NEW MOTOR OIL SPECIFICATIONS AND CHANGES (Euro Oils)

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Oil is the lifeblood of every engine so it is important to always use a high quality motor oil that meets the vehicle manufacturer's viscosity recommendations and performance specifications when servicing your customer's vehicles. Just use a name brand motor oil that meets the recommended SAE viscosity and current American Petroleum Institute (API) quality standards and you should have no problems, right? Maybe, maybe not.

The problem is every vehicle manufacturer has their own requirements for what type of oil should be used in their engines, and those requirements can vary by year, make, model and whether an engine is naturally aspirated, turbocharged, supercharged or a diesel or a hybrid. In other words, there is no one universal motor oil standard that everybody agrees upon.

So many brands and viscosities of motor oil are on store shelves today. Choose the wrong viscosity or service rating and it could cause engine trouble!

Here in the U.S., motor oil viscosity is rated according to SAE standards. The cold and hot flow characteristics of multi-viscosity oils such as 5W-20, 5W-30, 10W-30, 0W-40 and so on are determined by specific test sequences. The first number in a multi-viscosity rating refers to the oil's cold flow characteristics while the second number refers to it's hot flow characteristics. Thus, a 5W-20 oil acts

like a straight 5W oil for easier cold weather cranking and lubrication of critical upper valvetrain components, and maintains its viscosity when hot like a straight 30W oil for good oil film strength and oil pressure.

Most late model engines are factory filled with multi-viscosity 5W-20 or 5W-30 motor oil, but some require 5W-40, 0W-20 or 0W-30. It's important to follow the viscosity recommendations because many of these engines have tighter bearing clearances that require a lower viscosity oil for proper lubrication. Thinner oils also improve fuel economy. In some applications, such as Toyota Prius, using the wrong viscosity oil (too heavy) may set a fault code. On others, an oil that is too heavy may interfere with the normal operation of the variable valve timing system, causing additional fault codes to set.

OIL MISLABELING

Fortunately, the European and Asian vehicle manufacturers also use the same SAE viscosity ratings as their domestic counterparts, which makes life easier when it comes to choosing an oil that meets a specified viscosity recommendation. The trouble is, not all motor oils actually meet the viscosity ratings that are claimed for the product - and the situation is even worse with bulk oils. According to a recent API survey of over 1,800 oil samples purchased from bulk dispenser tanks in quick lube shops all across the U.S., nearly 20 percent (one out of five!) failed to meet API standards. Either the viscosity was incorrect or the additive package failed to meet the performance level claimed.

From time to time, another group called the Petroleum Quality Institute of America (PQIA) also audits the quality of branded and private label motor oils. The results of those tests are published on their website (www.pqiamerica.com). PQIA also issues consumer alerts when they discover products that fail to meet industry standards.

MOTOR OIL MATTERS & NEW REGULATIONS

To address this issue, API created its "Motor Oil Matters" (MOM) program that reminds consumers of the importance of using quality motor oils in their engines. Of course, consumers have no way of knowing what they are really getting when they have their oil changed, so it's buyer beware.

To hold service facilities and oil distributors accountable for the quality of the oil they are selling to their customers, the National Conference on Weights and Measures (NCWM) adopted standards that require shops to list the brand, viscosity and API service category of the oil they sell on their customer invoices. Starting January 1, 2014, many states are implementing the new NCWM rules and will require service facilities to label bulk containers, print the oil information on all job tickets and retain the paperwork for at least one year. Check with your appropriate government agency to find out if these new rules apply in your state.

MOM's Oil Change Checklist

❑ Time for a change?

Follow the oil change recommendations in your vehicle's owner's manual. If your vehicle has an oil-life monitor, pay attention to it. When the monitor says it's time for a change, it's time. Pay close attention to how you use your vehicle because vehicle manufacturers sometimes recommend oil drain intervals based on driving habits or conditions.

❑ Are you getting the right viscosity?

Use the viscosity recommended in your vehicle's owner's manual. SAE 5W-20 and 5W-30 are often recommended for today's cars. The viscosity might even be printed on the oil fill cap under the hood!

❑ Is it API-licensed?

Performance matters in lots of things, including motor oil. Know the level of performance recommended by your vehicle manufacturer. Many recommend oils meeting the latest ILSAC or API standard, such as API SN. Oils certified as meeting these standards are easy to find because they carry the API Starburst or API Donut.

❑ Do you know what you're getting?

Confirm with the service provider the motor oil's brand, performance level and viscosity before it's poured into your car or truck and then ask for all three to be included on your receipt. Drive away from locations that won't confirm in writing what they're pouring into your vehicle.

❑ Getting a full change?

Make sure the oil change includes a fresh filter. Your owner's manual probably recommends a specific type of oil filter, so make sure the right one is included with your oil change.

❑ Going to a MOM-licensed installer?

Look for the Motor Oil Matters logo and check out the MOM website—MotorOilMatters.org—to find a trusted location near you.

❑ Did you get a receipt?

Double-check the receipt to confirm that the service provider poured the motor oil you asked for into your car or truck's engine and that the oil meets your manufacturer's recommendation.

❑ When's your next oil change?

Write down the mileage and date you had your oil changed. Vehicle manufacturers often recommend oil changes based on miles or time, whichever comes first.

Ready for a Change?

Find an API-licensed Motor Oil Installer at
MotorOilMatters.org

OIL QUALITY STANDARDS

Oil quality and performance standards depend on the type of base oils that are used to formulate a given product (Group I, II, II, IV or V), and the different types of additives that are blended into the oil

to improve wear resistance, keep the engine clean, control foaming and corrosion, to modify friction characteristics and so on. The relative amounts of these additives and how they are combined determines the performance properties of the oil - and that's where things get interesting and confusing.

API rates motor oils differently if they are for gasoline engines or diesel engines. This rating is displayed in a "starburst" symbol on the product. There is also a "donut" that shows the service rating, viscosity and fuel saving properties of the oil. The current API standard for gasoline engines since 2011 has been "SN", which supersedes the previous "SM" rating (2010), "SL" rating (2004) and "SJ" rating (2001). All previous gasoline service ratings are obsolete.

The API current API service rating for diesel engines is "CJ-4" (introduced in 2010) which supersedes the previous "CI-4" rating (2002) and "CH-4" (1998) ratings. CJ-4 oils are primarily for diesel engines burning low sulfur fuels (less than 15 PPM), while the previous CI-4 oils are for diesels with EGR systems.

COMPATIBILITY ISSUES

API service ratings are supposed to be backwards compatible, and for many applications they are. But there are some exceptions. To help prolong the service life of the catalytic converter and oxygen sensors in late model OBD II vehicles, the amount of high pressure anti-wear additive ZDDP (zinc dialkyl dithiophosphate) has been reduced. If an engine is using oil, ZDDP can foul the catalyst and O2 sensors, so the amount of ZDDP has been gradually reduced over the years to maintain the emission control systems.

Back in the 1980s, motor oils typically contained around 1500 PPM (parts per million) of ZDDP. In the 1990s, that was reduced to 1200 ppm, then down to around 800 ppm in 2005. That level of anti-wear additive is adequate for overhead cam engines and pushrod engines that have roller cams, but it has proved to be inadequate for older engines with flat tappet cams, causing accelerated cam lobe and lifter wear. So for these older engines (especially performance engines with stiffer valve springs), a supplemental ZDDP crankcase additive is highly recommended or a street performance oil that contains higher levels of ZDDP or other anti-wear additives.

ASIAN OIL STANDARDS

A group called the International Lubricant Specification Advisory Committee (ILSAC) made up of Asian and U.S. auto makers has developed their own standards for oil quality. Though not exactly the same as the API standards, the current ILSAC "G-5" rating corresponds closely to the API "SN" rating. The G-5 rating requires improved deposit protection for pistons and turbochargers, more stringent

sludge control, improved fuel economy, enhanced emission control system compatibility, seal compatibility, and protection for engines using ethanol fuels such as E85. The current G-5 standard has been in effect since 2010, and is backwards compatible for the previous G-4 and earlier ratings. Most branded oil products carry both the API and ILSAC ratings, plus any other vehicle manufacturer specifications that they claim to meet.

EUROPEAN OIL STANDARDS

This is where things get really confusing. Germans like to be precise, very precise in fact when it comes to specifying motor oils. Audi, BMW, Mercedes and VW all follow a different set of oil standards called the ACEA European Oil Sequences. Like the API and ILSAC rating systems, the ACEA rating system is based on specific laboratory test procedures. In the U.S., we use various SAE standards and American Society of Testing Materials (ASTM) test procedures. In Europe, they use tests developed by the European Engine Lubricants Quality Management System (EELQMS).

The latest ACEA standards were updated in 2012 and include three basic sets of ratings for gasoline & light-duty diesel engines, light-duty diesel with exhaust after treatment, and heavy-duty diesels. Within each of these sets are subcategories that cover different engine performance requirements:

* A1/B1, A3/B3, A3/B4 & A5/B5 for various gasoline and light-duty diesel applications.
* C1, C2, C3 & C4 for catalyst-equipped gasoline and diesel engines
* E4, E6, E7 & E9 for heavy-duty diesels.

Each subcategory has very specific requirements for viscosity, shear stability, evaporation rates, sulfur and phosphor content, wear resistance, high and low temperature performance, sludge resistance and oxidation resistance according to the application.

Using the ACEA criteria, the European auto makers then establish their own standards for which oils meet the requirements for their specific engine applications (much like Ford, GM and Chrysler do here using SAE, ASTM and their own proprietary test procedures).

For example, Audi has a number of oil specifications including 501.01, 502.00, 505.00, 505.01, 504.00 & 507.00. Volkswagen has similar specifications: VW 502.00, 505.00, 505.01. Each number represents a specific oil requirement (much like GM's "dexos" oil requirement for some of their newer engines). Bottom line: if an oil does not meet the specific requirement for one of their engine applications, it is deemed unacceptable by the auto maker for use in that engine.

Audi technical service bulletin 17-12-29 dated June 26, 2012 lists all of the oils that meets their various specifications. It's a long list, but some of the familiar domestic oils listed that meet the Audi/WV 502.00 specification include Castrol Syntec Euro Formula 0W-30, Mobil 1 0W-40, Pennzoil Platinum Euro Formula 5W-40 & 5W-30, Pennzoil Synthetic Euro formula 5W-40, Valvoline Synpower MST 5W-30 and Valvoline Synpower HST 5W-40. The same TSB also lists approved oils that meet the Audi 505.01 specification, and also their 504.00 specification. Each list is different with some overlap, but you can't assume that an oil that meets one spec will necessarily meet other specs.

To keep a newer vehicle powertrain warranty in effect when servicing a customer's vehicle, therefore, you should always use an "approved" oil that meets the car maker's specifications -- especially on European vehicles. You should be able to find out which oils are approved for various makes/models/applications by searching the OEM service literature or an aftermarket database (alldata, Mitchell, etc.). Audi & VW have TSBs that cover this subject, but we couldn't locate similar information from BMW or Mercedes (they may have it but we couldn't find it). BMW says they require their own BMW Long Life 4 motor oil (such as 5W-30, part number 07 51 0 017 866), but they don't say what other brands meet their spec.

Once a vehicle is out of warranty, any type of oil can be used provided it meets the vehicle manufacturer's viscosity recommendations and basic performance requirements. Use the wrong oil

such as a bargain-priced conventional oil in an engine that requires a high quality long life synthetic, and the results could be engine damage or failure!

You can't go wrong using the type of oil specified by your vehicle manufacturer.

THE ISSUE OF OIL LONGEVITY

In Europe, long oil drain intervals are the norm. Some European auto makers recommend changing the oil every 2 years or 25,000 miles). To make the oil last that long, the base oil must be a high quality synthetic with lots of sludge-fighting and engine cleaning additives. In the North American market, energy conservation is given priority over extended oil life, so motor oils here are usually formulated differently and requires changing much more often (every 5,000 to 7,500 miles, or longer depending on the type of oil used and the type of driving).

The longer the oil drain interval, the high the quality of the motor oil that should be used otherwise viscosity breakdown and sludging can become a major problem. Toyota found that out the hard way when they began recommending 7,500 mile and even 10,000 mile oil change intervals a number of years ago. Engine sludging became a problem because the PCV systems on some Toyota engines did not flow enough air to keep moisture out of the crankcase. Moisture accumulation leads to sludge formation and engine damage.

If a customer has their oil changed every 3,000, 5,000 or even 7,500 miles, chances are they won't have any problems using a conventional motor oil assuming their engine isn't one that has a marginal PCV system. But if they are going beyond 7,500 miles between oil changes or are relying on an oil service reminder light to signal when an oil change is needed, they could end up having serious problems if they are not using a high quality synthetic oil that has been formulated for extended oil change intervals -- which is what most European auto makers specify.

Another factor that comes into play with many late model Gasoline Direct Injection (GDI) engines is the role oil plays in forming intake valve deposits. Deposit buildup has become a problem on some of these engines because the intake valves run dry. The fuel injector sprays fuel directly into the combustion chamber or cylinder rather than the intake port so there is no fuel wash to clean and cool

the intake valves. Consequently, if oil is getting past the valve guide seals it can form heavy carbon deposits on the intake valves that hurt performance and emissions.

A motor oil with a low volatility rating (its "NOACK" number, which is based on the ASTM D5800 lab test) is better because it reduces oil consumption and helps keep the PCV system and intake valves clean (especially in gasoline direct injection engines). Most recent European specifications call for a low NOACK rating (less than 15%).

SPECIALTY OILS

Some oil suppliers have developed special "Euro" products that have been specially formulated to meet European car maker specifications. These help eliminate much of the guesswork about which oils are acceptable to use and which are not. If in doubt, go with an Euro product for a European application.

RE-REFINED OILS

Some oils are also specially formulated for older high mileage (75,000 miles or more) engines. These oils typically contain extra additives to counter the effects of leaks, deposits, sludge and friction. Seal conditioners are increased to help keep crank seals soft and pliable so they don't leak. Extra detergents and dispersants help keep the engine clean and fight sludge.

Another change in motor oils is the introduction of more "green" products that contain up to 50% or more "re-refined" motor oil. The used motor oil in these products has been recovered and fully reprocessed using a multi-step refining procedure that is similar to that which is used to refine crude oil. The resulting base stock is as good or better than a comparable traditional base stock, and meets the same API and OEM performance requirements when it is reformulated with the proper additives. Re-refined motor oil is being used successfully by numerous fleets, the U.S. military and ordinary motorists.

The greatest benefit of re-refined motor oil is that it recycles a valuable product that might otherwise be burned or discarded. The U.S generates over 1.4 billion gallons of waste oil annually. Re-refining used motor oil uses 85 percent less energy than refining crude oil, and allows used motor oil to be recycled as many as 8 to 10 times!