

## THERMAL EFFECTS MODULE – K/WLF



*This module is used to determine the strain, temperature and frequency dependence of the viscoelastic storage and loss modulus for use in thermal-mechanical analysis with temperature effects and energy dissipation, or self-heating considerations.*

The K/WLF module is named for Kraus and for Williams-Landel-and-Ferry, two representations used to describe viscoelastic DMA (Dynamic Mechanical Analysis) measurements. Supports thermal-mechanical workflows for product temperature and energy dissipation analysis.

### Experiment Overview

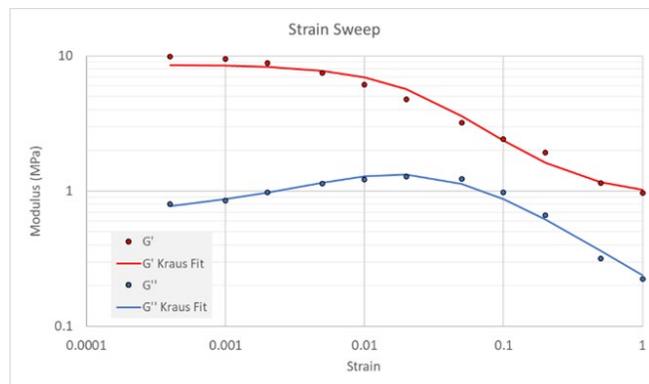
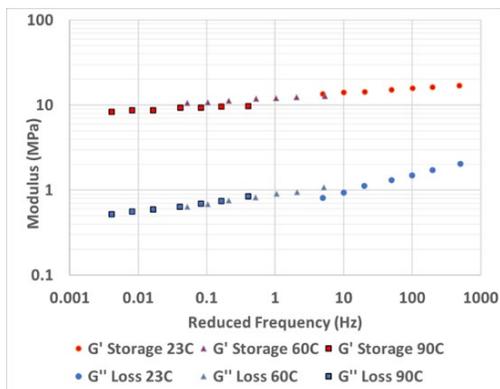
- low Strain Frequency Sweeps at 3 temperatures
- low Strain Temperature Sweep
- Strain Sweep – initial and repeat – at specified temperature and frequency
- optional thermal conductivity, specific heat and density
- three replicates of each test
- number of slabs needed for test: 4

#### Use with

- Kraus hysteresis law
- WLF temperature / rate law
- Lookup table hysteresis law

### Analysis and Reporting / Deliverables

- Kraus fit for strain amplitude dependence of storage and loss modulus.
- WLF shift and master curve for storage and loss modulus to describe response over a wide range of temperatures and frequencies.
- look-up tables for master curve representation and Kraus parameter fits for input to simulation codes.
- formatted input for analysis codes and final report



**FPM-TM-KWLF Thermal Effects Module – K/WLF \$4,950**

#### Additional Options

**FPM-THRM Thermal Conductivity, Specific Heat, and Density \$760**  
Requires 1 additional slab.

**FPM-TM-TEMP Temperature Upcharge for +2 Temperatures \$600**  
For frequency sweeps