Frequently Asked Questions

What are the advantages of a Gerotor pump over a spur gear design?

Smooth Pumping Action - Each rotor revolves around it's own center with no inherent imbalance. Gradual change in pumping pockets reduces pressure ripples.

Less Aeration of Oil - Gerotor cavities fill over 180° of shaft rotation, causing smooth flow of oil, reducing aeration of the oil.

High Volumetric Efficiency - Gerotor pumps self prime and efficiencies often exceed 95%. Large inlet ports are active for over 180° of shaft rotation providing superior fill.

Long Life - Gerotor pumps have less moving parts, more bearing surface, and steel on steel oil flow path significantly reduces wear. Gear pumps have a steel gear with aluminum housing that wears creating an internal leak path. The relative RPM between inner and outer rotors, on a gerotor pump, is 600 RPM at 3000 shaft RPM resulting in less wear between the pumping sections.

Better Suction - While Gerotor inlet ports are active for more than 180° of shaft rotation, spur gear pumps have a displacement or volume change about every 7° of rotation. The 180° of port opening on a Gerotor pump gives superior fill capacity and suction.

Pump cavitation: What causes it?

Oil pressure is the result of several things. First, the pump must have an adequate supply of oil at the inlet side. Secondly, the pump must have the capacity to pump enough oil to overcome the "leaks" inside the engine and develop pressure. These "leaks" are due to bearing clearances, lifter bore clearances and top end oiling. If the supply of oil to the inlet side is not adequate due to small hose and fitting sizes, anywhere in the inlet hose, the pump cannot fill each chamber completely on each pumping event and the pump "cavitates", or works at less than maximum efficiency. Please note that the hose or fitting size is really the I.D. size of the hose or fitting. Some industrial hoses and fittings use the same thread sizes and wrenches, but the hole "I.D." is smaller than a comparable "AN" or high-performance fitting such as "Earl¹s Performance Products" fittings. Typically, a small inlet hose size will cause the engine to see a loss in pressure at higher RPMs.

Can I run a Wet Sump engine and create vacuum in the crankcase?

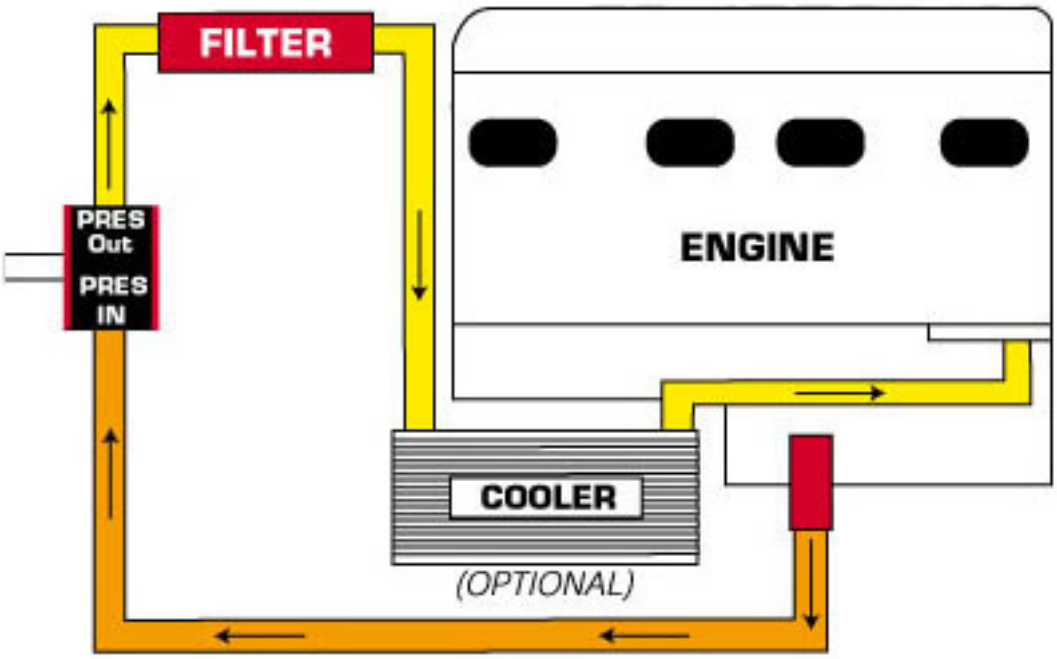
In Wet Sump applications using Peterson¹s Wet-Vac external pump or other manufacturer's vacuum pumps to create a vacuum in the engine, you will notice that as the vacuum increases, the oil pressure will decrease. This is the result of the pump having to suck the oil out of the pan, and in doing so, overcome the vacuum in the pan. As the vacuum increases, the force necessary to suck the oil from the pan increases and the pump is unable to completely fill on each pumping action, causing pump cavitation. Since the pump is pumping with less efficiency, due to the vacuum, the oil pressure decreases.

Wet sump or dry sump?

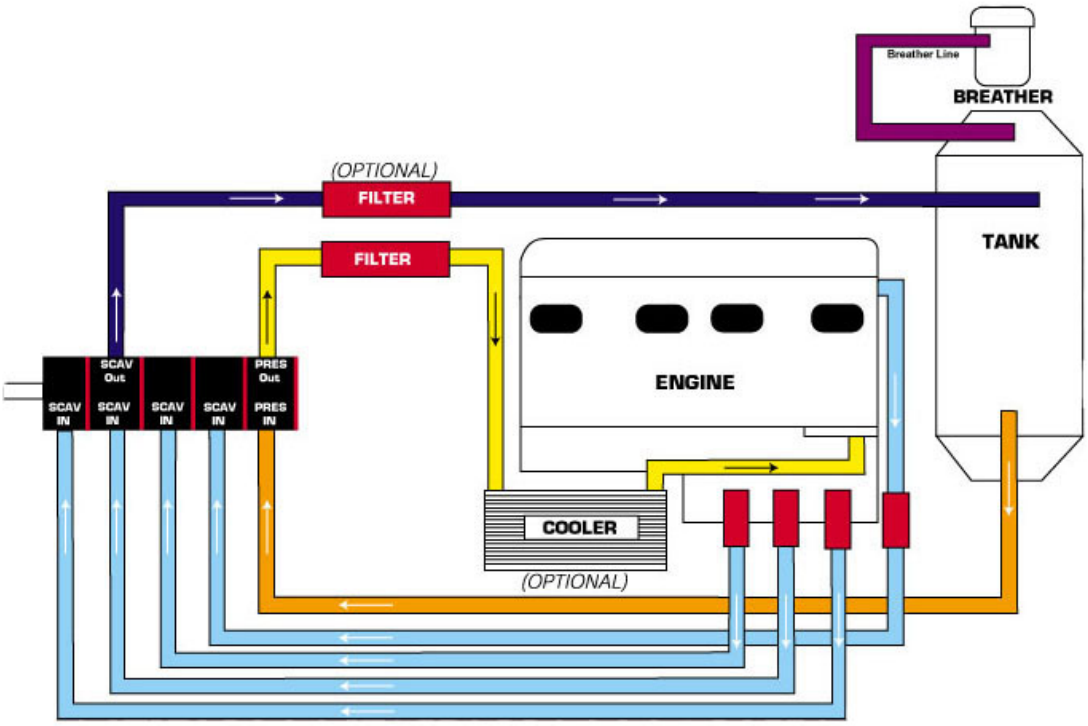
A Dry Sump system is preferable if the rules and budget allow a dry sump system. Some divisions only allow wet sump engines, and in that case, a Peterson External Wet Sump pump can provide externally adjustable pressure, more volume by adjusting pump speeds and more uniform timing by taking the pump drive off of the distributor. A great choice for those instances where you need to use a wet sump pump. Dry sump systems give you the ability to lower the engine in the chassis, due to a shallower pan configuration, control of windage and have a more positive supply of oil to the pump. Other advantages include: Externally adjustable oil pressure, the ability to speed up or slow down the pump, using different pulley and belt configurations, enabling the pump output to fit the need of the engine.

How do I choose the right sized pump for my application? 3, 4, or 5 stages?

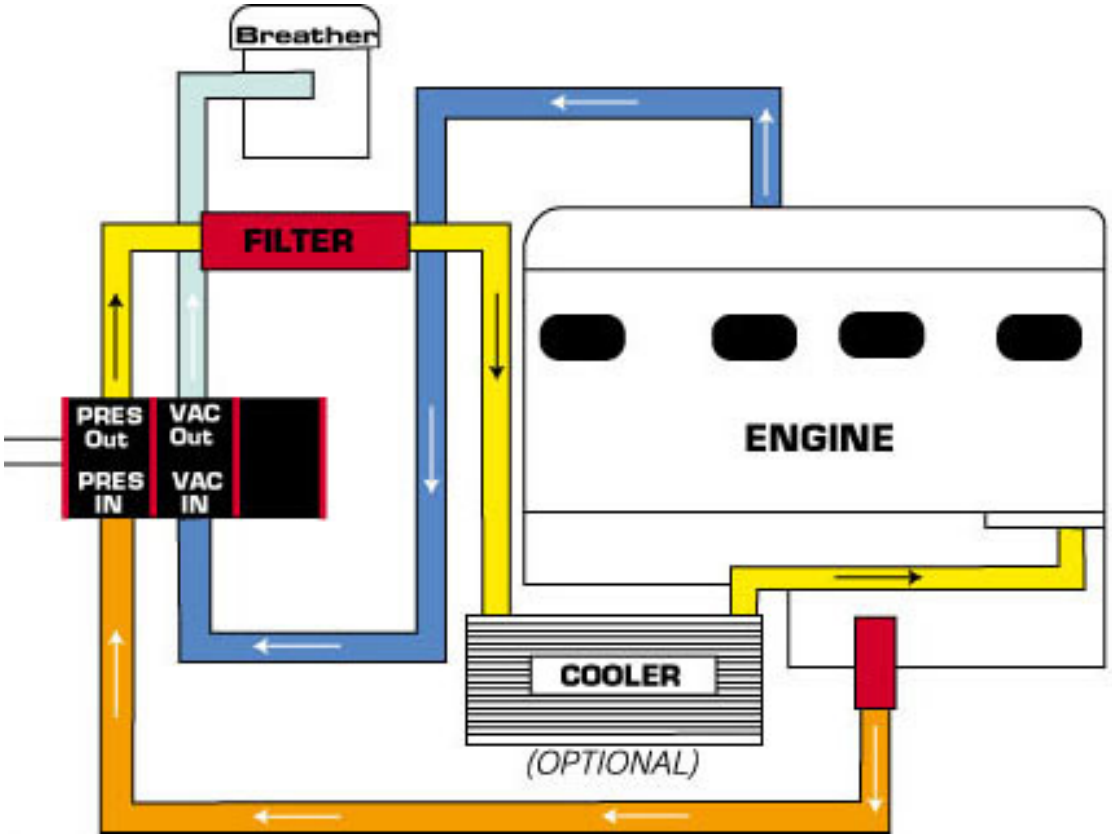
In modern racing engines, control of windage (oil in suspension inside the engine) is one of the best ways to gain usable power. Evacuation of the crankcase can be better accomplished using multiple scavenge sections. All Peterson Dry Sump pumps, along with our competitors, use one pressure and 2, 3, or 4 scavenge stages. We have found that the Peterson 4 stage pump is as efficient as most 5 stage gear pumps, because of Peterson¹s Gerotor design. Typically, 3 stage pumps scavenge with 2 pickup points in the pan, 4 stage scavenge with 2 pickup points in the pan and one pickup out of the lifter valley. 5 stage pumps scavenge with 3 pickup points in the pan and one pickup out of the lifter valley. Most pump manufacturers offer different size stages which pump more or less volume per rotation. Typically, the longer the section - the more volume



1 stage Pro-rotor plumbing



5 stage Pro-rotor plumbing



Wet/Vac Pro-rotor plumbing

Drives

Oil Pump Drive Speeds

Peterson oil pumps are a positive displacement pump as are most of our competitors pumps. This means that if you turn the pump slower it pumps less volumeand if you turn it faster it pumps more volume. Most pumps have a maximum RPM that you can turn them. Typically, pumps turn from 50% of engine speed, as is the case of cam driven pumps, to 57% of engine speed in the case of our standard belt driven pumps. However, ratios of up to 70% have been used. Peterson Fluid Systems produces pulleys of different sizes (tooth count) so that the pump speed can be adjusted to a praticular engine. Ideally the pump will turn just fast enough to satisfy the engine need and keep the oil pressure up without the need of bypassing oil. It takes horsepower to drive a pump andthe faster you turn it, the more volume it pumps and the more horsepower it takes. It doesnt make sense to pump volume that goes through the relief valve. On small displacment engines with less oil need, it is not uncommon to slow the pump to 45% of engine speed. If you know what your engine requirements are, in GPM of oil, our tech people can help you determine a pump speed, for Peterson pumps, that will not rob horsepower.

HTD vs. Gilmer

Gilmer or cog belts are the tried and true belts used to drive dry sump oil pumps and other engine accessories. HTD (High Tourqe Drive) belts offer deeper tooth engagment into the pulley, making them capable of carrying more load. These are useful in more severe conditions. Peterson provides pulleys, belts and drives of both types.

Filters

Micron Filter Sizes

Petersons filter elements are rated in micron sizes, reflecting the size of particle that will pass through the filter screen. The larger the micron size, the larger the particle that will pass through the screen. One micron equals .0000394 inches. The following is the micron particle size for Peterson filters:

Micron Size	Particle Size
45 Micron	.0018 inches
60 Micron	.0023 inches
75 Micron	.0029 inches
100 Micron	.0039 inches

Oil Tanks

How full to fill them

Peterson Oil tanks are rated in gallons of total capacity. A good rule of thumb is to run the tank about 2/3 full. When you first fill the tank, make a dipstick using a wood dowel or use a tape measure down through the cap and get a measurment as you put in each quart of oil. This can then be used to check the oil level on race night. After starting the engine, recheck the level and add oil as necessary to get about 2/3 full. If you find that you are blowing oil out of the breather, try lowering the level in the tank by about a quart. Blowing oil is often the result of the tank being too full.

Breather Cans

When plumbing in a breather can, to breath the engine, you should use at least a - 12 AN hose. The hose should run slightly up hill to the can so that any oil reaching the hose can run back down the hose to the tank. Be sure that the hose does not have any dips where oil can accumalate.

Remember- The air coming from the oil tank to the breather is a result of having multiple scavenge sections which pump a lot of air from the engine. If the breather hose is too small, the velocity of the air will increase over what it would be with a larger hose. This increase in velocity will tend to carry more oil droplets to the breather can. This is why a larer hose is better.

Plumbing

AN Thread Sizes

AN (Army-Navy) sizes were established by the aircraft industry and designate the outside diameter of rigid tubing that the corresponding fittings are used with. Each dash size equals 1/16 of an inch. (ie -8 AN = 8 x 1/16" = 1/2" OD of the metal tube) Each standard AN size has its own standard thread size. Since the tube sizes do not equate with the hose sizes, due to the variation in wall thickness, the ID of the hose and tubes are not the same. See the chart below for Earls Perform O' Flex hose and AN sizes.

AN Size	Tube OD	Thread Size	Hose ID
-4	1/4"	7/16-20	7/32"
-6	3/8"	9/16-18	11/32"
-8	1/2"	3/4-16	7/16"
-10	5/8"	7/8-14	9/16"
-12	3/4"	1 1/16-12	11/16"
-16	1"	1 5/16-12	7/8"

-20	1 1/4"	1 5/8-12	1 1/8"

**Above listed hose sizes reflect sizes published by Earl's Performance Products for their Perform O' Flex™ hose. Hoses from other manufacturers and hoses with teflon liners may differ in size*

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