

Viscosity and Thixotropic Index

WHAT

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WHY

Viscosity and TI are important parameters to consider when choosing an epoxy.

Viscosity and Thixotropic Index (TI) are common terminology used to describe the rheology of an epoxy. They both play a large role on how a product will perform for a particular application.

Viscosity is a measurement of a fluid's resistance to flow and is measured in Poise or more commonly centipoise (cPs). One

cPs is equal to the viscosity of water. From this reference, all other viscosities can be derived. A product like honey would have a much higher viscosity of approximately 10,000 cPs and would flow much slower out of a tipped glass than water.

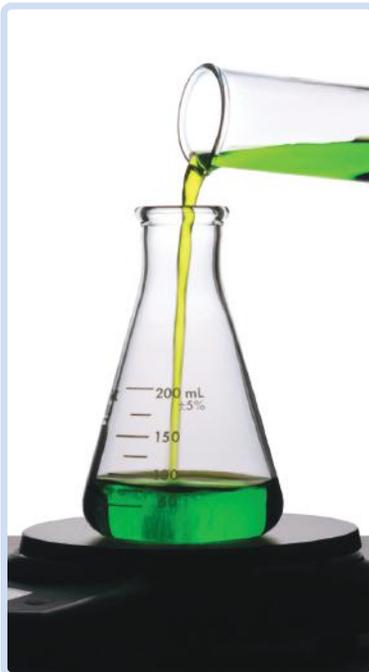
Here is a list of common materials and their viscosities:

Approximate Viscosities of Common Materials

(At Room Temperature 70°F)

MATERIAL	VISCOSITY IN CENTIPOISE
Water	1 cps
Milk	3 cps
SAE 10 Motor Oil	85-140 cps
SAE 20 Motor Oil	140-420 cps
SAE 30 Motor Oil	420-650 cps
SAE 40 Motor Oil	650-900 cps
Castrol Oil	1,000 cps
Karo Syrup	5,000 cps
Honey	10,000 cps
Chocolate	25,000 cps
Ketchup	50,000 cps
Mustard	70,000 cps
Sour Cream	100,000 cps
Peanut Butter	250,000 cps

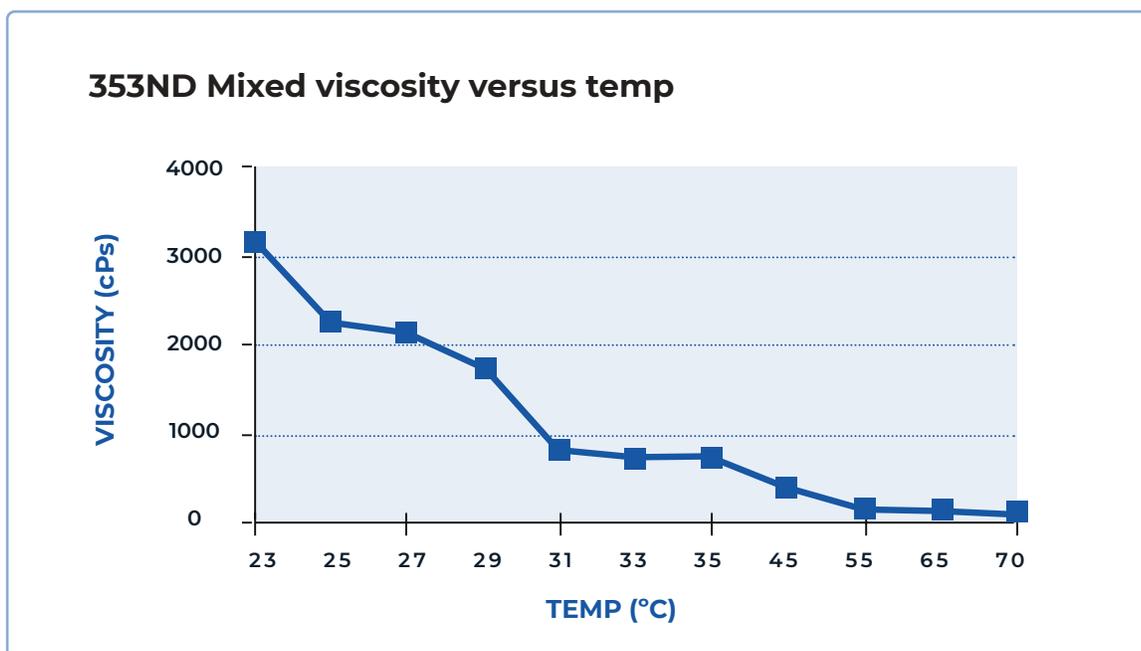
If necessary, the viscosity of a material can be decreased with an increase in temperature to better suit an application. Typically, this drop is in an exponential fashion.



The below graph shows how EPO-TEK® 353ND will react when heated:

TEMP (°C)	VISCOSITY (cPs)
23	3153
25	2252
27	2147
29	1728
31	785
33	737
35	737
45	409
55	163
65	143
70	102

The viscosity of the 353ND drops very quickly, and then levels out at increased temperatures. This is a great technique if an epoxy performs well for a certain application, but the viscosity is slightly high. It is important to note that by heating the mixture, this can accelerate the cure and reduce the pot life significantly.



Another important parameter that was mentioned earlier is thixotropic index. Thixotropic Index is a ratio of a material's viscosity at two different speeds, generally different by a factor of ten. This value is indicative of a material's ability to hold its shape. A highly thixotropic material will drop in viscosity as agitation or shear stress is increased. Mayonnaise

is a great example of this. It will hold its shape very well, but when a shear stress is applied, the material will easily spread.

Both viscosity and thixotropic index are important to consider when choosing an epoxy for a specific application and dispense method.



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