Instrumentation Corner

International specification standards for acoustical instruments

Procedure documents, for example those published by ISO, often require the use of an acoustical instrument meeting specification standard IEC XXXXX class Y or Z, but what is the standardisation process? Why are the standards important, how are the specifications agreed and how can you contribute to the production of international standards for acoustical instruments?

The leading global organization that prepares and publishes international standards for all electrical, electronic and related technologies is the International Electrotechnical Commission, IEC, founded in 1906. Currently there are 76 Full or Associate member countries of the IEC, and one of the key benefits is international equivalence and hence the removal of technical barriers to trade. The documents produced by IEC are also used as the basis for national standardization. In the UK for acoustical instruments, IEC standards are accepted by our standards body, the British Standards Institution (BSI), and generally re-published without change as BS EN documents.

IEC has 179 Technical Committees (TCs) for different subject areas. The relevant one for acoustical devices is TC29 'Electroacoustics'. Ultrasonics and underwater acoustics are covered by TC87, and BSI has National Committees that parallel both of these, EPL29 and EPL87.

Within each TC there are Working Groups/Maintenance Teams (WG/MT) which cover different instruments. In general a MT works solely on the revision of current standards, whereas a WG will also consider new items. WGs and MTs are truly international with members appointed from many different countries. Nomination is via an individual's own National Committee, BSI in the UK, and all nominated members belong to the parallel BSI committee.

IEC TCs meet every 18 months, with a different country acting as host on each occasion. For TC29 these main 'Plenary' meetings run for 5 days and include meetings of all the active WGs/MTs, who quite often also meet separately between the Plenary meetings. The last meeting of TC29 was in November 2009 in Tokyo, Japan. The UK parallel committee, EPL29, meets about once a year, carrying out most of its business, for example, agreeing comments and votes on circulated documents, through email.

The remit of TC29 is standardization in the field of electroacoustics. The specification standard documents therefore include performance requirements, which must be met for a manufacturer to claim an instrument conforms to a particular standard and class, and also increasingly they include testing protocols. Consequently, whether you are about to purchase a new instrument or are the user of equipment you have owned for some years, design and subsequent testing to show conformance with these international specification standards is key and very relevant to the measurements performed. In addition, conformance tests allow a clear demonstration that the instrument really does meet class Y or Z of IEC XXXXX. Unless otherwise specified

in a referencing document or test code, the latest version of an instrument specification standard should be used.

Table 1 lists the current WGs/ MTs within TC29. Information on the current published standards and the documents currently in process for each are given on the IEC website www.iec.ch.

IEC TC29 WG/MT	Title
MT4	Sound level meters
WG5	Measurement microphones
WG10	Audiometric equipment
WG13	Hearing aids
WG17	Sound calibrators
MT18	EMC requirements and updates of relevant IEC TC29 standards
MT19	Filters, revision of IEC 61260
MT20	Revision of IEC 60118-4, Induction loop systems
WG21	Head and ear simulators
WG22	Audio-frequency induction-loop systems and equipment for assisted hearing
MT23	Revision of 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

Table 1 IEC TC29 Working Groups and Maintenance Teams

The standardisation process itself is well defined by IEC, including timescales to be met, and documents must progress through various stages from preliminary to publication stage. Recently, both IEC and ISO have both been tightening up on the timescales permitted and applying these criteria more rigorously to ensure standards are produced in a reasonable timeframe. More detail of the process is available on the IEC website and the same principles apply for revision of existing standards.

At each stage there are detailed discussions on the content of the document. The key specifications for the instrument need to be agreed, together with the tolerances and the maximum permitted uncertainties of measurement for laboratories verifying that the instrument does conform to the specifications given in the standard. The standard will be used by manufacturers to inform their design processes, by any laboratories performing pattern evaluation tests of new models or designs, and by those performing periodic testing of particular instruments, such as UKAS-accredited laboratories, ensuring that the end user can have continuing confidence in the results obtained and functions performed by their instruments.

The WG/MT needs to reach consensus as far as possible for the standard to be successfully approved, and ensure that the specifications are clear and not open to differing interpretations. Another challenge in recent years for periodic testing has been to prescribe tests that are extensive enough to be effective in checking ongoing performance, whilst ensuring that the cost burden for users is not excessive. Documents evolve via discussions and comments raised either by the WG/MT members, or in the later stages as submitted via National Committees. Membership of a WG/MT gives early visibility of the documents, and an opportunity to discuss key

technical issues with international peers, so giving real input to the finally approved published documents.

The key stages for an international specification standard with IEC are:
Preliminary: This comprises projects envisaged for the future but not yet ready for immediate development, or preliminary work prior to a formal proposal.

Proposal: A proposal for new work generally originates from industry via a National Committee. There is a vote and criteria for acceptance. If successful the work is allocated to an existing or new WG, and this signifies the starting point for the overall IEC timescale for producing the final draft standard.

Preparatory: Working Drafts (WD) are prepared, by the Convenor/project leader within the WG. There are often several iterations, and drafts are only available to WG members.

Committee: When the WG members are comfortable with the content of the document it is submitted to National Committees as a formal committee draft (CD) for comment (2-4 months). There may be several iterations of CDs.

Enquiry: A Committee Draft for Vote (CDV), now in English and French, is submitted to all National Committees for a five-month voting period. This is the latest stage at which technical comments can be taken into consideration. Usually at this stage, if not at the previous stage, BSI publish a Draft for Public Comment (DPC), available to all for comment. Approval criteria are applied. If successful, a revised version of the document is sent to IEC Central Office within four months for Final Draft International Standard (FDIS) processing. If approval is not obtained the document is referred back to the WG or MT.

Approval: The FDIS, which must be available within 33 months of the approval of the project, is circulated to the National Committees for a two-month voting period. Each National Committee's vote must be explicit: positive, negative or abstention. Approval criteria are applied. If the document is approved, it is published. If not it is referred back to the WG or MT to be reconsidered.

Publication: The document is published by IEC Central Office, normally within 2 months, and becomes available for purchase. A date is also agreed before which the standard will not be revised.

If you are interested in participating in the work of BSI and IEC, initial contact should be made with Customer Services at BSI (www.bsigroup.com) who can put you in touch with the relevant person to discuss how this can be achieved. Each National Committee is made up of representatives of the interests of users, manufacturers, government departments and other bodies concerned with the work, and we are keen for new members to join the committees.

One word of caution – these international *specification* standard documents should not be confused with *a measurement standard artefact* - for example a calibrated microphone or calibrated sound calibrator from which measurements traceable to national measurement standards can be obtained.

For Acoustics, standards that give measurement procedures and methods and those on vibration, shock and condition monitoring are generally covered by the International Organization for Standardization (ISO) under TC43 and TC108. Similar standard development routes are followed by those committees. The National Committee is still BSI, so any enquiries about joining ISO or the parallel BSI committees can also be made via BSI.

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