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Calculation of sound absorption

This report is a translation of report P804900 from Swedish to English. The name of the material identified as nr. 3 in the Swedish report is now called Basoflex.

Mission

To calculate sound absorption coefficient according to ISO 354 from measurements according to the impedance tube method (ISO 10534-2). The material sample that should be assessed is identified as nr. 3 in our measurement report P600641.

Background

In our test report P600641 four different materials were tested, numbered 1-4. Material number 3, (now called Basoflex), had the average thickness 62 mm and the average weight 6,5 g, which corresponds to a density of 13,3 kg/m². The measurement results are shown in the table below.

Frequency [Hz]	Basoflex
100	0,10
125	0,15
160	0,22
200	0,31
250	0,41
315	0,51
400	0,59
500	0,56
630	0,90
800	0,99
1000	0,99
1250	0,98
1600	0,96

Calculation results

According to our calculations the weighted sound absorption coefficient according to ISO 11654 is estimated to $\alpha_w = 1$. This corresponds to sound absorption class A.

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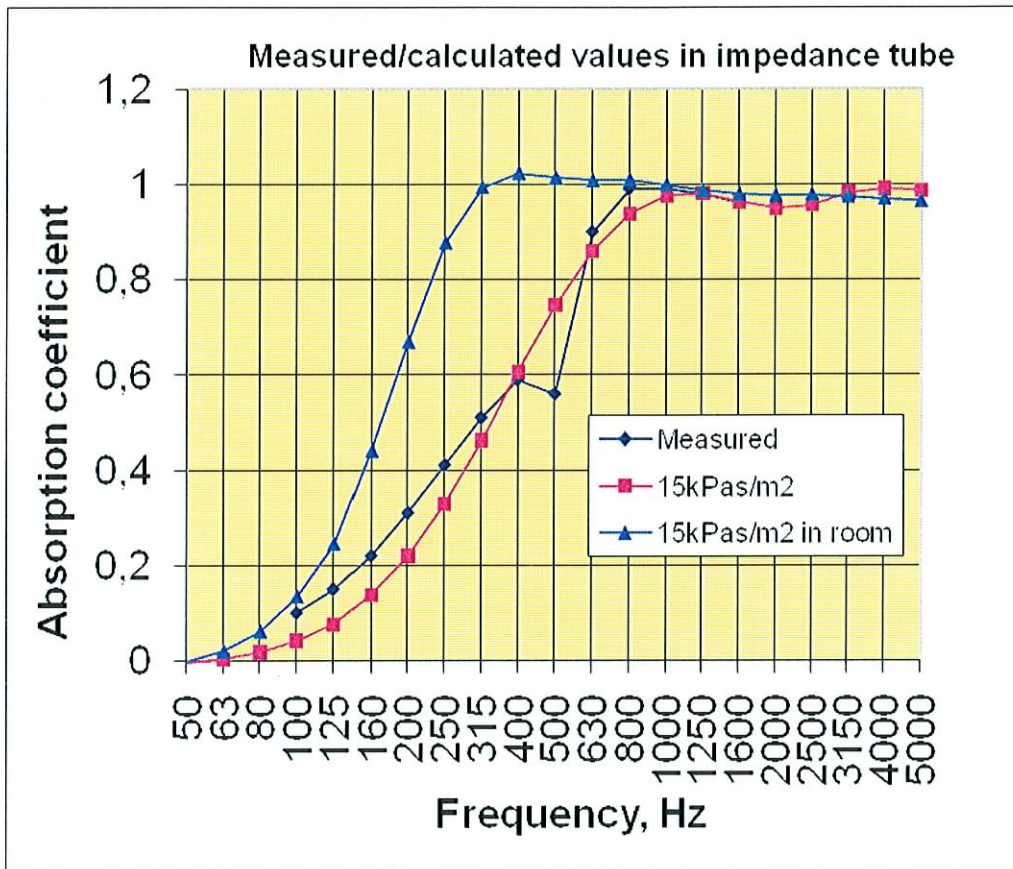
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Method

We have used sound absorption coefficients measured at normal incidence to estimate the material's specific flow resistance according to Delaney & Bazleys impedance model. This flow resistance can be converted into acoustic impedance and with the help of Thomasson's theory for sound absorption of limited areas in reverberation rooms, the sound absorption coefficient according to ISO 354 can then be calculated. Calculated values are then used to calculate practical sound absorption coefficients, weighted sound absorption coefficients and sound absorption class. Calculation results are shown in the figure below.



Calculation uncertainty

We cannot give any values but our experience of the used models is good so we assess the probability to be high that the actual material fulfil sound absorption class A.

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