Snowmobile online Off-Road.com

ARTICLE REPRINT

PRODUCT REVIEW

Blue Marble Two Cycle Oil Technology

Environmentally Friendly and Good for Your 2-Stroke!

By Matthew Baynard
Jan 2004

It's been two years since we first tested Blue Marble oil products in several of our snowmobiles, a jet ski, and two of our tow vehicles. At first we were a bit skeptical of the statements made by Enviro Fuels marketing guru Jeff Waugh, but using is the true test of the product. By the way, Jeff can talk you #*& off about oil and specifically Blue Marble oils.

My cynical view on anything new these days, is a direct result of testing and 'evaluating' hundreds of products each season for snowmobiles, ATV's and motorcycles. Very few products live up to the hype and the claims of the manufacturer. Most are complete disappointments really. That was not the case with Blue Marble after a season of use.

A few 'result' of using the product started to be obvious, even if we didn't understand why. Our fuel mileage improved, in the case of the Jet Ski it was very noticeable, and the max rpm of the engines seemed to increase over time. On the Jet Ski, the improvement was a few hundred rpm. The snowmobiles improvement was not as extreme, but it did increase.

One change that everyone noticed was smoke from the snowmobiles basically disappeared, even during warm-up, and the traditional two-stroke smell was virtually undetectable.

All of this from just changing the oil, sounds like complete malarkey, but it all did happen just from changing the oil.

The oil was developed as an alternative to traditional two cycle oils that come in about every flavor imaginable. We all have our favorites too. You might not know why you swear by one, and you probably have no performance or secondary reason for rationalizing why you 'love' it. My reason for swearing by Blue Marble has both performance and secondary reasons, and they can be backed up with scientific fact. As a writer, but also as an engineer, that's pretty important to me.

The core technology of Blue Marble is a patented chemistry that provides an increase in the efficiency of the combustion event and a reduction in friction and oxygen absorption at the cylinder wall. Sounds technical, but these two characteristics increase the performance of two cycle engines and reduce maintenance over the life of the engine. We all agree that removing friction improves performance, look at track designs the last few years. Everyone wants to make everything roll, flow, or slide with less friction, it all improves the complete performance package.

Traditional engine lubrication is dependant on the introduction of long-chain hydrocarbons or synthetic compounds that act as a buffer between the wall of the combustion chamber and the piston ring. This approach to lubrication has served the industry well, but it has its limitations. I'm not a chemist, so I'm not going to explain the long-chain hydrocarbons or synthetic compounds, but there are two issues to consider understanding here. First, most engines are fairly efficient mechanically. It would not be unusual to have a machine that is 93% to 95% efficient mechanically. Traditional lubrication can only help with this portion of the efficiency and, then, is still limited at the upper end by the inherent friction of the metal. Second, when you move from mineral to synthetic oils, Poly Alpha Olefins (PAO's), they will tend to see a varnishing on engine parts. (see the text box below) This can be addressed through additional treatments, but it is really a maintenance issue. This is why one of the largest ski mountains in the United States recently switched their equipment off of synthetics, just too many engine failures due to excessive varnishing on engine components.

Blue Marble's two stroke oil goes a step beyond providing a lubrication barrier between metal parts. Blue Marble's oil actually reduces the inherent friction of metal to metal parts by changing the crystal structure of the metal through a chemical reaction. That sentence is the key to this oil and something that no one else is doing right now. Unlike products that generate layers on the metal, Blue Marble's technology changes the surface chemistry of iron and aluminum to a depth of approximately 120 angstroms (.12 microns, that's point twelve microns and it's an unbelievably small).

To avoid the deluge of emails I'm bound to get, I'll pre answer a question, "Why isn't everyone doing the same thing." First, Blue Marble has a patent that protects them from anyone trying to generate the same surfaces in an engine lubrication scenario. Secondly, people have been trying to do this, and still do. That is what ceramics are all about. The real issue is cost, both operational and maintenance. The last reason is Blue Marble feels this is the direction for the future. It takes time for people to take advantage of technology shifts. We agree with them, this is a direction all oils need to take to have any real impact on your engine.

Because the surface of the metal is being converted, not just coated, there is no build up and there is no potential for change in the geometries of the engine. Keep in mind that the efficiency of any engine is dependant on the proper manufacture of that equipment. Modern manufacturers are able to make machines now to tolerances under 10 microns. So, if you have a high performance machine, with valves, rings and other metal to metal parts that is manufactured to such tight tolerances, the objective is to keep it as much like the original manufactured condition as possible. This is why people use more expensive oil in the first place, to maintain their equipment. If you then consider that maintenance should be more broadly defined as how an engine is treated, then it becomes clear that a snowmobiler, ATV'er or biker should consider their fuel, oil and anything else that goes in the engine and its impact on the metal surfaces of the engine. If a product builds a coating or a varnish on a metal part, that part is more likely to not fit the way it was intended to and it will diminish performance, or even break. This conversion surface has two characteristics that are beneficial. The first is that it has inherently less friction than a standard metal surface.

The reduction in friction is caused by the reduction in the size of voids in the crystal structure of the metal. The technology in Blue Marble Two Cycle Oil reacts with the metal creating a new surface that has characteristics analogous to a ceramic coating.
The second effect of the conversion surface is the reduction in reactivity of the surface. This contributes to engine performance in two ways. First, once the surface is generated, it is much more difficult for carbon to adhere to the surface metals. This reduces the potential for significant carbon buildup. In older engines, this can actually lead to the disruption of built up carbon.

Continued...

Snowmobile online Off-Road.com

ARTICLE REPRINT

PRODUCT REVIEW
Continued

Blue Marble Two Cycle Oil Technology

Environmentally Friendly and Good for Your 2-Stroke!

By Matthew Baynard
Jan 2004

Second, the metal of an engine surface reacts with oxygen during the combustion process. This is where NOx is generated primarily. A metal surface treated with Blue Marble technology is less reactive to oxygen. Any oxygen not reacting with, or held by the metal surface, during the combustion phase is available for more complete combustion. To what effect and to what amount this contributes to improved performance is still being studied by the folks at Blue Marble. Combustion is the second principal area that the technology in Blue Marble addresses. Blue Marble oil contains what is commonly known as a fuel borne catalyst. These catalysts are not particularly new, but the one in Blue Marble is a change from the historic direction of such catalysts.

As a side note, PAO's are considered to be the true synthetic oils. Not all oils labeled as synthetic, are really synthetic oils at all. Oils can also be classified into groups.

group I - old pre-2002
group II - new API-SL, less trash see 'sulfur' and 'aromatics', better 'viscosity index' and everything else over group I
group III - other "synthetics" that have even better 'viscosity index'
group IV - true synthetics, have superior cold weather performance 'pour point' and best 'viscosity index' (visit any oil company site to understand more about pour point and viscosity index).

The purpose of fuel borne catalysts is to improve the efficiency of the combustion event. Fundamentally, they are designed to increase fuel efficiency by helping the combustion event reach closer to completion. In laboratory testing, Blue Marble's technology has been shown to significantly reduce the amount of carbon monoxide and unburned hydrocarbons in the emissions of a combustion event, while slightly increasing carbon dioxide. Each of these changes is characteristic of a more complete combustion event. These point alone would make you wonder why Blue Marble is not handed out by my environmentalists everywhere. We get more efficiency and performance while we do less damage to the environment. Not that snowmobiles contribute anything more than trivial amounts of pollution to the environment compared to the diesel RV's putting through Yellowstone all summer long.

The more complete combustion means that less fuel is required for the same amount of work. The work can be measured either in duration of engine run time or in power output from the engine for a given amount of fuel.

The combination of the fuel catalyzation and the increased efficiency at the cylinder walls combine to make Blue Marble oil more than just oil, its technology. It may all sound like hype to you, but scientifically its provable and we've seen the results personally. This is not snake oil, this is the liquid of the Gods to your engine.

ADDITIONAL INFORMATION ON OILS

The following information I added to give you a full understanding of synthetic oils since they continue to be the flavor de jour. The parts below are extracted from a larger article on oil that can be read in full at http://www.calsci.com/ST1300/Oils1.html . The article is by Mark Lawerence who has been a technical contributor to many motorcycle internet sites. I would recommend reading his complete article, its extremely informative.

Synthetic Oils

Synthetic oils were originally designed for the purpose of having very pure base oil with excellent properties. By starting from scratch and building up your oil molecules from little pieces, you can pretty much guarantee that every molecule in the oil is just like every other molecule, and therefore the properties are exactly what you designed in, not compromised by impurities from dead cockroach shells or whatever. Synthetics were thus originally a reaction to the relatively poor refining processes available from about 1930 to about 1990. The original synthetics were designed for the Army Air Force in WW II. They simply could not make their high-performance turbo-charged radial engines stay alive on the available motor oils of the time.

One process for making synthetic base oils is to start with a chemical called an olefin, and make new molecules by attaching them to each other in long chains, hence "poly." The primary advantage of Poly-Alpha-Olefin "PAO" base oil is that all the molecules in the base oil are pretty much identical, so it's easy to get the base oil to behave exactly as you like. PAOs are called Group IV base oils.
Another type of base oil made from refined and processed esters and is called Group V. Esters start life as fatty acids in plants and animals, which are then chemically combined into esters and diesters. Group V base stocks are the most expensive of all to produce. However, the esters have very significant solvent properties - an ester base oil all by itself will do a very decent job of keeping your engine clean. So, people who are serious about making a superior oil will usually mix some Group V oils into their base stock.

Finally, there are new chemicals emerging which are made from liquefied natural gas called GTL (gas to liquid) base oils. These will perhaps be called Group VI, and many people think they will become an important part of the oils you buy within a few years. Natural gas is primarily made up of only one type of molecule, so the refining is already done for you. Most oil wells throw off a lot of natural gas. In many cases, it's more expensive to transport this gas to a large city than the gas is worth, so it's just burned off. For example, Iran burns off enough natural gas each day to power their entire country, electricity, cars, ships, airplanes, the whole thing. So the next time you hear Iran's nuclear reactors are purely for peaceful production of energy, you can wonder like the rest of us why a country that burns off more than their entire energy needs must spend tens of billions of dollars developing alternative energy sources. Well, anyway, natural gas is a chemical looking for a use. All you have to do is chemically attach these molecules to each other to turn them into quite pure oil stocks.

"Semi-synthetics" are oils which are a blend of petroleum oil and no more than 30% synthetic oil. If the manufacturer adds no more than 30% synthetic oil and does not change the additive package, they do not have to recertify the oil. These days, since everyone has agreed that Group III base oils are "synthetic," I'm not sure "semi-synthetic" means anything at all.

As you can see in the table, Oil Table synthetics offer real advantages when your engine is very cold and when your engine is very hot. The viscosity numbers shown above are at 212°F. At 32°F the PAOs and Diesters have about one third the viscosity of the mineral oils, meaning they pump through your engine three times better. Since about 75% of all the wear on your engine happens in the first five minutes after you start it up, synthetics offer an advantage in significantly reducing engine wear.

FOR MORE INFORMATION CONTACT
EnviroFuels, L.P.
1111 Fannin
Suite 1500
Houston, Texas 77002
Toll Free: 877-POWER-09 (877-769-3709)
info@envirofuelslp.com