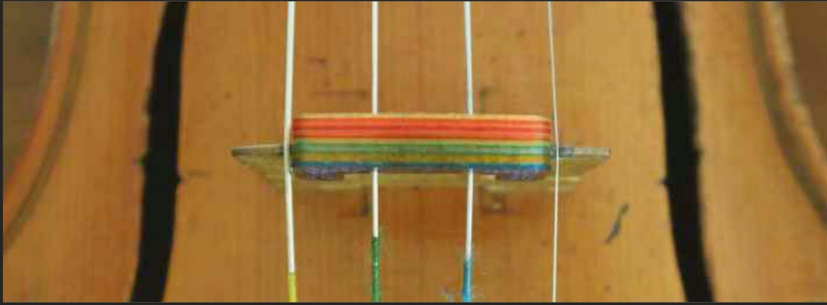


MUTE MAKING



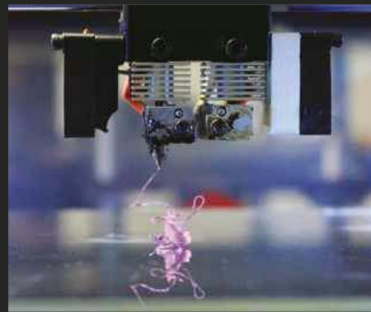
MUTES TO SHOUT ABOUT

William Wiessmeyer of Wiessmeyer & Son describes the process of manufacturing his company's 3D-printed mutes for violins, violas and cellos, and discusses the evolution of their design



1. Raw materials

The raw filament used to produce our 3DS and Prizma mutes comprises a rainbow of colours. Using computer algorithms the colours are mixed while the mute is 3D-printed, allowing for over 374,000 different colour combinations in a mute made from 2 grams of raw material.



2. Extrusion

Software is used to create a print file through a process called 'slicing'. The print file includes directions for variables, such as raw material flow rates and movement of the robotic print head. The process is akin to stacking paper-thin shapes to create a three-dimensional object. Filament is extruded from the 3D printer at temperatures of over 300C (572F) during the manufacturing process. Tiny white spots in this portion of the strand hint at the presence of microscopic air-bubbles.



3. Layering

The first few layers of this Prizma Disc mute for cello represent less than half a gram of material. The colour effect is created by extruding minuscule amounts of orange, purple, clear and yellow filament in a three-dimensional pattern as the mute is assembled.

MUTE MAKING



4. Acoustics

The 2010 Wiessmeyer leather mute design was used to baseline acoustic profiles for our 3D-printed mutes. Leather mutes are prized because they produce a rich, vibrant effect that preserves the unique character of each instrument.



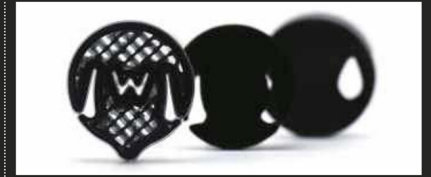
5. Structure

Our mutes, like this partially completed 'unicorn' model, are hollow and perforated with air pockets, allowing them to produce an acoustic effect similar to organic materials such as wood or leather. The material is flexible, ensuring excellent contact with the bridge and ease of use.



6. Achieving three dimensions

This onyx Dual Tone mute for violin shows the finished acoustic honeycomb. Sitting beneath is a gold and aquamarine cello mute that was printed mid-air allowing the acoustic honeycomb to unravel. Dual Tone mutes can be placed on top of the bridge or pinched up against it to create two different dynamics.



7. Evolution

The 2019 Prizma mute (left) with its fully exposed acoustic honeycomb is the product of 53 design iterations, incorporating feedback from musicians and violin makers across the world. Our 2018 3D Sound mute (middle) features a fully enclosed acoustic honeycomb. The original rubber mute (right) was first patented by Henryk Kaston in 1971 and thereafter mass produced. Low cost, flexible, and easy to use, the rubber mute was a fantastic invention for musicians of that time. Solid rubber, however, introduced several limitations including a dead, colourless sound and black marks on the bridge



8. Restoration

Our Viol mute traces its origins back to the 1901 Wurlitzer design by F. Istas. The mute incorporates the design's original functionality, allowing it to fit between any two strings. We have also introduced Kaston's 1971 locking mechanism, meaning the mute can be mounted on a single string for finer control.



9. Finished products

Our three mute designs each produce different sounds for different occasions. The Disc mute (left) delivers a rich, vibrant pianissimo that respects the player's unique sound and is perfect for modern orchestral playing. The Dual Tone (middle) generates both a filtered mezzo piano and pianissimo tone according to placement. The Viol (right) produces a lively mezzo piano, improving on the sound quality of the original 1970s rubber mutes. ●