Sonelastic® HZ

Dynamic elastic moduli and resonance meter

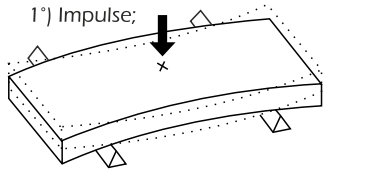
For a more accurate Finite Element Analysis and Quality Control of materials.

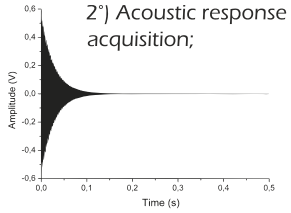
In accordance with the ASTM E1876-15 standard.

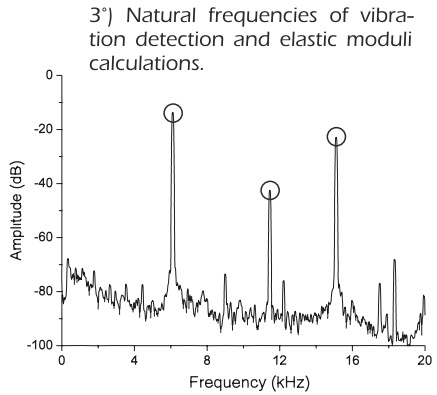
Sonelastic® HZ is based on the Impulse Excitation Technique for non-destructive characterization of Young's modulus, shear modulus, Poisson ratio and damping of materials. It also determines resonance frequencies of the sample or part under test.

The Impulse Excitation Technique

When submitted to a light mechanical impact, the sample emits a characteristic sound related to its dimensions, mass and elastic properties. The frequencies and decay rate of this sound allow the determination of the dynamic elastic moduli and damping.







Samples

Sonelastic® HZ can measure any rigid material in the shape of discs, rings, rectangular or cylindrical bars with dimensions ranging from 20 mm (3/4 inch) to 550 mm (22 inches).

Configuration

The basic setup comprises the Sonelastic® software, an acoustic sensor, sample supports and manual impulse devices.

Sonelastic® HZ provides:

- **Fast and practical measurement.**
- **Calibration with traceability to SI.**

WORLDWIDE 2 YEARS WARRANTY

ATCP Physical Engineering
ha@atcp-ndt.com / +55 16 3289-9481
www.atcp-ndt.com

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Areas of application

Materials characterization for accurate FEA

It is crucial to know elastic moduli exact values of your materials for accurate Finite Element Analysis with regards to frequency tuning, nodal point optimization and mode of vibration selection. Sonelastic® enables measuring the Young's modulus, shear modulus, Poisson´s ratio and damping of any metallic alloy and rigid material with precision and accuracy up to 0.15%.

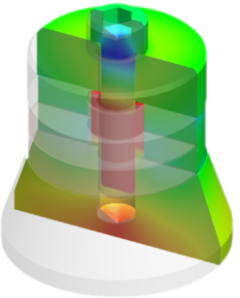
E (GPa):
73.626 ± 0.278

G (GPa):
26.549 ± 0.040

Poisson:
0.387 ± 0.005

Converters design and optimization

Converters and transducers are complex resonant elements that comprise many parts and materials. It is critical to know the materials' elastic moduli exact values because they all affect the element frequency, nodal point and stress distribution.

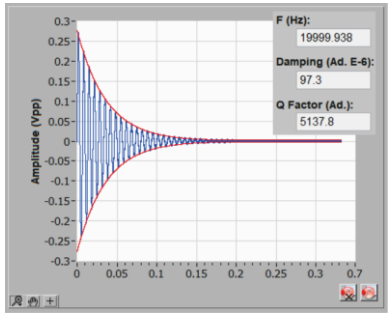


Receiving & incoming inspection

Elastic moduli are sensitive to microstructure and tempering process and should be monitored. Small variations are usual even along the same bar or rod. Changes affect the ultrasonic element resonance and can make the fine-tuning process harder if not proper compensated. Sonelastic® HZ also allows the identification of the material's rolling direction.

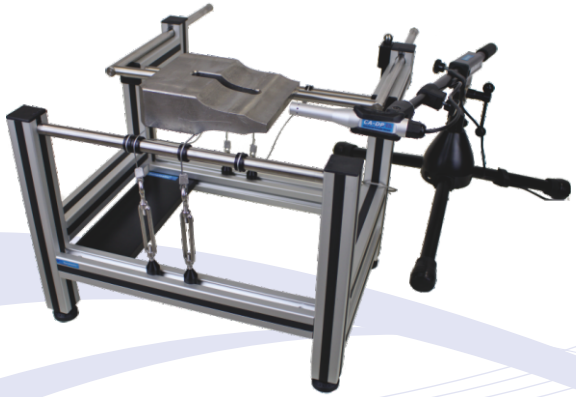
Damping and quality factor assessment

The damping and mechanical quality factor of resonant devices depend on the material's internal friction and energy loss as a result of friction on mechanical interfaces. The device efficiency is largely affected by these properties. Cracks on metallic parts increase the damping, causing the element to heat and the performance to be poor.



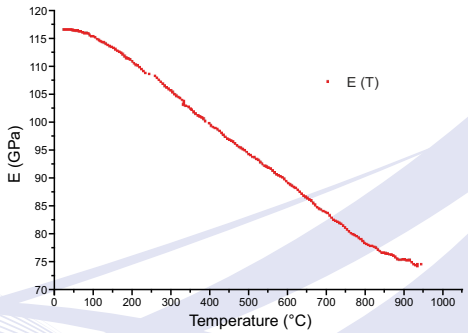
Basic modal analyses

Sonelastic® HZ is a cost-effective solution for basic modal analyses of ultrasonic elements for frequency testing. It also allows you to test piezoelectric ceramics for internal cracks.



Assessment of the temperature effect

ATCP offers characterization services for elastic moduli measurement in dependence of temperature up to 1150 °C, being applicable to studies involving thermal cycles, aging and heat-treating stress relief.



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