Quality Assurance of Bose® SoundLink® and SoundLink Mini Passive Radiator Materials

The Challenge:

Measure Dynamic Material Properties to Optimize Sound Performance in Bose Products

Background

One way that Bose consistently produces the highest quality products is through a strict quality assurance QA program.

Key benefits of a robust QA program may include consistent production of materials that produce the best sound quality, minimized costs from post-production customer support, and particularly for Bose, an unmatched reputation.

Meeting the Challenge

Bose® ElectroForce® testing instrumentation has been recently used to help design, optimize, and produce high-quality passive radiator materials within the Bose SoundLink® and SoundLink Mini Bluetooth® speaker products.

Materials testing capabilities provided by Bose ElectroForce test instruments have helped produce never-before-seen sound quality output by these compact and portable speakers.

In many cases, material properties are variable characteristics that can be measured, optimized, and controlled to create and help consistently produce the highest quality products. Bose has found that dynamic, quantitative, time-dependent properties of materials used in Bose speaker technologies directly correlate with acoustical sound quality.

Bose ElectroForce test instrumentation, with its patented linear motor technology, is a key part of the Bose QA program for the SoundLink and SoundLink Mini product lines with capabilities to quickly, accurately, and easily measure such dynamic material properties.

Bose® ElectroForce® 3200 Test Instrument

Proprietary Speaker Technology

SoundLink® Bluetooth® Mobile speaker II

SoundLink Mini Bluetooth speaker

Experimental Setup and Tests

The passive radiators used in these Bose speakers are made of a proprietary silicone-based material, and it was found that controlling the dynamic material properties of these components helps create an unmatched sound quality with optimized acoustical performance. As part of the Bose QA program, dynamic material properties of these passive radiators are precisely monitored using Bose ElectroForce test instrumentation.

Experimental Setup and Tests

Test fixtures and software were customized to meet testing needs and data output requirements for a full QA solution (Figure 2).

A representative plot of sound quality (performance) versus quantitative material properties found using Bose ElectroForce instrumentation is shown in Figure 3. Material properties must fall within specification to pass QA inspection.

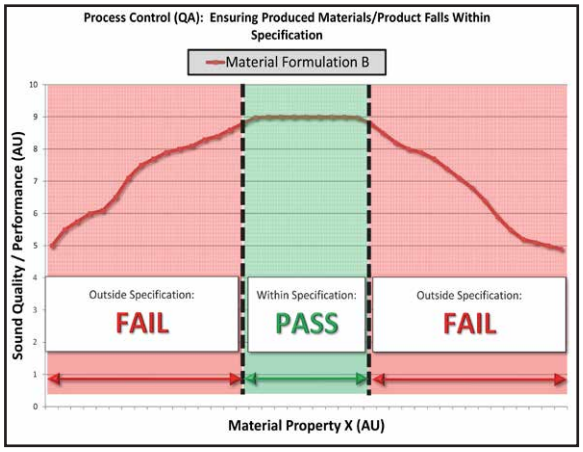

Figure 3 - QA requirements for material properties by Bose ElectroForce instrumentation

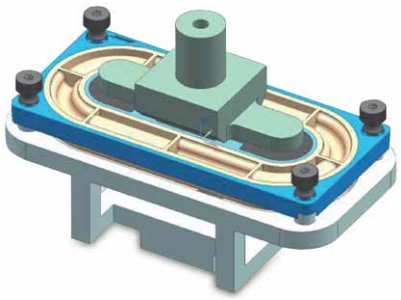

Figure 2 - Custom test fixture used for QA testing of Bose® passive radiator materials used in SoundLink® and SoundLink Mini portable Bluetooth® speaker products on Bose ElectroForce® 3220 test instrument.

Summary

Bose ElectroForce materials testing instrumentation can be used by researchers to provide a complete QA solution for bringing the best products to market.

The full QA solution includes push-button, technician-level instrument operation with automated pass/fail reporting, minimizing operator costs. An example QA process is outlined in Figure 4.

Such a QA program is used by Bose to optimize materials used in popular consumer products, including the Bose SoundLink® and SoundLink Mini portable Bluetooth® speakers.

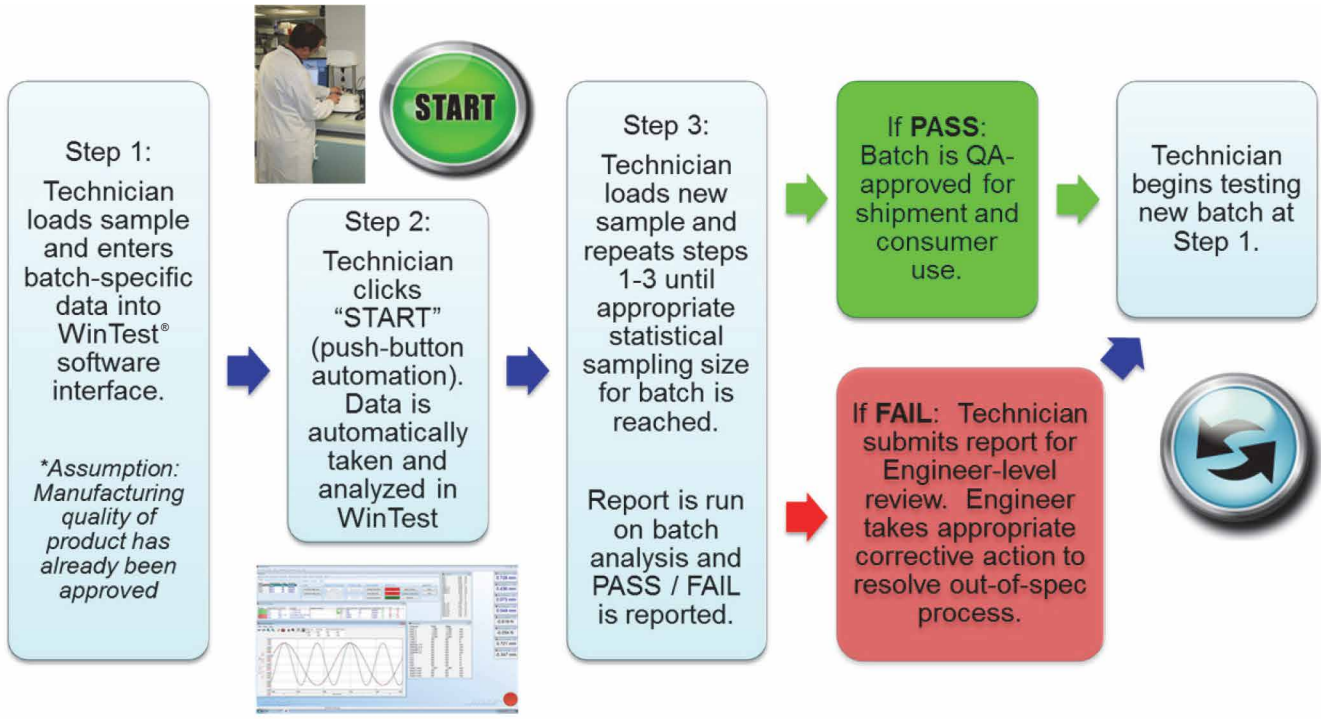

Figure 4 - Example Design Methodology for QA Process

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