

SPECIAL FEATURE

Not All Lubricants Are Created Equally!

In the sea of many fully synthetic engine oils, only one treats & lubricates your engine at the same time... read on and find out which one.

With the wide variety of engine oils available in the market today, it is little wonder that car owners are confused as to which does the best job for the engine. Many brands claim to provide similar benefits. But is this really true? Are all lubricants more or less the same? To answer this, let's begin by looking at the purpose of engine oils: Firstly, oil acts as a lubricant and is supposed to reduce friction in the moving parts. Secondly, it circulates throughout your engine, and cools parts that cannot get near a water jacket and thirdly it neutralizes harmful by products from the combustion process.

The bulk of engine oils sold in our local market comprise fully-synthetic oils. The reason is simple – good quality fully-synthetic oils will normally last about 10,000km compared to mineral (5,000km) or semi-synthetic (7,500km). Even though you may be paying a lot more for fully synthetic oils, the longer service interval it offers allows you to save on other costs – such as oil filter, labour costs and not to mention down time.

What's in the Oil?

BASE OIL

Not all fully-synthetic oils are created equally. As you will note from the table above, the term fully-synthetic applies to a range of various groups of oils – Group III (severely hydro-cracked oils), Group IV (Poly Alpha Olefins) and Group V (ester based oils). Most fully-synthetic oils are either Group III or Group IV or a blend of the two. Whilst they are very decent oils for lubrication, they cannot match Group V oils for stability in extremely low and high temperature operations. After all, Group V oils are so stable that they are used for lubrication of aircraft jet engines. Group V oils also require less polymeric thickeners (called viscosity index improvers or VIs) to achieve multi-grade viscosity. VIs tend to breakdown in high shear and high temperature environment, and when that happens, the oil breaks down and loses its ability to lubricate. Depending on how you drive, Group IV oils can last between 15,000km to 20,000km. But it is three times more costly than a Group III oil and twice as costly as a Group IV oil. Xrev is one of the few lubricants that utilizes Group V Poly Ester as base oil for its proven stability under extreme operating conditions. What is more remarkable is that Xrev is able to do this whilst maintaining a price (currently

Group	Description	Properties
I (Mineral)	Refined mineral oil.	Higher impurities which coagulate at low temperature and burns off at higher temperature
II (Mineral)	Highly refined mineral oil made through hydrocracking and catalytic-dewaxing process.	Better viscosity control compared to Group I with lower wax content (wax causes sludge build-up in engines)
III (Synthetic)	Severely hydro-cracked oils without paraffin or wax.	Properties approaching Group IV oils except for slightly higher pour point and lower flash point
IV (Fully-Synthetic)	Synthesized from olefin through a chemical process to form Poly Alpha Olefins (PAO).	Good high and low temperature qualities for lubrication.
V (Fully-Synthetic)	Synthesized from refined and processed esters and chemically combined to form ester, diester and polyester.	Most stable base oil providing the best performance in extreme high and low temperature operations.

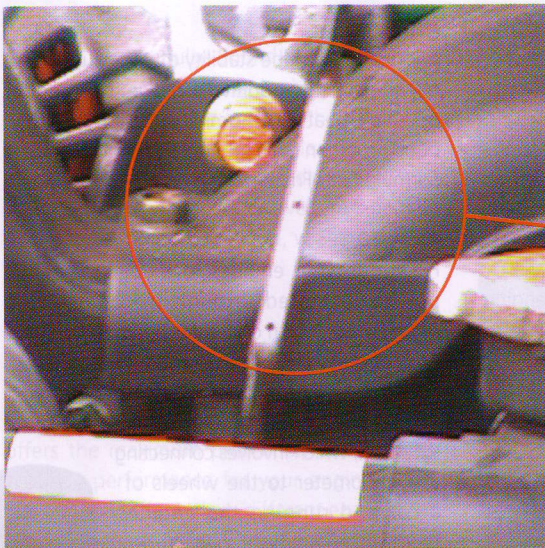
at \$90 for 4 litres) that is very competitive against other Group III and Group IV oils. Talk about delivering excellent value for your money!

ADDITIVES

The second main component in engine oils is the additive package, which should comprise:

- Detergents and Dispersants that are designed to hold onto foreign particles and chemicals in your engine, and sometimes break them into smaller pieces. These foreign chemicals may be combustion by products, or particles that slipped past your air filter. If the particles are large enough, then they will eventually be eliminated by the oil filter and taken out of circulation.
- Buffers to neutralize any acids which form in your engine. Acids are especially damaging for your bearings and other moving parts.
- Solvents to break up deposits of tar, paraffin, wax, asphalt, ash, and aromatics.
- Corrosion Inhibitors to keep your oil from oxidizing or otherwise breaking down due to time or contamination.
- Viscosity Index Improvers to make your oil stay thin at low temperatures and thick at high temperatures, providing maximum protection under any condition.
- Emergency Lubricants. These chemicals are present in case your oil film completely breaks down, due to abnormal temperatures or pressures.





Dry Dip-Stick proves that there was no oil in the engine.

Test car was driven 300+km from JB to KL without any oil in the engine.

Good lubricant manufacturers will localize their additive formulation for the domestic market, to take into account different climatic conditions and seasons. That's why Xrev uses only premium spec additives for the Singapore market which is localized for high heat and humid conditions for maximum protection for cars running on our roads. The local Xrev formula provides excellent lower operating temperature and high shear stability and is a different formulation from those manufactured for the US, European or other temperate countries.

Recently, some local trading companies and supermarkets have started importing engine oils from other markets (primarily USA & Europe) and selling them locally at low prices. Whilst many see this as a great bargain, buyers should beware that these oils were not formulated for our climate and will breakdown more quickly. In a recent case, a local car owner bought a few bottles of a leading brand fully synthetic oil parallel imported from the USA by a supermarket here and insisted that his workshop puts them into his turbo-charged WRX. Within three days, he was back at the workshop complaining of engine overheating. When the oil was drained, it had the texture of murky drain water, having lost all of its lubricity. **So Let the Buyers Beware – You have been warned!**

Friction Modifiers

The third main component of engine oils is a highly specialized additive whose function is to reduce friction in the moving parts of your engine. For many of our high performance engines, oil (no matter what group) alone is insufficient to do the job well. Whilst many brands of fully-synthetic oils claim to use some kind of friction modifier or another, it is important to examine what type and what quantity is present in each bottle. What you **must remember** here is that you should never use oils or stand-alone additives which contain solid particles as friction modifiers. No matter how small they are (even sub-micron particles), these particles will invariably get caught in the sludge build up in the oil filters and contribute to the clogging of the filter. Oil flow will no longer circulate freely and oil pressure will be affected. Some products you should avoid include those containing teflon or PTFT and molybdenum disulphide. There is also a product in the

market which claims to contain metal particles. Whilst they are great friction reducers, they should never find their way into your engine. **Good friction modifiers for automotive engines must be fully liquid – just like the proprietary ZeroFriction Metal Treatment additive developed by Xrev. Xrev's ZeroFriction additive bonds to the metal surfaces inside your engine to create a strong protective coating to eliminate direct metal to metal contact. The bonding eliminates friction, thereby reducing loss of power and heat build up. With a great reduction in engine noise, vibration and harshness (NVH), you will enjoy a smoother acceleration, quieter drive and more power on tap. With its molecular bonding effect, Xrev is the only lubricant that treats and lubricates your engine at the same time. Think of it as a spa treatment for your engine!**

For the techies out there, this is what the technical data of a highly spec lubricant would look like:

	Xrev Racing Formula		
	5W - 30	5W- 40	10W - 50
API	SL/CG	SL/CG	SL/CG
ACEA	A1,B1,A5,B5	A1,B1,A5,B5	A1,B1,A5,B5
Viscosity at 40°C	64	97	125
Viscosity at 100°C	10.3	12.6	19.5
Viscosity Index	154	170	162
Pour Point C	- 45	- 45	- 42
Flash Point C	250	251	252
Density at 15°C Kg/l	0.86	0.87	0.88

SPECIAL FEATURE

Testing your oil

With so much marketing hype out there, how do you separate the best lubricants from the lesser oils? Well, only the best will pass the following objective tests:

1. LUBRICITY TEST

Also known as Timken Bearing Test, this procedure subjects different brands to a comparative test of how effective each one is in providing lubrication and reducing friction. Using a Timken Bearing Testing device, a thin layer of oil is applied between a rotating bearing and a fixed bearing to lubricate the two surfaces which are in direct contact. When weights are added to the loading end, pressure at the point of contact between the two bearings increases tremendously. When the oil fails to provide sufficient lubrication, the rotating bearing seizes up and stops turning. In independent tests conducted by the editorial team of this magazine comparing two leading brands of oil and Xrev, the ability of the two leading brands to provide lubrication failed after adding 3 – 4 weights to the device. Xrev, on the other hand, continued to provide smooth lubrication even after 12 plates of weights were added. The bearing used for testing Xrev showed the least amount of abrasion, proving that Xrev is far more effective in reducing friction and providing protection. The objective conclusion from this test is that Xrev is at least 3 -4 times more effective in providing lubrication and reducing friction in your engine.

2. FRICTION MODIFIER TEST

To test the effectiveness of the friction modifier in your oil, we drain the oil and run the car without any oil in the engine. In this state, the engine solely relies on the friction modifier to provide the lubrication. Only Xrev Lubricant's proprietary ZeroFriction Metal Treatment Formula is able to provide enough lubrication to allow the car to run smoothly without any oil in the engine, and without any sign of over-heating or piston seizure for a 300+km drive from JB to KL. This is because the Xrev's Metal Treatment Formula molecularly bonds to the metal surfaces in the engine so that it remains working in the engine even when the oil is drained from the engine. Think of the maximum protection that your engine gets during morning starts or when your oil level drops below the minimum mark due to a leak or if excessive oil is burnt during the combustion process. Such a level of protection is only available in Xrev Lubricants.

3. USED OIL ANALYSIS

One of the best ways of checking how well an oil is protecting your engine from wear and tear is to do a Used Oil Analysis. In this test, we take used oil samples from various cars driven in Singapore for 10,000km and sent them to the USA for lab analysis. We have found that only one lubricant is able to provide 100 percent protection ie zero wear on bearings and piston – Xrev! This is a sure testament to the effectiveness of its overall

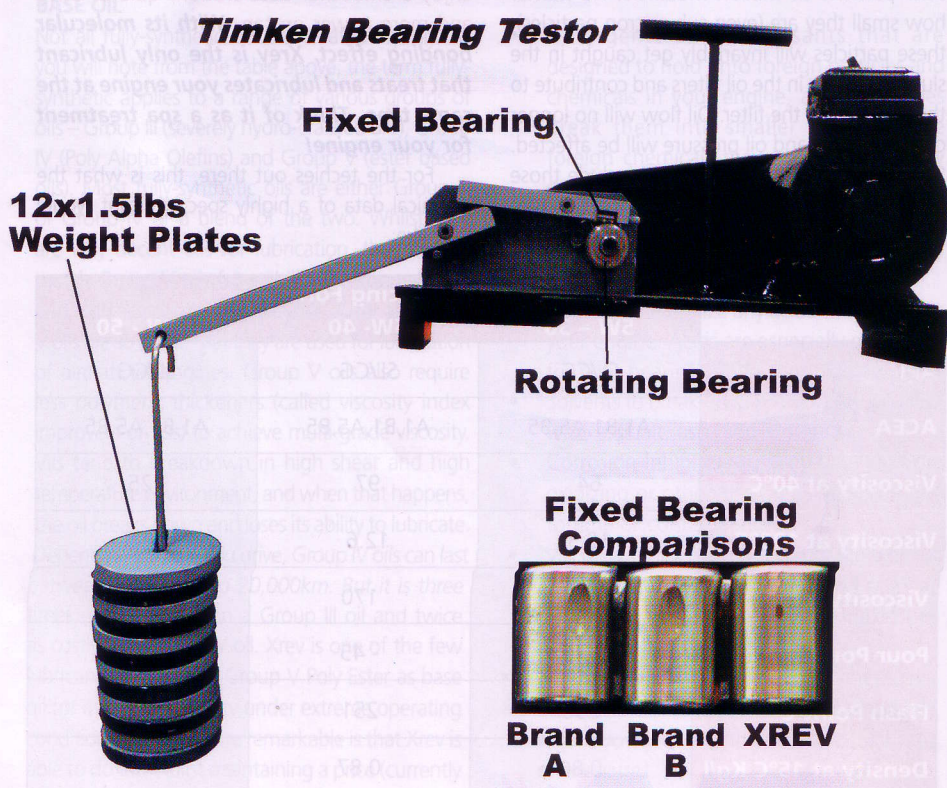
package – from the stability of its Group V base oil, and superior additive package (localised for our high heat and humidity) to the powerful bonding action of its proprietary Metal Treatment Formula (ZeroFriction).

4. DYNO TEST

Friction in your engines robs your car of the power generated through the combustion process and in turn generates heat. So it follows that if you reduce friction, you also reduce loss of power and heat build up. To find out if your oil is doing a good job on this score, we run a dyno test, which involves connecting a dynamometer to the wheels of a car and running the engine through the whole rev range using different types of oil. In one such test, we have found that by simply using Xrev Lubricants (without any other mods) you can increase torque by 20.4Nm (18.7 percent) and horsepower by 6bhp (7 percent) compared to other leading brands of fully synthetic oils!

5. SOUND TEST

A good lubricant should also reduce the engine noise, vibration and harshness (NVH). To test this aspect, we



use the Cirrus Impulse-Sound Meter, which is a very sensitive lab instrument which records the decibel level of engine noise in the cabin. We conducted this test on several leading brands of fully synthetic oils and we discovered that only Xrev is able to record an average 5 percent decrease in engine noise level, which is quite a noticeable difference.

CONCLUSION

So there you have it – the low-down on engine lubricants. Now you know what to look out for and how to ensure that the oil you choose offers the maximum protection and provides the best performance for your engine. Some oils perform differently in different engines and under different driving conditions. At the end of the day, you need to try it for yourself to get past all the marketing hype and select the lubricant that provides you with the smoothest acceleration, the quietest ride, and the most power for your engine. To get the best out of your engine, it is also wise to use an engine cleaner or flush regularly, like every alternate oil change. This will remove all the sludge and varnish that would otherwise build up in your engine which will affect performance over time. The Xrev Engine Flush is an excellent complement to its range of Metal Treatment Lubricants. These will keep your engine performing at its best!

What You Should Know ...

1. TREND TOWARDS THINNER OILS

With higher fuel prices, there is a definite trend towards using thinner engine oils, which provide lower resistance to the pistons, thereby leading to better fuel consumption. For newer and smaller capacity engines, it is quite safe to use thinner oils such as 5W-30 (5W-40 being the standard bearer in Singapore). However, some thinner oils (0W-20, 5W-20 and 0W-30) have found way to our local markets. These oils are originally formulated for temperate climates eg USA & Japan for usage during the colder months. Discerning car owners should demand to see a Used Oil Analysis (UOA) done on these oils after a 10,000km run in our local driving conditions before being tempted to switch. Not all of such oils can safely provide long term wear and tear protection.

2. API RATING

This is a rating accredited by the American Petroleum Institute. The rating applicable to the current generation of engines running on our local roads are the SL and SM rating.



3. POUR POINT

This refers to the lowest temperature at which an oil will flow. The lower the pour point, the faster the ability of the oil to circulate at cold starts. This is actually more relevant in countries with winter seasons...a little irrelevant in sunny Singapore.

4. FLASH POINT

This refers to the temperature at which an oil will burn off. The higher the flash point, the more resistant an oil will be to breaking down at high operating temperatures. Group V base oils have the highest flash points.

Testor's response

I drive a Toyota Harrier 2.4 (2WD). After having used Xrev Racing Formula 5W-40, my observations are:

1. Morning/hot starts are quieter and smoother
2. Revs are more responsive from 0-3000 RPM
3. Acceleration from rolling speed is faster
4. Lesser blow-by oil/gas recirculating back to intake manifold
5. Better NOACK volatility by sight
6. Lower intake temperature (due to non-recirculating blow-by waste)
7. No loss in oil volume (By sight)
8. Retains same golden hue in colour after running hard for 1800km. Contaminants suspended in the oil.

My Harrier has done approximately 87,000km to date and my driving habits places a lot of stress on the engine with various bolt-on parts. Constant driving at speeds above 100km/h with rapid gas pedal movement ie. cruising at 2000rpm and sudden acceleration to 5700rpm. This is done on a daily basis. Rain or shine. I have tried Esso, Shell Ultra Helix, Mobil 1, TRD Racing, HKS NA, FK Massimo, Castrol SLX and Royal Purple, with viscosity ranged from 0W30 to 5W50. They were all not up to my expectation. Each oil change was checked at every 600km mark with new oil filter change and ALL brands turned out SUPER BLACK and the feel of the engine seems to be rougher and oil consumption degrading greater. Fuel consumption was not good and blow-by oil was quickly accumulating in the PCV track and recirculating back to intake manifold (not good for power!). Someone mentioned to me detergents being the reason for the BLACK colour but I disagree. XREV Racing Formula did not change in hue after 1800km of gunning the engine! Shearing stability must have improved based on the above observation. Now after 12,000+km of hard running, the oil is still performing well. Overall, I will personally continue to use XREV Racing Formula with its proprietary Anti-Friction Metal Treatment additive plus Group-V ester based oil. I know it works because I see it work. The End of oil search for me... I strongly recommend to all closet racers out there.

Amos (Toyota Harrier 2.4 - 2WD)