



CHAMPION BRANDS  
1001 GOLDEN DRIVE  
CLINTON, MO 64735  
1-800-821-5693

[www.championbrands.com](http://www.championbrands.com)  
[www.championsusechampion.com](http://www.championsusechampion.com)

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AUTHOR: JAKE NEUBAUER

## UNDERSTANDING HYDRAULIC AND CIRCULATING OILS

Hydraulic oils, circulating oils, rust & oxidation inhibited turbine oils and ash-less compressor oils represent an important set of fluids for many industries. One of the most unique things about these oils is their very low additive concentrations – and conversely, the relatively higher importance of base fluid selection. A diverse array of base fluids can be found in these fluids including mineral oils, poly-alpha-olefins (PAOs), dibasic esters, polyol esters (POEs) and alkylated naphthalenes (ANs).

### ANTI-WEAR HYDRAULIC OILS

These oils contain anti-wear, extreme pressure, detergent, anti-oxidant, corrosion inhibitor, and anti-foaming additives. The additives in these oils must protect the base fluid from oxidation and the formation of sludge and acids. They must allow for separation of water and air in the sump, and must protect pump components from rust, corrosion, deposits and wear. Important specifications for this type of fluid include Parker HF-0, DIN 51524-2, and ISO 11158 HM.

### RUST AND OXIDATION (R&O) TURBINE OILS

R&O oils contain many of the same additives as anti-wear hydraulic oils, but do not contain metallic detergents or anti-wear additives. These oils must provide similar protection to base fluids. However, most applications which require this type of oil operate in the hydrodynamic and mixed lubrication regime, and do not require must in the way of extreme-pressure protection. Some important R&O specifications are Parker HF-1, DIN 51524-1, DIN 51515-1, AGMA 9005 E02 (RO), and OEM specifications.

### ASH-LESS COMPRESSOR OILS

These oils are sometimes simply R&O Turbine Oils, however there are some specialty oils which provide more extreme-pressure protection, better lubricity, more oxidation resistance and better demulsibility. Many compressor OEMs, particularly those who manufacture rotary screw compressors, recommend PAO fluids because of their superior ability to separate water and lower coefficient of friction.

### CIRCULATING OILS

Circulating Oils may contain no additives at all, or are treated only with anti-foaming agents and anti-oxidants. Premium circulating oils typically contain multiple types of anti-oxidant chemistries, surfactants to facilitate heat transfer, and peroxide scavengers – quench oils can also be used as circulating oils. Other types of premium oils, such as compressor, turbine, paper machine, anti-wear and rolling mill oils are also sometimes used to rationalize inventory.

