm **heat resistant** base close by a cold water tap, drain and power socket. Your Still Spirits Reflux Still comes complete with a **Still Spirits Reflux Marble**. Ensure the marble is fitted into the top of the condenser where it should sit on the indentations on the inside of the Reflux Condenser. Fit the Condenser to the Still Lid and tighten securely. To do this, remove the Still Lid, unscrew the bolt from the Condenser, insert the bolt from the inside of the Still Lid through the hole and screw back into the Condenser. Refit the Still Lid. Fit the thermometer so that the bulb appears on the inside of the black bung by 20mm. Then fit the bung & thermometer to the top of the Condenser.

## Cleaning & Sterilisation

Your 5 litre (1 US Gallon) Reflux Still is made from Stainless Steel. It is very important that you empty the Still after each use and rinse it out with clean water and then **dry it thoroughly**. Do not use corrosive cleaners on your still.

Everything used in the fermentation process must be cleaned and sanitised before and after use. This includes the fermenter (pail), airlock and stirrer. For optimum sterilising, we recommend **Still Spirits "No Rinse" Steriliser**.

## Fermentation (Using: Still Spirits Classic Turbo Yeast with 6kg (13.2 lbs) Still Spirits Turbo Sugar)

1. Add 21 litres (5.5 US Gallons) of water at 40°C (104°F) to a sterilized **Brewcraft 30 litre (8 US Gallon) Fermenter** or similar.
2. Add 6kgs (13.2 lbs) of **Still Spirits Turbo Sugar** and stir until dissolved. Once the sugar has been added to the water it should have settled at 35°C (95°F).
3. Add a **Still Spirits Classic Turbo Yeast** sachet to produce an alcoholic Wash. Each **Still Spirits Classic Turbo Yeast** sachet contains a mix of yeast and nutrients to make 25 litres (6.6 US Gallons) of Wash and produce alcohol that is extremely low in by-products.
4. The wash should ferment in an area where the room temperature is between 18°C to 30°C (64-86°F). When the air temperature is above 33°C (91°F) it's important to use **Still Spirits Heat Wave Turbo Yeast** instead as it is able to deliver excellent quality alcohol in hot conditions.
5. Part fill the U of the Airlock with water and fit to the fermenter to prevent any oxygen, bacteria or insects getting in during fermentation. Within 24 hours carbon dioxide should start bubbling through the airlock if the wash is working correctly and the fermenter is sealed properly. If the gas does not start to bubble through the airlock, then loosen the top and have a look inside. The wash should be bubbling and will probably have a foam or froth on top. If the wash is not bubbling and there is no froth around the top of the wash then check the temperature is in the recommended range.
6. A vigorous stir at this stage with a sterilised paddle (not wooden) will speed up fermentation. Stir gently to begin with to avoid a froth build up.
7. Fermentation can take as little as 3 days. In cooler weather it could take up to 7 days. For the first 24-48 hours, heat is generated from the fermentation process. **DO NOT ADD ANY HEAT DURING THIS TIME**. After this period a **Brewcraft Heater Pad** may be used in cooler weather to maintain the temperature.

Fermentation is complete when the yeast has used up all the sugar. There will be no bubbles rising through the wash and the wash hydrometer reading will have been static for two days. Float the hydrometer into the wash, and take the reading where the surface level of the liquid cuts across the scale on the hydrometer; the reading should be about 990. Remember to take care when handling hydrometers. They are very delicate.

## Wash Treatment

To remove all carbon and unwanted spent yeast cells prior to distilling treat the wash with **Still Spirits Turbo Clear**. Add part A by mixing in thoroughly and let stand for 2 hours then add part B by gently stirring in evenly at the surface and let stand for 24 hours.

Please note: It is illegal to use this unit in Australia to produce alcohol for consumption without a license from the Customs & Excise Department

## Hints & Tips: Fermentation

- **HOT CLIMATES ...** Fill some PET soft drink bottles with water and freeze, then add throughout fermentation to control the temperature.
- **HOT CLIMATES ...** Another method is the evaporation technique. Sit the fermenter in a tray with about 25mm of water. Drape some fabric over the fermenter so it dangles in the water (towelling or an old sweatshirt is ideal). The water is drawn up the fabric and evaporates causing slight refrigeration. If it is still too hot, turn a fan onto the fermenter.
- **MY WASH FAILED TO START FERMENTING ...** If the airlock is not bubbling after 24 hours it is most likely that the fermenter is not sealed properly. Check you have pressed the lid on correctly. Next check you have a good seal by lightly pressing the sides of the fermenter to force some air out through the airlock. When you release the pressure on the barrel the air should try to get back in through the airlock. If sealed properly the water level should remain uneven in the airlock (more water on one side than the other). In some circumstances the yeast can stop working before all the sugar is used. This will be indicated by a final hydrometer reading higher than 990. Any reading above 1000 on a standard Wash, Wine & Beer Hydrometer suggests that something has gone wrong. In most cases a good stir to get the yeast back into circulation should get the wash fermenting again. The most common cause of stuck fermentation is low temperature. In this case simply move the fermenter to a warmer place and stir the yeast back into the liquid. An inexpensive stick-on thermometer, available from your Brewing Specialist Store, will help monitor the temperature. If you are having problems maintaining temperature, a purpose designed Brewcraft Heating Pad, can be purchased from your local Brewing Specialist Store.

## Distillation

1. Pour 5 Litres (1.3 US Gallons) of the wash into the still while being careful to leave the sediment behind.
2. Fit the lid complete with condenser and hoses on to the Still.
3. Plug the element in. When the wash has warmed up, but before thermometer reads 50°C (122°F), start the cold water running through the condenser. (You can start running the water through at the beginning)
4. During most of the distillation process the cooling water flowing through the condenser should be flowing at about 500 mls (17 US fl oz) per minute. To measure the flow, fill a calibrated jug from the outlet pipe for one minute. Note: 500mls per minute (17 US fl oz) is the ideal flow rate for cooling water that is under 20°C (68°F). If your cold water supply is warmer than this then a higher flow rate may be required alternately cool the incoming water by connecting it via a copper tube and submersing this in a container of iced water.
5. Collect the first 50mls (2 US fl oz) and discard this. This is the **Head**. It is non-drinkable and **must** be discarded as it may contain by-products that will substantially reduce the quality of your spirit.
6. Collect 750mls (25 US fl oz) of the **Body**, which contains the Ethanol (drinkable alcohol) at about 70%/V. Make sure that the spirit outlet tube from the condenser stays well above the level of the spirit.
7. When using **Turbo Classic Yeast** it is important you **do not** collect more than 750mls (25 US fl oz) of distillate. Any spirit collected after this amount will be poor quality.
8. The more cooling water that flows through the condenser the lower the temperature in the reflux column, this will show on the thermometer. The temperature of your water also influences the amount you require. In summer you may need more water than in winter when the water is cooler. The slower the cooling water flows through the condenser, the higher the temperature will rise producing a faster flow of spirit. Running the cooling water at less than 500mls (17 US fl oz) per minute may result in a loss of alcohol through steaming from the spirit outlet. If you run more than 600mls (20 US fl oz) of cooling water through the condenser then this will slow the process down.
9. The thermometer temperature will slowly rise as the alcohol is boiled off. Increase the flow of water through the condenser to hold the temperature under 92°C (197°F). The flow will slow toward the end of the distillation.
10. Discard the rest of the remaining wash in the still as you've now extracted all the alcohol and the rest of the wash contains fermentation by-products and water.
11. Repeat these steps with the remaining 4 batches of 5 Litres (1.3 US Gallons) from the Wash you've fermented.

## Hints & Tips: Distillation

- **WASH NOT FERMENTED COMPLETELY ...** If for any reason the wash has not fermented completely, (i.e. above 990 SG all the sugar has not been converted to alcohol), then you will not collect the full amount of distillate through the Still. If you have not collected the full amount of alcohol, check you have used the correct amount of Turbo sugar/ dextrose in the Wash; and/or the specific gravity is below 990 before distilling; and/or there is no steam leak during distillation. A typical wash will take around 1.5 hours to run through the still. It will take about half an hour to heat up before any condensate will run out of the condenser. It will then take about 5 minutes to collect the Head, and approximately 1 hour to collect 750mls (25 US fl oz) of alcohol at 70%. This is a rough guide only. If the wash is not fully fermented out, then the unfermented sugars can foam causing the wash to come through the condenser with the distillate. In this instance Top Shelf Distilling Conditioner can be used to increase yield or avoid problems.
- **DISTILLATION WATER SAVER ...** Distillation Water Savers are available from your Brewing Specialist Store and the pump system recycles cooling water through your still to completely eliminate water wastage. You can save well over 150 litres (40 US Gallons) every time. The water saver is used in conjunction with a water drum or tank (60 litres (16 US Gallons) or larger) and frozen ice blocks to keep the water at a constant temperature below 50°C.

## Filtering Your Spirit

Use the **Still Spirits EZ Filter** to filter your spirit (sold separately).

The **Still Spirits EZ Filter** is the latest development in alcohol filtration. It uses a specially formulated solid activated carbon cartridge to remove unwanted flavours from distilled alcohol. The cartridge's porous design allows the spirit to pass through and the unwanted flavours to be absorbed by the activated carbon. The cartridge eliminates the need to handle powdered or granulated carbons.



## Watering the alcohol down and mixing up the spirits and liqueurs

Float a **Spirit Hydrometer** or **Alcometer** in the spirit to measure the alcohol content. Alcohol is thinner than water so the higher in strength the alcohol is, the further down the hydrometer floats. Read the line where the level of the spirit cuts across the hydrometer. Additives such as flavouring and **Liquid Glucose** will distort the hydrometer readings. Take good care of your Spirit Hydrometer as it is very fragile. Wash & sterilise with cold water only.

Spirit hydrometers should only be used to test spirit **before** any additives such as flavouring or liquid glucose are mixed and at the **calibrated temperature**. Still Spirits Spirit Hydrometers are calibrated at a temperature of 20°C (68°F) if the spirit is a different temperature to this then you can refer to the Temperature Correction Chart below. Taking readings of warmer liquids may damage your hydrometer.

### Temperature Correction Adjustment Chart Example

Your Spirit Hydrometer reads 50% A/V at a temperature of 25°C (77°F), look up the Correction Adjustment chart and you will see the value is minus 1.88. You then adjust your reading by that number – in this case subtract 1.88 from your reading of 50% A/V which will give you a realistic reading of 48.12% A/V.

20°C (68°F)	Alcohol % / Volume							
	30	40	50	60	70	80	90	98
Temp								
10°C (50°F)	4.12	3.98	3.67	3.42	3.19	2.92	2.45	2.06
15°C (59°F)	2.03	2.00	1.85	1.73	1.61	1.47	1.25	1.06
20°C (68°F)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
25°C (77°F)	-2.01	-1.95	-1.88	-1.76	-1.65	-1.51	-1.31	-1.12
30°C (86°F)	-4.06	-3.94	-3.78	-3.55	-3.33	-3.05	-2.67	-2.31
35°C (95°F)	-6.15	-5.98	-5.82	-5.4	-5.13	-4.67	-4.07	-3.54
40°C (104°F)	-8.29	-8.05	-7.92	-7.41	-7.03	-6.35	-5.5	-4.8

## Adjusting your alcohol strength down to 40% A/V

After carbon purifying, the spirit should be watered down in strength to 40% A/V prior to drinking. **We strongly advise against making higher strength spirit.**

### CALCULATION:

$$\frac{\text{LITRES (US Gallons) COLLECTED} \times \text{ALCOHOL STRENGTH}}{\text{ALCOHOL STRENGTH}} = \text{Total Litres (US Gallons) to be made up to}$$

### Example

To convert 45% strength alcohol to 40% use the following calculation

$$4.5 \text{ Litres (1.2 US Gallons)} \times 45 / 40 = 5.06 \text{ litres (1.33 US Gallons).}$$

If you collect 4.5 litres (1.2 US Gallons) of spirit and this measures 45% after carbon purifying, then multiply 4.5 x 45. Divide this by 40% and you will need to make the total spirit up to 5.06 litres (1.33 US Gallons) with water. In other words add 590mls (20 US fl oz) of water. This is a rough guide only. Watering down the spirit to 40%, or less, is very important as people unused to high strength spirit can easily overdose resulting in nausea and in extreme cases death.

## Troubleshooting

### **My wash started to ferment but stopped and my hydrometer reading is not down to 990 SG?**

It's probable the temperature rose too high in the first 24 hours of fermentation. It's important to note that yeast activity can raise the wash temperature by as much as 8°C (46°F) in the first 24 hours of fermentation. It's essential to start the wash at around 20°C (68°F) and not use any heat in the first 24 hours. If the wash overheats during this period the yeast may not have the energy to finish fermenting. If this has occurred, first stir the wash vigorously to stir the yeast back into circulation. If the SG has not lowered within 24 hours then obtain an EC1118 Wine Yeast. As there is alcohol present you should first start the yeast working in 200mls (7 US fl oz) of water. Once the yeast has dissolved, add a teaspoon of dextrose. When this is fermenting, add 200mls (7 US fl oz) of wash. When this is fermenting add half of this back to the stuck wash and top back up with wash. Continue this until the wash starts fermenting. Alternately, it may be because the wash has cooled down below 15°C (59°F). In this case, warm the wash up and stir vigorously to get the yeast back into circulation. Once the wash is warm fermentation should continue normally.

### **I have tried to get the wash going again but nothing seems to start it?**

Distill it anyway. You will not get as much alcohol as you would from a normally fermented wash. Watch the temperature on the condenser and stop when you have reached the appropriate maximum temperature for your model.

### **I did not get as much alcohol as the instructions said I would?**

Check that you have used the right quantity and type of sugar. Check there are no steam leaks from your still. Another cause could be that your wash has not fermented out completely.

### **My alcohol is not as strong as the instructions said it would be?**

Check as above. Also, make sure you do not exceed the maximum temperature allowed at the top of the Condenser for the type of still you have. If the alcohol is not in the wash then you can't distill it.

### **My distillate is blue?**

Ensure you have used Still Spirits Turbo System products (some brands produce a blue spirit due to an imbalance of nutrients). Use only one Turbo Yeast sachet per 25 Litre (6.6 US Gallon) wash—if the fermentation sticks do not add another Turbo sachet as this will result in an imbalance of nutrients.

### **My distillate is cloudy when it comes out of the still?**

The wash has frothed and come out the condenser with the distillate. Use Turbo Clear prior to distilling and/or Distilling Conditioner.

### **My distillate is clear when it comes out of the still and has been filtered but it goes cloudy after a few days?**

Mineral Salts have been washed out of the carbon and have reformed in the distillate. These are harmless but unsightly. This problem can also appear as coloured sediment when flavour essence has been added as the salts pick up the colouring from the flavouring. Wash the carbon cartridge more thoroughly at the recommended stage during fermentation. Ensure the temperature is kept as close as possible to ideal fermentation temperature. Filter spirit containing sediment with a wine filter. Leave until sediment has all dropped out (cold temperatures will accelerate process) and decant off sediment.

### **My distillate comes out of the condenser discoloured or has dark flecks in it?**

If the condenser is used for the first time then this could be residue from the manufacturing process. Soak with White Vinegar to clean this away then rinse with a weak solution of dishwashing liquid and warm water. If this has not occurred the first time the condenser has been used but occurs on subsequent uses then it can be traced to collecting too much distillate. This will result in the problem showing up next time the condenser is used. Clean as above and only collect the correct amount of distillate. Before distilling ensure that the SG is down to 990 otherwise make sure that you do not distill above the temperature limits of your condenser.

### **The condenser seems to overheat even though I am running plenty of water through it?**

The condenser may not be plumbed correctly. Fill the condenser with warm water then pull the hoses off the base of the main condenser. One of these will be the inlet for the water and the other will be the hose that transfers the water into the reflux condenser. The water should flow out of the condenser through the pipe that the inlet water pipe is connected to. If it flows out of the other one then the hoses have been fitted the wrong way around. Alternately, the internal overflow outlet could be missing or loose. Take the marble out of the reflux condenser and shake the whole condenser. There should not be any rattling. If there is, the overflow pipe may be loose.

### **No spirit comes out of my condenser and the lid pushes off?**

There is a blockage in the condenser – When the condenser is removed from the still it should be easy to blow in through the spirit outlet tube. Any resistance here would indicate a blockage that will most likely be at the back of the nipple that the outlet tube is attached to. Using a 4mm (1/6th of an inch) flat punch and a hammer just tap the punch up the outlet to push the inside wall of the main condenser away from the back end of the nipple. This should clear any blockage.

### **How do I know how much water flow the condenser needs to run correctly?**

Water flow is extremely important for the correct operation of the condenser. First the water runs through the main condenser, then into the reflux condenser. The water warms up in the main condenser as it removes heat from the condensing spirit. This hot water is then fed into the reflux condenser. If the flow of water is too high then the reflux condenser becomes too efficient which reduces the flow of steam into the main condenser. The reduced flow will also result in a higher alcohol content as more of the heavier molecules like water are returned to the Still and what does get past the reflux condenser is the lighter molecules or the alcohol – When a condenser is running properly the top two bands of the main condenser should be very hot. The bottom band of the spiral should be cool and the one above it should be hot but not too hot to touch.

### **Can I fit my condenser from my 5 Litre (1 US Gallon) Still onto a larger boiler?**

Yes you can fit the condenser from a 5 Litre (1 US Gallon) Still onto a 25 Litre (6.6 US Gallon) “3 in 1” fermenter. This will make a 25 Litre (6.6 US Gallon) Still. *Please note that in Australia, it is illegal to own and operate a still over 5 Litres.*

### **Classic Finest Reserve Scotch Whiskey goes cloudy when I mix it?**

This essence is prone to going cloudy if the alcohol content is below 40% A/V or the spirits is very cold - Make sure the alcohol content is above 40% when mixing. If possible mix it in at 50% then slowly water the spirit down. Make sure the spirit is warmer than 25°C (77°F).