



Designed for extreme performance



Quality products from





For extreme applications, you want a trusted performer.

Synfluid® polyalphaolefins (PAOs) are designed to meet both conventional and extreme performance requirements in a variety of applications.

Synfluid® Polyalphaolefins

The proven problem solvers

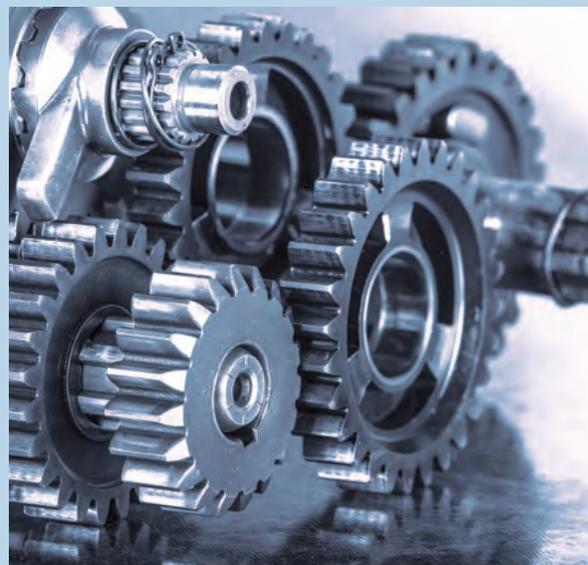
Synfluid® PAO products are trusted problem solvers in the development of new and innovative lubricants in a wide range of industries. Synfluid® PAO products' carefully designed molecules allow the user to focus on the specific performance properties needed for ever-increasing lubricant challenges. And thanks to our new Synfluid® mPAO, we now offer a broader range of viscosities. Synfluid® PAO products give you more flexibility than ever to push the limits in extreme applications.

The Synfluid® PAO product line includes low viscosity PAO 2, PAO 4, PAO 6 and PAO 8 based on 1-decene alpha olefins, and PAO 2.5, PAO 5, PAO 6 HVI, PAO 7, PAO 8 HVI and PAO 9 based on 1-dodecene alpha olefins. We also offer metallocene-based high viscosity mPAO 65, mPAO 100, mPAO 150, as well as a unique set of unhydrogenated dimer products: C10 Dimer and C12 Dimer.



Your foundation for innovation

- High viscosity index (VI) of our PAOs provides maximum protection in both hot and cold operating conditions
- Low volatility and excellent thermal stability are beneficial for achieving extended drain interval
- Outstanding oxidative and hydrolytic stability over a wide range of temperatures
- High load-carrying ability
- The ability to retain viscosity and lubricity in extreme temperatures
- Low flammability and high flash and fire points
- Environmentally friendly
- Excellent dielectric properties and effective liquid insulators
- All Synfluid® products are NSF H1 and HX-1 registered incidental food contact and Kosher certified



Applications

Aviation Lubricants

The ability to retain viscosity and lubricity in extreme temperatures make our PAOs a logical choice for aviation applications.

Compressor Lubes

Superior oxidative, thermal and hydrolytic stability make our PAOs outstanding for compressor lube applications.

Dielectric Fluids

Excellent dielectric properties and long service life enable PAOs to perform as effective liquid insulators.

Drilling Fluids

Our PAOs are environmentally friendly, especially for offshore applications. As a bonus, high thermal stability results in superior performance downhole.

Engine Oils

Our PAOs are the right choice for high-performance passenger car and heavy-duty motor oils. Low volatility and excellent thermal and oxidative stability extend lubricant drain intervals and overall performance.

Food Grade Lubricants

All Synfluid® PAOs are NSF H1 registered. These products are acceptable as a lubricant with incidental food contact (H1) for use in and around food processing areas.

Gear Oils

High thermal stability and load-carrying ability make these PAOs the superior basestocks for gear oils.

Greases

Outstanding oxidative and hydrolytic stability, and wide temperature ranges mean our PAOs are well-suited for synthetic grease applications.

Heat Transfer Fluid

Reduced volatility, better thermal stability and high flash and fire points make our PAOs superior base stock for heat transfer fluids.

Hydraulic Oils

Low flammability and good bulk modulus makes Synfluid® PAOs well-suited for hydraulic fluids.

Natural Gas Engine Oils

The high viscosity index of our PAOs provides maximum protection in both hot and cold operating conditions – a requirement of natural gas engine oils. Low volatility and excellent thermal stability are beneficial for achieving extended drain intervals in severe co-generation engine service.



Synfluid® mPAO

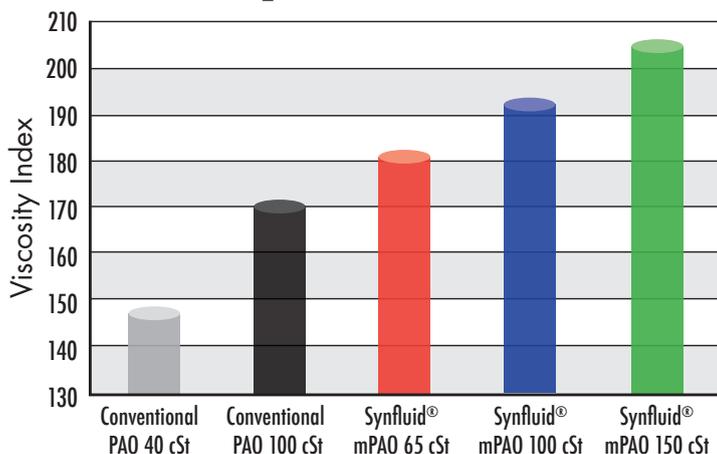
Synfluid® mPAOs are carefully designed molecules based on 1-octene. The combination of our proprietary technology and unique feedstock gives rise to different and improved chemical structures. These structures lead to a lower pour point, higher VI, lower foaming tendency, increased air release, and excellent high-temperature and shear stability. All this gives Synfluid® mPAO significantly broader application opportunities. Best of all, it's Chevron Phillips Chemical Company's Synfluid® PAO, an industry leader with a brand you can trust.

Typical Properties

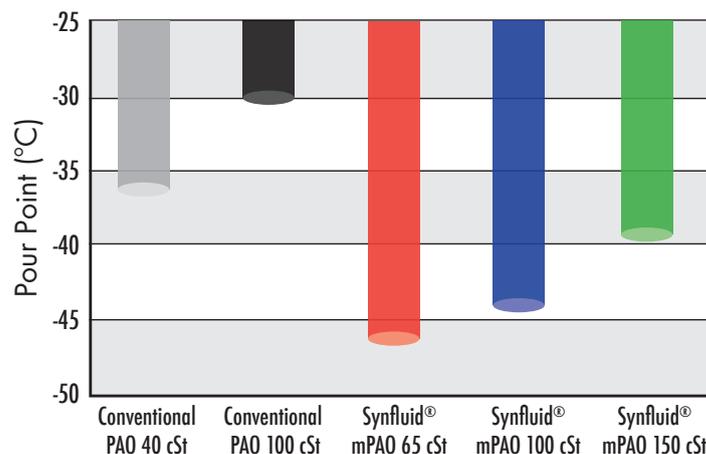
Property	mPAO 65 cSt	mPAO 100 cSt	mPAO 150 cSt
Viscosity, Kinematic			
100 °C, cSt	65	101	150
40 °C, cSt	605	1023	1719
Viscosity Index	181	192	205
Pour Point, °C (°F)	-45 (-50)	-42 (-47)	-42 (-44)
Flash Point, (COC) °C (°F)	260 (501)	265 (509)	268 (514)
Specific Gravity	0.874	0.846	0.848
Density, lb/gal	7.29	7.05	7.07
RPVOT, minutes [#]	>3,000	>3,000	>3,000

[#]Additized with 0.5 wt. % antioxidant

Viscosity Index

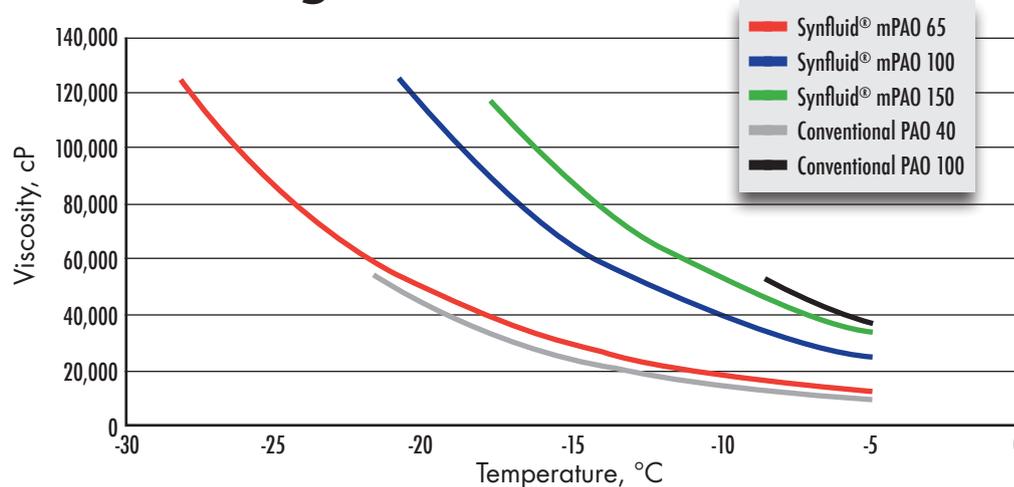


Pour Point

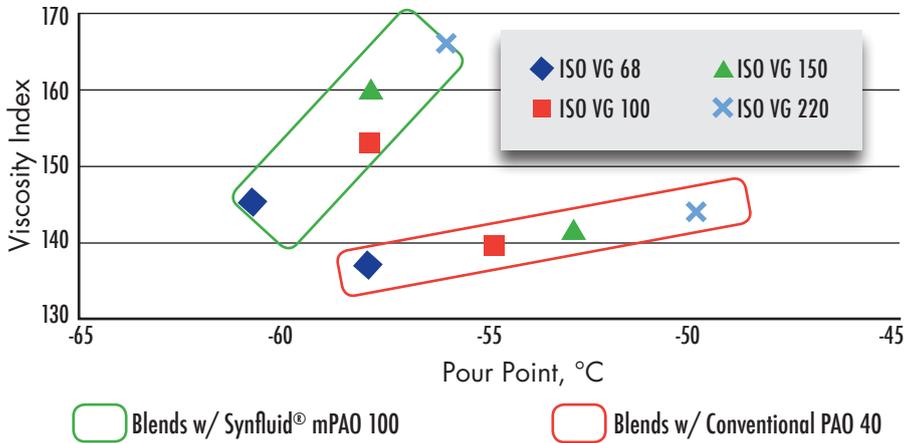


These different and improved chemical structures result in a viscosity profile that is lower than conventional HV PAOs. For instance, the low temperature viscosity of Synfluid® mPAO is typically less than half that of similar grades of conventional HV PAOs.

Scanning Brookfield



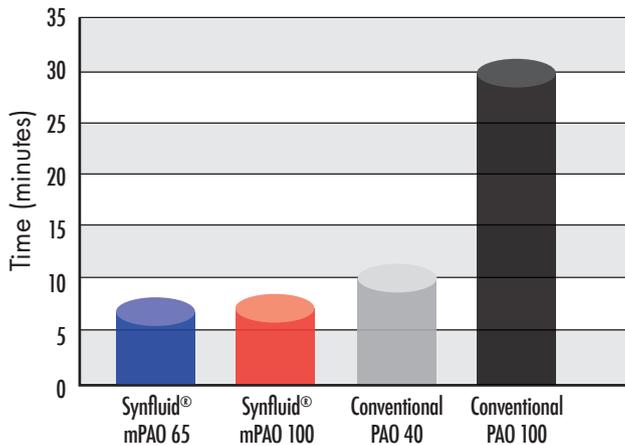
Final Blend Properties



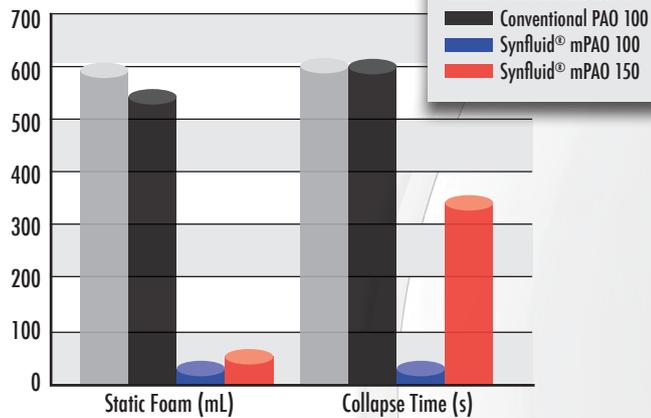
The enhanced characteristics of Synfluid® mPAOs give rise to improved final blend properties. The chart at left displays how utilizing Synfluid® mPAOs can improve the pour point and VI in the final blend when compared to conventional HV PAO.

Fighting micro pitting, cavitation and air entrainment are always critical. The two charts below highlight the superior performance of Synfluid® mPAO in foam generation/elimination and air release properties. Synfluid® mPAO offers significant advantages in these key properties when compared to conventional HV PAO.

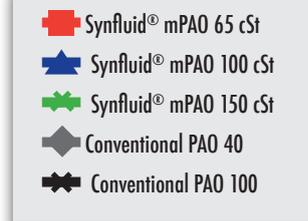
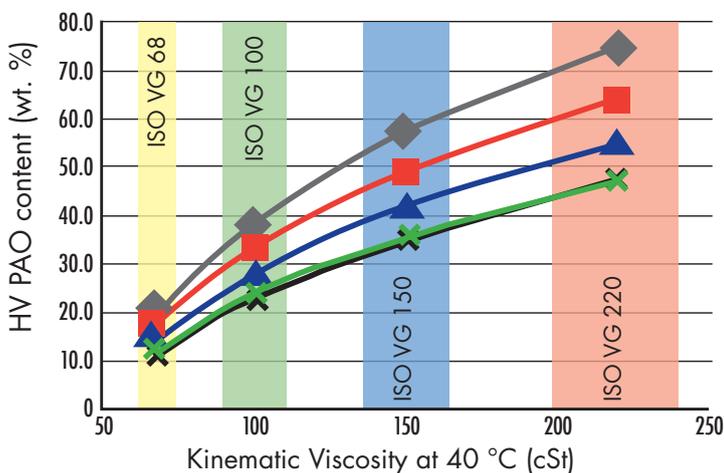
Air Release



Foam



Thickening Efficiency



Synfluid® mPAOs offer improved thickening efficiency when compared to some conventional HV PAOs. The chart at left offers examples of potential HV PAO usage reductions on several ISO viscosity grades.

Synfluid® PAO

Chevron Phillips Chemical leads the industry in developing high quality polyalphaolefins. PAOs are used in many synthetic products such as lubricants, greases and fluids, and have emerged as essential components in many applications.

The increase in PAO applications is largely driven by the stability of the PAO molecule. This stability, along with a host of other unique performance characteristics, makes PAOs far superior to mineral oils in a variety of end uses.

PAOs have many advantages over mineral oils:

- Greater oxidative stability
- Superior volatility
- Excellent low-temperature viscosities
- Consistent, quality basestock
- Extremely high viscosity index
- Exceptional pour points
- Pure petrochemical feedstocks

Typical Properties

C10 Based PAOs Product	2 cSt	4 cSt	6 cSt	8 cSt
Viscosity, Kinematic				
100 °C, cSt	1.7	3.8	5.9	7.8
40 °C, cSt	5.1	16.8	30.8	46.2
-40 °C, cSt	253	2,376	7,637	18,314
Viscosity Index	—	124	139	138
Pour Point, °C (°F)	-73 (-99)	-69 (-93)	-62 (-79)	-56 (-68)
Flash Point (COC), °C (°F)	158 (317)	222 (432)	246 (476)	261 (502)
Volatility, NOACK, Wt.%	—	13.6	6.8	3.8
Specific Gravity	0.7974	0.8186	0.8274	0.8319
Density, lb/gal	6.648	6.825	6.898	6.936

C12 Based PAOs Product	2.5 cSt	5 cSt	6 HVI	7 cSt	8 HVI	9 cSt
Viscosity, Kinematic						
100 °C, cSt	2.4	5.2	5.9	7.1	8	8.9
40 °C, cSt	8.3	24.7	29.1	38.0	45.9	53.0
-40 °C, cSt	1,811	4,852	7,000	10,557	—	—
Viscosity Index	—	145	150	150	148	148
Pour Point, °C (°F)	-52 (-62)	-46 (-51)	-44 (-47)	-44 (-47)	-36 (-32)	-36 (-32)
Flash Point (COC), °C (°F)	180 (355)	246 (475)	249 (480)	264 (507)	278 (532)	275 (527)
Volatility, NOACK, Wt.%	—	5.9	4.9	3.7	2.4	3.1
Specific Gravity	0.8064	0.8240	0.8251	0.8301	0.8310	0.8338
Density, lb/gal	6.723	6.870	6.878	6.921	6.919	6.916




SYNFLUID[®]
POLYALPHAOLEFINS

Quality products from


**Chevron
Phillips**
Chemical Company LP



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