IEC TC 29: Electroacoustics

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Introduction

The Technical Committee TC 29: Electroacoustics was established in 1953. The original very broad scope of the Committee covered nearly all aspects of electroacoustical instrumentation, transducers and calibration methods relating to airborne sound, ultrasonics and vibration. The problems referring to vibrations were very early transferred to ISO, except for the activities related to audiology.

The present scope of TC 29 is as follows:

To prepare International Standards related to instrumentation and methods of measurements in the field of electroacoustics.

Excluded from the scope are:

a) standards for sound and video recording as dealt with by TC 100;
b) standards for equipment in the field of audio and audiovisual engineering as dealt with by TC 100;
c) standards and terminology for ultrasonic techniques dealt with by TC 87.

Note - Close co-operation shall, however, be maintained with TC 87 in the fields of common interest.

Description of work

Due to lack of a secretariat for OIML/TC 13 OIML there has been a period of inactivity in OIML in the area of electroacoustics. During this period the requirements needed by OIML have actually, in agreement with OIML, been prepared by IEC/TC 29 for incorporation in the relevant IEC standards, notably on sound level meters and calibrators. Recently the secretariat responsibility for OIML/TC 13 has, however, been allocated to a national member state but the work already in preparation in IEC will be continued at least until responsibilities and relations between IEC and OIML in this areas have been fully clarified

The standards produced by TC 29 are used by governmental authorities as well as by industry. It is very important that experts preparing the draft standards represent research and development as well as test laboratories, industrial production, quality control and the users. The activity of TC 29 currently covers the following areas, each including performance requirements, calibration and test methods:

A. Measurement microphones.

B. Noise/sound measuring instrumentation: Sound level meters, personal sound exposure meters, equipment for aircraft noise certification, filters, instruments for the measurement of sound intensity and sound calibrators.

C. Ear simulators, head and torso simulators, acoustic and mechanical couplers, earphones and bone vibrators.

D. Audiological equipment: Pure-tone and speech audiometers, extended high frequency audiometers, aural impedance measuring instruments.

E. Hearing aids.

NOTES:

Ad A Calibration and specification of measurement microphones will continue to be a vital basis for the measuring instrumentation. In the context of quality system certification the industrial demand for calibration and traceability of measuring equipment is continuously requesting the development and standardization of simplified and less costly methods.

Ad B The development of instrumentation for noise measurements/analysis and the control of the individual noise exposure calls for continued revision of existing standards as an iterative process resulting from growing better knowledge about the effects of noise on man. A close co-operation with OIML has been established for e.g. harmonization of requirements and test procedures for pattern evaluation and periodic verification, and TC 29 has agreed to issue joint IEC/OIML standards.

Ad C In order to realistically measure the performance of earphones used in hearing aids, audiometers, telecommunication equipment and for entertainment purposes a range of ear simulators are required. TC 29 has produced measurement standards for hearing aid and audiometric earphones as well as a mechanical coupler for the measurement of bone vibrators. The current challenge is to meet the need for ear simulators for the wide range of earphones.

Ad D The use of audiometers to measure the threshold of hearing has become widespread in industry, school education and in the medical and rehabilitation audiology fields. Due to increasing legislation concerning the effects of noise and the technical developments in audiology, a requirement exists to ensure that standards are available to meet both the needs of practitioners and manufacturers, e.g. for the implementation of extensive and effective hearing conservation programmes. Close cooperation with OIML has also been established in this area.

Ad E Changes in technology, particularly the use of digital techniques, and the increasing knowledge on the requirements for hearing aids has lead to the development of new standards to supplement the IEC 118-series.

Developments in the telecommunications industry have meant that particular attention has to be given to the interface between hearing aid and the telephone. In addition, the question of interfering effects of RF transmissions from digital mobile phones is a current and ongoing matter in which TC 29 is engaged. The use of new technology also calls for modifications of required measurements, especially including in-situ measurements and the specification of digital interfaces.

General

At present specifications for EMC requirements and test methods are especially relevant to all of these areas.

The questions of
1) uncertainty statements and
2) amount of testing required
are to be given special consideration in all future new standards and revisions of existing standards of TC 29.

Further work will focus on ear simulators and head and torso simulators for different purposes to be used by SC 100C, by ITU and by ISO and CEN for evaluation of hearing protectors and hearing aids. Developments in audiometry and hearing aids require improvements in current ear simulators to more realistically represent the human ear.
Maintenance and continuously updating of existing standards to reflect the technical development and in order to comply with the latest findings and understanding about the nature of human sound perception, notably with regard to:
measuring devices for the control of the effect of noise on man, and
specifications and calibration methods for working standard microphones.

The work is prioritised i.a. through the use of Preliminary Work Items as registered in the programme of work of TC 29 in the IEC database.

Working Groups/Maintenance Teams under IEC/TC 29 "Electroacoustics"

WG 4	Sound level meters
WG 5	Measurement microphones
WG 10	Audiological equipment
WG 13	Hearing aids
WG 17	Sound calibrators
WG 18	Amendments of relevant IEC/TC 29 standards with respect to developments on EMC
MT 19	Revision of IEC 61260
MT 20	Revision of IEC 60118-3 and IEC 60118-4
WG 21	Head and ear simulators

Existing IEC/TC 29 standards related to metrology

IEC 60126:1973	IEC reference coupler for the measurement of hearing aids using earphones coupled to the ear by means of ear inserts
IEC 60318-1:1998	Simulators of human head and ear - Part 1: Ear simulator for the calibration of supra-aural earphones
IEC 60318-2:1998	Simulators of human head and ear - Part 2: An interim acoustic coupler for the calibration of audiometric earphones in the extended high-frequency range
IEC 60318-3:1998	Simulators of human head and ear - Part 3: Acoustic coupler for the calibration of supra-aural earphones used in audiometry
IEC 60373:1990	Mechanical coupler for measurements on bone vibrators
IEC 60645-1:2001	Audiological equipment - Part 1: Pure-tone audiometers
IEC 60645-2:1993	Audiometers - Part 2: Equipment for speech audiometry
IEC 60645-3:1994	Audiometers - Part 3: Auditory test signals of short duration for audiometric and neuro-otological purposes
IEC 60645-4:1994	Audiometers - Part 4: Equipment for extended high-frequency audiometry
IEC 60655:1979	Values for the difference between free-field and pressure sensitivity levels for one-inch standard condenser microphones
IEC 60711:1981	Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts
IEC 60942:2003	Sound calibrators
IEC 60959:1990	Provisional head and torso simulator for acoustic measurements on air conduction hearing aids
IEC 61012:1990	Filters for the measurement of audible sound in the presence of ultrasound
IEC 61027:1991	Instruments for the measurement of aural acoustic impedance/admittance
IEC 61043:1993	Instruments for the measurement of sound intensity - Measurement with pairs of pressure sensing microphones
IEC 61094-1:2000	Measurement microphones – Part 1: Specifications for laboratory standard microphones
IEC 61094-2:1992	Measurement microphones - Primary method for pressure calibration of laboratory standard microphones by the reciprocity technique
IEC 61094-3:1995	Measurement microphones - Part 3: Primary method for free-field calibration of Laboratory Standard Microphones by the reciprocity technique
IEC 61094-4:1995	Measurement microphones - Part 4: Specifications for working standard microphones
IEC 61094-5:2001	Measurement microphones - Part 5: Methods for pressure calibration of working standard microphones by comparison
IEC 61183:1994	Random-incidence and diffuse-field calibration of sound level meters
IEC 61252:1993	Personal sound level meters
IEC 61260:1995	Octave-band and fractional-octave-band filters
IEC 61265:1995	Instruments for measurement of aircraft noise - Performance requirements for systems to measure one-third-octave band sound pressure levels in noise certification of transport-category aeroplanes
IEC 61672-1:2002	Sound level meters - Part 1: Specifications
IEC 61672-2:2003	Sound level meters – Part 2: Pattern evaluation tests

Work programme of IEC/TC 29 related to metrology

Title of document	IEC reference number	Stage
Audiometric equipment - Part 5: Instruments for the measurement of aural acoustic impedance/admittance (Revision of IEC 61027:1991)	60645-5	Approved for FDIS. Expected end of the year.
Sound level meters:	61672 series	
Part 3: Periodic tests	61672-3	1 CD circulated. OIML to decide if joint publication.
Part 4: Verification	61672-4	In preparation. OIML to decide if joint publication.
Measurement microphones:	61094 series	
Part 6: Electrostatic actuators for determination of frequency response	61094-6	Approved for FDIS. Expected end of the year.
Measurement microphones - Part 7: Values for the difference between free-field and pressure sensitivity levels of laboratory standard microphones	61094-7	CD circulated. To be published as TS. DTS expected end of the year.
Filters (revision of IEC 61260:1995)	61260	Maintenance started. Document for comments circulated. Joint publication or cooperation with OIML expected.
Simulators of human head and ear:	60318 series	
Part 5: Simulators of human head and ear - Part 5: 2 cm^3 coupler for the measurement of hearing aids and earphones coupled to the ear by means of ear inserts (Revision of IEC 60126:1973)	60318-5	CD circulated.

Preliminary work items		
Calibration of working standard microphones by a comparison technique under free-field conditions	PWI 29-2, to become IEC 61094-8	
Method to determine pressure to free-field adjustments for use in setting-up the overall acoustical sensitivity level of a sound level meter using a calibrated sound calibrator	PWI 29-4	
Instrumentation for otoacoustic emission	PWI 29-5	
Instrumentation for auditory electrophysiology	PWI 29-6	
Revision of IEC 60318-1:1998 “Electroacoustics - Simulators of human head and ear - Part 1: Ear simulator for the calibration of supra-aural earphones”	PWI 29-8	
Revision of IEC 60318-2:1998 “Electroacoustics - Simulators of human head and ear - Part 2: An interim acoustic coupler for the calibration of audiometric earphones in the extended high-frequency range“	PWI 29-9	
Revision of IEC 60373:1990 “Mechanical coupler for measurements on bone vibrators“	PWI 29-10	
Revision of IEC 60711:1981 “Occluded-ear simulator for the measurement of earphones coupled to the ear by ear inserts“	PWI 29-11	
Revision of IEC 60959:1990 “Provisional head and torso simulator for acoustic measurements on air conduction hearing aids“	PWI 29-13	