



IEC/TC OR SC: 29	SECRETARIAT: DS	DATE: 2016-01
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Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

A. STATE TITLE AND SCOPE OF TC

Title

Electroacoustics.

Scope

Standardization of instruments and methods of measurement in the field of electroacoustics. This includes performance requirements, calibration and test methods for electroacoustic transducers (e.g. microphones, sound calibrators, filters, earphones, bone vibrators), sound measuring instruments (e.g. sound level meters), audiometric equipment as well as hearing aids and induction loop systems, and equipment used for measurement of aircraft noise.

Excluded are:

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

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

B. MANAGEMENT STRUCTURE OF THE TC

MT 4: Sound level meters

WG 5: Measurement microphones

WG 10: Audiometric equipment

WG 13: Hearing aids

MT 17: Sound calibrators

MT 18: EMC requirements and updates of relevant IEC/TC 29 standards

MT 19: Revision of IEC 61260, Filters

MT 20: Revision of IEC 60118-4, Induction loop

WG 21: Head and ear simulators

WG 22: Audio-frequency induction-loop systems and equipment for assisted hearing

MT 23: Revision of IEC 61265, Instruments for aircraft noise certification

C. BUSINESS ENVIRONMENT

TC 29's technical work plays a vital role in underpinning large areas of social, environmental, medical and rehabilitation work, which requires the accurate production, and measurement of sound. Acoustical instrumentation and devices are therefore required by a very diverse range of users.

The declaration and verification of noise emission values for all kinds of machinery as presently required by many national or regional regulations presupposes the use of uniformly specified and sophisticated sound measuring instrumentation with tight tolerances.

A major change in the business environment has been the rapid growth of telephone retailing, banking and information provision. Such development has created a demand for the use and development of TC 29 standards in determining the acoustic environment in which these businesses operate.

For the control of noise immission there is a growing need for instrumentation for the measurement and analysis of noise exposure in the work place as well as in residential areas, and within the entertainment sector. The available instruments and measuring methods still represent a high degree of simplification compared to the perception of noise by man and to the effect on the human ear. However, current instrumentation provides a consistent means of measurement, which allows preventative action to be taken where appropriate based on the best available data.

Regulation and law on acoustical instrumentation differs widely from country to country. For example, in some countries pattern evaluation of new models of instrument against the international standard is required before the device can be sold, and regular testing of individual specimens is also required by law. In other countries this is not the case and it is up to the user to follow good measurement practice. Hence the aim of TC29 is also to encourage testing in countries where it is not mandated by use of the same agreed international specified test methods within all countries, ensuring consistency and cost-effective testing across world markets.

In terms of worldwide market this varies considerably for the different instruments within the scope of the Committee's remit, and as the number of key manufacturers in some areas is quite small, data on sales is often not available for commercial reasons. However, as examples some 8 million hearing aids are manufactured worldwide each year, and it is known that in some countries lost productivity due to noise can equate to up to approximately 2% of GDP.

D. MARKET DEMAND

The demand for acoustical devices and measurement is worldwide, with many applications and stakeholders, and in many countries the control and measurement of noise is covered by law or legislative directives.

The range of users of the standards will include governments, local authorities, planners, the medical profession, manufacturers of acoustical devices, those measuring environmental noise, consultants as well as the many laboratories and test houses around the world.

Users of TC 29 standards include international and national standards organizations, and in many countries the international standards are directly adopted with no change as equivalent national standards.

As an example, up to 170 million citizens in the EU alone are said to be living in areas where the noise levels were such as to cause serious annoyance during daytime. Also, reports from some countries found that some 30% of the population are highly disturbed by road traffic noise. Measures to be taken to reduce the noise are normally very expensive and must be based on proven facts. Similarly ability to make reliable measurement of aircraft noise is vital to the industries concerned, airport operators and the general population.

Noise induced hearing impairment is one of the most frequent occupational hazards resulting in large social expense. Equipment for the measurement and analysis of noise as covered by TC 29, is in high demand and allows facts to be gathered based on accurate and reproducible measurements. Worldwide research in psychoacoustics is aiming at a better understanding of human reactions to noise exposure that certainly will call for further development of measuring techniques and instrumentation. Monitoring of hearing functions with improved audiometric equipment may contribute to an early detection and the minimizing of related risks.

Hearing aid performance, specification and measurement is the subject of a series of standards produced by TC 29. The associated standardization of ear simulators and head and torso simulators for measuring performance has allowed a better understanding to be found of the relationship between subjective and objective measurements. The effect of these standards has been to improve the means by which the vast majority of hard of hearing people communicate, and so improve their quality of life.

The ability to accurately measure the threshold of hearing is crucial to hearing conservation programmes, the early detection of hearing loss in children and the diagnosis of hearing loss. TC 29 works in conjunction with ISO/TC 43 to ensure that standards for thresholds of hearing and other techniques for audiometry are integrated. The same close cooperation also takes place on the integration of measurement methods and the necessary instrumentation for determination of acoustic power emission from machinery, total noise exposure of workers during a work day, etc.

E. TRENDS IN TECHNOLOGY AND IN THE MARKET

Technology trends

The current rapid development in digital measurement, manufacturing techniques and miniaturisation offers increased capabilities and more sophistication in sound measuring instrumentation in general, and for audiometry and hearing aids. The advent of automated methods of testing and calibration also have a key role to play, and newer digital designs may mean that in practice reduced test procedures are appropriate. Hence the international standards require continuous revision and updating to ensure specifications and test procedures remain appropriate and fit-for-purpose.

New technologies are continually evolving, for example in terms of hearing aids and microphones, and the Committee needs to ensure that as time progresses the standardisation keeps pace with the new products and systems introduced.

Market trends

Market trends are broadly in line with the technology trends mentioned in B.3, which is often allowing greater flexibility, more customisation and enhanced functionality of device, whilst maintaining a static cost base. Similarly miniaturisation in hearing aids and other areas has progressed considerably over recent years, and although some further change may occur the usability of devices will continue to be a key factor. TC 29 has liaisons with relevant TCs and these are unlikely to change substantially as TC29 only provides specifications of measurement performance.

F. SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)

TC 29 will actively continue to promote the ongoing liaisons to other committees and to system committees and to seek new liaisons, where relevant.

TC 29 as a supplier of standards	TC 62	Electrical equipment in medical practice
	TC 87	Ultrasonics
	TC 100	Audio, video and multimedia systems and equipment
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology
	ISO/TC 43	Acoustics
	ISO/TC 43/SC 1	Noise
	ISO/TC 108/SC 3	Use and calibration of vibration and shock measuring instruments
TC 29 as a customer of standards	SC 77B	High frequency phenomena
	TC 87	Ultrasonics
	TC 100	Audio, video and multimedia systems and equipment
	TC 106	Methods for the assessment of electric, magnetic and electromagnetic fields associated with human exposure
	TC 108	Safety of electronic equipment within the field of audio/video, information technology and communication technology

Cooperation established:

- Through liaison with the following international organisations:
 - ITU-T "International Telecommunication Union – Telecommunication Standardization Sector"
 - OIML "International Organization Of Legal Metrology"
 - ICAO "International Civil Aviation Organization"
- Through experts working on other TCs or with other bodies e.g. TC 106, ISO/TC 43, OIML, ICAO
- Previous experience of joint WG with ISO/TC 43.
- New liaisons to be sought:
 - IEC/TC 88 "Wind energy generation systems"
 - European Telecommunications Standards Institute (ETSI)

G. CONFORMITY ASSESSMENT

Essentially all standards of TC 29 include test specifications, reproducible test requirements and test methods.

With regard to uncertainties and conformance assessment TC 29 has prepared a basic document on policy on measurement uncertainty and conformance assessment for use in documents prepared by IEC/TC 29, Electroacoustics, given in doc 29/810/INF.

H. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES

Objectives

1. To keep TC 29 standards up-to-date to reflect new/changing technologies and user requirements both in the marketplace and via customer IEC and ISO Technical Committees.
2. Respond to requests for development of new standards to meet new marketplace and business needs and environmental noise protection concerns following IEC guidelines in a timely manner.
3. Ensure consistency within TC 29 standards on common aspects e.g. uncertainties of measurement and ensure the standards are written in such a way that requirements are clear to end-users.
4. Promote the work of the committee and increase the awareness of TC 29 publications.
5. Encourage new membership of the Committee.

Strategies

1. Continue regular reviews of the Stability Dates for each standard and ensure a comprehensive review of the options available for each.
2. Raise early awareness of new technologies or market requirements, likely to have an impact on existing standards or likely to trigger NWIPs, by using WG and MT members expert knowledge to identify.
3. Identify any additional guidance documents that would be useful to Convenors/Project Leaders on common aspects, clarity of wording or Committee decisions.
4. Discuss with IEC Central Office marketing staff effective methods to increase awareness of the work of TC 29 and of its publications. Encourage experts to perform a similar task at National Committee level.

Action plan

1. Maintain current record of Stability Dates, including a list in WG/MT order to ease identification of those due for review in the immediate future. In advance of plenary meetings, Convenors/Project Leaders to review and add relevant documents to their WG/MT Agendas to ensure members have an opportunity to consider requirement for revision prior to WG/MT meeting. *Initiate RR forms as appropriate.*
2. Agendas to include an item for discussion on new technologies or market requirements likely to impact the work of the Committee. *Convenors/Project Leaders to document, and initiate RR or NP as appropriate.*

3. Guidance documents – need for additional documents to be reviewed at each plenary meeting. *Convenors/Project Leaders to suggest any further documents required. Ongoing from 2015.*

4. Raise awareness of new and revised standards, and the work of TC 29, through internationally and nationally available channels such as professional bodies, conferences and journal papers. *All Members. Ongoing from 2014.* (References registered as per November 2015-11 are given in the annex).

Useful links to IEC website

The TC home page gives access to membership, TC/SC Officers, scope, liaisons, WG/MT/PT structure, publications issued and work and maintenance programmes and similar information for SCs, if any.

STRATEGIC OBJECTIVES 3-5 YEARS	ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES	TARGET DATE(S) TO COMPLETE THE ACTIONS
Maintain current record of stability dates	all stability dates reviewed and updated during the meeting	none
Agendas of WGs and MTs to include discussion of new technologies and market requirements likely to impact the work	discussed by all WGs and MTs	none
Consideration of need for additional guidance documents	discussed	none
Raise awareness of new and revised standards of TC 29	references collected and compiled	none
Note: The progress on the actions should be reported in the RSMB.		

ANNEX

Awareness references

Stig Arlinger, member of WG 10

- A list of international standards relevant for people within audiology on the web-page of the International Society of Audiology on <http://www.isa-audiology.org/standards.asp> (*maybe not completely up to date*).

Susan Dowson, chair of TC 29, convener of MT 17 and member of MT 4

- "Acoustical instruments – Specifications and use"; S P Dowson and R G Tyler, Proceedings of the Institute of Acoustics, Vol 36 Pt3 2014, pp 236-243.
- "Acoustical Instruments – Specification standards update"; S P Dowson, Acoustics Bulletin, Vol 40 No 6 pp 23-24.

Ryuzo Horiuchi, member of WG 5

- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in Pretoria", Ryuzo Horiuchi, Makoto Tateno, Masaharu Ohya and You-ichi Fujisaka, Journal of Acoustical Society of Japan, Vol. 70, No. 10 (2014).
- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in London", Ryuzo Horiuchi and Makoto Tateno, Journal of Acoustical Society of Japan, Vol. 67, No. 10 (2011).
- "Report on the meetings of IEC/TC 29 "Electroacoustics" held in Tokyo", Ryuzo Horiuchi Makoto Tateno and Hiroaki Takinami, Journal of Acoustical Society of Japan, Vol. 66, No. 6 (2010).

(These reports are in Japanese)

Erling Sandermann Olsen, member of WG 5 og MT 17

- Sandermann Olsen, Erling. Heat conduction correction in reciprocity calibration of laboratory standard microphones, præsenteret på Inter-noise 2012, New York, USA, 2012.
- Sandermann Olsen, Erling; Frederiksen, Erling. Microphone acoustic impedance in reciprocity calibration of laboratory standard microphones, præsenteret på Inter-noise 2013, Innsbruck, Østrig, 2013.
- Sandermann Olsen, Erling; Carlsen, Henrik. Influence of ground-shield configuration in reciprocity calibration of laboratory standard microphones, præsenteret på Inter-noise 2014, Melbourne, Australien, 2014.
- Jackett, Richard; Avison, Janine. Realizing the primary standard for sound pressure: The trouble with IEC 61094-2, præsenteret på Inter-noise 2015, San Fransisco, California, USA, 2015.
- Jackett, Richard. The effect of heat conduction on the realization of the primary standard for sound pressure, Metrologia 51, 2014 pp. 423-430.
- Sandermann Olsen, Erling. MP.EXE, DFM Microphone Pressure Sensitivity Calibration Calculation Program version 4.00. Part s800.002. Dansk Fundamental Metrologi A/S, 2010, 69 pp.
- Erling Sandermann Olsen and Richard Barham presentation on calibration of microphones at extreme frequencies at BIPM CCAUV meeting 2015-11-25/27

Gert Ravn, convenor of WG 13

- Robert Burcard, Ph.D., "Standards and calibration. Part 1: Standards process, Physical Principles, Pure tone and speech audiometry", Thieme, Seminars in Hearing, vol. 35, number 4, November 2014:
 - National and International Standards: Standardization and Calibration, *Laura Wilber, Ph.D., Einar Laukli, Ph.D., and Robert Burkard, Ph.D.*
 - Physics of Sound and Electroacoustics, *John D. Durrant, Ph.D. and Lawrence L. Feth, Ph.D.*
 - Sound Level Calibration: Microphones, Ear Simulators, Couplers, and Sound Level Meters, *Dr-Ing. Thomas Fedtke and Lee Grason.*
 - Audiometric Calibration: Air Conduction, *Craig A. Champlin, Ph.D. and Tomasz Letowski, Ph.D.*
 - Bone-Conduction Calibration, *Robert H. Margolis, Ph.D. and Gerald R. Popelka, Ph.D.*
 - Audiometric Calibration: Speech Signals, *Graham Frost, M.Sc. and Harry Levitt, Ph.D.*
- Robert Burcard, Ph.D., "Standardization and calibration. Part 2: Brief Stimuli, Immittance, Amplification, and Vestibular Assessment, Thieme, Seminars in Hearing, vol. 36, number 1, February 2015:
 - Calibration/Standardization of Short-Duration Stimuli, *Einar Laukli, Ph.D. and Robert Burkard, Ph.D.*
 - Acoustic Immittance, Absorbance, and Reflectance in the Human Ear Canal, *John J. Rosowski, Ph.D. and Laura Ann Wilber, Ph.D.*
 - Hearing-Aid-Related Standards and Test Systems, *Gert Ravn, B.Sc. and David Preves, Ph.D.*
 - Vestibular Function Measurement Devices, *Richard D. Miles, Ph.D. and David A. Zapala, Ph.D.*

Christopher J. Struck, member of WG 13

- My paper at InterNoise 2015 in San Francisco this August "An Overview of the ASA/ANSI Standards Program" referenced the US TAG to IEC TC29. It will be reprinted in Sound & Vibration in December.
- a session on Standards for an ASA meeting in Dec 2016 in Honolulu OR May 2017 in Boston on "Practical Applications of Standards" or "Standards in Action".

John Woodgate, member of MT 20 and WG 22

- Hearing loops; the preferred assistive listening technology, Thomas Kaufmann, Sterkens J, Woodgate J M, Journal of the Audio Engineering Society, vol.63 no. 4 298-302 (2015 April).
- A hearing loop system that worked!, J M Woodgate, Institute of Sound and Communications Engineers Magazine, Autumn 2015.