Sonelastic® is a set of configurable solution for the non-destructive characterization of damping and elastic moduli (Young’s modulus, shear modulus, and Poisson’s ratio) employing the Impulse Excitation Technique.

**The Impulse Excitation Technique**

This technique is based on natural frequencies of vibration. When submitted to a light mechanic impact, the sample under test emits a characteristic sound according to its dimensions, mass and elastic properties. The frequencies and decay rate of the acoustic response allow an accurate determination of the elastic moduli and damping.

### Applications and samples

Sonelastic® measures the elastic moduli of any rigid material in the shape of discs, rings, rectangular or cylindrical bars with dimensions ranging from 20 millimeters (3/4 inch) to 5.3 meters (17.4 feet).

### Configurations

The typical configuration comprises a software, an acoustic sensor and a sample holder that will vary according to the sample’s geometry and dimensions. Accessories, such as the automatic electromagnetic impulse device and instrumented furnaces, allow automatic measurements as a function of time and temperature.

In accordance with E1876, E756, C1548 and C1259 ASTM standards

![Image of Sonelastic® setup and software interface](image-url)
Areas of application

**Biomaterials, composites and technical ceramics**
Sonelastic® measures elastic moduli of biomaterials, polymers, composites, metals and technical ceramics under a typical uncertainty lower than 1%. It is possible to characterize rings, discs, rectangular and cylindrical bars.

**Grinding wheels, abrasive and friction materials**
Sonelastic® tests grinding wheels, abrasive materials, brake pads and linings by detecting variations in materials’ elastic moduli and damping.

**Measurements as a function of time and temperature**
Sonelastic® has accessories for automatic characterizations as a function of time and temperature, being applicable to studies involving drying, curing and sintering cycles.

**Grinding wheels, abrasive and friction materials**
Sonelastic® has accessories for automatic characterizations as a function of time and temperature, being applicable to studies involving drying, curing and sintering cycles.

**Structural and large-sized elements**
Sonelastic® characterizes natural frequencies of vibration and damping to ensure the quality control of beams, panels, railway sleepers, pillars and poles.

**Woods and derived materials**
Sonelastic® grades woods and derived materials. It also assists in obtaining longitudinal, transversal and radial elastic moduli. Trunks, beams, and lamellas may also be tested, as well as glue-laminated wood and plywood.

**Refractories, concretes and rocks**
Sonelastic® is employed to evaluate the refractories resistance to thermal shock damage, to ensure concretes quality control, and to determine the sound speed in rocks.

**Equipment developed and manufactured by ATCP Physical Engineering.**

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