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Title

INNOVATIVE USE OF SHEEP WOOL AND POLYURETHANE FOAM FOR OBTAINING MATERIALS WITH SOUND-ABSORBING PROPERTIES

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Short presentation

The aim of this work was to obtain materials with sound-absorbing properties using sheep wool and rigid bicomponent polyurethane foam. Four materials with three layers were obtained. A layer of sheep wool previously processed by hot pressing at 80°C and 5 MPa, with final thicknesses of 2, 4, 6 and 12 mm; a layer of polyurethane foam, with a thickness of 8....37 mm and a transition layer, 1...20 mm thick, resulting from the migration of polyurethane foam during the multilayer panel manufacturing process into the wool layer and/or the migration of wool into the polyurethane foam layer. Wool and polyurethane foam are the combination of sound insulation and sound absorption - wool absorbs sound and reduces it, and due to the rigid structure of polyurethane foam (closed pore structure), it does not allow sound to travel further, resulting in sound insulation.

The obtained materials have very good sound absorption properties with acoustic absorption coefficient values over 0.7 for the frequency range 800 ÷ 3150 Hz; the results prove that the sheep wool has a comparable sound absorption performance to that of mineral wool.

Applicability

The study explores alternative usage of sheep wool as a construction material with improved sound absorbing properties beyond its traditional application as a sound absorber in textile industry or using of waste wool in the textile industry as a raw material. Sound absorbing materials can be used to reduce noise and to obtain an adequate acoustic for enclosed spaces. They can have many uses, both outdoors and indoors: in industry, commercial areas, relaxation and leisure areas, in areas used for education, in constructions, on building sites, highways, roads and streets, airports, ports, railways, etc. Materials studied in this research can be used to reduce noise impact, as decorative panels with sound absorbing role, to improve acoustic conditions, and to reduce or stop reverberations.

Images

A

B

Fig.1. Processing phases:
A: Phase I - Wool plate hot formed ;
B: Phase II - Finale structure of the plate

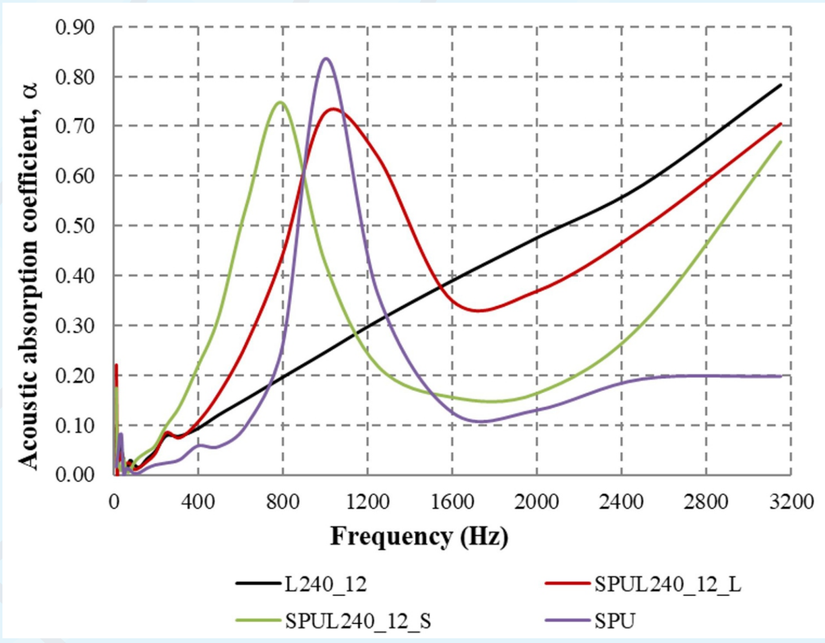

Fig. 2. Sound absorption coefficient variation function of…….