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AES information document for acoustics - Loudspeaker driver comparison chambers

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Abstract

Acoustic performance measurements on loudspeaker drivers that are measured in different sites or with different equipment or methods are subject to variations in accuracy and repeatability. Similarly, end-of-line loudspeaker test systems often utilize small, arbitrarily shaped, driver measurement chambers that do not correlate from line to line, or from site to site. This document is motivated by the need for engineers in different locations to share accurate measurement data on specific or same type loudspeaker drivers and addresses some of the factors affecting repeatability of measurements in different locations.

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Foreword

This foreword is not part of AES-73id AES *information document for acoustics – Loudspeaker driver comparison chambers*.

This document was developed in project AES-73id, in the SC-04-03 Working Group on Loudspeaker Modelling and Measurement, under the leadership of Steve Hutt.

The members of the writing group that developed this document in draft are: Geoff Hill, Steve Hutt, David Murphy, Ed Simon.

Steve Hutt
Chair, working group SC-04-03, 2019-02-28

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0 Introduction

0.1 General

In the design of loudspeaker drivers, numerous engineering acoustical tests are performed throughout the development cycle to ascertain the loudspeaker driver's performance characteristics and capabilities. And, during the manufacturing phase end-of-line quality tests place each driver into a relatively compact test chamber and measure the acoustic and electrical response based on a set of test signals. Results are compared with stored values derived from a reference such as a sample that has typically been quantified by the engineering acoustical tests or, with reference values derived from the mean capability of the loudspeaker production variance. End-of-line tests are not usually set up to provide full performance measurements however they can identify deviation and variance from the expected performance defined by reference parameters. Such test chambers are typically built only to meet local needs. As a result, the measurements derived from a chamber in one location do not compare well with measurements derived from another. It would be beneficial for collaboration over different sites if the loudspeaker measurement data was directly transferable.

This information document will set out some relevant issues and suggest loudspeaker test chamber designs and construction methods to achieve measurement results that will be comparable between different testing sites.

0.2 Patents

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. AES shall not be held responsible for identifying any or all such patent rights.

1 Scope

This document considers factors affecting the interchangeability of measurement data from simple loudspeaker comparison chambers and discusses some performance capabilities.

2 Normative references

The following standard contains provisions that, through reference in this text, constitute provisions of this document. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent edition of the indicated standard.

ISO 266, *Acoustics — Preferred frequencies for measurement*. Geneva, Switzerland: International Organization for Standardization, 1975

ISO 80000-8, *Quantities and units — Part 8: Acoustics*, Switzerland: International Organization for Standardization, 2007

IEC 60268-5, *Sound system equipment - Part 5: Loudspeakers*, Switzerland: International Electrotechnical Commission, 2007

IEC 60268-21, *Sound system equipment - Part 21: Acoustical (output based) measurements*, Switzerland: International Electrotechnical Commission, 2018