

Sound Intensity

Sound Intensity, Second Edition

F.J. Fahy

E & FN Spon, 7625 Empire Drive, Florence, KY, USA, an imprint of Chapman and Hall, 2-6 Boundary Row, London SE1 8HN, United Kingdom

Softcover, 1995, 295pp.

(As the author points out in the second edition of this book, first published in 1989, that a great deal has happened in this field in recent years, and an update is most appropriate.)

Two major developments have been standardized methods for the determination of sound power from sound intensity - both fixed-point methods and scanning methods - as well as the standardization of the characteristics of instruments for the measurement of sound intensity.

The book begins with a brief history of sound intensity methods, including the Olson patent of 1932, the Field Wattmeter of Wolff and Massa, velocity microphones, and the work of Schultz in the mid-1950s. He points out that 1977 was a "vintage year" for sound intensity, and describes the work of Alfredson which was reported in the NOISE-CON 77 Proceedings, and the work of Chung, Pope and others on the cross-spectral density method.

The book then covers the basics of acoustical waves necessary to understand sound intensity. These include pressure, density, particle velocity, basic equations, the wave equation and its solutions, sound energy, and sound intensity itself.

There are new sections on transient and instantaneous sound intensity, and the section on complex intensity has been expanded. There are several examples of sound intensity "maps," examples of power flux in fields, and a discussion of systematic errors in the measurement of sound intensity. There is also a chapter on instruments for sound intensity measurement, their calibration, and the new standards for these instruments.

There is an extensive discussion of determination of sound power via sound intensity, the standards available, and the field indicators that can be used to judge the accuracy of the results. There is also a discussion of other uses of sound intensity, including source localization, determination of the sound absorptive properties of materials, determination of power transmission through structures, applications to holography.

Finally, there is a discussion of sound intensity in ducts and pipes, with and without mean flow. An appendix contains a list of available standards related to sound intensity.