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Revision of AES7-1982

AES standard for the preservation and restoration of audio recording — Method of measuring recorded fluxivity of magnetic sound records at medium wavelengths

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Abstract
This standard specifies a method of measuring the recorded flux per unit track width, called fluxivity, of a magnetically recorded sinusoidal test signal at medium wavelengths for all magnetic sound record formats, by using a high-efficiency magnetic reproducing head. It also specifies the equipment needed to implement this method.

Contents

Foreword

[This foreword is not a part of *AES standard for the preservation and restoration of audio recording — Method of measuring recorded fluxivity of magnetic sound records at medium wavelengths,* AES7-2000.]

This standard is a revision of the Audio Engineering Society standard AES7-1982. In addition to editorial revisions, the subclause "Measuring the fluxivity by electronic integration" has been added. The revision has been made by a writing group of the SC-03-01 Working Group on Analog Recording of the SC-03 Subcommittee on the Preservation and Restoration of Audio Recordings. J. G. McKnight headed the writing group which consisted of Lowell Cross, Beverley R. Gooch, Frederick J. Kolb, Jr., John G. (Jay) McKnight, Greg Orton, Werner Singhoff, and John M. Woodgate.

The knowledge of the recorded signal amplitude on a magnetic record (which may be in the form of a tape, a disk, or a perforated film) has several practical uses:

a) determining and standardizing references for the levels of audio programs on these magnetic records;
b) specifying the recording-performance properties of magnetic media (for example, the distortion versus flux, and so on);
c) measuring and specifying the sensitivity of reproducing heads (and also, by reciprocity, recording heads).

The quantity for specifying the recorded signal is the short-circuit magnetic flux per unit track width, called fluxivity. Several possible methods exist for measuring tape flux (see annex A, references 1 and 2), but the measurement given here involves only the use of a calibrated ring-core head, which is described in annex A, reference 3.

Note that the present standard measurement is only for medium wavelengths. A further standard method would be necessary for measuring short-circuit flux at long wavelengths and at short wavelengths — that is, the frequency response of the flux on a magnetic record.

The technique utilizing a calibrated ring-core head to measure directly the flux at medium wavelengths is superior to the transfer to dc and magnetometer, and to the single-turn head used in the past for several reasons:

a) the ring-core head is easily manufactured using highly perfected commercial methods;
b) the transducer (head) is commercially available to any laboratory at a reasonable cost;
c) it is easily used and requires no specialized auxiliary equipment, although the standards committee also recommends using a simple integrating amplifier (described in 5.4);
d) the errors inherent in making the transfer recording which is necessary for a magnetometer measurement are eliminated, since no transfer is required.

Recently published research (see annex A, reference 4) has shown that the calibrated high-efficiency ring-core method of measurement gives results that are identical to measurements made by the transfer-to-dc method given in the German standard (see annex A, reference 2), but that earlier (1957) German measurements are 10 % in error, so that most commercially available calibration tapes identified as 320 nWb/m are actually 290 nWb/m.

The previous version of this standard, AES7-1982, was an editorial revision of American National Standard S4.6-1972, which was originally published as IEEE Standard 347-1972 by the Institute of Electrical and Electronics Engineers. As published in 1972, this standard represented the joint efforts of the Recording and Reproducing Standards Subcommittee of the Standards Committee of the IEEE Group on Audio and Electroacoustics, and the Sound Engineering Committee of the Society of Motion Picture and Television Engineers. It was originally prepared by a SMPTE ad hoc committee as a method of measurement of flux on magnetic sound tracks used in motion-picture films, and it was later modified for measurement of recorded flux in any form of magnetic sound record at medium wavelengths.

J. G. McKnight, Chair, SC-03-01
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1 Scope

This standard specifies a method of measuring the recorded flux per unit track width, called fluxivity, of a magnetically recorded sinusoidal test signal at medium wavelengths for all magnetic sound record formats, by using a high-efficiency magnetic reproducing head. It also specifies the equipment needed to implement this method.

2 Normative references

None

3 Definitions

3.1
magnetic recording medium
magnetic material used in conjunction with a magnetic recorder for retaining signals in the form of remanent magnetization

NOTE The material may be rigid or flexible in the form of tape, wire, disk, sheet, or other form on which one or more tracks can be recorded.

3.2
magnetic record
magnetic recording medium on which signals are recorded in the form of remanent magnetization

3.3
short-circuit flux
flux from a magnetic record that flows across a plane normal to the recorded medium, through a magnetic short circuit placed in intimate contact with the magnetic record

NOTE A precise definition is given in annex A, reference 3, section 1.

3.4
fluxivity
short-circuit flux per unit track width
measured short-circuit flux divided by measured width of the recorded track

3.5
medium wavelengths
wavelengths for which the core flux is directly proportional to the flux on the magnetic record and unmodified by the secondary effects observed at long wavelengths comparable to the length of the head core, or at short wavelengths comparable to the length of the head gap

NOTE Typical medium wavelengths and the corresponding frequencies for common transport speeds are shown in annex D.