

Oilybits Centrifugal Filtration Help Sheet

The Oilybits range of Centrifugal Oil Purifiers works on the simple principle of centrifugal force.

The force is created by spinning a rotor to a high speed (approx 8000 RPM), thus creating up to 2000 times gravity, this force causes heavier-than-oil particles & liquids to push through the lighter oil and to the outside of the rotor, where they are held by this force, this allows the lighter oil to pass through the rotor via the propulsion jets and out through the bottom. Once the pump is switched off or pressure drops for any other reason, then the centrifuge will slow, and any contaminants will start to go straight through the centrifuge, therefore during speed-up and slow-down, the oil coming out of the bottom will be un-purified.

A Centrifuge will not remove "miscible" liquids... these are liquids that are of the same Specific Gravity (S.G) as the oil, or contaminants that are attached the oil molecules chemically.

COMMON PROBLEMS:

AIR

If the ingoing oil is full of air, the centrifuge will not separate anything, this is because the contents of the centrifuge becomes buoyant in the rotor affecting the direction in which the separating forces act, and the air bubbles have no mass so reduce propulsion severely, almost completely. The only way air can get into the stream prior to the centrifuge is on the inlet line to the pump, where there will be a vacuum. Always have the pump fed by gravity from a bottom-outlet tank wherever possible, or ensure that all joints are leak-tight.

EXCESS ANIMAL FAT OR WATER

Any excessive quantities of animal fat or water will soon fill the centrifuge, and once the rotor is full of heavier-than-oil liquid, any further contaminants will be forced straight through and into your clean oil below. Always remove as much water and animal fat as possible before centrifuging, this should be done by heating the oil to around 50c, then allowing to settle in a conical-bottomed tank, from which it can be easily drained. Animal fat is white in colour so can be easily identified in the bottom of a clear vessel (providing the temperature is cool enough for the white colour to be apparent)

EXCESSIVELY LARGE PARTICLE DEBRIS

It is important that your oil is filtered to 200 microns before centrifuging, this is not only to protect the pump and the centrifuge from wear, but to prevent the centrifuge propulsion jets from becoming blocked, if they get blocked they are easily cleanable, but blocking or partial blocking of one or both jets will severely reduce the propulsion, almost completely.

EXCESSIVE GENERAL CONTAMINATION

If your oil is excessively contaminated with foreign solids or liquids, then this means that the time the oil has to spin in the rotor (only a few seconds) is insufficient for all of the heavier material to be forced to the outer wall, and thus some will go straight through, in this case the oil will need to be passed a number of times, or pre-filtered to a better standard, maybe lower than 200 microns. Once there is a sufficient body of clean liquid for the dirt to pass through then the centrifuge will start to separate the foreign material and gradually become more efficient.

TOO COLD

Your oil needs to be heated to around 50 celcius or more, if it is cooler than this then it will be more viscous, and a higher viscosity will mean that it cannot pass through the propulsion jets at such a high speed, and that particles in the oil will find it harder to pass through the more viscous oil to the outer wall of the rotor.

TOO HOT

This will not affect the centrifuge itself but oil that is too hot may cause the pump to overheat and the thermal cut-out to switch the pump off for its own protection. The thermal cut-out will stop the pump for around 30 minutes whist it cools down, then it will reset itself.

Overleaf - How we do it...

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GENERAL GUIDELINES FOR TROUBLE FREE USAGE

Collect Waste Oil, always leave behind excessively contaminated oil, for example thick sediments, this is not worth trying to recover oil from

Filter through a washable 200 micron bag into a container (ideally a conical-bottomed tank), it may take some time for all of the oil to pass through the filter. Do not force the oil through as it will damage the filter, but allow it to drain through overnight. If this takes too long, mild heating will help it to pass through the filter

Heat the oil to around 30 celcius or more then switch heater off (not necessary during summer when 25-30c ambient heat will be sufficient, or leave in sunlight) Allow oil to settle until there is clear oil at the top of the tank, this may happen quickly or take a few days, you will need to experiment with this

You will see darker and lighter (than the oil) liquids at the bottom of the tank, glycerol, animal fat, and some particle debris, drain this off and discard completely, its not worth purifying as it will fill your centrifuge too quickly for it to be able to function effectively

Your oil should now be reasonably clear, with only traces of water, glycerol, animal fat and particles in it

Heat oil to 50 celcius or more, and pump into centrifuge, collect the oil coming through the centrifuge in a waste bucket until the oil coming through is free of air bubbles, and the noise of the centrifuge stabilises – this is when it is at full-speed. Now remove the waste bucket and allow to drain into a collection vessel

Examine the oil after the first pass, if it is still contaminated then pass again (maybe a number of times), it would be worth disassembling the rotor periodically to check what debris has been collected (not necessary when you are familiar with the unit but helpful during commissioning and first usage)

HOW WE RUN OUR OWN SYSTEM

With our own system we use a conical bottomed tank with sidewall mounted immersion heater, and instead of messing around with start up / shut down waste buckets, we drain the settled debris through a tap in the bottom of the cone, then circulate the filtered oil in the tank (out of the bottom and back into the top) we do this for as long as we have time, but generally allowing for 3 to 5 passes based on the tanks volume and the flow rate of the centrifuge. For the final pass, we move the outlet hose from the centrifuge into a jerry-can, this means that all of the oil that goes into the jerry-can has passed at least once through the centrifuge

A centrifuge is basically a means of removing the majority of the fine debris in oil without wasting filters, this it does very effectively, providing that it is installed and is being operated correctly, and in accordance with the information we have provided.



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Problem	Probable cause	Action
Leakage at base of cleaner	Base gasket damaged / shrunk	Change Gasket
	Bolts have loosened	Tighten Bolts
Rotor does not rotate	Nozzles blocked	Open rotor and clean nozzles thoroughly.
Rotor does not rotate even after cleaning nozzles	Entry Valve Blocked	Entry Valve comprises 3 components, Centering Nut & Sealing Washer, Spring, Piston. Remove in that order, piston is pushed out from centrifuge inlet side. Clean with airline, reassemble carefully
Rotor does not rotate, and is leaking from around base of rotor cap	Top Nut is loose	Tighten top nut
	Rotor Cap has been over pressurised and has blown	Replace Rotor cap
Rotor rotates but at low speed	Leakage of oil through rotor assembly	Open rotor and ensure that the rubber ring has a proper seat on rotor body and that the top cap retaining nut is tight
	Oil level in centrifuge too high	Ensure outlet hose is vertical so oil can drain freely
	Rotor Bushes damaged / worn	Replace Rotor
	Rotor cap filled with dirt	Clean rotor cap out
Abnormal vibration	Rotor cap not correctly seated or top nut loose	Open rotor and reassemble it properly
	Arrow Marks (if present) are not aligned	Open rotor and reassemble it properly
	Rotor Shaft excessively worn	Replace entire centrifuge
	Rotor Bushes worn	Replace Rotor
Cleaner does not collect any dirt	Rotor not rotating at desired speed.	See points above. Check oil pressure and for blocks in filters upstream of oil pump
	Oil is already clean	No action required

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HOW TO TELL IF YOU HAVE OVER PRESSURISED YOUR CENTRIFUGE

Almost every time we have a centrifuge returned, it is due to the unit being over pressurised. There are no pumps which provide precisely the correct pressure and flow as is required by the various centrifuges, and so it is the responsibility of the user to ensure that the pressure is set correctly and the centrifuge is not over pressurised.

The maximum pressure for any centrifuge is 7 Bar / 100 PSI.

If the centrifuge is over pressurised, the most common result is that the Rotor Cap buckles, and as a result of this, oil pours out from the bottom, where it would normally be sealed against an O'ring.

Pictures below are ALL Buckled Rotors, you can see the top area where the Rotor Nut sits, is pushed down below the top surface of the rotor. The position of the nut is supposed to be at the absolute top of the rotor cap. The 3 images vary in severity from almost invisible (far left), to extreme (far right).



The image below is of the far right rotor still fitted to the centrifuge which it was a part of.



You can see the nut remains in the original position, but the Rotor Cap has lifted upwards, and the black O'ring that normally seals it against the Rotor has become visible.

This centrifuge was serviced with a new Rotor Cap and returned to the customer, but please be aware that repairs of this nature are chargeable and parts are not cheap!

RETURNS

We welcome returns of centrifuges for inspection and service / repair.

The cost of inspection, report & return is £25.00 inc VAT, this EXCLUDES the cost of any parts or labour required.

Items for service should be returned to;

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