



CHAMPION BRANDS  
1001 GOLDEN DRIVE  
CLINTON, MO 64735  
1-800-821-5693  
www.championbrands.com  
www.championsusechampion.com

TECHNICAL BULLETIN: JN0340  
SUBJECT: SYNTHETIC OILS

DATE: 11-07-12  
AUTHOR: JAKE NEUBAUER

## IMPORTANT INFORMATION ON SYNTHETIC OILS

### Synthetic Oil 101

While the term synthetic oil is widely used in the lubricant market, not all synthetic oils are created equal. Here is a crash course on the synthetic oils you may find on the market and the benefits and draw-backs of each.

### API Group III “Synthetics”

This group of synthetic oils is not actually the product of chemical synthesis, but is made up of the most highly refined and severely hydrocracked petroleum base oils. These oils are very high quality and cost-effective for most applications. They possess some of the same oxidation resistance, low friction and low volatility characteristics as the much more expensive PAO oils (more below) and also have high viscosity indices. However, they do not match the performance of PAO oils in oxidation, and have worse performance at very low start-up temperatures due to their residual wax content.

### Poly-alpha-olefins (PAOs)

PAO base oils offer superb oxidation resistance, low volatility, great cold-flow properties, good demulsibility, and have very low friction coefficients. They suffer from relatively high cost and do not have the solvent power to effectively dissolve lube oil additives and provide healthy swelling of seals. It is for this reason that PAOs are usually used with other synthetic base oil for engine oil and gear oil formulas.

### Esters

Esters are the most common sidekick to PAOs in difficult formulations. These oils come in many different types – some are made from natural products, while others are not. Esters offer great solvency and seal swell characteristics, and many are surface-active friction reducing additives. Typically these oils have low volatility, good low-

temperature properties, and help to keep deposits from forming. The incredible variety of esters available makes them a unique solution to many issues, but many have drawbacks including decomposition to acid by-products. Esters are also very expensive!

### Polybutenes

Polybutenes are made from light petroleum refinery cuts or natural gas liquids, which are built to strands of varying sizes. Lighter polybutenes find use as base oils, where they show good oxidation resistance and very low coefficients of friction. Heavier polybutenes are used as very shear-stable viscosity index improvers and as a replacement for solvent-refined heavy neutral oils. Polybutenes burn very cleanly, and are a primary component in low-smoke formulas for 2T engine oils.

### Polyglycols

Traditional polyglycols can be made from oxides of small molecules and typically DO NOT MIX with other oils. These oils are used primarily in industrial applications where extremely high oxidation stability, low deposit and low coefficients of friction are required – major applications include turbine oils, worm gear oils, and rotary-screw compressors. However, new polyglycol products are being introduced into the market which provide the same benefits and are soluble with other oils.

### The Bottom Line

The market for synthetic oils is growing, but not all synthetic oils are the same or are right for the same types of applications. Based on specific application requirements, the skilled formulator builds a product with the best tools for the job. Just always keep in mind that for the best performance and value, you want the right synthetic and must be able to trust your lubricant supplier to give you the product that is right for your needs.