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Materials That Can Shield Sound

The purpose of this experiment was to identify materials that can shield sound waves audible to human hearing and to determine which candidate material had the best overall sound blocking ability. In this experiment, seven candidate materials were tested, along with air (no material) as the control. Each candidate material was tested at two thicknesses, for ten frequencies ranging from 30 to 12000 Hz. The materials tested were selected from materials found around the house or in the hobby or hardware store. The sound levels were recorded by placing each material between a sound source and a sound receiver. Multiple trials for both thicknesses of candidate materials resulted in sound level data ranging from 55 dB to 116 dB. Analysis of this data showed that polyurethane foam performed best at lower frequencies and plastic bubble wrap and fiberglass insulation performed best at higher frequencies. Paper and foil performed poorly as shielding materials, especially at the lower frequencies. The polyurethane foam had the best overall sound blocking ability of the materials that were tested in this experiment. By determining materials that will shield sound, the results of this experiment might be used to choose materials to reduce or block undesired sound, especially if attempting to shield sound of a specific frequency audible to human hearing.