



Title

SANDWICH PANEL BASED ON HEMP SHIVES AND FIBERS, AND THE MODALITY OF OBTAINING IT



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Patent/ Application number

Patent OSIM: R0133611 -B1/30.06.2021



Short presentation

The invention relates to a sandwich panel based on hemp shives and fibers, and the method to obtain it, which has the applicability in the construction sector. The sandwich panel is designed with three layers: a low-density core defined by the hemp waste fibers with a cement binder and a thin skin-layer bonded to each side, prepared from hemp shives and hydrated lime-cement binder. The panel is used as a partition element with significant acoustic and thermal properties and it archive a part of sustainable development requirements. The panel was analyzed in four ways: (a) without perforations, (b) with perforations of 1 cm diameter and 10% degree of perforation, (c) with perforations of 1 cm diameter and 20% degree of perforation (d) with perforations of 1 cm diameter and 30% degree of perforation.

The physical characteristics of the sandwich panel are:

- without perforations (a): sound absorption coefficient $\alpha_{max} = 0.56$ at 350 Hz, thermal conductivity $\lambda = 0.068$ [W/mK], density $\rho = 413$ [kg/m³].
- with perforations (b): sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 650 - 1080 Hz, with max = 0,97 (810 - 860 Hz)
- with perforations (c): sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 970 - 1350 Hz, with max = 0,85 (1090 - 1200 Hz)
- with perforations (d): sound absorption coefficient $\alpha > 0,80$ on the range frequencies between 880 - 1740 Hz, with max = 0,95 (1140 - 1250 Hz)



Applicability

The problem solved by the invention consists in obtaining a sandwich panel accessible thanks to the raw material and the binders used. The sandwich structure is made of hemp shivs and fibers (natural resources considered waste from the textile fibers processing process) and common and accessible mineral binders. The sandwich panel is designed to act as a partitioning element while meeting acoustic and thermal performance requirements.



Images



Figure 1. Sandwich panel based on hemp

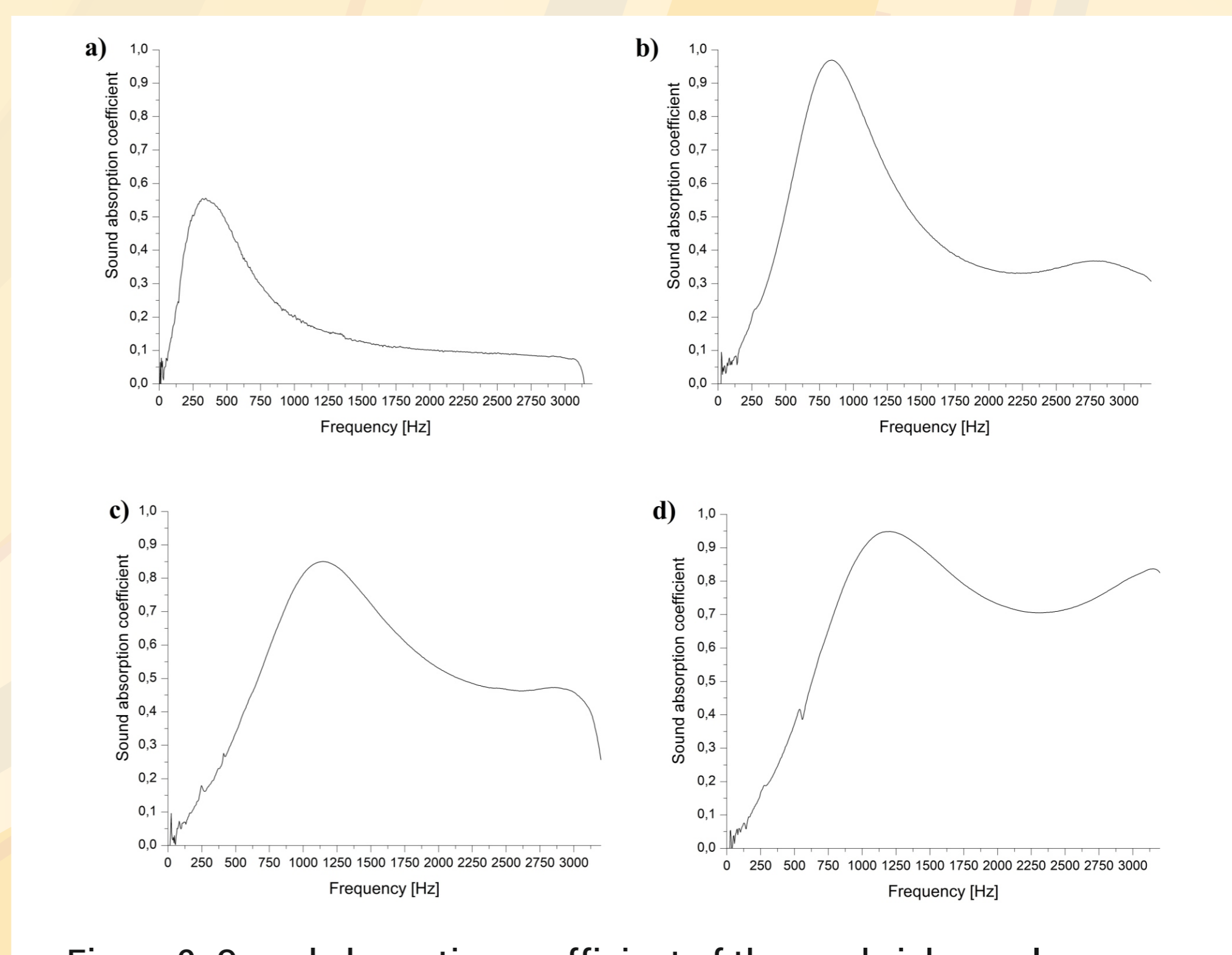


Figure 2. Sound absorption coefficient of the sandwich panel

(a) without perforations,

(b) with perforations of 1 cm diameter and 10% degree of perforations,

(c) with perforations of 1 cm diameter and 20% degree of perforations,

(d) with perforations of 1 cm diameter and 30% degree of perforations