



## Thermowood improves the tonal quality of musical instruments

A research project of the Institute for Musical Instrument Making at the TU Dresden in Zwota and the Institute for Wood and Paper Technology at the TU Dresden shows: Thermally modified timber, that is artificially aged wood, can considerably reduce storage times and costs.

“A violinist leaves behind some of his soul in the instrument“, replied world-famous violinist Anne-Sophie Mutter in 2007 to the Swiss daily newspaper “Der Bund“, to the question, what in her opinion is the secret of a Stradivarius. The musical past of a violin contributes to the sound production of the respective player. In contrast to a musician, wood science has to ignore the influence of the muse in its research activities, and limit itself to measurable data in the evaluation of tonal behaviour. Which is what the Institute for **Musical Instrument Making** at the TU Dresden in Zwota and the Institute for Wood and Paper Technology of the TU Dresden do, and they also scrutinise the properties of **thermally**



An experiment in the **constant climate chamber** was waiting for the visitors at the Labelexpo

**modified timber.** Positive research results from Prof. Dr.-Ing. André Wagenführ, Dipl.-Ing. Alexander Pfriem and Dipl.-Ing. (FH) Klaus Eichelberger provide hope for **violin makers** and other branches of the music industry.

## **Wooden treasures for musical instrument making are becoming rare**

The love for music is one that reaches around the world. Many millions of musical instruments are made from wood each year. And so the shortage of high-quality wood has been worrying some in the music industry for some time now, especially as environmental activists are up in arms against the use of rare tropical woods for guitar making. Spruce wood, often used for the lid of the guitar, must have a diameter of at least 60cm, and ideally the trunk should be a metre or more in size.

Fir trees have grown calmly in the mountains for 250 to 300 years with fine and uniform growth rings, until they provide light and yet stable resonating wood for guitars, violins, violas or cellos. But this precious wood is becoming rarer and more expensive, and to complicate matters, only one in five of these old trees is suitable for instrument making, in Klaus Eichelberger's estimation. Just increasing this proportion would be a great success for wood research.

## **Raw materials prepared thermally according to the mild pyrolysis method**

The Institute for **Musical Instrument Making** in Zwota studied the question of whether the physical-technical properties of the resonating woods could be improved through a specific modification. The raw materials were prepared thermally, in accordance with the mild pyrolysis method of the company Thermoholz Austria, in three different modification stages, and compared in a variety of tests with untreated wood.

## **Determination of moisture content in the drying oven in compliance with EN ISO 52180**



New chances for violin making and **guitar making** through thermal modification of spruce wood

## Humidity and paper quality

At the Labelexpo in Brussels a constant climate chamber demonstrated how a new, environmentally-friendly backing paper kept its dimensions stable, even at different levels of humidity...

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## Carbides for machine tools

Cell changes were examined under the scanning electron microscope, the water absorption coefficient was compared and mechanical properties such as acoustic velocity or acoustic resistance, tensile strength and bending strength were recorded. A Memmert Universal oven among other things is used to determine the **moisture content**, in compliance with DIN EN ISO 52180. Each wood reabsorbs humidity after drying, but the research team was able to verify that thermowood does this to a considerably lesser degree than untreated woods, which can be an advantage for **woodwind** instruments and instruments exposed to different climates.

## **Thermowood an alternative for violin makers and guitar makers**

Moreover, the woods that have been thermally treated mildly or to a moderate degree display a larger dimensional stability, higher durability and an improved tonal behaviour, comparable to artificial ageing, without negative effects such as the brittleness of the wood having any significant influence on the quality of the instrument. Increasing the value of poor stocks of wood will initially not be possible, according to a statement from the Zwota researchers, but an enhancement of wood quality could be achieved through thermal modification, so that it presents a genuine alternative to tonewood that has aged naturally, for **violin makers** and **guitar makers**.

[www.ifm-zwota.de](http://www.ifm-zwota.de)

Today **thermowood** is not the prevalent material for **violin makers**

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[www.atmosafe.net](http://www.atmosafe.net) > [Applications](#) > [Water content](#) > [Thermowood](#)

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Humidity has an effect on source materials and intermediate products during the manufacture of carbide as a research project of Fraunhofer Institute for Ceramic Technologies and Systems IKTS Dresden showed...

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**Laboratory ovens for material research**

[Constant climate chamber HPP](#)

[Climatic and temperature test chamber CTC/TTC](#)

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[Humidity Chambers HCP](#)

