



The TMI Group of Companies

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HOW DOES THE BQM WORK?

With regard to how the unit actually works:
First we need to know what we are measuring.

We are measuring MD Shear Stiffness of the combined corrugated board, B flute and C flute.
(see attached document for explanation of this property)

Measurement components and principle of the BQM:

- 1) Small vibrating dc motor vibrates the board (like the vibrating motor in your mobile phone).
- 2) Frequency is measured by an optical switch which is positioned around an eccentric weight on the dc motor shaft.
- 3) Each rotation of the dc motor produces a pulse.
- 4) The measurement sequence occurs between 150 Hz and downward to 100 Hz.
- 5) The piezo ring then measures the vibration of the board surface.
- 6) As the frequency of the motor is run down during a test:
 - _ Level of vibration
 - _ The magnitude
 - _ The frequency – is measured continuously (about 50 times during the test).
- 7) The frequency, at which the magnitude of the vibration is greatest, represents the system resonance which is directly related to the stiffness of the corrugated medium of the B or C flute corrugated sample.
- 8) The BQM reports in equivalent Shear Stiffness units of 0.0- 10.0 Kn/m.
- 9) There are 2 calibration sheets (low and high) provided to check the operation of the BQM.
- 10) Also provided is a foam sheet with a rectangular cut-out of 100 mm x 400 mm as a means to support the sample during testing.

In summary, the shear stiffness is measured by vibrating the board in a specific mode and measuring the frequency of vibration where a resonance occurs – that is a peak vibration magnitude. This “peak” is directly related to the stiffness in the particular mode measured. The unit is NOT ultrasonic. It provides a mechanical vibration that excites the corrugated board structure. The vibrations are coupled to the surface of the sheet via the rubber strips on the base of the BQM unit and the degree of excitation as the mechanical frequency is varied is measured by the contacting piezo ring.