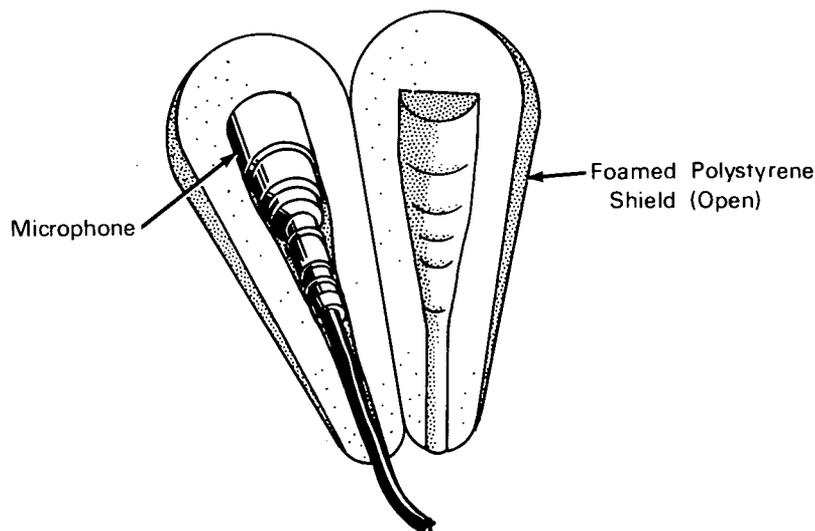


NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

Small Foamed Polystyrene Shield Protects Low-Frequency Microphones from Wind Noise



The problem: To design a small, inexpensive wind-noise shield for outdoor microphones used in measuring the intensity of low-frequency sound waves at far-field distances (over 10 wavelengths from the sound source). Commercially available wind screens used for microphones are bulky.

The solution: A shield made from a foamed polystyrene with a closed-cell structure and a density of 0.025 gm/cm^3 .

How it's done: The shield, made in the shape of a tear drop to minimize air turbulence, consists of two longitudinal sections, which are easily slipped on or removed from the microphone. Foamed polystyrene is used as the material for the shield because of its

extremely low specific acoustical impedance, low density, and good rigidity.

Sound waves striking the foamed polystyrene shield within an angle of $\pm 24.1^\circ$ of a normal to the surface of the material are transmitted to the microphone; sound waves falling outside this angle are reflected away. Wind-pressure pulses, however, are transmitted by this material over a much broader angle. The frontal surface of the shield presents a minimum area to the wind while still providing maximum response to sound waves within an angle of $\pm 24.1^\circ$ of the normal. In tests with foamed polystyrene shields, wind-noise attenuation ranged from 19 db in a 4 mph wind to 14 db in a 20 mph wind. The attenuation of sound waves ranged from 1 db at 300 cps to 12 db at 8,000 cps.

(continued overleaf)

Notes:

1. The longitudinal joint in the shield has a critical effect on the transmission of the higher frequency sound waves and therefore should be carefully made.
2. In addition to being useful as a wind-noise attenuator for outdoor sound measurements, this shield can serve to protect microphones against rain, dust, and mechanical shock.
3. For further information about this innovation inquiries may be directed to:
Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B63-10579

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA Headquarters, Washington, D.C. 20546.

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(M-FS-123)