

VISCOSITY and THIXOTROPY

The science of liquid movement is called “fluid dynamics”. We will take a look at two (2) simple parts of this known as “viscosity and thixotropy”.

Very simply, the “viscosity” of a liquid is how thick that liquid is. “Viscosity” can be measured in a number of ways and with different units of measure. Commonly used units of measure include stokes, poises and centipoises (cps). Scientifically speaking, it is the resistance of the liquid to oppose the energy being used to move it.

By examining water, which has a very low viscosity and comparing it to the “viscosity” of honey, which is higher, it would be much easier to stir the water and use less energy than stirring the honey. Both water and honey are called “Newtonian” fluids. This means the energy needed to move these materials is directly equal to the speed at which they are moved.

For instance, if it takes one unit of energy to move water at 1 mile per hour, it will take two (2) units of energy to move water at 2 miles per hour. It is directly proportionate.

“Thixotropy” is how much body or fluffiness there is in a material. A good example of a highly “thixotropic” liquid is mayonnaise. Mayonnaise has a high “viscosity” when stirred slowly but a much lower “viscosity” when stirred quickly. Because “thixotropic” liquids are called “Non-Newtonian” fluids, this means the energy to move them is NOT directly equal to the speed at which they are moved. So as in the above example of mayonnaise, “thixotropes” have a high viscosity when moved at a slow speed and a lower viscosity when moved at a higher speed.

The ratio of the slow speed viscosity or the “high speed number” divided by the high speed viscosity “low viscosity number” is called the “thixotropic index”. This refers to how much body the material has, how well it will hang and how well it will resist sagging, due to gravity.