

# AN OVERVIEW OF STANDARDS AND GUIDELINES INFLUENCING THE IMPLEMENTATION OF NOISE EMISSION DECLARATIONS FOR MACHINERY

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## 1. INTRODUCTION

The best known adverse health effect of excessive noise exposure is occupational noise-induced hearing loss (NIHL). The most reliable way of reducing the human and economic cost of excessive occupational noise exposure is to reduce the level of workplace noise. Cost effective methods include purchasing quieter machinery and planning noise control at workplace design stages. Application of these methods can be facilitated by implementing noise emission declarations for machinery (NEDM).

Prolonged use of noisy machinery (e.g., power tools) by consumers has a potential risk of NIHL, which NEDM could help mitigate.

Machinery also creates environmental noise, causing annoyance, sleep disturbance and interference with communication. NEDM can help reduce excessive environmental noise from sources such as factories, construction, or outdoor maintenance projects, thereby mitigating these health effects.

This paper provides an overview of some European, International, U.S., and Canadian standards and guidelines that influence the implementation of NEDM in Canada. Linkages to the development of a planned Health Canada (HC) Guideline: *Noise Emission Declarations for Machinery* will also be discussed.

## 2. EUROPEAN UNION DIRECTIVES

Noise control in the European Union (EU) is legislated by four Directives on: (i) occupational noise [1], (ii) machinery [2, 3], (iii) outdoor equipment [4, 5], and environmental noise [6]; all containing linkages to NEDM.

The Occupational Noise Directive [1] prescribes employer responsibilities to protect workers from the effects of noise on health and safety. The 2003 revision, effective 2006, increases the stringency of 1986 requirements. The energy averaged, daily exposure limit is now 87 dBA, down from 90 dBA. This Directive also recognizes NEDM's important role in occupational noise control [1].

The Machinery Directive [2, 3] gives requirements for declaration of (emission) sound pressure level and sound power level. The 2006 amendment, in force in 2009, requires a sound power level declaration if the sound pressure level exceeds 80 dBA, down from 85 dBA in the 1998 version. Also, a declaration of measurement uncertainty will be required if a non-harmonized i.e., non-ISO/CEN, measurement standard is used.

The Outdoor Equipment [4, 5] and Environmental Noise [6] Directives regulate environmental noise. The former requires certain outdoor equipment to provide sound power level declarations; a subset is also required to have limits on sound power level. The latter Directive prescribes the development and monitoring of action plans, in EU member states, for the control of environmental noise.

## 3. INTERNATIONAL

Supporting the EU Directives [1-6] are a noise emission declaration standard and fourteen basic measurement standards from the International Organization for Standardization (ISO) and European Committee for Standardization (CEN); nine for sound power level and five for emission sound pressure level. In addition, there are numerous test codes detailing measurement procedures specific to different classes of machinery [7].

The International Institute for Noise Control Engineering (I-INCE) has published a report: *A Global Approach to Noise Control Policy* [8]. It identifies source controls, such as purchasing quiet machinery, as a cost-effective method of noise reduction and encourages employers to seek noise-limited equipment. NEDM is needed for such actions. The report also identifies NEDM as a useful means of environmental noise control. For consumer machinery, the report suggests that consumer-friendly NEDM ought to be important for noise control.

## 4. U.S. STANDARDS AND GUIDELINES

The benefits of NEDM are suggested in publications by the Occupational Safety and Health Administration (OSHA) and the Mining Safety and Health Administration

(MSHA). OSHA has identified the purchase of quieter machinery as a way to significantly reduce noise exposure levels [9]. Three recent noise control guides by MSHA [10] recognize the importance of knowing the noise from mining machines, as well as the advantage of purchasing equipment with noise controls already engineered into the device. The importance of NEDM is also recognized by the National Institute for Occupational Safety and Health (NIOSH) via their online Power Tools Database for commonly used power tools in occupational settings [11].

The American National Standards Institute (ANSI) has developed standards to support NEDM, similar to the ISO/CEN standards, described above [7].

## 5. CANADIAN STANDARDS AND GUIDELINES

Canadian occupational noise exposure limits tend to be falling to 85 dBA with a 3 dB exchange rate. Since 2000, five provinces and one territory have adopted this limit, bringing the total to nine provinces and one territory [12, 13]. NEDM can help meet these limits. For example, an Alberta 2006 guide [14] recommends that employers: (i) target noisy equipment for replacement, (ii) set noise level criteria for new equipment purchases and (iii) request noise level specifications from manufacturers.

All of the above developments indicate the need for a Canadian NEDM standard. The Canadian Standards Association (CSA) has already fulfilled this need, publishing *Z107.58-02 Noise Emission Declarations for Machinery* [15]. This voluntary standard requires NEDM be provided in a form consistent with EU Directives [2-5]. The document also provides guidance on the use of the ISO standards for determining, providing and verifying noise specifications. CSA's *Z107.10-06 Guide for the Use of Acoustical Standards in Canada* [16] also facilitates NEDM by describing international acoustical standards recommended by CSA for use in Canada and providing guidance on their appropriate application.

To reduce potential health hazards from noise, the *Radiation Emitting Devices Act*, administered by HC, controls the sale, lease, importation and advertising of noisy machinery in Canada. Therefore, given the EU Directives [2, 4, 6] and CSA Z107.58-02, HC decided to gauge the feasibility of implementing NEDM here voluntarily, by commissioning two reports. Mixed results were obtained. Baseline data, for the extent and reliability of NEDM in Canada, appeared somewhat encouraging in one report [17]. The conclusions of the second [18], however, suggested that considerable promotion of NEDM and supporting standards would be needed for voluntary compliance to be successful.

Therefore, HC is drafting a three-part guideline, *subject to management approval*, recommending the provision and use

of NEDM according to *CSA Z107.58-02* and *Z107.10-06*. Parts one and two will provide guidance to manufacturers and purchasers of machinery for the reduction of occupational and environmental noise, respectively. Part three will provide consumer advice on the use of NEDM and the importance of purchasing quieter machinery. Each of the three guidelines will contain supporting rationales pertinent to their respective foci. A three-stage stakeholder consultation is planned, one for each part, starting with the document focusing on occupational noise reduction.

## REFERENCES

- [1] Directive 2003/10/EC of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise). OJ L 42, 15.2.2003, p.38-44
- [2] Directive 98/37/EC of 22 June 1998 [on the approximation of the laws of the Member States relating to] machinery. OJ L 207, 23.7.98, p. 1-46
- [3] Directive 2006/42/EC of 17 May 2006 on machinery. OJ L 157, 9.6.2006, p. 24-86.
- [4] Directive 2000/14/EC of 8 May 2000, [...see reference 2] the noise emission in the environment by equipment for use outdoors. OJ L 162, 3.7.2000, p.1-78
- [5] Directive 2005/88/EC of 14 December 2005 amending Directive 2000/14/EC. OJ L 344, 27.12.2005, p.44-46
- [6] Directive 2002/49/EC of 25 June 2002 relating to the assessment and management of environmental noise OJ L 189, 18.7.2002, p. 12-25
- [7] Commission communication in relation to machinery OJ C 160, 24.06.2008 p. 1-58.
- [8] I-INCE (2006). A global approach to noise control and policy. Noise Control Engineering Journal. Vol 54, No. 5. 2006 Sept-Oct.
- [9] OSHA (1983 accessed July 11, 2008). 29 CFR 1910.95(b)(1), Guidelines for Noise Enforcement, Appendix A.
- [10] MSHA (1999). Noise Control Resource Guides. <http://www.msha.gov/1999noise/noiseresources.htm>
- [11] NIOSH (accessed July 10, 2008). Power Tools Database. <http://www.cdc.gov/niosh/topics/noise/workplacesolutions/toolsdatibase.html>
- [12] Canadian Center for Occupational Health and Safety (CCOHS) (2007). Noise – Occupational Exposure Limits in Canada. [http://www.ccohs.ca/oshanswers/phys\\_agents/exposure\\_can.html](http://www.ccohs.ca/oshanswers/phys_agents/exposure_can.html)
- [13] CCOHS (2000). Noise Control in Industry: A Basic Guide. Canadian Center for Occupational Health and Safety: Hamilton, Ontario.
- [14] Government of Alberta (2006). Occupational Health and Safety Code 2006 Explanation Guide - Part 16: Noise. [http://employment.alberta.ca/documents/WHS/WHS-LEG\\_ohsc\\_2006\\_p16.pdf](http://employment.alberta.ca/documents/WHS/WHS-LEG_ohsc_2006_p16.pdf)
- [15] CSA (2002). Z107.58-02 Noise Emission Declarations for Machinery. Canadian Standards Association: Mississauga, Ontario
- [16] CSA (2006). Z107.10-06 Guide for the Use of Acoustical Standards in Canada. Canadian Standards Association: Mississauga, Ontario
- [17] CCOHS (2003) A pilot survey on the availability of noise emission data for equipment and machinery sold in Canada. Final Report, June 23, 2003.
- [18] HGC (2004) An experience - based investigation of machinery noise declarations in Canada. HGC Engineering. March 31, 2004.