Oil: Part 2

Types of oil:
There are two basic types of oil, mineral and synthetic. Mineral oil sometimes referred to as dinosaur juice is made from crude oil from oil wells. It's been around from before the automobile was invented. Synthetic oils were a laboratory curiosity in the early 1900's, but were developed in Germany to augment their dwindling oil supplies during WWII. It was further developed to lubricate turbo jet engines after that.

Mineral Oils
Oils recovered from crude oil are laden with impurities, which must be refined or processed out to make the oil usable in an automobile engine. It must be processed to the desired viscosity or thickness. All acids and waxes must also be removed. Then an additive package must be added to make the oil perform in the engine per the specifications of the engine manufacturer. This additive package will include viscosity improvers, detergents, and oxidation resisters. All manufacturers have their own additive packages, which they develop to mark their brand as better/different from other brands. In this area the customer decides which brand of oil best meets his needs. All of these oils will meet the Federal specifications for motor oils, and all of their oil containers are marked with the API starburst. This means that the oil meets the "minimum" specifications. Better (more expensive) brands will exceed these specifications. So you get what you pay for.

With exposure to heat and combustion contaminates all mineral oils will change viscosity (usually thin out) and become darker. The function of the additive package is to minimize this and make the oil last longer while doing its job of protecting the engine.

Synthetic Oils
Synthetic base stocks have very little in common with mineral oil base stocks. They are both used for the same purpose but mineral oil is simply transformed into something that will "adequately" do the job, while synthetic oil is designed specifically for the purpose of lubrication of an engine.

There are three basic synthetic base stocks, Polyalphaolefins (PAO's), Diesters, and Polyolesters. All of these are fabricated by mixing an acid with an alcohol then removing any left over molecules that didn't combine correctly. The result is a very uniform lubricant base stock.

PAO's are the most common base stock for synthetic oils today and are the basis of all of the lesser expensive synthetic oils. They contain absolutely no wax, metals, sulfur or phosphorous and have a very good natural viscosity index. They maintain their pour characteristics over a very large temperature range. PAO's have a tendency to shrink rubber seals when exposed to heat. Not good in an engine but certain additives counter this problem.

Diesters have most of the same characteristics of PAO's but have a more complex structure therefore their performance characteristics can be made to vary more. Never the less, if chosen carefully they have better pour points than PAO's and are more antioxidant. Diesters also have very good inherent solvency characteristics, which means that not only do they burn

clean but they also clean out deposits left behind by other lubricants.

Like PAO's, diesters also affect rubber seals but they tend to cause them to swell rather than shrink which is not a problem.

Polyolesters are very similar to diesters, but are slightly more complex and have a greater range of pour points and viscosity indexes. The same seal swell characteristics exist with polyolesters as with diesters.

Manufacturers of premium synthetic oils will blend more than one "species" of PAO and /or will blend these PAO base stocks with a certain amount of diesters or polyolesters in order to create a base stock, which combines all of the relative benefits of these different base stocks.

The better synthetics are made this way. They are more difficult to make and as a result are more expensive but are worth it. As I said before, you get what you pay for.

I hope this helps you to understand more about the lifeblood of your engine and enables you to choose which oil you want to use in your baby's engine.