

The Truth About Motorcycle Oils

The most common question among motorcycle owners when discussing the upkeep of their "baby" seems to be what motor oil they should use. Of course, from this central question other important and related ones arise. What viscosity should you use? How long should they leave your oil in? What filter should you use? Etc.

Unfortunately, there is a great deal of misinformation circulating throughout the motorcycle community - much of it propagated by motorcycle manufacturers and dealers in order to increase their bottom line. And guess who's being bled dry? YOU!

In this article, I hope to dispel some of the myths that are so prevalent among motorcycle owners and shed some light on the REAL issues that must be considered when choosing a motor oil for your pride and joy. Although some of what I say in this article will apply to other motorcycle applications, most of it will focus on wet-clutch applications - since these are where most of the confusion lies.

SYNTHETIC VS. PETROLEUM OIL

One question that invariably arises when deciding on which oil to use in your motorcycle is whether to use synthetic oil or petroleum oil. Although the answer lies in what your expectations are for your motorcycle, here are a few issues you should consider when making your choice:

HIGH TEMPERATURE PERFORMANCE

I believe this is generally a well known fact, but synthetic oils will, in general, perform much better in high temperature applications than petroleum oils will. There are a number of reasons for this that I could spend a few pages on. However, without going into a great deal of detail, here's the Reader's Digest Version.

The synthetic basestocks that synthetic oils are manufactured from have much higher flash points than petroleum oils typically do. In layman's terms, the flash point of an oil is the point at which it begins to vaporize. The higher this flash point, the better the oil will hold up in high temperature environments.

In addition, because synthetic oils are made up of particles of uniform size, they have less "internal friction" than petroleum oils (which are made up of particles varying greatly in size). This lowers the temperature of the oil, thus improving the cooling qualities of the oil. Of course, the end result is cooler engine temperatures.

Secondarily, synthetic oils do not cause the "blanket effect" that petroleum oils do. Because petroleum oils are made up of particles of varying sizes, the smaller particles tend to flow freely through the center of the oil galleries within your engine while the larger sized particles will be pushed to the "outside" of the oil stream - next to engine components. These large particles, for the most part, remain there and do not distribute heat from engine components back to the oil.

The uniform particles within a synthetic oil will **all** flow just as easily through oil galleries. Larger particles are not present to "blanket" engine component surfaces. Therefore, heat is distributed into the oil and carried away.

The end result is that a good quality synthetic oil can lower engine temperatures by as much as 20 to 50 degrees F. That can significantly extend the life of critical engine components. In addition, less stress is put on the oil, which extends its useful life as well.

Of course, the harder you run your bike, the more important these issues will be. Leisure riders will not have as much problem with this issue, but the issue does still exist.

SLUDGE AND DEPOSIT FORMATION

Petroleum oils are very prone to leaving behind sludge, varnish and other deposits while synthetics are not. You see, petroleum basestocks contain many impurities right from the factory. This is because they are a refined product. The refining process is designed to take out impurities. However, no refining process is 100%, and to achieve a level even close to that for a petroleum oil is a very expensive process.

Therefore, to keep petroleum oil prices down, motor oil manufacturers have to find a "happy medium" between high cost and high impurity levels. The end result is a "fairly clean" petroleum basestock. However, a number of impurities still are present.

Synthetic oils do not have this problem with impurities. The only thing in a synthetic oil is what the chemists put into the oil blend - and they don't add anything unless it improves the quality of engine protection and performance offered by the oil.

As motor oil burns off, any impurities within the oil are left behind to cling to engine component surfaces. Since petroleum oils are more prone to high temperature degradation than synthetic oils are AND contain higher levels of contamination in the first place, they leave behind much higher levels of engine deposits.

This is especially true within an air cooled engine which runs at higher temperatures than a water cooled engine because a petroleum oil is more apt to burn off under these temperature extremes. As a result, expect higher levels of deposit formation within a motorcycle application than with an automotive application if using a petroleum oil.

Obviously, the effect of having higher levels of deposit formation within your engine is seen in multiple areas. First, performance will obviously be decreased. Top end speeds will decline. Your bike won't get the same "jump" out of the starting blocks that it once did. I think you get the picture.

A second and related area of concern is fuel mileage. If you gum up the works, your mileage will decrease - without a doubt. Of course, this mileage decrease occurs over time, so it is less noticeable. Most people seem to expect a mileage drop over time as just a fact of life. However, it doesn't have to be that way. Synthetic oils will offer you better fuel mileage to begin with AND will maintain that high level of fuel efficiency much longer than a petroleum oil will.

A third area of concern, if your bike is a wet-clutch application, should be your clutch faces. Any deposit formation on these faces from your motor oil will likely cause clutch slippage to some extent. The more deposit formation, the more slippage that will occur. So, since synthetic oils leave fewer deposits than petroleum oils, they are the superior choice if you wish to avoid potential clutch slippage.

Now you might say, "How would I know if I were experiencing clutch slippage anyway?". Well, to be honest, it's not always easy. If you were experiencing clutch slippage, it is likely that your top end speed would be up to 10 to 20 mph slower than if you were not having any slippage.

However, the only way to know for certain if you've got clutch slippage due to deposit formation would be to check your top end speed. Then, have your bike in to be serviced, and have them check your clutch faces. If there is no deposit formation, then you know you're not experiencing clutch slippage due to deposit formation. However, you MIGHT be experiencing clutch slippage due to another issue that we'll get to in a little while.

If there ARE deposits on your clutch faces, have the issue taken care of. Then, check your top end speed again (using the same oil). If your top end speed has increased significantly, then you know that the deposits were likely the problem. At that point I'd be draining the oil and replacing it with a good synthetic that won't leave those deposits.

LONGER OIL LIFE

As much as this issue is debated, most people agree that synthetics hold up better than petroleum oils. In fact, many people even believe that synthetic oils will probably last longer than petroleum oils "in theory". However, in practice, very few people actually put this theory to the test.

They worry about ruining their engines. They are concerned that even if the oil is in good shape it may be carrying too much debris to adequately protect your engine. The fact is that these worries are really unfounded. There is plenty of evidence to indicate that just about any synthetic oil will outlast a petroleum oil by about 2 to 3 times.

You might want to continue to change your filter at the old 3 to 5,000 mile interval (unless you're using a high efficiency filter designed for extended change intervals), but the oil will still be good for continued use long after 5,000 miles. Most any synthetic oil will be good for at least 7500 miles, even in an air cooled motorcycle application. Some synthetics will even be good for 10 to 15,000 miles or more.

In the end, using extended oil drain intervals could save you a great deal of money without sacrificing engine protection. Of course, you have to do what you're comfortable with, but the facts are in. Synthetics WILL last longer than petroleum oils, no matter what kind of filtration you're using.

BEARING SLIPPAGE

Talk to many motorcycle manufacturers/dealers (especially HD), and you'll find that they might tell you to avoid synthetics in your bike. That trend is slowly changing, but I wouldn't be surprised if you run across someone who tries to tell you that synthetics will ruin your bike.

Most of them refer to bearing slippage. They say that synthetic oils are "too slippery" to maintain enough friction for bearings to roll as they are supposed to. As a result, they say that using synthetic oil will cause your bearings to "slip" instead. Of course, if that were to happen, flat spots would occur on bearings.

That is a bunch of nonsense. Of all the motorcycle mechanics I've ever spoken with, I've never had one of them say that they've seen any flat spots on bearings in bikes that used synthetic oil. It just doesn't happen.

TYING IT ALL TOGETHER

Basically, the story on synthetic vs. petroleum oil for motorcycles comes down to this. If you're not going to own your bike for more than a few years and you don't expect to ride it hard, petroleum will work just fine. However, if you intend on keeping your bike for the long haul and want to maintain its performance characteristics for more than a couple of years, there is no question that you should be going with synthetic.

And, if you intend on running your bike hard, only a quality synthetic can guarantee you proper protection and performance. Petroleum oils simply don't cut it in these types of situations.

Now that we've covered the question of whether you should be using synthetic or petroleum oil, we come to the issue of whether to use a motorcycle specific oil or not. You'll hear varying opinions on this. I'm going to lay out the facts for you, and you can decide what to do with them.

Speak with just about any motorcycle manufacturer rep or dealer and you'll hear the following rhetoric: Don't use any oil that has an API rating higher than SG. Some will even go so far as to say no higher than SF.

In case you don't know what those letters mean, the American Petroleum Institute (API) comes out with new standards for motor oils every few years. Each time they come out with a new standard, the bar is raised. Fuel efficiency must be better, protection benefits must be increased, cold temperature performance must be improved, etc.

So, the higher the second letter of the "code" the "better" the oil. In other words, you should expect an SH oil to be better than an SG oil, and an SJ oil is better than an SH oil, etc. As a side note, gasoline oils are always rated as an Sx, with the "x" being the level of the rating. Diesel oils are always rated with a Cx. Sometimes there will even be a number after the Cx, such as with a diesel CG-4 or CH-4 specification. Again, the higher the second letter, the better the oil. An oil that meets both the API gasoline specs and the diesel specs will likely carry both API ratings.

Motorcycle manufacturers have come up with a very clever way to avoid meeting the newer and more stringent API standards while still selling their oils as premium "motorcycle-specific" lubricants. Most motorcycle-specific oils haven't been tested for the latest API standards in the past decade or so. They are still rated SF or SG, which, according to motorcycle manufacturers and dealers is better for your bike. Many times they'll even go so far as to say that they'll void your warranty if you use an oil that is SH or SJ rated.

That makes it easy to scare you into thinking you need their oil because you don't feel like you have much choice. As a result, motorcycle manufacturers have been able to charge many motorcyclists \$3.00 to \$5.00 per quart or more for old, outdated petroleum motor oil formulations that would sell for about 50 cents in an auto parts store.

Do you think they're making a killing on these products? Do you think they're going to shoot straight with you if they can keep raking in the loot? I think we know the answer to those questions.

Just to set the record straight, they can't legally void your warranty for using an SH or SJ rated oil unless they can prove that use of such oils actually caused the mechanical failure in question. That's not to say they might not try, but if you stick to your guns, they really don't have a leg to stand on. They don't have any way of knowing that you used such oils anyway.

If you want to see the legislation that outlines these warranty coverage issues, head on over to Chapter 13 and read the section titled "New Car Warranties and Extended Drains". Or, simply [click here](#).

The truth is that many automotive oils are actually better for your bike than some motorcycle-specific oils. Let's take a look at some of the flaws in their arguments and see if we can't wade through the mumbo-jumbo.

ZINC AND PHOSPHORUS LEVELS

One of the reasons that motorcycle manufacturers and dealers say that you shouldn't use an SH or SJ rated oil is because these oils supposedly have less zinc and phosphorus than SF and SG oils. This is really only half true. But first, let's talk about the purpose of zinc and phosphorus in your oil to begin with.

Zinc and phosphorus are actually almost always added to an oil in combination and in closely related amounts. They work as a tag team to help minimize wear due to metal-to-metal contact. In essence, if there is ever a time when your engine components are under significant stress and the oil can't maintain a film of lubricity between metal components, metal to metal contact will occur.

Under these conditions, without some extra measure of protection, this would cause severe wear within your engine. However, the addition of zinc and phosphorus to your oil minimizes this risk. The zinc and phosphorus will actually form a thin "plating" over engine components preventing actual metal to metal contact - thereby preventing metal to metal wear. This is a VERY good thing, and very desirable.

Keep in mind a couple of things, though. First of all, the amount of zinc and phosphorus in your oil does not determine "how well" your engine will be protected against metal to metal contact. More zinc and phosphorus does not mean better protection. However, it does mean "longer" protection. The more zinc and phosphorus you have in your motor oil, the more times it will be able to prevent engine wear from metal to metal contact.

With that said, let's move on to the fallacy of the argument against SH and SJ oils for motorcycle use. First, it must be understood that most motorcycle applications call for a 10W-40 or 20W-50 viscosity grade, especially for larger engines and V- twin applications. So, in determining whether you can safely use an automotive oil in your motorcycle engine, only those two grades really need to be considered (or some similar grade like 20W-40 or 15W-50).

So, here's the deal. API SH and SJ specifications have indeed lowered the maximum acceptable limits for zinc and phosphorus content of an oil. However, two things are important to note here. First of all, anything over a 30 weight oil (ie. anything other than a 0W-30, 5W-30 or 10W-30) is NOT required to meet the zinc and phosphorus limit imposed by the SJ specification. In other words, a 10W-40 or 20W-50 motor oil can be rated SJ without being limited to the lower zinc and phosphorus levels.

Therefore, many oils in this viscosity range contain as much zinc and phosphorus as they did before meeting the API SJ specifications. Moreover, it is interesting to note that many of the motorcycle-specific SF and SG rated oils on the market have zinc and phosphorus levels that are UNDER the limits set by the API SJ specs AND under the levels of many standard automotive oils.

In other words, there is no reason that they could not have been formulated for SJ consideration without changing their zinc and phosphorus levels at all (although, as I said, they wouldn't be required to meet those requirements anyway). This makes it pretty clear that their only motivation for not meeting SJ specifications is to save money on reformulation and relabeling.

FRICITION MODIFIERS

Motorcycle manufacturers and dealers also refer to "friction modifiers" as being another reason not to use API SJ rated automotive oils. This MIGHT be the only somewhat valid point they make. However, it is not justified in all cases. Let me explain the issue more fully.

API SJ specifications mandate increased fuel economy over previous API ratings. In order to meet this qualification, motor oil manufacturers must add friction modifiers to their motor oil formulations. It is believed that these friction modifiers MAY cause clutch slippage, although I have not seen any specific scientific testing to validate this claim.

I have spoken with some motorcycle owners who switched from an automotive oil which may have contained friction modifiers to a synthetic motorcycle specific motor oil and noticed a significant increase in top end speeds (10 to 20 mph) immediately. This could be an indication that there was clutch slippage occurring before the switch. However, it is also possible that this increase is due to simply switching to a better formulation of oil which provides better performance. I have no way to say one way or the other.

What is important to note is this: Just as 10W-40 and 20W-50 weight oils are exempt from the zinc/phosphorus limits put in place by API SJ specifications, these same grade oils are exempt from the fuel efficiency mandates that the SJ rating requires. Thus, it is not necessary for motor oil manufacturers to add friction modifiers to their 40 and 50 weight motor oils.

Therefore, it cannot be assumed that just because an oil meets API SJ specs it must contain friction modifiers. It doesn't have to. Some automotive 10W-40 and 20W-50 motor oils may contain no friction modifiers whatsoever. This could only be determined by speaking with the manufacturer themselves. Unfortunately, if that manufacturer also carries a motorcycle specific brand of oil, it is likely that they would point you that direction and avoid answering the question. This is because their motorcycle specific oil generally costs more and makes them a better profit.

So, in the real world, here's where you stand. Just because a 10W-40 or 20W-50 automotive oil meets SJ specs, that doesn't mean that it contains friction modifiers, although it might. There is no scientific evidence that indicates that friction modifiers cause clutch slippage, although some anecdotal evidence suggests that it is possible.

Therefore, if you want to take the risk, you could use any automotive oil you wish (although preferably synthetic) and take your chances in regards to clutch slippage. If slippage does occur, you'll likely need repairs sooner than if no slippage occurred. If you don't want to take the risk, but don't mind making some phone calls, you might be able to find an automotive oil which you can be certain does not contain friction modifiers. This might take some digging though.

If, on the other hand, you don't want to waste your time on all that research but don't want to risk clutch slippage, find a good motorcycle specific oil that won't cost you an arm and a leg and stick with it. However, look for motorcycle specific oil that is still SJ rated. This assures you that you've got the latest in motor oil technology but designed for wet-clutch compatibility.

There is a wide range in pricing for motorcycle specific oils. Petroleum based products can range in the \$2.00 to \$5.00 or more depending on who you purchase from. Keep in mind they are still petroleum oil - nothing all that special, but at least you'll be sure there are no friction modifiers. Synthetic based motorcycle specific oils range from about \$6.00 up to \$12 per quart.

Believe it or not, the best of the pack is the least expensive of any of them and offers extended drain intervals to boot.

WHAT VISCOSITY SHOULD YOU USE?

Now that you've hopefully established what type of oil you are planning on using - or at least have established criteria for making the final decision - there is still the question of what viscosity grade to use. Many owner's manuals will recommend both a 10W-40 and 20W-50 for your bike. So which one do you choose, and why?

For what it's worth, this is what I recommend. If you are going to stick with a petroleum oil, I highly recommend going with the 20W-50, especially in a V-Twin engine. In MOST cases, if you have the choice between a 10W-40 and 20W-50 of the same brand of oil - both designed for the same type application - the 20W-50 will offer better engine protection.

However, if the issue of lifter "bleed down/pump up" is one you'd like to avoid, the 10W-40 will generally allow the lifters to pump back up more quickly. This can reduce the "ticking" that you hear at engine start-up.

If you decide to stick with a synthetic oil, then it's probably much less important which grade you use (10W-40 or 20W-50). Both will likely provide plenty of protection for your engine - even a V-Twin engine. You'll still see your lifters pump back up much more quickly with a 10W-40 than a 20W-50.

As far as temperatures go, once you get into a good quality synthetic, high temperature issues are much less important when selecting a viscosity grade. They actually become more important when selecting the brand of oil that you use. Some brands of synthetic are somewhat low quality and have flash points only slightly higher than petroleum oils of the same grade.

If you plan on doing any cold weather riding, the 10W-40 will be the better choice in just about all circumstances. As I said, if comparing oils within the same brand, if the 20W-50 is a good quality oil with good flash points, the 10W-40 will likely be also. Therefore, you can somewhat forget about the high temperature issue and focus on what will be better for cold temperature operation.

HOW LONG CAN I EXTEND OIL DRAINS?

This is a question that will probably be debated for some years to come. The old adage of "3,000 mile oil changes" is so prevalent that many people don't even consider the possibility of extended drains. The most common reasonings for NOT extending oil drains are "too much oil contamination", "high temperature degradation" or "additive depletion". Although these issues are important to consider, they apply differently to different oil types.

The fact is, that with a petroleum oil and standard filter, you are probably well served to continue 3,000 mile oil changes. If you're using a premium high efficiency oil filter with standard petroleum oil, you might extend to 4,000 or 5,000 miles. If you step up to just about any synthetic on the market, you can probably extend oil drains to 6,000 miles or so even with a standard filter. Use synthetic AND a high efficiency oil filter, and you're probably ok for about 7,500 to 9,000 miles.

Believe it or not, you can extend oil drains even further than that with the right oil and filter. The oil should be synthetic and it must be properly additized for extended drain use. There aren't many oils on the market that are formulated for such use, and those that are, generally are VERY expensive and/or not designed for motorcycle use (especially wet-clutch).

However, there is at least one oil on the market that is very reasonably priced and designed for such extended drain use. Amsoil manufactures a motorcycle specific oil in a 10w40 and 20w50 grade as mentioned a little earlier in this article. These oils cost about \$6.00 per quart. If you are using a standard oil filter, then you should be able to get about 10,000 miles out of Amsoil motorcycle oils without any trouble in touring bikes. Really high revving, high performance racing bikes and such, might consider slightly shorter intervals.

Neo motorcycle oils may also be ok for extended drains. They have a 10w40 and a 20w50 which appear to be wet-clutch compatible. Neo's other oils are designed for extended drain use. I'm guessing that their motorcycle oils would be also although I haven't been able to confirm this from their website information. The cost is about \$10 per quart, which is still very reasonable for a synthetic, extended drain motorcycle oil.

There may very well be other motorcycle oils available for extended drain use as well. A little extra research would tell you for sure. Just do an Internet search for "synthetic motorcycle oil" and then check for extended drain capability.

If you choose to use a high efficiency oil filter (there are number of brands out there including an Mobile 1, Pure 1, AC Delco and an Amsoil brand oil filter, as well as others), you could very likely extend your oil drains even further because your oil would remain much cleaner than with a conventional filter.

Please keep in mind, though, all these recommendations are rough estimates. Check with the oil manufacturer to determine the actual mileage they recommend for change intervals and then see if you can get the tech department to give you an off-the-record estimate, if you're speaking with a mainstream oil manufacturer who's making good money recommending short change intervals.