

# Flexil™

Flexil™ is a patent pending technology based on a reactively modified polysiloxane. The Flexil™ material has the unique ability to reduce the flex modulus of a plastic without being soluble in the polymer. Using this this unique polysiloxane chemistry in a plastic compound allows for use temperatures below -60°C, improved impact resistance and reduction in modulus with no effect on heat deformation temperature

## Flexil™ technology offers:

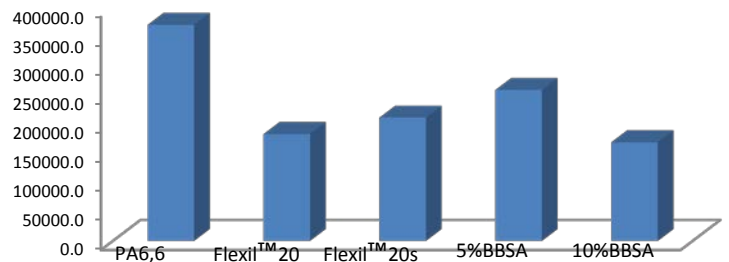
- *Excellent thermal stability (400oC+)*
- *Reduced flex modulus*
- *Increased elongation*
- *Elimination of low temperature Brittleness*
- *Improved impact resistance*

Traditional plasticizers include water, phthalates, caprolactum, BBSA, mineral oils and other chemicals are traditionally liquids. Most of the common plasticizers are cost effective solutions, however many of these liquids will migrate or leach out of the plastic, thus are unable to offer flexibility in all environments, becoming more brittle over time as the plasticizer slowly migrates out of the matrix. For that reason traditional plasticizers cannot be used in critical applications or in extreme environments.

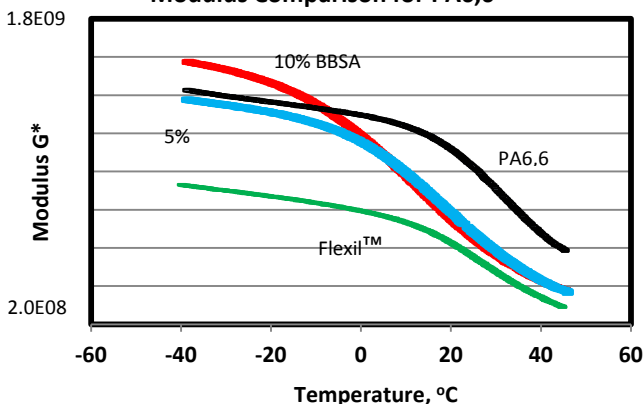
## Flexible Plastic

Making plastic flexible is often referred to as “plasticizing.” Traditional plasticizers function by being partially or entirely soluble in the polymer, allowing spacing between the chemical bonds of the plastic thus allowing movement on the molecular level allowing the plastic itself to become more flexible. Plasticizing typically leads to lower modulus, improved low temperature flexibility, improved impact resistance and increased elongation. Every type of plastic will require a plasticizer with the proper chemistry to give the desired effect; hence the numerous types of materials are utilized as plasticizers.

Modulus (Mean) PSI Polyamide 6,6



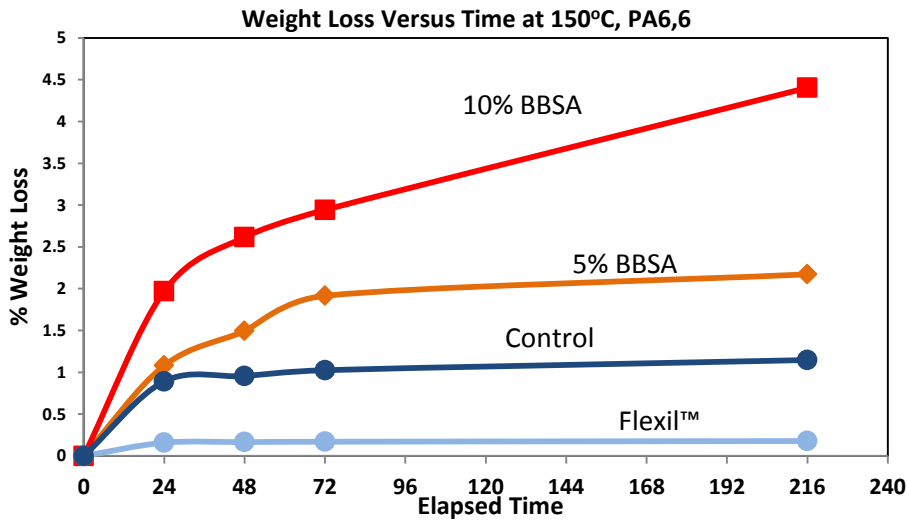
Modulus Comparison for PA6,6



Flexil is an ecofriendly technology that will never migrate out and never freeze. It behaves uniquely as both a solid and a liquid allowing for plasticizing of any plastic utilizing an unconventional mechanism. Flexil plasticizes a system by creating a network of “gels” that allow the system to remain flexible well beyond the original glass transition temperature of the polymer.

### Additional benefits of Flexil™:

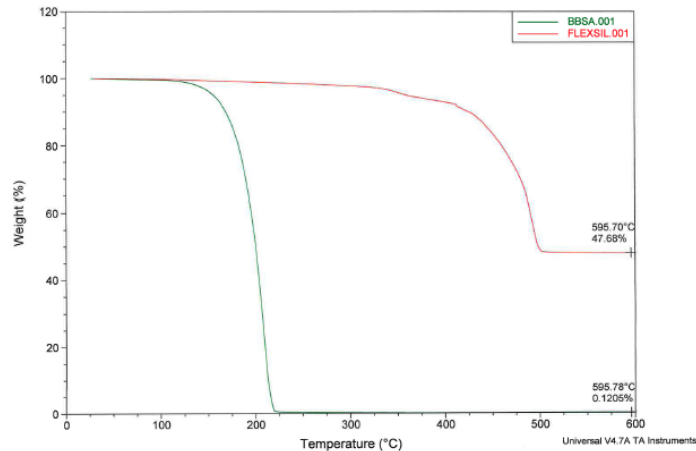
- *Approved for food contact*
- *Flexil™ will never migrate out of matrix*
- *No effect on HDT*
- *Not reliant on moisture for plasticity*
- *Flexil™ available in many polymers*



The unique polymeric siloxane nature of the Flexil™ reduces the overall moisture absorption of the polymeric nature, thus eliminating the polyamide dependency on moisture in the environment to maintain its plasticity. This mechanism allows broader condition limitations for plastic formulations.

The Flexil™ additive itself offers thermal stability beyond 380°C far beyond all common plasticizers. The chart to the right demonstrates the far superior thermal stability of Flexil versus the incumbent technology for plasticizing polyamides, known as BBSA.

The high thermal stability of the Flexil™ technology makes it an ideal material for plasticizing other high temperature resins. Polymer Dynamix is currently evaluating the Flexil technology in other matrix's please feel free to contact us to discuss any projects where this technology would be useful.



**Polymer  
Dynamix**

formulations that *free*

*your imagination*

