

CANADIAN STANDARDS ASSOCIATION ACTIVITY IN ACOUSTICS

2003 UPDATE

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ABSTRACT

Many Canadian acousticians work on writing and reviewing acoustics standard, both in Canada and around the world. This article is an update for 2003 of Acoustics Standards activities in Canada, especially those of the Canadian Standards Association. CSA currently has 11 Acoustics Standards and two more with significant acoustics content. More than twice that number of acoustics standards from other organisations such as ANSI and ISO have been reviewed and either endorsed or adopted as suitable for use in Canada.

RÉSUMÉ

Plusieurs acousticiens canadiens travaillent à l'écriture et à la revue des normes acoustiques, autant au Canada que dans le monde entier. Cet article est une mise à jour des activités de normalisation en acoustique au Canada pour 2003, spécialement celles de l'Association canadienne de normalisation (ACNOR). L'ACNOR a présentement 11 normes acoustiques et 2 autres comportant un contenu acoustique important. Plus du double de ce nombre de normes provenant d'autres organisations telles que ANSI et ISO ont été revues et soit endossées ou adoptées comme étant acceptable pour une utilisation au Canada.

1. INTRODUCTION

Acoustics, like most technical activities, has procedures and terminology which has been standardised so that everyone involved will measure and calculate using the same tools and procedures. Without such standards, collaboration and comparing results between practitioners would scarcely be possible.

This standardisation does not come without effort. Many Canadian acousticians put in a hours of volunteer effort each year writing and reviewing acoustics standards. This article is intended to give an update for 2003 of acoustics standards activity in Canada. Most of the Canadian Acoustical Standards activity takes place within committees of the Canadian Standards Association. CSA has written Canadian Acoustics Standards for over 30 years and is one of the most respected standards writing organisations in the world.

Few acousticians could function successfully without the international effort to prepare and review acoustical standards on a wide variety of topics. Canada has been involved in this work for many years on both the national and international level. People using these standards are encouraged to contact the working group chairs listed below and join this effort.

2. COMMITTEE ACTIVITIES

There are two CSA Technical Committees in Acoustics:

Z107 and Z94. The former oversees most of the acoustics standards work in Canada. The latter is responsible for a single standard. This reflects a trend in CSA away from Committees responsible for a single standard and towards super-committees responsible for multiple standards in an area of expertise. Z107 was one of the first of such super-committees and helped pioneer this approach within CSA.

2.1 Z107 Acoustics and Noise Control

Z107, the Acoustics and Noise Control Technical Committee, is responsible for all CSA Acoustics standards other than Z94 and liaises with Canadian activities on ANSI, ASTM, IEC and ISO standards. Several members belong to these organisations' committees or Z94 and provide liaison to them.

The committee meets twice a year, once during the Canadian Acoustics Week and once in the spring. It reviews progress by each subcommittee and votes on any new work proposals. The main committee is 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.

Z107 met most recently in Calgary and one item that was discussed was the possibility of adopting or endorsing the new ANSI standard on classroom acoustics. The Building Acoustics subcommittee headed by David Quirt is reviewing this standard. It is based on an initiative started by

ASA and fills a large existing gap.

Most of the work of the committee is carried out by its subcommittees who are responsible for the following standards:

Hearing Measurement, chaired by Tang Chow, is 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.

Powered Machines, no longer has standards of its own but recommends adopting or endorsing ANSI, SAE or ISO standards.

Industrial Noise, chaired by Tim Kelsall, is responsible for the following standards:

Z107.51-M1980 (R1994) Procedure for In-Situ Measurement of Noise from Industrial Equipment. A group is looking at replacing this standard with a series of ISO standards, within the framework of the new Z107.58 standard.

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.

Z107.53-M1982 (R1994) Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Activities. This standard will be replaced with ISO1996. A working group chaired by Chris Krajewski and including several Ontario consultants is examining using 1996 as a way of updating the way tonal and impulse sounds are handled in community noise¹. They have run several round robin tests of the procedures with sample sounds². Stephen Keith of Health Canada is acting as liaison with the ISO committee. The Canadian version will include an informative annex relating the standard to the Canadian context.

CAN3-Z107.54-M85 (R1993) Procedure for Measurement of Sound and Vibration Due to Blasting Operations. A working group, chaired by Ramani Ramakrishnan, is revising this standard. This activity is just getting started.

CAN/CSA-Z107.55-M86 Recommended Practice for the Prediction of Sound Levels Received at a Distance from an Industrial Plant. A joint CSA/ANSI working group co-chaired by Rich Peppin and Tim Kelsall is looking at ISO9613 for adoption or endorsement. This standard was originally written by an ISO working group chaired by Joe Piercy of NRC. It may ultimately replace or become the basis for a revised version of Z107.55, however the group has identified a number of shortcomings which need to be addressed.

Z107.56-94 Procedures for the Measurement of Occupational Noise Exposure is referenced in Federal and some provincial regulations and has been updated by a working group chaired by Alberto Behar. At the subcommittee meeting in June it was decided to remove all reference to a 5 dB exchange rate although Ontario and Quebec still use it. The subcommittee felt that this exchange rate was no longer technically defensible and that only the 3 dB exchange rate should be used. Consultation with the provinces is ongoing, but a recent request by Ontario to revisit this issue was overwhelmingly turned down by the subcommittee members. This standard is currently being reviewed by the Editorial Subcommittee before the latest revision goes to ballot.

Z107.58-2002 Guidelines For Machinery Noise Emission Declarations Levels was written by a group chaired by Stephen Bly and was published³ in 2003. It is a voluntary guide on noise emission declarations for machinery to be used in Canada and is compatible with European regulations to allow 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. 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, although in some cases they may be added together into a single number.

In addition, the Industrial Noise subcommittee undertakes reviews of proposed federal and provincial regulations, often at the request of the regulators, and other activities affecting industrial noise.

Transportation Noise, chaired by Soren Pedersen, is responsible for **CAN/CSA-Z107.9-00:** Standard for Certification of Noise Barriers. This standard is an adaptation of the Ontario MTO Highway Noise Barrier specification. 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 for long term use in Canadian conditions.

Manufacturers' specific barrier designs are certified as complying with the standard in such areas as: materials used, weathering and corrosion resistance testing, STC, NRC, etc. In addition, each barrier installation is reviewed and certified for compliance with such items as footings design, material sample testing, welding, caulking, backfilling, etc.

The US Highway Barrier Design Manual is already harmonised with the CSA standard, as is the Ontario Provincial Standard, making this the de-facto standard for barriers across North America.

Editorial, chaired by Alberto Behar, (which reviews all proposed standards) is responsible for reviewing and endorsing ANSI S1.1-1994 Acoustical Terminology. They are currently reviewing the latest revision to Z107.56.

Building Acoustics, chaired by David Quirt, does not have its own standards, but endorses or adopts other standards, mostly from ASTM. The most recent under examination is the new ANSI classroom acoustics standard.

Instrumentation and Calibration, chaired by George Wong, liaises with Canadian activities on ANSI, IEC and ISO instrumentation standards and endorses or adopts these standards. They have been actively involved in ongoing work to prevent changes to the A-weighting at the international level. This subcommittee is harmonised with the Standards Council of Canada Steering Committee for IEC Acoustical Instrumentation standards.

Liaison with the Canadian Steering Committee for ISO TC43 (Acoustics) and TC43(1) (Noise), chaired by Stephen Keith provides Canadian comments and votes on ISO standards and coordinates the work of Canadian representatives on several ISO working groups. This work was ably led by Krish Krishnappa until his untimely death this year and Stephen Keith has agreed to take on the considerable work required to chair this active group. The Steering committee is run by the Standards Council of Canada and is harmonised with the Z107 committee to which Stephen reports regularly on progress. Draft international standards are provided on a private website to which members have access in order to review them and recommend Canada's position.

2.2 Z94 – Hearing Protection

The second CSA Acoustics Standards Committee, Z94 is responsible for a single standard, the Hearing Protection Standard Z94.2 which defines Type A, B, and C type hearing protectors and is widely referred to in Canadian occupational noise regulations. They have recently approved a major new version of this standard in light of 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 also has extensive information for users on how to select and use hearing protection.

3. REVIEWING OTHER STANDARDS

A large part of the committee and subcommittee work is reviewing standards written by other standards-writing bodies, such as ANSI or ISO, for adoption or endorsement by Canada. Whenever possible, as global harmonisation becomes more important, CSA adopts or endorses international standards rather than writing their own. In areas where standards apply to goods coming from or going to other countries, use of international standards makes considerable sense.

Adopting a standard, i.e. republishing it, with changes or additions if necessary, costs less than half the cost of writing a new standard. Endorsing, which means that the standard has been reviewed and found suitable for Canadian use as is the least expensive option, but less useful because the standard is not so readily available.

4. CANADIAN ACOUSTICS STANDARDS

Table 1 shows all the Canadian Standards currently in force and also lists two standards whose Acoustics sections were written with the assistance of the Z107 committee. This table will 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.csaintl.org/onlinestore/GetCatalogDrillDown.asp?Parent=430>

There are also 24 acoustics standards from ANSI, ISO and ASTM endorsed by Canada. They are listed in Table 1 following the CSA standards.

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
Z107.51-M1980 (R1994) Procedure for In-Situ Measurement of Noise from Industrial Equipment
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

Activities (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

Z107.56-94 Procedures for the Measurement of Occupational Noise Exposure / Méthode de mesure de l'exposition au bruit en milieux de travail

Z107.58-2002 Guidelines For Machinery Noise Emission Declarations

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

Endorsed Standards

ANSI S1.1-1994 Acoustical Terminology(R1999)

ANSI S1.4-1983 Specification for Sound Level Meters (R2001)

ANSI S1.11-1986 Specifications for Octave-band and Fractional (R1998) Octave-band Analog and Digital Filters

ANSI S1.13-1995 Measurement of Sound Pressure Levels in Air (R1999)

ANSI S12.31-1990 Precision Methods for the Determination of (R1996) Sound Power Levels of Broad-band Noise Sources in Reverberation Rooms

ANSI S12.32-1990 Precision Methods for the Determination of (R1996) Sound Power Levels of Discrete-frequency and Narrow-band Noise Sources in Reverberation Rooms

ANSI/ASTM Standard Test Method for Sound Absorption and C423:00 Sound Absorption Coefficients by the Reverberation Room Method

ANSI/ASTM Standard Test Method for Laboratory E492-90 (1996) E1 Measurement of Impact Sound Transmission Through Floor-ceiling Assemblies Using the Tapping Machine

ASTM C384-98 Standard Test Method for Impedance and Absorption of Acoustical Materials by the Impedance Tube Method

ASTM E90-99 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

ASTM E336-97 Standard Test Method for Measurement of

Airborne Sound Insulation in Buildings

ASTM E596-96 Standard Test Method for Laboratory Measurement of the Noise Reduction of Sound-isolating Enclosures

ASTM E795-00 Standard Practices for Mounting Test Specimens During Sound Absorption Tests

ASTM E966-99 Standard Guide for Field Measurement of Airborne Sound Insulation of Building Facades and Facade Elements

ASTM E989-89 Standard Classification for Determination of (1999) Impact Insulation Class (IIC)

ASTM E1007-97 Standard Test Method Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-ceiling Assemblies and Associated Support Structures

IEC 60651-2001 Sound Level Meters

ISO 4872-1978 Acoustics – Measurement of Airborne Noise Emitted by Construction Equipment Intended for Outdoor Use – Method for Determining Compliance with Noise Limits

ISO 6393:1998 Acoustics – Measurement of Exterior Noise Emitted by Earth-moving Machinery – Stationary Test Conditions

ISO 6394:1998 Acoustics – Measurement at the Operator's Position of Noise Emitted by Earth-moving Machinery – Stationary Test Conditions

ISO 6395-1988 Acoustics – Measurement of Exterior Noise Emitted by Earth-moving Machinery – Dynamic Test Conditions

ISO 6395:1998 Acoustics – Measurement of Exterior Noise Emitted by Earth-moving Machinery – Dynamic Test Conditions – Amendment 1

SAE J919-1995 Sound Measurement – Off-road Work Machines – Operator Singular Type

SAE J1096-2000 Measurement of Exterior Sound Levels for Heavy Trucks under Stationary Conditions

REFERENCES:

1. C. Krajewski, Rating Sound Level- A New Method for Description and Measurement of Environmental Noise- An Overview of Amendment 1 to ISO 1996-2, Canadian Acoustics, Volume 29, No. 3, September, 2001
2. William J. Gastmeier and James L. Feilders, ISO 1996 Acoustics – Description and Measurement of Environmental Noise Round Robin Testing, Canadian Acoustics, Volume 29, No. 3, September, 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

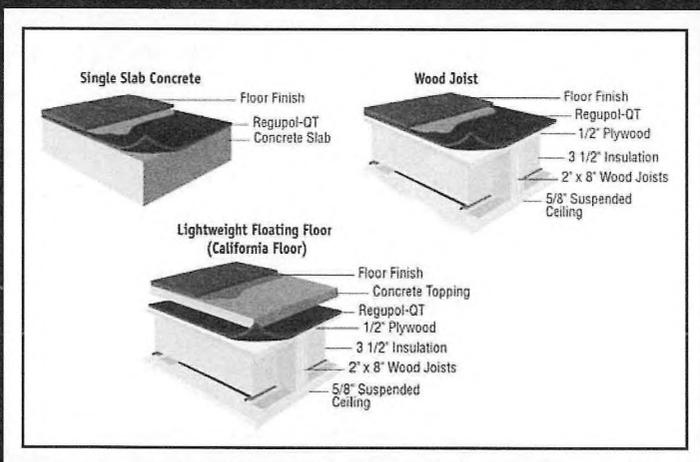
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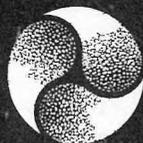
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