DEPARTMENT OF EMPLOYMENT AND LABOUR

NO. 5952 **6 March 2025**

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

PHYSICAL AGENTS REGULATIONS, 2024

The Minister of Employment and Labour has, under section 43(1)(*a*) and (*b*) of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), after consultation with the Advisory Council for Occupational Health and Safety, made the regulations in the Schedule.

MS N METH, MP

MINISTER OF EMPLOYMENT AND LABOUR

DATE: 04 February 2025

SCHEDULE

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1. Definitions

In these Regulations, any word or expression to which a meaning has been assigned in the Act bears the meaning so assigned and, unless the context otherwise indicates—

"**action level**" means the level of a physical agent at which specified actions or counter measures must 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 light**" means any light generated by artificial light sources;

"**artificial ventilation**" means the system in which air is caused to circulate through a room by means of a mechanical apparatus which forces or extracts filtered air from such a room;

"**clothing adjustment value**" means the single number that is added to the wet-bulb globe temperature to represent the effects of clothing worn during an activity;

"**Chief Director: Provincial Operations**" means the provincial director as defined in the General Administrative Regulations, 2003, published as Government Notice No. R. 929 in *Gazette* No. 25129 of 25 June 2003;

"**cold stress**" means a condition that occurs when the body can no longer maintain its normal core temperature;

"**competent person**" means—

(a) (i) in terms of the exposure risk assessment, a person who has, in respect of the work or task to be performed, the required knowledge, training and experience in the physical agent and, where applicable, relevant qualifications specific to or including 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; or

(ii) in terms of the exposure monitoring or inspections and tests of control measures, a person who has, in respect of the work or task to be performed, the required knowledge, training and experience in the identified physical agent and the relevant qualifications specific to or including the identified physical agent: Provided that where appropriate qualifications and training are registered in terms of the provisions of the National Qualifications Framework Act, 2008, those qualifications and that training must be regarded as the required qualifications and training; and

(b) a person who 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 and magnetic 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, which takes into account both dry-bulb temperature and wind speed;

"**exposure**" means contact with a physical agent at the workplace and includes potential, accidental or possible exposure, and exposed has a derivative meaning;

"**flicker**" means the impression of unsteadiness of visual perception induced by a light stimulus whose luminance or spectral distribution fluctuates with time;

"**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;

"**heat stress**" means the total heat load to which an employee may be exposed from the combined effects of metabolic heat, environmental factors and clothing requirements;

"**illuminance**" means the expressed amount of light falling on a surface per unit area, measured in lux;

"**illumination**" means the application of light to a scene, objects or their surroundings so that they may be seen, and lighting has a corresponding meaning;

"**indoor air quality**" means the totality of attributes of indoor air at the workplace that affect a person's health and well-being;

"**luminance**" means the intensity of light emitted from a surface per unit area in a given direction;

"**medical screening**" means a risk-based systematic medical assessment of a person or a group of people using a combination of medical history, physical examination and special tests or investigations to detect disease or abnormality;

"**natural ventilation**" means the movement of air into, inside and out of a building due to natural causes;

"**occupational non-ionising radiation**" means all radiations and fields of the electromagnetic spectrum that do not normally have sufficient energy to produce ionisation in matter and includes optical radiation and the electromagnetic field;

"**occupational exposure limit**" means the limit or value set by the Minister for a physical agent in the workplace;

"**optical radiation**" means the part of the electromagnetic spectrum that includes infrared radiation, visible light and ultraviolet radiation;

"**physical agent**" means a source of energy which may result in injury or disease after exposure and includes, but is not limited to, cold stress, heat stress, vibration, non-ionising radiation and illumination;

"**physical agent exposure monitoring**" means the systematic process of measuring the magnitude, frequency and duration of exposure to a physical agent;

"**physical agent exposure 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 19;

"**pitch, yaw and roll**" means the three dimensions of movement when an object moves through a medium;

"**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;

"**specialised illumination**" means additional illumination developed or designed for use in hazardous workplaces, locations or precision tasks;

"**stroboscopic effect**" means the change in motion perception induced by light stimulus, light luminance or spectral distribution, which fluctuates with time, for a static observer in a non-static environment;

"the Act" means the Occupational Health and Safety Act,1993 (Act No. 85 of 1993);

"**time-weighted average**" means the average of a number of representative measurements that are taken over a defined period of time;

"**uniformity of illuminance**" means the ratio of the minimum illuminance to the area-weighted average illuminance (E_{hmin}/E_{hav}) or area-weighted maximum illuminance (E_{hmin}/E_{hmax});

"**vibration**" means the mechanical, periodic or random oscillations of an object about an equilibrium point;

"**vulnerable employee**" means an employee who is at a higher risk of injury, disease or complications caused by exposure to a physical agent;

"**wet-bulb globe temperature index**" means a combination of the effects of the four main thermal components affecting heat stress: air temperature, absolute humidity, air velocity and mean radiant temperature;

"**whole-body vibration**" means mechanical vibration that is transmitted into the body, when seated or standing, through the supporting surface, during a work activity.

2. Scope of application

(1) These Regulations 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 plant and machinery for use at a workplace.

(2) With the exception of regulation 3(6), the provisions of regulations 3 and 8 shall not apply to a self-employed person.

(3) The provisions of these Regulations do not apply in the case of noise, where the Noise Exposure Regulations apply.

3. Information, instruction and training

(1) An employer who undertakes work which exposes an employee to a physical agent must consult the relevant health and safety representatives or the health and safety committee established for that workplace and inform them of the intention to conduct—

(a) a physical agent exposure risk assessment;

(b) physical agent exposure monitoring; and

(c) training as contemplated in subregulation (4).

(2) An employer who undertakes work which exposes an employee to a physical agent must inform the relevant health and safety representatives or the health and safety committee established for that workplace of the intention to conduct medical screening and medical surveillance.

(3) An employer who undertakes work which exposes an employee to a physical agent must inform the relevant health and safety representatives or the health and safety committee established for that workplace of the documented outcomes of the—

(a) physical agent exposure risk assessment;

(b) physical agent exposure monitoring; and

(c) medical screening and medical surveillance.

(4) Every employer who undertakes work which is likely to expose an employee to any physical agent must, before any exposure, ensure that such employee is comprehensively informed, instructed and trained in both the practical aspects and theoretical knowledge with regard to—

(a) the content and scope of these Regulations;

(b) the potential sources of exposure to the physical agent;

(c) the nature of the physical agent;

(d) the potential risk to health and safety associated with the physical agent;

(e) the differing effects of exposure to the physical agent on men, women, young employees and vulnerable employees, where such difference may exist;

(f) the control measures that are in place to prevent exposure to the physical agent;

(g) the necessity for compliance with control measures in all areas, including the correct inspection, use, care, maintenance and limitations of such control measures;

(h) the precautions to be taken by an employee to protect themself against the adverse effects associated with the exposure;

(i) the reason for and the outcomes of the physical agent exposure risk assessment and exposure monitoring, the necessity for medical screening and medical surveillance and the long-term benefits of medical screening and medical surveillance;

(j) the action level and occupational exposure limit for the physical agent and its purpose;

(k) the procedures for reporting, correcting and replacing defective noise control measures;

(l) any additional matters contemplated in regulations 4 and 8; and

(m) the process to access records of the physical agent exposure risk assessment, physical agent exposure monitoring and personal medical records.

(5) The employer must ensure that refresher training is conducted at least annually or at more frequent intervals as may be recommended by the health and safety committee or the health and safety representative.

(6) An employer or self-employed person must ensure, as far as is reasonably practicable, that mandataries or persons other than employees who may be affected by physical agent exposure at the workplace are informed and trained as contemplated in subregulation (4).

4. Duties of persons who may be exposed to a physical agent

(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 thereto by the employer or self-employed person, regarding—

(a) the use of measures adopted to control a physical agent;

(b) the immediate reporting of defective, damaged or lost physical agent control measures to the health and safety representative or the employer;

(c) cooperation with the employer in determining an employee's exposure to a physical agent;

(d) the reporting of potential physical agent risks to the health and safety representative or the employer;

(e) reporting for medical screening and medical surveillance; and

(f) information, instruction and training.

(2) An employee must, where there is a requirement to use personal protective equipment as contemplated in subregulation (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 or health and safety representative of any damage, defect or any need to clean or replace any of the personal protective equipment.

5. Duties of designers, manufacturers, importers and suppliers

(1) Any designer, manufacturer, importer or supplier must—

(a) as far as reasonably practicable, ensure that the applicable health and safety standards incorporated in these Regulations are incorporated within the design and manufacture;

(b) as far as is reasonably practicable, ensure that plant or machinery are designed and manufactured to minimise the risk of exposure to a physical agent when properly used;

(c) as far as is reasonably practicable, supply plant or machinery that can be transported, received, stored and handled in a manner that minimises the risk of exposure to a physical agent;

(d) as far as is reasonably practicable, install plant or machinery in a manner that minimises the risk of exposure to a physical agent when properly used;

(e) provide information, instruction and training as deemed necessary to minimise the risk of exposure to a physical agent during the use of plant or machinery; and

(f) provide information to potential users on the appropriate maintenance of plant or machinery to ensure safe operation and use.

6. Physical agent exposure risk assessment

(1) An employer or self-employed person must conduct a documented physical agent exposure risk assessment—

(a) as far as is reasonably practicable, before exposure to a physical agent;

(b) thereafter at intervals not exceeding 24-months; and

(c) by a competent person.

(2) The physical agent exposure risk assessment contemplated in subregulation (1) must include at least—

(a) a complete hazard identification;

(b) the identification of all persons who may be affected by a physical agent;

(c) how employees may be affected by a physical agent;

(d) the analysis and evaluation of the physical agent risks;

(e) the prioritisation of physical agent risks;

(f) previous physical agent exposure risk assessments; and

(g) previous physical agent exposure monitoring reports.

(3) The physical agent exposure risk assessment conducted in terms of subregulation (1) must take into account the specific effects of exposure to a physical agent on men, women, young employees and vulnerable employees, where applicable.

(4) An employer or self-employed person must, in terms of the physical agent exposure risk assessment—

(a) consider the recommendations identified by a competent person in the physical agent exposure risk assessment; and

(b) develop a documented action plan for the implementation of the recommendations.

(5) An employer or self-employed person must review the relevant physical agent exposure risk assessment made in accordance with subregulation (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 plant, machinery or personal protective equipment used to control the exposure;

(e) an incident occurred; or

(f) the medical surveillance reveals an adverse health effect where a physical agent is identified as a contributing factor.

(6) The review of the physical agent exposure risk assessment contemplated in subregulation (5) must be carried out in accordance with subregulations (1)*(c)*, (2), (3) and (4).

7. Physical agent exposure monitoring

(1) An employer or self-employed person must ensure that a physical agent exposure monitoring programme is implemented at a workplace where a physical agent exposure risk assessment or a review of such assessment indicates that any employee may be exposed to a physical agent—

(a) at or above the—

(i) occupational exposure limits in Tables 1 and 2; or

(ii) guideline values in Table 3;

(b) outside the range for the guideline values in Table 3.

(2) An employer or self-employed person must ensure that the physical agent exposure monitoring programme contemplated in subregulation (1) is—

(a) carried out in accordance with the provisions of these Regulations;

(b) conducted by a competent person;

(c) representative of an employee's exposure to a physical agent;

(d) conducted in accordance with recognised principles and methodology;

(e) conducted by means of instruments calibrated to a national or international traceable standard; and

(f) recording measurements that are traceable to national and international measurements standards.

(3) The physical agent exposure monitoring programme contemplated in subregulation (1) must include the quantification of exposure levels and comparison to values or occupational exposure limits for the particular physical agent.

(4) An employer or self-employed person must conduct the physical agent exposure monitoring contemplated in subregulation (1)—

(a) at a frequency determined by the physical agent exposure risk assessment; or

(b) at least every 24-months: Provided that an inspector may direct an employer or self-employed person, in writing, to re-conduct the exposure monitoring or part thereof.

(5) An employer or self-employed person must, in terms of physical agent exposure monitoring—

(a) consider the recommendations identified by a competent person in the physical agent exposure monitoring report; and

(b) develop a documented action plan for the implementation of the recommendations.

8. Medical screening and medical surveillance

(1) An employer must ensure that an employee is placed under a documented medical screening programme—

(a) where the physical agent exposure risk assessment or review of such assessment indicates the need for the employee to be placed under medical screening; or

(b) for a vulnerable employee, in which case the employer must obtain the opinion of an occupational medicine practitioner to determine whether it is necessary to conduct medical screening.

(2) In the case where the employer has to conduct medical screening as contemplated in subregulation (1), the occupational medicine practitioner must consider if—

(a) an employee has a health condition that makes the employee vulnerable to a physical agent;

(b) an employee has a health condition that impacts the proper use of personal protective equipment;

(c) there is an identifiable occupational disease or adverse health effect related to a physical agent;

(d) there is a reasonable likelihood that the occupational disease or adverse health effect may occur under the particular exposure conditions of the employee's work; and

(e) there are valid techniques to diagnose indications of the occupational disease or adverse health effect, as far as is reasonably practicable.

(3) Where the need for medical screening has been determined as necessary by the occupational medicine practitioner, the occupational medicine practitioner must specify requirements for medical screening, including—

(a) an evaluation of an employee's medical, occupational and exposure history;

(b) the appropriate clinical examination and medical tests; and

(c) the intervals at which medical screening must be conducted, appropriate to the health risks and health status of an employee.

(4) The employer must ensure that the medical screening contemplated in subregulation (1)—

(a) is carried out by an occupational health practitioner; and

(b) includes—

(i) an initial medical screening, as far as reasonably practicable, immediately before an employee commences employment; and

(ii) subsequently, periodic medical screening at intervals recommended by the occupational medicine practitioner, but not exceeding 24-months.

(5) After concluding medical screening, the occupational health practitioner must ensure that the employer is informed, in writing, of the outcome of an employee's health evaluation if the outcome was normal.

(6) The occupational medicine practitioner must notify the employer in writing by means of a medical certificate of fitness, and inform the employee accordingly, if—

(a) the employee has a medical condition which—

(i) prevents the wearing of personal protective equipment; or

(ii) is likely to be aggravated by the exposures at that workplace; or

(b) the medical screening identifies an adverse health effect caused by exposure to a physical agent at that workplace.

(7) The employer must ensure that an exit medical screening is carried out by an occupational health practitioner on termination of an employee's employment: Provided that a medical screening conducted within 6-months prior to the date of termination of employment shall be deemed to have fulfilled the requirements of an exit medical screening.

(8) With respect to the medical certificate of fitness contemplated in subregulation (6), the certificate must indicate at least—

(a) the recommendations pertinent to the employee's fitness to perform the inherent requirements of the job;

(b) the presence of an occupational disease, without including confidential medical information;

(c) if any restrictions or conditions apply to any specified duties performed by the employee; and

(d) the period for which any restrictions or conditions, as applicable, should be applied.

(9) The employer must, as far as is reasonably practicable—

(a) accommodate the conditions or restrictions recommended; and

(b) only permit an employee who has been medically certified for restricted duties to return to normal duties if the employee has been certified fit for those duties by an occupational medicine practitioner.

(10) An employer must establish, implement and maintain a documented system of medical surveillance, overseen by an occupational medicine practitioner, where medical screening has been determined necessary.

(11) The medical surveillance contemplated in subregulation (10) must at least—

(a) include an analysis of the screening results over time; and

(b) use the results of subregulation (2) to identify the need for targeted exposure prevention in the workplace.

(12) The employer must ensure that an employee provides written informed consent for inclusion in the—

(a) medical screening; and

(b) medical surveillance programme.

(13) An employee may appeal any finding by an occupational medicine practitioner stipulated in the medical certificate of fitness to the Chief Inspector in writing within 60-days of receiving the certificate.

9. Cold stress

(1) The employer or self-employed person must ensure that cold stress is eliminated at the source, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable and exposure is at or below the OEL stipulated in Table 1, the employer or self-employed person must, as a minimum—

(a) implement alternative working methods to reduce exposure to cold stress;

(b) install plant and machinery designed to reduce the risk of cold stress, where applicable;

(c) implement maintenance programmes for plant and machinery, the workplace and workplace systems;

(d) review the design and layout of workplaces, workstations and rest facilities;

(e) review the—

(i) physical agent exposure risk assessment;

(ii) physical agent exposure monitoring programme;

(iii) medical screening;

(iv) medical surveillance; and

(v) control measures;

(f) limit the duration and magnitude of exposure of employees such as to not exceed the periods as stipulated in Table 8; and

(g) provide an employee with dry, whole-body personal protective clothing and equipment with adequate insulation.

(3) The physical agent exposure monitoring programme must—

(a) take into account both the dry-bulb temperature and air velocity when determining the time-weighted average environmental equivalent chill temperature;

(b) be taken over a period of at least 4-hours;

(c) be conducted during the coldest period of an employee's shift; and

(d) be conducted during the coldest quarter of the year as determined by the physical agent exposure risk assessment.

10. Heat stress

(1) The employer or self-employed person must ensure that heat stress is eliminated at the source, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable and exposure is at or above the action level for heat stress as stipulated in Table 1, the employer or self-employed person must, as a minimum—

(a) identify the reason why the action level was reached; and

(b) review control measures to prevent the OEL from being reached.

(3) Where the provision of subregulation (1) is not reasonably practicable and the employee's exposure is at or above the OEL for heat stress as stipulated in Table 1, the employer or self-employed person must, as a minimum—

(a) implement alternative working methods to reduce exposure to heat stress;

(b) install plant and machinery designed to reduce the risk of heat stress, where applicable;

(c) implement maintenance programmes for plant and machinery, the workplace and workplace systems;

(d) review the design and layout of workplaces, workstations and rest facilities;

(e) review the—

(i) physical agent exposure risk assessment;

(ii) physical agent exposure monitoring programme;

(iii) medical screening;

(iv) medical surveillance programme; and

(v) control measures;

(f) limit the duration and magnitude of exposure to heat stress;

(g) subject the exposed employees to a heat acclimatisation programme;

(h) provide prompt first aid treatment, specific to the adverse health effects from heat stress;

(i) provide sufficient amounts of potable water for consumption at the place of work as determined by the physical agent exposure risk assessment; and

(k) provide appropriate personal protective clothing and equipment, taking into account the clothing adjustment value as indicated in Table 9.

(3) The physical agent exposure monitoring programme must be conducted in accordance with SANS 7243.

11. Illumination

(1) An employer or self-employed person must provide illumination in the workplace in the form of either natural light, artificial light or a combination thereof.

(2) An employer or self-employed person must ensure that, as far as reasonably practicable, illumination provided in the workplace takes into account at least—

(a) illuminance values;

(b) glare;

(c) uniformity of illuminance;

(d) flicker; and

(e) stroboscopic effect.

(3) An employer or self-employed person must ensure that, as far as reasonably practicable, specialised illumination is provided for—

(a) hazardous workplaces or tasks; or

(b) precision tasks.

(4) With respect to the illumination to be provided in terms of subregulation (1), the employer or self-employed person must ensure that—

(a) illuminance provided for the workplace is in accordance with the minimum maintained average illuminance values specified—

(i) in Table 4 for interior workplaces: Provided that where a workplace is not referenced in Table 4, the minimum maintained average illuminance values in Table 5 will apply; and

(ii) in Table 6 for exterior workplaces: Provided that where a workplace is not referenced in Table 6, the minimum maintained average illuminance values in Table 7 will apply;

(b) glare is eliminated at the source or, where this is not reasonably practicable, reduced to a degree that maintains visual performance in the workplace;

(c) the uniformity of illuminance—

(i) at any horizontal working plane in a room within an interior workplace, is not less than 0,75;

(ii) for interior workplaces within five metres of a working plane, is not less than 0,20 between the average illuminance on that working plane and on the adjacent floor areas; and

(iii) for exterior workplaces must be in accordance with the values listed in Table 6: Provided that where a workplace is not referenced in Table 6, the average uniformity in Table 7 will apply;

(d) flicker is eliminated or, where this is not reasonably practicable, reduced to a degree that maintains visual performance in the workplace; and

(e) the stroboscopic effect is eliminated where such a hazard is identified.

(5) Every employer or self-employed person must, with regards to emergency evacuation of a workplace, provide emergency sources of illumination which are such that, when activated, the minimum illuminance for—

(a) escape route illumination is not less than 1 lux at floor level;

(b) emergency escape illumination is not less than 5 lux at floor level;

(c) illumination at an emergency exit is not less than 5 lux at floor level;

(d) workplaces or types of work where it is necessary to stop machinery or shut down plant or processes before evacuating the workplace, is not less than 20 lux at floor level; and

(e) workplaces or types of work where dangerous materials are present or dangerous processes are carried out, is not less than 20 lux at floor level.

(6) An employer or self-employed person must ensure that the emergency sources of illumination—

(a) prescribed in subregulations (5)*(a), (b)* and *(c)* are activated within 30 seconds of the failure of the illumination prescribed in subregulation (1);

(b) prescribed in subregulations (5)*(d)* and *(e)* are activated within 0,5 seconds of the failure of the illumination prescribed in subregulation (1);

(c) last long enough to ensure the safe evacuation of the workplace;

(d) are—

(i) mounted at a height of not less than 2 metres above floor level; and

(ii) not aimed between 10 degrees above and 45 degrees below the horizontal line on which they are installed; and

(e) are kept clean, in good working order and tested for efficient operation at intervals of not more than 3-months.

(7) An employer or self-employed person must establish and conduct an illumination measurement and monitoring programme at that workplace where a physical agent exposure risk assessment or a review of such assessment indicates that any employee may be exposed to—

(a) illumination below the minimum maintained average illuminance values in Tables 4, 5, 6 and 7;

(b) flicker;

(c) stroboscopic effect; or

(d) specialised illumination for hazardous workplaces or tasks or precision tasks.

(8) The illumination measurement and monitoring programme as contemplated in subregulation (7) must be conducted—

(a) at a frequency determined by the physical agent exposure risk assessment; or

(b) at intervals not exceeding 24-months: Provided that an inspector may direct an employer or self-employed person, in writing, to re-conduct the measurement and monitoring or part thereof;

(c) by a competent person;

(d) by means of instruments calibrated to a national or international traceable standard;

(e) to record measurements that are traceable to national and international measurements standards; and

(f) in accordance with recognised principles and methodology stipulated in—

(i) SANS 10114-1 for interior lighting;

(ii) SANS 10389-1 for exterior lighting; and

(iii) SANS 10114-2 for emergency lighting.

(9) An employer or self-employed person must, in terms of the illumination measurement and monitoring programme as contemplated in subregulation (7)—

(a) consider the recommendations identified by a competent person in the illumination measurement and monitoring report; and

(b) develop a documented action plan for the implementation of the recommendations.

(10) In order to maintain the requirements in subregulation (1), an employer or self-employed person must ensure that—

(a) luminaires and lamps are maintained, kept clean, in good working order and replaced or repaired when defective; and

(b) windows and other sources of natural light are maintained, kept clean, fit for purpose and replaced or repaired when defective.

(11) An employer or self-employed person 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 agent exposure risk assessment.

(12) An employer or self-employed person must ensure that all windows comply with the requirements of SANS 10400: Part O.

12. Indoor air quality

(1) The employer or self-employed person must ensure that risk of exposure to hazardous biological, chemical and physical agents impacting indoor air quality is eliminated at the source, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable, the employer or self-employed person must control indoor air quality to guidance levels as contemplated in Table 3 through the provision of either—

(a) natural ventilation; or

(b) an artificial ventilation system.

(3) For an artificial ventilation system contemplated in subregulation (2)*(b)*, the employer or self-employed person must ensure that the system—

(a) complies with the air requirements for different types of occupancies listed in SANS 10400: Part O;

(b) is tested—

(i) by a competent person; and

(ii) at intervals as per the original manufacturer specifications but not exceeding 24-months; and

(c) is maintained as per the original manufacturer specifications: Provided that in the absence of the original manufacturer specifications, as per the physical agent exposure risk assessment.

(4) The physical agent exposure monitoring must take into account the following parameters as contemplated in Table 3—

(a) thermal environment, 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; and

(c) air requirements for different types of occupancies.

13. Vibration

(1) The employer or self-employed person must ensure that hand-arm vibration or whole-body vibration is eliminated at the source, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable and exposure is at or above the action level for hand-arm vibration or whole-body vibration as stipulated in Table 1, the employer or self-employed person must, as a minimum—

(a) identify the reason why the action level was reached; and

(b) review control measures to prevent the OEL from being reached.

(3) Where the provision of subregulation (1) is not reasonably practicable and exposure is at or above the OEL for hand-arm vibration or whole-body vibration as stipulated in Table 1, the employer or self-employed person must, as a minimum—

(a) implement alternative working methods to reduce exposure to vibration;

(b) install plant and machinery designed to produce the least possible vibration;

(c) implement maintenance programmes for plant and machinery, the workplace and workplace systems;

(d) review the design and layout of workplaces, workstations and rest facilities;

(e) review the—

(i) physical agent exposure risk assessment;

(ii) physical agent exposure monitoring programme;

(iii) medical screening;

(iv) medical surveillance; and

(v) control measures;

(f) limit the duration and magnitude of exposure to vibration; and

(g) provide personal protective clothing to protect employees from cold and damp.

(4) The physical agent exposure monitoring must—

(a) for whole-body vibration, be conducted in accordance with SANS 2631;

(b) for hand-arm vibration, in order to be representative of an employee's exposure—

(i) be conducted along the axes for pitch, yaw and roll;

(ii) be a minimum of one exposure cycle, normalised to an 8-hour time-weighted average: Provided that in the event of multiple sources of vibration, the partial exposure values are combined and normalised to an 8-hour time-weighted average;

(iii) in the case of plant or machinery which need to be held with both hands, be conducted on each hand, whereby the exposure is determined by reference to the higher value of the two;

(iv) be conducted during the coldest period of an employee's shift; and

(v) be conducted during the coldest quarter of the year as determined by the physical agent exposure risk assessment.

14. Occupational non-ionising radiation

(1) The employer or self-employed person must ensure that occupational non-ionising radiation is eliminated at the source, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable and exposure is at or above the OEL for the respective type of occupational non-ionising radiation as stipulated in Tables 1 and 2, the employer or self-employed person must, as a minimum—

(a) implement alternative working methods to reduce exposure to occupational non-ionising radiation;

(b) install plant and machinery designed to produce the least possible occupational non-ionising radiation;

(c) implement maintenance programmes for plant and machinery, the workplace and workplace systems;

(d) review the design and layout of workplaces, workstations and rest facilities;

(e) review the—

(i) physical agent exposure risk assessment;

(ii) physical agent exposure monitoring programme;

(iii) medical screening;

(iv) medical surveillance; and

(v) control measures;

(f) limit the duration and magnitude of exposure to occupational non-ionising radiation; and

(g) provide personal protective equipment to protect employees from occupational non-ionising radiation.

(3) The physical agent exposure monitoring must take into account—

(a) the source of the occupational non-ionising radiation; and

(b) the type of occupational non-ionising radiation.

(4) Signage must be provided—

(a) for—

(i) an identified source of occupational non-ionising radiation, where reasonably practicable; and

(ii) an area that has been identified to have an electromagnetic interference effect on bio-medical devices; and

(b) in the form specified in Annexure 1, which is clearly visible.

15. Prevention or control of exposure to a physical agent

(1) An employer or self-employed person must ensure that the exposure of a person to a physical agent is eliminated, where reasonably practicable.

(2) Where the provision of subregulation (1) is not reasonably practicable, an employer or self-employed person must, as far as is reasonably practicable, reduce exposure to a physical agent to below the OELs contemplated in Tables 1 and 2 by implementing a combination of the hierarchy of control measures, including, but not limited to—

(a) engineering control measures to eliminate or reduce exposure at its source, or the modification of the routes of exposure;

(b) keeping plant and machinery which generates a physical agent in good working order or repaired or replaced when defective; and

(c) administrative control measures to limit the number of persons exposed and the duration of exposure.

(3) An employer or self-employed person must ensure that an employee who is exposed to a physical agent receives information, instructions and training with regard to the inspection and correct use of control measures and reporting of failures of control measures implemented in subregulation (2).

16. Personal protective equipment and facilities

(1) Where it is not reasonably practicable to ensure that the exposure of an employee to a physical agent is either eliminated or controlled, the employer must provide the employee with suitable personal protective equipment.

(2) Where personal protective equipment is provided, the employer must ensure that—

(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;

(vi) compatibility with any other personal protective equipment that may be needed; and

(vii) any recommendations made by the occupational health practitioner;

(c) information, instructions, training and supervision are provided with regard to the correct inspection, use, care and disposal of personal protective equipment;

(d) reusable personal protective equipment is kept in a hygienic condition and proper working order;

(e) facilities are provided for the safe disposal of disposable personal protective equipment, in a manner that would not cause any hazard;

(f) the relevant personal protective equipment is readily available;

(g) storage facilities for personal protective equipment are provided when not in use; and

(h) personal protective equipment is used or worn by enforcing the use thereof.

(3) Subregulations (1) and (2) also apply to persons other than employees who may be exposed to physical agents.

17. Maintenance of control measures

(1) Every employer or self-employed person must ensure that any control measure is—

(a) fully and properly used;

(b) maintained in an efficient state and in good working order;

(c) in good repair and clean condition; and

(d) reviewed for effectiveness through inspections and tests at intervals not exceeding 24-months.

(2) The inspections and tests contemplated in subregulation 1*(d)* must be conducted by a competent person.

18. Records

(1) An employer or self-employed person must—

(a) keep record of—

(i) training;

(ii) the physical agent exposure risk assessment and action plan;

(iii) the physical agent exposure monitoring and action plan;

(iv) the illumination measurement, monitoring and action plan;

(v) medical screening and medical surveillance reports; and

(vi) maintenance of control measures;

(b) keep records as contemplated in subregulation (1)*(a)* for 40-years;

(c) make available to—

(i) the relevant health and safety representative, health and safety committee or an inspector the records as contemplated in regulations 3, 6, 7, 11 and 17; and

(ii) any person the records contemplated in regulation 8, subject to formal written consent of the employee.

(2) If an employer or self-employed person ceases activities, the employer or self-employed person must inform the relevant Chief Director: Provincial Operations of—

(a) where the records listed in subregulation 1*(a)* will be kept; and

(b) how those records will be accessed when required.

19. Physical agents technical committee

(1) The Council may, after consultation with the Minister, establish a physical agents technical committee which must consist of—

(a) a chairperson designated by the Chief Inspector from the employees of the Department of Employment and Labour;

(b) one person designated by the Chief Inspector from the employees of the Department of Employment and Labour;

(c) three persons designated by employers' 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 must—

(a) appoint members of the physical agents technical committee for a period that the Council may determine at the time of the appointment;

(b) 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 subregulation (2)*(b)*.

(3) The physical agents technical committee must—

(a) advise the Council on physical agents related matters, including, but 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;

(e) conduct its work in accordance with the instructions and rules of conduct framed by the Council; and

(f) advise the Chief Inspector regarding appeals lodged in writing regarding a medical certificate of fitness as contemplated in regulation 8(6).

20. Offences and penalties

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.

21. Repeal of regulations

The Environmental Regulations for Workplaces, 1987 as amended, published as Government Notice No. R. 2281 of 16 October 1987, will be repealed 18-months after the date of promulgation of the Physical Agents Regulations.

22. Short title

These regulations shall be called the Physical Agents Regulations, 2024.

ANNEXURE 1 – SIGNAGE

Beware of occupational non-ionising radiation

Beware of Electromagnetic interference on bio-medical devices

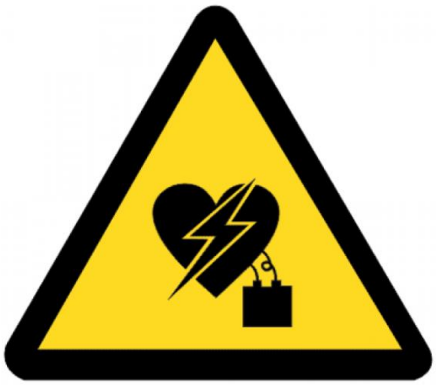


Table 1: Occupational exposure limits and action levels for physical agents

Physical agent	Action level	Time-weighted average OEL	Unit	Duration
Cold stress equivalent chill temperature or ECT	-	10	degrees Celsius, °C	4-hours
Heat stress wet-bulb globe temperature index	27	30	Degrees Celsius, °C	1-hour
Hand-arm vibration	2,5	5	metres per square second, m/s^2	8-hours
Whole-body vibration	0,5	1,15	metres per square second, m/s^2	8-hours
Ultraviolet radiation	-	0,1	microwatt per square centimetre, $\mu W/cm^2$	8-hours
Infrared radiation	-	10	milliwatt per square centimetre, mW/cm^2	1 000 seconds

Table 2: Occupational exposure limits for electromagnetic fields*

Frequency range	Incident E-field strength – E_{inc} V/m^{-1}	Incident H-field strength – H_{inc} A/m^{-1}	Incident power density – S_{inc} W/m^{-2}
0,1 to 30 MHz	$660/f_M^{0,7}$	$4,9/f_M$	n/a
> 30 to 400 MHz	61	0.61	10
> 400 to 2 000 MHz	$3/f_M^{0,5}$	$0,008/f_M^{0,5}$	$f_M/40$
> 2 to 300 GHz	n/a	n/a	50

*Note: levels for exposure are averaged over 30 minutes and for the whole-body.

Table 3: Guideline levels for indoor air quality parameters

IAQ parameter	Level	Unit
Air temperature	20 to 28 dry-bulb temperature	degrees Celsius, °C
Air velocity	0,1 to 0,5	meters per second, m/s
Relative humidity	30 to 60	per cent, %
Carbon dioxide	Not to exceed outdoor concentration by more than 600 ppm	parts per million, ppm
Carbon monoxide	10	parts per million, ppm

Table 4: Minimum maintained average illuminance values for interior workplaces

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
General Building Areas	
Entrance halls	100
Lounges	200
Circulation areas and corridors	100
Stairs, escalators and travelators	150
Loading ramps/bays	150
Canteens	200
Rest rooms	100
Rooms for physical exercise	300
Cloakrooms, washrooms, bathrooms, toilets	200
Sickbays	500
Rooms for medical attention	500
Plant rooms, switchgear rooms	200
Post rooms, switchboards	500
Stores, stockrooms, cold stores	100
Dispatch packing and handling areas	300
Control stations	150
Airports	
Arrival and departure halls, baggage claim areas	200
Connecting areas, escalators, travelators	150
Information desks, check-in desks	500
Customs and passport control desks	500
Waiting areas	200
Luggage store rooms	200
Security check areas	300
Air traffic control towers	500
Air traffic rooms	500
Radar-type and other control tower-type screens	specialised illumination
Ticket halls and concourses	200

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Ticket and luggage offices and counters	300
Platforms and passenger subways, underpasses	50
Testing and repair hangars	500
Engine test areas	500
Measuring areas in hangars	500
Banks	
Counters (see also offices)	500
General work areas	500
Sales areas: small	300
Sales areas: large	500
Till areas, wrapper tables	500
General work areas	300
Stairs and corridors	200
Stockrooms	200
Cabinet Making	
Veneer sorting and preparation	500
Veneer pressing	400
Marquetry, inlay work	750
Components store	100
Fitting, final inspection	500
Car Parks, indoors	
In/out ramps: day	300
In/out ramps: night	75
Traffic lanes	75
Parking areas	75
Ticket offices: manned	300
Ticket vending machines	150
Cement, Concrete and Brick Industry	
Drying	50
Preparation of materials, work on kilns and mixers	200

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
General machine work	300
Rough forms	300
Fiberising, mixing, shredding, agitating, manufacturing of flat sheets, corrugated sheets and moulded goods	300
Pipe and pole manufacturing: mixing, spinning, reinforcing, stripping	200
Ceramics and Glass Industry	
Drying	50
Furnace rooms, mixing, bending, annealing ovens, forming	200
Enamelling, rolling, pressing, shaping simple parts, glazing, glass blowing	300
Preparation, general machine work	300
Grinding, engraving, glass polishing, shaping precision parts, manufacture of glass instruments	750
Decorative work	500
Grinding of optical glass, crystal hand grinding and engraving, work on average goods	750
Precision work, e.g. decorative grinding, hand painting	1 000
Manufacture of synthetic precious stones	1 500
Finishing, bevelling, etching, silvering	500
Brilliant cutting	800
Inspection – General	300
Inspection – Fine	800
Chemical, plastics and rubber Industries	
Hand furnaces, boiling tanks, stationary driers or gravity crystallisers	150
Mechanical driers	150
Evaporators, filtration plants	150
Mechanical crystallising, bleaching	200
Extractors, percolators, nitrators, electrolytic cells	200
Controls, gauges, valves	100
Control rooms: vertical control panel face: vertical illuminance	400

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Control desks	400
General work areas	150
Inspection	1 000
Clay and Pottery	
Grinding, filter pressing, kiln rooms, moulding, pressing, cleaning, trimming, firing	400
Enamelling, colouring, decorating	600
Dye Works	
Reception, "grey" perching	600
Wet processes	300
Dry processes	300
Dyers' offices	800
Educational Buildings	
Playschool rooms	300
Nursery classes	300
Nursery craft rooms	300
Classrooms, tutorial rooms	300
Classrooms for evening classes and adult education	500
Lecture halls	500
Chalk boards: vertical illuminance	500
Demonstration tables	500
Art and craft rooms	500
Art rooms in art schools	750
Technical drawing rooms	750
Preparation rooms and workshops	500
Music practice rooms	500
Student common rooms and assembly halls	200
Assembly halls for exams	500
Teachers' rooms	300
Library shelves, stacks	300
Reading tables	400

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Dormitories	100
Corridors and stairs	150
Electrical Manufacturing	
Cable and wire manufacturing	300
Coil winding: – large coils – medium coils – small coils	 300 500 750
Coil impregnating	300
Coil and armature processes, general	400
Galvanising	300
Assembly – rough, e.g. large transformers – medium, e.g. switchboards – fine, e.g. telephones	 300 500 750
Precision, e.g. measuring equipment	1 000
Electronic workshops, testing, adjusting	1 500
Electricity Generating Stations	
Turbine halls: operating floor	300
Blowers, auxiliary generators	150
Cable, screens and transformer chambers	100
Cable tunnel, covered walkways, storage tanks	50
Battery and charging equipment rooms	150
Coal and ash handling	100
Boiler rooms	100
Boiler front: operating floor	150
Between boilers: operating floor, stairs, galleries, operating platforms and precipitator high-voltage chamber	150
Pulverisers, feeders, ash-plants, conveyors: tunnel, junction tower	100
Overland conveyor housing walkways	100
Boiler house and turbine house basements	150
Pump houses and rooms, water treatment plants	150

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Control rooms, control panel face: vertical illuminance	300
Control desks with display screen equipment	400
Rear of control panels	150
Computer rooms	500
Switch houses and rooms	200
Relay and telecommunications rooms	300
Nuclear reactors, steam raising plants, reactor areas, boilers, galleries	200
Gas circulator bays	200
Reactor charge/discharge face	200
High-voltage substations: indoor	200
Entertainment	
Cinemas	
Projection rooms	200
Corridors, stairs	150
Foyers	100
Auditoriums: other than during performances	100
Booking areas	300
Theatres and concert halls	
Foyers	100
Auditoriums: other than during performances	100
Platforms	200
Corridors and stairs	150
Booking offices	300
Cloakrooms, washrooms, bathrooms, toilets	200
Food Industry	
Workplaces and zones in breweries, malting floor, area for washing, barrel filling, cleaning, sieving, peeling, cooking in preserve and chocolate factories, fermentation cellars	200
Sorting and washing of products, milling, mixing, packing	300

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Workplaces and zones in slaughter houses, butcheries, dairies, mills, filtering floors	500
Cutting and sorting of fruit and vegetables	300
Manufacturing of delicatessen foods, kitchens	500
Inspection of glasses and bottles, product control, trimming, sorting, decoration	500
Laboratories	500
Colour inspection	1 000
Inspection of produce	500
Abattoirs	
Cold stores, casting and stunning pens	150
Bleeding areas	200
Dressing, evisceration, washing tripery and skin sorting	300
Inspection and grading	500
By-products manufacturing, e.g. digesters, grinding, etc.	200
Agriculture	
Loading and operating of goods-handling equipment and machinery	200
Feed preparation, utensil washing	200
Cutting and sorting of fruit and vegetables	300
Bakeries	
Preparation and baking	300
Finishing, glazing and decorating	500
Brewing and distilling	
General work areas	200
Brewhouses, bottling and canning plants	300
Bottle inspection	500
Canning and preserving	
Preparation, kettle areas, mechanical cleaning, dicing, trimming	400
Retorts for canned and bottled goods	200
High-speed labelling lines	400

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Can inspection	400
Automatic processes	200
Dairies	
General work areas	200
Bottle inspection	500
Bottle filling	500
Dispatching	150
Sugar refinery	
General workplaces and zones	200
Crushing, settling, evaporating, boiling, curing, drying, packing	200
Centrifuging, metering, filtering, condensing	200
Panning, mixing, drying	300
Foundries and Metal Casting	
Man-size underground tunnels, cellars	50
Platforms	100
Sand preparation	200
Dressing rooms	200
Workplaces at cupola and mixer	200
Casting bays	200
Shakeout areas	200
Machine moulding	200
Hand and core moulding	300
Die casting	300
Model building	500
Furniture Industry	
Raw material stores	100
Finished goods stores	100
Wood machining and assembly	300
Raw material store	100
Rough sawing and cutting	200

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Machining, sundry and assembly of components	350
Rough sawing and cutting	200
Machining, sundry and assembly of components	350
Gas Works	
Retort houses, oil gas plants, water gas plants, purifiers, coke screening and coke handling plants	50
Hat Making	
Stiffening, braiding, cleaning, refining, forming, pouncing	300
Flanging, finishing, ironing	400
Inspection	1 000
General work areas	400
Governor, meter, compressor, booster, exhauster houses	250
Healthcare and Hospital Premises	
Waiting rooms	200
Stairs and corridors during the day	200
Stairs and corridors at night	50
Day rooms	200
Casualty and outpatient departments	200
Staff offices	500
Staff rooms	300
Wards	
General lighting	100
Reading lighting	300
Simple examination	300
Examination and treatment	1 000
Night lighting, observation lighting	5
Bathrooms and toilets for patients	200
Examination rooms: general	500
Ear and eye examination	1 000
Reading and colour vision test with vision charts	500

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Scanners with image enhancers and television systems	50
Dialysis rooms	500
Dermatology rooms	500
Dispensaries	400
Endoscopy rooms	300
Plaster rooms	500
Medical baths	300
Massage and radiotherapy rooms	300
Pre-op and recovery rooms	500
Operating theatres	1 000
Operating cavity	specialised illumination
Intensive care	
General lighting	100
Simple examination	300
Examination and treatment	1 000
Night watch	20
Sterilisation rooms	300
Disinfection rooms	300
Autopsy rooms and mortuaries	500
Autopsy and dissecting tables	5 000
Dentistry	
General lighting	500
At the patient	1 000
Operating cavity	5 000
White teeth matching	5 000
Colour inspection: laboratories	1 000
Hosiery and Knitwear	
Circular and flat knitting machines; universal winders; cutting out, folding and pressing	400
Lock-stitch and overlocking machines	500
Mending – light goods	1 000

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Mending – dark goods	1 500
Examining and hand-finishing light goods	600
Examining and hand-finishing dark goods	1 000
Linking or running on	500
Hospitality Industry	
Restaurants and hotels	
Reception/cashier desks, porters' desks, lounges	300
Kitchens and bakeries	500
Restaurants, dining rooms, function rooms, bars	200
Food preparation	300
Freezers, refrigerators	150
Self-service restaurants	200
Buffets	300
Conference rooms	500
Corridors	100
Stairs	150
Entrance halls	200
Lounges	150
Bedrooms: general	100
Dressing tables, headboards, etc.	200
Billiard rooms: general	200
Billiard tables	specialised illumination
Card rooms	300
Laundries	300
Goods and passenger lifts	100
Cloakrooms and toilets	150
Bathrooms	150
Self-service counters	300
General work areas	300
Iron and Steel	

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Production plants without manual intervention	50
Production plants with occasional manual intervention	150
Production plants with continual manual intervention	200
Slab stores	50
Furnaces	200
Mill trains, coilers, shear lines	300
Control platforms, control panels	300
Testing, measurement and inspection	500
Underground man-sized tunnels, belt sections, cellars, etc.	50
Slab yards, melting shops, ingot stipping, soaking pits, blast furnaces, work areas, pickling and clearing lines, mechanical pump houses, slabbing and large section rolling mills	100
Mould preparation, light section wire and cold strip mills, mill motor rooms, slab and bloom inspection and conditioning, sheet and plate finishing, tinning, galvanising and roll shops	100
Inspection	300
Tin plate inspection and pulpits: control rooms	500
General work areas	200
Inspection areas	
Rough work, e.g. counting and rough checking of stock parts	300
Medium work, e.g. "go" and "no-go" gauges	400
Subassemblies	400
Fine work, e.g. radio and telecommunication equipment, calibrated scales, precision mechanisms, instruments	600
Very fine work, e.g. gauging and inspection of small, intricate parts	1 200 or 1 600
Minute work	1 200 or 1 600
Jewellery Manufacturing	
Working with precious stones	1 500
Manufacturing of jewellery	1 000
Watchmaking: manual	1 500
Watchmaking: automatic	500

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Fine processes	800
Minute processes	4 000
Gem cutting, polishing	1 500
Joinery	
Bench gluing, assembly	300
Machine turning, fluting, dressing, rebating, grooving, cutting, sawing, sinking	500
Quality control	1 000
Laboratories and Test Rooms	
General laboratories, balance rooms	500
Electrical and electronic instrument laboratories	500
Calibration scales, precision mechanical instruments	700
Laundries and Dry-cleaning	
Goods receiving, marking and sorting	300
Washing and dry-cleaning	300
Ironing, pressing	300
Inspection and repairs	750
Leather Industry	
Work on vats, barrels, pits	200
Fleshing, skiving, rubbing, tumbling of skins	300
Saddlery work, shoe manufacture, sewing, polishing, shaping, cutting, punching	500
Sorting and grading	1 000
Leather dyeing: machine	500
Glove making	500
Clicking and closing, preparation operations	800
Cutting tables and presses, stitching	1 000
Bottom stock preparation, lasting and bottom finishing	800
Shoe rooms	800
Quality control	1 000
Inspection	1 000

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Wrapping, packing and labelling	200
Sorting stock	200
Open die forging	200
Drop forging, welding, cold forming	300
Rough and average machining, tolerances > 0,1 mm	300
Precision machining, grinding, tolerances < 0,1 mm	500
Scribing, inspection	750
Wire and pipe drawing, shapes	300
Plate machining > 5 mm	200
Sheet metal-work < 5 mm	300
Tool making, cutting equipment manufacture	750
Rough	200
Medium	300
Fine	500
Precision	750
Galvanising	300
Surface preparation and painting	750
Template and jig making, precision mechanics, micro-mechanics	1 000
Rough	200
General work areas	250
Tempering	200
Rough bench and machine work	200
Medium bench and machine work, ordinary automatic machines, rough grinding, medium buffing and polishing	400
Lifts	
Car interior	100
Motor rooms	200
Machining and Fitting	
Rough bench and machine work	200
Medium bench and machine work, ordinary automatic machines, rough grinding, medium buffing and polishing	400

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Material Handling Premises	
Wrapping, packing and labelling	200
Sorting stock	200
Mattress Making	
Assembly	400
Tape edging	500
Metal Work – Assembly	
Rough	200
Medium	300
Fine	500
Precision	750
Galvanising	300
Surface preparation and painting	750
Template and jig making, precision mechanics, micro-mechanics	1 000
Metal Work – Blacksmith	
General work areas	250
Tempering	200
Metal Work – Processing	
Open die forging	200
Drop forging, welding, cold forming	300
Rough and average machining, tolerances > 0,1 mm	300
Precision machining, grinding, tolerances < 0,1 mm	500
Scribing, inspection	750
Wire and pipe drawing, shapes	300
Plate machining > 5 mm	200
Sheet metal work < 5 mm	300
Tool making, cutting equipment manufacture	750
Offices	
Entrance halls and reception areas	200
Reception desks	300

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Copying, filing, etc.	300
General office workstations, computer and business machine operation	500
Writing, reading, data processing	500
Technical drawing – illustrating etc. – pen and ink	750
CAD workstations	500
Paint Industry	
General automatic processes	200
Special batch mixing	400
Colour matching	600
Paint Shops and Spray Booths	
Rubbing, dipping, ordinary painting, spraying and finishing	400
Fine painting, spraying and finishing	700
Retouching and matching	1 000
Paper Industry	
Pulp mills, edge runners	200
Paper manufacturing and processing, paper and corrugating machines, cardboard manufacturing	300
Paper and board making, machine houses, calendaring, preparation plants, cutting, trimming, finishing	300
Inspection and sorting: overhauling	400
Paper converting process, general	300
Associated printing	300
Paper Bag, Carton and Box Making	
Corrugated boards, cartons, containers and paper box manufacturing	200
Coating and laminating process	300
Associated printing	300
Pharmaceutical and Fine Chemical	
Raw material storage	200
Control laboratories and testing	500

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Pharmaceuticals manufacturing, grinding, granulating, mixing and drying, tableting, sterilising and washing	500
Preparation of solutions and filling, labelling, capping and inspection	400
Fine chemical plant processing	200
Fine chemical finishing	500
Photographic	
Safety-light darkrooms	10
Studios	specialised illumination
Plastics	
Processing: calendering, extruding	300
Moulding: compression, injection	300
Sheet: shaping	300
Trimming, machining, polishing	400
Colour matching and inspection	1 000
Plating	
Vats and baths	400
Final buffing and polishing	600
Printing Industry	
Cutting, gilding, embossing, block engraving, work on stones and platens, printing machines, matrix making	500
Paper sorting and hand printing	500
Typesetting, retouching, lithography	1 000
Electrotyping: block making, electroplating, washing, backing	500
Moulding, finishing, routing	400
Photoengraving: block making, etching, masking	400
Finishing, routing	500
Colour printing: inspection areas	1 000
Public Buildings	
Churches, mosques, synagogues and temples	
General interior	150

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Pulpit and lectern areas, chancel, choir	200
Altars, communion tables	200
Vestries	200
Courtrooms	
Seating	200
Courts	500
Fire stations	
Appliance rooms	150
External aprons	50
Libraries	
Shelves and stacks	300
Carrels, reading rooms, newspapers and magazines, reading tables, counters	500
Binding	500
Cataloguing, sorting, stockrooms	300
General work areas	300
Shelves and stacks	300
Museums and art galleries	
General	200
Displays and paintings	specialised illumination
Post offices	
Circulation	100
Counters	500
Sorting of mail by hand	500
Sorting of mail by auto-sort-system	200
Refrigeration	
Chilling and cold rooms, ice-making	200
Retailing	
Sales areas: small	300
Sales areas: large	500
Till areas, wrapper tables	500

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
General work areas	300
Stairs and corridors	200
Stockrooms	200
Rubber	
Fabric preparation creels	200
Dipping, moulding, compounding calenders	500
Tyre and tube making	400
Curing	400
Inspection	1 000
Sheet metal	
Bench work, pressing, punching, shearing, stamping, spinning	300
Sheet inspection	500
Soap manufacturing	
All processes, e.g. kettle houses and ancillaries, batch or continuous soap rooting and soap stamping	300
General areas	300
Auto processes	200
Control panel face	200
Product processing and packing	200
Spray booths	
Colour finishing	600
Clear finishing	400
Structural steel fabrication	
General	200
Marking off	400
Telephony	
Manual exchange rooms: on desk	300
Main distribution frame rooms in automatic exchanges, UPS rooms	300
Battery rooms	150
Cable tunnels	50

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Textile Industry	
General areas	
Workplace and zones in baths, bale opening	200
Carding, washing, ironing, drawing, combing, sizing, card cutting, pre-spinning	300
Spinning, plying, reeling, winding, warping, weaving, braiding, knitting	500
Sewing, fine knitting, taking up stitches	750
Manual design, drawing patterns	750
Finishing, dyeing	500
Drying rooms	100
Automatic fabric printing	500
Burling, picking, trimming	1 000
Colour inspection, fabric control	1 000
Invisible mending	1 500
Hand tailoring	1 000
Cotton or linen	
Bale breaking, blowing, carding	300
Roving, slubbing, spinning: ordinary counts, winding, hackling, spreading, cabling	300
Warping, slashing, dressing and dyeing, doubling: fancy, spinning (fine counts)	300
Healding: drawing in	800
Weaving: patterned cloths	800
Weaving: plain "grey" cloths	800
Cloth inspection	1 000
Jute	
Weaving, spinning flat, Jacquard carpet looms, cop winding	300
Yarn calender	400
Silk or synthetics	
Soaking, fugitive tinting, conditioning or setting of twist	500

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Spinning	500
Winding, twisting, rewinding and coning, quilling, slashing	350
Warping	400
Healding: drawing in	800
Weaving	800
Inspection	1 000
Upholstery	
Cloth inspection	800
Filling, covering	500
Slipping	500
Cutting, sewing	500
Woollens	
Preparing, raising, brushing, pressing, backwashing, gilling, grabbing, blowing	300
Blending, carding, combing: white, tentering, drying, cropping	300
Spinning, roving, winding, warping, combing: coloured, twisting	500
Healding: drawing in	800
Weaving: fine worsteds	800
medium worsteds, fine woollens	500
heavy woollens	400
burling and mending	800
Perching: "Grey"	800
Finals	2 000
Tobacco	
Primary manufacturing: weighing, blending, conditioning, threshing, cutting	250
Cigarette making machines, filter plug makers	500
Catcher: inspection	1 000
Hand processes	750
Cigarette or tobacco packing	600
Tool Rooms	

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
General	300
Benches	400
Transport Terminals: Bus, Rail, Sea	
Radar-type and other control tower-type screens	specialised illumination
Reception areas: desks, customs and immigration halls, lounges, luggage collection, security check	300
Check-in counters, customs and passport control	500
Circulation, platforms, dispatch	150
Vehicle Construction	
Body work and assembly	500
Painting, spraying chambers, polishing chambers	750
Painting: touch-up, inspection	1 000
Upholstery manufacture	1 000
Final inspection	1 000
General assemblies, chassis assemblies, car assemblies, trim shops, body subassemblies	400
Final inspection	500
Vehicle Servicing	
Parking areas: indoors	75
Washing bays, polishing, greasing bays	200
Servicing pits	200
Repairs	350
Workbenches	400
Fuel pumps	200
Warehousing	
Small material, racks, packing and dispatch	200
Issue counters	300
Loading bays, large material	100
Inactive storage and automatic stores	50
Welding and Soldering	
Gas and arc welding	250

Type of interior, area, task or activity	Minimum maintained average illuminance, Lux
Medium soldering, brazing and spot welding, e.g. domestic hardware	350
Fine soldering and spot welding, e.g. instruments, radio set assembly	800
Very fine soldering and spot welding, e.g. printed circuits	1 500
Woodworking and Sawmilling	
Rough sawing and bench work, sizing, planing, rough sanding	250
Medium machine and bench work, gluing, cooperage	300
Fine bench and machine work, fine sanding and finishing	500
Automatic processing, e.g. drying, plywood manufacturing	50
Steam pits	150
Saw frames	300

Table 5: Minimum maintained average illuminance value ranges for workplaces not listed in Table 4

Type of area, task or activity	**Illuminance range** (lux)
Outdoor circulation and work areas	20 to 50
Circulation areas, simple orientation or short, temporary visits	50 to 150
Rooms not used continuously for working purposes	100 to 200
Tasks with simple visual requirements	200 to 500
Tasks with medium visual requirements	300 to 750
Tasks with demanding visual requirements	500 to 1 000
Tasks with difficult visual requirements	750 to 1 500
Tasks with special visual requirements	1 000 to 2 000
Performance of very exacting visual tasks	> 2 000
The lower values in the range may be used— (a) when reflectance or contrast is unusually high, (b) when speed or accuracy is not important, and (c) when the task is only performed occasionally.	

Table 6: Minimum maintained average illuminance values for exterior workplaces

Areas to be lit, operation performed	**Minimum maintained average illuminance** Lux		**Minimum uniformity ratio**	**Minimum uniformity ratio**
	Horizontal Ehav	**Vertical** Evav	Ehmin/Ehav	Ehmin/Ehmax
Airports				
Apron parking areas	20	20	0,25	0,2
Areas adjacent to apron	10		0,25	0,2
Taxiway between aprons	5	15	0,25	0,2
Building Sites				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,4	0,2
Accurate work	100		0,4	0,2

Areas to be lit, operation performed	**Minimum maintained average illuminance** Lux		**Minimum uniformity ratio**	**Minimum uniformity ratio**
	Horizontal Ehav	**Vertical** Evav	Ehmin/Ehav	Ehmin/Ehmax
Fine work	200		0,5	0,2
Traffic areas Pedestrian passages, vehicle turning, loading and unloading points	50		0,4	0,2
Safety and security General lighting on building site, element mould, timber and steel storage, building foundation hole and working areas on sides of the hole	50		0,4	0,2
Canals and locks Outport embankment ballasting		1 to 10		
Waiting quays	10		0,25	0,125
Locking chamber walls: • Wall height below 10 m • Wall height over 10 m		 25		
Filling and Service Stations				
Entry and exit driveways: light environment: cities dark environment	 50 20		 0,4 0,4	 0,2 0,2
Meter reading area: light environment: cities dark environment	 300 150		 0,5 0,5	 0,333 0,333
Air pressure and water checking points and other service areas	75		0,4	0,2
Vehicle parking and storage area (see also parking areas)	5		0,25	0,1
Harbours				

Areas to be lit, operation performed	Minimum maintained average illuminance Lux		Minimum uniformity ratio	Minimum uniformity ratio
	Horizontal Ehav	Vertical Evav	Ehmin/Ehav	Ehmin/Ehmax
Work area or task				
Cargo handling, loading and unloading	20		0,25	0,125
Coupling of hoses and pipes	50			0,167
Traffic area				
Walking passages exclusively for pedestrians	10		0,25	0,125
Passenger areas in passenger harbours	50		0,4	0,2
Vehicle traffic areas	20		0,4	0,167
Dangerous part of walkways and driveways	50		0,4	0,2
Safety and security				
General lighting	10		0,25	0,125
Medium risk areas	20		0,4	0,167
High risk areas	50		0,4	0,2
Industrial Yards and Storage Areas				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,40	0,2
Accurate work	100		0,50	0,33
Fine work	200		0,50	0,33
Traffic areas				
Walkways exclusively for pedestrians	5		0,25	0,1
Traffic areas for slowly moving vehicles: max. 10 km/h	10		0,4	0,2
Regular vehicle traffic: max. 40 km/h	20		0,4	0,2

Areas to be lit, operation performed	**Minimum maintained average illuminance** Lux		**Minimum uniformity ratio**	**Minimum uniformity ratio**
	Horizontal Ehav	**Vertical** Evav	Ehmin/Ehav	Ehmin/Ehmax
Safety and security				
Low risk areas	5		0,25	0,125
Medium risk areas	20		0,4	0,167
High risk areas	50		0,4	0,2
Parking Lots				
Parking lots and pedestrian areas				
Light traffic	5		0,25	0,1
Medium traffic	10		0,25	0,125
Heavy traffic	20		0,25	0,125
Vehicle driveways				
Light traffic	5		0,25	0,1
Medium traffic	10		0,4	0,167
Heavy traffic	20		0,4	0,2
Petrochemical Industries and Other Hazardous Industries				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,4	0,2
Accurate work	100		0,4	0,2
Fine work	200		0,5	0,33
Traffic areas				
Walkways exclusively for pedestrians	5		0,25	0,1
Traffic areas for slowly moving vehicle traffic: max. 10 km/h	10		0,4	0,167
Regular vehicle traffic: max. 40 km/h	20		0,4	0,2
Safety and security				

Areas to be lit, operation performed	Minimum maintained average illuminance Lux		Minimum uniformity ratio	Minimum uniformity ratio
	Horizontal Ehav	Vertical Evav	Ehmin/Ehav	Ehmin/Ehmax
Low risk areas	10		0,4	0,167
Medium risk areas	20		0,4	0,167
High risk areas	50		0,4	0,2
Fuel loading and unloading sites	100		0,4	0,2
Power, Electricity, Gas and Heat Plants				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,4	0,2
Accurate work	100		0,4	0,2
Fine work	200		0,5	0,33
Traffic areas				
Pedestrian movements within electrically safe areas	5		0,25	0,1
Traffic areas for slowly moving vehicle traffic: max. 10 km/h	10		0,4	0,167
Regular vehicle traffic: max. 40 km/h	20		0,4	0,2
Safety and security				
Low risk areas	5		0,25	0,1
Medium risk areas	20		0,4	0,167
High risk areas	50	50	0,4	0,2
Railways Areas				
Passenger areas				
Open platforms, small stations	10		0,25	0,125
Open platforms, medium-size stations	20		0,4	0,33

Areas to be lit, operation performed	**Minimum maintained average illuminance** Lux		**Minimum uniformity ratio**	**Minimum uniformity ratio**
	Horizontal Ehav	**Vertical** Evav	Ehmin/Ehav	Ehmin/Ehmax
Open platforms, large stations	50		0,4	0,33
Covered platforms, small stations	50		0,4	0,33
Covered platforms, large stations	100		0,5	0,33
Stairs, small and medium-size stations	50		0,4	0,33
Stairs, large stations	100		0,5	0,33
Walkways, small and medium-size stations	20		0,4	0,167
Walkways, large stations	50		0,4	0,2
Freight areas				
Freight track, temporary or quick operation	10		0,25	0,125
Freight track, continuous operation	20		0,4	0,167
Open platforms	20		0,4	0,167
Covered platforms, temporary or quick operation	50		0,4	0,33
Covered platforms, continuous operation	100		0,5	0,33
Traffic areas for mobile cranes and cars	20		0,4	0,167
Container handling areas	20		0,5	0,167
Container storage areas	10		0,25	0,125
Track for trailer loading on wagons	20		0,4	0,167
Railway Yards				
Flat marshalling yards				

Areas to be lit, operation performed	Minimum maintained average illuminance Lux		Minimum uniformity ratio	Minimum uniformity ratio
	Horizontal Ehav	Vertical Evav	Ehmin/Ehav	Ehmin/Ehmax
Switching area	10		0,25	0,125
Central area of yard, temporary or quick	10		0,4	0,167
Central area of yard, continuous operation	15		0,4	0,2
Turn-out track, uncoupling area	10		0,5	0,33
Retarder marshalling yards				
Switching area	10		0,25	0,125
Central area of yard	15		0,4	0,2
Hump area				
Wagon inspection pit		100		
Uncoupling area	50	20	0,4	0,33
Hump crest, wagon numbering reading	20	50	0,4	0,33
Classification yards				
(a) Hard operated wagon rolling, switching and braking				
Braking rail with brake shoe	20		0,4	0,33
Switching area, head end	15			
Brake area with brake shoe	15		0,4	0,2
(b) Automatic wagon rolling and switching				
Retarders		50		0,33
Continuous retarders	15		0,4	0,2
Switching area, head end	15		0,4	0,2
Central area of	15		0,4	0,2

Areas to be lit, operation performed	Minimum maintained average illuminance Lux		Minimum uniformity ratio	Minimum uniformity ratio
	Horizontal Ehav	Vertical Evav	Ehmin/Ehav	Ehmin/Ehmax
classification yard				
Switching area, central area of yard	10		0,25	0,125
Tracks on passenger station areas				
Switching area, central area of yard	10		0,25	0,125
Servicing and stabling tracks for cars, trains and locomotives				
Passenger car cleaning area	10		0,25	0,125
Passenger car servicing area	20	20	0,4	0,2
Passenger car washing area	20	20	0,4	0,2
Stabling tracks for wagons and cars	5		0,25	0,125
Stabling tracks for locomotives	20		0,4	0,2
Level crossings	20		0,4	0,2
Saw Mills				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,4	0,33
Accurate work	100		0,4	0,2
Fine work	200		0,5	0,33
Very fine work	300		0,50	0,25
Traffic areas				
Walkways exclusively for pedestrians	5		0,25	0,1
Traffic areas for slowly moving vehicle traffic: max. 10 km/h	10		0,25	0,125
Regular vehicle traffic: max. 40 km/h	20		0,4	0,2

Areas to be lit, operation performed	Minimum maintained average illuminance Lux		Minimum uniformity ratio	Minimum uniformity ratio
	Horizontal Ehav	Vertical Evav	Ehmin/Ehav	Ehmin/Ehmax
Safety and security				
Small risk areas	5		0,25	0,1
Medium risk areas	10		0,4	0,167
High risk areas	50		0,4	0,2
Shipyards and Docks				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,25	0,2
Accurate work	100		0,4	0,2
Fine work, mounting of electrical and mechanical components	200		0,5	0,33
Traffic areas				
Walking passages exclusively for pedestrians	5		0,25	0,125
Traffic areas for slowly moving vehicle traffic: max. 10 km/h	10		0,4	0,2
Regular vehicle traffic: max. 40 km/h	20		0,4	0,167
Safety and security				
General lighting on shipyard area, storage areas for prefabricated goods	20		0,25	0,125
Water and Sewage Plants				
Work area or task				
Very rough work	20		0,25	0,125
Rough work	50		0,4	0,2

Areas to be lit, operation performed	**Minimum maintained average illuminance** Lux		**Minimum uniformity ratio**	**Minimum uniformity ratio**
	Horizontal Ehav	**Vertical** Evav	Ehmin/Ehav	Ehmin/Ehmax
Accurate work	100		0,4	0,2
Fine work	200		0,5	0,33
Traffic areas				
Walkways exclusively for pedestrians	5		0,25	0,1
Traffic areas for slowly moving vehicle traffic: max. 10 km/h	10		0,40	0,167
Regular vehicle traffic: max. 40 km/h	20		0,40	0,2
Safety and security				
Low risk areas	5		0,25	0,1
Medium risk area	20		0,4	0,167

Table 7: Minimum maintained average illuminance values for exterior workplaces not mentioned in Table 6

Work	Minimum maintained average horizontal illuminance Ehav (lux)	Minimum uniformity ratio	
		Emin/Eav	Emin/Emax
Very rough	20	0,25	0,125
	20	0,4	0,1666
	20	0,4	0,2
	20	0,4	0,333
	50	0,4	0,2
Rough	50	0,4	0,2
	50	0,4	0,333
Accurate	100	0,4	0,2
	100	0,5	0,333
Fine	200	0,5	0,333

Table 8: Cold stress exposure period

ECT in °C	Maximum exposure
<10 to -18	No limit
Lower than -18 but not lower than -34	Maximum continuous exposure during each hour = 50 minutes. After every exposure in a low-temperature area at least 10 minutes must be spent, under supervision, in a comfortably warm environment.
Lower than -34 but not lower than -57	Two periods of 30 minutes each, at least 4-hours apart. Total low-temperature exposure: 1-hour per day.
Lower than -57	Maximum permissible exposure = 5 minutes during any 8-hour period.

Table 9: Clothing adjustment values or CAV

Ensemble	Comments	CAV
Work clothes	Work clothes made from a woven fabric is the reference ensemble	0
Cloth coveralls	Coveralls made from woven fabric that includes treated cotton	0
Non-woven SMS coveralls as a single layer	A non-proprietary process to make non-woven fabrics from polypropylene	0
Non-woven polyolefin coveralls as a single layer	A proprietary fabric made from polyethylene	2
Double-layer woven clothing	Generally taken to be coveralls over work clothes	3
Vapour-barrier apron with long sleeves and long length over cloth coveralls	The wrap-around apron configuration was designed to protect the front and sides of the body against spills from chemical agents	4
Vapour-barrier coveralls as a single layer, without hood	The real effect depends on the level of humidity and in many cases the effect is less	10
Vapour-barrier coveralls with hood as a single layer	The real effect depends on the level of humidity and in many cases the effect is less	11
Vapour-barrier over cloth coveralls, without hood	-	12
Hood	Wearing a hood of any fabric with any clothing ensemble	+1

employment & labour

Department:
Employment and Labour
REPUBLIC OF SOUTH AFRICA

Explanatory Notes to Physical Agents Regulations, 2024

Chief Directorate: Occupational Health and Safety

FOREWORD

The purpose of this document is to provide guidance to all employers, employees and the public alike, who are responsible for or concerned with the control and prevention of exposure to physical agents in the workplace.

This guide does not replace the Physical Agents Regulations of 2024. It is intended to give practical insight into the application of the Regulations. It should always be read in conjunction with the Occupational Health and Safety Act of 1993, Act 85 of 1993 as amended, the Physical Agents Regulations and any other applicable legislation and referenced standards.

CONTENTS

Introduction

A physical agent is a source of energy that may cause injury or disease after exposure. In the Physical Agents Regulations, there are a number of occupational stressors specified: cold stress, heat stress, illumination, indoor air quality, vibration and occupational non-ionising radiation. Indoor air quality is considered under these Regulations because it is directly impacted by sources of energy. However, there may be additional physical agents, which meet the definition, but are not listed in the Regulations, which are potential hazards in the workplace, for which the employer would be required to either eliminate or mitigate exposure. Physical agents may present risks to employees in most industry categories.

The practical benefits of controlling the exposure to a physical agent may have a real and direct impact on productivity and performance. Some of the benefits may include, but not limited to:

- Labour – improved health, well-being and safety of employees.
- Business – improved productivity, efficiency and prevention of occupational incidents and adverse health effects.
- Government – a workplace that is safe and without risk to the health of employees.

The Regulations speak to a programme approach which should be integrated into new and existing occupational health and safety programmes. A physical agents' programme is a systematic process for anticipating, identifying, analysing and controlling exposure to a physical agent through the sub-regulations of the Physical Agents Regulations. It is important to acknowledge that a physical agent is not only addressed in isolation, but its interaction with other workplace hazards is assessed as well.

Regulation 2: Scope of Application

These Regulations apply at any workplace, as defined by the Occupational Health and Safety Act, Act 85 of 1993 as amended (OHS Act), and are intended to protect the health and safety of any person (as prescribed in Sections 8 and 9 of the OHS Act) who may be exposed to a physical agent in the workplace.

Regulation 3: Information, Instruction and Training

The provision of information, instruction and training for any person who may be exposed to a physical agent is essential, in order to assist employers and employees in mitigating the exposure to a physical agent. The employer must ensure employees are knowledgeable

about the Physical Agents Regulations, to understand the requirements imposed on them by these Regulations.

Before any instruction and training is provided to any persons, the employer should consult with relevant health and safety representatives and or health and safety committee members on aspects of these Regulations, which have an impact on the training programme.

The employer must ensure that they obtain suitable information, which is specific to that workplace, in order to provide effective training. The Physical Agents Regulations, regulation 3(4) does not stipulate whether training must be provided by an external service provider or not. However, regardless of whether an internal employee or external service provider is used, the requirements of regulation 3(4) still apply.

Information and training must be planned carefully and presented on commencement of employment. Thereafter, the frequency of training should occur at least annually. However, the frequency of training may be increased by the health and safety representatives and or health and safety committee, taking into account aspects of these Regulations, as well as the severity of the risks. The frequency may vary for different sections in a workplace.
Health and safety committee members and health and safety representatives, as employees, would receive training relating to the identified physical agents in the workplace. However, in order for the health and safety committee members and health and safety representatives to perform other functions in the workplace, as prescribed by legislation, they should have an understanding of the Physical Agents Regulations, in order for them to identify which physical agent is present in their area of appointment.

An employer should also verify that any person that has received training in terms of these Regulations, has understood the training they have received.

The aspects of training stipulated in regulation 3 are a minimum requirement of a training programme. However, the employer should provide a suitable training programme that is understandable to all their employees and any other persons exposed and is applicable to current risk identified.

The employer would be required to present at least the following portfolio of evidence:

- competence of the person who provided the training,
- attendance of training, and
- training content framework.

Regulation 4: Duties of those who may be at risk of exposure to a physical agent

Employees or any other person exposed to a physical agent at the workplace, have a moral and legal duty to comply with any lawful instruction and procedure (written or oral) given by or on behalf of the employer. In addition, employees must comply with the requirements laid down by the OHS Act and other applicable Regulations. These instructions and procedures may vary from one workplace to another because workplaces are not identical.

Regulation 5: Duties of Designers, Manufacturers, Importers and Suppliers

Designers, manufacturers, importers and suppliers must take account of potential physical agent exposure in the workplace during the design, implementation and operational phases, so as to contribute to the elimination or mitigation of the physical agent in the workplace.

Designers, manufacturers, importers and suppliers should provide an employer with sufficient information regarding the performance, operation, and safety requirements of plant or machinery and design parameters. This information should be factored into any exposure risk assessment or exposure monitoring or during a review of such, to mitigate risk associated with any physical agent identified.

A physical agent needs to be taken into account in all steps of the life cycle of the plant, machinery or workplace. To support the above, the following should be taken into account by the designer, manufacturer, importer and supplier -

- the design, installation, operation, maintenance and decommissioning should be considered;
- employee characteristics, behaviours and duties;
- foreseeable operating conditions including emergencies;
- the interface between the employee and plant, machinery or workplace;
- instructions, technical information, training information, warning signs, safe operation and disposal requirements must be provided; and
- where applicable, SANS standards.

Regulation 6: Physical Agent Exposure Risk Assessment

It is the duty of the employer to conduct an exposure risk assessment for all tasks where an employee is exposed to a physical agent. The exposure risk assessment must be conducted by a person that must be familiar with the task at the workplace and have an adequate level of competence to conduct the exposure risk assessment. This may be either an employee or

a health and safety professional. While one individual may be able to carry out an exposure risk assessment, it may be beneficial to draw on the knowledge and competencies of others.

The exposure risk assessment should include at least the following steps -

- identifying the work process and or task which generate a physical agent
- identifying the employees who are exposed to a physical agent
- determining the extent of exposure (through exposure monitoring)
- evaluating control measures
  - existing control measures
  - efficacy of existing control measures
- considering additional control measures
- analysing, evaluating and rating the risk
- implementing recommendations directed at eliminating or mitigating exposure

When conducting the exposure risk assessment, the employer must take into consideration the diversity (e.g. age, gender, religion, ethnicity, disability, etc.) of the workforce, their differences and how the differences may be affected by exposure to the physical agent present.

When conducting the exposure risk assessment, the employer should take into account –

- the previous exposure risk assessments;
- exposure monitoring reports;
- the outcomes of medical screening and medical surveillance.
- previous incidents
- the information provided about plant and machinery from designers, manufacturers, importers and suppliers; and
- any other information which may influence the risk of exposure to current and emerging physical agent.

Once the exposure risk assessment has been completed, the recommendations identified in the exposure risk assessment needs to be considered. Thereafter, an action plan must be drafted to address the identified recommendations, where reasonably practicable.

The exposure risk assessment should be conducted and reviewed at least every 24-months and recorded. Shorter review periods may be necessary if new information becomes available or there has been a change in task or control measures. The exposure risk assessment should

also be reviewed if a reportable incident occurs or if an employee suffers an adverse health effect as a result of exposure to a physical agent.

Regulation 7: Physical Agent Exposure Monitoring

Exposure monitoring must be conducted when the exposure risk assessment or review of such assessment indicates that an employee may exposed to a physical agent at the limits or levels indicated in tables 1, 2 and 3 or outside of the range of levels indicated in table 3.

The exposure monitoring must be conducted by a competent person, as contemplated in the definition for a competent person (a) (ii), whose essential requirement must be qualification-based knowledge about the: recognised principles and methodologies related to that physical agent, the equipment used to monitor the physical agent and the standards used for measuring the physical agent. This person who conducts the exposure monitoring may or may not be the same person who conducted the exposure risk assessment.

It is essential the equipment used to monitor the physical agent is fit for purpose and has an up-to-date calibration certificate.

Once the exposure monitoring has been completed, the recommendations identified in the exposure monitoring report needs to be considered. Thereafter, an action plan must be drafted to address the identified recommendations, where reasonably practicable.

Regulation 8: Medical screening and medical surveillance

Medical surveillance in the workplace is an integral part of occupational health surveillance. Surveillance is the close observation of a person or group, especially those identified by the risk assessment. It refers to the detection of adverse health effects resulting from occupational exposures at as early a stage as possible, so that appropriate preventative measures can be instituted promptly. For this reason, medical surveillance is placed at a secondary level of prevention as the adverse health effect is still reversible or more easily treatable.

Medical surveillance should have a clearly defined objective for targeted employees, and medical procedures, such as questionnaires and health examinations, must be available to achieve the objective. Medical surveillance must be risk based and tailored to a specific adverse health effect that is to be prevented. Medical surveillance for a physical agent should be either incorporated into current or new medical surveillance programmes.

Medical surveillance is performed at regular pre-determined intervals; at the beginning, termination of employment and throughout the employment period and or as determined by the occupational medicine practitioner. Medical surveillance must be carried out by the occupational health practitioners.

Medical surveillance includes the following elements –

- identification of employees according to the physical agent exposure risk assessment, for which the medical surveillance activities will be appropriate;
- an initial health examination and collection of clinical history;
- periodic health examinations at regularly scheduled intervals;
- more frequent and scheduled health examinations, as indicated on the basis of findings from these examinations;
- a written report of medical findings;
- employee training to recognise symptoms of exposures to a physical agent; and
- employer actions in response to the identified adverse health effects on employees with ongoing data analysis to evaluate collected information and institute control measures, including employee rehabilitation at the workplace.

When designing and implementing a programme of medical surveillance, the following, minimum criteria should be included in any programme -

- risk assessment to determine the potential exposure to a physical agent.
- identification of target-organ toxicity, so as to direct medical screening.
- selection of appropriate tests and testing schedule. Tests should have the desirable operating characteristics of high sensitivity, specificity, reliability and predictive value. The frequency of testing is stipulated in the Regulations but should be based on an understanding of the nature of the hazard and the natural history of any adverse effects.
- development of action criteria. The occupational health practitioners will have to develop pragmatic criteria in the context of the specific workplace.
- standardisation of test process. Quality control needs to be exercised both in the testing site and in the laboratory contracted to carry out analyses. Consistency should be sought to make measurements comparable over a period of time.
- ethical considerations. Information and training of employees should include the rationale for doing medical surveillance and the consequence of abnormal findings. An employee must be notified of the results and interpretation of their tests and any recommendations made. The confidentiality of personal medical records is laid down by Regulations.

- determination of employees fitness to remain in that job. Results may be compared against the action criteria and preferably also with the employees previous results to determine whether individual action needs to be taken. Action may include repeating the test, further medical examination, removal of the employee from further exposure, and notification of the employer.
- evaluation of control. An abnormal finding in an employee, or a pattern of findings in a group of employees, may point to inadequate primary control of exposure. In such cases the employer needs to be notified of such details of the medical findings as are necessary to evaluate the workplace problem and take remedial action.
- record keeping. This includes both medical records and exposure information for every employee. While the employer is responsible for record keeping in terms of the Regulations, the contents of personal medical records may be accessible to the occupational medicine practitioner, the employee, and any person nominated by the employee in writing.

Regulation 9: Cold stress

The windchill index (WCI) is universally accepted for describing the combined cooling effects of air temperature and wind velocity. This index provides a description of cold thermal conditions rather than just air temperature alone because, at any given constant temperature, the risk of tissue freezing increases with air movement (convection). Windchill reflects the cooling power of wind on exposed flesh and is commonly expressed as an equivalent chill temperature (tch). The tch is the temperature under calm wind (velocity = 1.8 m/s), which would cause cooling of the skin equivalent to that found with other combinations of temperature and wind.

The windchill index (WCI) and the equivalent chill temperature (tch) can be calculated as follows-

WCI = (10.45 + 10 var 1/2 – var) (33 – Ta)

tch = (33 – (WCI/22), ºC

where;

WCI = windchill index;

var = relative air velocity, m/s;

Ta = air temperature, ºC;

tch = equivalent chill temperature, ºC

Regulation 10: Heat Stress

Heat stress is a risk for both indoor and outdoor employees across all sectors. A task-based exposure risk assessment will determine the severity of exposure to the heat stress. Both external factors and individual characteristic should be considered when conducting the exposure risk assessment. Examples of external factors include, but not limited to: geographical location, heat source, working conditions and physical exertion, whilst examples of individual characteristics include, but not limited to: age, health, socioeconomic status and even gender. These must be accounted for in risk mitigating measures.

For the limitation of duration and magnitude of exposure, the employer may implement an appropriate work/rest schedule, specific to the conditions at their workplace.

The heat acclimatisation programme is a process of adapting the body to a new thermal environment. Acclimatisation is the physiological adaptation that occurs during repeated exposure to a hot environment and conducted over a defined time period, based on the circumstances of the workplace. Employees who may need to undergo acclimatisation for heat exposure are identified by the exposure risk assessment. These may include, but not limited to, employees who –

- will be exposed to changes in processes and or working conditions;
- are new to the job;
- will be wearing additional clothing, like chemical protective clothing;
- are more active than usual;
- have been on vacation or sick leave;
- are working through seasonal temperature changes;
- are working on a day when it's significantly warmer than the day before.

For the provision of potable water, employees should aim to drink water regularly during a shift and not only when thirsty. Employees should also be encouraged to rehydrate between shifts.

An employer may issue personal protective clothing for exposure to another hazard which may increase core body temperature, for example a furnace suit or long sleeve overall. Thus, the clothing adjustment value of that particular clothing must be taken into account in determining that employee's total exposure to heat in the workplace.

Regulation 11: Illumination

The provision of good quality illumination promotes employee wellbeing and performance and may improve efficiency and productivity within the workplace. The correct levels and quality of illumination required for the task to be undertaken should be provided at all times. Poor quality illumination and low illumination levels can adversely affect wellbeing, performance, efficiency and productivity, as can illumination levels which are excessively high. Thus, care should be exercised in maintaining illumination levels and limit exposure where correct illumination cannot be provided.

Although flicker is visible in a static environment, it does not mean that it is not visible in an environment that has moving objects. Furthermore, whilst a light source may be static and not the cause of flicker, moving objects between the light source and the observer may create flicker and will need to be addressed.

Tasks with demanding visual requirements: Are tasks undertaken by an employee that require prolonged attention, focus, effort and time to complete the task.
Tasks with difficult visual requirements: Are tasks that require additional illumination in a visually difficult environment to allow an employee to fulfil a difficult or demanding task, which may require speed and accuracy.
Tasks with special visual requirements: Are tasks that may require specialised illumination to allow an employee to fulfil specialised and more difficult visual tasks requiring precision, intense focus and attention, focus, effort and time to complete the task.

Emergency escape lighting can be regarded as the part of emergency lighting that provides illumination for the safety of people who are leaving a location in the premises or who are attempting to terminate a hazardous process before leaving the location. Escape route lighting is the part of emergency escape lighting that is provided to ensure that the escape routes can be effectively identified and safely used at all times. Emergency exit lighting refers to an exit that is intended to be used during an emergency and is sufficiently illuminated by the emergency escape lighting system, such that the emergency exit can be easily recognised.

Regulation 12: Indoor air quality

Indoor air quality (IAQ) is impacted by energy sources present in the workplace and addresses the ambient environment of that workplace. Whilst other Regulations, such as the Regulations for Hazardous Chemical Agents, Lead Regulations, Asbestos Abatement Regulations, the Major Hazard Installation Regulations and Hazardous Biological Agents Regulations

addresses specific occupational hazards, IAQ regulation addresses the biological, chemical and physical agents' adverse impact on employee wellbeing, performance, efficiency and productivity.

Regulations are interlinked and the risk assessment for that particular workplace will identify how biological, chemical and physical agents impact the IAQ in that workplace.

Regulation 13: Vibration

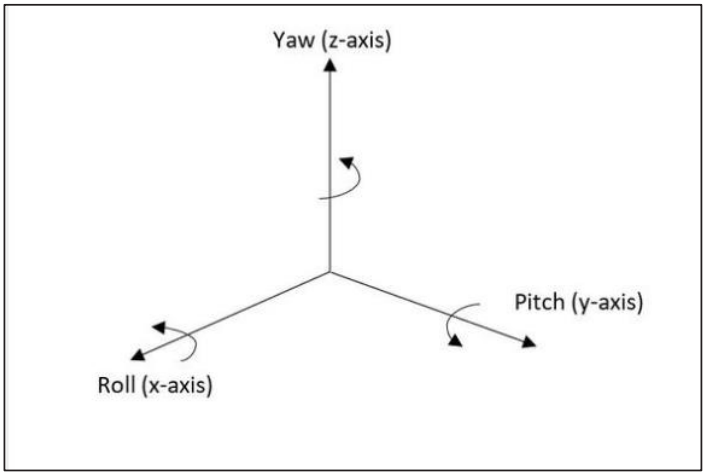
Exposure monitoring for both whole-body and hand-arm vibration must take into account the roll, pitch and yaw. The images below indicate the roll, pitch and yaw, based on the position of the employee's body or hand/s position.

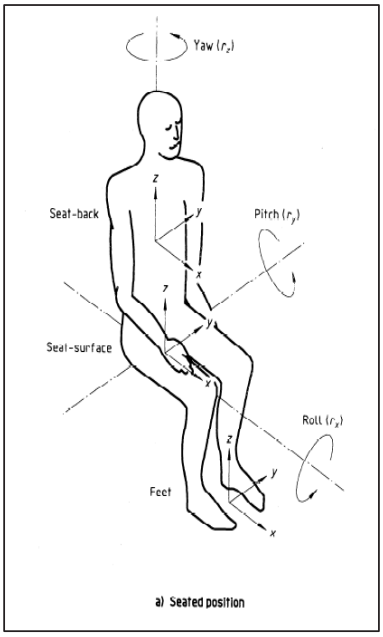
Where,

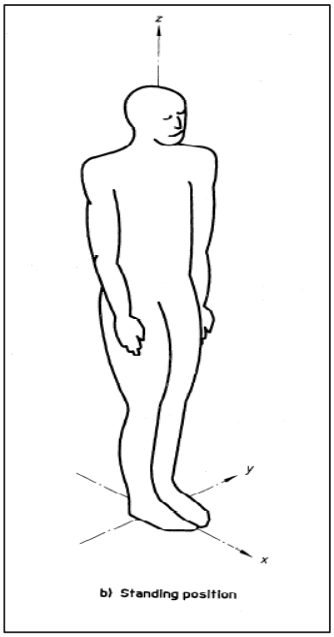
Roll is x-axis

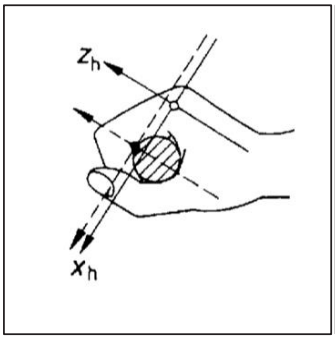
Pitch is y-axis

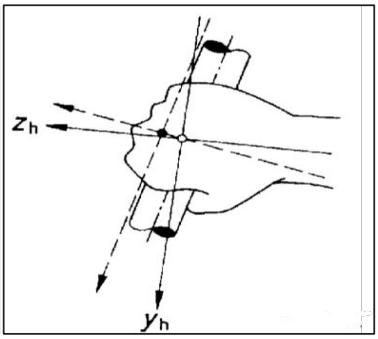
Yaw is z-axis


Yaw (z-axis)
Pitch (y-axis)
Roll (x-axis)


Yaw (r_z)
Seat-back
Pitch (r_y)
Seat-surface
Roll (r_x)
Feet
a) Seated position

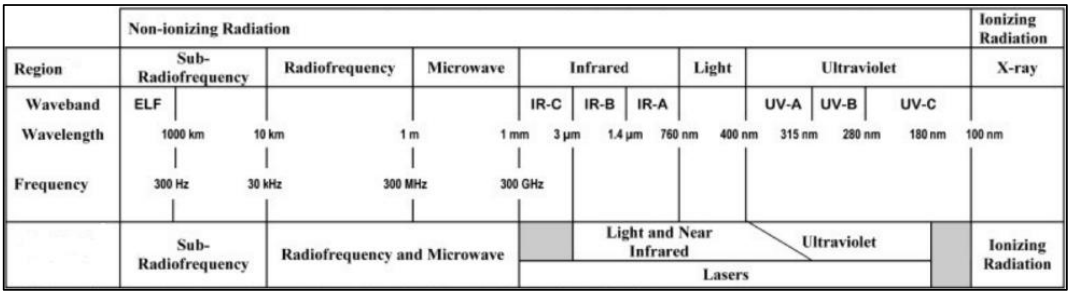

b) Standing position


Z_h
X_h


Z_h
Y_h

Regulation 14: Occupational non-ionising radiation

The diagram below is a depiction of the electromagnetic spectrum, which consists of non-ionising and ionising radiation. The Physical Agents Regulations only cover the aspect of non-ionising radiation of the spectrum, in an occupational environment.



Regulation 15: Prevention and control of exposure to a physical agent

Exposure to a physical agent should be mitigated to the lowest reasonably practicable level by implementing a progressive combination of the hierarchy of controls.

The hierarchy of controls is a step-by-step approach to eliminate or mitigate workplace hazards. It ranks controls from the most effective level of protection to the least effective level of protection. When choosing a control method, start from the top of the list below. Assess the feasibility of the first layer of controls (elimination) before moving on to the second layer (substitution). Continue this process until you reach the bottom of the list and have identified as many controls as possible to adequately protect the employee from the hazard.

The hierarchy of controls are listed as follows –

1. Elimination: Elimination is the process of removing the hazard from the workplace. It is the most effective way to control a risk because the hazard is no longer present. It is the preferred way to control a hazard and should be used whenever possible. Examples may include:
   - not introducing the physical agent into the workplace.
   - redesigning the job or task so that the physical agent is eliminated from the workplace.
2. Substitution: If eliminating a hazard is not possible, substitution is the next control method that should be considered. Substitution is the act of replacing a hazard with a less hazardous one. The hazards and risks associated with an alternative must be thoroughly assessed to determine if it is an appropriate replacement, and the new hazard is actually lower, and not as harmful or more harmful. Examples may include:

- the current job or task should be replaced with a less hazardous job or task. It is important to ensure that the new design is less hazardous than the original.
- the current plant or machinery should be replaced with a less hazardous plant or machinery. It is important to ensure that the new plant or machinery is less hazardous than the original.

3. Engineering controls: Engineering controls are methods that will remove the hazard at the source, before it comes in contact with the employee. Engineering controls can be built into the design of a plant, machinery, or process to minimize the hazard. Engineering controls are a very reliable way to control employee exposures when the controls are designed, used, and maintained properly. Examples of engineering controls are:

- isolation and shielding – separating employees from the hazard by distance or the use of barriers
- enclosures – placing the material or process in a closed system (e.g., enclosed machines, booths, etc.)
- ventilation – using local exhaust or general dilution ventilation to eliminate or mitigate a physical agent
- mechanical lifting devices – using mechanical methods to lift or move objects instead of manual lifting

4. Administrative controls: Administrative controls involve developing procedures to ensure the work is conducted in a way that minimizes the hazard. Administrative controls are ranked lower and have more limitations than elimination, substitution, and engineering controls because this method does not necessarily eliminate or mitigate the hazard from the workplace. Administrative controls should be used in combination with other control measures where possible.

Examples of administrative control include:

- developing or changing policies, implementing or improving training and education, and developing or enhancing work practices and procedures, such as -
    i. using job-rotation schedules or a work-rest schedule that limit the amount of time an employee is exposed to a physical agent.
    ii. implementing a preventative maintenance programme to keep plant and machinery in proper working order.
    iii. scheduling maintenance and other high exposure operations for times when minimal employees are present (such as evenings, weekends).
    iv. restricting access to a work area.
    v. restricting the task to only those competent or qualified to perform the work.
    vi. using signs to warn employees of a hazard.

Regulation 16: Personal protective equipment and facilities

Personal protective equipment (PPE) refers to anything employees wear to help protect them from a physical agent. The use of PPE as the main method to control exposures should be limited to situations where elimination, substitution, engineering, or administrative controls are not practicable, or when:

- additional protection is required because other control methods are not sufficient to mitigate the hazard
- the hazard is a result of a temporary or emergency condition

Only once elimination, substitution, engineering, or administrative controls have been tried and shown to be ineffective in controlling a physical agent to a reasonably practicable level, the additional use of PPE should be considered.

PPE limits exposure to the harmful effects of a hazard but only if the PPE is worn and used correctly. It is important that there is consultation at the workplace in the fitting and selection of assigned PPE, to ensure that the PPE is fit for use.

The choice of what type of PPE is required must be based on the specific physical agent found at the workplace.

Regulation 17: Maintenance of control measures

The employer should implement a planned maintenance programme for all control measures implemented to eliminate or mitigate the exposure to a physical agent.

The evaluation of the control measures must be done through inspections and tests, analysis of incident reports, medical surveillance reports and exposure monitoring reports. Recommendations to any identified or reported deficiency in the control measures, need to be implemented to make sure that the control measure is working effectively.

The physical agent exposure risk assessment must be updated to reflect any changes made to a control measure for a physical agent.

Regulation 18: Records

Well-kept records are documented information which may provide input to the risk assessment process. The records may provide documented proof between the exposure to a physical

agent and adverse health effects caused by the resultant exposure, as well as what control measures were implemented to eliminate or mitigate exposure.

With regard to access to medical surveillance records, the medical surveillance records imply any report relating to-

- exposure to a physical agent and
- an adverse health effect diagnosis relating to exposure to a physical agent

The causal relationship between exposure to a physical agent and diagnosis, may occur over a period of time, hence necessitating the long period of retention of records.

The Regulations does not specify the format on how records should be stored, i.e. electronically or hardcopy. Whichever method of storage the employer choses to use, the records should be easily accessible and in a manner that allows the person accessing the records to be readable.