

## PART 7: NOISE, VIBRATION, RADIATION AND TEMPERATURE

### NOISE DIVISION 1 - NOISE EXPOSURE

#### Definitions

#### Definition

"daily exposure"

7.1 In sections 7.1 to 7.23:

means the amount of noise, stated in dBA Lex or Pa<sup>2</sup>h, to which a worker is exposed during the workday;

"dBA"

means decibels of noise, measured with an A weighted filter;

"dBA Lex"

means the level of a worker's total exposure to noise in dBA, averaged over the entire workday and adjusted to an equivalent 8-hour exposure (for example, a worker who works in an average of 85 dBA of noise for 16 hours has an Lex of 88 dBA, and for four hours an Lex of 82 dBA);

"3 dB exchange rate"

means that when the sound energy doubles, the decibel (dB) level increases by 3;

"noise"

means sound energy in the workplace;

"Pa<sup>2</sup>h"

means Pascal-squared hour, a unit of sound exposure (for example, 1 Pa<sup>2</sup>h equals 85 dBA Lex and 0.5 Pa<sup>2</sup>h equals 82 dBA Lex);

"peak sound level"

means the maximum instantaneous sound level, in dBA.

(1) In this Division, "noise exposure limits" means either of the noise exposure limits established under section 7.2.

(2) Noise terminology and measurements used or described in this Division have the same meaning that they have in

(a) *CSA Standard Z107.56-94, Procedures for the Measurement of Occupational Noise Exposure*, as amended from time to time, and

(b) *ANSI Standard S1.25-1991, Specification for Personal Noise Dosimeters*, as amended from time to time.

#### Exposure Limits and Program

#### Exposure Limits Noise exposure limits

7.2

An employer must ensure that a worker is not exposed to noise levels above either of the **following** exposure limits of:

(a) 85 dBA Lex (1 Pa<sup>2</sup>h) ~~daily exposure~~ **daily noise exposure level**; and

(b) 135 dBA ~~140 dBC~~ peak sound level.

#### Noise Measurement

#### When required

7.4

(1) ~~If a worker is or may be exposed to potentially harmful levels of noise, or if information indicates that a worker may be exposed above 82 dBA Lex, the employer must measure the noise exposure.~~

(2) ~~The noise exposure measurement must be~~

(a) ~~performed in accordance with *CSA Standard Z107.56-94, Procedures for the Measurement of Occupational Noise Exposure*, or other standard acceptable to the board, and~~

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		<del>(b) updated if a change in equipment or process affects the noise level or the exposure duration.</del>
<b>Noise dosimeters</b>	<b>7.7</b>	<del>(1) Noise dosimeters must meet the requirements for a Type 2 instrument as specified by <i>ANSI Standard S1.25-1991, Specification for Personal Noise Dosimeters</i>, or other standard acceptable to the board.  (2) A noise dosimeter must be set with (a) a criterion level of 85 dBA, and (b) a threshold level at or below 80 dBA or at 'Off'.</del>
		<b>Education and Training</b>
<b>For workers below the exposure limits</b>	<b>7.9</b>	<del>If a worker's daily noise exposure is between 82 dBA Lex and 85 dBA Lex, the employer must inform the worker of (a) the results of any noise exposure measurement, (b) the significance of those results to the risk of hearing loss, and, (c) at the request of the worker, the purpose of hearing protection and testing.</del>
<b>For workers above the exposure limits</b>	<b>7.10</b>	<del>If a worker's noise exposure is above either exposure limit in section 7.2, the employer must inform the worker of (a) the results of any noise exposure measurement, (b) the effects of noise on hearing, (c) the proper use and maintenance of hearing protection, and (d) the purpose of hearing testing.</del>
<b>Noise measurement required</b>	<b>7.3</b>	<b>(1) If a worker is or may be exposed to potentially harmful levels of noise, or if information indicates that a worker may be exposed to a level exceeding 82 dBA Lex, the employer must measure the noise exposure.  (2) The noise exposure measurement must (a) be performed in accordance with <i>CSA Standard Z107.56-94, Procedures for the Measurement of Occupational Noise Exposure</i>, as amended from time to time, except as otherwise determined by the Board, and (b) be updated if a change in equipment or process affects the noise level or the duration of noise exposure.  (3) Except as otherwise determined by the Board, noise dosimeters and sound level meters used for measuring noise exposure must meet the requirements of <i>ANSI Standard S1.25-1991, Specification for Personal Noise Dosimeters</i>, as amended from time to time.  (4) The employer must inform affected workers of the results of any noise exposure measurement and the significance of the measurement to risk of hearing loss.</b>
<b>Exemption</b>	<b>7.5</b> <b>7.4</b>	<del>An employer is exempt from the requirement not required to measure the noise exposure of a worker if the employer</del>

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- (a) based on other information, **the employer** identifies the worker as being exposed to noise in excess of an exposure limit, and
- (b) **the employer** establishes an effective noise control and hearing conservation program for that worker.

**Exposure Limits and Program**

**Program** 7.3  
**Noise control and hearing conservation program** 7.5

- (1) If noise in the workplace exceeds either of the **noise** exposure limits, ~~in section 7.2~~ the employer must develop and implement an effective noise control and hearing conservation program **with the following elements:**
  - (a) ~~noise measurement,~~ **measurement;**
  - (b) ~~education and training,~~ **training;**
  - (c) ~~engineered noise control,~~ **control;**
  - (d) ~~hearing protection,~~ **protection;**
  - (e) ~~posting of noise hazard areas,~~ **areas;**
  - (f) ~~hearing tests, and~~ **tests;**
  - (g) annual program review.
- (2) ~~The program must be in writing and address~~
  - (a) ~~noise measurement,~~ **measurement;**
  - (b) ~~education and training,~~ **training;**
  - (c) ~~engineered noise control,~~ **control;**
  - (d) ~~hearing protection,~~ **protection;**
  - (e) ~~posting of noise hazard areas,~~ **areas;**
  - (f) ~~hearing tests, and~~ **tests;**
  - (g) annual program review.

**Program Review**

**Annual review** 7.22

- (1) ~~An employer must review the noise control and hearing conservation program annually to ensure its effectiveness.~~
- (2) ~~The review must address~~
  - (a) ~~the need for further noise measurement,~~
  - (b) ~~the education and training of workers regarding noise exposure,~~
  - (c) ~~the adequacy of noise control measures,~~
  - (d) ~~the selection and use of hearing protection, and~~
  - (e) ~~hearing testing and information on the rate and extent of occupational hearing loss.~~

**Noise Measurement**

**General equipment requirements** 7.6

- (1) ~~Noise measurement must be conducted with an instrument such as a noise dosimeter, an integrating sound level meter or other equipment acceptable to the board.~~
- (2) ~~All noise measurement equipment must be calibrated, maintained and operated according to manufacturer's instructions.~~
- (3) ~~Integrating noise measuring equipment must be set to the 3 dB exchange rate.~~

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		<b>Noise Control</b>
<b>Investigating controls</b>	<b>7.11</b>	If a worker is exposed to noise above either a noise exposure limit, in section 7.2, the employer must investigate options for engineered noise control.
<b>Engineered noise control</b>	<b>7.6</b>	<p>(a) investigate options for engineered noise control, and</p> <p>(b) when practicable, implement one or more of those options to reduce noise exposure of workers to or below the exposure limits.</p>
<b>Implementing controls</b>	<b>7.12</b>	If a worker is exposed to noise above either exposure limit in section 7.2, the employer must, when practicable, implement one or more options for engineered noise control to reduce worker exposure to or below the exposure limit.
		<b>Hearing Protection</b>
<b>When required</b>	<b>7.13</b>	(1) If it is not practicable to reduce noise levels to or below the noise exposure limits in section 7.2, the employer must
<b>Hearing protection and warning signs</b>	<b>7.7</b>	<p>(a) reduce noise exposure to the lowest level practicable,</p> <p>(b) provide and maintain hearing protection to the affected workers, and post warning signs in the noise hazard areas,</p> <p>(c) ensure that the hearing protection is worn effectively. give to affected workers hearing protection that meets the requirements of <i>CSA Standard Z94.2-02, Hearing Protection Devices – Performance, Selection, Care, and Use</i>, as amended from time to time, except as otherwise determined by the Board, and maintain the hearing protection so that it continues to meet those standards, and</p> <p>(d) ensure that hearing protection is worn effectively in noise hazard areas.</p> <p>(2) Workers in a posted noise hazard area must wear hearing protection.</p>
<b>Selection and maintenance</b>	<b>7.14</b>	If hearing protection is required, the employer must provide and maintain the hearing protection to workers, in accordance with <i>CSA Standard Z94.2-94, Hearing Protectors and its appendix</i> , or other standard acceptable to the board.
		<b>Noise Hazard Areas</b>
<b>Warning signs and hearing protection</b>	<b>7.15</b>	If it is not practicable to reduce noise levels to or below the exposure limits in section 7.2, the employer must
		<p>(a) post warning signs in any work area where</p> <p>(i) the area noise level exceeds 85 dBA, as averaged over the full workshift, or</p> <p>(ii) peak sound levels exceed 135 dBA,</p>

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		<del>(b) supply hearing protection to all workers required to enter such an area, and</del>
		<del>(c) ensure that hearing protection is worn by any worker working in the area.</del>
<b>Worker responsibility</b>	<b>7.16</b>	<b>A worker must wear hearing protection in all posted noise hazard areas and in accordance with instructions provided by the employer.</b>
		<b>Hearing Tests</b>
<b>Annual tests</b>	<b>7.17</b>	<b>(1) An</b> <del>The employer must provide hearing tests for</del> <b>give workers</b>
<b>Hearing tests</b>	<b>7.8</b>	<del>exposed who are exposed to noise above that exceeds the noise exposure limits in section 7.2 as follows:</del>
		(a) <del>an initial hearing test as soon as practicable</del> <b>after employment starts</b> , but not later than 6 months after the start of employment; <del>and</del>
		(b) <del>annual tests thereafter</del> <b>a test at least once every 12 months after the initial test.</b>
		<b>(2) Hearing tests must be administered by a hearing tester authorized by the Board.</b>
		<b>(3) The employer must ensure that the authorized hearing tester sends the test results to the Board.</b>
<b>Test administration</b>	<b>7.18</b>	<del>An employer must ensure that hearing tests are administered by persons authorized by the board.</del>
		<b>Noise Measurement</b>
<b>Records</b>	<b>7.8</b>	<del>(1) Noise exposure measurement results must be recorded and</del>
<b>Records to be kept</b>	<b>7.9</b>	<del>specify</del>
		<b>The employer must keep records of</b>
		<del>(a) the date of the noise measurement,</del>
		<b>(a) the annual hearing test results for each worker, which must</b>
		<b>(i) be kept as long as the worker is employed by the employer, and</b>
		<b>(ii) be kept confidential and not released to anyone without the written permission of the worker, or as otherwise required by law,</b>
		<del>(b) the workers or occupations evaluated, and</del>
		<b>(b) the education and training provided to workers, and</b>
		<del>(c) the measuring equipment used.</del>
		<b>(c) the results of noise exposure measurements taken under section 7.3.</b>
		<del>(2) An employer must ensure that current noise measurement results are readily available for reference by an officer, and the joint committee or the worker health and safety representative, as applicable.</del>
		<del>(3) If non-integrating noise measuring equipment is used for measuring noise exposure its use must be described and justified in writing.</del>

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**Hearing Tests**

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| <b>Test records</b>    | <b>7.21</b> | The employer must maintain, in a manner acceptable to the board, a record of the hearing tests for each worker which must be<br><br>(a) kept as long as the worker is employed by the employer, and<br>(b) treated as confidential and not released to anyone without the written permission of the worker.  |
| <b>Medical history</b> | <b>7.19</b> | (1) For an initial hearing test, the tester must request that the worker provide relevant medical history information and must record the information provided on a form or in a format required by the board.<br><br>(2) The employer must not duplicate or keep a copy of the medical history record.  |
| <b>Test results</b>    | <b>7.20</b> | An employer must ensure that the authorized hearing tester<br><br>(a) records the hearing tests in a manner required by the board,<br>(b) advises the worker of the test results,<br>(c) counsels the worker on the use and maintenance of hearing protection,<br>(d) on request, provides a copy of the test results to the worker, and<br>(e) submits the test results to the board. |

**Program Review**

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| <b>Joint committee</b> | <b>7.23</b> | When a joint committee or worker health and safety representative is required at the workplace, the employer must ensure that the committee or representative participates in the program review. |
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**VIBRATION DIVISION 2 – VIBRATION EXPOSURE**

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| <b>Definitions</b>                 | <b>7.24</b><br><b>7.10</b> | In sections 7.25 to 7.31 this Division:   |
| <i>"hand-arm vibration"</i>        |                            | means vibration that is transmitted from vibrating surfaces of objects, such as hand tools, through the hands and arms;   |
| <i>"vibration exposure limits"</i> |                            | means the limits referred to in section 7.11;   |
| <i>"whole-body vibration"</i>      |                            | means vibration that is transmitted to a worker's body from vibrating surfaces on which a worker stands or sits.  |
| <b>Equipment selection and use</b> | <b>7.26</b>                | (1) The exposure guidelines for vibration in the standards referenced in section 7.25 must be used for guidance in the purchase and design of equipment and machinery.<br><br>(2) When practicable, equipment which meets the guidelines in subsection (1) must be used in preference to equipment which produces higher levels of vibration.                             |
| <b>Vibration exposure limits</b>   | <b>7.11</b>                | <b>An employer must ensure, to the extent practicable, that workers are not exposed to vibration in excess of the limits specified in</b><br><br>(a) for hand-arm vibration, the American Conference of Governmental Industrial Hygienists publication entitled <i>Threshold Limit Values and Biological Exposure Indices</i> , dated 2003, as amended from time to time; |

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		<p>(b) for whole-body vibration, <i>ANSI Standard S3.18-2002/ISO 2631-1-1997, Mechanical Vibration and Shock – Evaluation of Human Exposure to Whole Body Vibration – Part 1: General Requirements</i>, as amended from time to time;</p> <p><b>except as otherwise determined by the Board.</b></p>
<b>Evaluation</b>	<b>7-25</b>	The evaluation of hand-arm vibration and whole-body vibration must be
<b>Evaluation of</b>	<b>7.12</b>	conducted <b>by the employer</b> in accordance with
<b>vibration</b>		
		<p><del>(a) ISO Standard 5349-1986, Mechanical Vibration – Guidelines for the Measurement and Assessment of Human Exposure to Hand-transmitted Vibration,</del></p> <p>(a) for hand-arm vibration, <i>ISO Standard 5349-1:2001, Mechanical Vibration – Measurement and Evaluation of Human Exposure to Hand-transmitted Vibration – Part 1: General Requirements and ISO Standard 5349-2:2001, Mechanical Vibration – Measurement and Evaluation of Human Exposure to Hand-transmitted Vibration – Part 2: Practical Guidance for Measurement at the Workplace</i>, as amended from time to time;</p> <p><del>(b) ANSI Standard S3.34-1986, Human Exposure to Vibration Transmitted to the Hand, Guide for the Measurement and Evaluation of,</del></p> <p>(b) for whole-body vibration, <i>ANSI Standard S3.18-2002/ISO 2631-1-1997, Mechanical Vibration and Shock – Evaluation of Human Exposure to the Whole Body Vibration – Part 1: General Requirements</i>, as amended from time to time;</p> <p><del>(c) ISO Standard 2631/1-1985, Evaluation of Human Exposure to Whole-body Vibration, or</del></p> <p><del>(d) other standard acceptable to the board.</del></p> <p><b>except as otherwise determined by the Board.</b></p>
<b>Reducing</b>	<b>7-27</b>	(1) <del>If equipment is used which produces excessive levels of vibration,</del>
<b>vibration</b>	<b>7.13</b>	<del>the employer must investigate and, if practicable, implement means to reduce the vibration.</del>
<b>Vibration</b>		<b>The employer must, if a worker is or may be exposed to vibration in excess of the vibration exposure limits, develop and implement an exposure control plan that meets the requirements of section 5.54 (2).</b>
<b>exposure control</b>		
<b>obligations</b>		
		<p><del>(2) Means to reduce whole body vibration include</del></p> <p><del>(a) controlling the source of vibration by engineered means such as balancing or vibration damping,</del></p> <p><del>(b) providing seated workers with vibration isolated seating,</del></p> <p><del>(c) providing standing workers with mechanically isolated flooring,</del></p> <p><del>(d) isolating the source of vibration by other measures, and</del></p> <p><del>(e) limiting the duration of exposure.</del></p> <p><del>(3) Means to reduce hand arm vibration include the use of anti vibration or low vibration tools, hand tools, grips and gloves.</del></p>

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<del>Information on adverse effects</del>	<del>7.30</del> 7.14	<del>The employer must, ensure that if a worker is exposed to excessive levels of vibration</del> <b>above the vibration exposure limits, inform the worker</b> <del>is informed of the nature of the hazard and possible adverse effects.</del>
Information about vibration hazards		
Labels	<del>7.28</del> 7.15	<del>If the manufacturer of Equipment which equipment that produces levels of vibration above the recommended guidelines must be labelled to identify the hazard in excess of the vibration exposure limits</del> <b>does not label the equipment to identify the hazard, the employer is responsible for doing so.</b>
<del>Pneumatic tools</del>	<del>7.29</del> 7.16	<del>The discharge of cold gases from a pneumatic tool that produces excessive levels of vibration must not be directed over the operator's unprotected hands.</del>
Exposure to cold and hand-arm vibration		<b>When a worker is exposed to hand-arm vibration, the employer, to the extent practicable, must ensure that the worker's hands or arms are not exposed to cold, either</b>  <b>(a) from the environment in which the worker is working or as a result of using equipment, or</b>  <b>(b) from coming into contact with cold objects.</b>
Instruction and training	7.31	<del>If a worker is exposed to excessive levels of vibration the employer must provide instruction and training in work practices that can reduce the risk, including</del>  <del>(a) maintenance of machinery to prevent the development of excess vibration,</del>  <del>(b) use of gloves and clothing to maintain body temperature,</del>  <del>(c) proper use of any anti vibration tools, grips or, in some circumstances, gloves, and</del>  <del>(d) any other effective means to reduce the transmission of vibration to the hands or body.</del>

~~IONIZING AND NON-IONIZING RADIATION DIVISION 3 – RADIATION EXPOSURE~~

Definitions	7.32 7.17	In sections 7.33 to 7.49 <del>this Division:</del>
<i>"action level, ionizing radiation"</i>		means an effective dose of 1 milliSievert (mSv) per year;
<i>"action level, non-ionizing radiation"</i>		means the exposure limits for the general public listed in the codes and standards identified in this Part <b>referred to in section 7.19 (4)</b> , <del>or or, if no public limit is specified in an applicable standard, referred to,</del> it means the maximum exposure limit for workers <del>as specified in the standard;</del> <b>referred to in section 7.19 (4)</b> ;
<i>"effective dose"</i>		means the amount of ionizing radiation, <b>measured</b> (in mSv), absorbed by the worker's whole body, adjusted for the energy level and type of radiation and the differing susceptibilities of the organs and tissues irradiated, and if only part of the body is <del>exposed,</del> <b>exposed</b> the effective dose is the sum of the weighted equivalent doses in all irradiated tissues and organs;

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"equivalent dose"		means the amount of ionizing radiation, <b>measured</b> (in mSv), absorbed by a specific body part and adjusted for the energy level and type of radiation.
<b>Application</b>	<b>7.33</b> <b>7.18</b>	<p>(1) <del>Sections 7.34 to 7.49 apply</del> <b>This Division applies</b> to all sources of ultrasonic energy, non-ionizing and ionizing radiation, including radiation sources governed by the <del><i>Atomic Energy Control Act</i> (Canada), or any successor legislation, and the regulations under that Act, but excluding natural background radiation, except as specified by the board, and medical or dental radiation received as a patient.</del> <b><i>Nuclear Safety and Control Act</i> (Canada), except as otherwise determined by the Board.</b></p> <p>(2) <b>This Division does not apply to medical or dental radiation received by a patient, or to natural background radiation, except as specified by the Board.</b></p>
		<b>Ionizing Radiation</b>
<b>General responsibility</b>	<b>7.38</b>	The employer must ensure that the exposure of workers to ionizing radiation is kept as low as reasonably achievable below the exposure limits.
<b>Exposure limits</b>	<b>7.39</b> <b>7.19</b>	<p>(1) A worker's exposure to ionizing radiation must be limited to <del>not exceed any of the following:</del></p> <ul style="list-style-type: none"> <li>(a) an annual effective dose of 20 mSv; <del>and</del></li> <li>(b) an annual equivalent dose of <ul style="list-style-type: none"> <li>(i) 150 mSv to the lens of the eye,</li> <li>(ii) 500 mSv to the skin, averaged over any 1 cm<sup>2</sup> area at a nominal depth of 7 mg/cm<sup>2</sup>, regardless of the area exposed, <del>and</del> or</li> <li>(iii) 500 mSv to the hands and feet.</li> </ul> </li> </ul> <p>(2) <del>Once</del> <b>If a worker has declared</b> <del>declares</del> her pregnancy <b>to the employer</b>, her effective dose <b>of ionizing radiation</b>, for the remainder of the pregnancy, from external and internal sources, must be limited <b>by the employer</b> to the lesser of</p> <ul style="list-style-type: none"> <li>(a) 4 mSv, or</li> <li>(b) the dose limit specified for pregnant workers under the <del><i>Atomic Energy Control Act</i>, or any successor legislation,</del> <b><i>Nuclear Safety and Control Act</i> (Canada)</b> <del>and the regulations under that Act.</del></li> </ul> <p>(3) <b>The employer must ensure that the exposure of workers to ionizing radiation is kept as low as reasonably achievable below the exposure limits.</b></p> <p>(4) <b>The employer must ensure that a worker's exposure to non-ionizing radiation does not exceed the exposure limits specified in</b></p> <ul style="list-style-type: none"> <li>(a) <b>for radiofrequency:</b> <ul style="list-style-type: none"> <li>(i) <b><i>Health Canada Safety Code 25, Short-Wave Diathermy Guidelines for Limiting Radiofrequency Exposure, 1983, as amended from time to time;</i></b></li> </ul> </li> </ul>

- (ii) *Health Canada Safety Code 26, Guidelines on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems, 1987, as amended from time to time;*
- (iii) *Health Canada Safety Code 6, Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999, as amended from time to time, and*

(b) for lasers:

- (i) *ANSI Standard Z136.1-2000, Safe Use of Lasers, as amended from time to time;*
- (ii) *ANSI Standard Z136.2-1997, Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources, as amended from time to time;*
- (iii) *ANSI Standard Z136.3-1996, Safe Use of Lasers in Health Care Facilities, as amended from time to time;*
- (iv) *CSA Standard Z386-01, Laser Safety in Health Care Facilities, as amended from time to time,*

except as otherwise determined by the Board.

- (5) A worker's exposure to ultraviolet radiation produced by equipment or industrial processes must not exceed the threshold limit values specified in the American Conference of Governmental Industrial Hygienists publication entitled *Threshold Limit Values and Biological Exposure Indices*, dated 2003, as amended from time to time.

**Non-ionizing Radiation**

**Electromagnetic fields**

**7.46**

- ~~(1) Exposure to radiofrequency electromagnetic fields from short-wave diathermy devices must be limited to the maximum exposure levels in the latest edition of *Safety Code 25, Health and Welfare Canada, Short-Wave Diathermy Guidelines for Limiting Radiofrequency Exposure.*~~
- ~~(2) Exposure to electromagnetic fields from magnetic resonance clinical systems must be limited to the maximum exposure levels in the latest edition of *Safety Code 26, Health and Welfare Canada, Guideline on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems.*~~
- ~~(3) Except as identified in subsections (1) and (2), exposure to non-ionizing radiation and contact currents from radiofrequency electromagnetic fields must not exceed the limits in the latest edition of *Safety Code 6, Health and Welfare Canada, Limits of Exposure to Radiofrequency Fields at Frequencies from 10 kHz to 300 GHz.*~~



### **Ionizing Radiation**

- |                                       |                            |   |
|---------------------------------------|----------------------------|---|
| <b>Instructions</b>                   | <b>7.40</b>                | <p>(1) <del>Before a worker uses or approaches equipment or materials whereby the worker exceeds, or may exceed the action level, the employer must prepare written instructions for</del></p> <ul style="list-style-type: none"> <li><del>(a) the safe operation of the equipment,</del></li> <li><del>(b) the boundaries of the hazard area,</del></li> <li><del>(c) the work procedures to be followed,</del></li> <li><del>(d) the correct use of any required personal protective equipment, and</del></li> <li><del>(e) procedures to be followed in an emergency.</del></li> </ul> <p>(2) <del>The instructions required by subsection (1) must be posted or otherwise available in the work area, or near the equipment controls.</del></p> |
| <b>Reviewing exposure information</b> | <b>7.44</b>                | <p>(1) <del>In assessing the adequacy of control measures for ionizing radiation, the employer must use all available exposure information to measure the effectiveness of the controls in comparison with similar industry and occupation groups.</del></p> <p>(2) <del>If there is a significantly higher dose profile than industry averages indicate is achievable, the employer must examine the work practices and conditions of exposure at the workplace, and alter them to reduce the unusually high doses as required by section 7.38.</del></p>  |
| <b>Reproductive hazards</b>           | <b>7.45</b><br><b>7.21</b> | <p>(1) The employer must ensure that every worker who exceeds, or may exceed, the action level, <b>ionizing radiation</b> is fully informed of any potential reproductive hazards associated with <del>the worker's</del> exposure to ionizing radiation.</p> <p>(2) When requested by a pregnant worker or by a worker intending to conceive a child, the employer must make counselling available with respect to the reproductive hazards <b>associated with exposure to ionizing radiation</b>.</p>   |
| <b>Monitoring exposure</b>            | <b>7.44</b><br><b>7.22</b> | <p>(4) <del>Unless specifically exempted by the board</del><b>Board</b>, if a worker exceeds or may exceed the action level, <b>ionizing radiation</b>, the employer must ensure that the worker is provided with and properly uses an <del>acceptable</del> a personal dosimeter <b>acceptable to the Board</b>.</p> <p>(2) <del>Personal dosimetry data must be submitted to the National Dose Registry of Health Canada, and if requested, a copy must be submitted to the board.</del></p>  |

### **General Requirements**

- |  |                            |  |
|--|----------------------------|--|
| <b>Operation of equipment Standards for use of equipment</b> | <b>7.35</b><br><b>7.23</b> | <p>Equipment producing ionizing or non-ionizing radiation <b>or ultrasonic energy</b> must be installed, operated and maintained in accordance with the applicable standard from the following list, or other standard acceptable to the board: <b>following</b>:</p> <ul style="list-style-type: none"> <li>(a) <b>for ionizing radiation</b>: <ul style="list-style-type: none"> <li>(i) <b>Health Canada Safety Code 20A, X-Ray Equipment in Medical Diagnosis Part A: Recommended Safety Procedures for Installation and Use, 1980, as amended from time to time;</b></li> </ul> </li> </ul> |
|--|----------------------------|--|

- (ii) **Health Canada Safety Code 27, Requirements for Industrial X-Ray Equipment Use and Installation, 1987, as amended from time to time;**
  - (iii) **Health Canada Safety Code 28, Radiation Protection in Veterinary Medicine – Recommended Safety Procedures for Installation and Use of Veterinary X-Ray Equipment, 1991, as amended from time to time;**
  - (iv) **Health Canada Safety Code 29, Requirements for the Safe Use of Baggage X-Ray Inspection Systems, 1993, as amended from time to time;**
  - (v) **Health Canada Safety Code 30, Radiation Protection in Dentistry – Recommended Safety Procedures for the Use of Dental X-Ray Equipment, 1999, as amended from time to time;**
  - (vi) **Health Canada Safety Code 31, Radiation Protection in Computed Tomography Installation, 1994, as amended from time to time;**
  - (vii) **Health Canada Safety Code 32, Safety Requirements and Guidance for Analytical X-Ray Equipment, 1994, as amended from time to time;**
  - (viii) **Health Canada Safety Code 33, Radiation Protection in Mammography, 1995, as amended from time to time;**
- (b) for radiofrequency:
- (i) **Health Canada Safety Code 25, Guidelines for Limiting Radiofrequency Exposure – Short-Wave Diathermy, 1983, as amended from time to time;**
  - (ii) **Health Canada Safety Code 26, Guidelines on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems, 1987, as amended from time to time;**
  - (iii) **Health Canada Safety Code 6, Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999, as amended from time to time;**
- (c) for lasers:
- (i) **ANSI Standard Z136.1-2000, Safe Use of Lasers, as amended from time to time;**
  - (ii) **ANSI Standard Z136.2-1997, Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources, as amended from time to time;**
  - (iii) **ANSI Standard Z136.3-1996, Safe Use of Lasers in Health Care Facilities, as amended from time to time;**
  - (iv) **CSA Standard Z386-01, Laser Safety in Health Care Facilities, as amended from time to time;**
- (d) for infrared and ultraviolet:

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- (i) **CSA Standard CAN/CSA-C22.2 No. 224-M89 (R1994), Radiant Heaters and Infrared and Ultraviolet Lamp Assemblies for Cosmetic or Hygienic Purposes in Nonmedical Applications**, as amended from time to time;
- (e) for ultrasound:
  - (i) **Health Canada Guidelines for the Safe Use of Diagnostic Ultrasound, 2001**, as amended from time to time;
  - (ii) **Health Canada Safety Code 24, Guidelines for the Safe Use of Ultrasound: Part II – Industrial and Commercial Applications, 1991**, as amended from time to time,

except as otherwise determined by the Board.

**Ionizing:**

- ~~(a) latest edition of *Safety Code 20a, Health and Welfare Canada, X-ray Equipment in Medical Diagnosis, Part A – Recommended Safety Procedures for Installation and Use*;~~
- ~~(b) latest edition of *Safety Code 27, Health and Welfare Canada, Requirements for Industrial X-ray Equipment – Use and Installation*;~~
- ~~(c) latest edition of *Safety Code 28, Health and Welfare Canada, Radiation Protection in Veterinary Medicine – Recommended Safety Procedures for Installation and Use of Veterinary X-ray Equipment*;~~
- ~~(d) latest edition of *Safety Code 29, Health Canada, Requirements for the Safe Use of Baggage X-ray Inspection Systems*;~~
- ~~(e) latest edition of *Safety Code 30, Health Canada, Radiation Protection in Dentistry: Recommended Safety Procedures for the Use of Dental X-ray Equipment*;~~
- ~~(f) latest edition of *Safety Code 31, Health Canada, Radiation Protection in Computed Tomography Installations*;~~
- ~~(g) latest edition of *Safety Code 32, Health Canada, Safety Requirements & Guidance for Analytical X-ray Equipment*;~~
- ~~(h) latest edition of *Safety Code 33, Health Canada, Radiation Protection in Mammography*;~~

**Radiofrequency:**

- ~~(i) latest edition of *Safety Code 26, Health and Welfare Canada, Guideline on Exposure to Electromagnetic Fields from Magnetic Resonance Clinical Systems*;~~
- ~~(j) latest edition of *Safety Code 6, Health and Welfare Canada, Limits of Exposure to Radiofrequency Fields at Frequencies from 10 kHz to 300 GHz*;~~
- ~~(k) latest edition of *Safety Code 25, Health and Welfare Canada, Short-Wave Diathermy Guidelines for Limiting Radiofrequency Exposure*;~~

**Lasers:**

- ~~(l) *ANSI Standard Z136.1-1993, Safe Use of Lasers*;~~

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~~(m) ANSI Standard Z136.2-1988, Safe Use of Optical Fiber  
Communication Systems Utilizing Laser Diode and LED Sources;~~

~~(n) ANSI Standard Z136.3-1988, Safe Use of Lasers in Health Care  
Facilities;~~

**Infrared and ultraviolet:**

~~(o) CSA Standard CAN/CSA-G22.2 No. 224-M89 (R1994), Radiant  
Heaters and Infrared and Ultraviolet Lamp Assemblies for Cosmetic  
or Hygienic Purposes in Nonmedical Applications.~~

**Non-ionizing Radiation**

**Ultrasound**

**7.49**

The operation of equipment which emits ultrasonic energy must be in accordance with the practices and procedures identified in the following codes or standards, where applicable, or other standard acceptable to the board:

~~(a) latest edition of Safety Code 23, Health and Welfare Canada—  
Guidelines for the Safe Use of Ultrasound: Part 1—Medical and  
Paramedical Applications;~~

~~(b) latest edition of Safety Code 24, Health and Welfare Canada—  
Guidelines for the Safe Use of Ultrasound: Part 2—Industrial and  
Commercial Applications.~~

**Ionizing Radiation**

**Radiation  
surveys**

**7.42**

**7.24**

~~(1) If a worker exceeds, or may exceed, the action level, **Except as otherwise determined by the Board**, the employer must conduct a radiation survey **for ionizing radiation** which measures radiation levels in the occupied work areas that may be influenced by the radiation producing equipment or material **in accordance with the standard practice specified under the applicable Safety Code listed in section 7.23 (a) or the regulations under the Nuclear Safety and Control Act (Canada)**,~~

~~(a) at the times required by the Safety Code or regulations, as the case requires,~~

~~(b) if equipment has been damaged or modified, or~~

~~(c) if there is an indication of an unusually high exposure of a worker to ionizing radiation.~~

~~(2) A radiation survey must include leak testing to determine any unusual source of emission of ionizing radiation or any source of escape of a radioisotope.~~

~~(3) The radiation survey must be conducted at least every 2 years, and when~~

~~(a) the equipment has been damaged or modified,~~

~~(b) a radioisotope or a radioactive sample has been spilled or accidentally released,~~

~~(c) there is an indication of an unusually high exposure of a worker to ionizing radiation, or~~

~~(d) specified in the equipment manufacturer's instructions.~~

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- Records**                    **7.43**            (1) The employer must  
                                      **7.25**
- (a) ~~maintain records of radiation surveys and make available to the Board,~~
    - (i) for at least 10 years, **records of radiation surveys**, and of exposure monitoring and personal dosimetry data
    - (ii) for the period of employment ~~that the worker is employed plus 10 years,~~ **records of exposure monitoring and personal dosimetry data, and**
  - (b) **make the records available to workers.**

(2) ~~The records referenced in subsection (1) must be available to workers.~~

**General Requirements**

- Personal protective equipment**                    **7.36**            If required in a standard acceptable to the board, personal protective equipment must be provided by the employer and properly used by the worker.

**HEAT STRESS DIVISION 4 – THERMAL EXPOSURE**

- Definitions**                    **7.50**            In sections 7.51 to 7.62 this Division:  
                                      **7.26**

**“ACGIH Standard”**                                    **means the American Conference of Governmental Industrial Hygienists publication entitled *Threshold Limit Values and Biological Exposure Indices*, dated 2003, as amended from time to time, except as otherwise determined by the Board;**

**“unacclimatized worker”**                            means a worker who is not accustomed to working in a hot environments or who has ~~been removed from~~ **been out of** a hot environment for seven consecutive days;

**“WBGT °C”**    means ~~the wet bulb globe temperature measured with a black globe thermometer (GT), wet bulb thermometer (WB), and a dry thermometer (DB) and measured according to the equations~~

(a) ~~for indoor or outdoor environments with no solar load,  $WBGT^{\circ}C = 0.7WB + 0.3GT$ , and~~

(b) ~~for outdoor environments with solar load,  $WBGT^{\circ}C = 0.7WB + 0.2GT + 0.1DB$ .~~

**Heat Exposure**

- Application**                    **7.54**            (1) **Subject to subsection (2), Sections 7.52 to 7.62 sections 7.28 to**  
                                      **7.27**                    **7.32 apply to a workplace where-if**
- (a) a worker is or may be exposed to **thermal** conditions which could cause heat related disorders, ~~including exposure to a thermal environment that stress,~~
  - (a) ~~is in excess of the heat action levels in Table 7.2, or~~
  - (b) ~~which could result in a worker’s core body temperature exceeding 38° C (100° F).~~

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		(b) the thermal conditions could result in a worker's core body temperature exceeding 38° C (100° F), or
		(c) the thermal conditions are in excess of the levels listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard for unacclimatized workers.
		(2) Firefighting is exempt from subsection (1) provided <del>Subsection (1) does not apply to firefighting if special provisions, satisfactory to the Board, are made in place to ensure that the firefighter's core body temperature is maintained below 38° C (100° F), including</del>
		<del>(a) instruction and training,</del>
		<del>(b) work procedures that address both the hazards and necessary controls, and</del>
		<del>(c) specialized personal protective equipment.</del>
<b>Exposure limits</b>	<del>7.52</del> <del>7.28</del>	The exposure of a worker wearing a single layer of light summer clothing must be maintained below the heat exposure limits listed in Table 7-2 by <del>engineering or administrative controls.</del>
		(1) A worker must not be exposed to levels that exceed those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard.
		(2) Clothing corrections must be applied in accordance with the heat stress and strain section of the ACGIH Standard.
<b>Clothing correction</b>	<del>7.54</del>	If clothing other than a single layer of light summer clothing is required to be worn due to the nature of the work, the heat action levels and exposure limits must be corrected by subtracting the appropriate clothing correction value listed in Table 7-3.
<b>Heat stress assessment</b>	<del>7.55</del>	(1) If a worker is or may be exposed to conditions which could cause heat related disorders, <del>the conditions specified in section 7.27,</del> the employer must
<b>Heat stress assessment and exposure control plan</b>	<del>7.29</del>	(a) conduct a heat stress assessment to determine the potential for <del>overexposure of workers by measuring the WBGT° C or other measuring standard acceptable to the board in the work area.</del> <b>hazardous exposure of workers, using measures and methods that are acceptable to the Board, and</b>
		(b) develop and implement a heat stress exposure control plan meeting the requirements of section 5.54 (2).
<b>Exposure control plan</b>	<del>7.56</del>	If a worker is or may be regularly exposed to a thermal environment in excess of the heat action levels as determined by a heat stress assessment, the employer must develop and implement an exposure control plan meeting the requirements of section 5.54.
<b>Education and training</b>	<del>7.61</del>	Workers at risk of heat related disorders, and their supervisors and immediate coworkers must be adequately educated and trained in
		(a) recognition of signs and symptoms of heat related disorders, and

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		<del>(b) the responsibility to leave the hot environment if signs or symptoms of a heat-related disorder occur.</del>
<b>Action levels</b>	<b>7.53</b>	The exposure of an unacclimatized worker wearing a single layer of light summer clothing must be maintained below the heat action levels listed in Table 7-2.
<b>Heat stress controls</b>	<b>7.30</b>	<p>(1) If a worker is or may be exposed to the conditions specified in section 7.27, the employer must implement engineering controls to reduce the exposure of workers to levels below those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard.</p> <p>(2) If the action described in subsection (1) is not practicable, the employer must reduce the exposure of workers to levels below those listed in the screening criteria for heat stress exposure in the heat stress and strain section of the ACGIH Standard by providing</p> <p>(a) administrative controls, including a work-rest cycle, acceptable to the Board, or</p> <p>(b) personal protective equipment, if the equipment provides protection equally effective as administrative controls.</p>
<b>Risk control</b>	<b>7.57</b>	<p><del>(1) If it is not practicable to reduce exposure below the heat exposure limits by engineering controls then the employer must provide</del></p> <p><del>(a) administrative controls such as an acceptable work rest cycle, or</del></p> <p><del>(b) where it provides equally effective protection, personal protective equipment such as reflective suits or air or water cooled vests.</del></p> <p><del>(2) The work rest cycle must ensure that the thermal index averaged over the hottest 2 hour period is below the exposure limits listed in Table 7-2.</del></p>
<b>Provision of water</b>	<b>7.58</b> <b>7.31</b>	The employer must provide and maintain an adequate supply of cool potable water close to the work area for the use of a heat exposed worker. <b>If a worker is or may be exposed to the conditions specified in section 7.27, the employer must provide and maintain an adequate supply of cool potable water close to the work area for the use of a heat exposed worker.</b>
<b>Warning signs</b>	<b>7.60</b>	<del>The employer must post heat stress hazard warning signs in indoor work areas where the heat exposure limits could be exceeded if a worker was continuously exposed to heat.</del>
<b>Removal and treatment</b>	<b>7.59</b>	If a worker exhibits <del>shows</del> signs or reports symptoms of a heat-related disorder <del>heat stress or strain</del> , the worker must be removed from the hot environment and <del>assessed</del> <b>treated</b> by a <del>Level 2 or Level 3</del> <b>an appropriate</b> first aid attendant, if available, or by a physician.
<b>Removal from and treatment for heat exposure</b>	<b>7.32</b>	
<b>Records</b>	<b>7.62</b>	The employer must, when required by the board, maintain records of
		<del>(a) the heat stress assessment required under section 7.55, and</del>
		<del>(b) worker education and training.</del>

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**Table 7-2: Action levels and exposure limits**

Work load <sup>1</sup>	Action level <sup>2</sup> (2-hour TWA)	Exposure limit <sup>2</sup> (2-hour TWA)
Light Work that generates a metabolic rate of less than 200 kcal/hr such as: performing light hand work while seated or standing, casual walking.	28 WBGT <sup>o</sup> C	30 WBGT <sup>o</sup> C
Moderate Work that generates a metabolic rate of between 200 and 350 kcal/hr such as: hand and arm work, arm and leg work, picking fruits and vegetables, brisk walking.	24.7 WBGT <sup>o</sup> C	26.7 WBGT <sup>o</sup> C
Heavy Work that generates a metabolic rate greater than 350 kcal/hr such as: shovelling, sledge hammer work, sawing, planing, digging, axe work, pushing or pulling heavy loads, angle grinding, restocking cans on shelves.	23 WBGT <sup>o</sup> C	25 WBGT <sup>o</sup> C
<sup>1</sup> - If work involves a continuous task the work load is based on the metabolic rate for that task. If the work involves a variety of tasks or is intermittent, the work load is based on the average metabolic rate for the various activities, weighted according to the duration of each. <sup>2</sup> - The WBGT for a particular work situation is the time-weighted average over the hottest 2 hour period of work.		

**Table 7-3: Clothing correction values**

Clothing type	Correction value (WBGT <sup>o</sup> C)
Cotton coveralls worn over light summer clothing	2
Winter work clothing	4
Impervious coveralls	6

**COLD-STRESS**

**Cold Exposure**

<b>Application</b>	<b>7.63</b> <b>7.33</b>	<p>Sections <del>7.64 to 7.75</del> <b>7.34 to 7.38</b> apply to <del>any a</del> workplace where if a worker is, or may be, exposed to conditions which would cause the body core temperature to fall below 36° C (96.8° F) or would cause cold-related injury to the exposed skin.</p> <p>(a) <b>thermal conditions that could cause cold stress or injury,</b></p> <p>(b) <b>thermal conditions that could cause a worker’s core body temperature to fall below 36° C (96.8° F), or</b></p> <p>(c) <b>thermal conditions that are below the levels classified as “little danger” to workers in the criteria for the cooling power of wind on exposed flesh in the cold stress section of the ACGIH Standard.</b></p>
<b>Cold stress assessment</b> <b>Cold stress assessment and exposure control plan</b>	<b>7.64</b> <b>7.34</b>	<p><del>(1) If a worker is or may be exposed to the conditions which could cause hypothermia or cold-related injury, specified in section 7.33, the employer must</del></p> <p>(a) <b>conduct a cold stress assessment to determine areas and tasks where workers may be at risk. the potential for hazardous exposure of workers, using measures and methods that are acceptable to the Board, and</b></p> <p><del>(2) The potential for accidental exposure to cold conditions must be included in this assessment.</del></p> <p>(b) <b>develop and implement a cold exposure control plan meeting the requirements of section 5.54 (2).</b></p>
<b>Education and training</b>	<b>7.74</b>	<p><del>Workers at risk of developing hypothermia or cold-related injury must be adequately educated and trained in</del></p> <p><del>(a) recognition of the signs and symptoms of cold injury or impending hypothermia,</del></p> <p><del>(b) proper rewarming procedures and appropriate first aid treatment,</del></p> <p><del>(c) proper use of clothing,</del></p> <p><del>(d) proper eating and drinking practices, and</del></p> <p><del>(e) safe work practices appropriate to the work that is to be performed.</del></p>
<b>Records</b>	<b>7.75</b>	<p>The employer must, when required by the board, maintain records of</p> <p><del>(a) the cold stress assessment required under section 7.64, and</del></p> <p><del>(b) worker education and training.</del></p>
<b>Cold stress controls</b>	<b>7.35</b>	<p>(1) <b>If a worker is or may be exposed to the conditions specified in section 7.33, the employer must implement effective engineering controls to reduce the exposure hazard to levels above those classified as “little danger” to workers in the criteria for the cooling power of wind on exposed flesh in the cold stress section of the ACGIH Standard.</b></p> <p>(2) <b>If the action described in subsection (1) is not practicable, the employer must reduce the exposure hazard by providing</b></p>

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- (a) **effective administrative controls, or**
- (b) **personal protective equipment, if the equipment provides protection equally effective as administrative controls.**

<b>Cold surfaces</b>	<b>7.66</b>	When cold surfaces are present, precautions must be taken to prevent frostbite from contact with these surfaces.
<b>Hand warming</b>	<b>7.70</b>	If a worker is required to perform work with bare hands and there is a risk of cold related injury to the hands, provision must be made for warming the worker's hands to prevent the cold-related injury.
<b>Accidental exposure</b>	<b>7.71</b>	If it can be reasonably anticipated that a worker may be exposed to hazardous cold conditions outdoors as a result of an unplanned event, the worker at risk must be provided with clothing and equipment sufficient to permit survival from exposure to the natural elements until the worker can be removed from the exposure.
<b>Heated shelters</b>	<b>7.65</b> <b>7.36</b>	If a worker is exposed to a thermal environment with an equivalent chill temperature less than -7° C (19° F), as determined using <del>Table 7.4</del> <b>the criteria for the cooling power of wind on exposed flesh in the cold stress section of the ACGIH Standard, a nearby heated shelter must be available to the worker.</b>  (a) <del>a heated shelter must be made available near the worker, and</del> (b) <del>the worker must be instructed to enter the shelter at the onset of symptoms of impending hypothermia.</del>
<b>Clothing Clothing and personal protective equipment</b>	<b>7.67</b> <b>7.37</b>	(1) A worker who is <b>or may be exposed to the conditions referred to in section 7.33 at risk of developing hypothermia or cold-related injury must wear adequate insulating outer clothing and personal protective equipment.</b>  (2) <del>For</del> <b>If</b> work in a controlled environment such as a freezer the employer must provide protective clothing which affords adequate protection against cold conditions <b>takes place outdoors in snow or ice covered terrain where excessive ultraviolet light, glare or blowing ice crystals present a risk of injury to the eyes, workers must wear eye protection appropriate to the hazards.</b>  (3) <del>If clothing becomes wet so that its insulating value is impaired, the worker must be provided with the opportunity to change into dry clothing in a heated shelter.</del>  (4) <del>If a worker becomes immersed in water, the worker must be immediately provided with dry clothing and, if necessary, treated for hypothermia.</del>
<b>Eye protection</b>	<b>7.68</b>	<del>If work takes place outdoors in snow or ice covered terrain and there is excessive ultraviolet light, glare or blowing ice crystals which present a risk of injury to the eyes, workers must wear eye protection appropriate to the hazards.</del>
<b>Protection of the extremities</b>	<b>7.69</b>	Protective gloves, mittens, footwear, head covering and/or facemasks appropriate to the hazard must be worn if there is a danger of frostbite to the extremities.

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<b>Removal and treatment</b>	<del>7.72</del> <b>7.38</b>	<del>If a cold exposed worker exhibits signs or reports symptoms of impending hypothermia.</del> <b>If a worker exposed to cold shows signs or reports symptoms of cold stress or injury</b> , the worker must be removed from further exposure and assessed <del>treated</del> by a <del>Level 2 or Level 3</del> <b>an appropriate</b> first aid attendant, if available, or a physician.
<b>Warning signs</b>	<del>7.73</del>	<del>Warning signs must be posted in indoor work areas where there is a risk of hypothermia or cold-related injury.</del>

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**Table 7-4: Equivalent chill temperature<sup>1</sup>**

Estimated wind speed (in km/h)	Actual temperature reading (°C)												
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
0 (Calm)	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
8	9	3	-2	-7	-12	-18	-23	-28	-33	-38	-44	-49	-54
16	4	-2	-7	-14	-20	-27	-33	-38	-45	-50	-57	-63	-69
24	2	-5	-11	-18	-25	-32	-38	-45	-52	-58	-65	-72	-78
32	0	-7	-14	-21	-28	-35	-42	-50	-56	-64	-71	-78	-84
40	-1	-8	-16	-24	-31	-38	-46	-53	-60	-67	-76	-82	-90
48	-2	-10	-17	-25	-33	-40	-48	-55	-63	-70	-78	-86	-94
56	-3	-11	-18	-26	-34	-42	-50	-58	-65	-73	-81	-89	-96
64	-3	-11	-19	-27	-35	-43	-51	-59	-66	-74	-82	-90	-98
(Wind speeds greater than 64 km/h have little additional effect.)	LOW HAZARD Risk of exposed, dry skin being affected in less than one hour. Awareness of hazard low.				INCREASING HAZARD Danger from freezing of exposed flesh within one minute.				HIGH HAZARD Flesh may freeze within 30 seconds.				

The table was originally developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA, and is adapted from the 1995-1996 *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, published by the ACGIH. The ACGIH publication provides the equivalent table with temperature in degrees Fahrenheit and wind speed in mph.

Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36° C (96.8° F).

Equivalent chill temperatures for actual temperatures and wind speeds not listed in this chart may be calculated by interpolation. For example, at a wind speed of 16 km/h, an actual temperature reading of -23° C (<sup>3</sup>/<sub>5</sub> of the difference between -20°C and -25°C) produces an equivalent chill temperature of -36° C (<sup>3</sup>/<sub>5</sub> of the difference between -33° C and -38° C).

<sup>1</sup> This table shows the cooling power of wind on exposed flesh expressed as equivalent temperature under calm conditions.