

Collecting and Filtering Used Cooking Oil

The collection and filtering of used cooking oil seems to be the area of vegoil motoring that has spawned the most wide ranging methods, rumours and counter information. This can give rise to uncertainty and confusion leading to either complex, expensive and inefficient filtering systems being built or worse still, people seeing it as a difficult thing to do and not bothering at all. This is a shame because it can be a very simple process that takes very little time and can give the biggest rewards both financially and environmentally. This guide has been prepared to show how simple, quick and inexpensive it can be to collect and produce your own fuel from used cooking oil. The fuel produced using this filter arrangement has not been tested for fuel compliance by BioTuning - It has been used in the field for a number of years and works for us.

Securing a good source of used oil.

This is as the name implies, cooking oil that has already been used. It is widely available at pubs, cafes, canteens and restaurants and is generally available for free. The quality of the oil varies from hardly used golden brown translucent oil to thick opaque sludge full of crud. This is one of the most critical aspects to efficient production of your fuel. It pays to work at this stage, getting this part right can make a huge difference.

So how do you go about finding that source and what are you looking for? A certain amount of legwork and community networking is required here. You ought to visit the local restaurants, canteens, pubs, takeaways etc and speak to the owner. Tell them what you plan to do and ask if they would be prepared to let you have their used oil. If they are willing then you should take a container of their oil to "see how suitable it is". You could be speaking to your friends and neighbours who may offer the local school's oil or may suggest a place that you haven't visited. They may also be friendly with the owner of the local pub etc making it easier to secure these sources.

Now, you will have been offered access to a few oil drums of thick frothy crud, some tins of oil with holes punched in (you'll find these may have more rain than oil when you get them home!) and possibly some 20litre or 25litre oversized plastic milk cartons (cubees) of oil. What you are looking for is oil that is clear, not opaque and without lots of very small particles. You particularly don't want any oil/water fractions or thick layers of fat. You will also know which places have really bad oil and will be questioning eating at those places anymore!

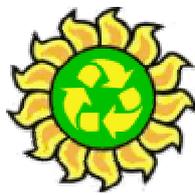


When you have one or more sources of clean cooking oil, check that it is turned over regularly in quantities that suit the volumes you require. Let the owners know what it will be used for. You can't stress enough the importance of keeping the oil sealed and out of the rain - make it clear to the owner that if water gets into the oil it's not good. Cubees make the best containers for used oil to be retained in at the restaurant. They can be easily sealed and the oil kept clean. They are easily transported. They pour well and you can see the quality of the oil inside. You may be lucky enough to find a place that likes what you are doing so much that they change to using cubees. You may also find a place that is happy to fill your containers, in which case you leave them a few empties when you collect the full ones.

Try to establish a good relationship with the owner and staff and you are more likely to get a regular supply of decent oil.

Filtering the oil

An oil drum or equivalent can be used to filter and store the oil. This filter arrangement takes no more effort than pouring the oil into the filter and letting gravity do all of the work. It is very cheap, easy to build and relatively small scale. The oil filters quickly enough in the UK climate and by using homemade pre-filters, the main filters will last many months or even years. Here is how the filter station is made and used...



- Acquire a 55gal metal or plastic drum. These can be found for free by asking at the local garage, factory etc. Ensure that it is clean inside. A drum with a removable top is best.
- Cut 4 holes of 5" diameter into the top of the drum. Fewer holes can be cut but by using 4 you maximize the filtering throughput that can be achieved. A jigsaw is ideal for cutting the holes. Use a file to remove any sharp edges. If the top is removable, then take the top off before cutting the holes. Thoroughly clean away the shards of metal that have fallen into the drum. The inside of the drum needs to be squeaky clean!

- A simple gauge can be made by fitting a length of clear silicone tube to the side of the barrel, running from the top to bottom. It can be fitted using brass hydraulic fittings - a bulkhead connector and an elbow hose tail at each end. The gauge will allow you to tell the level of fuel in the drum without the need to lift the filters to peek inside. Well worth the effort.



- Into the holes, drop your final stage filter socks. 5 micron filter socks are ideal. Since onboard diesel filters typically filter to 10 microns, the fuel will be clean enough to pass through the vehicle's filter without problems - any coarser and the filter will block regularly. Finer filters could be used but the time taken for the fuel to pass through the filter will be greatly increased, particularly in the winter.



- It is advisable to add at least one stage of filtration before the final filter to prolong the life of the 5 micron filters. These 'pre-filters' can be purchased or better still, made from denim or other material. See below for the simple denim pre-filter design.

- The clean fuel can be pumped from the barrel, using for example a cheap rotary barrel pump, straight into the car or into containers for setting aside. Be sure to record the volume of fuel taken from the drum. This is when the fuel becomes taxable so the amount taken from the barrel is the amount you need to declare to Customs and Excise. The pump should suck fuel from above the bottom of the drum to ensure that it does not draw any sediment or water that may have accumulated on the bottom.



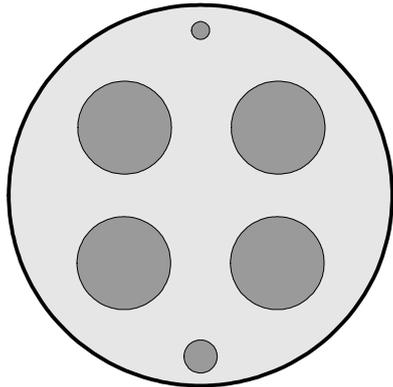
- Filter at outdoor temperatures if you vehicle has normal unheated fuel tank and lines. In the UK we do not need to heat fuel to gravity filter or to run along the fuel lines. If you heat the oil prior to or during filtering then a heated fuel tank and lines are required otherwise thick fatty blobs that were melted during filtering will solidify and clog the system up, leading to fuel starvation and stalling.

Making denim pre-filters

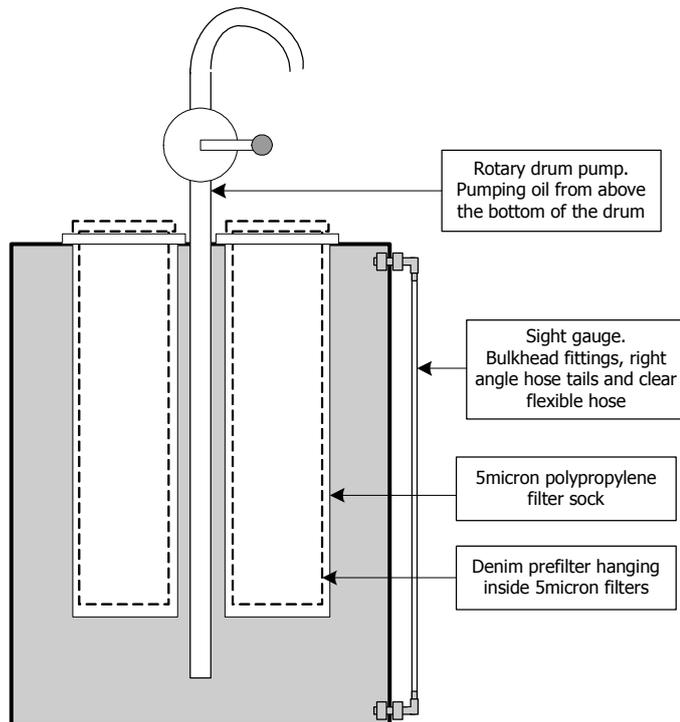
Making home-made pre-filters is easy and they will make a huge difference to the running cost of your filtering station. They can be made from old jeans using a sewing machine as follows;

Cut the leg sections off some old jeans, double or triple stitching the bottom of the legs and make a drawstring loop at the top. Make a hanging loop by running a length of 8mm OD nylon around the neck of the jeans and fixing it together with a short piece of 8mm ID nylon.

These filters can be made for pennies if you strike up a deal with the local charity shop and get to the scraps bag before the rag man.



Top view - 4 holes for hanging filters



Side view - filters and gauge in place

The Finished Filter Station

In this picture you can see the finished filtering station. There is a cubee of used oil that has settled – the top fraction is ready to be filtered. There are 4 filters with pre-filters hanging inside the drum. The pre-filter at the back is raised for access using a large plant pot with the base cut away. There is a sieve in the bucket for collecting the larger crispy bits in the oil when pouring. The site gauge is clearly visible so no need to lift the filters to see how much is in there. The barrel pump will fill a jerry can with fuel grade vegoil in less than a minute.



Filtering your oil

Your oil is filtered by simply pouring it into the pre-filters hanging inside the 5 micron filters; however, there are a few factors that you ought to consider.

Firstly, check that the oil is relatively good and clean before pouring it into the filters. If the oil is cloudy or shows signs that there is some water, let it settle for a week or two and then carefully siphon or decant the top section of the oil which will be the clean water free oil.

If the oil is nice and clear but there are some dregs at the bottom, try to stop pouring before the dregs run through and save these in another container. These can be added to and allowed settle before taking off the good clean oil from the top.

If the filter throughput begins to slow down, it is a sign that the pre-filter is clogged. These can be either washed and reused or replaced with new ones. The pre-filters can be replaced many times before the 5 micron socks will need to be changed.

Try to recycle all of the containers and dispose of any unusable oil in an environmentally sound manner.

While every effort is taken to ensure that the information in this guide is accurate we accept no responsibility for any problems experienced while acting upon it. Please ensure personal protective equipment is used as appropriate and safety precautions are taken at all times. We are not held responsible for any injuries suffered.

You must register with HM Revenue and Customs as a Biofuels producer and ensure that the correct level of duty is paid on your fuel.