

CSA Z107.6 AUDIOMETRIC TESTING FOR USE IN HEARING LOSS PREVENTION PROGRAMS: A NEW TITLE FOR A NEW EDITION

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1 Introduction

The Canadian Standards Association's (CSA) Occupational Hearing Conservation Technical Committee was formed in 2010, and created several subcommittees with different focuses. Among the subcommittees, one was tasked with reviewing and revising CSA Z107.4 *Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening*, and CSA Z107.6 *Pure Tone Air Conduction Audiometry for Hearing Conservation*, which were written in 1986 and 1990 respectively. It was quickly recognized that the two standards contained both redundant and complementary information. In 2012, CSA Z107.4 was withdrawn with the understanding that the new edition of CSA Z107.6 would contain the relevant information. Concurrent to this, a new standard, CSA Z1007 *Hearing Loss Prevention Program Management* was being drafted by a different subcommittee, and efforts were made to create complementary documents intended for different audiences. While Z1007 would be aimed at employers and their Hearing Loss Prevention Program Administrators (HLPPAs), and covers all aspects of creating and managing an organization's HLPP, CSA Z107.6 would be directed to individuals, organizations and service providers responsible for conducting audiometric tests as part of a Hearing Loss Prevention Program (HLPP).

This new edition of the CSA Z107.6 Standard will be completed in 2016, and like its predecessor, focuses on quantifying hearing loss as a means of early detection of possible damage from hazardous noise exposure. The 2016 edition most notably includes guidance to the technician on classifying test results, advising the tested individual about their test results and providing reports to the Hearing Loss Prevention Program Administrator for use within an HLPP. Also added were mobile test facility requirements, and expanded sections on audiometric test equipment and audiometric technician training requirements.

2 New Sections

2.1 Explaining test results

Significant threshold shift

Canada has never had a single method of determining whether a change in hearing is indicative of early signs of noise induced hearing loss. CSA Z107.6 tackled this issue and recognized that there are many different strategies to determine if hearing has possibly deteriorated due to exposure to noise, both nationally and internationally. Many jurisdictions within Canada have developed their own unique methods and definitions of hearing loss and change in hearing. In British Columbia for example, "Early Warning Change" is defined as ≥ 15 dB deterioration at either 3 or 4kHz in either ear. In jurisdictions without defined methods of interpretation, companies or service providers tend to develop their own methods or follow OSHA's recommendations.

The Z107.6 Standard now provides a recommendation with two methods of determining whether a change in hearing consistent with hazardous noise exposure has occurred. Specifically, it recommends the following for the calculation of Significant Threshold Shift (STS):

- an average shift of the thresholds at 2000, 3000 and 4000 Hz of ≥ 10 dBHL (30dBHL or more combined) in either ear, or
- a shift of ≥ 15 dBHL at 3000 or 4000 Hz in either ear.

The new edition of the Standard also provides a recommendation for determining whether an individual's hearing has possibly been affected by noise, even when there is no previous test with which to compare it, either because it is a 'base-line' test or because previous records are unavailable. In such cases the recommendation is that, if the difference between a threshold at 3000 Hz, 4000 Hz, or 6000 Hz and the adjacent lower frequency is ≥ 15 dBHL, a note should be made indicating possible contribution of noise.

Explaining results to the tested individual

While, previous editions of CSA Z107.6 did not require that the technician counsel the tested individual, the 2016 edition requires that technicians explain the implications of hearing loss or shifts in hearing, and ensure that each individual, even those without a hearing loss or shift in hearing, is advised on the importance of protecting their hearing and appropriate use of Hearing Protection Devices.

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Reporting Results

CSA Z1007, the Management standard, provides guidance to the HLPPA on what actions to take when hearing loss consistent with noise exposure has occurred. CSA Z107.6 in turn provides guidance to the audiometric technician on what to report to the HLPPA.

2.2 Mobile facility requirements

Many employers or organizations where hazardous noise might be present prefer to have an audiometric testing facility visit their site, rather than either purchasing the equipment to have “in-house” testing, or spend time commuting to and from an audiometric test site. Recognizing that mobile testing facilities are common, but also recognizing that there are unique issues posed by their transient nature, the new Z107.6 includes requirements specific to mobile testing facilities. Specifically, to meet the requirements set out in the standard, ambient noise levels are to be verified daily, and whenever the facility is relocated. It is also recommended that noise levels be continuously monitored, and that when ambient noise levels are exceeded testing is paused or stopped until allowable levels are achieved again. Relocation of the mobile facility might be necessary in order to obtain the required ambient noise levels.

3 Expanded sections

3.1 Audiometric Testing Equipment

The technical characteristics of audiometers for use in hearing loss prevention programs, which were previously specified in a separate document Z107.4, have now been integrated into the revised Z107.6 Standard. Given that audiometers are designed and fabricated for the global market, it was also felt that specifying detailed characteristics and requirements for the Canadian market was not warranted and harmonization with the international standards was a better approach.

The minimum requirement is a Type 4 audiometer as per ANSI/ASA S3.6 with recommended additional provisions for an expanded frequency range (500-8000 Hz) and hearing level range (-10 to 100 dB HL). Furthermore, CSA Z107.6 now specifies a wider range of earphones, either supra-aural or insert types, that can be used for audiometric testing. Manual or automatic threshold search methods may still be used as they were in the previous edition.

The new edition also provides an expanded section on calibration requirements. These are comprised of periodic annual electroacoustic calibration to be carried out by a trained service technician as well as routine equipment checks to be carried out by the audiometric technician by means of a biologic or bio-acoustic simulator approach. Reporting and recording requirements are now specified for the issuing of the certificate of calibration and routine equipment checks.

3.2 Training Requirements for the Technician

The revised edition of CSA Z107.6 has additional training components due to the expanded role of the audiometric technician. The Standard now requires training on how to classify test results, provide appropriate feedback to individuals and HLPPAs, as well as the criteria for referral to a health care professional. In addition, technicians are to be trained in the use of hearing protection devices and their selection and rating methods (as outlined in CSA Z94.2). Like the original edition, it is suggested that this training requires a minimum of 20 hours. Furthermore, a “refresher” course must also be completed by technicians at least every 5 years.

Only someone who has taken all components of the training course meets the requirements to be labeled an “audiometric technician” within the Standard, but the new edition recognizes that for some organizations, roles can be divided between people. One person will conduct the hearing tests, for example, and another will provide the advice and recommendations. In these cases, the Standard requires that all elements of the training must still be covered by the different people.

4 Conclusion

The new edition of Z107.6 is a comprehensive revision of the first edition of the standard and is aimed at covering all aspects of audiometric testing for use in Hearing Loss Prevention Programs, and is directed to organizations and service providers responsible for conducting or administering audiometric testing for HLPPs. It now includes the characteristics of the test environment and equipment, training requirements for technicians, detailed pre-testing and testing procedures, interpretation of test results and advising, and record keeping and reporting requirements.

It is hoped that the second edition will foster a more structured and uniform approach to audiometric testing and contribute to the success of HLPPs across the country.

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References

- ANSI S3.6-2010 American National Standard- Specification for Audiometers
- CSA Z94.2-14 Hearing protection devices — Performance, selection, care, and use
- CSA Z1007-16 Hearing loss prevention program management