

## **Static Stiffness Evaluation and Aging Behaviour of Played Alto Saxophone Reeds**

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### **ABSTRACT**

There are several well known inconsistencies that are frequently observed in woodwind reeds, specifically their variable stiffness (as rated by the manufacturer) and their changing behaviour with time. The present ongoing study is being conducted to describe differences in static stiffness of as-manufactured reeds, each reed with the same geometry, hardness and stiffness rating. The sample set consists of 8 reeds to be measured and tracked. The static measurements are being taken at 6 individual points along the tip and vamp of the reed to increase spatial resolution and capture potential asymmetric effects. Subsequently, the functional life of these reeds will be tracked over the course of regular playing by a professional musician. In this way, initial differences in stiffness are being compared quantitatively using load-deflection testing and qualitatively through stiffness ranking by the musician. These initial values are tracked at regular time intervals over the life of the reed, with the end-of-life determined by the musician. Initial results show that initial static stiffness measurements differ between the reeds, despite an identical rating from the manufacturer. Differences are also observed between spatial positions along the tip. Reeds initially identified as being substantially more stiff than the others also exhibit increased objective stiffness in the load-deflection test. In general, there appears to be a break-in period where the reeds continue to absorb moisture (as measured by reed mass), before stabilizing roughly one month into the experiment. Static stiffness measurements also vary with time, although changing reed masses alone do not account for the difference observed. These findings support the long standing notion of high variability within a box of purchased reeds. The findings of this study will help musicians better understand the reeds they purchase and potentially help manufacturers find ways to better classify and/or pre-condition reeds before packaging.