

LUBE

TECHNI-GRAM



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CHEMISTRY OF PETROLEUM

Over the years, many excellent articles have been published documenting the importance of the superior paraffinic, High Viscosity Index base stock Southwestern utilizes in the manufacturing of SWEPCO's full line of quality lubricants. Periodically, confusion arises regarding comparisons of naphthenic versus paraffinic base stocks or the pitfalls of products manufactured from re-refined base stocks. Therefore, we are re-publishing a series of highlights from these important articles to help clear some of this confusion. Additional information pertaining to the manufacturing of SWEPCO's technologically superior lubricants will be published in several upcoming Techni-Grams:

Some knowledge of the chemical structure of petroleum based lubricating oils is useful in understanding the quality and the application of lubricants.

All refined petroleum products are primarily composed of only two elements, carbon and hydrogen; other constituents present are in minor quantity, such as sulfur, oxygen...etc. The fundamental difference between petroleum products is the arrangement and number of the individual carbon and hydrogen atoms which make the particular type of molecules in the product.

There are four principle types of atomic structure which the chemist has to deal with: straight chain (paraffin), ring (naphthen), aromatic and unsaturate. There are many other types which are basically combinations of the above four, part chain, part ring, branched chain...etc.

Paraffin base lubricating oils are blends of light and heavy distillate, whereas the naphthenic or asphaltic base oils may be run directly from the distilling process without resorting to blending. This is due to the fact that the lower the percentage of paraffin type molecules in the original crude, the lower the boiling points of various fraction. It is also generally true that the more asphalt in a crude, the lower the percentage of paraffin-type; hence the higher the percentage of the naphthenic type.

The comparison below gives a general idea of the difference between paraffinic and naphthenic oils.



... to keep it running

The difference between the two oils is very significant. While both have the same viscosity @ 210°F, they are vastly different @100°F. The naphthenic is significantly heavier @ 100°F. This vast difference in viscosity is indicated by the spread in the viscosity index of these oils. The paraffinic oil viscosity index of 100 is much superior to the naphthenic oil viscosity index of 20. This means naphthenic base lubricants would run very light at peak operating temperatures and very thick at start up temperatures. This of course leads to poor and improper lubrication of the moving parts. It also greatly reduces the energy efficiency of the operation.

It is also important to note the difference in the flashpoint which is higher for the paraffinic oils. This means lower evaporation and less oil consumption, as well as lower operating temperatures and pressure.

Oxidation resistance is another important property of lubricating oils. Paraffinic oils are more resistant to oxidation than naphthenic oils. This means less varnish and oxidation by-products formation which leads to a better lubrication and less drain frequencies.

Here at SWEPCO we are proud of the fact that we use only paraffinic base stock oils to compound our lubricating oils. This is only one of many reasons we believe that our lubricating oils are of the highest quality. Using superior quality lubricants extends the life expectancy of equipment, increases energy efficiency, reduces downtime and increases the lubrication cycles. All of these benefits are money savers.

TYPE	API GRAVITY	SAE No.	SUS@100° F	SUS@210° F	FLASHPOINT ° F	VI
Paraffinic	29	30	310	54	450	100
Naphthenic	20	30	580	56	390	20