

# FULLY RELAXING MODULE – REQUIRED TEST

## Fatigue Behavior



This module is a pre-requisite for any fatigue analysis.

The Core Module gives the basic fatigue crack growth rate curve as well as the strain-life curve and crack precursor size.

### Experiment Overview

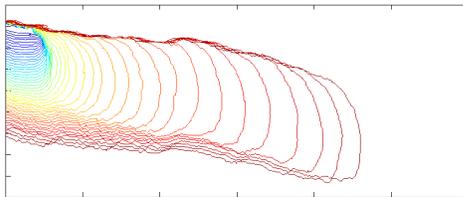
- static tearing
- fatigue crack growth (20 hour procedure)
- cyclic simple tension to rupture, 2 strain levels
- number of slabs needed for test: 5

**Use with**

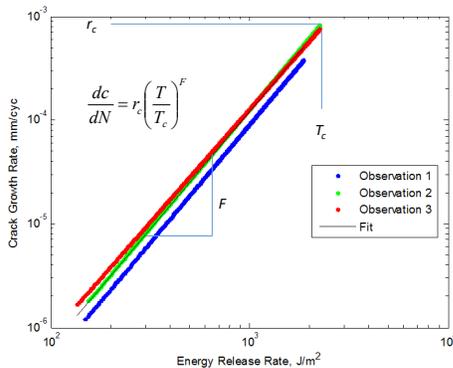
- Thomas Law
- Lake-Lindley
- Table Lookup

### Analysis and Reporting / Deliverables

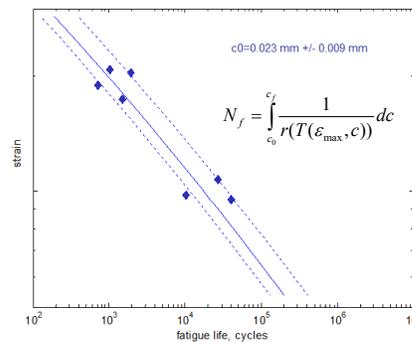
- critical tearing energy  $T_c$
- tensile strain, stress, energy at break
- Thomas Law fatigue crack growth rate curve and its parameters  $r_c$  and  $F$
- crack precursor size  $c_0$  calculation and sensitivity analysis
- computed strain-life, stress-life, and energy-life fatigue curves



Typical crack tip images collected during fatigue testing. Each contour shows the crack tip shape at a given number of cycles. Colors indicate time/cycles, with blue at the beginning of the test, and deep red at the end.



Fatigue crack growth rate observations and model fit parameters.



Crack nucleation experiments overlaid with computed strain-life curve corresponding to crack precursor size  $c_0$ . Dotted lines show the effect of crack precursor size variation on the strain-life curve.

<b>FPM-C</b>	<b>Fully Relaxing Fatigue - Core Module</b> completed at lab ambient temperature (23°C) fully relaxing (R = 0) conditions for all fatigue tests	<b>\$7,850</b>
<i>Additional Options</i>		
<b>FPM-C-HOT</b>	<b>Temperature Upcharge for Core HOT Hyperelastic Module</b> Indicate temperature with range of >23°C to 150°C	<b>\$1,400</b>
<b>FPM-C-COLD</b>	<b>Temperature Upcharge for Core COLD Hyperelastic Module</b> Indicate temperature with range of -40°C to <23°C	<b>\$2,145</b>