DETERMINATION OF STRUCTURE BORNE NOISE DAMPING BY SOUND DEADENING MATERIALS

Application

This method is used to determine the damping of structure borne noise by sound deadening materials. This method is applicable for materials up to a thickness of 2.5 mm.

Apparatus Required

Test Equipment

See drawings.

Test Panel

Surface roughness 0.9 - 1.8 micrometre C.L.A, dimensions 600 x 30 x 1 mm. The weight of the test panel must be 140 +/- 2 g.

Excitation and Measuring Device (see diagram)

*Beat frequency oscillator	Type 1017
*Microphone amplifier	Type 2603
*Recorder	Type 2305
*Exciter	Type MM 0002
*Pick-up	Type MM 0002

*Source: Bruel & Kjaer AG
Copenhagen
Denmark

Mechanical Convection Oven

Capable of maintaining temperatures up to 200 +/- 2 °C.

Cold Box

Capable of maintaining temperature down to - 40 +/- 1 °C.

Note: Both the mechanical convection oven and the cold box must be large enough to accommodate the test equipment with the test panel.

Basic Theory

The damping factor characteristics (structure born noise) is known as the loss factor Z. It is proportional to the deformation work energy converted to heat per cycle.

For coated sheet metals the resonance method is used to determine the loss factor η.

Date	Action	Revisions
2000 12 08	Revised	Editorial – no technical change A. Cockman
1994 02 28		

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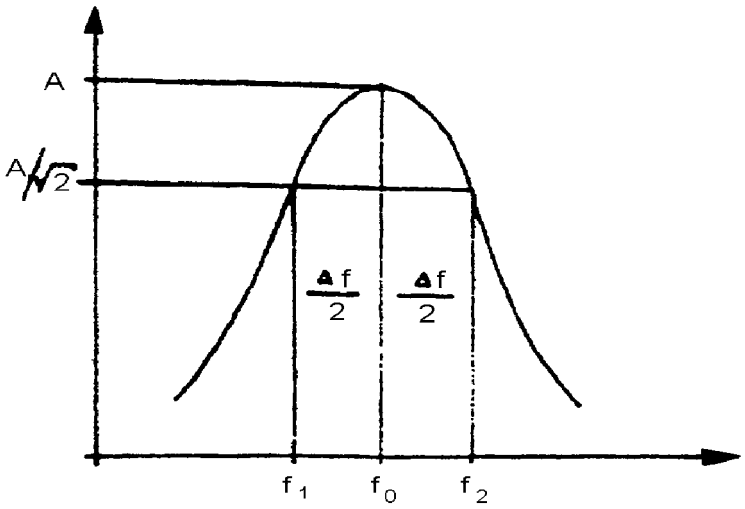

For a resonance frequency f_0, the two frequencies f_1 and f_2 are determined whereby $f_1 < f_o < f_2$ and the amplitudes are lower by the factor $A/\sqrt{2}$ and where A is the max amplitude of f_o. It is

$$f_2 - f_1 = f$$

f is the band width of the resonance frequency.

The loss factor is $= \frac{f_2 - f_1}{F_0} = \frac{f}{f_0}$

For quality comparison purposes in the automotive industry the loss factor η at 200 Hz is a function of the material weight and the total weight.

Conditioning and Test Conditions

All test values indicated herein are based on material conditioned in a controlled atmosphere of 23 +/- 2 °C and 50 +/- 5 % relative humidity for not less than 24 h prior to testing and tested under the same conditions unless otherwise specified.

Procedure

Preparation of Test Assemblies

A minimum of 3 test assemblies for each material should be prepared.

1. Prepare test panels in accordance with requirements of the relevant material specification and accurately weigh to 0.1 gf (G_1).

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