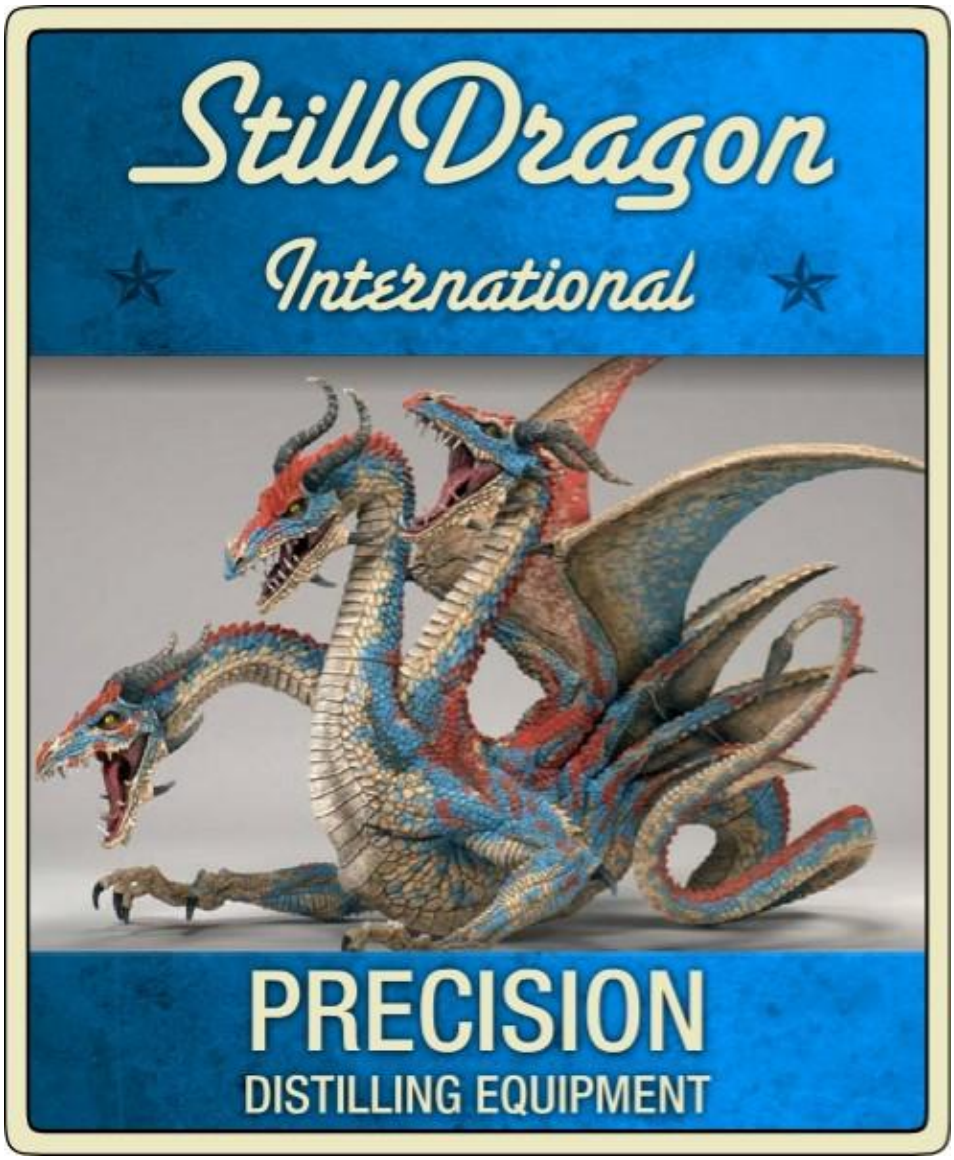
WELCOME TO THE WORLD OF STILLDRAGON



An introductory guide to the assembly

and use of StillDragon's

modular distillation components

By Crozdog©

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Introduction

Welcome to the StillDragon world of modular distillation equipment. Each component has been carefully designed by experienced distillers to bring you the greatest amount of flexibility and consequently many years of distilling pleasure.

Regardless of whether you have purchased a basic pot still or a tricked out Dash, you have made a solid investment in a system that will grow and adapt with you. StillDragon's modular approach ensures that.

This guide has been developed to provide you, the proud new "Dragon", with a basic understanding of how StillDragon's modular system can be configured and operated so you can start out your own StillDragon journey.

When you start out, please follow the instructions in this guide and don't listen to your next-door neighbour "who has been brewing for years". These guidelines have been developed by experienced distillers to ensure you successfully get on the road to making quality spirits.

But don't take this guide as being the one and only way, rather treat it as the starting point which shows you how to quickly get up and running using tried and tested techniques. Once you are comfortable with the information provided here, feel free to experiment if you wish – but you don't have to if you don't want to.

Regardless of whether you experiment of not, please provide your feedback as, StillDragon recognises that our customers are the innovators and the catalysts that push the distilling movement forward into creating better, safer, more precisely manufactured distilling equipment. Your experimentation and feedback will help the evolution and deliver of quality products to meet the needs of the distilling community.

Feedback on StillDragon products & this guide are best provided by signing up and posting on the StillDragon User Group forum. Simply visit http://www.stilldragon.org

Guarantee

Don’t forget StillDragon offer the following Guarantee;
Every item is backed by an unconditional money back guarantee. If you don't like it for any reason, send it back within 30 days in unused condition for a prompt, no questions asked refund of your purchase price.

Legal Considerations

Depending on your location, distilling alcohol without a license may be a violation of the law.

StillDragon equipment is only intended for legal uses, and we strongly discourage illegal use of any kind. Before purchasing or using our products, we recommend that you investigate your local laws regarding distillation and fully comply with any necessary licensing requirements.

Thanks

The author wishes to thank Philter & Cooperville for their editing and technical input. Cheers guys.

Extra thanks to Cooperville for allowing me to include the link to his videos.

Also this manual would not be here without Fester, Smaug & Punkin. Keep up the good work.

Glossary

ABV	Alcohol by Volume, often expressed as a percentage. Example 40% abv.
Alcometer	An instrument used to find the ethanol percentage in a binary ethanol-water solution.
Aldehyde	A volatile impurity found in the fore shots.
Azeotrope	Liquid mixture of two or more components, which has a unique constant boiling point. Maximum azeotrope for alcohol is 192 degrees proof.
Backset	The acidic liquid left in the still after distillation of whiskey has completed. Used in the creation of sour mash whiskey.
Bubble Caps	Used in a column and sit over risers. Caps provide contact between the rising vapors and descending enriching the vapors.
Charge	The volume of alcoholic beverage wash, or low wines going to the still.
CM	Cooling Management: A type of reflux still which is controlled by the "management" of the rate of flow of coolant to control the reflux rate / output. The Dash series are CM stills.
Column	The vertical section rising off a boiler. Can consist of either a plated column; a packed section or a combination (hybrid).
Condenser	A heat exchanger in which hot vapors are cooled and condensed into liquids.
Congeners	Impurities. These minor chemicals give liquor (spirits) distinctive character and flavors. Found in both heads and tails. Maybe considered desirable or undesirable depending on quantity and type.
Cuts	The process of separating different types of alcohol. Usually cuts are made for foreshots, heads, hearts and tails during the final distillation run.
DAP	Diammonium Phosphate a yeast nutrient.
Dephlegmator	A reflux condenser at the top of the column that sends distillate back toward the boiler.
Distillation	The process of boiling and condensing a mixture of volatile liquids that changes the relative concentrations of those liquids in the output.
Double Distilling	A process where the distillate is distilled twice first to remove alcohol and second distillation is to make cuts separating heads, hearts, and tails.
Downcomer	A pipe or tube for moving fluid material downward usually transferring liquid from one tray to the one below in a bubble tray column.
Dunder	The acidic liquid left in the still after distillation of rum. Used in subsequent fermentations to produce more flavoured heavy rum.
Enzymes	Proteins that assist conversion of starches into sugars that will ferment.
Esters	Fermented by products made by yeast action that contributes fruity characteristics, aroma, and flavor to the wash.
Ethanol	Otherwise known as ethyl alcohol. A clear colorless, flammable oxygenated hydrocarbon with a boiling point of 78.5 C. Drinking alcohol.
Feints	Often used to refer to a mixture of heads and tails to be recycled into a following run. Some feel feints refer to tails only but not always defined as such on the various forums.
Fermentation	A change that takes place when yeast converts the sugar to alcohol.
Final Gravity	The density of the wash after fermentation. Knowing the original and final gravity of a wash allows you to determine the percentage of alcohol of the wash.
Flocculation	The clumping and settling of yeast out of solution, forming a cake-like substance in the bottom of the fermenter.
Foreshots	A small amount of low boiling distillate containing acetone, methanol, and aldehyde volatiles. Note that the fore shots are hazardous and must not to be consumed.
Fusel Oil	A bitter oil found in tails. A liquid composed of amyl and isobutyl alcohols.
Heads	Spirits from the beginning of the run that contain a high percentage of low boiling alcohols and other compounds such as aldehydes and ethyl acetate.
Hearts	The desirable middle alcohols from your run.

Hybrid	A still made by adding a packed column on top of a plated column.
Hydrometer	An instrument that measures the weight or gravity of a liquid in relation to the weight of water. Cannot be used to directly measure alcohol already in a mixture.
LM	Liquid Management: A type of reflux still which is controlled by the "management" of the rate of liquid output.
Low Wines	The spirits collected from the first distillation.
Lyne Arm	In a traditional pot still the tubing from the pot's head to the condenser.
Mash	A mixture of ground malted grains and hot water.
Malt	Sprouted Dried grains. Malted grains contain enzymes that convert starches into fermentable sugars.
Mash Tun	A tank with a false bottom in which hot water and grains are mixed to produce wash.
Must	A fermentable liquid that uses the sugars from fruit.
Neutral	See NGS.
NGS	Neutral Grain Spirits 95+% alcohol.
Oaking	process of aging your liquor in oak barrels, chips or sticks.
OG	Original Gravity. The density of the wash before fermentation.
Packing	Material used in a still's column to increase the surface area and thus the reflux and quality of the alcohol. Stainless steel and copper mesh are commonly used packing materials.
Parrot	A device looks a bit like a bird that attaches to the still or is at the point of collection that floats the alcometer.
pH	A measure of the acidity or alkalinity of a solution. The pH scale used ranges from 0-14.
Pitch	The process of adding yeast to the wash.
Plates	Sometimes known as trays, they are located horizontally at intervals in a column, often contain bubble caps that enrich the reflux.
Pot Still	A simple batch distillation unit used for the production of heavily flavored distillates. It consists of a boiler and an overhead-vapor pipe (lyne arm) leading to a condenser. Usually chosen for stripping runs and the making of whiskey and rum.
Proof	A measurement of alcohol concentration. 100 proof is equal to 50% abv.
Reflux	Formed when vapors condense and re-vaporize in the column of a still.
SG	Specific Gravity. SG meters are a hydrometer calibrated to measure sugar content in a wash to determine potential alcohol.
Shot Gun	A shell in tube type of condenser with multi-tubes where the vapors pass through the tubes surrounded by coolant.
Slop	Hot smelly spent corn wash from the still.
Sparging	Performed at the end of mashing, a process in which hot water is sprayed on or run through the grain bed to extract additional sweet wash.
Spirit Run	The final distillation producing finished product.
Stripping	The process of running low ABV wash through a still with no head or tails cuts to increase alcohol concentration before being re-distilled.
Tails	A distillate containing a high percentage of fusel oil and little alcohol collected at the end of a run.
VM	Vapor Management: A type of reflux still which is controlled by the "management" of the rate of vapor output.
Wash	Fermented substrate containing alcohol.
Yeast	Any of a certain unicellular fungi, generally members of the class Ascomycetaceae. Many types of yeast are capable of producing ethanol and carbon dioxide by the anaerobic fermentation of sugars.

Safety in the Distillery

You need to not only be aware that there are dangers in operating a distillery but that simple measures can be implemented to minimise the risks. This section details some of the major concerns & how they may be mitigated.

The number one thing to remember is: **do not leave your still unattended**. Things can and do happen fast. If you are not there, how can you stop a problem from becoming a situation?

CO2

The conversion of carbohydrates like starch & sugar into alcohol is achieved through the process of fermentation. Our yeast friends eat the carbohydrate and produce both alcohol and carbon dioxide CO2 (among other things).

Carbon dioxide is a toxic gas, which is odourless, colourless and heavier than air. Rising levels of carbon dioxide affect the human body and can cause asphyxia, but what level is dangerous and how do you know you are suffering from carbon Dioxide poisoning?

1000ppm - 0.1% - Prolonged exposure can affect powers of concentration

5000 ppm - 0.5% - The normal international Safety Limit (HSE, OSHA)

10,000ppm - 1% - Your rate of breathing increases very slightly but you probably will not notice it.

15,000ppm - 1.5% - The normal Short Term Exposure Limit (HSE, OSHA)

20,000ppm - 2% - You start to breathe at about 50% above your normal rate. If you are exposed to this level over several hours you may feel tired and get a headache.

30,000ppm - 3% - You will be breathing at twice your normal rate. You may feel a bit dizzy at times, your heart rate and blood pressure increase and headaches are more frequent. Even your hearing can be impaired.

40,000-50,000ppm - 4-5% - Now the effects of CO2 really start to take over. Breathing is much faster - about four times the normal rate and after only 30 minutes exposure to this level you will show signs of poisoning and feel a choking sensation.

50,000-100,000ppm - 5-10% - You will start to smell carbon dioxide, a pungent but stimulating smell like fresh, carbonated water. You will become tired quickly with laboured breathing, headaches, tinnitus as well as impaired vision. You are likely to become confused in a few minutes, followed by unconsciousness.

100,000ppm-1,000,000ppm - 10-100% - Unconsciousness occurs more quickly, the higher the concentration. The longer the exposure and the higher the level of carbon dioxide, the quicker suffocation occurs.

Harm minimisation

Luckily, CO2 levels can be easily controlled by simply ensuring your fermentation area has lots of ventilation, especially in lower levels of the room.

If you use a converted chest freezer as a fermentation chamber, be aware that CO2 will “pool” in the bottom of the cabinet. Propping the lid open and using a fan to inject fresh air into the cabinet would be a wise precaution to periodically perform.

For more information see
http://www.eiga.eu/fileadmin/docs_pubs/Info_24_11_Carbon_Dioxide_Physiological_Hazards_Not_just_an_asphyxiant.pdf

Intoxication

Many distillers consider it OK to have a few drinks while running their still. We don't need to preach on about how alcohol affects perception, judgement & reaction times, so we won't. Just remember that the consumption of any alcohol during a run will affect your abilities & may contribute to stupid, potentially dangerous mistakes or accidents.

Ethanol vapour is not only highly flammable (see fire risk below) it is also easily inhaled. Repeated inhalation will result in intoxication. So even though you have not had a drink, your blood alcohol level may be over the legal limit if you do drive a car after a run.

Harm minimisation

Save your drinking until after the run has completed. Consider it a reward for a job well done.

Only use gaskets in good condition. Replace any that are broken, hard or cracked.

Ensure that all Tri-clamp fittings are tightened firmly before starting a run.

Provide adequate ventilation in the distillery – if possible, open doors & windows so you get a cross breeze.

Fire risk

As Ethanol is highly flammable, great care must be taken in the distillery.

Vapour leaks need to be quickly identified & stopped even if it means shutting down and starting the run at another time / day.

Any spills must be quickly cleaned up.

Harm minimisation

Keep an appropriate type of fire extinguisher close at hand. CO2 and dry powder extinguishers are both suitable.

Provide adequate ventilation in the distillery.

Don't smoke in the distillery.

If you use a gas burner as your heat source, build a shroud around the burner – this might improve your efficiency slightly too.

Rinse cleaning sponges & rags well after cleaning up.

Water & Electricity

We all know they don't mix, so take extreme care. If you are making your equipment eg a boiler always use the services of a qualified electrician to do the build for you or inspect the wiring before use.

Use GFCI's / RCD's .

Where possible do not use extension cords or power boards.

Ensure all equipment is properly earthed.

Don't run power cables through pools of water.

Do no use equipment with damaged plugs, sockets or cables. Examples include burn marks, cut insulation and exposed wiring.

Physical Injury

Lots of accidents occur at home that would not occur in the work place simply because workplace safety laws are not followed at home.

Harm minimisation

To minimise the risks of injury:

- Always wear protective clothing like gloves, steel cap boots. Consider using a liquid proof apron – hot dunder / backset can easily scald when it splashes out of a bucket.
- Clean up any spills immediately
- Do not leave hoses or power cords running over the floor in the work area
- Practice Safe lifting
    - Always bend the knees, keep your back straight & use the power of your legs rather than your arms
    - A 50l keg ¾ full with a DASH 1 mounted on top will weigh over 50kg. – do not try & pick it up!
    - At the end of a run the boiler will still hold a lot of heat even after you've drained it – don't try & pick it up!
    - Be aware of the weight of objects and your own limits. A 25kg sack weighs 25kg regardless of what it contains.
    - There are a range of strategies that can assist when dealing with performing "heavy work" i.e. lifting or carrying up to 45kg including:
- Elimination—consider eliminating the requirement to lift by design, where possible e.g. use a pump to move liquid rather than bucketing it around
- Substitution—consider breaking down the load into lighter components or replace lifting a load with pushing a load (for example, using a trolley)
- Minimisation—try to decrease the frequency of lifting where possible
- Engineering—use a trolley or other manual handling equipment
- Assistance—get help for lifting and lowering
- Personal protective equipment—e.g. gloves, footwear & back braces.

(Source: Australian Safety and Compensation Council 2007, WorkCover NSW 2007).

At a minimum, turn power off at the wall before unplugging or moving any electrical items.

Storage

All alcohol needs to be carefully stored, high ABV% even more so.

Glass or stainless steel containers are the perfect storage vessels. HDPE drums are also alcohol safe, but many do not like the idea of keeping high proof alcohol in plastic.

Keep any product in a secure location out of the sun and out of reach of children – they are silly enough as they are ;-)

Boilers

Just to remind you, your new StillDragon unit won't work without a boiler. While a StillDragon boiler is ideal, and allows the still to be directly mounted, many people around the world mount their dragons on top of a 50l (15G) Sanke beer keg.

If you use a keg, please ensure that they are legally sourced.

DragonTip

For safety reasons, keep the boiler charge below 40% ABV. Dilute your charge if you need to.

Heat

All boilers need a source of heat to raise the temperature of the wash so that the alcohol vaporises. While many users run their rig on propane burner, the StillDragon Element guard provides a safe and simple way to wire in an electric element.

If you cannot weld stainless steel, you will need to get a welder to cut a hole in the side of the keg at near the bottom and weld on a ferrule to mount an Element Guard.

Figure 1: An installed Element Guard

Draining

After a run you will need a method to drain your boiler. Various approaches are taken with syphoning and pumping often being used. A neater solution is to install a drain port and mount a tap.

Figure 2: Keg Drain

Figure 3: Low Profile Drain on what was the top of the keg

Still Mounting

Your new StillDragon unit needs to be securely fastened to the top of your boiler. The StillDragon Modular system utilises the simplicity of triclamp fittings for doing this.

If you are using a keg boiler:

- The flange that the dip tube mounts in is 2” in diameter. Once the dip tube is removed, a gasket, a 2” – 4” adaptor and a 2” triclamp are all that is required to mount your still on the top of the keg.
- Alternately you can weld on a larger triclamp ferrule. 4” is common but 6” allows easier access for cleaning. If you cannot weld stainless steel, you will need to get a welder do this for you.

If you are using any other sort of boiler you will need to attach a triclamp ferrule to the top of the boiler to attach the still to.

Figure 4: A 4" Ferrule welded onto what was the bottom of a keg. A fill port can also be seen.

Options

If you are getting a keg modified for an element guard kit or a 4' ferrule, you may want to consider getting some additional optional enhancements made at the same time. Some options to consider are:

- Drain port
- Fill port
- 2nd element
- Legs
- Depth gauge

Heat control

A method of controlling the amount of heat that is applied to the wash in the boiler is very handy. It will allow you to get to temperature quicker and provide another method of control.

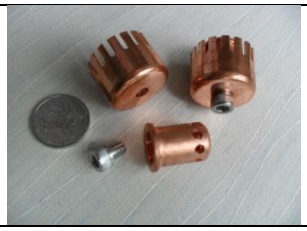
Electric element users have a large variety of choices available to control the amount of power applied. Options range from the simple (run 2 elements and turning the second element off as needed) through, home-made units using a variety of techniques through to off the shelf units eg our element controllers made by Big Pa available on the StillDragon site or from http://www.rbscontrols.com/ .

Those who use gas burners can control them through some or all of the following options:

- Turning rings on or off as required
- Adjusting the burner control up or down
- Using an adjustable regulator (note - these have much finer control than the burner control knob)

What are all these bits?

When you unpack your delivery we suggest that you group all of the same components together. That will help you check that everything has been delivered and make assembly easier.

Item	Description / Use	Pic
Silicone gaskets	Sealing gaskets used between 2 components	
Triclamps	Clamping mechanism used to join components	
Keg Adaptor	These are either straight extensions or reducers. They are used to connect to the top of the keg.	
Extension piece	Add height eg move column up from top of keg; pack with scrubbies etc Various lengths and diameters available.	
Bubble cap	Copper bubble cap	

Downcomer	All copper downcomers to fit the predrilled Stilldragon copper plates.	
Bubble plate	Precision cut plates to suit Stilldragon Dash series.	
Bubble Tee	Use this in conjunction with a 3" lens and clamp or our 3" Sightglass Kit for a custom bubbletee.	
Reducer	Connect different size fittings together. Use as a Keg Adaptor. Various sizes available.	
Dephegmator	Reflux condenser in our Dash units or on hybrid columns. 2” product condensers can also be used as deplhegmators on smaller stills.	
Product Condenser	Various sizes available. Colling hot vapour to liquid product.	

Bends	Various uses to get equipment aligned as required / save space. 45° and 90° available in 2” & 3 “. U bend only available in 2”	  
Parrot		
Ferrule	For custom fabrication eg use a 2” on the side of a keg to mount an element in an element guard	

Element Guard Kit	Use with a Ferrule to Safely install an electric element in a boiler	

Note: depending on what you have purchased, you may not have some of these components – remember the modular nature of StillDragon.

http://www.stilldragon.com.au/stilldragon_store.php?category=17&view=productListPage

Figure 5: Just out of the box - Partially assembled

Pre-Assembly

Bubble plates

Before use, you will need to mount the bubble caps and down comer onto a predrilled plate using the following procedure:

1. Arrange the predrilled plates, bubble caps and downcomers in front of you on a bench or table
2. Take 1 down comer assembly, pull apart, insert pipe into plate, mount slotted cap over bottom of downcomer (on the bottom side of the plate), insert screw & tighten finger tight
3. Take 1 bubble cap assembly, pull apart, insert riser into plate from bottom, mount slotted cap over top of riser (on the top side of the plate), insert screw & tighten finger tight.
4. Repeat step 3 for each of the remaining 4 bubble caps
5. Use a 2.5mm Allan key (not supplied) to firmly tighten all screws including the one on the downcomer. Do not over tighten as you could strip the thread.
6. Repeat steps 2 - 5 for all other plates

DragonTip

For a uniform look, ensure that when you install the sight glass kit on each bubble Tee, the half back plates are all aligned the same way eg the split is in the middle at the top

Figure 6: Blank Plates

Figure 7: Bubble Caps

DragonTip

Some owners drill a single 1 – 1.5mm (max) hole in each plate & the bottom of the downcomer to allow the column to drain at the end of a run. This is not necessary.

Figure 9: Downcomers

Figure 8: Plate Assembly

Sight Glasses

Before use, you will need to mount the sight glasses onto each bubble Tee using the following procedure:

1. Install the silicone o-ring into the groove of the ferrule on the side port of a bubble Tee
2. Place the lens over the o-ring and center the lens on the ferrule
3. Push O-ring firmly into the groove of the outer housing (the complete circle)
4. Turn the outer housing over and place on top of the lens
5. Place the half back plate under the ferrule and start 1 of the screws at 1 end of the half back plate
6. Start 2nd screw opposite 1st
7. Repeat steps 5 & 6 for the other half back plate
8. Insert remaining screws, re-centre if required
9. Tighten screws – DO NOT OVER TIGHTEN

Video: http://www.stilldragon.com/3-sgk.html

Figure 10: Sight Glass Kits (Brass rings not shown)

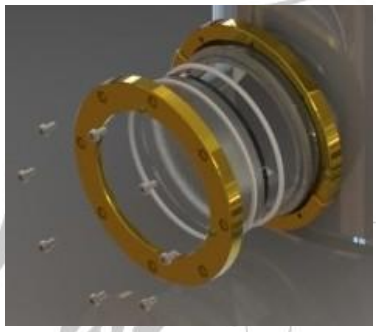


Figure 11: Sight Glass Assembly

Condensors

Screw in quick connect fittings using PTFE tape. Either straight or 90° fittings can be used.

Figure 12: 90° Straight Quick Connect Fittings

Figure 13: 90° Quick Connect Fittings

Parrot

Before use, you will need to assemble the parrot using the following procedure:

1. Place a ¾’ silicone gasket into the groove of the ferrule on the top of the inlet tube.
2. Place the surge arrestor[1] on the silicone gasket.
3. Secure the surge arrestor to the parrot using a triclamp – do not over tighten.
4. Place a ¾’ silicone gasket into the groove of the ferrule on the parrot drain.
5. Place the ¾” ball valve fitting on the silicone gasket. Secure using a triclamp – do not over tighten.

DragonTip

Whenever you join two triclamp fittings together, always ensure that the gasket seats into the groove of both fittings.

Figure 14: A Disassembled Parrot - As Shipped

DragonTip

Insert a small piece of stainless or copper mesh into the bottom of the parrot to reduce the chance of alcometer breakage.

Figure 15: An Assembled Parrot

[1] A surge arrestor is used to open the input of the parrot to the atmosphere. This stops incorrect alcometer readings, which would otherwise be produced by the pressure of the vapour.

Assembly

Because of the modular nature of the StillDragon range, it is not possible to detail each and every possible permutation. Instead this guide will show you three commonly used configurations, a pot still, a plated column and a hybrid column.

Note: for simplicity this guide assumes the use of a keg boiler &/or a boiler with fittings that a triclamp will mount to. If you are using another type of boiler, you will have to determine how to connect your still to the boiler.

DragonTip

For simplicity and safety it is recommended that the components be assembled directly onto your boiler rather than assembling everything and then trying to mount the built unit onto the boiler.

Pot still

The following assembly uses a 4" extension, substitute 2" or 3' fittings as you need depending on what you have purchased.

1. Place an appropriate sized silicone gasket on the ferrule on top of the keg
2. Place the column adaptor on the silicone gasket
3. Secure the column adaptor to the keg using a triclamp – do not over tighten
4. Place an appropriate sized silicone gasket on the column adaptor
5. Place the extension fitting on the silicone gasket. Secure using a triclamp – do not over tighten
6. Place an appropriate sized silicone gasket on the extension
7. Place the reducer on top of the extension
8. Connect the bend(s) to the reducer
9. Connect the product condenser
10. Connect the parrot

DragonTip

Whenever you join two triclamp fittings together, always ensure that the gasket seats into the groove of both fittings.

Refer to following section for details on connecting up coolant lines before use.

Alternate Configurations

By using different StillDragon components can easily assemble a pot still that suits your situation. You are only limited by your imagination and what you have purchased. Pot stills can be assembled using Torpedos or Bubble Tee's without the plates. The following pictures provide an indication of just some of the possibilities.

DragonTip

The dephlegmator or other fittings can be used to add height so that the output of the parrot is at a convenient height.

Figure 16: A 2" Pot Shot

Figure 17: 2" pot stills made from extensions

Figure 18: The Authors 4" Pot Still using a 510mm Extension

Figure 19: Extensions Used to Move Location of Parrot

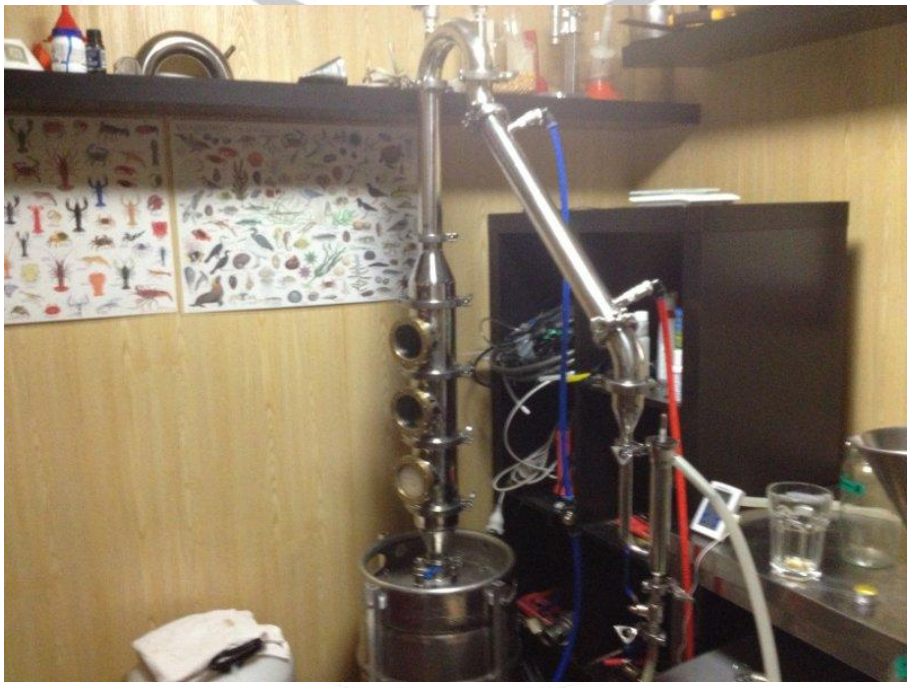


Figure 20: Bubble Tee's Being Run Without Plates

Plated column still

The following assembly describes a 4” Dash 1. A Dash 2 is assembled the same way; just add 2 more bubble tees. Substitute 2”-4” adaptors and torpedo sections for bubble tees if that is what you have purchased.

1. Place an appropriate sized silicone gasket on the ferrule on top of the keg
2. Place the column adaptor on the silicone gasket
3. Secure the column adaptor to the keg using a triclamp – do not over tighten
4. Place a bubble cap silicone gasket on the column adaptor. These do not have the flange on the inner side of the ridge.
5. Place the 1st Bubble plate fitting on the silicone gasket.
6. Place the 1st Bubble Tee fitting on the silicone gasket / bubble plate.
7. Secure using a triclamp – do not over tighten
8. Repeat steps 4, 5, 6 & 7 for the number of plates you want to use
9. Place a silicone gasket on the top bubble tee
10. Place the dephlegmator in position
11. Secure using a triclamp – do not over tighten
12. Place the reducer on top of the dephlegmator
13. Connect the180° bend to the reducer
14. Connect the product condenser
15. Connect the parrot

Refer to following section for details on connecting up coolant lines before use.

Figure 22: A 2 Plater using Torpedos

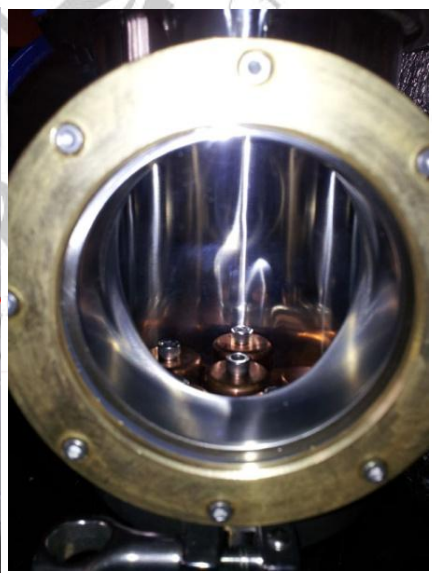


Figure 21: Magic Happens Here

Figure 24: A 4 Plate Dash 1

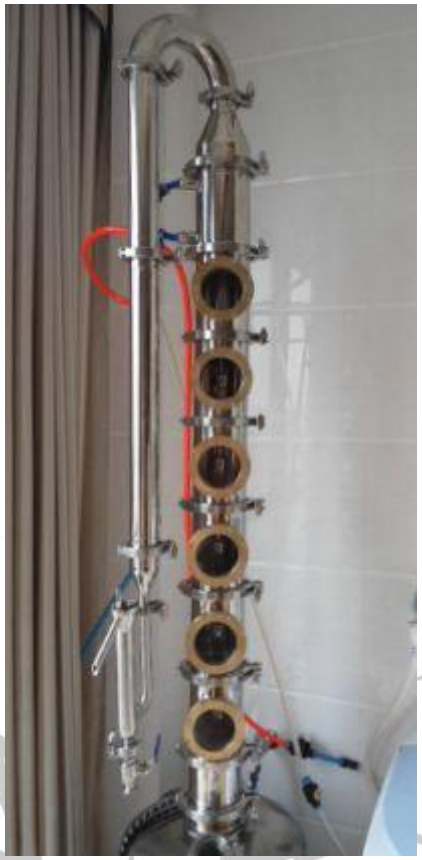


Figure 23: A 6 Plate Dash 2

Hybrid column still

The following assembly describes how the author adds a 510mm extension to a 4" Dash 1 to make a hybrid.

Figure 25: The Author's Hybrid Setup

Assemble as you would a Dash, but before mounting the dephlegmator as described in step 10 above, connect a packed extension on top of the 4th Bubble Tee, then proceed with the rest of the assembly as described in steps 11-15 above.

Stainless steel or copper mesh make good packing. The author uses 6 large stainless steel scourers / scrubbies to pack his 510mm extension. The picture below shows the ones he purchased from Bunnings [2]in a 3 pack.

Figure 26: Stainless Steel Scourers Used for packing

[2] Bunnings is a large hardware store in Australia. In the US try Home Depot or Walmart.

Alternate Configurations

Figure 27 2 Plates with a 2" Packed Section

Figure 28 2 Torpedos with a 2" Packed Section

Figure 29: Modularity at Work

Plumbing

Overview

Cooling is an essential part of distillation and has 2 basic uses:

1. Reflux control
2. Product condensing / cooling

As a general rule pot stills don't use any induced reflux however it may be used if you desire lighter less flavoured products. Plated column stills like the Dash series & hybrid stills need reflux to operate ie load the plates. The dephlegmator is the component used to generate reflux. Adjusting the coolant flow through the dephlegmator controls the amount of reflux.

DragonTip

More coolant flow through dephlegmator = more reflux

Less coolant flow through dephlegmator = more output

Figure 30: Various Size Dephlegmators (Reflux Condensers)

When the cooling capacity of the dephlegmator is equals to or greater than the power input, all vapour reaching the dephlegmator is condensed and returned to the column, no product reaches the product condenser. The still is known to be in equilibrium. Maintaining the still in this state for 30 minutes at the start of the run will cause fores and heads to compress at the top of the column.

Figure 31: Different Size Product Condensers

Condenser Connections

There are 2 threaded ports on the side of each condenser. These are used for the coolant inlet & outlet. Whilst you can use these ports with straight quick connect fittings, 90^{O} fittings are commonly used to reduce any stress on the hose / fitting.

Quick Connect Fittings

Quick connect fittings are used to quickly & easily setup & disassemble your still. They make it easy to reconfigure your setup as you require.

You will need to install the condenser connection fittings using PTFE tape and tighten then with a spanner.

Figure 33: Quick Connect Y's

Figure 32: Quick Connect Tee's

Figure 34: Quick Connect Joiners

Figure 35: Quick Connect Thermo Tee

Connection

To connect hose to the fitting, simply push the hose into the fitting as far as it will go, then pull back slightly.

Disconnection

To disconnect hose from a fitting, simply push back the blue ring then gently pull the hose out of the fitting.

DragonTip

After a lot of use, you may need to cut approximately 1cm from the end of the tubing to get a better seal. Plastic conduit cutters work well for this task.

Needle Valves

Needle valves are used to provide fine control of the coolant flow. They can be used on both the dephlegmator and the product condenser. They can be fitted on either the input or the output. The author uses them on the output.

Figure 36: Quick Connect Needle Valve

DragonTip

Needle valves are directional. Make sure you install them with the coolant flowing in the direction indicated on the valve.

Counter Flow or not?

The following diagrams represent the flows and temperatures of two ways of connecting the cooling lines to a condenser.

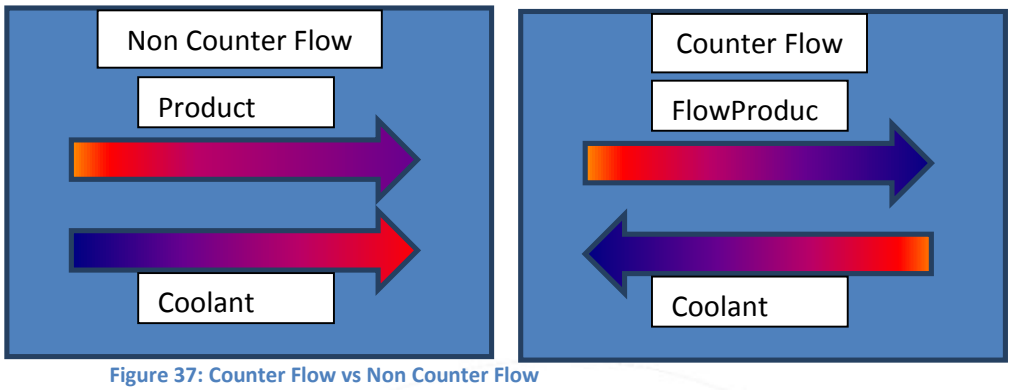


Figure 37: Counter Flow vs Non Counter Flow

Counterflow cooling is considered to be more efficient. However some people have had issues getting it working efficiently with their dephlegmator on top of their column. This is because the dephlegmator does not completely fill with coolant when filled from the top. Air becomes trapped in the dephlegmator thereby reducing its effectiveness.

Connections

There are 2 common ways to connect the plumbing:

1. Each condenser is fed individually.
2. The product condenser is fed with the warm output of the dephlegmator.

This guide will only show how the author uses individual feeds. Feel free to research and experiment with supplying the product condenser from the dephlegmator output.

You will need to carefully cut the PU tubing into several pieces to suit your setup / goals. Use a “Stanley” knife on a piece of scrap wood to achieve this – please be careful.

Use the blue tubing for the coolant input and the red tubing for the hot output.

The following diagram shows how the author setup his cooling lines using counterflow. This setup can be seen in subsequent photos.

DragonTip

To operate a dephlegmator in counter flow mode, it must be full of coolant. To achieve that, connect the coolant supply to the bottom port of the dephlegmator and fill. Once a steady stream comes out of a hose connected to the top port ie no more bubbles, close the needle valve then swap the inlet & outlet hoses so that the

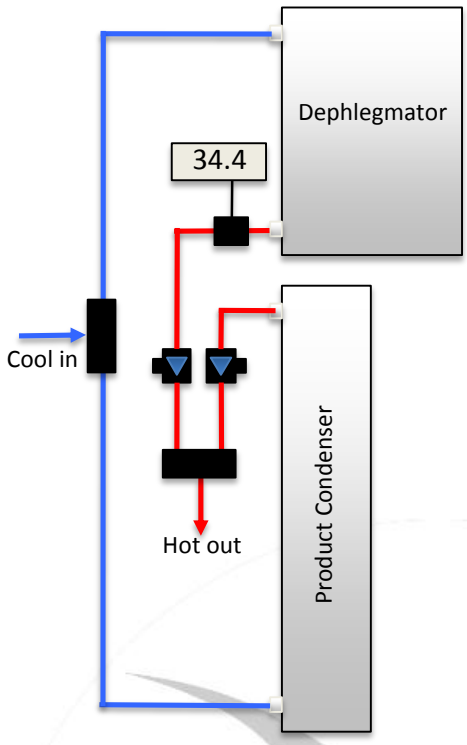


Figure 38: Plumbing Diagram

For a simple pot still configuration, only the product condenser will need to be plumbed in.

The author uses a recirculating system driven by a pump. Bilge pumps and large aquarium pumps can be used. Many operators install a pressure-reducing valve to reduce stress on the pump cause by backpressure.

Figure 39: Condenser Connection, Quick Connect Fitting & Thermo Tee

Figure 40: Quick connects, Y Splitters & Needle valves (note direction of flow)

Figure 41: The Authors Plumbing Setup

Figure 42: Connect Needle Valves & Thermo Tee's where they are Easy to Reach

Operation

The instructions in this section are not the only way to operate the StillDragon units. They have been proven to be reliable techniques that will get new owners producing quality products.

It is strongly recommended that for the first several runs, new owners follow these instructions and record each run on the run record sheet (copy the one at the end of this book) before attempting to develop your own method. This approach will provide new owners with a basic understanding of still operation as well as a body of reference data before performing any experiments.

Cleaning Run

Before using your unit to produce alcohol for consumption it is necessary to do a cleaning run. This is required to remove any oils and contaminants that remain on the components following the manufacturing process.

It is only necessary to perform a cleaning run once. Please note that you will need to clean any additional components you add to your system before using them.

1. Complete assembly
2. Partially fill boiler with water ensure that the element is well covered. In a Keg boiler half full works well.
3. Add 2l white vinegar to the water in the boiler.
4. Set the product condenser to a high flow
5. Set the dephlegmator to medium flow
6. Close the parrot drain
7. Put the 1st collection jar under the parrot output spout
8. Ensure work area is clean, free of hazards and your fire extinguisher is easily reached
9. Turn on your element or burner. Adjust it to maximum output.
16. Once “product” start coming out, you will observe there is likely an oily film on the surface and a vinegar smell. This is normal.
17. Collect in one jar.
18. Continue to collect for 20-30 minutes.
19. Shutdown and clean up.
20. Discard all collected “product”.

Have a look at Coopervilles video of his cleaning run:
http://www.youtube.com/watch?v=WyikHbgnXmM

Pot still mode

The following instructions apply to the operation a pot still.

Stripping Run Operation

The purpose of a stripping run is to quickly reduce the water concentration so that the output of a couple of runs can be combined to do a spirit run. This is a more efficient way to operate a pot still and generally results in better quality spirit.

1. Complete assembly
2. Fill boiler with wash. Depending on the volume you may want to consider adding 'top up' water to ensure that the element does not get exposed during the run.
3. Calculate the alcohol content in the boiler e.g. 40l of 10% wash = 4l of 100%
4. Set the product condenser to a high flow
5. Close the parrot drain insert alcometer
6. Label collection jars 1-x
7. Put the 1st collection jar under the parrot output spout
8. Ensure work area is clean, free of hazards and your fire extinguisher is easily reached
9. Turn on your element or burner. Adjust it to maximum output.
21. Watch and record any observations including the time you made the observation.
22. When you feel that the temperature near the top of the still is the same as the rest of the riser, pay attention, product will soon be coming out the parrot.
23. Once product starts coming out, record time & ABV%. Collect in small jars (the author likes 1 l glass jars marked every 100ml).
24. Once jar fills, swap in an empty one & record time.
25. Continue to collect in small jars & record ABV, time and volume for each jar. By keeping track of how much you have collected and comparing that to the amount you calculated was in the boiler, you can get an indication of how far into your run you are.
26. As the run progresses the ABV% will decrease.
27. Continue to collect until alcometer reads 10-20%, shut down & clean up.
28. Combine collected product (now known as low wines) in a storage vessel. Measure and record ABV%.

DragonTip

Assembling with 1-2 plates will allow the production of quality flavoured products like rum or whiskey with only a single run.

Remember More plates = less flavour.

DragonTip

Some owners discard the heads and tails from stripping runs. This is a matter of personal preference.

Spirit Run Operation

The purpose of a spirit run is to carefully manage the operation of the still to collect high quality spirits.

1. Complete assembly
2. Fill boiler with low wines from 1 or more stripping runs. Depending on the volume you may want to consider adding 'top up' water to ensure that the element does not get exposed during the run.
3. Calculate the alcohol content in the boiler e.g. 40l of 10% wash = 4l of 100%
4. Set the product condenser to a high flow
5. Close the parrot drain insert alcometer
6. Put the 1st collection jar under the parrot output spout
7. Ensure work area is clean, free of hazards and your fire extinguisher is easily reached
8. Turn on your element or burner. Adjust it to maximum output.
9. Watch and record any observations including the time you made the observation.
10. When you feel that the temperature near the top of the still is the same as the rest of the riser, pay attention, product will soon be coming out the parrot.
11. Reduce heat.
12. Once product starts coming out of the parrot, record time & ABV%.
13. Adjust the heat until you get 1-2 drops per second coming out of the parrot. Collect fores until you're happy 100– 200ml is typical. Record amount collected.
14. Once heads start coming out, adjust heat until you get a broken stream. Collect in small jars (the author likes 1 l glass jars marked every 100ml) & record time to fill each & volume collected. Depending on the wash, you will collect 500ml – 1500ml of heads.
15. Once a jar fills, swap in an empty one & record time & ABV%.
16. Don't forget to smell the output & I also like to periodically taste a drop to see how it is progressing.
17. Once you are into hearts, increase the heat some more to get a bigger stream out from the parrot – but not too much – a pencil lead size stream works well. Continue to collect in small jars & record ABV, time and volume for each jar. As the run progresses the ABV% will decrease.
18. By keeping track of how much you have collected and comparing that to the amount you calculated was in the boiler, you can get an indication of how far into your run you are. As you get towards the end of a run (i.e. when you have collected about 80% of the amount you previously calculated), you need to pay more attention to detect when tails start.
    a. Keep smelling & tasting but do it more frequently.
    b. Watch what is the alcometer doing - ABV will drop quite quickly once hearts end
    c. Swap out jars more frequently

DragonTip

Read Kiwi's excellent guide to making cuts to get a good rundown on how to determine when you are into hearts http://www.stilldragon.org/discussion/50/kiwis-guide-to-cuts

19. Continue to collect until alcometer reads 10-20%, shut down & clean up.
20. Cover jars with filter paper or cloth and air – a minimum of overnight.
21. Proceed to make cuts to determine which jars to save as hearts.

Plated Column mode and Hybrid mode

The following instructions apply equally to the operation of both a plated column and a hybrid configuration.

1. Complete assembly
2. Fill boiler. Depending on the volume you may want to consider adding 'top up' water to ensure that the element does not get exposed during the run
3. Calculate the alcohol content in the boiler eg 40l of 10% wash = 4l of 100%
4. Set the product condenser to a high flow[3]
5. Set the dephlegmator to maximum flow
6. Open the parrot drain & put a beaker under it
7. Label collection jars 1-x
8. Put the 1st collection jar under the parrot output spout
9. Ensure work area is clean, free of hazards and your fire extinguisher is easily reached
10. Turn on your element or burner. If you can adjust it to maximum output to shorten heat up time. If you cannot adjust the heat input, don't worry.
11. Watch and record any observations including the time you made the observation.
12. If you can adjust the heat input, turn the heat down when you see the plate which is 2nd from the top start to bubble, then watch.
13. The top plate will start to fill & you will see reflux falling from the dephlegmator. You should not get anything out of the bottom of the parrot. If you do, turn down the heat a bit more - you might need a couple of tries to get it to stop. Anything that comes out should only come out slowly, so only small adjustments are needed. If you get a lot out you need to turn down the heat a LOT MORE or increase the coolant flow through the dephlegmator a LOT MORE.
14. When nothing is coming out the bottom of the parrot, record your settings (so you can repeat it easily in future) then sit & watch science in action for 30 minutes to an hour. Your still is now in equilibrium (some call it equalisation). Leaving it in this state will compress the foreshots & heads to the top of the still.
15. Close the dephlegmator needle valve slowly (Try 3-4 quarter turns at a time) then watch again for a couple of minutes before adjusting again if necessary. Adjust the dephlegmator needle valve until you get 1-2 drops per second coming out of the parrot drain. Collect fores until you're happy 100– 200ml is typical. Record amount collected.
16. Close the parrot drain valve. Then close the dephlegmator needle valve some more - not a lot. Look into parrot you will see liquid pooling. Once liquid rises to about 50mm insert alcometer.

DragonTip

Read Kiwi's excellent guide to making cuts http://www.stilldragon.org/discussion/50/kiwis-guide-to-cuts

DragonTip

If adjusting product condenser flow does not impact product temp, check the temperature of your coolant source. If you're running a reservoir, you may need to drain and refill. Consider using a radiator or swamp cooler to reduce the coolant

[3] To save water if you are using a mains water supply, only turn it on once the 1st plate gets liquid on it.

17. Once heads start coming out, adjust dephlegmator needle valve until you get a broken stream. Collect in small jars (the author likes 1 l glass jars marked every 100ml) & record time to fill each & volume collected. Depending on the wash, you will collect 500ml – 1500ml of heads. Increase the flow rate to the product condenser if you are getting warm product out.
18. Don't forget to smell the output & I also like to periodically taste a drop to see how it is progressing.
19. Once you are into hearts, close up the dephlegmator needle valve some more to get a bigger stream out from the parrot – but not too much – a pencil lead size stream works well. Continue to collect in small jars & record ABV, time and volume for each jar
20. By keeping track of how much you have collected and comparing that to the amount you calculated was in the boiler, you can get an indication of how far into your run you are. As you get towards the end of a run (i.e. when you have collected about 80% of the amount you previously calculated), you need to pay more attention to detect when tails start.
    d. Keep smelling & tasting but do it more frequently.
    e. Watch what is the alchometer doing? ABV will drop quite quickly once hearts end
    f. Keep an eye on the site glasses….. The plates will remain pretty static through the run, but as the boiler charge gets low in alcohol, the plates will start to dry up from the bottom up with fogging occurring. Things to look for:
        i. Does the viscosity of the liquid change?
        ii. Is it beading up rather than being a sheet covering the glass?
        iii. What is happening on the plate itself? Is it drying up

Extra comment for hybrid users only:

When fogging starts on the 2nd top plate you are getting towards the end of the run. Swap out to another jar. Keep smelling & tasting (more frequently) to detect where tails start. The author has found that he can pull another 500ml of hearts after the 3rd plate fogs before tails start.

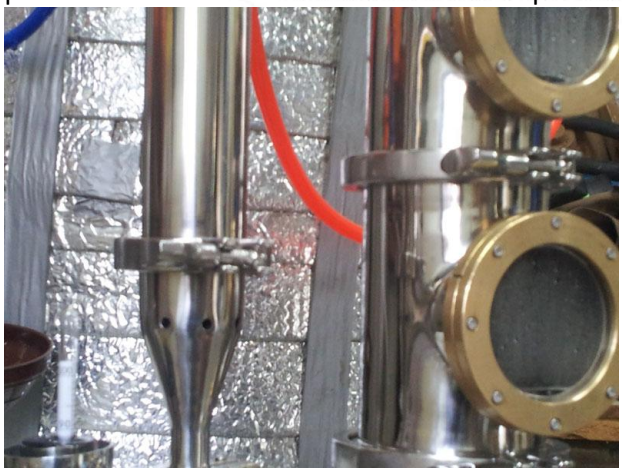


Figure 43: Sight glasses fogging

21. Once tails detected, you can either stop the coolant flow to the dephlegmator & increase power to collect tails to go into your feints collection or shut down & clean up.

Have a look at Coopervilles video of running his Dash 2:
http://www.youtube.com/watch?v=FKYK8JUAwUE

Recipes

There are a lot of fantastic recipes out there in the Net. The ones below are well and truly proven. They will get you going without needing a lot of equipment or understanding of "All Grain" brewing / mashing.

Before we jump into the recipes, you need to understand a little of what happens in the fermenter and how your actions can affect the quality of your output.

Fermentation

Fermentation is a chemical change brought on by the action of microscopic organisms such as yeasts, molds and bacteria. In simple terms, alcohol is produced when yeast breaks up sugar into roughly equal parts of alcohol and carbon dioxide gas. Whilst bakers yeast is commonly known, most yeast occurs wild in nature and are spread through both the air and water. Yeast spores are everywhere and if they get a chance they will gladly ferment your wash. The problem with this is that there are thousands of strains of wild yeast and most of them are not suitable for fermenting alcohol. Most wild yeast will give your wash strange off-tastes. In addition, most of them are not very tolerant to alcohol, meaning you will end up with a partly fermented, low alcoholic, sweet beverage. Specific strains of yeast have been isolated for their suitability to ferment alcoholic beverages.

Yeast

Yeast strains cultivated for distillation such as the SAFSPIRIT range produce excellent results, however many brewers and wine making yeasts can be successfully used as can bakers yeast.

The yeast strain selected can play a big part in the final taste of your product, as they are instrumental to the production of many of the congeners and fusel oils that are part of the flavour profile of the end product. Vodka producers like to use yeasts that tolerate higher alcohol levels and produce little congeners etc. EC1118 is well suited to this. On the other hand, Rum has more yeast-induced flavours. EDV 43 & bakers yeast are therefore better suited to the production of rum. Great Scotch can be made from quality English beer yeast strains such as Nottingham.

Yeast initially requires oxygen to multiply, but then do most of their work in an anaerobic (oxygen free) state. It is therefore necessary to ensure that you thoroughly oxygenate the wash through splashing etc before adding yeast. Some distillers use a drill powered paint stirrer to achieve this. Obviously they only use this implement for this purpose & don't mix paint with it.

Nutrients

Like you & I, yeast also need nutrients for optimum health. Grain based washes have plenty of nutrients, however simple sugar washes require additional nutrients to be added for best results. The tomato paste used in the TPW recipe below is added to provide the necessary nutrients. The DAP in the Rum recipe performs the same function.

DragonTip

Remember, you are making food, so always practice safe food handling practices such as washing hands & always using clean equipment.

Cleanliness

Make sure that all equipment uses is clean and in good condition. Dirt and grime harbors bacteria that will grow rapidly in your wash and cause spoilage. Replace any old, discolored or scratched plastic equipment, as it is impossible to clean and will cause problems.

After fermentation, rinse the yeast trub etc out of the fermenter & wipe the high tide mark off – I use my hand. Fermenters clean up well with a soak in sodium percarbonate. It is the active ingredient in Napisan / Oxyclean. **MAKE SURE YOU USE UNSCENTED!**

Use a firm-fitting lid on all fermenting drums or buckets. The use of an air lock is not necessary – unless you have a hole in the lid in which case an air lock is the easiest way to plug it. Many brewers successfully ferment with just using the fermenter lid or plastic wrap to keep the nasties out.

EXPOSURE TO AIR CAN INTRODUCE WILD YEAST AND BACTERIA, SO RESIST THE URGE TO OPEN THE FERMENTER TO "HAVE A LOOK".

This is particularly important during the first 24 to 48 hours before your yeast has had a chance to start working.

Sanitation

Sanitise all equipment before use with a specialised "no-rinse" sanitiser such as "Starsan" or "Iodophor". These are available from good home brew shops or online.

Sanitising will ensure that you have the best chance of producing a quality product. Yes, many people do not sanitise, but in the author's experience it is only a matter of time before those people get an infected wash & depending on the infection, they can be very difficult to eliminate. So why take the chance and waste money, time an opportunity?

Temperature Control

In beer brewing it is very important to control the temperature of fermentation to reduce the formation of off flavours. Distillers' washes are not as "temperamental". The higher temperature used in distillers washes not only speed up the process but also help produce desired flavours.

Vodka

TPW or Birdwatchers Sugar Wash

One of the best, easiest neutral tasting sugar washes around. Used for production of vodka and neutral. Use this recipe for cheaper cleaner vodka instead of buying “turbo” yeasts. Many who use this recipe find that their product is so clean they do not need to filter their product through carbon.

For a 40 litre wash;

- 8 kg of sugar
- 320 grams of salt reduced Tomato Paste
- ½ teaspoon of citric acid.

Dissolve all ingredients in 12l of hot water until smooth.

Add to fermenter and top up to 40 litres.

Pitch 1 tablespoon of distillers yeast or EC 1118 at 28-30 degrees C.

Ferment to .990 and let clear before distilling.

SPD

A good use for some of the neutral spirit you have just made. This one is a favourite with the girls and the boys alike.

- 1-2 litres frozen strawberries
- White granulated sugar
- Bottle of clear brandy or vodka
- Lemon juice

Put frozen strawberries in a large glass jar. Fill the jar. Fill the jar the rest of the way up to the top with 60-70% abv clear brandy or neutral.

Macerate the strawberries for a week (shaking it a couple times a day). Strain out liquid into another jar or bottle. Add enough sugar to the strawberries to completely cover them. Let the jar sit (giving it a shake now and then) until most of the sugar appears to be gone, and there is a lot of syrup in the jar. Pour the syrup into a separate jar and add more sugar to the strawberries. Repeat this step until there is no more juice being released from the berries. Add about 1-2 tablespoons of lemon juice to the alcohol, and then add the strawberry syrup until the desired taste is reached, water to 40%abv and strain until no strawberry particles are seen. The lemon juice will help preserve the red colour, and the flavour of the strawberries. Without the lemon juice, the finished product will have a chalky aftertaste (quite unpleasant). Any leftover syrup and/or berries are excellent on ice cream and/or cheesecake.

VARIATION:- use blueberries.

This is a good drink to put in a blender with ice. Tastes like a strawberry smoothie.

Rum

PugiRum Mollasses Wash

- Start with the ‘Yeast Bomb’;
- 2 vitamin B, crushed with mortar and pestle
- 5 teaspoons of DAP (di-ammonium phosphate)
- 1/4 teaspoon of epsom salt (optional)
- 1/4 cup bakers yeast
- 4litres of water

Boil all for 15 min.

For a 40-litre wash add;

- 4 litres of feed molasses
- 2kg -4kg of brown cane sugar (raw or turbinado sugar can be used instead)
- Aim for a hydrometer reading around 1.080
- The "yeast bomb" = 4 litres
- 16 litres of water
- 12litres dunder (use water the first time you make this wash)

Pitch 1 tablespoon of distillers yeast such as EDV 43 or similar. Ec 1118 or at a pinch plain bakers yeast can also be used.

This should ferment out in 3 -4 days at 28-32degrees C.

The unfermentable sugars in the molasses may cause your finishing gravity to be as high as 1.030 or slightly under, so calculate the starting gravity next time to give you a wash around 10-14% abv.

Age on oak chips.

Bourbon Style Whiskey

UJSSM (Uncle Jesses Simple Sour Mash - Often shortened to UJSM)

Taken from a recipe from J.W. Walstad's book “Simple Sour Mash to Simple Alcohol Fuel”.

Recipe for 40l wash;

- 7kg cracked corn (chicken corn from the feed store)
- 7kg sugar (white / raw / turbinado)
- 5 litres of hot backset (use hot water for your 1st run)
- 35l of water

Optional: Swap out some of the cracked corn for other grains. 10-15% cracked malt barley is an excellent inclusion as is cracked malted rye in the same proportion. Cracked wheat, triticale or any other preservative free, non- treated grain can be used.

Theory

Unlike a cooked mash, a simple mash does not rely on grains for starch. The corn is included for a bit of alcohol, but mainly for flavour while the sugar provides the alcohol. The conversion of starches to sugars is a natural process, accelerated by cooking. An uncooked mash will convert starches to sugars but much more slowly and less efficiently. Your added sugar will ferment rather easily and will provide most of the alcohol in your beer.

Keep your ferment at between 28-30 degrees C for quickest results.

Your first distillation run will be a "sweet" run since you will not have any backset to use for sour mashing. I recommend using the spirits you collect in your first run as feints for the next run. Yes, all of them. Your second run will produce your first batch of sour mash, which will be good, but in truth the flavour and consistency will not start to reach their peak until the third or fourth run in my experience.

First Fermentation

Put your ingredients into the fermenter in the order listed (replace the backset potion with hot water) and close it. You should start to see fermentation of the sugar within 12 hours. It should take 3 - 7 days for the ferment to end depending on temperature and PH. When the mash is at 1.0 - 0.990 on your hydrometer siphon your beer out of the fermenter with a racking cane and charge your still.

Siphoning is the best method because it allows you to pull the beer off the top of your lees, leaving them undisturbed. You do not want suspended solids in your still and this method works quite well in keeping the lees at the bottom of your fermenter. You can also drain them from a tap if you have plenty of good filter material around your tap inlet like stainless scrubbers.

Scoop about 20% of your grain mix off the top while the fermenter is empty and replace with fresh grains.

When the still run is complete use 5 litres of the hot backset (the spent slops) in the still to dissolve your next lot of 7kg of sugar. Allow sugar/backset mix to cool before adding to the fermenter. Adding it back when hot will kill the yeast.

Add 30l of cold water to the fermenter with much splashing and then add your dissolved sugar, top up to the 40l mark and reseal. There is no need to add any more yeast as the yeast is still active within the grains.

Activity should start again almost immediately, but at least within a few hours as the yeast get to work on their new sugar.

Age on oak chips.

Checkout Cooperville's 4 videos on making UJSM:

http://www.youtube.com/watch?v=bQn8pokVsok

http://www.youtube.com/watch?v=CRNjKhclGUE

http://www.youtube.com/watch?v=jai3yqf9dt4

http://www.youtube.com/watch?v=eZlpGU9umTg

Airing

All “new make” spirit (even the recipes described above) will benefit from airing. Airing is simply the process of covering the top of your collection jars and leaving them to sit for a day before making cuts and diluting. Cover your jars with clean fabric. Coffee filter paper is often used (the author uses socks – washed of course).

Airing allows many volatile products to dissipate resulting in a higher quality product.

Care Instructions

Look after your dragon & it will give you many, many years of reliable service.

Move and store components with some care as damage to the triclamp fittings may cause the joints to not seal properly and flammable vapour to be released. This is not only potentially dangerous but is inefficient.

Replace cracked, perished or hard gaskets. Do not use rubber or other products, as they will taint your spirit. Insist on genuine StillDragon parts.

After each run rinse all components in fresh water and allow to dry. Ensure you drain and rinse out your boiler too.

DragonTip

StillDragon components can be put into a dish washer for easy cleaning.

Tips & Tricks

Drain hole: Drill a 1 – 1.5mm (max) hole in each plate & the bottom of the downcomer to allow the column to drain at the end of a run.

Use all senses

- Feel - column to gauge how heat up is progressing
- Feel – temp of water flowing back to drain / reservoir
- Watch - what is happening in the sight glasses (if you have them)
- Watch – rate of output – drips, broken stream, pencil lead stream etc
- Watch – colour of output. If suddenly cloudy = possible puke
- Watch – any sign of leaks?
- Smell – do you have a leak?
- Smell – fores – heads – hearts – tails
- Taste – ok?

Cuts: Some operators like to collect both fores and heads from the parrot drain valve. They do this to reduce the "bleeding" of heads into hearts. This is a matter of personal preference / experimentation.

Recirculate: Use a recirculating system to save water. A radiator or homemade swamp cooler will help keep the temperature of the reservoir down if you don't have a well or swimming pool or rain water tank to use.

Insert small pieces of stainless steel or copper mesh into the Dephlegmator pipes to increase reflux.

Cleaning

- Heads can be used to clean all sorts of things around the house eg windows.
- Clean copper components like plates, down comers & caps using a warm weak citric acid solution.
- You can clean the stainless components in a dishwasher – you don't need to take the sight glasses off

Sanitise

- Put sanitiser in a trigger grip spray bottle to spray into fermenter taps, into hoses etc.
- Spray or soak everything that your wash will touch

Use only fresh high quality ingredients.

Don't be in a hurry with fermentation. When it has finished bubbling, let it sit & the yeast will naturally drop out of suspension (you don't need to buy any special clearing agents if you use the suggested recipes). This process can be sped up by simply crash cooling the wash.

Troubleshooting

Symptom	Issue	Solution(s)
Cloudy output	Puking	- Decrease boiler heat - Use an antifoaming agent like Punkin's Silicon antifoam. For a fine Scotch Whisky, use 4ml at the start of the stripping run. It is easily measured with a 5ml syringe from your local pharmacy / drug store
Product out hot	Cooling	- Increase coolant flow in product condenser. - Use colder coolant
Alcohol smell during heat up or run	Possible leak	Locate & fix. You may need to shutdown.
Flecks on strip/spirit run	Too much power during the Hearts take off	Reduce power
Oily film during tails takeoff	None	The oil indicates congeners/fusel oils and is normal

Wash Record

Wash details									
Wash Type				**Wash number**					
Ingredients & additives				**Process details**					
Item details		**Quantity used**							
Sugar									
Grain									
Grain									
Grain									
Nutrient									
Buffer									
Yeast									
Water									
Gravity	**OG**		**FG**		**pH**	**Initial**		**Final**	
Observations / notes:									

Run Record

Run details							
Run Type single, spirit, strip				**Run number**			
Wash Type		**Wash number**		**Wash volume into boiler**		**volume "topup" water boiler**	
Wash ABV		**Estimated output**		**Wash Temp into boiler**			
Time		**Activity**		**Observations / Notes** eg needle valve setting, power controller setting, Dephlegmator output temp, volume collected, ABV in parrot			
		Heat on					
		Fog on plate 1					
		Fog on top plate					
		Top plate bubbling					
		Reduce dephleg flow / increase heat to collect fores (slow drip)					
		Volume fores collected					
		Reduce dephleg flow / increase heat to collect Heads (fast drip)					
		Volume heads collected					
		Reduce dephleg flow / increase heat to collect Heart (start with broken stream)					
		Jar 1					
		Jar 2					
		Jar 3					
		Jar 4					
		Jar 5					
		Jar 6					
		Jar 7					
		Jar 8					
		Jar 9					
		Jar 10					
		Jar 11					
		Stop dephleg flow / increase heat to collect Tails					
Total Fores				Estimate Heart			
Total Heads				Total Tails			
Airing time							
Jars kept for hearts				Volume hearts kept			
Observations / notes / suggestions							