

Viscosity Summary



Viscosity is a scientific term that describes the resistance to flow of a fluid. The fluid can be a liquid or a gas, but the term is more commonly associated with liquids. Fluids with larger, more complex, molecules will have higher viscosities. This is particularly true for the long, chain-like molecules that are found in polymers and the heavier hydrocarbon compounds. These molecules tend to become entangled with one another, impeding their movement.

Zedi reports viscosity using ASTM D445 and then convert units to Sabolt Universal Seconds (SUS) by using ASTM D2161. Similar methods to ASTM D445 include IP 71 and ISO 3104. ASTM D88 is not used because it requires more sample, and is less accurate based on findings from ASTM.

Other forms of viscosity are dynamic viscosity. This is done by multiplying kinematic viscosity with density. The SI units for kinematic viscosity is mm²/s, which also corresponds directly with centistokes (cSt). SUS is the US measurement for viscosity and has been a common unit used in the oil and gas industry. Dynamic viscosity is also known as absolute viscosity and is typically reported in centipoise (cP).

We're more than happy to report viscosity as mm²/s or even dynamic viscosity as a majority of the time density is also requested

We typically report viscosities at 100 and 120 degrees F. If different temperatures are needed, please let us know and we will adjust the measurements accordingly.

Some customers have requested multiple temperatures analyzed to determine a viscosity curve to provide more data.

Another method that is used is ASTM D2270 that utilizes kinematic viscosity values measured at 40 and 100 degree C to provide a viscosity index number.

Each of these additional methods like ASTM D2161 or ASTM D2270 reference ASTM D445 as the referee method as the other methods have to account for each individual sample bias correction that if not performed correctly can cause inaccuracies to the results. Please find table below of a brief description of common viscosity methods. Note that the methods are focused on oil matrices.

Viscosity Methods	ASTM D88	ASTM D445	ASTM D7042	ASTM D7279
Measurement type	SSU Viscometer	Glass Capillary Viscometer	Stabinger Viscometer	Houillen Viscometer
Measurement units	SUS	Kinematic Viscosity	Kinematic Viscosity - sample bias correction required	Kinematic Viscosity - sample bias correction required
			Density	
Units	SUS	mm ² /s	mm ² /s	mm ² /s
	Physically measured	Physically measured	Automated	Automated

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