

nanoⁿ LUBRICANTS

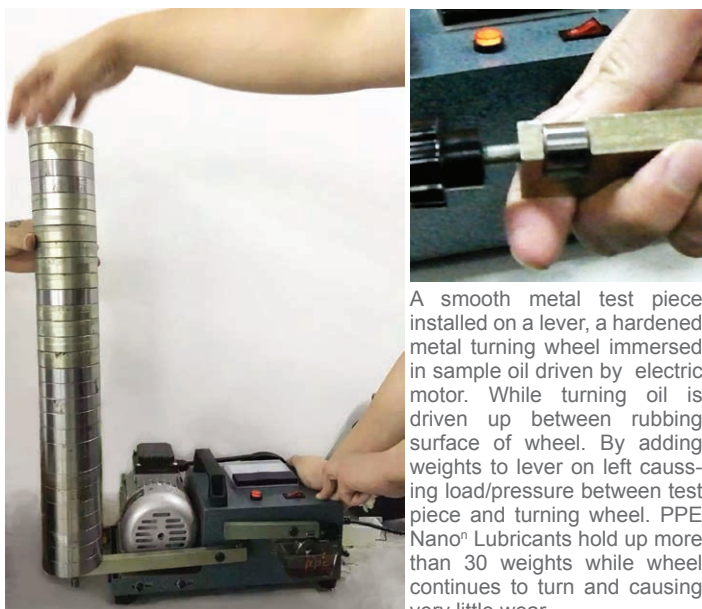
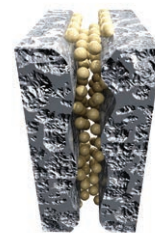
BY PROPIIONEER ENGINEERING

ProPioneer Engineering (PPE) lubricants design goal has set to break through traditional engine oil limitation. ZDDP, zinc dialkyldithiophosphate, is a well known effective traditional anti-wear additive to engine oil since 1940s. While Zinc is a known harmful component to catalytic converters, its usage has been limited by API and ACEA, and increase in restriction in newer standards. Later on Molybdenum disulfide (MoS₂) is developed from Germany, aim as a replacement for ZDDP. However the effect of oxidation and the use of these metal based anti-wear raises long term toxicity concerns, especially toxic to aquatic wildlife. PPE decided to use something different, non toxic and has better anti-wear behavior than traditional technologies.

During that time, we have inspected various high performance engine oil in the market, collecting all the advantages from existing oil formulas, and optimizing all the shortcomings. Vowing to break through the inheritance of high performance with short life, and non performance oil with longevity. SAE has well defined about lubricant performance standards, PPE decided to do something different. Instead of meeting minimum requirements, all design goal is to exceeds all existing requirement in both low temperature performance and high temperature viscosity sustainability.

To achieve above requirements, years over years of research and development, until end of 2014, PPE has come to a break through in organic nano technology. With superior viscosity durability and high temperature sustainability, the born of Nano Power Lubricants (Nanoⁿ Lubricants) has superior anti-wear capability under both low and high temperature, multiple times better than traditional ZDDP and MoS₂ additives. This technology has immediate applied to engine oil, gear oil, and industrial lubricants etc.

With extensive laboratory tests, road tests and results from endurance races, PPE lubricants has proven itself to be an award winning lubricant. Disregard PPE lubricants has exceeds general standards, it has also proven itself out performs the capabilities of ordinary lubricant in many areas. For instance, its superior anti-wear capability at all temperatures, during an anti-wear test, with enormous pressure load causing only minimal wear on test piece in all conditions. In a micro perspective, nano size particles fills micro cracks on rough/worn surfaces, forming a roller bearing layer between moving parts, forming an effective low friction layer which withstands 250°C working temperature.



A smooth metal test piece installed on a lever, a hardened metal turning wheel immersed in sample oil driven by electric motor. While turning oil is driven up between rubbing surface of wheel. By adding weights to lever on left causing load/pressure between test piece and turning wheel. PPE Nanoⁿ Lubricants hold up more than 30 weights while wheel continues to turn and causing very little wear.

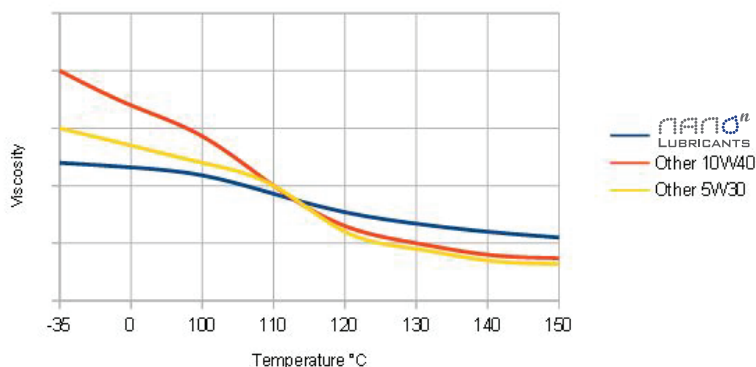
Left Timken anti-wear test ran for consecutive 10 minutes with more than 20 weights, resulting test piece working temperature has go up to 200°C with very minimal wear

Right Result from Timken test piece of ZDDP and MoS₂ based lubricants. Only 4-5 weights is used on the same testing enviroment causing significant wearing



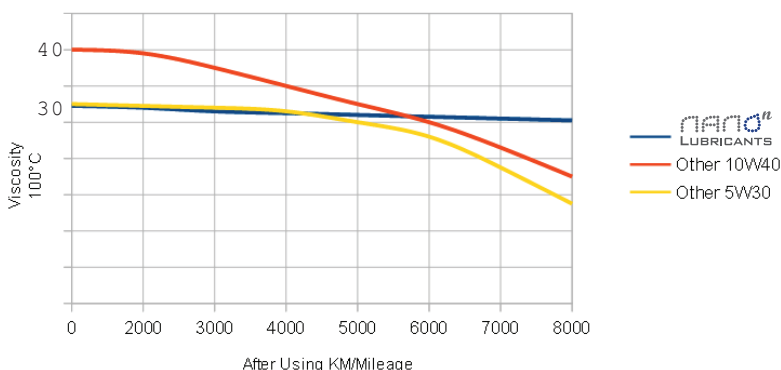
Traditionally, ZDDP in lubricants not just having anti-wear effect, but also performed as an antioxidant which enhances oil longevity. ZDDP free engine oil faces a problem of oxidation stability. To get away ZDDP dependency, PPE worked with additives companies in Europe to develop a proprietary viscosity modifier to insure high temperature viscosity stability, results in excellent performance under high-temperature high-shear that out performs common synthetic lubricants.

Viscosity vs Temperature (New Oil)

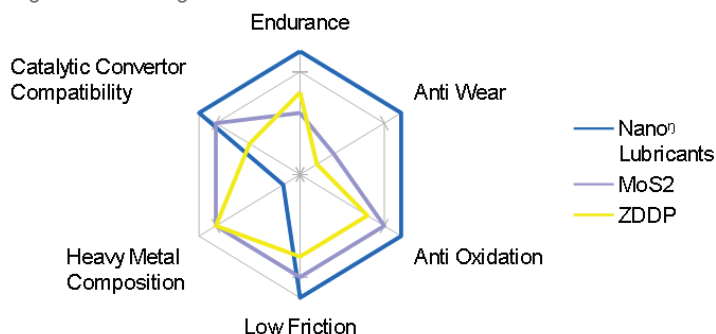


With high-end synthetic base oil, PPE Extreme Edition 0W30 high temperature high shear out performs common SAE 40 oil. The stability of viscosity and lifetime out performs many existing industry players. Generally, many 40 grade oil at 110°C viscosity will drop below PPE's 30 grade oil viscosity level. With 5,000 kilometers of milesage, many engine oil degrades to a level out of acceptable range. Viscosity degrade is a common phenomenon, the feeling of engine lost power is a result of lost in oil film

Viscosity vs Mileage



Above information refer to typical scenario. In reality, the actual degrade of viscosity depends on fuel quality, engine conditions, driving behaviour and whether conditions.

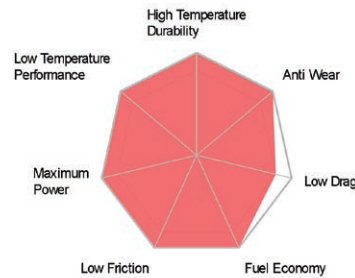


With many break throughs, ProPioneer Engineering Nanoⁿ Lubricant redefines engine oil standards

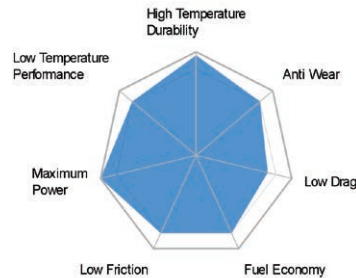
Extreme series as its name, its designed for extreme performance durability. 100% synthetic high performance double ester and high performance PAO with proprietary nano anti-wear technology. Delivering ultimate power output with superior protection and with endurance capability. With all the high tech formulation, Extreme series oil provides very good High Temperature High Shear together with extreme low temperature performance, ultimate protection starts from cold engine starts to the racing finish line.

Viscosity Grades: SAE 0W/5W, 20/30/40/50/60
Meets or Exceeds: API: SN/CF, ACEA: A3/B4, A1/B1, A5/B5
Meets or Exceeds Manufacturer Requirements

VW502.00/505.00
BMW Longlife-04 (BMW LL-04)
Mercedes Benz, MB-229.5



Premium Sport series engine oil is designed for high performance sports driving. 100% synthetic blend with double ester and PAO base oil with proprietary Nano anti-wear technology. With superior low temperature performance, Premium Sports series protects your engine from starts to the finish line. With proprietary extra stable viscosity modifier, enables low friction together with high temperature high shear. Low evaporation volatility design to cope with modern high temperature service vehicles with reduced evaporation loss



Viscosity Grades: SAE 0W/5W, 16/20/30/40/50

Meet Or Exceeds: API: SN/CF, ACEA: A1/B1, A3/B4, A5/B5
Meets or Exceeds Manufacturer Requirements

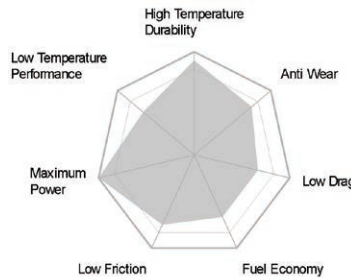
VW502.00/505.00
BMW Longlife-04 (BMW LL-04)
Mercedes Benz, MB-229.5



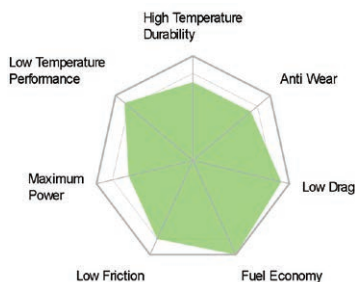
High Performance series engine oil is designed for high performance applications. Based on double ester and PAO synthetic blends with high quality base oils, sustainable high temperature viscosity suitable for engine high power output. With proprietary Nano anti-wear technology with superior engine protection. High flash point, low evaporation volatility behaviour suitable for high temperature service and sustainability.

Viscosity Grades: SAE 10W/15W, 20/30/40/50/60
Meets or Exceeds: API: SN/CF, ACEA: A3/B3, A3/B4, A1/B1
Meets or Exceeds Manufacturer Requirements

VW502.00/505.00
BMW Longlife-01 (BMW LL-01)
Mercedes Benz, MB-229.5



ECO SYNERGY series lubricants composes synthetically blended double ester, PAO and high quality base oil with organic nano molecules. Designed with less drag, reduced friction, which suitable for newer condition vehicles. Low volatility that makes Eco Synergy suitable for all environments and climates. Formulated with high oil flow and superior cold start protection by nano anti-wear capability. Designed for extended oil drain period and mileage for road operated vehicles.



Viscosity Grades: SAE 5W-16, 5W-20, 5W-30, 5W-40
10W-20, 10W-30, 10W-40

Meet Or Exceeds: API: SN/CF, ACEA: A1/B1, A3/B4, A5/B5
Meets or Exceeds Manufacturer Requirements

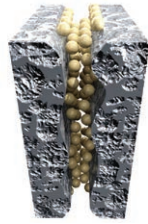
Honda HTO-06
Ford WSS-M2C946-A, WSS-M2C929-A, Ford WSS-M2C913-C
Jaguar Land Rover STJLR.03.5003
GM - dexos1™ supersedes GM-LL-A-025, GM6094M and GM4718M

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75% Engine Wear Occurs at Cold Temperature Nanoⁿ Lubricants has revolutionary changed engine wear destiny!

**nanoⁿ
LUBRICANTS**

BY PROPIONEER ENGINEERING



Left Organic nano particles are physical tiny roller bearings between rubbing surfaces, provides sliding contact for anti-wear and reduced friction. Works by physical method unlike traditionally chemically reacted anti-wear technologies which relies on temperature



Right Anti-wear test results at room temperature comparison between traditional chemical anti-wear lubricants and PPE Nanoⁿ Lubricants

SAE J300	SAE J300									
	0W-20	0W-30	0W-40	0W-50	5W-30	5W-40	5W-50	5W-60		
API	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF
ACEA	A1/B1, A5/B5	A1/B1, A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4
Flash Point °C (ATSM D92)	>245	>250	>250	>250	>250	>250	>250	>250	>250	>250
Pour Point °C (ATSM D92)	<-48	<-48	<-48	<-48	<-45	<-45	<-45	<-45	<-45	<-45
KV100°C (ATSM D445)	9.1	12.3	15.5	19.8	12.3	15.5	18.8	23.0		
HTHS (ASTM D5481)	2.91	3.7	4.1	4.8	3.7	4.2	4.8	5.6		
Total Base Number	8.0	8.1	10.9	10.9	8.1	10.9	11	11		
NOACK Volatility % (ASTM D5800)	<8%	<8%	<9%	<9%	<6%	<7.5%	<9%	<10%		
Packaging Code										
1L	MOEX00W20-1L	MOEX00W30-1L	MOEX00W40-1L	MOEX00W50-1L	MOEX05W30-1L	MOEX05W40-1L	MOEX05W50-1L	MOEX05W60-1L		
4L	MOEX00W20-4L	MOEX00W30-4L	MOEX00W40-4L	MOEX00W50-4L	MOEX05W30-4L	MOEX05W40-4L	MOEX05W50-4L	MOEX05W60-4L		
6L (1L x 6)	MOEX00W20-1L6B	MOEX00W30-1L6B	MOEX00W40-1L6B	MOEX00W50-1L6B	MOEX05W30-1L6B	MOEX05W40-1L6B	MOEX05W50-1L6B	MOEX05W60-1L6B		
16L (4L x 4)	MOEX00W20-4L4B	MOEX00W30-4L4B	MOEX00W40-4L4B	MOEX00W50-4L4B	MOEX05W30-4L4B	MOEX05W40-4L4B	MOEX05W50-4L4B	MOEX05W60-4L4B		

SAE J300	SAE J300								
	0W-16	0W-20	0W-30	0W-40	5W-20	5W-30	5W-40	5W-50	
API	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF
ACEA	A1/B1	A1/B1, A5/B5	A3/B4	A3/B4	A1/B1, A5/B5	A3/B4, A5/B5	A3/B4	A3/B4	A3/B4
Flash Point °C (ATSM D92)	>240	>245	>250	>250	>250	>250	>250	>250	>250
Pour Point °C (ATSM D92)	<-51	<-48	<-48	<-48	<-45	<-45	<-45	<-45	<-40
KV100°C (ATSM D445)	7.9	9.1	12.2	12.2	9.1	12.1	15.5	19.8	
HTHS (ASTM D5481)	2.6	2.91	3.6	4.1	2.9	3.6	4.2	4.8	
Total Base Number	8.0	8.0	8.1	9.3	8.1	8.1	9.1	11	
NOACK Volatility % (ASTM D5800)	<7.5%	<8%	<8%	<9%	<6%	<6%	<7.5%	<7.5%	
Packaging Code									
1L	MOPS00W16-1L	MOPS00W20-1L	MOPS00W30-1L	MOPS00W40-1L	MOPS05W20-1L	MOPS05W30-1L	MOPS05W40-1L	MOPS05W50-1L	
4L	MOPS00W16-4L	MOPS00W20-4L	MOPS00W30-4L	MOPS00W40-4L	MOPS05W20-4L	MOPS05W30-4L	MOPS05W40-4L	MOPS05W50-4L	
6L (1L x 6)	MOPS00W16-1L6B	MOPS00W20-1L6B	MOPS00W30-1L6B	MOPS00W40-1L6B	MOPS05W20-1L6B	MOPS05W30-1L6B	MOPS05W40-1L6B	MOPS05W50-1L6B	
16L (4L x 4)	MOPS00W16-4L4B	MOPS00W20-4L4B	MOPS00W30-4L4B	MOPS00W40-4L4B	MOPS05W20-4L4B	MOPS05W30-4L4B	MOPS05W40-4L4B	MOPS05W50-4L4B	

SAE J300	SAE J300							
	10W-20	10W-30	10W-40	10W-50	15W-40	15W-50	15W-60	
API	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF
ACEA	A1/B1, A5/B5	A1/B1, A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4	A3/B4
Flash Point °C (ATSM D92)	>230	>230	>235	>235	>235	>240	>245	>245
Pour Point °C (ATSM D92)	<-40	<-40	<-40	<-40	<-35	<-35	<-25	<-25
KV100°C (ATSM D445)	9.1	12.1	15.5	18.8	15.6	19.9	23.0	
HTHS (ASTM D5481)	2.91	3.6	4.1	4.8	4.2	4.7	5.5	
Total Base Number	8.0	8.1	10.9	10.9	10.9	11	12	
NOACK Volatility % (ASTM D5800)	<7.5%	<7.5%	<8.5%	<9.5%	<7.5%	<8.5%	<8.5%	
Packaging Code								
1L	MOHP10W20-1L	MOHP10W30-1L	MOHP10W40-1L	MOHP10W50-1L	MOHP15W40-1L	MOHP15W50-1L	MOHP15W60-1L	
4L	MOHP10W20-4L	MOHP10W30-4L	MOHP10W40-4L	MOHP10W50-4L	MOHP15W40-4L	MOHP15W50-4L	MOHP15W60-4L	
6L (1L x 6)	MOHP10W20-1L6B	MOHP10W30-1L6B	MOHP10W40-1L6B	MOHP10W50-1L6B	MOHP15W40-1L6B	MOHP15W50-1L6B	MOHP15W60-1L6B	
16L (4L x 4)	MOHP10W20-4L4B	MOHP10W30-4L4B	MOHP10W40-4L4B	MOHP10W50-4L4B	MOHP15W40-4L4B	MOHP15W50-4L4B	MOHP15W60-4L4B	

SAE J300	SAE J300							
	5W-16	5W-20	5W-30	5W-40	10W-20	10W-30	10W-40	
API	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF	SN/CF
ACEA	A1/B1	A1/B1	A1/B1, A5/B5	A3/B4	A1/B1	A1/B1, A5/B5	A3/B3	A3/B3
Flash Point °C (ATSM D92)	>225	>225	>230	>230	>220	>220	>220	>220
Pour Point °C (ATSM D92)	<-48	<-48	<-48	<-48	<-40	<-40	<-40	<-40
KV100°C (ATSM D445)	7.7	8.5	10.5	13.5	8.6	9.9	13.5	
HTHS (ASTM D5481)	2.5	2.7	3.2	3.7	2.8	3.3	3.6	
Total Base Number	8.1	8.1	8.1	10.9	8.1	8.1	10.9	
NOACK Volatility % (ASTM D5800)	<7%	<7%	<8%	<9%	<8%	<8%	<9.5%	
Packaging Code								
1L	MOEC05W16-1L	MOEC05W20-1L	MOEC05W30-1L	MOEC05W40-1L	MOEC10W20-1L	MOEC10W30-1L	MOEC10W40-1L	
4L	MOEC05W16-4L	MOEC05W20-4L	MOEC05W30-4L	MOEC05W40-4L	MOEC10W20-4L	MOEC10W30-4L	MOEC10W40-4L	
6L (1L x 6)	MOEC05W16-1L6B	MOEC05W20-1L6B	MOEC05W30-1L6B	MOEC05W40-1L6B	MOEC10W20-1L6B	MOEC10W30-1L6B	MOEC10W40-1L6B	
16L (4L x 4)	MOEC05W16-4L4B	MOEC05W20-4L4B	MOEC05W30-4L4B	MOEC05W40-4L4B	MOEC10W20-4L4B	MOEC10W30-4L4B	MOEC10W40-4L4B	

All above data are typical data of engine oil for product data reference use only, it is not suppose to be used as engineering data or any technical recipes references. All stated standards that claimed by a product means technically meets or exceeds given requirements in a typical manner