

MATERIAL CHARACTERIZATION

Fatigue Property Mapping™

Know Your Material



Success is riding on your compound. Don't leave its fatigue behavior uncharted. Our characterization service offers test modules for probing each of the behaviors that govern your material's fatigue performance.

Whether you seek higher durability, or lower cost without compromising durability, Endurica's Fatigue Property Mapping™ service offers you a comprehensive inventory of the fatigue capabilities of your material. Get Durability Right® in your development and analysis projects with our uniquely efficient, reliable, and physics-based testing protocols.

BENEFITS

- Material parameters ready to use with simulation software: Abaqus, ANSYS, Marc, fe-safe/Rubber™ and Endurica CL™.
- Full support for both nucleation (ϵ -N) or (σ -N) and crack propagation (da/dN) analysis methods.
- Accurate and timely results via uniquely reliable and productive test strategies.
- Reduced risk and cost of development iterations when you take your material's fatigue capabilities into account.
- Leverage your material's full potential by properly aligning its capabilities with the application's demands.

THE ENDURICA DIFFERENCE

Learn more at:

www.endurica.com/elastomer-testing-characterization/

Call today to discuss your testing project: **+1.419.957.0543**

Endurica

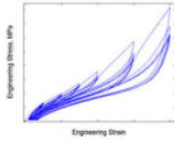
Get Durability Right®

GET DURABILITY RIGHT[®] WITH ENDURICA'S FATIGUE PROPERTY MAPPING

Hyperelastic Module

Simple, planar, equibiaxial tension Mullins Effect

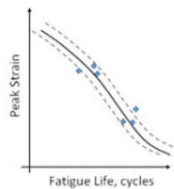
- Required as prerequisite to Finite Element Analysis, lab ambient temperature
- One temperature between -40°C and 150°C



Core Fatigue Module

Fully relaxing behavior from both nucleation and fracture mechanical perspectives

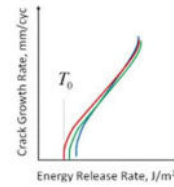
- Required for fatigue analyses
- User specifies one temperature between -40°C and 150°C
- Fully relaxing (R=0) Conditions for all fatigue tests



Intrinsic Strength Module

Quantify endurance limits

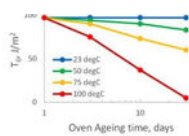
- Recommended for cases with fatigue life longer than 10⁶ cycles



Extended Life Module

Quantify endurance limit, estimate aging rate of stiffness, intrinsic and ultimate strength

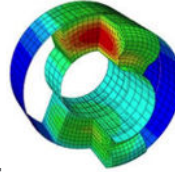
- Recommended for cases with fatigue life longer than 10⁶ cycles, and when aging must be taken into account
- Quantify Arrhenius ageing law parameters
- Basic and Advanced time/temperature options available



Thermal Module

Quantify dissipative properties, thermal properties, temperature dependence

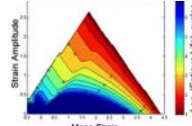
- Recommended for cases involving significant self-heating, thermal expansion, or thermal gradients
- User specifies three additional (to FPM-C) temperatures between -40°C and 150°C.
- Basic and Advanced options available



Nonrelaxing Module

Quantify strain crystallization min and mean strain effects

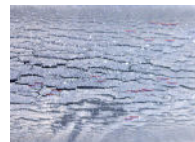
- Recommended for cases where fatigue loading is never fully relieved to zero
- One temperature between -40°C and 150°C
- Test is run under range of nonrelaxing (R>0) conditions



Ozone Module

Quantify ozone attack critical tearing energy and rate

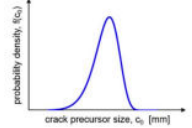
- Required when rubber has a susceptibility to ozone attack and is operating in an environment with ozone



Reliability Module

Weibull statistics for strength and crack precursor size populations

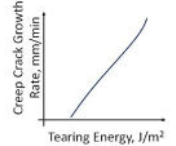
- Recommended when probability of failure needs to be estimated
- Testing is conducted at room temp. 23°C
- Weibull analysis parameters relating frequency of occurrence to size of crack precursor



Creep Module

Quantity creep crack growth rate effects

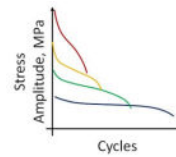
- Recommended for cases involving long periods under static load
- User specifies one temperature between -40°C and 150°C



Cyclic Softening Module

Quantify cyclic softening effects

- Recommended for cases where degradation limits durability
- User specifies one temperature between -40°C and 150°C



C-SUITE INSIGHTS

RIGHT-SIZE YOUR TESTING

Use our modular framework to meet your program requirements, from rapid screening to deep characterization.

LEVERAGE YOUR STRENGTH

Know your material's physics so you can leverage its full capabilities in your application.

PLUG AND PLAY

Our testing modules deliver compatible results that plug right into our fatigue solvers.

SCALE UP YOUR CAPACITY

Planning to implement these in your own lab? Use our testing service to keep product development moving while you scale up.

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