South African Institute of Occupational Safety and Health

Comments

Draft Physical Agents Regulations 2022
Government Gazette 47337 NO. 2665 21 October 2022

	(New/Amended)	Comments	Proposal
	Definitions 1. In these Regulations any word or expression to which a meaning has been assigned in the Act has the meaning so assigned and, unless the context indicates otherwise-		
	"action level" means the level of an agent at which specified actions or counter measures which must to be taken;		
	"air velocity" means the rate of motion of air in a given direction, measured as distance per unit time;		
	"air temperature" means the temperature of air as determined by a standard thermometer, with units expressed in degrees Celsius (°C);		
	"artificial ventilation" means the system in which air is caused to circulate through a room by means of a mechanical apparatus which forces air into or extracts air from such a room;	Suggest using the ASHRAE definition for mechanical (artificial) ventilation.	**"artificial ventilation"** means the active process of supplying air to or removing air from an indoor space by powered equipment such as motor-driven fans and blowers but not by devices such as wind-driven turbine ventilators and mechanically operated windows.
	"clothing adjustment factor" means the single number that is added to the environmental WBGT to represent the effects of clothing worn during an activity;		
	"Chief Director: Provincial Operations" means the provincial director as defined in regulation 1 of		

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	the General Administrative Regulations, 2003, published as Government Notice R.929 in Gazette No. 25129 of 25 June 2003;		
	"competent person" means a) has, in respect of the work or task to be performed, the required knowledge, training and experience in the physical agent and, where applicable, the relevant qualifications specific to the physical agent: provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2008 (Act No. 67 of 2008), those qualifications and that training must be regarded as the required qualifications and training; and b) is familiar with the Act and the applicable regulations made under the Act;		
	"electromagnetic field" means the static electric, static magnetic and time-varying electric, magnetic and electromagnetic fields with frequencies up to 300 GHz;		
	"equivalent chill temperature" means the expression of wind-chill reflecting the cooling power of wind on exposed flesh;	The proposed 10 C, based on Equivalent chill temperature", requires air temperature plus wind /air movement. USA (OSHA) and UK (Health & Safety Executive) legislate cold stress but don't stipulate a windchill level. At 10 C windchill air movement has limited effect calm or 1.4 m/s. Propose using dry-bulb and not windchill.	Delete definition.

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	"exposure" means the condition of being affected by a physical agent at the workplace, and includes potential, accidental or possible exposure, and exposed has a derivative meaning;	"The condition of being affected by a physical agent" is the effect. This is the outcome of exposure and not exposure itself. Exposure results in effect.	**"exposure"** means contact to a physical agent and includes potential, accidental or possible exposure, and exposed has a derivative meaning;
	"exposure monitoring" means the systematic process of measuring the magnitude, frequency and duration of exposure to a physical agent;		
	"flicker" means the perception of visual unsteadiness induced by a light stimulus the luminance or spectral distribution of which fluctuates with time, for a static observer in a static environment;	Since the definition provided uses very particular framework (static observer with static environment), it is appropriate to include the range of frequency that is applicable. Additionally, this should be accompanied by the addition of stroboscopic effect also including a frequency range. This then shows the difference in meaning between flicker and stroboscopic effect. A suggested definition is provided.	**"flicker"** means the perception of visual unsteadiness induced by a light stimulus the luminance or spectral distribution of which fluctuates with time, for a static observer in a static environment, with a typical frequency range from 0 – 80 Hz; **"Stroboscopic Effect"** means the change in motion perception induced by a light stimulus whose luminance or spectral distribution fluctuates with time, for a static observer in a non-static environment, with a typical frequency range from 80 – 2000 Hz;
	"glare" means the condition of vision that is caused by luminance that sufficiently exceeds the luminance to which the eyes are adapted and that causes annoyance or discomfort or reduction in visual performance and visibility; **"hand-arm vibration"** means the mechanical vibration which is transmitted into the hands and arms during a work activity;		
	"illuminance" means the expressed amount of light falling upon a surface, and measured in the unit of lux;		

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	"indoor air quality" means the totality of attributes of indoor air that affect a person's health and wellbeing;	Suggest that the definition is too wide at the moment. Considering the wide scope of IAQ it is necessary to define what is included. Particularly because Ionising radiation is outside the scope of mandate of DEL it is NB to note that the definition excludes radon gas. This is with the understanding that radon is responsible for 3-14% of lung cancers (depending on country and smoking prevalence).	"Indoor air pollution" means chemical and biological contamination of indoor air, which may result in adverse health effects, where pollutants may include suspended Particulate Matter (PM2.5 & PM10), nitrogen dioxide (NO2), Sulphur Dioxide (SO2), carbon monoxide (CO), formaldehyde, volatile organic compounds (VOC's), polycyclic aromatic hydrocarbons (PAHs), ozone, asbestos, mercury, human-made mineral fibres, tobacco smoke, allergens, bacteria and viruses, but excludes radon which is under the mandate of the National Nuclear Regulator
	"lighting" means the application of light to a scene, objects or their surroundings so that they may be seen, and illumination has a corresponding meaning;		
	"natural ventilation" means the movement of air through a building due to natural causes;	It needs to be clear that ventilation is the air exchange between indoor and outdoor environment. Additionally, it is "forces" that drive ventilation and not "causes". Forces include: winds and thermal buoyancy force due to indoor and outdoor air density differences.	**"natural ventilation"** means the flow of air between the outside and the inside of the building, due to natural forces;
	"non-ionising radiation" means the series of energy waves composed of oscillating electric and magnetic fields traveling at the speed of light, and includes the spectrum of ultraviolet, visible light, infrared, microwave, radio frequency, and extremely low frequency;		
	"occupational exposure limit" means the limit value set by the Minister for a physical agent in the workplace;		

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	"optical radiation" means the part of the electromagnetic spectrum, and includes infrared radiation, visible light and ultraviolet radiation;		
	"physical agents" means a source of energy which may result in injury or disease after exposure, and includes, but not limited to cold stress, heat stress, vibration, non-ionising radiation and illumination;	As per introductory comment non-ionising radiation should be limited to "ultra-violet radiation". Remove illumination from the definition of physical agent (as it is not a hazard. More illumination is better not less illumination). See comment in Regulation 3. Information, instruction and training. Lighting / illumination is already defined and it does not need to be included in this definition.	**"physical agents"** means a source of energy which may result in injury or disease after exposure, and includes, but not limited to cold stress, heat stress, vibration and ultra-violet radiation;
	"physical agents risk assessment" means a risk assessment and risk categorisation of potential exposure to a physical agent;		
	"physical agents technical committee" means a committee established in terms of regulation 18;		
	"relative humidity" means the ratio of the quantity of water vapour present in the air to the quantity that would saturate it at any specific temperature;		
	"SANS 10114, part 1" means the South African National Standards' Code of Practice for interior		

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	lighting, part 1: artificial lighting of interiors;		
	“SANS 10114, part 2” means the South African National Standards’ Code of Practice for interior lighting, part 2: emergency lighting;		
	“SANS 10389, part 1” means the South African National Standards’ Code of Practice for exterior lighting, part 1: artificial lighting of exterior areas for work and safety;		
	“SANS 10400, part O” means the South African National Standards’ Code of Practice for the application of the national building regulations, part O: lighting and ventilation;		
	“SANS 2631” means the South African National Standards’ Code of Practice for interior lighting, part 2: emergency lighting:	Suggest that this is a mistake and that it should reference the code of practice for vibration and shock.	“SANS 2631” means the South African National Standards’ Code of Practice for Mechanical vibration and shock — Evaluation of human exposure to whole-body vibration — Part 1: General requirements
	“SANS 7243” means the South African National Standards’ Code of Practice for hot environments – estimation of the heat stress on working man, based on the WBGT-Index (wet bulb globe temperature);		
	“specialised” means working environments or workplaces that may require specialist guidance and analysis of the visual task, application		

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	that may result in more special requirements for the illumination of the workplace, task area;		
	“time weighted average” means a level over a defined period of time to which nearly all workers may be exposed repeatedly, day after day, without adverse effects;	*“ to which nearly all workers may be exposed repeatedly, day after day, without adverse effects”,* this is part of the definition of OEL and not TWA. Use the definition from Environmental Regulation for Workplaces.	"time-weighted average" means the average of a number of representative measurements that are taken over a period of time and that are calculated as follows: Time-Weighted average = $\frac{x_1 t_1 + x_2 t_2 + x_3 t_3 + \ldots + x_n t_n}{t_1 + t_2 + t_3 + \ldots + t_n}$ Where x_1, $x_2$etc., are the observed measurements during the corresponding periods t_1, t_2, etc., minutes, and $t_1 + t_2 + t_3 + \ldots\ldots + t_n$ is the total time in munites over which the measurements are taken;
	“thermal comfort” means the description of the human satisfactory perception of the thermal environment;		
	“uniformity of illuminance” means the ratio of the minimal illuminance over the area weighted average illuminance (Ehmin/Ehav) or area weighted maximum illuminance (Ehmin/Ehmax);		
	“vibration” means the mechanical oscillations of an object about an equilibrium point;		
	“vulnerable employees” means an employee who is at a higher risk of injury, disease or complications;		
	“Wet bulb globe temperature Index or WBGT Index” means the combination of the effect of the four main thermal components affecting		

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	heat stress: air temperature, humidity, air velocity, and radiation, as measured by the dry bulb (Tdb), natural wet bulb (Tnwb), and globe (Tg) temperatures;		
	"whole body vibration" means mechanical vibration which is transmitted into the body, when seated or standing, through the supporting surface, during a work activity;		
	Scope of application 2. (1) These Regulations will apply to: (a) any employer or self-employed person who carries out work at a workplace, which may expose any person to a physical agent in that workplace; and (b) a designer, manufacturer, importer or supplier of machinery or plant for use at a workplace.		
	(2) The provision of regulation 3 shall not apply to a self-employed person.		
	Information, instruction and training 3. (1) An employer who undertakes work which exposes an employee to a physical agent must inform and consult the relevant health and safety representatives or health and safety committee for that workplace of the intention to conduct: (a) a physical agents risk assessment contemplated in regulation 6;		

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	(b) physical agents exposure monitoring contemplated in regulation 7; and (c) a training programme contemplated in sub-regulation (4). (2) An employer who undertakes work which exposes an employee to a physical agent must inform the relevant health and safety representatives or health and safety committee for that workplace of the intention to conduct medical surveillance contemplated in regulation 8;		
	(3) An employer must inform the relevant health and safety representatives or health and safety committee for that workplace of the documented outcomes of the: (a) physical agents risk assessment contemplated in regulation 6; (b) physical agents exposure monitoring contemplated in regulation 7; and (c) medical surveillance contemplated in regulation 8.		
	(4) Every employer who undertakes work which is liable to expose an employee to a physical agent risks must, before any employee is exposed or may be exposed, after consultation with the health and safety committee established for that section of the workplace, establish a training programme, which incorporates the following:	One: The word “liable” is not correctly used. Two: The lack of illumination is a safety hazard. Using illumination as a “hazard” – as defined in the definition of “physical agents” means that “more” is worse. Note that the SANS “increases” exposure in general, (relative to the previous schedule under the Environmental Regulations	One: “Every employer who undertakes work which exposes an employee…” Delete provision of vulnerable employee.

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	(a) the content and scope of these Regulations; (b) the potential sources of exposure to a physical agent; (c) the nature of the physical agent; (d) the potential risk to health and safety associated with physical agent; (e) the differing effects of exposure to physical agents to men, women, young employees and vulnerable employees, where such difference may exist; (f) the control measures that are in place to prevent exposure to a physical agent; (g) the necessity, correct use, maintenance and limitations of such control measures; (h) the procedure for reporting physical agent risks to the health and safety representative or employer; (i) the precautions to be taken by an employee to protect himself against physical agent risks; (j) the reason for and the outcomes of the physical risk assessment and monitoring of exposure, the necessity for medical surveillance and the long-term benefits of undergoing such surveillance; (k) the occupational exposure limit for the physical agent and its meaning; and (l) access to records of physical risk assessment, physical agents exposure monitoring and personal medical	for Workplaces), as the required “minimum illuminance” levels have “increased” and not “decreased”. “(b) the potential sources of exposure to a physical agent”, expresses that less exposure is desirable. This is an inherent paradox in these regulations.	

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	records.		
	(5) The employer must conduct refresher training at intervals that may be recommended by the health and safety committee or the health and safety representative.		
	Duties of persons exposed to physical agents 4. (1) Any person who is exposed or may be exposed to a physical agent must obey any lawful instruction issued by the employer or self-employed person or by anyone authorised by the employer or self-employed person, regarding: (a) the use and failure of measures adopted to control physical agents; (b) cooperation with the employer in determining the employee's exposure to physical agents; (c) the reporting of potential physical agent risks to the health and safety representative or the employer; (d) reporting for medical surveillance as required by regulation 8; and (e) information, instruction and training received as contemplated in regulation 3.		
	Duties of designers, manufacturers, importers and suppliers 5. (1) Any designer, manufacturer, importer or supplier of machinery or plant for use at work must:	Section 10 (1) *"Any person who designs, manufactures, imports, sells or supplies any article for use at work shall ensure, as far as is reasonably practicable, that the article is safe and without* ***risks to health when properly used****"*…	

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	(a) as far as is reasonably practicable, ensure that machinery or plant minimises the exposure to a physical agent; (b) as far as is reasonably practicable, supply machinery or plant that can be transported, received, stored and handled in a manner that minimise the exposure to a physical agent; (c) provide information, instruction and training as deemed necessary to minimise the exposure to a physical agent during use of machinery or plant; (d) as far as is reasonably practicable, install machinery or plant in a manner that minimise the exposure to a physical agent; and (e) provide information to potential users on the appropriate maintenance of machinery or plant to ensure safe operation and use.	Regulation 5 is subject to Section 10, where it obtains mandate from. This mitigates strict liability on the *"Any designer, manufacturer, importer or supplier"*. Section 10 mentions both "reasonably practicable" as well as "properly used", where "properly used" is defined. Legally the term "properly used" must be brought into Regulation 5. (d)… *"minimise the exposure to a physical agent"*. Note that the definition of physical agent includes lighting. So the responsibility that this sub-regulation gives is that the employer must " *minimise the exposure to* ***LIGHTING****"*, meaning that the employer must minimise lighting levels. It is not thought that this is the intent.	
	Physical agents risk assessment 6. (1) An employer or self-employed person must carry out a documented physical agent risk assessment, as far as is reasonably practicable, immediately, by a competent person.	"as far as is reasonably practicable, immediately". The two terms "as far as is reasonably practicable" and "immediately" are contradictory terms and differ in application. Since the regulation is subject to the Act, the regulation should default to the term "reasonably practicable".	6. (1) An employer or self-employed person must carry out a documented physical agent risk assessment, as far as is reasonably practicable, by a competent person.
	(2) The physical agents risk assessment contemplated in sub-regulation (1) must- (a) be conducted at intervals not exceeding 24 months; and (b) includes: (i) a complete hazard identification;	**"**(i) a complete hazard identification". This needs to be limited to physical agents. Using the ambiguous term "complete hazard identification" extends the scope of the assessment to beyond the regulation. "(iv) the ***analysis*** and evaluation of the physical agents risks; and"	Replace with (i) a physical hazard identification; Replace (iv) the evaluation of the physical agents risks; and

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	(ii) the identification of all persons who may be affected by the physical agents risks; (iii) how employees may be affected by the physical agents risks; (iv) the analysis and evaluation of the physical agents risks; and (v) the prioritisation of physical agents risks.	Inclusion of the term analysis is confusing and ambiguous.	
	(3) The risk assessment conducted in terms of sub-regulation (1) must take into account the specific effects of exposure to men, woman, young employees and vulnerable employees, where applicable;	With the way that the regulation is currently written, it is not possible to implement. Use of the word "risk" doesn't allow distinction between "hazard identification" and "exposure" (i.e. groups exposed). At risk assessment level it is not possible for the employer to know who the vulnerable people are as the competent person would need to have "forced disclosure" of health status of every employee. This has implications in terms of POPIA as well as medical consent in general. A state of disaster would needed to justify this level of personal intrusion into personal medical records. Even for COVID, the right to personal medical status (vulnerability) was opened and then closed with the closing of the state of emergency. A solution to this problem is to limit the duty of the employer to hazard identification, which would serve the purpose of the ILO focus to protect vulnerable employees.	The hazard identification conducted in terms of sub-regulation 2(b)(i) must take into account specific effects of exposure to men, women, young employees and vulnerable employees, where applicable;
	(4) An employer must, in terms of the physical agents risk assessment; (a) consider the recommendations identified by the competent person in		

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	the physical agents risk assessment; and (b) develop a documented action plan for the implementation of the recommendations.		
	(5) An employer must review the relevant physical agents risk assessment made in accordance with sub-regulation (1) if: (a) such assessment is no longer valid; (b) control measures are no longer effective; (c) technological or scientific advances allow for more effective control methods; (d) there has been a change in– (i) the workplace or work methods; (ii) the type of work carried out; or (iii) the type of machinery, plant or personal protective equipment used to control the exposure; (e) an incident occurs; (f) medical surveillance reveals an adverse health effect, where a physical agent risk is identified as a contributing factor.		
	Physical agent exposure monitoring 7. (1) Where a physical agent risk assessment or a review of such assessment indicates that any employee may be exposed to a physical agent at or above the occupational exposure limit, an employer must ensure that a physical agents exposure monitoring programme at that workplace is:	It reflects a lack of continuation of work practice to require AIA's to monitor "Noise", "Chemicals", "HBA's" in the regulations for "Noise Induced Hearing Loss Regulations", "Regulations for Hazardous Chemical Agents" and "Hazardous Biological Agents Regulations" but not "non-ionising radiation" and "Vibration" in these Physical Agents Regulations. Note that monitoring of non-ionising radiation and vibration are among the most technically demanding to conduct. They require substantial high level occupational hygiene expertise. This also applies	(b) conducted by a competent person in the identified physical agent, who holds registration with a professional body recognised by the chief inspector

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	(a) representative of the employees' exposure to a physical agent; and (b) conducted by a competent person in the identified physical agent;	to all the Safety regulations such as Regulations: Major Hazard Installation, Regulations: Lift, escalator and passenger conveyor, Pressure Equipment Regulations etc.. It is noted that this ***regulation sets a legal precedent for the dismantling of the AIA system for all Health and Safety regulations*** to be replaced with the lesser demand of competent person. There are advantages to the revised Department of Employment and Labour approach as the AIA system comes with substantial financial burden to the South African economy, so the change is welcomed! We look forward to the change being rolled out across other regulations, The proposed control is to extend an additional competency to "competent person". See proposal in adjacent column This wording is taken from Regulation 19(e) – Composition of TC.	
	(2) The physical agents exposure monitoring programme referred to in sub-regulation (1) must include the quantification of exposure levels and comparison to occupational exposure limits for the particular physical agent;		
	(3) An employer must conduct the physical agents exposure monitoring, referred to in sub-regulation (1), at a frequency determined by the physical agents risk assessment, or at intervals not exceeding 24-months;		
	(4) An employer must, in terms of physical agents exposure monitoring-		

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	(a) consider the recommendations identified by the competent person in the physical agents exposure monitoring report; and (b) develop a documented action plan for the implementation of the recommendations.		
	Medical surveillance 8. (1) An employer must establish, implement and maintain a documented system of medical surveillance, which is overseen and approved by an occupational medicine practitioner, if; (a) the physical agents risk assessment or the exposure monitoring for physical agents indicates the need for the employee to be placed under medical surveillance; or (b) in the opinion of an occupational health practitioner the relevant employees must be under medical surveillance, in which case the employer may call upon an occupational medicine practitioner to ratify the appropriateness of such recommendation; and (c) there are techniques to identify the disease or adverse health effect, as far as is reasonably practicable;		
	(2) In order to comply with sub-		

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	regulation (1), an employer shall, as far as is reasonably practicable, ensure that the documented system of medical surveillance shall include at least the following: (a) an initial health evaluation carried out by an occupational health practitioner immediately before a person commences employment or placement, where any exposure exists or may exist of; (i) an evaluation of the employee's medical, occupational and exposure history; (ii) an appropriate clinical examination; and (iii) any other medical test which in the opinion of the occupational health practitioner is necessary in order to enable such practitioner to perform an appropriate evaluation; (b) a periodic health evaluation of the employee under medical surveillance by an occupational health practitioner, must be performed at intervals corresponding with the health risks and the health status of the employee, but which must not exceed intervals of twenty-four months and consists of (ii) an appropriate clinical examination; and (iii) any other medical test which in the opinion of the occupational health practitioner is necessary in order to enable such practitioner to perform an appropriate evaluation; and (c) an analysis of the health data to identify trends that may indicate adverse health effects of exposure to a physical agent, where the results of		

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	the analysis shall be recorded as required by regulation 17; (d) an exit health evaluation of the employee under medical surveillance by an occupational health practitioner which consists of: (ii) an appropriate clinical examination; and (iii) any other medical test which in the opinion of the occupational health practitioner is necessary in order to enable such practitioner to perform an appropriate evaluation;		
	(3) The documented system of medical surveillance must be approved by an occupational medicine practitioner; and		
	(4) After concluding the initial or periodic health evaluation, the occupational health practitioner must ensure that the employer is informed, in writing, of the outcome of an employee's health evaluation.		
	Cold stress 9. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the average environmental equivalent chill temperature taken over a period of four-hours is below 10 degrees Celsius, unless the employer takes reasonable measures to protect such employee against the cold and further takes all precautions necessary for the health and safety of such employee;	First issue: • The DEL needs to justify on the basis of risk (aligned with reasonably practicable) why the previous OEL of 6 degrees Celsius was not appropriately protective for a legislated level. • A Social Impact Assessment needs to be conducted to justify the cost impact (in terms of loss of jobs) of the changed value. Recommend retaining 6 degrees Celsius as the threshold for implementation of these regulations. Second issue:	9. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the average environmental equivalent dry bulb temperature taken over a period of four-hours is below 6 degrees Celsius, unless the employer takes reasonable measures to protect such employee against the cold and further takes all precautions necessary for the health and safety of such employee;

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		Using equivalent chill temperature both drives down the standard as well as making it very difficult to implement. It seems that no other country in the world has used a equivalent chill temperature and is not reasonably practicable to implement this in a regulation.	
	(2) No employer must require or permit an employee to work in an environment in which the average environmental equivalent chill temperature is below 10 degrees Celsius, provided that: (a) the maximum exposure of the employee does not exceed the periods as indicated in table 3; (b) the employee is provided with dry, whole body personal protective clothing and equipment, with adequate insulation;	Remove wind chill. If wind chill is going to be retained then a chart should be provided as a schedule to the regulation as there isn't a standard agreement of calculating wind chill. 4 hour measurement is inordinately long period to take the measurement over. There is some sense to measuring in an outdoor environment. To have to measure for this long indoors is not necessary as most indoor cold environments are relatively fixed temperature and air movement. The previous regulation was entirely adequate. It was both adequately protective and simple to implement. It is recommended that the previous regulation be used with minimal change.	
	(3) The physical agents exposure monitoring programme referred to in regulation 7 (1), must: (a) take into account both dry-bulb temperature and air velocity, when determining the average environmental equivalent chill temperature; (b) taken over a period of at least four hours, during the coldest period of an employee's shift; and (c) is conducted during the coldest quarter of the year, as determined by the physical agents risk assessment.	There is such variation in temperature that there can be many comparatively warm periods "(c) is conducted during the coldest quarter of the year, as determined by the physical agents risk assessment". A far more effective way to determine this is to refer to average low temperatures for an area. This can be obtained from any reputable internet site.	

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	Heat stress 10. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the time-weighted average WBGT Index, determined over a period of one hour, does not exceed 30;		
	(2) An employer must, where the time-weighted average WBGT exceeds the action level of 27: (a) provide training to exposed employees on adverse health effects relating to heat stress exposure and the precautionary measures to be taken; and (b) subject exposed employees to a heat acclimatisation programme.		
	(3) No employer must require or permit an employee to work in an environment in which the time-weighted average WBGT Index is above 30, provided that: (a) appropriate means of ventilation systems are implemented; (b) a work rest cycle is established and implemented for that workplace; (c) sufficient amounts of potable water is available at the place of work, in relation to the number of employees exposed; (d) prompt first aid treatment, specific to adverse health effects from heat stress, is made available; and (e) the employee is provided with the appropriate personal protective clothing and equipment, taking into		

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	account clothing adjustment factor, according to SANS 7243;		
	(4) The physical agents exposure monitoring programme referred to in regulation 7 (1), must: (a) be conducted in accordance with the latest version of SANS 7243; and		
	Lighting 11. (1) An employer must provide illumination in the workplace in the form of either natural light, artificial light, or a combination thereof;		
	(2) An employer must ensure that, as far as reasonably practicable, illumination be provided in the workplace to carry out work, without risk to health and safety, by taking into account: (a) illuminance values; (b) glare; (c) uniformity; (d) flicker; (e) hazardous or specialised workplaces; and (f) hazardous or specialised operations;		
	(3) With respect to the illumination to be provided in terms of sub-regulation (1), the employer must ensure that:	It is noted that Table 5, 6 & 7 use the SANS 10114 values. SANS 10114 says of its intended use: "The aim of this part of SANS 10114 is to provide basic ***guidelines*** and recommendations for the	

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	(a) illuminance provided for the workplace is in accordance with the minimum illuminance values specified: (i) in table 5 for interior workplaces: Provided that where a workplace is not referenced in table 5, the minimum illuminance levels in table 6 will apply; and (ii) in table 7 for exterior workplaces of these Regulations: Provided that where a workplace is not referenced in table 7, the minimum illuminance levels in table 8 will apply; (b) glare within the workplace must not exceed the maximum glare values specified: (i) in table 5 for interior workplaces: Provided that where a workplace is not referenced in table 5, the maximum glare values must be informed by the physical agents risk assessment; and (ii) in table 7 for exterior workplaces: Provided that where a workplace is not referenced in table 7, the maximum glare values in table 8 will apply. (c) the average uniformity of illuminance at any working plane: (i) for interior workplaces, within 5-meters of a working plane, is not less than one fifth of the average illuminance on that working plane and on the adjacent floors; and (ii) for exterior workplaces, must be in accordance with the values listed in table 7: Provided that where a workplace is not referenced in table 7, the average uniformity of illuminance in table 8 will apply; (d) flicker in the workplace must be eliminated;	creation of ***good viewing conditions*** and a comfortable visual environment to facilitate ***productivity***". It is the mandate of the OHSA is to legislate Health and Safety. By copying SANS 10114 values it would be legislating "productivity". This is ultra vires. In terms of the OHSA an employer is potentially criminally liable for not meeting "productivity", values. This use of "guideline" values is also not aligned with the "reasonably practicable" approach adopted by DEL in the RHCA. DEL adopted the 2xOEL approach (based on ACGIH TLV's) and by publishing the RHCA with 2xOEL this has set legal precedent and so has entered into common law.	

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	(e) specialised lighting must be required for use in hazardous or specialised workplaces, as identified by the physical agents risk assessment; and (f) specialised lighting must be required for use in hazardous or specialised operations, as identified by the physical agents risk assessment;		
	(4) With a view to the emergency evacuation of interior workplaces, every employer must, in such workplaces, provide emergency sources of lighting which are such that, when activated, an illuminance for: (a) escape route lighting must not be less than 1 lux at floor level; (b) emergency escape lighting must not be less than 5 lux at floor level to emphasise the existence of potential workplace hazards and the location of safety equipment; (c) lighting at an emergency exit must not be less than 5 lux at floor level; and (d) workplaces or operations where it is necessary to stop machinery or shut down plant or processes before evacuating the workplace, or where dangerous materials are present or dangerous processes are carried out, the illuminance must not be less than 20 lux at floor level;		
	(5) An employer shall ensure that the emergency sources of lighting prescribed by sub- regulation (3): (a) are capable of being activated within:		

	(New/Amended)	Comments	Proposal
	(i) 25 seconds of the failure of the lighting prescribed by sub-regulation (3) (a), (b) and (c); and (ii) 0,5 seconds of the failure of the lighting prescribed by sub-regulation (3) (d); (b) will last long enough to ensure the safe evacuation of the workplace; (c) are mounted at a height of not less than two meters above floor level and are not aimed between 10° above and 45° below the horizontal line on which they are installed; and (d) are kept clean, in good working order and tested for efficient operation at intervals of not more than three months;		
	(6) The lighting measurement and monitoring programme must be conducted according to; (a) SANS 10114-1, for interior lighting; (b) SANS 10389-1, for exterior lighting; (c) SANS 10114-2, for emergency lighting; and (d) the lighting measurement contemplated in sub-regulation (6)(a), (b) and (c) must be conducted by a competent person;		
	(7) In order to ensure that lighting levels meet the minimum illumination levels prescribed in sub-regulation (2)(a), an employer must ensure that: (a) luminaires and lamps are maintained, kept clean, in good working order and must be replaced or repaired when defective; and		

	(New/Amended)	Comments	Proposal
	(b) windows and other sources of natural lighting are kept clean, replaced and repaired when defective;		
	(8) An employer engaged in building work shall cause all workplaces where danger may exist through the lack of natural light, to be illuminated such that it will be safe in terms of the physical agents risk assessment.		
	Indoor air quality 12. (1) An employer must ensure good indoor air quality for a workplace, by: (a) introducing and distributing the ventilation of air; (b) controlling airborne contaminants; and (c) maintaining air temperature, air velocity and relative humidity;	For CO2, the level of 600ppm (as a marker chemical, with the intent to control bio-effluent / body odour) is based on the ASHRAE level. This makes it a comfort based level. Is it the intent of the DEL to legislate for body odour in the workplace? For CO2 as a direct toxicant the level of 10000ppm is covered in the RHCA. For CO, the level of 10ppm seems to be based on the WHO level. Again this is a guideline "good practice level for indoor air quality" ID Number: (ashrae.org) and not a risk based level. The CO risk based level is provided in the RHCA and is set at 50ppm. Air temperature (other than heat or cold stress), air velocity and relative humidity are all comfort based parameters. It is our understanding that these comfort based parameters are not legislated anywhere in the world. If these parameters are not complied with employees will experience **discomfort** and will not experience **risk**.	Delete "CO, CO2, air temperature, air velocity and relative humidity".

	(New/Amended)	Comments	Proposal
		<table><tr><th>IAQ Parameter</th><th>Level</th><th>Unit</th></tr><tr><td>Air temperature</td><td>20 to 28 (dry bulb temperature)</td><td>Degrees Celsius</td></tr><tr><td>Air velocity</td><td>0.1 to 0.8</td><td>meters per second (m/s)</td></tr><tr><td>Relative humidity</td><td>30 to 60</td><td>%</td></tr><tr><td>Carbon Dioxide</td><td>Not exceed the outdoor concentration by more than 600ppm</td><td>Parts per million (ppm)</td></tr><tr><td>Carbon Monoxide</td><td>10</td><td>mg/m^3</td></tr></table> These requirements are outside of the scope of the Occupational Health and Safety Act, specifically Section 8(1) *"Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees"*. All regulations have to be subject to Section 8. Currently there is nothing in this regulation that is within the scope of the OHSA. Internationally Indoor Air Quality is not regulated.	
	(2) The employer shall ensure that risk from the exposure of employees to hazardous biological, chemical and physical agents impacting indoor air quality is, as far is reasonably practicable, either eliminated at source, diluted through either natural ventilation or an artificial ventilation system or filtered through the use of a filtration system;	This creates confusion between applicability of RHBA and RHCA, directly competing with these regulations for scope. Are different standards being applied for the same stressor for office employees and employees working in operational environments. There are no other regulations which apply different standards for different types of employees. There is confusion between comfort and risk in this sub-regulation. "shall ensure that the risk", but then the standards which are being referred to are comfort and not risk based OEL's (e.g. CO – comfort based 10ppm vs risk based RHCA 50ppm).	Delete as ventilation controls are provided in RHCA & RHBA.
	(3) The employer must ensure that the artificial ventilation system referred to in sub-regulation (2) complies with the air requirements for different types of occupancies, listed in Part-O of the	Suggest that way to obtain the control required by SANS 10400- Part O is to regulate the occupancies, where the equipment must be able to achieve the required ventilation for the occupancy. A change of wording is preferable to reflect this.	(3) The employer must ensure that the artificial ventilation system referred to in sub-regulation (2) is able to deliver ventilation required for different types of occupancies, listed in Part-O of the National Building Regulations, SANS 10400; Delete as ventilation controls are provided in RHCA & RHBA.

	(New/Amended)	Comments	Proposal
	National Building Regulations, SANS 10400;	The purpose of installing controls such as artificial ventilation systems are associated controls to mitigate both HBA and HCA and fall under the applicable regulations. This forms a duplicate requirement.	
	(4) The employer must ensure that the artificial ventilation system referred to in sub-regulation (2) is tested, by a competent person, at intervals as per the original manufacturer specifications but not exceeding 24 months;	**Maintenance of control measures** 12. An employer must ensure— (a) that all control equipment and facilities provided in terms of regulations 10 and 11 are maintained in good working order; and (b) that thorough examinations and tests of engineering control measures are carried out at intervals not exceeding 24 months by an approved inspection authority. There is an inconsistency between the RHCA requirements for ventilation as a control technology in Reg 12(b), where an AIA is required to carry out the testing and this reg where a competent person is required to do the testing. Either the RHCA should be changed (to competent person) or this regulation should be changed (to AIA). The purpose of installing controls such as artificial ventilation systems are associated controls to mitigate both HBA and HCA and fall under the applicable regulations. This forms a duplicate requirement.	Delete as ventilation controls are provided in RHCA & RHBA.
	(5) The employer must ensure that the artificial ventilation system is maintained as per the original manufacturer specifications: Provided that in the absence of the original manufacturer specifications, a risk based approach is undertaken;		
	(6) The physical agents exposure monitoring referred to in regulation 7(1), must take into account the following parameters:	To regulate: 6(a) “thermal comfort” is ultra vires and outside the scope of the OHSA, Section 8.	Delete.

	(New/Amended)	Comments	Proposal
	(a) thermal comfort, including: (i) Air temperature; (ii) Air velocity; and (iii) Relative humidity; (b) airborne contaminants, including: (i) carbon monoxide; (ii) carbon dioxide; (iii) other applicable hazardous chemical agents; (iv) mould; and (v) other applicable hazardous biological agents; (c) air changes per type of occupancy;	(b)(i) carbon monoxide and (ii) carbon dioxide, should be deleted as they are regulated in the RHCA. All of the hazards under (b)(i) are either regulated under RHCA or RHBA. Risk related to "mould and other applicable hazardous biological agents" should fall under RHBA. Risk related to "chemical agents" should fall under RHCA. Controls such as artificial ventilation systems are associated controls to mitigate both HBA and HCA and fall under the applicable regulations. All of these hazards should be deleted as they are being regulated on the basis of comfort / best practice and not risk. The foundation of all law and the OHSA is risk. These regulations do not have the legal mandate to create a separate category of risk (consequence vs likelihood) which will not result in disease. Air changes per type of occupancy (as specified in SANS 10400)	
	Vibration 13. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the time-weighted average occupational exposure limit, determined over a period of eight hours, does not exceed OEL for hand-arm vibration or whole body vibration, stipulated in table 1;	The way that this is written makes it a legal requirement to expose persons to levels of vibration above the OEL. This cannot be the intent.	13. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the time-weighted average occupational exposure limit, determined over a period of eight hours, exceeds OEL for hand-arm vibration or whole body vibration, stipulated in table 1;

	(New/Amended)	Comments	Proposal
	(2) An employer shall ensure that risk from the exposure of employees to vibration is either eliminated at source or, where this is not reasonably practicable, reduced to as low a level as is reasonably practicable, provide that: (a) Where it is not reasonably practicable to eliminate risk referred to in sub-regulation (2), and an action level for hand arm vibration or whole body vibration, as stipulated in table 1, is likely to be reached or exceeded, the employer must reduce exposure to as low a level as is reasonably practicable by establishing implementing: (i) other working methods which eliminate or reduce the exposure to vibration; (ii) choice of plant and machinery designed to produce the least possible vibration; (iii) maintenance programs for plant and machinery, the workplace and workplace systems; (iv) the design and layout of workplaces, workstations and rest facilities; (v) provide training to exposed employees on adverse health effects relating to vibration exposure and the precautionary measures to be taken; (vi) review medical surveillance, physical agents exposure monitoring program and physical agents risk assessment; (vii) limitation of the duration and magnitude of the exposure to vibration; (viii) appropriate work schedules with adequate rest periods; and	TABLE 1. TLV® and AL Weighted Acceleration Levels Weighted Acceleration ($a_{hv(rms)}ms^{-2}$) Vibration Exposure Time (hrs) / TLV® / AL 0.25 (15 min) 28.28 14.14 1.0 14.14 7.07 2 10.0 5.0 4 7.07 3.54 6 5.77 2.89 8 5.0 2.5 Table 1: Occupational Exposure Limits and Action Levels for Physical Agents. | Physical Agent	Action Level	Occupational Exposure Limit	Unit	Duration	Target organ
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Cold Stress	-	10	°C	1-hour	-
Heat Stress	27	30	WBGT	4-hours	-
Hand-arm vibration	2,5	5	m/s^2	8-hours	-
Whole-body vibration	0,5	1,15	m/s^2	8-hours	-	 17 The levels for both hand-arm and whole-body vibration are identical to the ACGIH TLV's. This is regulation of guidance values, based on health alone and does not consider socio-economic impact. As such these OEL's do not align with the principal of reasonably practicable must be adjusted to consider economic factors.	For hand arm vibration Action level should be set at 5 m/s^{-2} and the OEL set at 10 m/s^{-2}.

	(New/Amended)	Comments	Proposal
	(ix) the provision of clothing to protect employees from cold and damp. (b) Subject to sub-regulation 2(a), the employer must ensure that employees are not exposed to vibration at or above an occupational exposure limit, and where such limit is exceeded, must: (i) reduce exposure to vibration to below the occupational exposure limit; (ii) identify the reason for that limit being exceeded; and (iii) modify the control measures taken in accordance with sub-regulation (2)(a) to prevent it being exceeded again;		
	(3) The physical agents exposure monitoring programme referred to in regulation 7 (1), must: (a) for whole body vibration, be conducted in accordance with the latest version of SANS 2631; (b) for hand-arm vibration, for monitoring to be representative of an employee's exposure, it must; (c) be conducted along each axis for roll, pitch and yaw; (d) be a minimum of one exposure cycle, normalised to an 8-hour time weighed average: Provided for the event of multiple sources of vibration, the partial exposure values are combined and normalised to an eight-hour time weighed average; (e) in the case of plant or machinery which need to be held with both hands, monitoring must be conducted on each hand, whereby the exposure		

	(New/Amended)	Comments	Proposal
	is determined by reference to the higher value of the two; and (iv) be conducted during the coldest period of an employee's shift.		
	Non-ionising radiation 14. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the time-weighted average occupational exposure limit, does not exceed the occupational exposure limit for the type of non-ionising radiation, stipulated in tables 1 and 2;	See comment in overall comments where it is recommended that the regulation be limited to Ultraviolet (UV) Radiation. • The UK have the Control of Electromagnetic Fields at Work Regulations 2016 and the European Union have a Physical Agents Directive concerning worker exposure to Electro-Magnetic Fields (EMFs). However, it is our understanding that no country in the world regulates non-ionising in its entire scope. The problem with legislating all of the hazards such as visible light is that it makes the regulation unworkable. • To have time-weighted average occupational exposure limit, does not exceed the occupational exposure limit. To refer to limit and limit is self-referencing.	14. (1) Subject to the provisions of sub-regulation (2), no employer must require or permit an employee to work in an environment in which the time-weighted average occupational exposure ~~limit~~, does not exceed the occupational exposure limit for the type of non-ionising radiation, stipulated in tables 1 and 2;
	(2) An employer must ensure that risk from the exposure of employees to non-ionising radiation is either eliminated at source or, where this is not reasonably practicable, reduced to as low a level as is reasonably practicable;	See comment in overall comments where it is recommended that the regulation be limited to Ultraviolet (UV) Radiation.	
	(3) An employer must ensure that employees are not exposed to non-ionising radiation above an occupational exposure limit, and where such limit is exceeded, must:	See comment in overall comments where it is recommended that the regulation be limited to Ultraviolet (UV) Radiation.	

	(New/Amended)	Comments	Proposal
	(a) reduce exposure to non-ionising radiation to below the occupational exposure limit; (b) identify the reason for that limit being exceeded; and (c) modify the control measures taken in to prevent the limit from being exceeded again;		
	(4) The physical agents exposure monitoring referred to in regulation 7(1), must take into account: (a) the source of the non-ionising radiation; (b) the type of non-ionising radiation: (i) optical radiation; and (ii) electromagnetic fields (c) a methodology that is conducted according to an internationally recognised standard for the type of non-ionising radiation;	See comment in overall comments where it is recommended that the regulation be limited to Ultraviolet (UV) Radiation.	
	(5) Signage must be: (a) provided for: (i) identified source of the non-ionising radiation; and (ii) the effect of electromagnetic interference on heart pacemakers; b) in the form specified in Annexure 1, which: (i) is clearly visible; and (ii) with the number of labels, based on the physical agents risk assessment, serving as a warning of exposure.	See comment in overall comments where it is recommended that the regulation be limited to Ultraviolet (UV) Radiation.	
	Control of exposure to physical agents 15. (1) An employer or self-employed person must ensure that the exposure of a person to a physical agent is either prevented or, where this is not	Change of language suggested.	15. (1) An employer or self-employed person must ensure that the exposure of a person to a physical agent is either prevented or, controlled as far as is reasonably practicable;

	(New/Amended)	Comments	Proposal
	reasonably practicable, adequately controlled;		
	(2) In order to comply with sub-regulation (1), an employer or self-employed person must, as far as is reasonably practicable, reduce exposure to a physical agent to levels below the limits referred to in tables 1 and 2, by implementing a combination of the hierarchy of control measures including, but not limited: (a) engineering control measures; (b) administrative control measures; and (c) the use of personal protective equipment and facilities;		
	(3) An employer must ensure that an employee who is exposed to a physical agent receives information, instructions and training with regard to the correct inspection and use, and reporting of failures of control measures implemented in sub-regulation (2).		
	Personal protective equipment and facilities 16. (1) If it is not reasonably practicable to ensure that the exposure of an employee is controlled as contemplated in regulation 15, the employer must provide the employee with suitable personal protective equipment;		
	(2) Where personal protective equipment is provided, the employer must ensure that:		

	(New/Amended)	Comments	Proposal
	(a) the relevant personal protective equipment is capable of reducing the exposure to the physical agent concerned; (b) selection of the relevant personal protective equipment takes into consideration: (i) the nature of the physical agent; (ii) the type of work to be done; (iii) the physical effort required to do the work; (iv) the length of time it will have to be worn; (v) the requirements in relation to the work for visibility, comfort and employee communication; and (vi) compatibility with any other personal protective equipment that may be needed; (c) information, instructions, training and supervision are provided with regard to the correct inspection, use, care and disposal of the personal protective equipment, to exposed persons; (d) reusable personal protective equipment is kept in hygienic condition and efficient working order; (e) the relevant personal protective equipment is readily available to exposed persons; (f) storage facilities for personal protective equipment are provided when not in use; and (g) personal protective equipment is used or worn by the employee, by enforcing its use through providing adequate supervision;		

	(New/Amended)	Comments	Proposal
	(3) The employee must, where there is the requirement to use personal protective equipment as contemplated in sub-regulation (1); (a) inspect, use, wear, store and dispose of the personal protective equipment in accordance with any information, training or lawful instruction given by the employer; (b) not intentionally misuse or damage the personal protective equipment; and (c) immediately inform the employer of any damage, defect, or any need to clean or replace any of the personal protective equipment.		
	Maintenance of control measures 17. (1) Every employer or self-employed person must ensure that any control measure that are provided for the benefit of employees in compliance with his duties under these regulations is: (a) fully and properly used; (b) inspected, maintained in an efficient state, in good working order, repair and cleanliness; and (c) reviewed for effectiveness, at intervals not exceeding 24-months.		
	Records 18. (1) An employer or self-employed person must: (a) keep record of: (i) training, as contemplated in regulation 3; (ii) physical agents risk assessments and action plan, as contemplated in regulation 6;		

	(New/Amended)	Comments	Proposal
	(iii) physical agents exposure monitoring and action plan, as contemplated in regulation 7; (iv) medical surveillance reports, as contemplated in regulation 8; and (v) maintenance of control measures, as contemplated in regulation 17; (b) keep records for a minimum period of: (i) 40-years for records contemplated in regulations 6, 7 and 8; (ii) five years for records contemplated in regulation 17; (iii) the length of time the employee remains at the workplace for records contemplated in regulation 3; (c) make available to; (i) the relevant health and safety representative, health and safety committee or to an inspector, the records contemplated in regulations 3, 6, 7 and 17; (ii) any person, the records contemplated in regulation 8, subject to formal written consent of the employee; and (d) submit all records, as contemplated in sub-regulation 1(a) to the relevant chief director: provincial operations, when they cease activity.		
	Physical agents technical committee 19. (1) The Council must, after consultation with the Minister, establish a physical agents technical committee which must consist of: (a) a chairperson (b) one person designated by the chief inspector from the employees of the		

	(New/Amended)	Comments	Proposal
	Department of Employment and Labour; (c) three persons designated by employer's organisations to represent employers; (d) three persons designated by employees' organisations to represent the federation of unions; (e) one person to represent a professional body recognised by the chief inspector; (f) one person representing a higher educational institution; (g) one person representing occupational medicine; and (h) persons who are competent in respect of the matters to be dealt with by the physical agents technical committee who have been co-opted by the committee with the authorisation of the council;		
	(2) The Council: (a) must appoint members of the physical agents technical committee for a period that the council may determine at the time of the appointment; (b) must, after having afforded a member a reasonable opportunity to respond, discharge such a member at any time, for reasons that are fair and just; and (c) appoint a new member in the place of a member who is discharged in terms of sub-regulation (2)(b).		
	(3) The physical agents technical committee must: (a) advise the Council on physical agents related matters, including, but		

	(New/Amended)	Comments	Proposal
	not limited to, codes, standards and training requirements; (b) make recommendations and submit reports to the Council regarding any matter to which these Regulations apply; (c) advise the Council regarding any matter referred to the physical agents technical committee by the Council; (d) perform any other function for the administration of a provision of these Regulations that may be requested by the Council; and (e) conduct its work in accordance with the instructions and rules of conduct framed by the Council.		
	Offences and penalties 20. Any person who contravenes or fails to comply with any provision of regulation 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,14, 15, 16, 17 or 18 shall be guilty of an offence and liable on conviction to a fine or to imprisonment for a maximum of 12-months and, in the case of a continuous offence, to an additional fine of R200 for each day on which the offence continues or additional imprisonment of one day for each day on which the offence continues: Provided that the period of such additional imprisonment shall in no case exceed 90-days.	For example, for UVC, the value is taken directly from ACGIH. This is a guideline health-based value and does not factor in socio economic considerations. This means that the OEL's are not based on "reasonably practicable" and are ultra vires in that they are not subject to the Occupational Health and Safety Act.	

Table 1: Occupational Exposure Limits and Action Levels for Physical Agents.

Physical Agent	Action Level	Occupational Exposure Limit	Unit	Duration	Target organ
Cold Stress	-	10	°C	1-hour	-
Heat Stress	27	30	WBGT	4-hours	-
Hand-arm vibration	2,5	5	m/s^2	8-hours	-
Whole-body vibration	0,5	1,15	m/s^2	8-hours	-

Various wind chill charts – Examples:

Estimated wind speed (in km/h)	Actual temperature reading (°C)												
	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
	Equivalent chill temperature (°C)												
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	-59	-59	-66	-74	-82	-90	-98
(Wind speeds greater than 64 km/h have little additional effect.)	LITTLE DANGER In < 1 hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.				
	Trenchfoot and immersion foot may occur at any point on this chart.												

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

Source: Guideline for Thermal Stress, Workplace Health and Safety Division, September 2007, page. 14.

wind			*temperatuur*								
km/u	m/s	Bft	10	5	0	-5	-10	-15	-20	-25	-30
5	1.4	1	10	4	-2	-7	-13	-19	-24	-30	-36
10	2.8	2	9	3	-3	-9	-15	-21	-27	-33	-39
15	4.2	3	8	2	-4	-11	-17	-23	-29	-35	-41
20	5.6	4	7	1	-5	-12	-18	-24	-31	-37	-43
25	7.0	4	7	0	-6	-12	-19	-25	-32	-38	-45
30	8.3	5	7	0	-6	-13	-20	-26	-33	-39	-46
35	9.7	5	6	0	-7	-14	-20	-27	-33	-40	-47
40	11.1	6	6	-1	-7	-14	-21	-27	-34	-41	-47
45	12.5	6	6	-1	-8	-15	-21	-28	-35	-42	-48
50	13.9	7	5	-1	-8	-15	-22	-29	-35	-42	-49
55	15.3	7	5	-2	-8	-15	-22	-29	-36	-43	-50
60	16.7	7	5	-2	-9	-16	-23	-30	-36	-43	-50
65	18.1	8	5	-2	-9	-16	-23	-30	-37	-44	-51
70	19.5	8	5	-2	-9	-16	-23	-30	-37	-44	-51
75	20.8	9	5	-2	-10	-17	-24	-31	-38	-45	-52
80	22.2	9	4	-3	-10	-17	-24	-31	-38	-45	-52

Most windchill charts don’t have 10C windchill

Below is Canadian and ACGIH

Table 1. Wind Chill Chart[1]

WIND CHILL CHART									
	Ambient Temperature oC								
	4	-1	-7	-12	-18	-23	-29	-34	-40
Wind Speed km/h	Equivalent Chill Temperature oC								
0	4	-1	-7	-12	-18	-23	-29	-34	-40
8	3	-3	-9	-14	-21	-26	-32	-38	-44
16	-2	-9	-16	-23	-30	-35	-43	-50	-57
24	-6	-13	-20	-28	-36	-43	-50	-58	-65
32	-8	-16	-23	-32	-39	-47	-55	-63	-71
40	-9	-18	-26	-34	-42	-51	-59	-67	-76
48	-10	-19	-27	-36	-44	-53	-62	-70	-78
56	-11	-20	-29	-37	-46	-55	-63	-72	-81
64	-12	-21	-29	-38	-47	-56	-65	-73	-82
Adapted from Threshold Limit Values (TLV) and Biological Exposure Indices (BEI) booklet: published by ACGIH, Cincinnati, Ohio, 2008.	LITTLE DANGER			INCREASING DANGER			GREAT DANGER		
	In less than 1 hr with dry skin. Maximum danger of false sense of security.			Danger from freezing of exposed flesh within 1 minute			Flesh may freeze within 30 seconds		
	Ensure dry clothing worn			Continuous work not permitted					

[1] Canadian Centre for Occupational Health & Safety (2008). Cold Environments – Working in the Cold