

ACOUSTICS STANDARDS ACTIVITY IN CANADA 2007 UPDATE AND INVITATION TO PARTICIPATE

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ABSTRACT

CSA currently has 10 Acoustics Standards and three more with significant acoustics content. Over five times that number of international acoustics standards have been reviewed and endorsed in a new Canadian Standard, Z107.10. This innovative standard streamlines the process whereby CSA endorses standards suitable for use in Canada from other organisations, such as ANSI and ISO. This article is an update for 2007 of Acoustics Standards activities in Canada, especially those of the Canadian Standards Association. Canadian acousticians are invited to contact the author to become more involved with the many acoustics standards activities currently underway in Canada and on behalf of Canada around the world.

SOMMAIRE

L'Association canadienne de normalisation (ACNOR) a présentement dix normes acoustiques et 3 autres comportant un contenu acoustique important. Plus de cinq fois ce nombre de normes acoustiques internationales ont été revues et sont endossées dans une nouvelle Norme Canadienne, Z107.10. Cette norme innovatrice améliore le processus par lequel CSA approuve des normes des autres organisations (par exemple ANSI ou ISO) comme étant acceptable pour une utilisation au Canada. Cet article est une mise à jour des activités de normalisation en acoustique au Canada pour 2007, spécialement celles de l'ACNOR. Les acousticiens canadiens sont invités à contacter l'auteur pour s'impliquer dans les nombreuses activités en rapport avec les normes acoustiques actuellement en cours au Canada et au nom du Canada partout dans le monde.

1. Introduction

It is hard to practice acoustics (or many other disciplines) without interacting with consensus standards such as those produced by CSA, ISO, ANSI, IEC and similar bodies. They define the units we use, the weightings, the instruments. They provide measurement and calculation procedures to allow one practitioner's work to be compared with another. Imagine what it would be like if each measurement had to be described without the use of standard nomenclature, units, instruments, procedures. Reports would be much longer and the huge variety of different measurements would make it extremely difficult to reproduce others' work. Specifying or limiting sound levels would become virtually impossible without agreed and recognised ways to measure and describe sound.

The Canadian Standards Association (CSA) Technical Committee Z107 – Acoustics and Noise Control and its subcommittees look after all but one of the 10 Canadian Acoustics Standards (the exception is Z94.2 Hearing Protection Devices, which has its own technical committee). Z107 also coordinates all Canadian acoustics standards activity, with representatives from the Hearing Protection Technical Committee and from Canada's international standards advisory committees providing liaison to their activities. It also

reviews international standards and endorses those found relevant and useful for Canada.

The goal of this article is to inform Canadian acousticians of progress in Canadian Standards activities and to invite those who are interested to become more involved with these activities. Participation is one of the best ways to stay in touch with this fast moving field and an excellent way to meet those who are leading it in many fields. Any acoustician interested in becoming involved with Acoustics standards in Canada is invited to contact the author or any of the subcommittee chairs. Most chairs welcome newcomers willing to work and the work need not involve a lot of time.

2. Z107.10 Omnibus Standard

The most important recent change to Acoustical Standards in Canada is the 2006 publication of Z107.10, Guide for the Use of Acoustical Standards in Canada, a new omnibus standard by Cameron Sherry and his Editorial Subcommittee. The standard summarises all acoustics standards in which Z107 has an interest, including CSA standards, and those ISO, ASTM, ANSI and IEC standards that Z107 considers of importance to Canada. This gives the reader a single source for information relating to Acoustics standards of interest to Canada, including those referred to by regulations and guide-

lines within Canada. Given the speed with which ISO and other groups are changing standards, this new approach is not only convenient, it is essential, and the intent is to issue revisions annually.

This year the new standards added include ANSI 12.60 on Classroom Acoustics. This standard, available free from ANSI, fill an important need in North American classrooms. Other standards include:

- ISO 1999 – 1990 Acoustics - Determination of Occupational Noise Exposure and Estimation of Noise-Induced Hearing Impairment.
- ISO 7574 – 1:1985 Acoustics -- Statistical Methods for Determining and Verifying Stated Noise Emission Values of Machinery and Equipment
- ISO 11689:1996 – Acoustics -- Procedure for the Comparison of Noise-Emission Data for Machinery and Equipment
- ISO 11690 – 1:1996 – Acoustics -- Recommended Practice for the Design of Low-Noise Workplaces Containing Machinery
- ISO 11820:1996 – Acoustics -- Measurements on Silencers in Situ
- ISO 12001:1996 - Acoustics -- Noise Emitted by Machinery and Equipment -- Rules for the Drafting and Presentation of a Noise Test Code
- ISO 15664: 2001 -- Acoustics -- Noise Control Design Procedures for Open Plant

Z107.10 is an important innovation in standards review in Canada. For many applications there is no need to write a Canadian Acoustics Standard. Many international standards are well written by highly qualified technical committees and their use here helps simplify communication with international acousticians and acoustics done in Canada by global organisations. Canada, and most other countries, could not afford to prepare the variety of standards available internationally. It also cannot afford to ignore them.

Until now, standards from outside Canada were either endorsed or adopted singly, a time consuming process whereby each standard was reviewed and balloted and in some cases published with small changes required for the Canadian context. The new standard streamlines this process considerably and is the first of its kind in Canada, addressing an important need in allowing Canadian users more ready access to Acoustics standards around the world.

An example will give an idea of what level of detail Z107.10 contains for each standard it lists:

ANSI S12.60-2002

Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools

This Standard provides acoustical performance criteria, design requirements, and design guidelines for new school classrooms and other learning spaces. These criteria, requirements, and guidelines are intended to provide the acoustical qualities needed to achieve a high degree of speech intelligibility in learning spaces. The standard may be applied to the

design of new learning spaces, or (in some cases) to the renovation of existing classrooms. Informative annexes provide design guidelines that are intended to aid in conforming to the design requirements. Test procedures for verifying conformance to this standard are also suggested in an annex.

*(Copies of the document may be downloaded (free of charge). The Standard is available through the ASA Standards Store at <http://asastore.aip.org/>.

This example shows an entry for an ANSI standard newly proposed for use in Canada. It describes the standard, its results and the relevance in a Canadian context.

3. Committee Activities

3.1 Z107 Acoustics and Noise Control

The Z107 main committee meets once a year, usually during the Canadian Acoustics Week. Its executive, consisting of all the subcommittee chairs and representatives of other committees, meets in the spring, either in person or by teleconference. Most other work is done by e-mail. The main committee reviews progress by each subcommittee and votes on any new work proposals. The main committee is also the last technical hurdle for a standard before CSA editors put it into final form. The steering committee, to which the main committee reports, approves work and reviews completed standards; however they cannot make technical changes.

Most work is done within the Z107 subcommittees, which are responsible for the following standards:

Hearing Measurement, chaired by Alberto Behar, responsible for CAN3-Z107.4-M86 Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening and CAN/CSA-Z107.6-M90 Pure Tone Air Conduction Threshold Audiometry for Hearing Conservation

Vibration, chaired by Tony Brammer, provides liaison between Z107 and the Technical Advisory Committee of Standards Council on ISO standards on vibration. Tony is active on the ISO group for ISO 2631, the definitive standard on measurement of whole body vibration.

Occupational Noise, chaired by Stephen Bly, is responsible for the following standards :

- Z107.52-M1983 (R1994) Recommended Practice for the Prediction of Sound Pressure Levels in Large Rooms Containing Sound Sources. This standard is in need of major updating and a chair is being sought to do this work. The intent is to provide guidance to Canadian industry on how to design quiet plants. It is seen as building upon Z107.58, which provides advice on buying quiet equipment.
- A new version of Z107.56-94 Procedures for the Measurement of Occupational Noise Exposure, was published in 2006. It is referenced in Federal and some provincial regulations. Recently, at least in part due to

recommendations by Z107, both Manitoba and Ontario adopted a 3 dB exchange rate and dropped impulsive noise limits, leaving Quebec as the only major Canadian province still using the 5 dB exchange rate.

- Z107.58-2002 Noise Emission Declarations for Machinery, was written by a group chaired by Stephen Bly. It is a voluntary guide on noise emission declarations for machinery to be used in Canada and is compatible with European regulations allowing Canadian machinery to be sold into that market. A Noise Emission Declaration is a statement of sound levels produced by equipment, which would usually be included with the instruction or maintenance manual and in technical sales literature. Measurements are made according to ISO standards and include estimates of the likely variability of the measurements. Canada recommends use of a declaration stating the level and uncertainty as two numbers, rather than adding them together into a single number as is sometimes done elsewhere.

Environmental Noise, chaired by Bill Gastmeier has responsibility for environmental noise standards formerly handled by Industrial Noise, Transportation Noise and Powered Machines. These include:

- Z107.53-M1982 (R1994) Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Activities. This standard is being replaced with the ISO1996 series, which were the last ISO Acoustics standards endorsed separately, before Z107.10 took over that role^{1,2}.
- CAN3-Z107.54-M85 (R1993) Procedure for Measurement of Sound and Vibration Due to Blasting Operations. A working group, chaired by Vic Schroter, is revising this standard.
- CAN/CSA-Z107.55-M86 Recommended Practice for the Prediction of Sound Levels Received at a Distance from an Industrial Plant. This standard is being revised to provide a simple alternative to ISO 9613(2) and to explain when each is best used.
- CAN/CSA-Z107.9-00: Standard for Certification of Noise Barriers. This standard was written by a group chaired by Soren Pedersen. It provides municipalities, developers, road and highway departments, railways and industry with a standard specification which can be used to define the construction of barriers intended to be durable enough for long term use in Canadian conditions. It has been widely cited in both Canada and the US.
- The US Department of Transportation, Federal Highway Administration, "Highway Noise Barrier Design Handbook" is already harmonized with the CSA standard, as are several Ontario municipalities, the Ministry of Transportation of Ontario, and numerous US state transportation agencies, making this the de-facto standard for barriers across North America.

Wind Turbines – A group chaired by Brian Howe is assisting
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the CSA wind turbine committee with the acoustical aspects of their standards, specifically with adopting the ISO measurement procedures in ISO 61400.

Editorial, chaired by Cameron Sherry, (which reviews all proposed standards) and is responsible for reviewing and endorsing ANSI S1.1-1994 Acoustical Terminology. In addition, they have ongoing responsibility for updating the omnibus standard Z107.10 using input from each subcommittee. Cameron is actively looking for new members to assist in this work and can be contacted directly or through the author. It would be a great way to quickly gain an overview on some of the most important acoustics standards in Canada and the world.

Sound Quality is a new group chaired by Colin Novak and concerned with sound quality standards, primarily aimed at the automotive industry but becoming increasingly useful in other areas.

Z107 also has subcommittees providing liaison with International Standards activities, specifically steering committees in Building Acoustics, Instrumentation, Acoustics and Noise. These Steering committees are run by the Standards Council of Canada and are harmonised with the Z107 committee to which they report regularly on progress and upcoming issues. Draft international standards are provided on a private website to which steering committee members have access in order to review them and recommend Canada's position.

Building Acoustics, chaired by David Quirt, does not have its own CSA standards, but reviews other standards from a Canadian viewpoint, mostly those from ASTM and ISO. David Quirt is chair (and Z107 liaison) of the Standards Council of Canada Steering Committee for ISO TC 43 SC2, Building Acoustics. Members of this group are active on many ASTM and ISO building acoustics groups. Their main issue in the next few years will be the balance between the technically superior ISO standards and the ASTM standards which are important for North American trade. They also recommend Canadian endorsed standards on building acoustics (a large part of the current Z107.10 list) and prepare appropriate entries.

Instrumentation and Calibration: George Wong, is the chairman (and the CSA liaison) for the Standards Council of Canada Canadian Subcommittee of IEC/TC 29: Electroacoustics. He is seconded at present by Leo Wu. This group deals with all instrumentation pertaining to acoustical measurements, such as WG 4: Sound level meters; WG 5: Microphones; WG 10: Audiometers; WG 13: Hearing aids; WG 17: Sound calibrators; WG 21: Ear simulators; and maintenance teams (MT) MT19: Filters; and MT20: Hearing aids induction loops. All of the above international Working Groups have Canadian members.

The Canadian Steering Committee for ISO TC43 (Acoustic Canadian Acoustics / Acoustique canadienne

tics) and TC43(1)(Noise) is chaired by Stephen Keith, who provides Canadian comments, votes on ISO standards and coordinates the work of Canadian representatives on several ISO working groups. This group deals with ISO Standards on measurement and assessment of sound and hearing, such as WG 17: Hearing protectors WG28: Machinery noise emission standards (referenced in CSA Z107.58) WG 40: Impulsive sound propagation for environmental noise assessment, WG 45: Acquisition of data pertinent to land use, and WG 53: Occupational Noise Exposure. All of the above international Working Groups have Canadian members.

All these groups are always interested in new members willing to work.

Z94 – Hearing Protection

The other CSA Acoustics Standards Committee, the Hearing Protection Technical Committee is responsible for the Z94.2-02 Standard: Hearing Protection Devices – Performance, Selection Care and Use, widely referred to in Canadian occupational noise regulations. The major new version of this standard was issued in January 2002 that includes changes to the ANSI hearing protector standards and procedures. This will mean the introduction of user-fit hearing protector measurements, similar to those used by ANSI and now recognized as being more representative of how hearing protectors are used in practice than the old technician-fitted testing methods. This standard includes also extensive practical information for users on how to select and use hearing protectors. Canadian Acoustics Standards

Table 1 shows all the Canadian Standards currently in force and also lists three standards with significant acoustical content. This table may also soon be found at the CAA website and will be kept up to date there. Meanwhile the list can be found at <http://www.csa-intl.org/onlinestore/GetCatalogDrillDown.asp?Parent=430>

Table 1- CSA Acoustics Standards

CAN3-Z107.4-M86 Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening / Audiomètres tonals à conduction aérienne pour la préservation de l'ouïe et pour le dépistage
 CAN/CSA-Z107.6-M90 Pure Tone Air Conduction Threshold Audiometry for Hearing Conservation
 CAN/CSA-Z107.9-00: Standard for Certification of Noise Barriers
 Z107.10 Guide for the Use of Acoustical Standards in Canada,
 Z107.52-M1983 (R1994) Recommended Practice for the Prediction of Sound Pressure Levels in Large Rooms Containing Sound Sources
 Z107.53-M1982 (R1994) Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Ac-

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tivities (soon to be replaced by ISO 1996).

CAN3-Z107.54-M85 (R1993) Procedure for Measurement of Sound and Vibration Due to Blasting Operations / Méthode de mesure du niveau sonore et des vibrations émanant des opérations de dynamitage

CAN/CSA-Z107.55-M86 Recommended Practice for the Prediction of Sound Levels Received at a Distance from an Industrial Plant / Pratique recommandée pour la prévision des niveaux sonores reçus à une distance donnée d'une usine

Z107.56-06 Procedures for the Measurement of Occupational Noise Exposure / Méthode de mesure de l'exposition au bruit en milieu de travail

Z107.58-2002 Noise Emission Declarations for Machinery Z94.2-02 • Hearing Protection Devices - Performance, Selection, Care, and Use / Protecteurs auditifs

Standards with Acoustics Component:

Z62.1-95 Chain Saws

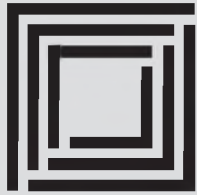
CAN/CSA-Z412-M00 Office Ergonomics / L'ergonomie au bureau

CAN/CSA-M5131-97 (R2002) Acoustics - Tractors and Machinery for Agriculture and Forestry - Measurement of Noise at the Operator's Position - Survey Method (Adopted ISO 5131:1996)

Endorsed Standards (Over 50 standards listed in Z107.10)

4. References

1. C. Krajewski, Rating Sound Level- An Overview of Amendment 1 to ISO 1996-2, Canadian Acoustics, Volume 29, No. 3, September, 2001
2. William J. Gastmeier and James L. Fielders, ISO 1996 Acoustics – Description and Measurement of Environmental Noise Round Robin Testing, Canadian Acoustics, Volume 29, No. 3, September, 2001 presented at CAA Conference 2001
3. Stephen Keith, Stephen Bly, Tim Kelsall, A preview of the Draft CSA Guideline – Noise Emission Declarations for Machinery, Canadian Acoustics, Volume 29, No. 3, September, 2001
4. Kelsall, Tim, Impulse Measurement Considerations in Setting Occupational Noise Criteria, Canadian Acoustics, Canadian Acoustics, Volume 34, No. 3, September, 2006



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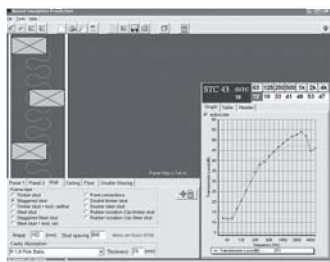


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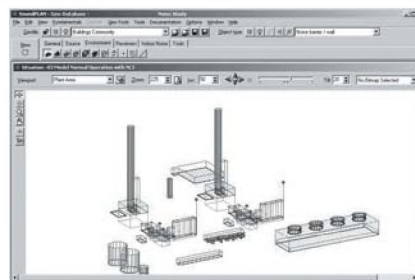
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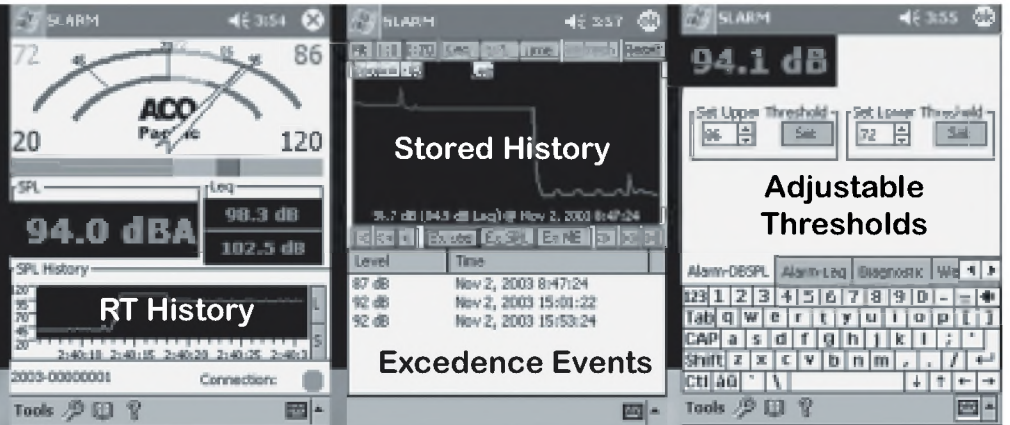
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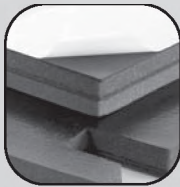
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