



Cooking Oil Filtration Guide



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Spent cooking oil

Spent cooking oil is generated when deep frying foods such as fish and chips. While the spent oil can typically be uplifted for free, or a rebate by waste contractors, purchasing oil itself is expensive, and the disposal process, (which typically takes place fortnightly) is often messy and time consuming.

This means, that it is in the interest of businesses to extend the lifespan of their deep-frying cooking oil as much as possible.



Why consider oil filtration?

One way to extend the lifespan of cooking oil is through filtration. This could provide the following benefits for your business:

- Longer lifespan of oil in deep fryers.
- Up to 50%¹ reduced oil consumption.
- Up to 50%² reduced oil purchase costs.
- Reduced environmental impact (e.g. carbon emissions) through reduced oil use.
- Improved kitchen efficiency, through reduced fryer downtime and oil change time demands.
- Improved cooking oil, product quality and product consistency, due to reduction of total polar material (TPM) and free fatty acids.

¹Typical, average savings reported by suppliers. User testimonials suggest that further savings may be achieved depending on filtration frequency, business type, etc.

²Frying fats that undergo chemical deterioration during frying process, proven to affect taste and oil colour.



What are the options?

In general, there are two oil filtration methods: built-in filtration fryers and portable filtration units.

1. Built-in Filtration Fryers (Automatic Filtration)

New fryers can be purchased with built in filtration. These work by allowing the oil to drain into an enclosed filtration reservoir below the fryer, where it is pumped through a filter system then back into the fryer pans. Similar to standard fryers, there are both gas

and electricity supplied options available, as well as a range of capacities to suit your business' requirements.

Indicative Costs³:

Gas: £3,800 (18 litre fryer) - £13,700 (63 litre fryer)

Electricity: £1,900 (8-9 litre fryer) - £14,500 (90 litre fryer)

Built-in filtration fryers may be 50-70% more expensive than standard fryers (depending

on capacity, power source, features, etc.), but in the long-term they are typically more cost-effective, therefore making up for the difference.

For example, consider the two following hypothetical situations of a site, with and without oil filtration on page 6.



What are the options?

	Without Filtration	With Filtration
Fryer Cost	£3,110	£5,020
Fryer Capacity	30 litres	30 litres
Annual Oil Consumption	750 litres⁴	375 litres⁵
Ongoing Annual Cost⁶	£750	£375
10 Year Cost	£7,500	£6,140
Cooking Oil Cost	£7,500	£3,750
Filter Paper Cost	-	£2,390
Carbon Impact⁷	3.92 t.CO2/year	1.96 t.CO2/year

³Price range includes VAT and depends on fryer capacity and features.

⁴Assuming oil replaced once a fortnight.

⁵Assuming 50% reduction in oil consumption, compared to 'without filtration' case.

⁶Assuming an oil purchase cost of £20 per 20 litre container.

⁷Based on a frying oil density of 0.92 kg/L and a carbon factor of 5.68 t.CO2/tonne.



Case Study (Built-in Filtration): The Auchrannie Resort on Arran

Through Zero Waste Scotland's food and drink waste assessment programme, it was identified that there was an estimated 27 tonnes of spent cooking oil generated across the resort's three restaurants every year – with 160 litres collected for disposal every two days.

In order to reduce this, Zero Waste Scotland recommended that the site purchase new fryers with built-in filtration. This was estimated to reduce oil waste by up to 13.6 tonnes and enable £14,600 of oil purchase cost savings. Given the filtration unit cost £16,751, this gave the concept a payback period of only 1.1 years.

After reviewing the benefits associated with this recommendation, the resort took the decision to implement this opportunity and realise the projected savings.

“An excellent programme which has helped us dramatically reduce spend on kitchen oil and volume of waste oil. You have nothing to lose and lots to gain from this programme”

**– David Johnston
Projects Director
Auchrannie Resort**

More information on the Auchrannie Resort case study can be found [here](#).



Portable Filtration Units (Semi-automatic Filtration)

If you already have a fryer and do not wish to replace it, a portable filtration unit is the way to go. This is a portable, electrically powered, compact filtration device with a five-minute-long filtration cycle (per pan) that is placed directly in the fryer's frying pan. The unit circulates oil which is still at service temperature through a filter and back into the pan.

Portable filtration units typically have quick filtration cycles and are easy to handle, which could enable users to filter cooking oil more than once a day (ideal for heavily used fryers which accumulate high TPM levels).

Indicative Costs⁸: £1,485 (up to 10 litre fryer) - £3,180 (up to 45 litre fryer).

⁸Price range includes VAT and depends on fryer capacity.

A close-up photograph of a deep fryer. The oil is bright yellow and bubbling vigorously, with many small, white, frothy bubbles rising to the surface. The background is a solid, vibrant blue color.

Case Study (Portable Filtration): The Bay Fish & Chips

The Bay Fish & Chips in Stonehaven serve locally sourced, sustainable fish and chips through their seafront shop and mobile fish and chip van (used for events catering). When their van's fryer filtration system was unable to efficiently remove carbon built-up from the frying oil, therefore affecting the fish and chips' quality, the business was forced to discard the oil every three events to maintain a healthy and crisp product. Since the van is equipped with a three-pan fryer (120 litre), this led to a huge amount of waste oil and increased running costs for the business.

To combat this, owner Calum Richardson purchased a portable filtration unit. According to Calum, portable filtration has restored their product's quality and they now only replace frying oil after 9-10 events, leading to a 67% reduction in oil consumption.

Calum also finds the filtration quick and efficient, as the unit can be left inside the frying pan during filtration and will automatically warn staff when it's finished, allowing them to take care of other tasks around the kitchen. Furthermore, Calum recognises the health and safety benefits of portable filtration, due to its automated nature.

Finally, he added that cleaning the filtration unit is very easy as it can be simply taken apart and placed in the dishwasher, and that their fryer's performance has also improved, and maintenance has become quicker and easier, as there is no carbon built up through the fryer's parts.

In Calum's words: "We would definitely recommend this. Before, the cooking oil carbon built up would be massive, but now oil is clean and polished. The portable filtration unit stops product being saturated and delivers a nice, crisp and healthier product. It's a win-win all around"

**– Calum Richardson
Owner of The Bay Fish & Chips**



Business Case

How to assess oil filtration feasibility at your site

<p>Potential Savings</p>	<p>1. Estimate annual fryer oil consumption (litres): Annual consumption (litres) = no. of oil waste bins x bin capacity (litres) x uplift frequency per month x 12</p> <p>2. Estimate associated annual raw material costs: Annual Cost = annual consumption (litres) x annual purchase cost (£/litre)⁹ – total annual rebate received by uplift contractor (if any).</p> <p>3. While suppliers suggest up to 50% reduction in oil consumption, a 35% conservative savings percentage is recommended when estimating relevant annual savings. As such: <i>Annual savings (£) = 0.35 x annual cost – annual filtration system running costs (e.g. filter papers)</i> <i>Annual savings (litres) = 0.35 x annual consumption (litres)</i></p> <p>It should be noted this is a high-level approach and savings should be verified with selected supplier prior to purchase.</p>
<p>Capital Cost</p>	<p>Consult capital cost figures provided above depending on filtration method preference or contact potential suppliers for quotation:</p> <p>1. Vito UK: 01953 542 101 info@vitouk.co.uk www.vitouk.co.uk 2. Alliance: 0141 771 2900 scotland@alliancelocal.co.uk www.alliancenational.co.uk 3. Nisbets: 0845 140 5555 sales@nisbets.co.uk www.nisbets.co.uk</p>
<p>Simple Payback</p>	<p>This is estimated by dividing capital cost by estimated annual savings (£).</p>

⁹An average oil purchase cost of £1/litre may be used, if unknown.



Further Considerations

Filtration Frequency

Oil filtration should be performed at least once a day to achieve best results, oil TPM testers are available to determine when filtration is needed.

Maintenance

In general, both automatic and semi-automatic filtration units must be regularly cleaned, and filter paper replaced after every run to preserve the units' effectiveness. The filter papers are typically sold in packs of 100 at an average cost of £240 (incl. VAT).

Health & Safety

Consult the Health and Safety Executive's (HSE) 'Safety during emptying and cleaning of fryers' information sheet for general health and safety advice regarding fryer oil use. For more information and to access the HSE information sheet on fryer click [here](#). Manufacturer's instructions for the filtration units should also be followed.



Useful Links

To find out more about the Food and Drink Waste Prevention Programme:
<https://www.zerowastescotland.org.uk/FoodDrink>

To access our free Food and Drink Waste Prevention Guides:
<https://www.zerowastescotland.org.uk/FoodDrink/ManagingFoodWaste>

To sign up for a free Food and Drink Opportunity Assessment:
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