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The New CSA Z94.2 Standard: Hearing Protection Devices — Performance, Selection, Care, and Use is Now Published

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After 12 years there is now a new version of CSA Standard Z94.2 **"Hearing protection devices Performance, Selection, Care, and Use"**. Here is how CSA describes the new standard:

"This is the seventh edition of CSA Z94.2, Hearing protection devices – Performance, selection, care, and use. It supersedes previous editions published in 2002, 1994, 1984, 1979, 1974, and 1965.

This edition expands on performance requirements and the rating schemes that might help the user select hearing protection devices. It now includes the widely used noise reduction rating (NRR) and an applicable derating scheme.

This edition no longer includes physical performance and related testing requirements (such performance is no longer sought by Canadian users). It addresses acoustical performance measurements and includes revisions in the packaging marking requirements to clarify the use of the various ratings.

Clauses 8 to 12 regarding the selection, care, and use of hearing protection devices (HPDs) have been expanded to include issues related to style and functions of hearing protectors not mentioned in previous editions, as well as the potential use of field attenuation estimation systems (FAES). Table 4, which specifies the selection of HPDs based on noise exposure levels, now requires octave-band noise measurements at exposures greater than 105 dBA.

Although users of hearing protection devices are required to follow the criteria in Clauses 8 to 12 in order to comply with this standard, reference should also be made to applicable local occupational health and safety regulations, which can require additional or superior performance.

The CSA Subcommittee on Hearing Protection recognizes that significant variations in performance (as great as ± 20 dB attenuation) can occur depending on how an HPD is used. This standard emphasizes the importance of a comprehensive hearing loss prevention program, including hazard assessment and instruction on the careful selection, proper wearing, and high-quality maintenance of hearing protection devices. It is the opinion of the subcommittee that wearing HPDs without proper selection, care, and use can result in significantly lower attenuation for the user than that obtained from the tests specified in this standard.

This standard should be used in conjunction with CSA Z1007, Management of hearing loss prevention programs, which is currently under development. CSA Z1007 covers all aspects of the creation and management of hearing loss prevention programs."

The New Standard

Following are brief descriptions of the most important sections of the standard:

Section 6, "Test Procedures," states that tests should be performed following one of the following two test procedures: a) ANSI S3.19-1974 Standard, or b) ANSI S12.6-1997 Standard, Method B. The first is similar to the test used in the previous edition. The second test, yields results closer to those found in real life. By including this second technique, the door is open for a new treatment of the test data for the calculation of the attenuation of protectors.

Results from the tests are reported as mean octave band attenuations and standard deviations. Data obtained using Method A, are used to determine the class of protector, in the same way prescribed in the previous version and also for the calculation of the popular NRR which is listed on most hearing protector packaging because it is required by US law.

Data obtained using Method B are used to compute a new estimate, call the Single Number Rating (Subject Fit 84th Percentile), abbreviated SNR(SF_{84}). The meaning of SNR(SF_{84}) is the protection provided at a nominal 84% confidence interval. For instance, a protector with SNR(SF_{84}) = 20, will provide 20 dB or more attenuation to 84% of the users in a well-run hearing conservation program.

SNR(SF_{84}) is obtained through calculations included in Appendix A of the standard, using the mean value and standard deviation at each one of the test frequencies, when testing of the protector is done using Method B.

Probably the most important sections for users is **Section 9 "Selection of Hearing Protection Devices"** that provides guidance to persons writing hearing protection programs for a workplace. It gets into details of the different types of hearing protectors, their characteristics and applications. It touches subjects such as sound attenuation, attenuation at frequency extremes, double protection, overprotection, etc.

Section 9 deals also with the extremely touchy issue of NRR and its derating, Table 2 concretely providing directions on how to derate when using single and double protection. In summary, the derating scheme is as follows:

- Ear plugs 50% of the nominal NRR
- Ear muffs 70% of the nominal NRR
- Double protection 65% of the sum of the nominal NRR +5

Section 10 "Specialized hearing protection devices" expands greatly the information provided in the previous standard, and now covers devices using active noise control, flat frequency response, etc.

A brand new issue is treated in **Section 13 "Field Attenuation Estimation Systems (FAES)."** Those are devices allowing actual measurements of the real attenuation provided to the actual user of the protector. FAES are becoming popular because of the speed and r of use and also because they can be useful for training purposes and reduce the variability inherent in using one number to describe how a protector works on every user, regardless of the size and shape of each individual's head.

Certification

The issue of how to confirm that a hearing protector device meets the requirement of the Z94.2 standard is very important. However, no process for certification is yet in place at the CSA. Therefore, in this present standard it is not a requirement. As well, Appendix C gives an example of laboratory test results that a user may request from the manufacturer, to ascertain that those

results were obtained using standard procedures. The standard is also written in way which should make it easier to apply in a certification program if there is enough interest in the future to warrant setting one up. Such a program would only be developed if regulators, users and suppliers agreed that it was worth setting up and using.

In Summary

This new version of the standard meshes more closely with US approaches, recognizing the reality of how closely our two economies are entwined and provides more guidance to health and safety professionals needing reliable information on how to select hearing protection. It should become the new standard for due diligence in selecting and using hearing protection in Canada.