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Lubricants

THE OIL STORY

WHAT IS OIL?

Engine oils and transmission/hydraulic fluids are carefully selected combinations of base stocks and additives which are blended to give desired performance in a wide variety of applications.

Base Stocks are refined from crude oil to obtain products with the best lubricating properties. Base stocks generally make up 80-95% of a typical engine oil.

Additives are chemicals added to the base stocks to improve performance. While representing only 20% or less of the material in engine oils and hydraulic fluids, the proper additives are critical to obtain optimum lubricating performance in today's equipment. There are a number of additives used in oil. The most common are viscosity index improvers, detergents, dispersants, anti-wear and friction modifiers, oxidation and corrosion inhibitors, acid neutralizers, pour point depressants, and anti-foam agents. By properly blending combinations of these additives, oil manufacturers can tailor products to meet the specific needs of their customers.

Multigrade Engine Oils exhibit behavior at low temperatures for easier starting and thick oil characteristics at operating temperatures for better wear resistance and sealing. The addition of special polymers to the base oils allows for this versatility. These polymers expand as temperature increases, resulting in a thicker oil. One big drawback in the use of multigrade oils is that the polymers shear, or break down under load. As a result, with time of service in heavy-duty applications, performance is reduced. Polymer shearing also can contribute to carbon deposit formation in diesel engines. Hydrostatic transmissions are even more sensitive to polymer shear than engines.

WHAT OILS DO

Lubricating oils are expected to perform an assortment of tasks to keep your equipment running smoothly.

Lubrication is the first and foremost task. To do this, oils form a thin fluid film on moving parts, preventing the metal to metal contact which would cause excessive wear or failure of an engine or transmission.

Cooling is provided by the circulating oil which carries heat away from moving parts to minimize oxidation and deposit formation.

Dispersion of Contaminants is achieved by special additives which surround some contaminants keeping them in solution within the oil. These special additives insure that particles are transported to the filter where they can be removed from the oil. Particle disbursement prevents the formation of deposits on metal surfaces in the engine and also prevents corresponding engine wear.

Oxidation Resistance is important in extending the service life of an oil. Oil reacts with oxygen at high temperatures in engines to form gums and varnish which cause deposits and thickening of the oil. When added to oil, oxidation inhibitors reduce sludge formation and significantly increase the oil's useful life.

Corrosion Protection is necessary to combat chemical attack on engines. Detergents and acid neutralizers are added to oil to clean engines of harmful deposits and to counteract the strong acids which are formed in an engine during combustion.

The way an oil is used has important effects on the type of oil required.

Available Horsepower Used in an engine ranges from 30% in a car or pick-up truck to 60% in an over-the-road truck, and up to 90% in a farm tractor or piece of construction equipment. Oils for your tractor, therefore, need to be formulated differently than oil for your car due to the vastly different severity of service.

THE OIL STORY

WHAT SHOULD I LOOK FOR IN AN OIL?

Not all oils are the same. The only way to distinguish them is by comparing data sheets and analyzing the areas listed in the Typical Properties Table (shown on bottom of page).

Viscosity is a measure of an oil's resistance to flow. In practical terms, viscosity is the property which governs oil thickness in an engine. If oil has too low a viscosity (is too thin) there will be increased oil consumption, oil leakage, engine noise, friction and wear. On the other hand, if the viscosity is too high (too thick an oil) there will be problems with starting, increased fuel consumption, reduced power output and impaired engine cooling.

Zinc content is a measure of the amount of zinc dithiophosphate, an anti-wear additive, in the oil. No. 1 is formulated with 100% high thermal stability zinc dithiophosphate, which is less susceptible to chemical breakdown than the zinc additives typically used in gasoline engine oils. All universal diesel/gasoline engine oils (API CF-4 or CE and SF or SG) contain low thermally stable zinc additive. Case IH engineering has determined that high thermally stable zinc is more effective in diesel engines. This change has enabled us to use slightly lower levels of zinc than in the past, and actually improved diesel engine performance.

Sulfated Ash content is an indication of the amount of additives in the oil for detergency, dispersion and acid neutralization. In a gasoline engine a lower ash content is preferable because it minimizes spark plug and valve deposits, and acid is less of a problem than in diesel engines. In most diesel engines, a high ash content is desirable for improved varnish control and acid neutralization. Case No. 1 oil has an ash content of 1.4%, while typical universal oils have ash contents of about 1%.

Viscosity Index (VI) is a measure of the rate of change in viscosity at different temperatures. For an engine oil, a VI of 95 or higher for a straight grade product indicates a quality base stock. A VI above 115 indicates a multi-grade oil which contains a polymer to increase viscosity index for an "all seasons" oil.

Cold Crank, borderline pumping temperature, and pour point all relate to the ability of an oil to lubricate during the critical cold start period. The first few minutes can cause more wear than several hours of heavily loaded operation. The lower the numbers the better.

Total Base Number (TBN) is an indication of the acid neutralizing capability of an oil. This is especially important in diesel engines where the sulfur content of the fuel can lead to sulfuric acid corrosion. The higher the TBN, the more protection against acid. As a rule of thumb, TBN should be at least 20 times the sulfur content of the fuel.

TYPICAL PROPERTIES

API Service Class	SAE 10W CD	SAE 10W-30 CF-4, CD	SAE 30 CE, CDII	SAE 15W-40 CF-4, CE, CDII
Viscosity: cSt, @ 40°C	42	70	108	99
cSt, @ 100°C	6.8	11.9	12.2	15.1
SUS, @ 100°F	217	358	565	505
SUS, @ 210°F	49	67	69	80
Zinc, %	0.13	0.13	0.13	0.13
Sulfated Ash,%	1.4	1.4	1.4	1.4
Viscosity Index	110	160	100	160
Pour Point, °F	-37 (-35)	-35 (-31)	-26 (-15)	-29 (-20)
Total Base No. (ASTMD-2896)	12.0	12.0	12.0	12.0
Cold Crank, cP @ °C (°F)	2900 @ -20°C	3100 @ -20°C	N.A.	3100 @ -15°C
Borderline Pumping Temperature °C (°F)	-33 (-27)	-33 (-27)	-20 (-4)	-29 (-20)
Flash Point, °C (°F)	210 (410)	210 (410)	224 (435)	220 (428)
API Gravity	29.5	29.0	27.0	28.5

Lubricants

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Each lubricant needs to perform different functions and is blended to specifications designed to protect and enhance different systems.

Transmission/Hydraulic Fluids lubricate, protect, transfer heat and serve as a power transmission medium for hydraulic and transmission systems. Typical anti-wear (AW) hydraulic oils are designed to meet industrial hydraulic applications in indoor (temperature and humidity controlled) environments. They are not transmission fluids.

Case IH designs its hydraulic/transmission fluids to be used in all-season outdoor environments, torque converters, and high pressure hydraulic applications. Case IH fluids contain more anti-wear additive and have far better water tolerance than typical AW hydraulic oils.

Engine Oils lubricate, cool, help clean and provide corrosion protection for engines. Typical oils are designed for use in cars and trucks. Case IH specially blends its premium engine oils for the severe service demands of heavy-duty off-road equipment.

Case IH No. 1 - the preferred choice for heavy-duty gas applications (on-road and off-road). Case Engineering Approved.

Case IH Low Ash - the preferred choice for heavy-duty gas applications. Case Engineering Approved.

Case also offers a line of standard performance products for price sensitive customers:

Dura-Plus - the standard choice for gas and diesel applications (on-road and off-road).

Auto Supreme - the standard choice for automobile/pick-up gasoline applications (light-duty).

OTHER LUBRICATING PRODUCTS

Lubrication for special applications due to specific engineering design includes products such as: transaxle fluid, crawler brake oil, HTO additive, limited slip additive, brake rebuild additive, FBS, AG lube and steering gear lube. Each lubricant needs to perform different functions and is blended to specifications designed to protect and enhance different systems.

IMPORTANT: When it comes to lubricants, we suggest you know these definitions:

Approved - This is the highest level of endorsement. It means the oil being described has been tested and approved for use by the military or OEM named. This indicates the oil has undergone a long, exhaustive series of performance tests and has convinced the approving organization that it will perform satisfactorily in actual field service.

Meets - This designation is a statement that, in the oil company's opinion, the product meets the specifications named. It does not mean the oil has been tested and approved by the military or OEM whose specifications are being cited.

Recommended - The recommendation is being made by the oil company, not the OEM. The product may or may not be acceptable for use by the OEM. Products recommended may not conform to OEM specification requirements.

QUESTIONS AND ANSWERS

Q: Why should I drain my oil regularly?

A: Regular oil drains are necessary to remove built up sludge and spent oil in which the additives have been depleted and are no longer giving the engine proper protection.

Q: Can I use multigrade oils in my equipment?

A: It is always best to follow the recommendations in the Owner's Manual. However, many heavy-duty engines have been tested by manufacturers who make specific recommendations against the use of multigrade oils.

Q: Why is the water tolerance of Hy-Tran[®] Plus important?

A: Unlike engines where high temperatures evaporate moisture, water can condense and will build up in transmissions. When this happens the additives in hydraulic fluid will drop out, giving reduced performance. Hy-Tran[®] Plus is formulated to suspend up to 1% by volume of water without adverse effect, more than any competitive product, giving you increased protection for your equipment.

THE OIL STORY

QUESTIONS AND ANSWERS (Cont'd)

Q: Why does Case IH recommend against the use of Zinc in hydraulic fluids?

A: Zinc additives have a sulfur bonding agent that reacts with water to form acids which attack the brass and bronze parts of a tractor's hydraulic/ Transmission system. Because you can't control water buildup from condensation, Case IH used a unique load carrying additive that does not contain zinc.

Q: Aren't all oils the same?

A: No! Oils vary in base stock composition, additive type and level, quality control and the supplier's expertise in formulation and production. Case IH takes pride in supplying high quality oils its customers can rely on.

Q: Are there different measures of viscosity?

A: Yes. However, regardless of which method is used, there are two important points to remember. First, the higher the viscosity number on the given scale, the thicker the oil. And second, the grades are ranges, not specific points. For instance, an SAE 30 grade oil is an oil that drains a standard size vial in 58-70 seconds. An oil draining in 69 seconds is more viscous than one draining in 59 seconds even though both would be classed as 30 grade oils.

DRUM STORAGE

Many chemical and petroleum product complaints can be attributed to the way drummed products are stored. Care should be taken to keep water and all other contaminants out of drums by storing them in a way which prevents moist air or water from entering through the drum heads, particularly the bungs.

Even in covered storage, temperature changes can cause the drum to "breathe;" the moisture in the air breathed into the drum can condense inside the drum. Drums in uncovered, outside storage may accumulate water on the heads which may be sucked into the drums by the same breathing action. Incredible as it seems, gallons of water can be drawn into a drum over a period of time through the tiniest pinhole of an opening. (see Figure 1)

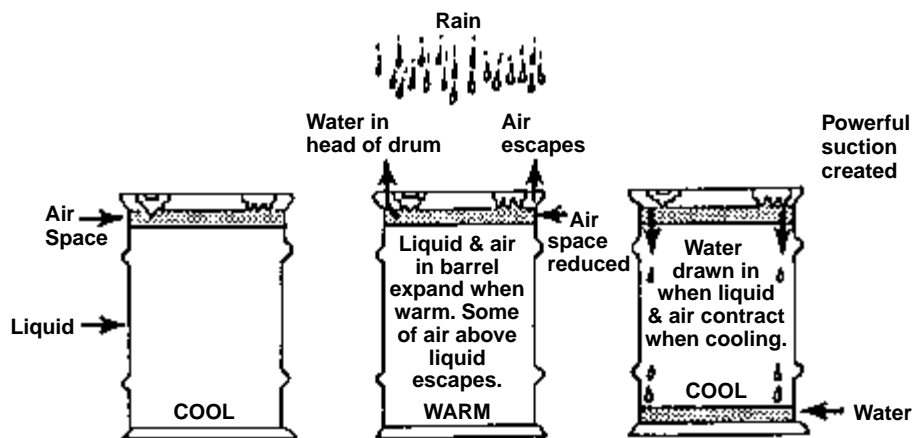


FIGURE 1

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Lubricants

THE OIL STORY

LIQUID DRUM STORAGE *DO'S AND DON'TS*

1. **Do** keep bungs drawn down tight. **Do** use a bung wrench to make sure. **Don't** forget to replace bungs. Don't put them in only finger tight.
 2. **Do** store drums inside whenever possible. Warm storage in winter is preferable.
 3. If drums must be stored outside:
 - a. **Do** lay drums on their sides with the bungs below the level of liquid so that seals cannot dry out (the rubber seal on the bungs prevents airborne moisture contaminations);
 - b. **Do** store drums with bungs facing down instead of bungs facing up; or
 - c. If drums cannot be laid on their sides or upside down, tilt them slightly using a 2" x 4" board on the bottom edge to prevent water accumulation across the complete head of the drum; be sure to align bungs parallel to the 2" x 4".
 - d. If drums must be stored bungs up outdoors, **do** use drum covers (these may be obtained from companies listed under "Barrel and Drums - Equipment and Accessories" in the Yellow Pages of the Telephone Directory).
 - e. **Don't** stand drums in long-term storage directly on the ground, they should be raised so that air can circulate beneath and around them. Such a practice reduces rusting.
 - f. Prolonged unprotected drum storage leads to obliteration of the markings and eventually to rusting of the outside surfaces and potential product contamination. Before this occurs, **do** use "magic marker" or similar device to remark the drums.
4. Where drums are stacked, **do** use a rack to allow "first in, first out" usage and prevent lower drums from remaining undisturbed for years.
 5. **Do** arrange for frequent turnover of drummed stock.
 6. **Do** check for leaking drums periodically.

CASE IH NO. 1™

ENGINE OILS



FOR DIESEL ENGINES

SAE	Part No.	Container Size	Pkg. Qty.	SAE	Part No.	Container Size	Pkg. Qty.
10W	407357R4	☼ 5 Gal./18.93L	1	15W40	407410R2	☼ 1 Qt./.95L	12
30	407352R4	☼ 1 Qt./.95L	12	15W40	139034A1	☼ 1 Gal./3.79L	4
30	139032A1	☼ 1 Gal./3.79L	4	15W40	143949A1	☼ 2.5 Gal./9.46L	2
30	143947A1	☼ 2.5 Gal./9.46L	2	15W40	407414R2	☼ 5 Gal./18.93L	1
30	407356R4	☼ 5 Gal./18.93L	1	15W40	253782A1	☼ 30 Gal./113.56L	1
30	407360R4	☼ 30 Gal./113.56L	1	15W40	407420R2	☼ 55 Gal./208.19L	1
30	407362R4	☼ 55 Gal./208.19L	1	☼ - Available in Canada			
10W30	104104A1	☼ 1 Qt./.95L	12				
10W30	139033A1	☼ 1 Gal./3.79L	4				
10W30	372253A1	☼ 2.5 Gal./9.46L	2				
10W30	104106A1	☼ 5 Gal./18.93L	1				
10W30	372254A1	☼ 30 Gal./113.56L	1				
10W30	104108A1	☼ 55 Gal./208.19L	1				

Lubricants

CASE IH NO. 1™

ENGINE OILS

FOR DIESEL ENGINES

Case IH No. 1 is a premium high performance diesel engine oil designed and tested by Case IH engineering for heavy-duty high temperature operation, low temperature startability and compatibility in Case IH diesel engines. It is **APPROVED** by Case IH for engineering standard FZG9459, and MS1121.

Heavy-duty diesel engines depend on high quality diesel engine oil for optimum performance and long life. Case IH No. 1 is recommended for naturally aspirated and turbocharged diesel engines requiring oils meeting performance requirements of API Service Classification CH-4, CG-4, CF-4, CF, CE, CDII, CD, or CC; Cummins 20076; Mack EO/K-2; Mack EO-M+; JASO CD; MAN-270 and 271; and Caterpillar Series 3.

No. 1 Engine Oil provides superior piston and valve train protection as demonstrated by Cummins test requirements. Meets Cummins engine viscosity requirements and provides excellent oil consumption control and engine wear protection. High total base number meets Caterpillar requirements for use with fuels containing up to 0.5% sulfur. Minimizes engine deposits and provides excellent soot control. The multi-grades provide excellent low temperature pumpability.

Suitable for transmissions and hydraulic systems where engine oil is recommended. Meets Caterpillar TO-2 and Allison C-3 **and** C-4 performance requirements. Use specified SAE Viscosity Grade.

TYPICAL PROPERTIES


API Service Class	CF	CG-4, CF-4, CF	CF-4, CF-2, CF	CH-4, CG-4, CF-4, CF	CG-4	CG-4, CF-4, CF
Viscosity:	SAE 10W	SAE 10W-30	SAE 30	SAE 15W-40	SAE 0W30	SAE20W-50
cSt, @ 40°C	42	70	108	99	66	157
cSt, @ 100°C	7.0	12.0	12.1	15.1	11.2	18.0
SUS, @ 100°F	217	358	565	505	—	—
SUS, @ 210°F	49	67	69	80	—	—
Cold Crank, cP @ °C	2900 @ -20°C	3100 @ -20°C	—	3100 @ -15°C	3100 @ -30°C	3600 @ -10°C
Viscosity Index	105	141	105	143	165	135
Borderline Pumping Temperature °C (°F)	-33 (-27)	-33 (-27)	-20 (-4)	-29 (-20)	-48 (-54)	-20 (-4)
Pour Point, °C (°F)	-39 (-38)	-36 (-33)	-26 (-15)	-33 (-27)	-45 (-49)	-27 (-17)
Flash Point, °C (°F)	210 (410)	210 (410)	224 (435)	220 (428)	215 (419)	225 (437)
API Gravity	29.5	29.0	27.0	28.5	—	—
Zinc, %	0.17	0.17	0.17	0.17	0.17	0.17
Sulfated Ash,%	1.45	1.45	1.45	1.45	1.45	1.45
TBN (ASTM D-2896)	11.5	11.5	11.5	11.5	11.5	11.5

CASE IH LOW ASH

ENGINE OILS



FOR GASOLINE, LPG, 2 STROKE CYCLE DIESEL ENGINES

SAE Grade	Part No.	Container Size	Pkg. Qty.
10W	407345R3	5 Gal./18.93L	1
10W	407351R3	55 Gal./208.2L	1
30	407340R3	1 Qt./.95L	12
30	139037A1 	1 Gal./3.79L	4
30	407344R3	5 Gal./18.93L	1
30	407350R3	55 Gal./208.19L	1

 - Available in Canada

Lubricants

CASE IH LOW ASH

ENGINE OILS

FOR GASOLINE, LPG, 2 STROKE CYCLE DIESEL ENGINES

Specifically designed for heavy-duty service in gasoline, LPG, natural gas and 2 stroke cycle diesel engines in agricultural, industrial, truck, passenger car and construction engine.

Case IH Low Ash Engine Oil used in tandem with unleaded gasoline is the ideal combination to maintain performance and extend engine life.

Heavy-duty engines depend on high quality engine oil for optimum performance and long life.

Higher Ash Oils tend to cause valve torchings and spark plug deposits in severe duty gasoline, LPG, natural gas and 2 stroke cycle diesel fueled engines. Sulfated ash is a laboratory measure that relates to the level of metallic anti-wear and detergent/alkaline reserve additives. Alkaline reserve (also measured by TBN) neutralizes the acids formed by fuel sulfur. Gasoline, LPG and Natural Gas fuels tend to have 10% or less of the sulfur typically found in diesel fuel.

Case IH Low Ash is a high dispersant (detergent) engine oil formulated to minimize metallic ash deposits and lengthen valve and spark plug life. It exceeds API Service Classification SF. Tenneco Automotive Supreme is recommended where API SG engine oil is specified.

Gasoline/LPG engines operate differently from diesel engines. Oils that are sold to lubricate both gasoline and 4 stroke cycle diesel engines often compromise the performance of both.

Compare before you buy. Not all engine oils are the same. Case IH Low Ash Engine Oil assures that your gasoline/LPG powered equipment will run as cleanly as intended.

Consult Operators's Manual for proper application and replacement interval.

TYPICAL PROPERTIES

	SAE 10W	SAE 30
Viscosity: cSt, @ 40°C	47	103
cSt, @ 100°C	6.8	11.9
SUS, @ 100°F	241	588
SUS, @ 210°F	49	69
Cold Crank, cP @ -20°C	3000	N.A.
Viscosity Index	115	105
Borderline Pumping Temperature °C (°F)	-33 (-27)	N.A.
Pour Point, °C (°F)	-34 (-30)	-23 (-10)
Flash Point, °C (°F)	216 (420)	238 (460)
API Gravity	30.6	29.2
Density 15°C	0.873	0.881
Zinc, wt. %	0.16	0.16
Sulfated Ash, wt. %	0.5	0.5
TBN (ASTM D-2896)	2.0	2.0

CASE IH AUTO SUPREME™ (SAE 10W-30)

ENGINE OILS



Case IH Auto Supreme is formulated with selected, high quality base oils and additives that provide outstanding performance and engine protection under the most severe driving conditions. This superior combination of base oils and additives is designed to remain stable and to protect engines against wear, deposits, rusting or oil thickening in turbocharged or naturally aspirated gasoline, and non-turbocharged diesel engines. Outstanding performance is assured in services ranging from stop-and-go city driving to trailer towing and turnpike speeds.

Case IH Auto Supreme exceeds manufacturers warranty requirements for all passenger cars, light trucks and inboard marine gasoline, diesel or L.P. gas engines that require an API SG/CD performance level oil. It also meets the requirements of U.S. Military specification MIL-L-46152E.

TYPICAL PROPERTIES

SAE Grade	10W-30	5W-30
API Service	GF-2/SJ	GF-2/SJ
Viscosity - cSt @ 100°C	10.5	10.5
Cold Crank Simulator, cP @ -20°C	3100	3100
Viscosity Index	139	138
Pour Point, °C	-36	-42
Flash Point, °C	209	205
API Gravity	30.6	30.7
Zinc, wt. %	0.10	0.10
Sulfated Ash, wt %	0.9	0.9
TBN (ASTM D-2896)	8.1	8.1

SAE	Part No.	Container Size	Pkg. Qty.
10W30	B500401	1 Qt./ .95L	12
5W30	372255A1	1 Qt./ .95L	12

🍁 - Available in Canada

Case IH Auto Supreme is a premium quality multi-grade engine oil offering superior protection and performance under the most severe driving conditions all four seasons of the year. It reduces friction; gives quick, easy starting, instant lubrication and fast warm-up, and is fuel efficient. The need for seasonal oil grade change is eliminated.

Case IH Auto Supreme meets API (American Petroleum Institute) "energy conserving" category per SAE J1423. It effectively reduces viscous drag in cold engines, resulting in increased life of starting motors, batteries, oil pumps and valve lifters. The low temperature fluidity of Auto Supreme allows oil delivery into valve lifters and bearing clearances, even at low cranking speeds. The fast film formation on cylinder walls provides quick piston ring sealing for rapid compression pressure rise during cranking to give positive engine starting. Gasoline waste and high exhaust emissions during engine starting are minimized.

Lubricants

CASE IH HY-TRAN[®] ULTRA (MS1209)

HYDRAULIC/TRANSMISSION FLUIDS



FOR CASE, INTERNATIONAL HARVESTER & CASE IH EQUIPMENT

Part No.		Container Size	Pkg. Qty.
139029A2	☼	1 Gal./3.79L	4
143945A2	☼	2.5 Gal./9.46L	2
372705R7		5 Gal./18.93L	1
999597R7	☼	30 Gal./113.56L	1
999655R7	☼	55 Gal./208.19L	1
236610A2†	☼	5 Gal./18.93L	1
141941A2†	☼	55 Gal./208.19L	1

☼ - Available in Canada

† - Low Temperature

Hy-Tran Ultra is a unique all-weather fluid designed for use in an ambient temperature range of -30°C (-20°F) to +50°C (+120°F). It is blended to provide the stable viscosity essential to maintaining optimum machine performance and long life.

Specifically Designed to provide excellent water tolerance and filtration efficiency. Hy-Tran Ultra provides superior wear protection for hydraulic components, drive train gears and other transmission parts. Controlled frictional characteristics provide safe, smooth operation of wet brakes and clutches.

Case IH Hy-Tran Ultra (MS1209) is new a formulation designed to meet the requirements of IH Hy-Tran (B-6), Case PTF Fluid and Case TCH Fluid. There are several differences between Hy-Tran Ultra (MS1209) and the typical tractor hydraulic/transmission fluids marketed by oil companies.

Hy-Tran Ultra is a mono viscosity grade fluid. It does not contain any viscosity index improver (Polymer). VI improvers are added to low viscosity fluids to impart the properties of higher viscosity fluids to impart the properties of higher viscosity fluids at operating temperature. The resulting multi-viscosity grade fluid (e.g. SAE 10W-30) has the low start up temperature properties of the lower viscosity grade (10W) and the higher operating temperature properties of the higher viscosity grade (SAE 30). Caterpillar Tractor Company has changed their transmission fluid recommendations to mono-viscosity fluids because they found that VI improvers don't work well in bearing applications. The extreme pressures found in hydrostatic transmissions destroy the high temperature properties of polymers by physically shearing them. The result is shortened oil life, necessitating a reduced oil change interval.