

The Amazing Plastic Still

A clever method of making spirit
PREVIEWTEXT



First Edition – 021211

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The latest version of this book can always be downloaded from:
www.amazingstill.com

The amazing still has many advantages compared to the usual home distillation apparatus

- It is simple to make – takes only a couple of hours to assemble. No welding or difficult work is required.
- It is inexpensive to make.
- Odour-free when it is working.
- Does not need cooling water so it can be used anywhere.
- Small – easy to hide away, even when it is working.
- Makes good alcohol.
- Easy to dismantle.

Does this appear too good to be true?

Not at all, read on and you will understand how it is done!

IMPORTANT!

Before you build and use a still, ensure that you check the law in your country. Distillation as a hobby is illegal in certain countries.

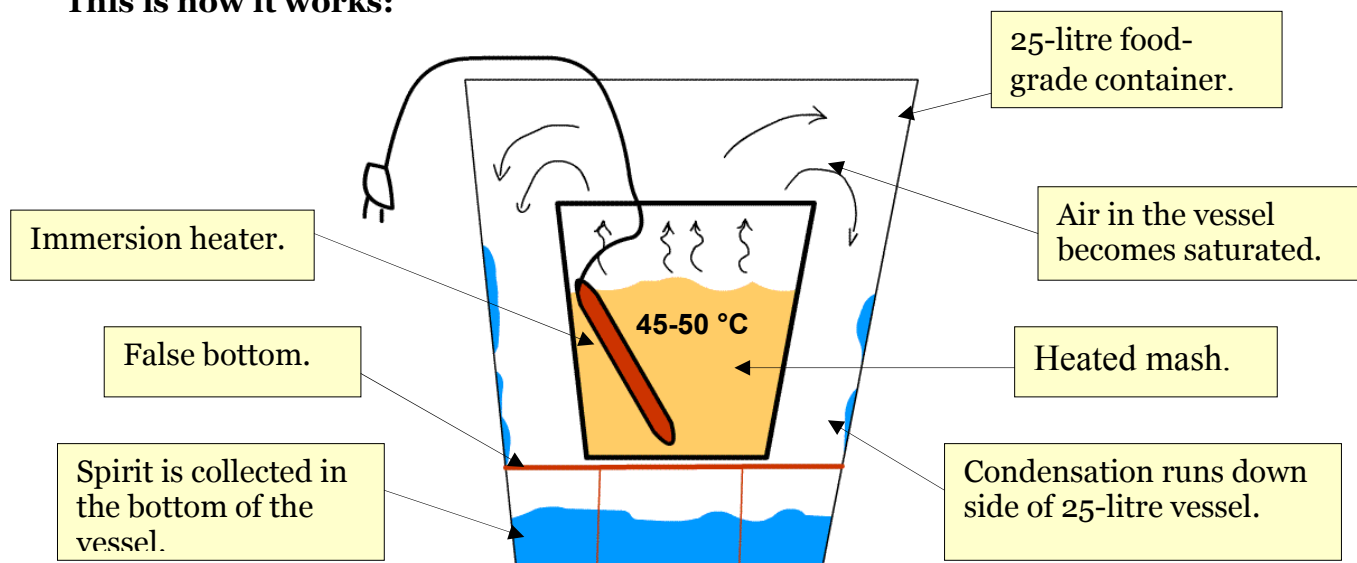
Better than the usual apparatus

Many different types of plans for hobby stills exist but almost all have difficult components in common. They are welded together using expensive stainless steel. Some have electronically controlled electric elements. When they are in operation they need cooling water. The process gives rise to smells, and the cooling water can cause turbulence in the plumbing which can alert the neighbours to what is going on. Leaving a still without supervision can be worrying – tubes can come adrift, water can be cut off.

Unfortunately out comes a pungent but otherwise strong spirit, which must be purified several times through active carbon before it is a good product. Often the still is incorrectly constructed, working well below its optimum function.

Does that sound as though I am sceptical about ordinary hobby stills? No, not at all, it gives great pleasure in producing one's own alcohol, to ensure the apparatus functions optimally and give better spirit. However, for the normal consumer the traditional still is unnecessarily difficult. There is no reason to have a still that gives 10 litres per brew when you only need one bottle for the weekend. This is the reason I have designed a still ideal for domestic use.

This is how it works:



The principle is simple. In a 25-litre vessel an ordinary 10 litre plastic bucket containing mash is placed (Mash is what one makes the alcohol from, one can call it a wine without fruit, but more about that later). The lid is placed on the vessel shutting in the 10-litre bucket. The mash in the 10-litre bucket is heated with an immersion heater to 45-50 degrees C. The air in the 25 litre vessel becomes saturated with water and alcohol vapour. After a short while the spirit and water vapour condenses in the inside of the 25 litre vessel and runs down to the bottom. That's it! It is no more difficult than that. The alcohol that condenses out has strength of 35-40% which is the usual strength of commercial spirits. It is possible to make several different versions of the apparatus to give higher strengths, but more of that later. The quality is good, but not absolutely perfect. A little purification with activated carbon is required, and I will explain about that later. Compared with the quality one get from a usual still, this is much better. If one holds 50 degrees C in the mash, one gets about one litre per 24 hours, which should suffice for the most thirsty individual. 45 degrees C produces a better quality but at a slower rate. The idea of saturating the air with water and alcohol vapour and allow it to condense is not new, but as far as I know no apparatus exists that is as simple as this to make.

How to make a plastic still, step by step:

Wine fermentation vessels can be bought in many outlets. These containers are usually of 30 litre capacity but are usually called 25 litre wine containers or fermentation vessels.

In the bottom of the 25-litre container something should be placed to raise up the 10 litre container a bit. This should be a container of some sort. I have used a 10-litre bucket that I have cut down to make it about 60 mm high. It is wide and gives good support. Remember, it must be something that is alcohol proof, e.g. food grade plastic (PP or PE plastic), stainless steel or ceramics. Plastic items are usually stamped with the type of plastic they are made from. A 60 mm high item is about right. Use a white or transparent plastic item to be on the safe side, ensuring it contains no toxic colours.

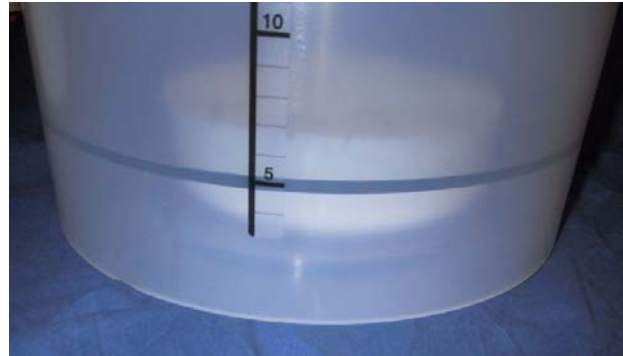


Make sure there is a hole in the item you intend to use so it does not float when alcohol runs down in the bottom of the 25-litre container. I have cut a little hole in the 10-litre vessel I am going to use as a support.

Over this support I have placed plastic disc. This is cut from the lid of a fermentation vessel. Cut the disc so that there are as small gaps as possible round the edge. The disc should be 320 mm in diameter. In the picture one can see I have cheated a bit, but it gives an idea of how accurate it should be. The disc is there to separate the alcohol from the air in the vessel. A nice touch is to order a glass disc from a glazier. This should be more than 4 mm thick and have a diameter of **317** mm with bevelled edges for safety. Cost about 15 Euros. Such a disc gives a bottom plate that is a perfect fit. Remember to place it high enough to give a tiny gap all round for the alcohol to run past.



Here is a picture showing the container from the side with a glass disc. There should be 5 litres capacity for the alcohol in the bottom. As the fermenting vessel has volume graduation on the outside it is easy to see how high the disc should be placed.



Now is the time to put the 10 litre container in the 25-litre container. The 10-litre container can be obtained anywhere. It does not have to be exactly as shown in the picture. The 10-litre vessel should be filled with 8 – 9 litres of mash. Preferably use a white container if you are unsure if it has food quality approval.



Then one puts on the lid. I have cut a hole towards the edge of the lid allowing for the entry of the immersion heater. Preferably use an electric drill, otherwise it is easy to split the lid. The reason for using a fermentation lock is that the air in the container will expand and contract a little, depending on the temperature of the surroundings. If you use a fermentation lock with activated carbon the distillation will be completely odour free, use no water in the fermentation lock, only activated carbon.



The immersion heater is bought in a pet shop. Normally used to heat a fish tank, and is available in various sizes and wattage. There are several different types of immersion heaters that work well with this apparatus. Unfortunately most of the units sold in pet shops are unsuitable. Nearly all heaters have an integral thermostat. A thermostat is for regulating the heat of the water. You set the temperature required and the immersion heater then holds this temperature in the water.



Unfortunately nearly all thermostats have a maximum setting of 32 degrees C. This heat is too low and it would take for ever to produce anything. A suitable temperature range for this unit is 45 – 52 degrees C. Buy an immersion heater with a thermostat that goes up to 55 degrees C.

www.partyman.se supplies a thermostat-controlled immersion heater of 100 watts, 22 – 55 degrees C. This unit is for fermentation in cold areas as well as to hold the temperature when using enzyme treatment of dried and fresh fruit (45 – 50 degrees C) when making wine. Functions very well.

Then use a digital oven thermometer to indicate the temperature of the mash as it is difficult to know if one has the right setting of the immersion heater. 45 – 50 degrees C is about right.

Immersion heaters for heating tea water are available but are not recommended! They work to begin with but do not stand up to the damp conditions in the vessel and short circuit after a time.

After you have acquired an immersion heater you need to fix a rubber bung over the flex to seal the entry of the wire through the lid when you fit the immersion heater to the apparatus. Rubber bungs usually already have a hole in the middle. Cut off the flex near the electric plug, put in the rubber bung and re-connect the flex with a terminal block or put on a replacement plug. Seal the hole in the rubber bung with silicon sealant or tape to make it airtight. Alternatively saw through the bung to the hole and slide in the flex, thus making it unnecessary cut the flex.

The immersion heater is in position. Now one only has to plug in and wait. After an hour vapour forms in the container and then spirit starts to flow down the edges of the vessel. As you will appreciate spirit also forms on the inside of the lid and drops back in the 10 litre container. The strength of the spirits increases somewhat thanks to this. However there is sufficient speed in the drips nonetheless. ½ to 1 litre per 24 hours if the vessel is kept at room temperature.



Useful to know about home distilled spirit

One cannot become blind from drinking home distilled. That is to say one cannot become blind from drinking spirit distilled at home from mash. It is a myth that stubbornly lives on. A distilling apparatus does not create any products, it only separates different products. Because one can drink mash without harm it follows home distilled spirit is also drinkable. It is not possible to mess things up and make poisonous spirit. But it is true that small amounts of impurities (fusel oils) are formed during the fermentation of the mash. This is why spirit smells bad before it is purified. The amount is not dangerous but spoils taste and odour. Remember that fusels form in the fermenting of beer, wine and cider, in fact in any fermentation process. In the case of beer and wine the product is not purified at all. The alcohol content is low so the amount is not noticed so much and can even add to the aromatic flavour. For example whisky is relatively crudely distilled spirit which is then stored in barrels where the fusel oils, thanks to long storage adds aroma to the spirit.

One can be blinded by spirit, so-called industrial spirit. In the case of Sweden all illegally consumed spirit is termed "black spirit". This can be a little of anything, such as smuggled spirit, home distilled or industrial spirit. It is industrial spirit that is the real problem. Both ethanol (drinking spirit) and methanol (wood spirit) have industrial uses. Methanol both tastes and smells the same as ordinary spirit. One can get drunk in just the same way. However the hangover is quite different and the effects can sometimes be fatal. Unfortunately the term "home distilled" is used wrongly instead of "black spirit".

If you are offered home distilled you cannot be certain it is actually home distilled. In the worse case it can be industrial spirit of unknown provenance. Make spirit yourself if you can legally.

How to make spirit

There are three stages:

1. You must have something to distil first. This is called mash and is a simple tasteless wine made from sugar, yeast and water.
2. Distil the mash in the apparatus and get a spirit that tastes disappointing.
3. Purify the spirit in activated carbon producing a really fine spirit in the same class as the best vodka.

The mash

Mash is a very simple wine that is made from sugar, water and turbo yeast. When the mash ferments sugar it forms alcohol and also carbon dioxide which bubbles up from the mash. As well as alcohol, fusel oil is formed. This is the cover name for the small amounts of impurities made by the yeast. Ideally it would be best if the yeast only formed alcohol but this ideal has not been achieved yet. Every year new types of yeast are developed that in principle ferment faster and above all, cleaner. Fusels are not useful but are formed in such small amounts that they are not harmful, but we want to get rid of them anyway. Both taste and aroma are ruined by fusels. The reason the distillate smells a bit is because the fusels are apparent when there is only alcohol, water and by-products.

Luckily it is easy to remove the fusel oil. If the spirit is purified by passing it through active carbon virtually all the fusel is removed, so that both the taste and aroma is made good. There are certain impurities that cannot be removed using activated carbon. The use of a good yeast causes a minimal amount of these impurities to form (read Turbo Pure). As good yeasts exist it is sensible to use them.

A prerequisite for making strong alcohol in this apparatus is the use of a strong mash. There are some good turbo yeasts on the market that produce strong mash, Prestige 8 kg Turbo which is marketed via www.partyman.se. Superior to all, a yeast that outclasses all others available is Turbo Pure!

Turbo Pure

This yeast exists as a 24-hour variety that produces 14% and another variety produces 18% in a week. I have tested both types of this yeast and found it absolutely superior! The alcohol produced by this yeast makes the mash almost so clean that no carbon purification is required (I am NOT exaggerating). If you use the type that produces 14% you must double distil otherwise the spirit will not be strong enough. The 18% version only needs a single distillation to give a good strength. It also ferments cleaner but the 24 hour version produces a somewhat better quality.

The yeast is only sold by www.partyman.se

Making mash is very easy; just follow the directions on the packet. In principle the procedure is as follows: Pour 8 kg granulated sugar in a fermenting vessel and add water up to the 25 litre mark. Add the yeast and stir until the sugar has dissolved. On the yeast packet it states that fermentation should take 3-5 days as a rule. This is not enough. Allow a week, preferably more. If you have strong mash you will get strong spirit and visa versa. 18-20 % mash is necessary to reach 40 % in the final product. Turbo Pure 24 hour only needs 48 hours, but as mentioned you would have to double-distil to achieve a good strength spirit using this yeast.



One more point about mash

When you distil it is preferable that the mash is as pure as possible. That is to say there are a few things to think about that will improve quality. These are not essential but if you want the best possible quality I do recommend you follow them.

- 1 Use good yeast. The best you can get is Turbo Pure.
- 2 Ferment cold, if you can so allow fermenting at a temperature of 20 degrees C. Remember that 24 and 48 hour yeast evolves quite a bit of heat so place the vessel where the temperature is less than 20 degrees. You produce a cleaner product if fermenting is cooler.
- 3 After fermentation ceases add a wine-clearing agent. A clearing agent or finings causes the yeast to sink to the bottom faster giving a clear liquid. It is possible to distil a cloudy mash but the quality will not be as good.

How to use the apparatus

When the happy day arrives when the mash has at last finished fermenting it is time to distil. Pour 8 litres in the 10-litre container and place it in the 25 litre container and switch on the immersion heater. If you place the still in a cool atmosphere the process will proceed a little faster and you will get a somewhat higher strength. Otherwise ordinary room temperature will do. Stop the distillation when you have 3 litres in the 25-litre container, which takes 3 – 4 days. Allow the apparatus to cool down a little and then pour away the remaining contents of the 10 litre vessel. In the bottom of the 25-litre container you have spirit, which is to be purified through activated carbon. Store it in, for example, a keg. Then you just distil the next 8 litre batch of mash and then the last 8 litres. Now you have 9 litres of spirit to purify.

Alternative method

If you are not satisfied with an alcohol strength of 35-40% another procedure can be followed. Distil a good 8 litres measure of mash as usual but wait until you have 4 litres of spirit instead of three. Repeat this with the rest of the mash. After this you are left with 12 litres of weak spirit. Clean out the apparatus and distil the 12 litres you have just distilled. Now you have a higher strength and a more pure spirit. It is possible to get out 7 – 8 litres of 50% spirit. You will now have a remaining 10% of spirit in the 10-litre vessel, which you can add to the next batch of mash (after it has finished fermenting).

More methods...

The apparatus is inexpensive, so you can make two. Use them as follows:

1. Distil 8 litres of mash in the first still and remove the 4 litres of distillate. You then pour the distillate into the 10-litre vessel of the second unit. Dispose of the remainder in the 10-litre vessel of the first unit.
2. Repeat again and you have 8 litres in the 10-litre vessel of the second unit.
3. Start the second unit and take out 4 litres. The resulting product is strong and almost pure, needing very little carbon to finish it off.
4. The same time as the second unit is operating you pour new mash in the first unit and take out 4 litres. Discard the remaining content of the 10-litre vessel after distillation.
5. The remainder left in the 10-litre vessel of the second unit after distillation is returned to the 10-litre vessel of the first unit.
6. Top up with mash to 8 litres in the first unit and distil.
7. Return to point 2.

The advantage with two stills is that you get a stronger and cleaner spirit as it is double-distilled. The procedure is just as quick as using one apparatus although it involves a little more work.

Yet another method is to break off distilling earlier, instead of 3 litres you make 2 – 2 ½ litres. The first alcohol to emerge is actually stronger.

It is difficult to utilise all the alcohol formed in the mash with this apparatus. So what? Mash is cheap to produce and the still produces enough alcohol anyway.

An improved apparatus

35 – 40% is a little weak. If the alcohol reached 45% or more it would be better as it easily happens that one gets a lower strength on purification with activated carbon. Personally I think alcohol should preferably be over 40% in any case, as it seems weak otherwise. I have experimented quite a bit and evolved an alternative that works well. The basic idea is the same but insulated and with a cover. This gives 3 litres at 45 – 50% in 6 days. (The time varies depending on what temperature you use). I recommend you make this apparatus instead of the simple one I described earlier. It is not especially difficult to make an insulated version.

The 10-litre vessel inside the 25-litre vessel leaks quite a bit of heat from the sides. This effect is a disadvantage as it is more difficult for the steam in the air to condense when it is heated by waste heat. The task is to find an insulation which withstands alcohol and is not toxic. Luckily such a product is available at many builders merchants.

This is intermediate floor foam sheet (underlay foam), used in floor laying, and works well. It is composed of PE plastic that resists alcohol and is not toxic.

The manufacturer is Pergo AB, a Swedish company. A whole roll of 15 m² costs about 9 Euros and is found at building suppliers. There is more than enough on the roll for our purpose. Make sure to ask the supplier that the foam you buy is made from PE plastic (polythene) where you are buying a different make.



Use an ordinary 10 litre container but TWO suitable lids. The second lid you place on top as extra insulation. Cut out a square hole just above the 8 litre mark of the 10-litre container. The hole should be 30 mm wide and 20 mm high. Cut carefully to avoid cracking the plastic. On the opposite side at the top cut another somewhat larger hole. The lid will cover the hole a little. The size of this second hole should be 35 mm wide and 20mm high. The different heights of the holes induce a draught in the vessel.



It is not difficult to insulate. Cut a strip of insulation making it 1 metre long and a bit wider than the vessel. (Roll out a length and cut off). Place it round the vessel and tie in place with cotton string. Cut off surplus insulation round the top and bottom of the vessel and cut out the holes. The insulation is very easy to cut so this is simple. Put on more layers and bind fast until you finally have a thickness of 10 mm or more. It's finished!

Keep the temperature in the vessel below 50 degrees C. If the heat is greater than this to quality of the spirit will suffer. At 45 degrees C the quality will be so good very little active carbon will be needed to make to the spirit perfect.

Follow the instructions how to make a plastic still on the previous pages, but instead of using an ordinary 10 litre bucket, use this insulated instead. Fill up with 8 litres of mash and put on the lid. The extra lid is placed on top of the other lid to give the top extra insulation. Finally place the lid on the 25-litre vessel.



Purification with activated carbon

The spirit is purified with activated carbon to remove fusel oils and bad odours. Do not be mean with purifying. It is better to make produce of quality which much more fun to offer your guests than bad home-distilled. You can purify so well the product is equal to the finest vodka. Purification with activated carbon is done by pouring the spirit through a tube filled with the activated carbon. The spirit which runs out at the bottom is pure; it really is as simple as that. Thanks to the fact that the quality of the spirit is already good from the beginning very little carbon filtration is required. Use activated carbon of good quality! There is a big difference between various brands. Buy the best at www.partyman.se Carbon with a granule size of 0.4 mm – 0.85 mm is generally better than 0.4 – 1.2 mm. The best method of purifying is to use a water purifier as found in home-brew shops. This comprises a 1.5 metre long tube with a 10-litre container at the top. The tube is filled with activated carbon and after pouring spirit in the top 10-litre container the alcohol runs slowly through the carbon. The picture to the right shows a half meter tube that is sufficient if you choose high quality carbon and rinse it with water.



Some carbon brands are poorly washed at the factory, so pour 3-5 litres of hot water through the activated carbon before you purify the spirit so as to wash out the salts not wanted in the spirit. Also the cleaning function of the carbon is enhanced if it is wet. Wait an hour or preferably 24 hours after washing and then wash again with 2 litres of hot water. Then you only have to pour the spirit in the top. Discard the water that comes out first.

Purify slowly! If you give the carbon plenty of time it will purify better. Constrict the tube from the container so the spirit runs slowly. Read the activated carbon book that can be downloaded from www.partyman.se The book describes different types of carbon and methods for enhancing purification.

When the spirit is pure... well I don't think I need to present any more advice ☺

Advice about the apparatus

Place an oven thermometer in the mash when you distil so you know what temperature you have.

Regarding the wattage: Raising the wattage of the immersion heater speeds up the process and a higher strength are achieved. The downside is that the quality is not as good. Dropping the wattage too much lowers the strength but the quality is somewhat better.

The apparatus functions at room temperature but if it is possible to locate it in a cool place then do it. You will get a higher strength and better quality. Place it outdoors in the winter. Using the freezer, refrigerator or cooling fan is also to be recommended.

In warmer climates it may be necessary to raise the temperature of the mash to give a satisfactory strength.

This booklet will be updated as soon as more ideas are tested and proven functional, check www.amazingstill.com occasionally to make sure you got the latest version. Ideas are welcome, send me an email at plastbrannaren@home.se

Cheers!

The Author

