



The Fundamentals of Viscosity

What is viscosity?

Viscosity is the resistance of oil to flow and is the most important single property affecting the selection of oil for machine elements designed for fluid film lubrication. It is important to note that the viscosity of petroleum products is dependent on temperature.

Factors in Selecting the Proper Viscosity:

- Higher load – Higher viscosity needed
- Higher temperature* – Higher viscosity needed
- Increased speed – Lower viscosity needed

*Oil tends to thin out at a greater temperature; hence the higher viscosity needed.

Units of Viscosity:

- ISO – International Standard Organization (measure for industrial and hydraulic oil) established as a universal classification for lubricants
- cST – Centistokes: measured at 40°C and 100°C
- SUS – Saybolt Universal Seconds: measured at 100°F and 210°F
- ASTM (American Society for Testing and Materials) viscosity classification – A method of specifying viscosity levels for industrial lubricants; does not denote quality.
- SAE – Society of Automotive Engineers: A 2-classification system: one for crankcase oils and one for transmission and axle lubricants

Why is this important to know?

The grade of oil is important to know because oil that is too thin (low viscosity) may not protect components correctly, and oil that is too thick (high viscosity) may cause sudden decreases or increases in oil pressure causing mechanical damage.

For further reference, please review:

[SAE Viscosity Grade Chart](#)
[Viscosity Equivalent Chart](#)
[Glossary of Energy Terms](#)