Government Gazette
Staatskoerant

REPUBLIC OF SOUTH AFRICA
REPUBLIEK VAN SUID AFRIKA

Regulation Gazette **No. 10867** *Regulasiekoerant*

Vol. 639 14 September / September 2018 No. 41904

ISSN 1682-5843

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DEPARTMENT OF LABOUR

NO. R. 950 **14 SEPTEMBER 2018**

OCCUPATIONAL HEALTH AND SAFETY ACT, 1003.

DRAFT REGULATIONS FOR HAZARDOUS CHEMICAL AGENTS

INVITATION OF PUBLIC COMMENTS ON DRAFT REGULATIONS FOR HAZARDOUS CHEMICAL AGENTS

I, Nelisiwe Mildred Oliphant, Minister of Labour, hereby give notice that I intend, in terms of section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), to make the regulations in the schedule.

Electronic copies the draft Regulations for Hazardous Chemical Agents may be downloaded from the Departments of Labour's webpage at www.labour.gov.za.

Interested persons who which to comment on the draft regulations are invited to do so in writing within 90 days from the date of publication of this notice, in the prescribed format (see annexure A).

All representations and comments must be sent to the Director-General of the Department of Labour.

By hand: The Department of Labour – attention: E Lourens

Laboria House

215 Francis Baard Street

Pretoria CBD

By post: The Director General

The Department of Labour – attention: E Lourens

Private Bag X117, Pretoria 0001

By Fax: 012 309 4763

By email: elize.lourens@labour.gov.za OR david.tshabalala2@labour.gov.za

NELISIWE MILDRED OLIPHANT

MINISTER OF LABOUR

13/07/2018

Annexure A

Comments/ Inputs on the Draft Regulations for Hazardous Chemical Agents as proposed by the Department of Labour.

Kindly provide inputs, corrections and /or comments in writing on the proposed Draft Regulations in the following format:

Name and Surname:	E-Mail:	Phone number:
Company name (if applicable)		
Government ☐ Industry ☐ Union ☐ Consultancy ☐ Private ☐ Other ☐		

1	Regulation and/or Sub regulation from draft, referring to	Comment/Input/Correction/Proposal Plus Motivation
Will the proposal have an impact on any other regulation? If so, which regulation and what will be the impact?		
2	Regulation and/or Sub regulation from draft, referring to	Comment/Input/Correction/Proposal Plus Motivation
Will the proposal have an impact on any other regulation? If so, which regulation and what will be the impact?		
General Comments:		

Signature:_____

Date:_____

Provide inputs to the Department of Labour by e-mailing this completed document to: elize.lourens@labour.gov.za and david.tshabalala2@labour.gov.za or by Faxing it to 012-3094763

Draft Regulations for Hazardous Chemical Agents (2018)

1. Definitions

In this Schedule a word or expression to which a meaning has been assigned in the Act shall bear the meaning so assigned to it and unless the context other-wise indicates –

"air monitoring" means the monitoring of the concentrations of airborne hazardous chemical agents;

"Asbestos Regulations" means the Asbestos Regulations published by Government Gazette No. R.155 of 10 February 2002 under section 43(1) of the Act;

"assessment" means a programme to determine any risk from exposure to a hazardous chemical agent associated with any hazard thereof at the workplace in order to identify the steps needed to be taken to remove, reduce or control such hazard;

"BEI" or "biological exposure index" "'BEI or "biological exposure index" is a reference value for assessing biological monitoring results, intended as a guideline for the likelihood of adverse health effects and generally represents the level of determinants that are most likely to be observed in specimens collected from healthy employees who have been exposed to chemicals with inhalation exposure at the Occupational Exposure Limit, as listed in Table 4 of Annexure 2 hereby as revised from time to time and listed in the Government Gazette;

"CAS number" or "chemical identity" means a name that will uniquely identify a chemical, given in accordance with the nomenclature systems of the International Union of Pure and Applied Chemistry or the Chemical Abstracts Service, or a technical name;

"carcinogen" or "carc" means any agent or mixture which induces cancer or increases its incidence, classified by GHS as:

(a) Category 1: known or presumed human carcinogens;
(b) Category 2: suspected human carcinogens;

"chemical agent" means a GHS aligned agent or mixture;

"chief director, provincial operations" means the chief director, provincial operations as defined in the General Administrative Regulations;

"consumer product" means a product containing an HCA that:

(a) is packed or repacked primarily for use by a household consumer or for use in an office; and
(b) if the product is packed or repacked primarily for use by a household consumer, is packed in the way and quantity in which it is intended to be used by a household consumer; and
(c) if the product is packed or repacked primarily for use in an office, is packed in the way and quantity in which it is intended to be used for office work;

"container" means in relation to an HCA, anything in or by which an HCA is, or has been, wholly or partly covered, enclosed or packed, including anything necessary for the container to perform its function as a container;

"engineering control measures" means control measures that remove or reduce the exposure of persons at the workplace by means of engineering methods;

"exposed" means exposed to a hazardous chemical agent whilst at the workplace and "exposure" has a corresponding meaning;

"GHS classification" means the GHS hazard classes and hazard categories assigned to a hazardous chemical agent;

"hazard category" means a division of criteria within a hazard class in the GHS, where these categories compare hazard severity within a hazard class and should not be taken as a comparison of hazard categories more generally;

"hazard class" means the nature of a physical, health or environmental hazard under the GHS;

"hazard pictogram" means a graphical composition, including a symbol plus other graphical elements, such as a boarder, background pattern or colour that is intended to convey specific information, that is assigned in the GHS to a hazard class or hazard category;

"hazard statement" means a statement assigned in the GHS to a hazard class or hazard category describing the nature of the hazards of a hazardous chemical including, if appropriate, the degree of hazard;

"HCA" or "hazardous chemical agent" means a GHS aligned chemical agent as provided in Annexure 1;

"HSG 173" means the Guidance Note EH 42 of the Health and Safety Executive of the United Kingdom: Monitoring strategies for toxic substances 2006 HSE ISBN 978 0 7176 6188 6 as revised from time to time and published in the Government Gazette;

"importer" means an employer or self-employed person who imports an HCA into the republic by any means, that is to be used, or could reasonably be expected to be used at a workplace;

"in transit" means in relation to an HCA that:

(a) is supplied to, or stored at, a workplace in containers that are not opened at the workplace; and

(b) is not used at the workplace;

"Lead Regulations" means the Lead Regulations published by Government Notice No. R.586 of 22 March 1991 under section 43(5) of the Act;

"manufacturer" means an employer or self-employed person manufacturing an HCA that is to be used, or could reasonably be expected to be used, at a workplace;

"measurement programme" means a programme according to the monitoring strategy as contemplated in HSG 173;

"monitoring" means the planning, carrying out and recording of the results of a measurement programme;

"OEL" or "occupational exposure limit" means a limit value set by the Minister, which represents the airborne concentration for an HCA and where the exposure standard can be of three forms:

(a) 8-hour Time-weighted Average;
(b) ceiling limit; and
(c) short term exposure limit.

"OEL ceiling limit" or "ceiling limit" or "C" means a maximum or peak airborne concentration of an HCA determined over the shortest analytically practicable period of time which does not exceed 15 minutes;

"OEL-ML" or "occupational exposure limit- maximum limit" means an HCA as listed in Table 2 of Annexure 2;

"OEL-RL" or "occupational exposure limit- restricted limit" means an HCA as listed in Table 3 of Annexure 2;

"OEL-Short Term Exposure Limit" or "STEL" means the time-weighted average maximum airborne concentration of an HCA calculated over a fifteen-minute period;

"OEL 8-hour Time-weighted average" or "TWA" means the maximum average airborne concentration of an HCA when calculated over an eight-hour working day, for a five-day working week;

"OESSM" means the Occupational Exposure Sampling Strategy Manual, published by the National Institute for Occupational Safety and Health (NIOSH), Publication No. 77-173 of 1977, United States of America: Department of Health, Education and Welfare;

"precautionary statement" means a phrase prescribed by the GHS that describes recommended measures that should be taken to minimise or prevent:

(a) adverse effects resulting from exposure to an HCA; or
(b) improper storage or handling of an HCA.

"prohibited agent" means a hazardous chemical agent prohibited by the Minister and listed in Table 1 of Annexure 2, where the agents prohibited may be revised from time to time, by notice in the Government Gazette;

"retailer" means an employer or self-employed person who supplies consumer products, containing HCA, to members of the public, who are not primarily engaged in the further supply of those products;

"respiratory protective equipment" means a device which is worn over at least the mouth and nose to prevent the inhalation of airborne hazardous chemical agents and which is of a type, or conforms to a standard approved by the Minister;

"respirator zone" means an area where the concentration of an airborne HCA during normal operations exceeds the OEL - RL for that HCA;

"SDS" or "Safety Data Sheet" means a document aligned to GHS, that provides information on the hazard classification, properties of hazardous chemicals and procedures for handling or working with hazardous chemicals in a safe manner and how they affect the health and safety in the workplace, prepared in accordance with regulation 14A;

"sensitizer" including: "DSEN and RSEN" an HCA that causes a substantial proportion of exposed people to develop an allergic reaction in normal tissue after repeated exposure, which includes Dermal Sensitizer (DSEN), Respiratory Sensitizer (RSEN);

"signal word" means the word "danger" or "warning" used on a GHS aligned label, to indicate to the reader to a potential hazard as well as the relative severity level of a hazard;

"skin" means that the HCA might be absorbed in toxicologically significant amounts through direct contact with skin, or mucous membranes and eyes from airborne exposure to gases, vapour, or liquid, so that conclusions about exposure and health effects based solely on airborne concentration limits may be incomplete;

"supplier" means an employer or self-employed person who conducts a business or undertaking of supplying any HCA, including supply to a retailer;

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

"UN IMO International Maritime Dangerous Goods Code" means the International Maritime Organisation, International Maritime Dangerous Goods (IMDG) Code, which was developed as an international code, as an agency of the United Nations, for the maritime transport of dangerous goods in packaged and bulk form, with particular reference to the segregation of incompatible substances, as may be updated from time to time;

"UN Globally Harmonized System" or "GHS" means the Globally Harmonized System of classification and labelling of chemicals, a guidance document developed by the United Nations for standardizing and harmonizing the classification and labelling of chemicals globally, as may be updated from time to time, commonly known as the UN Purple Book;

"UN Number" means the HCA four figure identification number in the UN Transport of Dangerous Goods Model regulations, as may be updated from time to time;

"UN Proper Shipping Name" means the HCA name in the UN Transport of Dangerous Goods Model regulations, most accurately describing the goods, as may be updated from time to time;

"UN Transport of Dangerous Goods" means the UN Recommendations on the Transport of Dangerous Goods Model regulations Volumes 1 and 2 and, which are guidance documents developed by the United Nations to harmonize dangerous goods transport regulations, as may be updated from time to time, commonly known as the UN Orange Book;

2. Scope of application

(1) Subject to the provisions of subregulation (2), these regulations shall apply to:

(a) an employer or a self-employed person who carries out work at a workplace which may expose any person to an HCA at the workplace; and

(b) a manufacturer, importer, supplier or retailer of chemicals that are intended for use at a workplace;

(2) The provisions of regulations 3(1), 6 and 7 shall not apply to:

(a) a self-employed person; or

(b) a person who visits a workplace as contemplated in subregulation (1).

(3) The provisions of these regulations shall not apply in the case where the Lead Regulations and Asbestos Abatement Regulations apply.

3. Information, instruction and training

(1) Every employer who undertakes work which is liable to expose an employee to an HCA shall, before any employee is exposed or may be exposed, after consultation with the health and safety committee established for that section of the workplace, provide that employee with suitable and sufficient information, and training, as well as thereafter informed and trained at intervals as may be recommended by that health and safety committee.

(2) The information and training shall include:

(a) in regard to the HCA regulations:

(i) that chemical regulations are in place which govern all aspects of HCA use at the workplace;
(ii) that legislated OELs are in place; and
(iii) duties of persons who are likely to be exposed to an HCA, as contemplated in regulation 4;

(b) details of the HCA to which the employee is likely to be exposed at the workplace including:

(i) the names of the HCAs and where they can be found in the workplace;
(ii) information on the potential harmfulness of HCAs at the workplace;
(iii) the significant findings of the HCA exposure assessment, as required by regulation 5(2); and
(iv) how to access the relevant SDSs;

(c) the information that each part of an SDS provides;
(d) the information that each part of the label on containers provides and why the information is being provided;
(e) the work practices and procedures to be followed in the use, handling, storage, transportation, spillage, disposal, emergency situation, good housekeeping and personal hygiene for HCA;
(f) the necessity of personal air sampling, biological monitoring and medical surveillance;
(g) the need for engineering controls and how to use as well as maintain them;
(h) the need for personal protective equipment including respiratory protective equipment as well as the use and maintenance;
(i) the precautions to be taken by an employee to protect himself against the health risks associated with such exposure, including the wearing and use of protective clothing and respiratory protective equipment.
(j) the necessity, correct use, maintenance and potential of safety equipment, facilities and engineering control measures provided; and
(k) the necessity of personal air sampling and medical surveillance;

(3) An employer shall give written instructions of the procedures to be followed in the event of spillages, leakages or any similar emergency situation, to the drivers of vehicles transporting the HCA.

(4) As contemplated in section 37(2) of the Act, the employer must agree in writing to the arrangements and procedures between them to ensure compliance by the mandatory to information and training requirements of regulation 3.

4. Duties of persons who may be exposed to hazardous chemicals

Every person who is or may be exposed, shall obey a lawful instruction given by or on behalf of the employer or a self-employed person, regarding:

(a) the prevention of an HCA from being released;
(b) the wearing of personal protective equipment;
(c) the wearing of monitoring equipment to measure personal exposure;
(d) the reporting for health evaluations and biological tests as required by these regulations;
(e) the cleaning up and disposal of materials containing an HCA;
(f) housekeeping at the workplace, personal hygiene and environmental and health practices; and
(g) information and training as contemplated in regulation 3.

5. Risk Assessment of exposure

(1) An employer or self-employed person shall after consultation with the relevant health and safety representative or relevant health and safety committee, cause an immediate assessment to be made and thereafter at intervals not exceeding two years, to determine if any employee may be exposed by any route of intake.

(2) The employer shall inform the relevant health and safety representative or relevant health and safety committee in writing of the arrangements made for the assessment contemplated in subregulation (1), give them reasonable time to comment thereon and ensure that the results of the assessment are made available to the relevant representatives or committees who may comment thereon.

(3) When making the assessment, the employer or self-employed person shall keep a record of the assessment and take into account such matters as:

(a) the HCA to which an employee may be exposed;
(b) what effects the HCA can have on an employee;
(c) where the HCA may be present and in what physical form it is likely to be;
(d) the route of intake by which and the extent to which an employee can be exposed; and
(e) the nature of the work, process and any reasonable deterioration in, or failure of, any control measures.

(4) If the assessment made in accordance with subregulation (3) indicates that any employee may be exposed, the employer shall ensure that monitoring is carried out in accordance with the provisions of regulations 6 and 7 and that the exposure shall be controlled as contemplated in regulation 10.

(5) An employer shall review the assessment required by subregulation (1) forthwith if:

(a) there is reason to suspect that the previous assessment is no longer valid; or
(b) there has been a change in a process involving an HCA or in the methods, equipment or procedures in the use, handling, control or processing of the HCA, the provisions of subregulations (2) and (3) shall apply.

6. Air Monitoring

(1) Where the inhalation of an HCA is concerned, an employer contemplated in regulation 5(4) shall ensure that the measurement programme of the airborne concentrations of the HCA to which an employee is exposed, is:

(a) carried out in accordance with the provisions of these regulations;
(b) carried out only after the relevant health and safety representative or relevant health and safety committee has been informed thereof and given a reasonable opportunity to comment thereon;
(c) carried out by an approved inspection authority; and
(d) representative of the exposure of employees to the airborne HCA in accordance with the provisions of subregulation (2).

(2) In order to comply with the provisions of subregulation (1)(d) an employer shall;

(a) ensure that the measurement programme, in the case of a group measurement, makes provision for the selection of the number of persons for a sample to be done as contemplated in chapters 3 and 4 and Technical Appendix A of the OESSM: Provided that such sample size shall be chosen for the top 10% of the group at the 95% confidence level for an HCA with a control limit and for the top 10% of the group at the 90% confidence level for an HCA with a recommended limit; and
(b) subject to the criteria contained in regulation 6(1), carry out representative measurements at least every 24 months for an HCA with an OEL RL or an OEL ML as listed in Table 2 and 3 of Annexure 2

(3) In order to comply with the provisions of subregulation (1)(e), an employer shall obtain the service of an approved inspection authority who shall, at intervals not exceeding 24 months:

(a) verify, by examining the measurement and analysis equipment of the employer and questioning the person referred to in subregulation (1)(c), regarding the carrying out of the measurement programme; and
(b) enter the results of the investigation and measurements as contemplated in subregulation 6(2)(a) and 6(2)(b) respectively, in the record required by regulation 9.

7. Medical surveillance

(1) An employer shall ensure that an employee is under medical surveillance if:

(a) the employee may be exposed to a agent listed in Table 4 of Annexure 2;

(b) the exposure of the employee to any agent hazardous to his or her health is such that an identifiable disease or adverse effect to his or her health may be related to the exposure, there is a reasonable likelihood that the disease or effect may occur under the particular conditions of his or her work and there are techniques to diagnose indications of the disease or the effect as far as is reasonably practicable; or

(c) the occupational health practitioner recommends that the relevant employee should be under medical surveillance in which case the employer may call on an occupational medicine practitioner to ratify the appropriateness of such recommendation.

(2) In order to comply with the provisions of subregulation (1) the employer shall, as far as is reasonably practicable, ensure:

(a) that an initial health evaluation is carried out by an occupational health practitioner immediately before or within 14 days after a person commences employment, where any exposure exists or may exist, which comprises:

(i) an evaluation of the employees medical and occupational history;

(ii) a physical examination; and

(iii) any other essential examination which in the opinion of the occupational health practitioner is desirable in order to enable the practitioner to do a proper evaluation.

(b) that subsequent to the initial health evaluation contemplated in subregulation (a) the relevant employee undergoes examinations as contemplated in subregulation (a)(ii) and (iii), at intervals not exceeding two years, or at intervals specified by an occupational medical practitioner.

(3) An employer shall not permit an employee who has been certified unfit for work by an occupational medicine practitioner to work in a workplace or part of a workplace in which he or she would be exposed: Provided that the relevant employee may be permitted to return to work which will expose him or her if he or she is certified fit for that work beforehand by an occupational medicine practitioner.

(4) The employer shall record and investigate the incident contemplated in subregulation (3) in compliance with regulation 8 of the General Administrative Regulations.

8. Respiratory zone

An employer shall ensure:

(a) that any workplace or part of a workplace under his or her control, where the concentration of an HCA in the air is or may be, such that the exposure of employees working in that workplace exceeds the recommended limit without the wearing of respiratory protective equipment, is zoned as a respirator zone;

(b) that a respirator zone is clearly demarcated and identified by notice indicating that the relevant area is a respirator zone and that personal protective equipment as contemplated in regulation 11 must be worn there; and

(c) that no person enters or remains in a respirator zone unless he or she is wearing the required personal protective equipment.

9. Records

An employer shall:

(a) keep records of the results of all assessments, air monitoring, and medical surveillance reports required by regulations 5 , 6 and 7, respectively: Provided that personal medical records shall only be made available to an occupational health practitioner;
(b) subject to the provisions of subregulation (c), make the records contemplated in subregulation (a), excluding personal medical records, available for inspection by an inspector.
(c) allow any person subject to personal written consent of an employee, to peruse the records with respect to that particular employee;
(d) make the records of all assessments and air monitoring available for perusal by the relevant health and safety representatives or relevant health and safety committee;
(e) keep all records of assessments and air monitoring for a minimum period of 30 years;
(f) minimum period of 30 years and if the employer ceases activities, all those records shall be handed over or forwarded by registered post to the relevant regional director; and
(g) keep a record of the investigations and tests carried out in terms of regulation 12 (b) and of any repairs resulting from these investigations and tests, and the records shall be kept for at least three years.

10. Control of exposure to HCA

(1) An employer shall ensure that the exposure of an employee is either prevented or, where this is not reasonably practicable adequately controlled, provided that:

(a) where there is exposure for which there is a restricted limit, the control of the exposure shall be regarded as adequate if the level of exposure is below that limit or if the relevant area is zoned and the level of exposure is reduced to below that restricted limit by means of adequate personal protective equipment only after the level has been reduced to as low as is reasonably practicable by any other means than personal protective equipment; or
(b) where there is exposure for which there is a maximum limit, the control of the exposure shall be regarded as adequate if the exposure is at a level as low as is reasonably practicable below that maximum limit: Provided that in the case of temporary excursions above the control limit, the employer shall ensure:

(i) that the excursion is without a significant risk from exposure;
(ii) that the excursion is not indicative of a failure to maintain adequate control; and

(iii) that during the excursion, the area is temporarily demarcated as prescribed in regulation 8(b); and the provisions of regulation 11 are complied with.

(2) Where reasonably practicable, the employer shall control the exposure of an employee by:

(a) limiting the amount of an HCA used which may contaminate the working environment;
(b) limiting the number of employees who will be exposed or may be exposed;
(c) limiting the period during which an employee will be exposed or may be exposed;
(d) using a substitute for an HCA;
(e) introducing engineering control measures for the control of exposure, which may include the following:

(i) Process separation, automation or enclosure;
(ii) the installation of local extraction ventilation systems to processes, equipment and tools for the control of emissions of an airborne HCA;
(iii) use of wet methods; and
(iv) separate workplaces for different processes;

(f) by introducing appropriate work procedures which an employee must follow where materials are used or processes are carried out which could give rise to exposure of an employee and that procedures shall include written instructions to ensure:

(i) that an HCA is safely handled, used and disposed of;
(ii) that process machinery, installations, equipment, tools and local extraction and general ventilation systems are safely used and maintained;
(iii) that machinery and work areas are kept clean; and
(iv) that early corrective action can be readily identified.

(3) An employer shall ensure that the emission of an HCA into the atmosphere comply with the provisions of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).

11. Personal protective equipment and facilities

(1) If it is not reasonably practicable to ensure that the exposure of an employee is adequately controlled as contemplated in regulation 10, the employer shall:

(a) in the case of an airborne HCA, provide the employee with suitable respiratory protective equipment and protective clothing; and
(b) in the case of an HCA which can be absorbed through the skin, provide the employee with suitable non-HCA impermeable protective equipment.

(2) An employer or self-employed person shall

(a) provide respiratory protective equipment and protective clothing suitable for protection against regulated asbestos fibres, to all person who may be exposed to asbestos, where respiratory protective equipment is provided to supplement engineering controls as required by regulation 10(2)(d);

(b) ensure that the respiratory protective equipment provides the appropriate level of protection for the type of asbestos work to be undertaken.

(3) Where respiratory protective equipment is provided, the employer shall ensure:

(a) that the relevant equipment is capable of controlling the exposure to below the OEL for the relevant HCA;
(b) that the relevant equipment is correctly selected and properly used;
(c) that information, instructions, training and supervision which is necessary with regard to the use of the equipment is known to the employees; and
(d) that the equipment is kept in good condition and efficient working order.

(4) An employer shall, as far as is reasonably practicable:

(a) issue no used personal protective equipment to an employee, unless the relevant protection equipment is decontaminated and sterilised;
(b) provide separate containers or storage facilities for personal protective equipment when not in use; and
(c) ensure that all personal protective equipment not in use is stored only in the place provided therefore.

(5) An employer shall as far as is reasonably practicable, ensure that all contaminated personal protective equipment is cleaned and handled in accordance with the following procedures:

(a) where the equipment is cleaned on the premises of an employer, care shall be taken to prevent contamination during handling, transport and cleaning;
(b) where the equipment is sent off the premises to a contractor for cleaning purposes, the equipment shall be packed in impermeable containers;
(c) the containers shall be tightly sealed and have clear indication thereon that the contents thereof are contaminated; and
(d) the relevant contractor shall be fully informed of the requirements of these regulations and the precautions to be taken for the handling of the contaminated equipment.

(5) Subject to the provisions of subregulation (4)(b) an employer shall ensure that no person removes dirty or contaminated personal protective equipment from the premises: Provided that where contaminated personal protective equipment has to be disposed of, it shall be treated as HCA waste as contemplated in regulation 15.

(6) Subject to the provisions of the Facilities Regulations, an employer shall, where reasonably practicable, provide employees, using personal protective equipment as contemplated in subregulation (1), with:

(a) adequate washing facilities which are readily accessible and located in an area where the facilities will not become contaminated, in order to enable the employees to meet a standard of personal hygiene consistent with the adequate control of exposure, and to avoid the spread of an HCA;
(b) two separate lockers separately labelled 'protective clothing' and 'personal clothing', and ensure that the clothing is kept separately in the locker concerned; and

(c) separate 'clean' and 'dirty' change rooms if the employer uses or processes an HCA to the extent that the HCA could endanger the health of persons outside of the workplace.

12. Maintenance of control measures

An employer shall ensure:

(a) that all control equipment and facilities provided in terms of regulations 10 and 11 are maintained in good working order; and
(b) that thorough examinations and tests of engineering control measures are carried out at intervals not exceeding 24 months by an approved inspection authority.

13. Prohibitions

No person shall as far as is reasonably practicable:

(a) use compressed air or permit the use of compressed air to remove particles of an HCA from any surface or person;
(b) smoke, eat, drink or keep food or beverages in a respirator zone or permit any other person to smoke, eat, drink or keep food or beverages in that zone;
(c) use statements such as 'non-toxic', 'non-harmful', 'non-polluting', 'non-hazardous' or other statements indicating that the HCA is not hazardous or any other statements that are inconsistent with its GHS classification, should not appear on the label or packaging of any HCA; and
(d) use any prohibited agent, which must not be manufactured, procured, used, handled or stored within the workplace; and OELs are not provided in Table 2 and 3 of Annexure 2, for the following HCAs:
    (i) prohibited agents;
    (ii) Ozone Depleting Substances controlled by the Montreal Protocol, which has been ratified by the Republic of South Africa; and
    (iii) Persistent Organic Pollutants prohibited by the Prohibition on the Import, Export, Possession, Acquisition, Sale, Use and Disposal Of Agricultural Remedies, under the Fertilizers, Farm Feeds, Agricultural Remedies And Stock Remedies Act, 1947 (Act No. 36 Of 1947), and published under Government Notice No. R.862 of 29 July 2016.

14. Classification of an HCA

The manufacturer or importer of a chemical agent shall, before it is supplied to a workplace:

(a) determine whether the chemical agent is an HCA;
(b) ensure that GHS classification is carried out for the HCA; and
(c) review the GHS classification, should a change in composition be made.

14A. Safety Data Sheet (SDS)

(1) Subject to section 10(3)(b) of the Act, a safety data sheet, for an HCA shall be:

(a) prepared by an importer or, manufacturer before manufacture and if not reasonably practicable, immediately after manufacture but before import, provided that the safety data sheet is:

(i) GHS compliant;
(ii) classified for the HCA, in accordance with regulation 14;
(iii) reviewed at least once every 5 years;
(iv) amended whenever necessary to ensure that it contains correct and current information, aligned to its GHS classification required in regulation 14(2), which includes new data regarding the hazard presented by an HCA, that changes its classification in a category or subcategory of a hazard class, or results in its classification in another hazard class; and
(v) given the most recent applicable date which, may be the date of first issue, review or amendment

(b) provided by the manufacturer or importer to any person, if the person is:

(i) likely to be exposed to the HCA;
(ii) a medical practitioner who needs the information to treat a person who has been exposed to the HCA; or
(iii) an emergency service professional who requires the information to fulfil his or her duties as an emergency respondent;

(c) provided by the supplier, before first supplying it to a workplace;
(d) obtained by the employer before the HCA is first supplied to the workplace; and
(e) subregulations (1)(a) and (b) do not apply to a manufacturer or importer of an HCA who has not manufactured or imported the HCA in the past 5 years.

(2) The information in the GHS compliant safety data sheet should be presented using the following 16 headings in the order given below, as may be updated from time to time:

(a) Section 1: identification of the substance/mixture and of the company/undertaking;
(b) Section 2: hazards identification;
(c) Section 3: composition/information on ingredients;
(d) Section 4: first aid measures;
(e) Section 5: firefighting measures;
(f) Section 6: accidental release measure;
(g) Section 7: handling and storage;
(h) Section 8: exposure controls/personal protection;
(i) Section 9: physical and chemical properties;
(j) Section 10: stability and reactivity;
(k) Section 11: toxicological information;
(l) Section 12: ecological information;
(m) Section 13: disposal considerations;
(n) Section 14: transport information;
(o) Section 15: regulatory information; and
(p) Section 16: other information.

14B. Labelling of an HCA

(1) With regard to labelling of an HCA:

(a) a manufacturer or importer of an HCA shall ensure that the HCA is correctly labelled as soon as practicable after manufacturing or importing;
(b) a supplier of an HCA shall not supply an HCA, if it is not correctly labelled;
(c) a retailer of an HCA shall not supply consumer products containing HCAs, to be used in a workplace, if they are not correctly labelled; and
(d) an employer shall:

(i) ensure that an HCA used, handled or stored at the workplace is correctly labelled;
(ii) ensure that a container labelled for a hazardous chemical is used only for the use, handling or storage of that hazardous chemical;
(iii) so far as is reasonably practicable, ensure that when an HCA is transferred or decanted at the workplace, from its original container into a destination container, the destination container is correctly labelled for that HCA; and
(iv) so far as is reasonably practicable, that a hazardous chemical in pipe work is identified by a label, sign or another way on or near the pipe work.

(2) Subject to the provisions of subregulation (1) an HCA is correctly labelled, if the selection and use of label elements is in accordance with the GHS and is packed in a container that has a label:

(a) which shall include:

(i) wording in at least the English language;
(ii) the product identifier and where applicable the UN proper shipping name;
(iii) the chemical identity of all HCA ingredients;
(iv) the name, address, business and telephone number of the manufacturer; or the importer;
(v) an emergency telephone number, where support is available in at least the English language; and
(vi) any signal word, hazard statement, precautionary statement and pictogram consistent with the GHS classification of the HCA, made in accordance with Regulation 14.

(b) which may include:

(i) the quantity of the HCA in the package, unless this quantity is specified elsewhere on the package;
(ii) the quantity of each HCA ingredient;
(iii) any information about the hazards, first aid and emergency procedures relevant to the HCA, not otherwise included in the hazard statement or precautionary statement;

(iv) first aid measures; and
(v) an expiry date.

14C. Packaging of an HCA

(1) Packaging for an HCA shall satisfy the relevant requirements of UN Transport of Dangerous Goods for packaging and fastenings, or where applicable the UN IMO International Maritime Dangerous Goods Code, including the following requirements:

(a) The manufacturer or importer of an HCA shall ensure that the HCA is correctly packed, as soon as reasonably practicable after manufacturing or importing, where correctly packed means:

(i) is in sound condition;
(ii) will safely contain the chemical for the time the chemical is likely to be packed;
(iii) is made of material that is compatible with, and will not be adversely affected by, the chemical;
(iv) the packaging and fastenings are strong and solid throughout, to ensure that they will not loosen and will meet the normal stresses and strains of handling; and
(v) does not usually contain food or beverages and cannot be mistakenly identified as containing food or beverages.

(2) A supplier, shall not supply the HCA if it is not correctly packed, as contemplated in subregulation (1).

(3) Where a retailer supplies an HCA in a container that is supplied by the person purchasing the chemical, then the retailer shall ensure that the HCA is correctly packed as contemplated in subregulation (1).

(4) The employer or self-employed person shall only receive, use, handle or store an HCA if it is correctly packed, as contemplated in subregulation (1).

(5) An employer shall as far as reasonably practicable, ensure that a container or a vehicle in which an HCA is transported is clearly identified and in compliance with the National Road Traffic Act, 1996 (Act No. 93 of 1996).

15. Disposal of Hazardous Chemical Agents

An employer shall, as far as is reasonably practicable:

(1) Ensure that all HCA waste is classified and disposed of as waste in terms of the following legislation, as updated from time to time:

(a) National Environmental Management: Waste Act, no 59 of 2008;
(b) Waste classification and management regulations, 2013;
(c) National norms and standards for the assessment of waste for landfill disposal, 2013; and

(d) National norms and standards for disposal of waste to landfill, 2013.

(2) Ensure that all collectable HCA waste is placed into containers that will prevent the likelihood of exposure during handling.

(3) Ensure that all vehicles, re-usable containers and covers which have been in contact with HCA waste are cleaned and decontaminated after use in such a way that the vehicles, containers or covers do not cause a hazard inside or outside the premises concerned.

(4) Ensure that all employees occupied in the collection, transport and disposal of HCA waste, who may be exposed to that waste, are provided with suitable personal protective equipment.

(5) Ensure that if the services of a waste disposal contractor are used, a provision is incorporated into the contract stating that the contractor shall also comply with the provisions of these regulations.

16. 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, 14A, 14B, 14C or 15 shall be guilty of an offence and liable on conviction to a fine or to imprisonment for a period not exceeding six months and, in the case of a continuous offence, to an additional fine of R500 for each day on which the offence continues or additional imprisonment of one day for each day on which the offence continuous: Provided that the period of such additional imprisonment shall in no case exceed 90 days.

17. Short title

The Regulations for Hazardous Chemical Substances, 1995. published under Government Notice No. R. 1179 of 25 August 1995, are hereby repealed. These regulations shall be called the Regulations for Hazardous Chemical Agents, 2018.

ANNEXURE 1

Table 1:

GHS HAZARD CLASSES[1] – PHYSICAL HAZARDS

HAZARD CLASSES	CATEGORIES / DIVISIONS / TYPES						
Flammable gases	Cat 1	Cat 2					
Aerosols flammable and non-flammable	Cat 1	Cat 2					
Oxidising gases	Cat 1						
Gases under pressure Compressed gas Liquefied gas Refrigerated liquefied gas Dissolved gas	Cat 1						
Flammable liquids	Cat 1	Cat 2	Cat 3				
Flammable solids	Cat 1	Cat 2					
Self-reactive agents and mixtures	Type A	Type B	Type C	Type D	Type E	Type F	Type G
Pyrophoric liquids	Cat 1						
Pyrophoric solids	Cat 1						
Self-heating of agents or mixtures,	Cat 1	Cat 2					
Agents or mixtures which in contact with water emit flammable gases	Cat 1	Cat 2	Cat 3				
Oxidising liquids	Cat 1	Cat 2	Cat 3				
Oxidising solids	Cat 1	Cat 2	Cat 3				
Organic peroxides	Type A	Type B	Type C	Type D	Type E	Type F	
Corrosive to metals	Cat 1						

GHS HAZARD CLASSES[2] – HEALTH HAZARDS

HAZARD CLASSES	CATEGORIES			
Acute toxicity Oral Dermal Inhalation	Cat 1	Cat 2	Cat 3	Cat 4
Skin corrosion/irritation	Cat 1	Cat 2		
Serious eye damage/eye irritation	Cat 1	Cat 2		
Respiratory or skin sensitisation	Cat 1			
Germ cell mutagenicity	Cat 1	Cat 2		
Carcinogenicity	Cat 1	Cat 2		
Reproductive toxicity	Cat 1	Cat 2	Lactation	
Specific Target Organ Toxicity - Single exposure	Cat 1	Cat 2	Cat 3	
Specific Target Organ Toxicity - Repeated exposure	Cat 1	Cat 2		
Aspiration hazard	Cat 1			

Note: where subcategories exist, they are included within the category

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ANNEXURE 2

Table 1. Prohibited hazardous chemical agents

CAS number	Chemical	Use category	Use limitation
92-67-1	4-AMINOPHENYL and its salts		B
92-87-5	BENZIDINE and its salts		B
91-59-8	2-NAPHTYLAMINE and its salts		B
92-93-3	4-NITROPHENYL		B
1336-36-3	POLYCHLORINATED BIPHENYLS (PCB), except MONO- and DICHLORINATED BIPHENYLS	I	B
61788-33-8	POLYCHLORINATED TERPHENYLS (PCT)	I	B
	PREPARATIONS with a PCB or PCT content higher than 0.01% by weight	I	B

Abbreviations:
Use category: **I**: industrial chemical
Use limitation: **B**: ban

Table 2. Occupational exposure limits- Maximum limits for hazardous chemical agents

AGENT	CAS NUMBER	FORMULA	RHCA-OEL ppm	RHCA- OEL mg/m'	RHCA - STEL/C ppm	RHCA - STEL/C mg/m'	NOTATIONS
A							
Acrylamide	79-06-1	CH2=CHCONH2	-	0.06	-	-	CARC, SKIN
Acrylonitrile	107-13-1	CH2=CHCN	4	-	-	-	SKIN
Arsenic & compounds, except Arsine [as As]	7440-38-2	As	-	0.02	-	-	CARC
Asbestos, all forms. See Asbestos Regulations	1332-21-4	-	-	-	-	-	CARC
B							
Benzene	71-43-2	C6H6	1	-	5	-	CARC, SKIN
Bis(chloromethyl) ether [BCME]	542-88-1	(CH2Cl)2O	0.002	-	-	-	CARC
1,3-Butadiene [Buta-1,3-diene]	106-99-0	CH2=(CH)2=CH2	4	-	-	-	CARC
2-Butoxyethanol [EGBE]	111-76-2	-	40	-	-	-	
C							
Cadmium and compounds [as Cd]	7440-43-9 (metal)	Cd (metal)					CARC (cadmium metal, cadmium chloride, fluoride and sulphate)
Respirable particulate			-	0.004	-	-	
Total particulate			-	0.02	-	-	
Carbon disulphide	75-15-0	CS2	2	-	-	-	SKIN
Chromium, metal and inorganic compounds [as Cr]	7440-47-3 (metal)	Cr (metal)					

Water soluble Cr [VI] compounds			-	0.1	-	-	CARC, RSEN, SKIN
Insoluble Cr [VI] compounds			-	0.02	-	-	CARC, RSEN, SKIN
D							
1,2-Dibromoethane	106-93-4	BrCH2CH2Br	0.5	-	-	-	CARC, SKIN
Dichloromethane	75-09-2	CH2Cl2	100	-	-	-	SKIN, CARC
2,2'-Dichloro-4,4'-methylene dianiline [MbOCA]	101-14-4	CH2(C6H3ClNH2)2	0.02	-	-	-	CARC, SKIN
E							
2-Ethoxyethanol [EGEE], [Ethylene glycol monoethyl ether]	110-80-5	CH3CH2OCH2CH2OH	10	-	-	-	SKIN
2-Ethoxyethyl acetate [EGEEA], [Ethylene glycol monoethyl ether acetate]	111-15-9	C2H5OCH2CH2OOCCH3	10	-	-	-	SKIN
Ethylene oxide	75-21-8	CH2CH2O	2	-	-	-	CARC
F							
Formaldehyde	50-00-0	HCHO	-	-	0.6	-	CARC, DSEN, RSEN
G							
Grain dust (oat, wheat, barley, maize, rye)	-	-	-	8	-	-	RSEN
H							
Hydrogen cyanide [as CN]	74-90-8	HCN	-	-	9.4	-	SKIN
I							
K							
L							
Lead and compounds	See Lead Regulations	Pb	See Lead Regulations				CARC (Lead compounds, inorganic)
Tetraethyl lead [as Pb]	78-00-2		See Lead Regulations				SKIN

Tetramethyl lead [as Pb]	75-74-1		See Lead Regulations				SKIN
M							
N							
Nickel and its inorganic compounds [as Ni]	7440-02-0						
Soluble inorganic compounds			-	0.2	-	-	CARC
Insoluble inorganic compounds			-	0.4	-	-	CARC
O							
P							
Q							
R							
Rubber fume	-	-	-	0.4	-	-	CARC
S							
*Silica, crystalline, respirable particulate:							
Cristobalite	14464-46-1	SiO	-	0.1	-	-	CARC
Quartz	14808-60-7	SiO_2	-	0.1	-	-	CARC
Tridymite	15468-32-3	SiO_2	-	0.1	-	-	
Tripoli	1317-95-9	SiO_2	-	0.1	-	-	
Styrene, monomer	100-42-5	C6H5CH=CH2	40	-	80	-	CARC
T							
Talc (containing asbestos fibers), respirable particulate	14807-96-6	Mg3Si4O10(OH)2	See Asbestos Regulations				CARC
1,1,1-Trichloroethane	71-55-6	CH3CCl3	700	-	900	-	
Trichloroethylene	79-01-6	CCl2=CHCl	20	-	50	-	CARC, SKIN
U							
V							
** Vinyl chloride	75-01-4	H2C=CHCl	2	-	-	-	CARC
W							

Wood dust species: oak, beech, birch, mahogany, teak and walnut	-	-	-	2	-	-	CARC, RSEN
X							
Y							
Z							

Abbreviations:
Carc: Denotes carcinogenicity, which is based on IARC categorisation including category 1A, 1B and Category 2;
RSEN: Respiratory sensitisation, potential to produce respiratory sensitisation
DSEN: Dermal sensitisation, potential to produce dermal sensitisation
RSEN and DSEN do not imply that sensitisation is the critical effect on which the OEL is based, nor do they imply that this effect is the sole basis for the agents OEL;
Skin: Danger of cutaneous absorption. Refers to the potential significant contribution to the overall exposure by the cutaneous route including mucous membranes and the eyes by contact with vapours, liquids and solids. Overexposure may also occur following dermal contact with liquids and aerosols, even when airborne exposures at or below the OEL.

Note:
*All industries handling, manufacturing and producing silica dust are required to submit bi-annual reports that includes the following:

- number of samples taken and analysed
- composition of dust
- concentration of the constituents and
- whether the employer is complying with the Occupational Exposure Limit, it not, what steps are implemented to comply with the exposure limit.

Table 3. Occupational exposure limits- Restricted limits for hazardous chemical agents

AGENT	CAS NUMBER	FORMULA	RHCA - OEL	RHCA - OEL	RHCA - STEL/ C	RHCA - STEL/ C	NOTATIONS
			ppm	mg/m'	ppm	mg/m'	
A							
Acetaldehyde	75-07-0	CH3CHO	-	-	50	-	CARC
Acetic acid	64-19-7	CH3COOH	20	-	30	-	
Acetic anhydride	108-24-7	(CH3CO)2O	2	-	6	-	
Acetone	67-64-1	(CH3)2CO	500	-	1000	-	
Acetonitrile	75-05-8	CH3CN	40	-	-	-	SKIN
Acetylsalicylic acid [Asprin]	50-78-2	CH3COOC6H4COOH	-	10	-	-	
Acrolein [Acrylaldehyde]	107-02-8	CH2=CHCHO	-	-	0.2	-	SKIN
Acrylic acid	79-10-7	CH2=CHCOOH	4	-	-	-	SKIN
Aldrin	309-00-2	C12H8Cl6	-	0.1	-	-	SKIN
Allyl alcohol	107-18-6	CH2=CHCH2OH	-	1	-	-	SKIN
Allyl chloride	107-05-1	CH2=CHCH2Cl	2	-	4	-	SKIN
Allyl glycidyl ether [AGE]	106-92-3	C6H10O2	2	-	-	-	
Aluminium metal and insoluble compounds [as Al], respirable particulate:	7429-90-5 (metal)	Al (metal)	-	2	-	-	
Aminodimethylbenzene	95-64-7		See Xylidine				
2-Aminoethanol	141-43-5	NH2CH2CH2OH	See Ethanolamine				
Ammonia, anhydrous	7664-41-7	NH3	50	-	70	-	
Ammonium chloride, fume	12125-02-9	NH4Cl	-	20	-	40	
Ammonium sulphamate	7773-06-0	NH2SO3NH4	-	20	-	-	
Aniline	62-53-3	C6H5NH2	4	-	-	-	SKIN
Anisidines, o- and p-isomers	90-04-0 104-94-9	NH2C6H4OCH3	-	1	-	-	CARC, SKIN

Antimony & compounds [as Sb] except Antimony trisulphide & Antimony trioxide & Antimony hydride	7440-36-0	Sb	-	1	-	-	CARC
Antimony hydride	7803-52-3		See Stibine				
Arsine	7784-42-1	AsH3	0.01	-	-	-	
Asphalt, petroleum fumes	8052-42-4	-	-	1	-	-	CARC
Atrazine	1912-24-9	C8H14ClN5	-	4	-	-	
Azinphos-methyl	86-50-0	C10H12O3PS2N3	-	0.4	-	-	DSEN, SKIN
B							
Barium & soluble compounds [as Ba]	7440-39-3	-	-	1	-	-	
Barium sulphate, respirable particulate:	7727-43-7	BaSO4	-	5	-	-	
Benomyl	17804-35-2	C14H18N4O3	-	2	-	-	DSEN
Benzene-1,2,4,-tricarboxylic acid 1,2-anhydride	552-30-7	C9H4O5	-	0.001	-	0.004	DSEN, RSEN, SKIN
p-Benzoquinone	106-51-4	C6H4O2	0.2	-	-	-	
Benzoyl peroxide	94-36-0	(C6H5CO)2O2	-	10	-	-	
Benzyl chloride	100-44-7	C6H5CH2Cl	2	-	-	-	CARC
Beryllium & compounds [as Be]	7440-41-7	Be	-	0.0001	-	-	DSEN, RSEN, SKIN
Biphenyl	92-52-4	C6H5C6H5	0.4	-	-	-	
Bismuth telluride [as Bi2Te3]							
Undoped	1304-82-1	Bi2Te3	-	20	-	-	
Selenium-doped	-		-	10	-	-	
Borates, tetra, sodium salts							
Anhydrous	1330-43-4	Na2B4O7	-	4	-	12	

Decahydrate	1303-96-4	Na2B4O7.10H2O	-	4	-	12	
Pentahydrate	12179-04-3	Na2B4O7.5H2O	-	4	-	12	
Boron oxide	1303-86-2	B2O3	-	20	-	-	
Boron tribromide	10294-33-4	BBr3	-	-	1.4	-	
Boron trifluoride	7637-07-2	BF3	-	-	1.4	-	
Bromacil	314-40-9	C9H13BrN2O2	-	20	-	-	
Bromine	7726-95-6	Br2	0.2	-	0.4	-	
Bromine pentafluoride	7789-30-2	BrF5	0.2	-	-	-	
Bromoethane	74-96-4	CH3CH2Br	10	-	-	-	SKIN
Bromoethylene	593-60-2	CH2=CHBr	See Vinyl bromide				
Bromoform	75-25-2	CHBr3	1	-	-	-	
Bromomethane	74-83-9	CH3Br	See Methyl bromide				
n-Butane	106-97-8	CH3CH2CH2CH3	-	-	2000	-	
2-Butanol [sec-Butyl alcohol]	78-92-2	CH3CH(OH)CH2CH3	200	-	-	-	
tert-Butanol [tert-Butyl alcohol]	75-65-0	(CH3)3COH	200	-	-	-	
trans-But-2-enal	See Crotonaldehyde						SKIN
n-Butyl acetate	123-86-4	CH3COO(CH2)3CH3	100	-	300	-	
sec-Butyl acetate	105-46-4	C6H12O2	100	-	300	-	
tert-Butyl acetate	540-88-5	CH3COOC(CH3)3	100	-	300	-	
Butyl acrylate	141-32-2	CH2=CHCOOC4H9	4	-	-	-	DSEN
n-Butylamine	109-73-9	CH3(CH2)3NH2	-	-	10	-	SKIN
n-Butyl glycidyl ether [BGE]	2426-08-6	C4H9OCH2CHCH2O	6	-	-	-	DSEN, SKIN
n-Butyl lactate	138-22-7	CH3CH(OH)COOC4H9	10	-	-	-	
o-sec-Butylphenol	89-72-5	C2H5(CH3)CHC6H4OH	10	-	-	-	SKIN
C							
Calcium cyanamide	156-62-7	CaNC≡N	-	1	-	-	

Calcium hydroxide	1305-62-0	Ca(OH)2	-	10	-	-	
Calcium oxide	1305-78-8	CaO	-	4	-	-	
Calcium silicate, [naturally occuring as Wollastonite]	1344-95-2	CaSiO3	-	2	-	-	
Calcium sulphate [including Plaster of Paris & Gypsum]	7778-18-9 10034-76-1 10101-41-4 13397-24-5	CaSO4	-	20	-	-	
Camphor, synthetic	76-22-2	C10H16O	4	-	6	-	
Caprolactum	105-60-2	NH(CH2)5CO					
Dust only			-	10	-	-	
Vapour			-	10	-	-	
Captafol	2425-06-1	C10H9Cl4NO2S	-	0.2	-	-	CARC, SKIN
Captan	133-06-2	C9H8Cl3NO2S	-	10	-	-	DSEN, SKIN
Carbaryl	63-25-2	CH3NHCOOC10H7	-	1	-	-	SKIN
Carbofuran	1563-66-2	C12H15NO3	-	0.2	-	-	
Carbon black	1333-86-4	C	-	6	-	-	CARC
Carbon dioxide	124-38-9	CO2	10000	-	60000	-	
Carbon monoxide	630-08-0	CO	50	-	-	-	
Carbon tetrabromide	558-13-4	CBr4	0.2	-	0.6	-	
Carbon tetrachloride	56-23-5	CCl4	10	-	20	-	CARC, SKIN
Catechol	120-80-9	C6H4(OH)2	10	-	-	-	CARC, SKIN
Cellulose	9004-34-6	(C6H10O5)n	-	20	-	-	
Cement [Portland cement], respirable particulate	-	-	-	2	-	-	
Chlordane	57-74-9	C10H6Cl8	-	1	-	-	CARC, SKIN
Chlorine	7782-50-5	Cl2	1	-	2	-	
Chlorine dioxide	10049-04-4	ClO2	0.2	-	0.6	-	
Chlorine trifluoride	7790-91-2	ClF3	-	-	0.2	-	
2-Chloroacetophenone	532-27-4	C6H5COCH2Cl	0.1	-	-	-	
Chloroacetyl chloride	79-04-9	ClCH2COCl	0.1	-	0.3	-	SKIN

Chlorobenzene	108-90-7	C6H5Cl	20	-	-	-	SKIN
Chlorobromomethane	74-97-5	CH2BrCl	400	-	-	-	
Chlorodifluoromethane	75-45-6	CHClF2	2000	-	-	-	
Chlorodiphenyl [PCBs]			-	-	-	-	CARC, SKIN
Chlorodiphenyl (42% chlorine)	53469-21-9	C6H4ClC6H3Cl2 (Approx)	-	2	-	-	CARC, SKIN
Chlorodiphenyl (54% chlorine)	11097-69-1	C6H3Cl2C6H2Cl3 (Approx)	-	1	-	-	CARC, SKIN
1-Chloro-2,3-epoxy propane	106-89-8	C3H5OCl	See Epichlorohydrin				
Chloroethane	75-00-3	CH3CH2Cl	See Ethyl chloride				
2-Chloroethanol	107-07-3	CH2ClCH2OH	See Ethylene chlorohydrin				
Chloroethylene	75-01-4	H2C=CHCl	See Vinyl chloride				
Chloroform	67-66-3	CHCl3	20	-	-	-	CARC, SKIN
Chloropentafluoroethane	76-15-3	CClF2CF3	2000	-	-	-	
Chloropicrin	76-06-2	CCl3NO2	0.2	-	-	-	
beta-Chloroprene	126-99-8	CH2=CClCH=CH2	20	-	-	-	CARC, SKIN
alpha-Chlorotoluene	100-44-7	C6H5CH2Cl	See Benzyl chloride				
2-Chlorotoluene [o-Chlorotoluene]	95-49-8	ClC6H4CH3	100	-	-	-	
2-Chloro-6-(trichloromethyl) pyridine	1929-82-4	ClC5H3NCCl3	See Nitrapyrin				
Chlorpyrifos	2921-88-2	C9H11Cl3NO3PS		0.2			SKIN

Chromium, metal and inorganic compounds [as Cr]							
Metal and Cr [III] compounds	7440-47-3 (metal)	Cr (metal)	-	1	-	-	
Coal dust, respirable particulate:	-	-					
Anthracite			-	0.8	-	-	
Bituminous or Lignite			-	1.8	-	-	
Coal tar pitch volatiles [as cyclohexane soluble fraction]	65996-93-2	-	-	0.4	-	-	CARC
Cobalt & cobalt inorganic compounds [as Co]	7440-48-4 (metal)	Co (metal)	-	0.04	-	-	CARC, RSEN
Copper:							
Fume (copper oxide) [as Cu]	1317-38-0	CuO	-	0.4	-	-	
Dusts & mists [as Cu]	7440-50-8 (metal)	Cu (metal)	-	2	-	-	
Cotton dust, raw, untreated	-						
Cotton dust (less fly)			-	-	-	-	
Cotton dust (thoracic fraction)		-	-	0.2	-	-	
Cresols, all isomers	95-48-7, 106-44-5, 108-39-4, 1319-77-3	CH3C6H4OH	-	40	-	-	SKIN
Crotonaldehyde	4170-30-3	CH3CH=CHCHO	-	-	0.6	-	SKIN
Cumene	98-82-8	C6H5CH(CH3)2	100	-	-	-	CARC, SKIN
Cyanamide	420-04-2	NH2CN	-	4	-	-	SKIN
Cyanide salts [as CN]							

Calcium cyanide	592-01-8	Ca(CN)2	-	-	-	10	SKIN
Potassium cyanide	151-50-8	KCN	-	-	-	10	SKIN
Sodium cyanide	143-33-9	NaCN	-	-	-	10	SKIN
Cyanogen	460-19-5	(CN)2	-	-	10	-	
Cyanogen chloride	506-77-4	ClCN	-	-	0.6	-	
Cyclohexane	110-82-7	C6H12	200	-	-	-	
Cyclohexanol	108-93-0	C6H11OH	100	-	-	-	SKIN
Cyclohexanone	108-94-1	C6H10O	40	-	100	-	SKIN
Cyclohexene	110-83-8	C6H10	600	-	-	-	
Cyclohexylamine	108-91-8	C6H11NH2	20	-	-	-	
Cyclonite [RDX]	121-82-4	C3H6N6O6	-	1	-	-	SKIN
Cyhexatin	13121-70-5	(C6H11)3SnOH	-	10	-	-	SKIN
D							
DMDT [p,p'-Dimethoxydiphenyltrichloroethane]	-	-	See Methoxychlor				
Diacetone alcohol	123-42-2	CH3COCH2C(CH3)2OH	100	-	-	-	
Diazinon	333-41-5	C12H21N2O3PS	-	0.02	-	-	CARC, SKIN
Diazomethane	334-88-3	CH2N2	0.4	-	-	-	
Dibenzoyl peroxide	94-36-0	(C6H5CO)2O2	See Benzoyl peroxide				
Diborane	19287-45-7	B2H6	0.2	-	-	-	
Diboron trioxide	1303-86-2	B2O3	See Boron oxide				
Dibromodifluoromethane [Difluorodibromomethane]	75-61-6	CBr2F2	200	-	-	-	
Dibutyl phenyl phosphate	2528-36-1	C14H23O4P	0.6	-	-	-	SKIN
Dibutyl phosphate	107-66-4	(C4H9O)2(OH)PO	-	10	-	-	SKIN
Dibutyl phthalate	84-74-2	C6H4(CO2C4H9)2	-	10	-	-	
Dichloroacetylene	7572-29-4	ClC=CCl	-	-	0.2	-	
1,2-Dichlorobenzene [o-Dichlorobenzene]	95-50-1	C6H4Cl2	50	-	100	-	SKIN

1,4-Dichlorobenzene [p-Dichlorobenzene]	106-46-7	C6H4Cl2	20	-	-	-	CARC
Dichlorodifluoromethane [Difluorodichloromethane]	75-71-8	CCl2F2	2000	-	-	-	
1,3-Dichloro-5,5-dimethyl hydantoin	118-52-5	C5H6Cl2N2O2	-	0.4	-	0.8	
1,1-Dichloroethane	75-34-3	CH3CHCl2	200	-	-	-	SKIN
1,2-Dichloroethane	107-06-2	ClCH2CH2Cl	20	-	-	-	CARC, SKIN
1,1-Dichloroethylene	75-35-4	CH2=CCl2	-	10	-	-	
1,2 Dichloroethylene, cis & trans isomers	540-59-0	ClCH=CHCl	400	-	-	-	
Dichlorofluoromethane	75-43-4	CHCl2F	20	-	-	-	
1,3-Dichloropropene (cis and trans isomers)	542-74-6		2	-	-	-	CARC, SKIN
1,3-Dichloropropene, cis & trans isomers	542-75-6	ClHC=CHCH2Cl	2	-	-	-	CARC, SKIN
1,2-Dichlorotetrafluoroethane	76-14-2	CClF2CClF2	2000	-	-	-	
Dichlorvos [DDVP]	62-73-7	(CH3O)2POOCH=CCl2	-	0.2	-	-	CARC, DSEN, SKIN
Dicyclopentadiene	77-73-6	C10H12	10	-	-	-	
Dicyclopentadienyl iron (as Fe)	102-54-5	(C5H5)2Fe	-	20	-	-	
Dieldrin	60-57-1	C12H8Cl6O	-	0.2	-	-	SKIN
Diethanolamine	111-42-2	(CH2CH2OH)2NH	-	2	-	-	CARC, SKIN
Diethylamine	109-89-7	(C2H5)2NH	10	-	30	-	SKIN
2-Diethylaminoethanol	100-37-8	(C2H5)2NCH2CH2OH	4	-	-	-	SKIN
1,4-Diethylenediamine	110-85-0	C4H10N2	See Piperazine				
Diethylenetriamine [DETA]	111-40-0	(NH2CH2CH2)2NH	2	-	-	-	SKIN
Di-(2-ethylhexyl) phthalate [DEHP]	117-81-7	C6H4(COOC8H17)2	-	10	-	-	CARC

Diethyl ketone	96-22-0	CH3CH2COCH2CH3	400	-	600	-	
Diethyl phthalate	84-66-2	C6H4(COOC2H5)2	-	10	-	-	
Diglycidyl ether [DGE]	2238-07-5	(OCH2CHCH2)2O	0.02	-	-	-	
o-Dihydroxybenzene		C6H4(OH)2	See Catechol				
m-Dihydroxybenzene	108-46-3	C6H4(OH)2	See Resorcinol				
p-Dihydroxybenzene		C6H4(OH)2	See Hydroquinone				
Diisobutyl ketone	108-83-8	[(CH3)2CHCH2]2CO	50	-	-	-	
Diisopropylamine	108-18-9	(CH3)2CHNHCH(CH3)2	10	-	-	-	SKIN
N,N-Dimethylacetamide	127-19-5	CH3CON(CH3)2	20	-	-	-	SKIN
Dimethylamine	124-40-3	(CH3)2NH	10	-	30	-	DSEN
N,N-Dimethylaniline	121-69-7	C6H5N(CH3)2	10	-	20	-	SKIN
1,3-Dimethylbutyl acetate	108-84-9	C8H16O2	100	-	-	-	
N,N-Dimethylformamide	68-12-2	HCON(CH3)2	20	-	-	-	CARC, SKIN
Dimethyl phthalate	131-11-3	C6H4(COOCH3)2	-	10	-	-	
Dimethyl sulphate	77-78-1	(CH3)2SO4	0.2	-	-	-	CARC, SKIN
Dinitolmide	148-01-6	C8H7N3O5	-	2	-	-	
Dinitrobenzene, all isomers	25154-54-5	C6H4(NO2)2	0.3	-	-	-	SKIN
Dinitro-o-cresol	534-52-1	CH3C6H2(OH)(NO2)2	-	0.4	-	-	SKIN
Dinitrotoluene	25321-14-6	CH3C6H3(NO2)2	-	0.4	-	-	CARC, SKIN
1,4-Dioxane	123-91-1	OCH2CH2OCH2CH2	40	-	-	-	CARC, SKIN
Dioxathion	78-34-2	C12H26O6P2S2	-	0.2	-	-	SKIN
Diphenylamine	122-39-4	(C6H5)2NH	-	20	-	-	
Diquat [Diquat]	85-00-7 2764-72-9 6385-62-2	C12H12Br2N2					SKIN
Total particulate	-	-	-	1	-	-	
Respirable particulate	-	-	-	0.2	-	-	

Disulfoton	298-04-4	C8H19O2PS3	-	0.1	-	-	SKIN
6,6-Di-tert-butyl-4,4'-thiodi-m-cresol	96-69-5	C22H30O2S	-	-	-	-	
Diuron	330-54-1	C9H10Cl2N2O	-	20	-	-	
Divinyl benzene [DVB]	1321-74-0	C6H4(HC=CH2)2	20	-	-	-	
E							
Endosulfan	115-29-7	C9H6Cl6O3S	-	0.2	-	-	SKIN
Endrin	72-20-8	C12H8Cl6O	-	0.2	-	-	SKIN
Enflurane	13838-16-9	CHFClCF2OCHF2	150	-	-	-	
Epichlorohydrin	106-89-8	C3H5OCl	-	1	-	-	CARC, SKIN
1,2-Epoxy-4-epoxyethyl-cyclo-hexane	106-87-6	C8H12O2	See 4-Vinyl cyclohexene dioxide				
2,3-Epoxypropyl isopropyl ether	4016-14-2	C6H12O2	See Isopropyl glycidyl ether [IGE]				
Ethanethiol	75-08-1	CH3CH2SH	See Ethyl mercaptan				
Ethanol [Ethyl alcohol]	64-17-5	CH3CH2OH	-	-	2000	-	
Ethanolamine	141-43-5	NH2CH2CH2OH	6	-	24	-	
Ethyl acetate	141-78-6	CH3COOC2H5	800	-	-	-	
Ethyl acrylate	140-88-5	CH2=CHCOOC2H5	10	-	30	-	CARC
Ethylamine	75-04-7	CH3CH2NH2	10	-	30	-	SKIN
Ethyl amyl ketone	541-85-5	C8H16O	20	-	-	-	
Ethyl benzene	100-41-4	CH3CH2C6H5	40	-	-	-	CARC, SKIN
Ethyl bromide	74-96-4	CH3CH2Br	See Bromoethane				
Ethyl butyl ketone	106-35-4	CH3CH2CO(CH2)3CH3	100	-	150	-	SKIN
Ethyl chloride	75-00-3	CH3CH2Cl	200	-	-	-	SKIN
Ethylene chlorohydrin	107-07-3	CH2ClCH2OH	-	-	2	-	SKIN
Ethylene diamine	107-15-3	NH2CH2CH2NH2	20	-	-	-	
Ethylene dibromide	106-93-4	BrCH2CH2Br	See 1,2-Dibromoethane				

Ethylene dichloride	107-06-2	ClCH2CH2Cl	See 1,2-Dichloroethane				
Ethylene glycol, total particulate	107-21-1		-	-	-	200	SKIN
Ethylene glycol dinitrate [EGDN]	628-96-6	O2NOCH2CH2ONO2	0.1	-	-	-	SKIN
Ethylene glycol methyl ether	109-86-4	CH3OCH2CH2OH	0.2	-	-	-	
Ethylene glycol monomethyl ether acetate [EGMEA]	110-49-6	CH3COOCH2CH2OCH3	0.2	-	-	-	SKIN
Ethyleneimine	151-56-4	CH2NHCH2	0.1	-	0.2	-	CARC, SKIN
Ethyl ether [Diethyl ether]	60-29-7	C2H5OC2H5	800	-	1000	-	
Ethyl formate	109-94-4	CH3CH2OCHO	-	-	200	-	
Ethylidene dichloride	75-34-3	CH3CHCl2	-	-	-	-	
Ethyl mercaptan	75-08-1	CH3CH2SH	1	-	-	-	
4-Ethylmorpholine [N-Ethylmorpholine]	100-74-3	C4H8ONCH2CH3	10	-	-	-	SKIN
Ethyl silicate	78-10-4	Si(OC2H5)4	20	-	-	-	
F							
Fenchlorphos	299-84-3	(CH3O)2PSOC6H2Cl3	-	10	-	-	
Ferbam	14484-64-1	[(CH3)2NCSS]3Fe	-	10	-	-	
Ferrocene	102-54-5	(C5H5)2Fe	See Dicyclopentadienyl iron				
Fluorides [inorganic as F]	16984-48-8	F	-	5	-	-	
Fluorine	7782-41-4	F2	2	-	4	-	
Formamide	75-12-7	HCONH2	20	-	-	-	SKIN
Formic acid	64-18-6	HCOOH	10	-	20	-	
Furfural [2-Furaldehyde]	35796	C5H4O2	4	-	-	-	SKIN

Furfuryl alcohol	98-00-0	OCH=CHCH=CCH 2OH	20	-	30	-	SKIN
G							
Germanium tetrahydride [Germane]	7782-65-2	GeH4	0.4	-	-	-	
Glutaraldehyde	111-30-8	OCH(CH2)3CHO	-	-	0.1	-	DSEN, RSEN
Graphite, natural & synthetic, respirable particulate	7782-42-5	C	-	4	-	-	
Guthion	86-50-0	C10H12O3PS2N3	-	-	-	-	
H							
Hafnium	7440-58-6	Hf	-	1	-	-	
Halothane	151-67-7	CF3CHClBr	100	-	-	-	
Heptachlor and Heptachlor epoxide	76-44-8 1024-57-3	C10H5Cl7	-	0.1	-	-	CARC, SKIN
Heptane, all isomers	142-82-5 142-82-5 590-35-2 565-59-3 108-08-7 591-76-4 589-34-4	CH3(CH2)5CH3 (for n-Heptane)	800	-	1000	-	
Heptan-3-one	106-35-4	CH3CH2CO(CH2) 3CH3	See Ethyl butyl ketone				
Hexachloroethane vapour	67-72-1		2	-	-	-	CARC, SKIN
Hexahydro-1,3,5-trinitro-1,3,5-triazine	121-82-4	C3H6N6O6	-	-	-	-	
Hexamethylene diisocyanate [HDI]	822-06-0	OCN(CH2)6NCO	0.01	-	-	-	
Hexane, all isomers except n-Hexane	75-83-2, 79-29-8, 96-14-0, 107-83-5	C6H14	1000	-	2000	-	
n-Hexane	110-54-3	CH3(CH2)4CH3	100	-	-	-	SKIN

2-Hexanone [Hexan-2-one]	591-78-6	CH3CO(CH2)3CH3	See Methyl-n-butyl ketone				
Hexone	108-10-1	CH3COCH2CH(CH3)2	See Methyl isobutyl ketone [MIBK]				
sec-Hexyl acetate	108-84-9	C8H16O2	See 1,3-Dimethylbutyl acetate				
Hexylene glycol	107-41-5	C6H14O2	-	-	50	-	
Hydrazine [Diamine]	302-01-2	H2NNH2	0.02	-	-	-	CARC, SKIN
Hydrogen bromide	10035-10-6	HBr	-	-	4	-	
Hydrogen chloride (gas & aerosol mists)	7647-01-0	HCl	-	-	4	-	
Hydrogen fluoride [as F]	7664-39-3	HF	1	-	4	-	CARC, SKIN
Hydrogen peroxide	7722-84-1	H2O2	2	-	-	-	
Hydrogen selenide [as Se]	7783-07-5	H2Se	0.1	-	-	-	
Hydrogen sulphide	7783-06-4	H2S	2	-	10	-	
Hydroquinone	123-31-9	C6H4(OH)2	-	2	-	-	DSEN
2-Hydroxypropyl acrylate [Propylene glycol monoacrylate]	999-61-1	C6H10O3	1	-	-	-	DSEN, SKIN
I							
Indene [Indonaphthene]	95-13-6	C9H8	10	-	-	-	
Indium & compounds [as In]	7440-74-6	In	-	0.2	-	-	CARC (Indium phosphide)
Iodine	7553-56-2	I2	0.02	-	0.2	-	
Iodoform	75-47-8	CHI3	1.2	-	-	-	
Iodomethane	74-88-4	CH3I	4	-	-	-	SKIN
Iron oxide fume [as Fe]	1309-37-1	Fe2O3	-	10	-	-	
Iron pentacarbonyl [as Fe]	13463-40-6	Fe(CO)5	0.2	-	0.4	-	
Iron salts [as Fe]	-	-	-	2	-	-	
Isoamyl alcohol	123-51-3	(CH3)2CHCH2CH2OH	200	-	250	-	
Isobutanol [Isobutyl alcohol]	78-83-1	(CH3)2CHCH2OH	100	-	-	-	

Isooctyl alcohol	26952-21-6	C8H17OH	100	-	-	-	SKIN
Isophorone	78-59-1	C9H14O	-	-	10	-	
Isophorone diisocyanate [IPDI]	4098-71-9	C12H18N2O2	0.01	-	-	-	
Isopropyl acetate	108-21-4	CH3COOCH(CH3)2	200	-	400	-	
Isopropyl benzene	98-82-8	C6H5CH(CH3)2	See Cumene				
Isopropyl ether	108-20-3	(CH3)2CHOCH(CH3)2	500	-	620	-	
Isopropyl glycidyl ether [IGE]	4016-14-2	C6H12O2	100	-	150	-	
J							
K							
Ketene	463-51-4	CH2=CO	1	-	3	-	
L							
Liquified petroleum gas [LPG]	68476-85-7	Mixture: C3H6; C3H8; C4H10; C4H8;	-	Asphyxiant	-	-	
Lithium hydride	7580-67-8	LiH	-	-	-	0.1	
M							
Magnesium oxide [as MgO], Total particulate	1309-48-4	MgO	-	10	-	-	
Malathion	121-75-5	C10H19O6PS2	-	2	-	-	CARC, SKIN
Maleic anhydride	108-31-6	C4H2O3	-	0.02	-	-	DSEN, RSEN
Manganese, elemental, and inorganic compounds [as Mn]	7439-96-5	Mn					
Total particulate	-	-	-	0.2	-	-	
Respirable particulate and fume	-	-	-	0.04	-	-	
Manganese cyclopentadienyl tricarbonyl [as Mn]	12079-65-1	C5H5Mn(CO)3	-	0.2	-	-	SKIN

Mercaptoacetic acid	68-11-1	HSCH2COOH	2	-	-	-	SKIN
Mercury and divalent inorganic mercury compounds including mercuric oxide and mercuric chloride [as Hg]	7439-97-6	Hg					
Alkyl compounds			-	0.02	-	0.06	CARC, SKIN
Aryl compounds			-	0.2	-	-	SKIN
Elemental and inorganic forms			-	0.05	-	-	SKIN
Mesityl oxide	141-79-7	(CH3)2C=CHCOCH3	30	-	50	-	
Methacrylic acid	79-41-4	CH2=C(CH3)COOH	40	-	-	-	
Methanol [Methyl alcohol]	67-56-1	CH3OH	400	-	500	-	SKIN
Methomyl	16752-77-5	C5H10N2O2S	-	0.4	-	-	SKIN
Methoxychlor	72-43-5	(C6H4OCH3)2CHCCl3	-	20	-	-	
1-Methoxypropan-2-ol	107-98-2	CH3CHOHCH2OCH3	See Propylene glycol monomethyl ether				
Methyl acetate	79-20-9	CH3COOCH3	400	-	500	-	
Methyl acrylate	96-33-3	CH2=CHCOOCH3	4	-	-	-	DSEN, SKIN
Methylacrylonitrile [Methacrylonitrile]	126-98-7	CH2=C(CH3)CN	2	-	-	-	SKIN
Methylal	109-87-5	CH2(OCH3)2	2000	-	-	-	
Methylamine	74-89-5	CH3NH2	10	-	30	-	
Methyl n-amyl ketone	110-43-0	CH3CO(CH2)4CH3	100	-	-	-	
N-Methylaniline	100-61-8	C6H5NHCH3	1	-	-	-	SKIN
Methyl bromide	74-83-9	CH3Br	2	-	-	-	SKIN
Methyl-n-butyl ketone	591-78-6	CH3CO(CH2)3CH3	10	-	20	-	SKIN
Methyl chloride	74-87-3	CH3Cl	100	-	200	-	SKIN

Methyl chloroform	71-55-6	CH3CCl3	See 1,1,1-Trichloroethane				
Methyl 2-cyanoacrylate	137-05-3	CH2=C(CN)COOCH3	0.4	-	-	-	
Methyl ethyl ketone [MEK]	78-93-3	CH2COC2H5	400	-	600	-	SKIN
Methylcyclohexane	108-87-2	CH3C6H11	800	-	-	-	
Methylcyclohexanol	25639-42-3	CH3C6H10OH	100	-	-	-	
2-Methylcyclohexanone	583-60-8	CH3CHCO(CH2)3CH2	100	-	150	-	SKIN
Methylene bis(4-cyclohexylisocyanate)	5124-30-1	CH2[(C6H10)NCO]2	0.01	-	-	-	
Methylcyclopentadienyl manganese tricarbonyl [as Mn]	12108-13-3	CH3C5H4Mn(CO)3	-	0.4	-	-	SKIN
4,4'-Methylenebis(2-chloroaniline) [MbOCA]	101-14-4	CH2(C6H4ClNH2)2	See 2,2'-Dichloro-4,4'-methylene dianiline [MbOCA]				
Methylene chloride	75-09-2		See Dichloromethane				
4,4'-Methylenedianiline [MDA]	101-77-9	CH2(C6H4NH2)2	0.2	-	-	-	
4,4'-Methylene-diphenyl diisocyanate [MDI]	101-68-8	CH2(C6H4NCO)2	0.01	-	-	-	
Methyl formate	107-31-3	HCOOCH3	100	-	200	-	SKIN
Methyl hydrazine	60-34-4	CH3NHNH2	0.02	-	-	-	SKIN
Methyl iodide	74-88-4	CH3I	See Iodomethane				
Methyl isoamyl ketone	110-12-3	C7H14O	40	-	100	-	SKIN
Methyl isobutyl carbinol [4-Methylpentan-2-ol]	108-11-2	C6H14O	50	-	80	-	SKIN
Methyl isobutyl ketone [MIBK]	108-10-1	CH3COCH2CH(CH3)2	40	-	150	-	CARC, SKIN
Methyl isocyanate [MIC]	624-83-9	CH3NCO	0.04	-	0.12	-	DSEN, RSEN, SKIN
Methyl mercaptan	74-93-1	CH3SH	1	-	-	-	

Methyl methacrylate	80-62-6	CH2=C(CH3)COOCH3	100	-	200	-	DSEN
Methyl parathion	298-00-0	C8H10NO5PS	-	0.04	-	-	SKIN
Methyl propyl ketone	107-87-9	CH3(CH2)2COCH3	-	-	300	-	
Methyl silicate	681-84-5	(CH3O)4Si	2	-	-	-	
alpha-Methyl styrene	98-83-9	C6H5C(CH3)=CH2	20	-	-	-	CARC
Mevinphos	7786-34-7	C7H13PO6	See Phosdrin				
Mica	12001-26-2		-	6	-	-	
Molybdenum compounds [as Mo]'	7439-98-7	Mo					
Soluble compounds, respirable particulate	-	-	-	1	-	-	
Metal and insoluble compounds, total particulate	-	-	-	10	-	-	
Metal and insoluble compounds, respirable particulate	-	-	-	5	-	-	
Monochloroacetic acid	79-11-8	ClCH2CO2H	1	-	-	-	SKIN
Morpholine	110-91-8	C4H9NO	40	-	-	-	SKIN
N							
Naled	300-76-5	C4H7Br2Cl2O4P	-	0.2	-	-	DSEN, SKIN
Naphthalene	91-20-3	C10H8	20	-	-	-	CARC, SKIN
Nickel and its inorganic compounds [as Ni]	7440-02-0						
Elemental			-	3	-	-	CARC, SKIN
Nickel carbonyl [as Ni]	13463-39-3	Ni(CO)4	-	-	0.1	-	CARC
Nickel, subsulphide [as Ni]	12035-72-2	Ni3S2	-	0.2	-	-	CARC
Nicotine	54-11-5	C10H14N2	-	1	-	-	SKIN
Nitrapyrin	1929-82-4	ClC5H3NCCl3	-	20	-	40	
Nitric acid	7697-37-2	HNO3	4	-	8	-	CARC

Nitric oxide	10102-43-9	NO	See Nitrogen monoxide				
4-Nitroaniline [p-Nitroaniline]	100-01-6	NO2C6H4NH2	-	6	-	-	SKIN
Nitrobenzene	98-95-3	C6H5NO2	2	-	-	-	CARC, SKIN
p-Nitrochlorobenzene	100-00-5	ClC6H4NO2	0.2	-	-	-	
Nitroethane	79-24-3	C2H5NO2	200	-	-	-	
Nitrogen monoxide	10102-43-9	NO	50	-	-	-	
Nitrogen dioxide	10102-44-0	NO2	0.4	-	-	-	
Nitrogen trifluoride	7783-54-2	NF3	20	-	-	-	
Nitroglycerine [NG]	55-63-0	CH2NO3CHNO3CH2NO3	0.1	-	-	-	SKIN
Nitromethane	75-52-5	CH3NO2	40	-	-	-	CARC
1-Nitropropane	108-03-2	C3H7NO2	50	-	-	-	
2-Nitropropane	79-46-9	(CH3)2CH(NO2)	20	-	-	-	CARC
Nitrotoluene, all isomers	88-72-2; 99-08-1; 99-99-0	CH3C6H4NO2	4	-	-	-	SKIN
Nitrous oxide	10024-97-2	N2O	100	-	-	-	
O							
Octachloronaphthalene	2234-13-1	C10Cl8	-	0.2	-	0.6	SKIN
Osmium tetroxide [as Os]	20816-12-0	OsO4	0.0004	-	0.0012	-	
Oxalic acid	144-62-7	COOHCOOH.2H2O	-	2	-	4	
Ozone	10028-15-6	O3					
Heavy work			0.1	-	-	-	
Moderate work			0.16	-	-	-	
Light work			0.2	-	-	-	
Heavy, moderate or light workloads (<2hrs)			0.4	-	-	-	
P							
Paraffin wax fume	8002-74-2	-	-	4	-	-	
Parathion	56-38-2	(C2H5O)2PSOC6H4NO2	-	0.1	-	-	CARC, SKIN

Particles not otherwise classified [PNOC]	-	-					
Total particulate	-	-	-	10	-	-	
Respirable particulate	-	-	-	5	-	-	
Pentachlorophenol	87-86-5	C6Cl5OH	-	1	-	2	CARC, SKIN
Pentaerythritol	115-77-5		-	20	-	-	
Pentane, all isomers	78-78-4; 109-66-0; 463-82-1	C5H12	2000	-	-	-	
Pentyl acetate, all isomers	628-63-7; 626-38-0; 123-92-2; 625-16-1; 624-41-9; 620-11-1	CH3COO(CH2)4CH3	100	-	200	-	
Perchloryl fluoride	7616-94-6	ClFO3	6	-	12	-	
Persulphates, as persulfate		SO5 /S2O8	-	0.2	-	-	
Phenacyl chloride	532-27-4	C6H5COCH2Cl	-	-	-	-	
Phenol	108-95-2	C6H5OH	10	-	-	-	SKIN
p-Phenylenediamine	106-50-3	C6H4(NH2)2	-	0.2	-	-	SKIN
Phenyl ether vapour	101-84-8	C6H5OC6H5	2	-	4	-	
Phenyl glycidyl ether [PGE]	122-60-1	C6H5OCH2CHOCH2	0.2	-	-	-	CARC, DSEN, SKIN
Phenylhydrazine	100-63-0	C6H5NHNH2	0.2	-	-	-	SKIN
Phenyl mercaptan	108-98-5	C6H5SH	0.2	-	-	-	SKIN
2-Phenylpropene	98-83-9	C6H5C(CH3)=CH2	See alpha-Methyl styrene				
Phorate	298-02-2	C7H17O2PS3	-	0.1	-	-	SKIN
Phosdrin	7786-34-7	C7H13PO6	-	0.02	-	-	SKIN
Phosgene	75-44-5	COCl2	0.2	-	-	-	
Phosphine	7803-51-2	PH3	0.6	-	2	-	
Phosphoric acid	7664-38-2	H3PO4	-	2	-	6	
Phosphorus oxychloride	10025-87-3	POCl3	0.2	-	-	-	
Phosphorus pentachloride	10026-13-8	PCl5	0.2	-	-	-	
Phosphorus pentasulphide	1314-80-3	P2S5/ P4S10	-	2	-	6	

Phosphorus trichloride	7719-12-2	PCl3	0.4	-	1	-	
Phthalic anhydride	85-44-9	C6H4(CO)2O	2	-	-	-	DSEN, RSEN
Picloram	1918-02-1	C6H3Cl3N2O2	-	20	-	-	
Picric acid	88-89-1	(NO2)3C6H2OH	-	0.2	-	-	
Piperazine and salts [as Piperazine]	110-85-0	C4H10N2	0.06	-	-	-	DSEN, RSEN
Platinum							
Metal	7440-06-4	Pt	-	2	-	-	
Soluble salts [as Pt]	-	-	-	0.004	-	-	DSEN, RSEN
Polyvinyl chloride [PVC], respirable particulate	-	-	-	2	-	-	
Potassium hydroxide	1310-58-3	KOH	-	-	-	4	
n-Propanol [n-Propyl alcohol]	71-23-8	CH3CH2CH2OH	200	-	-	-	SKIN
2-Propanol [Propan-2-ol]	67-63-0	(CH3)2CHOH	400	-	800	-	
Propargyl alcohol [2-Propyn-1-ol]	107-19-7	HC≡CCH2OH	2	-	-	-	SKIN
Propionic acid	79-09-4	CH3CH2COOH	20	-	-	-	
Propoxur	114-26-1	C11H15NO3	-	1	-	-	
n-Propyl acetate	109-60-4	CH3COOC3H7	400	-	-	-	
Propylene glycol dinitrate [PGDN]	6423-43-4	CH3CHONO2CH2ONO2	0.1	-	-	-	SKIN
Propylene glycol monomethyl ether	107-98-2	CH3CHOHCH2OCH3	100	-	200	-	SKIN
Pyrethrum	8003-34-7	-	-	10	-	-	
Pyridine	110-86-1	C5H5N	2	-	-	-	
Pyrocatechol	120-80-9	C6H4(OH)2	-	-	-	-	
Q							
Quinone	106-51-4	C6H4O2	See p-Benzoquinone				

Quintozene	82-68-8	C6Cl5NO2	See Pentachloronitrobenzene				
R							
Resorcinol	108-46-3	C6H4(OH)2	20	-	40	-	SKIN
Rhodium							
Metal and insoluble compounds [as Rh]	7440-16-6	Rh	-	2	-	-	
Soluble compounds [as Rh]			-	0.02	-	-	DSEN
Rosin core solder thermal decomposition products [colophony]	8050-09-07	-	Exposure by all routes should be carefully controlled to ALARP				
S							
Selenium & compounds, except hydrogen selenide [as Se]	7782-49-2	Se	-	0.4	-	-	
Silicon carbide	409-21-2	SiC					
Total particulate (nonfibrous)	-	-	-	10	-	-	CARC
Respirable particulate (nonfibrous)	-	-	-	5	-	-	CARC
Fibrous (including whiskers)			-	0.1 f/cc	-	-	CARC
Silicon tetrahydride [Silane]	7803-62-5	SiH4	10	-	-	-	
Silver							
Metal	7440-22-4	Ag	-	0.2	-	-	
Soluble compounds [as Ag]	-	-	-	0.02	-	-	
Sodium azide	26628-22-8	NaN3	-	-	-	0.6	SKIN

Sodium 2,4-dichlorophenoxy ethyl sulphate [2,4-DES], [Sesone]	136-78-7	C8H7Cl2NaO5S	-	20	-	-	CARC
Sodium fluoroacetate	62-74-8	CH2FCOONa	-	0.1	-	-	SKIN
Sodium hydrogen sulphite [Sodium bisulphite]	7631-90-5	NaHSO3	-	10	-	-	
Sodium hydroxide	1310-73-2	NaOH	-	-	-	4	
Sodium metabisulphate	7681-57-4	Na2S2O5	-	10	-	-	
Starch, total particulate	9005-25-8	-	-	10	-	-	
Stibine [Antimony hydride]	7803-52-3	SbH3	0.2	-	-	-	
Strychnine	57-24-9	C21H22N2O2	-	0.3	-	-	
Subtilisins (Proteolytic enzymes as 100% pure crystalline enzyme)	1395-21-7 9014-01-1	-	-	-	-	0.00012	RSEN
Sucrose	57-50-1	C12H22O11	-	20	-	-	
Sulfotep	3689-24-5	[(CH3CH2O)2PS]2O	-	0.2	-	-	SKIN
Sulphur dioxide	7446-09-5	SO2	-	-	0.5	-	
Sulphur hexafluoride	2551-62-4	SF6	2000	-	-	-	
Sulphuric acid (mist)	7664-93-9	H2SO4	-	0.4	-	-	CARC
Sulphur monochloride	10025-67-9	S2Cl2	-	-	2	-	
Sulphur pentafluoride	5714-22-7	S2F10	-	-	0.02	-	
Sulphur tetrafluoride	7783-60-0	SF4	-	-	0.2	-	
Sulphuryl fluoride[Sulphuryl difluoride]	2699-79-8	SO2F2	10	-	20	-	
Synthetic vitrous fibres [SVF]:	-	-					
Continuous filament glass fibres	-	-	-	2 f/mL	-	-	
Continuous filament glass fibres			-	5	-	-	

Glass wool fibres	-	-	-	2 f/mL	-	-	
Rock wool fibres	-	-	-	2 f/mL	-	-	
Slag wool fibres	-	-	-	2 f/mL	-	-	
Special purpose glass fibres			-	2 f/mL	-	-	
Refractory ceramic fibres	-	-	-	0.4 f/mL	-	-	CARC
T							
Talc (containing no asbestos fibers), respirable particulate	14807-96-6	Mg3Si4O10(OH)1	-	4	-	-	
Tellurium & compounds, except hydrogen telluride [as Te]	13494-80-9	Te	-	0.2	-	-	
Terphenyls, all isomers	26140-60-3	C18H14	-	-	-	10	
1,1,2,2-Tetrabromoethane	79-27-6	CHBr2CHBr2	0.2	-	-	-	SKIN
Tetracarbonyl nickel [as Ni]	13463-39-3	Ni(CO)4	See Nickel carbonyl				
1,1,2,2-Tetrachloro-1,2-difluoroethane	76-12-0	CCl2FCCl2F	100	-	-	-	
1,1,1,2-Tetrachloro-2,2-difluoroethane	76-11-9	CCl3CClF2	200	-	-	-	
Tetrachloroethylene	127-18-4	Cl2C=CCl2	50	-	200	-	
Tetrachloronaphthalene	1335-88-2	C10H4Cl4	-	4	-	-	
Tetraethyl orthosilicate	78-10-4	Si(OC2H5)4	See Ethyl silicate				
Tetraethyl pyrophosphate [TEPP]	107-49-3	[(CH3CH2O)2PO]2O	-	0.02	-	-	SKIN
Tetrahydrofuran	109-99-9	C4H8O	100	-	-	-	SKIN
Tetramethyl succinonitrile	3333-52-6	C8H12N2	1	-	-	-	SKIN
Tetryl	479-45-8	(NO2)3C6H2N(NO2)CH3	-	3	-	-	
Thallium, soluble compounds [as Tl]	-	Tl	-	0.04	-	-	SKIN

4,4'-Thiobis(6-tert-butyl-m-cresol)	96-69-5	C22H30O2S	-	2	-	-	
Thioglycolic acid	68-11-1	HSCH2COOH	See Mercaptoacetic acid				
Thionyl chloride	7719-09-7	SOCl2	-	-	0.4	-	
Thiram	137-26-8	(CH3)2NCS2CS2N(CH3)2	-	0.1	-	-	DSEN

Tin compounds:		-					
Tin metal	744-31-5	-	-	4	-	-	
Tin oxide and Inorganic except SnH_4 [as Sn]		-	-	4	-	-	SKIN
Organic except Cyhexatin [as Sn]	-	-	-	0.2	-	-	SKIN
Titanium dioxide, total particulate	13463-67-7	-	-	-	20	-	CARC
Toluene	108-88-3	C6H5CH3	40	-	-	-	SKIN
2,4-Toluene diisocyanate [TDI]	584-84-9	CH3C6H3(NCO)2	0.002	-	0.01	-	
o-Toluidine	95-53-4	CH3C6H4NH2	4	-	-	-	CARC, SKIN
m-Toluidine	108-44-1	CH3C6H4NH2	4	-	-	-	SKIN
p-Toluidine	106-49-0	CH3C6H4NH2	4	-	-	-	SKIN
Tribromomethane	75-25-2	CHBr3	See Bromoform				
Tributyl phosphate, all isomers	126-73-8	(C4H9)3PO4	-	10	-	-	
Trichloroacetic acid	76-03-9	CCl3COOH	1	-	-	-	CARC
1,2,4-Trichlorobenzene	120-82-1	C6H3Cl3	-	-	10	-	SKIN

1,1,2-Trichloroethane	79-00-5	CHCl2CH2Cl	20	-	-	-	SKIN
Trichlorofluoromethane	75-69-4	CCl3F	-	-	2000	-	
Trichloronitromethane	76-06-2	CCl3NO2	See Chloropicrin				
2,4,5-Trichlorophenoxyacetic acid [2,4,5-T]	93-76-5	Cl3C6H2OCH2COOH	-	20	-	-	CARC
1,2,3-Trichloropropane	96-18-4	CH2ClCHClCH2Cl	20	-	-	-	CARC
1,1,2-Trichlorotrifluoroethane [1,1,2-Trichloro-1,2,2-trifluoroethane]	76-13-1	CCl2FCClF2	2000	-	2500	-	
Tri-o-cresyl phosphate [Tri-o-tolyl phosphate]	78-30-8	(CH3C6H4O)3P=O	-	0.04	-	-	
Tricyclohexyltin hydroxide	13121-70-5	(C6H11)3SnOH	See Cyhexatin				
Triethanolamine	102-71-6	(CH2OHCH2)3N	-	10	-	-	
Triethylamine	121-44-8	(C2H5)3N	1	-	2	-	SKIN
Trifluorobromomethane	75-63-8	CF3Br	2000	-	-	-	
Trimellitic anhydride	552-30-7	C9H4O5	See Benzene-1,2,4,-tricarboxylic acid 1,2-anhydride				
Trimethylamine	75-50-3	(CH3)3N	10	-	30	-	
Trimethylbenzene, all isomers or mixtures	25551-13-7	C6H3(CH3)3	50	-	-	-	
Trimethyl phosphite	121-45-9	(CH3O)3P	4	-	-	-	
2,4,6-Trinitrotoluene [TNT]	118-96-7	CH3C6H2(NO2)3	-	0.2	-	-	SKIN
Triphenyl phosphate	115-86-6	(C6H5O)3PO4	-	6	-	-	SKIN
Tungsten	7440-33-7						
Soluble compounds [as W]			-	2	-	6	
Metal & Insoluble [as W]			-	10	-	20	
Turpentine	8006-64-2	C10H16 (approx)	40	-	-	-	
U							

Uranium (natural). Soluble & insoluble compounds [as U]	7440-61-1	-	-	0.4	-	1.2	
V							
Vanadium pentoxide, total particulate	1314-62-1	V2O5	0.1	-	-	-	CARC
Vinyl acetate	108-05-4	CH2=CHOOCCH3	20	-	30	-	CARC
Vinyl benzene	100-42-5	C6H5CH=CH2	See Styrene, monomer				
Vinyl bromide	593-60-2	CH2=CHBr	1	-	-	-	CARC
4-Vinyl cyclohexene	100-40-3	C8H12	0.2	-	-	-	CARC
4-Vinyl cyclohexene dioxide	106-87-6	C8H12O2	0.2	-	-	-	CARC, SKIN
Vinyl toluene	25013-15-4	CH2=CHC6H4CH3	100	-	200	-	
W							
Warfarin	81-81-2	C19H16O4	-	0.02	-	-	SKIN
Wood dust, all species, excluding oak, beech, birch, mahogany, teak and walnut	-		-	5	-	-	CARC, RSEN
X							
Xylene, o-, m-, p- or mixed isomers	1330-20-7	C6H4(CH3)2	200	-	300	-	SKIN
Xylidine, all isomers	1300-73-8	(CH3)2C6H3NH2	1	-	-	-	CARC, SKIN
Y							
Yttrium & compounds [as Y]	7440-65-5	Y	-	2	-	-	
Z							
Zinc chloride, fume	7646-85-7	ZnCl2	-	2	-	4	
Zinc oxide, fume	1314-13-2	ZnO	-	4	-	20	
Zirconium compounds [as Zr]	7440-67-7	Zr	-	10	-	20	

Abbreviations:

OEL-ML: Occupational Exposure Limit – Maximum Limit

OEL-RL: Occupational Exposure Limit – Restricted Limit

ppm: Parts per million

mg/m^3 Milligrams per cubic meter

Carc: Denotes carcinogenicity, which is based on IARC categorisation including category 1A, 1B and Category 2;

RSEN: Respiratory sensitisation, potential to produce respiratory sensitisation

DSEN: Dermal sensitisation, potential to produce dermal sensitisation

RSEN and DSEN do not imply that he sensitisation is the critical effect on which the OEL is based, nor do they imply that this effect is the sole basis for the agents OEL;

Skin: Danger of cutaneous absorption. Refers to the potential significant contribution to the overall exposure by the cutaneous route including mucous membranes and the eyes by contact with vapours, liquids and solids. Overexposure may also occur following dermal contact with liquids and aerosols, even when airborne exposures at or below the OEL.

Table 4. Biological Exposure Indices (BEI) for hazardous chemical agents

AGENT/ DETERMINANT	CAS NUMBER	SAMPLE MATRIX	SAMPLING TIME	VALUE	UNIT	NOTATION
A						
Acetone	**67-64-1**					
Acetone		urine	End of shift	25	mg/L	Ns
Acetylcholinesterase inhibitors						
Cholinesterase activity in red cells		blood	Discretionary	70	% of baseline	Ns
Aniline	**62-53-3**					
p-Aminophenol		urine	End of shift	50	mg/L	B, Ns, Sq
Arsenic, Elemental and soluble inorganic compounds (excluding gallium arsenide and arsine)	**7440-38-2**					
Inorganic arsenic plus methylated metabolies		urine	End of workweek	35	µg/L	B
B						
Benzene	**71-43-2**					
S-Phenylmercapturic acid (sPMA)		urine	End of shift	25	µg/g creatinine	B
t,t-Muconic acid (ttMA)		urine	End of shift	500	µg/g creatinine	B
1,3-Butadiene	**106-99-0**					
1,2-Dihydroxy-4-(N-acetylcysteinyl)-butane		urine	End of shift	2.5	mg/L	B, Sq
Mixture of N-1-and N-2-(hydroxybutenyl)valine haemoglobin adducts		blood	Not critical	2.5	pmol/g Hb	Sq

2-Butoxyethanol	**111-76-2**					
Butoxyacetic acid (BAA)		urine	End of shift	200	mg/g creatinine	-
C						
Cadmium and inorganic compounds	**7440-43-9**					
Cadmium		urine	Not critical	5	µg/g creatinine	B
Cadmium		blood	Not critical	5	µg/L	B
Carbon disulphide	**75-15-0**					
2-thiothiazolidine-4-carboxlyic acid (TTCA)		urine	End of shift	0.5	mg/g creatinine	B, Ns
Carbon monoxide	**630-08-0**					
Carboxyhaemoglobin		blood	End of shift	3.5	% haemoglobin	B, Ns
Carbon monoxide		end exhaled	End of shift	20	ppm	B, Ns
Chlorobenzene	**108-90-7**					
4-Chlorocatechol		urine	End of shift at end of workweek	100	mg/g creatinine	Ns
p-Chlorophenol		urine	End of shift at end of workweek	20	mg/g creatinine	Ns
ChromiumVI (Water soluble fume)	**7440-47-3**					
Total chromium		urine	End of shift at end of workweek	25	µg/L	-
Total chromium		urine	Increase during shift	10	µg/L	-
Cobalt & inorganic compounds, including cobalt oxides but not combined with Tungsten carbide	**7440-48-4**					
Cobalt		urine	End of shift at end of workweek	15	µg/L	Ns
Cyclohexanone	**108-94-1**					
1,2-Cyclohexanediol		urine	End of shift at end of workweek	80	mg/L	Ns, Sq
Cyclohexanol		urine	End of shift	8	mg/L	Ns, Sq
D						

Dichloromethane	**75-09-2**					
Dichloromethane		urine	End of shift	0.3	mg/L	Sq
N,N-Dimethylacetamide	**127-19-5**					
N-Methylacetamide		urine	End of shift at end of workweek	30	mg/g creatinine	-
N,N-Dimethylformamide (DMF)	**68-12-2**					
N-methylformamide		urine	End of shift	15	mg/L	-
N-Acetyl-S-(N-methylcarbamoyl) cysteine		urine	Prior to last shift of workweek	40	mg/L	Sq
E						
2-Ethoxyethanol (EGEE) and 2-Ethyxyethyl acetate (EGEEA)	**110-80-5; 111-15-9**					
2-Ethoxyacetic acid		urine	End of shift at end of workweek	100	mg/g creatinine	-
Ethyl benzene	**100-41-4**					
Sum of mandelic acid and phenlglyoxylic acid		urine	End of shift	0.15	g/g creatinine	Ns
F						
Fluorides	**16984-48-8**					
Fluoride		urine	Prior to shift	2	mg/L	B, Ns
Fluoride		urine	End of shift	3	mg/L	B, Ns
Furfural	**98-01-1**					
Furoic acid		urine	End of shift	200	mg/L	Ns
G						
H						
1,6-Hexamethylene diisocyanate	**822-06-0**					
1,6-Hexamethylene diamine		urine	End of shift	15	µg/g creatinine	Ns
n-Hexane	**110-54-3**					
2,5-Hexanedione		urine	End of shift at end of workweek	0.4	mg/L	-

I						
J						
K						
L						
Lead	**7439-92-1**					
Lead		blood	Not critical	See Lead Regulations		
M						
Mercury (Elemental)	**7439-97-6**					
Mercury		urine	Prior to shift	20	µg/g creatinine	-
Methanol	**67-56-1**					
Methanol		urine	End of shift	15	mg/L	B, Ns
Methaemoglobin inducers						
Methaemoglobin		blood	During or end of shift at end of shift	1.5	% haemoglobin	B, Ns, Sq
2-Methoxyethanol and 2-Methoxyethylacetate	**109-86-4; 110-49-6**					
2-Methoxyacetic acid		urine	End of shift at end of workweek	1	mg/g creatinine	-
Methyl n-butyl ketone	**591-78-6**					
2,5-Hexanedione		urine	End of shift at end of workweek	0.4	mg/L	-
Methyl Chloroform	**71-55-6**					
Methyl Chloroform		end exhaled	Prior to last shift of workweek	40	ppm	
Trichloroacetic acid		urine	End of workweek	10	mg/L	Ns, Sq
Total trichloroethanol		urine	End of shift at end of workweek	30	mg/L	Ns, Sq
Total trichloroethanol		blood	End of shift at end of workweek	1	mg/L	Ns
Methyl Ethylketone (MEK)	**78-93-3**					
Methyl ethylketone (MEK)		urine	End of shift	2	mg/L	Ns

Methyl Isobutyl Ketone (MIBK)	**108-10-1**					
Methyl Isobutyl Ketone (MIBK)		urine	End of shift	1	mg/L	-
N						
Nitrobenzene	**98-95-3**					
Methaemoglobin		blood	See Methemoglobin inducers BEI			
O						
P						
Parathion	**56-38-2**					
Total p-nitrophenol		urine	End of shift	0.5	mg/g creatinine	Ns
Cholinesterase activity in red blood cells		blood	Discretionary	70	% of baseline	B, Ns, Sq
Phenol	**108-95-2**					
Phenol		urine	End of shift	250	mg/g creatinine	B, Ns
2-Propanol	**67-63-0**					
Acetone		urine	End of shift at end of workweek	40	mg/L	B, Ns
Q						
R						
S						
Styrene	**100-42-5**					
Mandelic acid + phenylglyoxylic acid		urine	End of shift	400	mg/g creatinine	Ns
Styrene		urine	End of shift	40	µg/L	-
T						
Tetrachloroethylene (Perchloroethylene)	**127-18-4**					
Tetrachloroethylene		end exhaled	Prior to shift	3	ppm	-
Tetrachloroethylene		blood	Prior to shift	0.5	mg/L	-
Tetrahydrofuran	**109-99-9**					

Tetrahydrofuran		urine	End of shift	2	mg/L	-
Toluene	**108-88-3**					
Toluene		blood	Prior to last shift of workweek	0.02	mg/L	-
Toluene		urine	End of shift	0.03	mg/L	-
o-Cresol		urine	End of shift	0.3	mg/g creatinine	B
Toluene diisocyanate-2,4, or as a mixture of isomers	**584-84-9**					
Toluene diamine		urine	End of shift	5	µg/g creatinine	Ns
Trichloroethylene	**79-01-6**					
Trichloroacetic acid		urine	End of shift at end of workweek	15	mg/L	Ns
Trichloroethanol		blood	End of shift at end of workweek	0.5	mg/L	Ns
U						
Uranium	**7440-61-1**					
Uranium		urine	End of shift	200	µg/L	-
V						
W						
X						
Xylenes	**95-47-6: 106-42-3; 108-38-3; 1330-20-7**					
Methylhippuric acids		urine	End of shift	1.5	g/g creatinine	-
Y						
Z						

Notations:

B - Background

The determinant may be present in biological specimens collected from subjects who have not been occupationally exposed, at a concentration which could affect interpretation of the results. Such background concentrations are incorporated in the BEI value.

Nq – Non-quantitative
Biological monitoring should be considered for this compound based on the review; however, a specific BEI could not be determined due to insufficient data.

Ns – Non-specific
The determinant is nonspecific, since it is also observed after exposure to other chemicals.

Sq – Semi-quantitative
The biological determinant is an indicator of exposure to the chemical, but the quantitative interpretation of the measurement is ambiguous. These determinants should be used as a screening test if a quantitative test is not practical, or as a confirmatory test if the quantitative test is not specific and the origin of the determinant is in question.

ANNEXURE 3

HAZARDOUS CHEMICAL AGENT GUIDELINES

Prevention and control of exposure

(1) Exposure of employees to agents hazardous to health should be prevented or, where this is not reasonably practicable, adequately controlled. This is a fundamental requirement of the Regulations for Hazardous Chemical Agents (HCA), 1995. Exposure can occur by inhalation, ingestion or absorption through the skin, but inhalation is usually the main route of entry into the body. Tables 1 and 2 of Annexure 1 list the occupational exposure limits, which should be used in determining the adequacy of control of exposure by inhalation, as required by the HCA Regulations.

(2) The advice in this document should be taken in the context of the requirements of the HCA Regulations, especially regulation 5 (Assessment of potential exposure) regulation 10 (Control of exposure), regulation 12 (Maintenance of control measures) and regulation 6 (Air monitoring). Agents hazardous to health are defined in regulation 1. There is separate legislation for lead and asbestos and these agents are not covered in detail in this document. This document also does not apply to exposure below ground in mines or exposure to micro-organisms.

(3) Adequate control of exposure (when prevention is not reasonably practicable) should be achieved by one or more of a range of control measures described in regulation 10 of the HCA Regulations. Control by personal protective equipment should be applied only when other means are not reasonably practicable.

Medical surveillance

Guidance on Medical surveillance and biological monitoring

Important concepts

(4) Notwithstanding the definition in the OH&SA, medical surveillance herein refers to the overall monitoring of employees to identify changes in their health status because of exposure to certain chemical agents. These monitoring activities are not limited to just “medical testing”; they also importantly include the monitoring and analysis of the individual and group outcome data, including historical data, derived from the medical testing.

(5) Medical testing, therefore, is that aspect of medical surveillance that involves the use of interviews, questionnaires and standard clinical assessments to detect the presence of adverse health effects. This can also include tests like spirometry (lung function), radiography (e.g. chest X-rays) and laboratory tests (e.g. full blood counts).

(6) Medical surveillance ideally aims to detect symptoms or a disease at an early subclinical or pre-symptomatic stage to enable interventions that may reverse these effects or to slow their progression. However, medical surveillance is also directed at established occupational disease when the adverse effects have progressed to clinical impairment.

(7) Medical surveillance and biological monitoring

Biological monitoring is discussed in detail in section 4.5 below. It is often incorrectly categorised as a type of medical surveillance. Biological monitoring provides an additional means to assess the exposure to an HCA, by measuring metabolites of the HCA, or other similar markers of exposure. Therefore, it does not represent an adverse effect or an occupational disease; it only reflects exposure. A positive finding during biological monitoring does not necessarily mean that there has been a breach of the safety standard, but is a positive indication of employee-exposure.

(8) The distinction between early biological effects and established disease is not always clear; there tends to be a severity gradient in which one blends into the other. An occupational disease may be said to be present when the adverse biological effect progresses to clinically detectable organ damage requiring treatment, or permanent impaired function. The categorisation of the condition is therefore sometimes at the discretion of the responsible medical practitioner. The distinction becomes important when considering a case for statutory reporting. As described below, reporting of cases of established occupational disease is legally prescribed.

(9) The presence of chemical agents in the workplace does not automatically infer the need for medical surveillance; certain criteria must be met for medical surveillance to be warranted. This principle is addressed in subregulation 7(1)(b) and is further elaborated below.

(10) Work-related adverse health findings identified by medical surveillance not only affect the individual employee's management in the work place but may also have important implications regarding the effectiveness of exposure control measures in the workplace, and warrant further steps by the employer.

Indications for doing medical surveillance

(11) Medical surveillance must be provided if an employee:

(a) is using, handling, generating or storing an HCA that is known to cause adverse health effects, and
(b) the level of exposure is such that an occupational disease or adverse effect may reasonably be expected to occur, and
(c) valid medical testing techniques are available to detect the adverse effect on the employee's health.

(12) This means the employer must, with inputs from a competent person, conduct a health risk assessment to determine the likelihood of exposure to an HCA, in conjunction with the known health effects of the HCA, to decide if a programme of medical surveillance is necessary. These steps are addressed in Regulation 5.

(13) Additionally, medical surveillance should be provided if, in the opinion of an occupational medicine practitioner it is necessary, notwithstanding the above criteria are not met.

Designing and implementing a programme of medical surveillance

(14) The following steps should be included in any programme:

(a) Risk assessment. This will determine the potential exposure to and routes of absorption of an HCA and identification of potential target-organ toxicity, to direct medical surveillance.
(b) Test selection. Tests should have the desirable operating characteristics of appropriate sensitivity, specificity, reliability and predictive value.

(c) Test schedule. The frequency of testing is laid down in general terms by Regulation 7(2), but should in any case be based on an understanding of the nature of the hazard and the natural history of any adverse effects that may develop in specific target organs.
(d) Development of action criteria. Criteria for interpreting spirometry have been published in the medical literature. However, in many cases, the occupational medicine practitioner will have to develop pragmatic criteria in the context of the specific workplace.
(e) Standardisation of test process. Quality control needs to be exercised both at the testing site and in the laboratory contracted to carry out analyses. Consistency over time should be sought to make longitudinal measurements comparable.
(f) Ethical considerations

    (i) Information and training of employees as required by Regulation 3(1) should include the rationale for doing medical surveillance, and the consequence of abnormal findings.
    (ii) Written informed consent should be obtained for medical tests to be conducted, in accordance with requirements prescribed by the Health Professions' Council of South Africa. Should an employee refuse to give consent, it should be explained to the employee that this means the employee cannot be offered the work for which medical surveillance is required, which may impact on his/her employment.
    (iii) An employee must be notified of the results and interpretation of his/her tests and any recommendations made, including, where appropriate, the need for medical referral for confirmation of diagnosis and related actions.
    (iv) The confidentiality of personal medical records is laid down by Regulation 9.

(a) Determination of steps to be taken in the event of identifying a work-related health problem. This is covered in detail below. Co-operation of employees can be best secured by a policy of protection of conditions of service in case of medical removal from a particular job.
(b) Evaluation of controls. An abnormal finding in an employee, or a pattern of findings in a group of employees, may point to inadequate primary control of exposure(s). 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 to prevent continued exposure to the worker as well as yet unexposed workers.
(c) Data analysis. The outcomes of medical surveillance tests should be subjected to analysis monitored for trends over time & place, or group effects.
(d) Record keeping. This includes both medical records and exposure information for every employee. While the employer is responsible for record keeping in terms of Regulation 9, the contents of personal medical records may be accessible to the occupational health practitioner, the employee, and any person nominated by the employee in writing.

(15) Designing a programme of medical surveillance should be done by an experienced occupational health practitioner; where this is an occupational nurse practitioner it must be in consultation with an occupational medical practitioner.

(16) The medical surveillance programme should be described in a written document (code of practice), in which the key issues listed in 4.5 above are addressed. The document must be made available to the Health and Safety Committee.

(17) The employer must provide the occupational health practitioner with the following information about the work to be performed that has triggered the requirement for medical surveillance:

(a) the work the employee is, or will be, carrying out
(b) if the employee has started that work, how long the employee has been carrying it out
(c) a list of the hazardous chemicals to which the employee is or will be exposed and the relevant SDS's of or the chemicals
(d) relevant risk assessments reports (compliant to regulation 5) and results of air monitoring carried out at the workplace
(e) the type of PPE being used by the employee

Management of outcomes of medical testing

Work-related versus non work-related outcomes

(18) Non work-related findings include various health conditions that may be identified by the medical testing process, such as hypertension, diabetes, etc. These findings should be shared with the employee (preferably in writing) by the occupational health practitioner to enable the employee to take appropriate action to improve his or her general health. In addition, the occupational health practitioner should refer the employee to his/her own healthcare provider for further treatment, if necessary.

(19) The presence of non-occupational disease does not require notification to the employer.

Work-related findings include two categories:

(a) Occupational Disease
This relates to adverse health effects consequent on exposure to an HCA. It is a legal requirement that those which have progressed to occupational disease must be communicated to the employee, employer and the Department of Labour. This important process is further described below.
(b) Medical fitness to work
This relates to identified health conditions that are not caused by the workplace, but which impact on the vulnerability of the employee who may be exposed to an HCA, and which may be aggravated by workplace exposures. (for example, an employee who has asthma since childhood and is performing work that may result in exposure to a respiratory irritant or allergen). In these circumstances, the occupational nurse practitioner, in consultation with an occupational medicine practitioner, must carefully consider the risks and convey the appropriate

task or workplace restrictions to the employer in the form of a written certificate of fitness. The employer may not allow the employee to return to normal duties until cleared by an occupational medicine practitioner (see Regulation 7(3))

Important notes:

(a) Neither of the above work-related findings are reason to automatically declare that the employee is medically unfit to perform his or her job. It is an incapacity that should be handled with careful thought, and all options for accommodation should be considered, as prescribed by the Labour Relations Act (66 of 1995) and Employment Equity Act (55 of 1998).

(b) Informing the employer of a health-related restriction does not mean that disclosure of the specific medical diagnosis is required; such disclosure may occasionally be warranted, but then should be done with the consent of the employee, and where such disclosure is in the best interests of the employee. Should the employee refuse consent despite a necessity to inform the employer, the employee should be told that the employer will be informed and the details of the information to be provided.

Actions by the employer if an occupational disease is identified

(20) The employer must initiate an incident investigation to identify the failures of controls that led to the disease and put into place appropriate corrective actions (subregulation 7(4); also Regulation 8 of the General Administrative Regulations).

(a) The employer must provide training to the employee, on ways to mitigate further exposure
(b) The employer has a statutory duty to report the incident
(c) The employer must report the case as prescribed by Regulation 8 of the General Administrative Regulations
(d) If the prescribed criteria are met, the employer must notify the Chief Inspector as prescribed in section 24(1)(a) of the Occupational Health and Safety Act.
(e) The employer has a statutory duty to submit a claim for compensation as contemplated under the Compensation for Occupational Diseases Act (130 of 1993) by completing the necessary forms and following the procedure prescribed by the Compensation Commissioner.

Legal duties prescribed for a medical practitioner* if an occupational disease is identified

(21) The medical practitioner must notify the Chief Inspector as prescribed in section 25 of the Occupational Health and Safety Act. The prescribed format is the use of the WCL forms used for the submission of claims for an occupational disease under the Compensation for Occupational Diseases Act (130 of 1993).

(22) The medical practitioner must facilitate the submission of a claim for compensation under the Compensation for Occupational Diseases Act (130 of 1993) by completing the necessary medical reports and following the procedure prescribed by the Compensation Commissioner. These are described in "Internal Instruction" documents published by the Compensation Commissioner.

* Note that this legal duty is placed on any medical practitioner, not just an occupational medicine practitioner. However, given the training received by occupational practitioners, they are best suited to fulfil these duties.

Biological monitoring

Distinction between biological monitoring, biological exposure monitoring and biological effect monitoring.

(23) These terms are often confused with one another. In these regulations, biological exposure monitoring and biological effect monitoring are subsets of the overarching term, biological monitoring.

(24) 24. Biological exposure monitoring is the measurement and assessment of chemicals or their metabolites (substances the body converts the chemical into, for purposes of elimination) in exposed workers. These measurements are made on samples of breath, urine, blood, or other biological materials, or any combination of these. Biological monitoring measurements reflect the total uptake of a chemical by an individual by all routes (inhalation, ingestion, through the skin or by a combination of these routes).
Biological exposure monitoring therefore does not represent an adverse effect or an occupational disease; it only reflects exposure. It is often incorrectly listed as a type of medical surveillance.

(25) Biological effect monitoring is the measurement and assessment of early non-adverse reversible subclinical physiological effects caused by absorption of chemicals (i.e. prior to established clinical disease). It typically involves measuring biochemical responses (for example, measuring plasma and erythrocyte cholinesterase activity in workers exposed to organophosphate pesticides; or measuring increases in urinary protein following exposure to cadmium; or changes in functioning of enzymes. Hence measuring for changes in blood cell counts following exposure to bone marrow toxins does not constitute biological effect monitoring; this is medical testing). These responses may have potential health implications for the individual, and may also arise from causes other than occupational exposure. Consequently, biological effect monitoring should always be carried out with the close involvement of an occupational medicine practitioner.

Objectives & uses of biological exposure monitoring

(26) The main objective of biological monitoring is to provide a complementary technique to air monitoring when air sampling techniques alone may not give a reliable indication of exposure. Hence it may be particularly useful in the following ways:

(a) to detect and determine absorption via the skin or gastrointestinal system, in addition to that by inhalation
(b) to test the efficacy of personal protective equipment and monitor work practices
(c) to compliment air monitoring in circumstances when work practices are not normal, such as abnormally long or variable work hours, or very strenuous work (high breathing rates = increased chemical intake)
(d) to detect non-occupational exposures
(e) to assess total body burden
(f) to reconstruct past exposure in the absence of other exposure measurements for chemicals with long half-lives
(g) to assess the effectiveness of medical removal procedures when indicated for certain chemicals (e.g. lead)

Important considerations in biological exposure monitoring

(27) In choosing a test to meet the above objectives, it is important to understand the relationship between environmental exposure and the concentration of an HCA in biological samples. This includes an understanding of the principles of absorption, biotransformation, distribution and excretion of the HCA or its metabolites.
(28) In addition, there should be analytical methods available of sufficient sensitivity and specificity to detect concentrations of the agent in biological media in the range likely to be encountered in industry. The HCAs listed in Table 4 of Annexure 1 are those for which the above criteria have a reasonable chance of being met.

Biological Exposure Indices (BEIs)

(29) BEIs are reference values intended as guidelines for the evaluation of potential health hazards in the practice of industrial hygiene. They must not be used as statutory reference values.
(30) A BEI represents in theory the level of an HCA or metabolite most likely to be observed in a specimen collected from a healthy worker who has been exposed to an HCA to the same extent as the worker with inhalation exposure to an OEL-TWA. BEIs do not represent a sharp distinction between hazardous and non-hazardous exposures. For example, owing to biological variability, it is possible that an individual's measurements can exceed the BEI without incurring an increased health risk. Conversely, there may be some susceptible individuals who may be harmed at levels below the BEI.
(31) If measurements in specimens obtained from a worker on different occasions persistently exceed the BEI, or if the majority of measurements in specimens obtained from a group of workers at the same workplace exceed the BEI, the cause of the excessive values must be investigated and proper action be taken to reduce the exposure.
(32) BEIs apply to eight-hour exposures, five days a week. However, BEIs for differing work schedules may be extrapolated on pharmacokinetic grounds. BEIs should not be applied either directly or through a conversion factor, in the determination of safe levels for non-occupational exposure to air and water pollutants, or food contaminants. The BEIs are not intended for use as a measure of adverse effects or for diagnosis of occupational disease.
(33) Actual exposures can be determined using some of the above methods, but it is important to understand the limitations of results. The level of a hazardous chemical or its metabolites in the body does not necessarily correlate with exposure to the hazardous chemicals, symptoms or damage to health.

Legal background to exposure limits

(34) Two types of occupational exposure limits are defined in regulation 1 of the HCA Regulations. The two types are occupational exposure limit - control limit (OEL-ML), and occupational exposure limit - recommended limit (OEL-RL), as listed in Tables 1 and 2 of Annexure 1 (Table 1) (Table 2). The key difference between the two types of limits is that one OEL-RL is set at a level at which there is no indication of a risk to health; for an OEL-ML, a residual risk may exist and the level set, takes socio-economic factors into account. Further details are given in paragraphs 8 to 16.

(35) Regulation 10 of the HCA Regulations lays down the requirements for the use of an OEL-ML and an OEL-RL for HCA for the purpose of achieving adequate control. Regulation 10(1) requires that, where there is exposure to a agent for which an OEL-ML is specified in Table 1 of Annexure 1, the control of exposure shall, so far as inhalation of that agent is concerned, be treated as adequate only if the level of exposure is reduced so far as is reasonably practicable and in any case below the OEL-ML.

(36) Regulation 10(1) of the HCA Regulations requires that, where there is exposure to a agent for which an OEL-RL has been approved, the control of exposure shall, so far as inhalation of that agent is concerned, be treated as adequate if-

(a) that OEL-RL is not exceeded; or

(b) where that OEL-RL is exceeded, the employer identifies the reasons for the exceeding of the standard and takes appropriate action to remedy the situation as soon as is reasonably practicable.

Setting occupational exposure limits

Advisory Council and Standing Technical Committee

(37) OEL-RL and OEL-ML are set by the chief inspector on recommendation of the Advisory Council for Occupational Health and Safety (the Advisory Council), following assessment by the Standing Committee No. 7 (TC7) of the Advisory Council for Occupational Health and Safety.

(38) TC 7 must first consider what type of limit is appropriate, OEL-RL, or OEL-ML, and secondly, at what concentration the limit should be set. Setting an OEL-RL is the first option to be considered and TC 7 comes to a decision based on a scientific judgment of the available information on health effects, where TC7 may consider that an OEL-ML is more appropriate. Following public consultation, new OEL-MLs and OEL-RLs are listed in Table 2 and Table 3 of Annexure 2 respectively.

The indicative criteria

(39) For a substance to be assigned an OEL-RL it must meet all the following three criteria:

(a) **Criterion 1** The available scientific evidence allows for the identification, with reasonable certainty, of concentrations averaged over a reference period, at which there is no indication that the substance is likely to be injurious to employees if they are exposed by inhalation day after day to that concentration;

(b) **Criterion 2** Exposure to concentrations higher than that derived under criterion 1 and which could reasonably occur in practice, are unlikely to produce serious short or long term effects on health over the period that it might reasonably take to identify and remedy the cause of excessive exposure;

(c) **Criterion 3** The available evidence indicates that compliance with the OEL-RL, as derived under criterion 1, is reasonably practicable.

(40) A agent is to be assigned an OEL-ML if it meets the following criterion:

Criterion 4 The available evidence on the substance does not satisfy criterion 1, or 2, or both for an OEL-RL and exposure to the substance has, or is liable to have, serious health implications for workers;

Setting an OEL-RL

(41) Criterion 1 sets out the fundamental basis for establishing such a limit: The existence of a threshold above which there may be evidence of significant effects on health but below which, on existing knowledge, there are thought to be no adverse effects.

(42) Criterion 2 is necessary in order to take account of HCA Regulation 10(1) of the HCA Regulations whereby exposures above an OEL-RL are allowed provided the employer identifies the reasons for exceeding the standard and takes steps to reduce exposure to that OEL-RL as soon as is reasonably practicable. Clearly, it is necessary to take account of the likelihood and probable extent of cases in deciding whether an OEL-RL is appropriate. The health effects to be taken into account include sensory and other effects such as the slowing of reflexes which might result in the impairment of safety.

(43) Criterion 3 takes account of whether industry can reasonably comply with the exposure limit derived under the first criterion. There is no purpose in setting an OEL-RL which plainly cannot be achieved in practice. Note that industry's ability to comply influences the decision of whether to set an OEL-RL, but does not influence the level at which that OEL-RL is set.

Setting an OEL-ML

(44) To be assigned an OEL-RL, an agent must meet all the first three criteria; if it does not, then it can be considered for an OEL-ML. To be assigned an OEL-ML, there should be serious implications for the health of workers exposed to the agent. Serious health implications include both the risk of serious health effects to a small population of workers and the risk of relatively minor health effects to a large population. In practice, an OEL-ML has been most often allocated to

carcinogens and to other agents for which no threshold of effect can be identified and about which there is no doubt about the seriousness of the effects of exposure.

(45) An OEL-ML and an OEL-RL, therefore, differ not only in their legal status, but also in the way in which they are set. For an OEL-RL the only consideration in setting the limits is the protection of the health of the employee; for an OEL-ML this is still the primary consideration but socio-economic factors are also taken into account. The indicative criteria, provide the framework within which the discussions at the various stages of limit-setting can be conducted.

Applying occupational exposure limits

General

(46) The lists of occupational exposure limits given in Table 1 and Table 2 of Annexure 1, unless otherwise stated, relate to personal exposure to agents hazardous to health in the air of the workplace.

Units of measurement

(47) For occupational exposure limits, concentrations of gases and vapours in air are usually expressed in parts per million (ppm), a measure of concentration by volume, but, may also be expressed in milligrams per cubic metre of air (mg/m³), a measure of concentration by mass. Concentrations of airborne particles (fume, dust, etc.) are usually expressed in mg/m³. In the case of airborne particulates, the limits where applicable in Table 2 and Table 3 refer to the total airborne particulate fraction unless specifically indicated as referring to the respirable fraction (see paragraphs 37 to 40). In the case of man-made mineral fibres, the limit is expressed as fibres per millilitre of air (fibres/ml).

Often gases and vapours will be measured in milligrams per cubic meter of air (mg/m³), whereas the OEL is only available in ppm. In these cases, the OEL in ppm must be converted to its equivalent in mg/m³. This is to allow for the measured HCA concentration in mg/m³ to be compared to the OEL (note: the measured HCA concentration must not be converted to ppm).

In order to convert the OEL in ppm to its equivalent OEL in mg/m³ at NTP (Normal Temperature and Pressure, NTP - a temperature of 25°C and an atmospheric pressure of 101.325 kPa), the following formula is applicable:

$$\text{OEL in mg/m}^3 = \frac{\text{OEL (in ppm) x molecular weight of the HCA}}{24.45}$$

Occupational exposure limits - control limits: OEL-ML (table 2)

(48) An OEL-ML is the maximum concentration of an airborne agent, averaged over a reference period, to which employees may be exposed by inhalation under any circumstances, and is specified together with the appropriate reference period in Table 2 of Annexure 2.

(49) Regulation 10(1) of the HCA Regulations, when read in conjunction with the Act, imposes a duty on the employer to take all reasonable precautions and to exercise all due diligence to ensure that exposure is kept as far below an OEL-ML as is reasonably practicable.

(50) To comply with this duty, in the case of agents with a 8-hour reference period, employers should undertake a programme of monitoring in accordance with regulation 6 so that they can show (if it is the case), that an OEL-ML is not exceeded. Such a monitoring programme need not be undertaken if the assessment carried out in accordance with regulation 5 shows that the level of exposure is most unlikely ever to exceed an OEL-ML. For agents assigned a short-term limit, such value should never be exceeded.

(51) The assessment should also be used to determine the extent to which it is reasonably practicable to reduce exposure further below an OEL-ML as required by regulation 10(1) In assessing reasonable practicability, the nature of the risk presented by the agent in question should be weighed against the cost and the effort involved in taking measures to reduce the risk. (Also see the definition of reasonably practicable as defined in the Act.)

Occupational exposure limit-recommended limit: OEL-RL (Table 3)

(52) An OEL-RL is the concentration of an airborne agent, averaged over a reference period, at which, according to current knowledge, there is no evidence that it is likely to be injurious to employees if they are exposed by inhalation, day after day, to that concentration.

(53) For an agent, which has been assigned an OEL-RL, exposure by inhalation should be reduced to that standard. However, if exposure by inhalation exceeds the OEL-RL, then control will still be deemed to be adequate provided that the employer has identified why the OEL-RL has been exceeded and is taking appropriate steps to comply with the OEL-RL as soon as reasonably practicable. In such a case, the employers objective must be to reduce exposure to the OEL-RL, but the final achievement of this objective may take some time. The assessment under regulation 5 will determine the urgency of the necessary action, taking into account the extent and cost of the required measures in relation to the nature and degree of exposure involved.

(54) Control of an OEL-RL as prescribed in regulation 10 (1) (a) can always be regarded as adequate control of that agent for the purpose of the HCA Regulations, so far as exposure from inhalation is concerned. However, due to the variations in process control and the fluctuations in agent concentrations in the workplace, it will be prudent for employers to reduce exposure below an OEL-RL as to ensure that the exposure of all employees does not exceed that OEL-RL. Similarly, it is not intended that the statutory requirements under regulation 10 (1) should discourage the further application of good occupational hygiene principles in order to reduce exposure below the OEL-RL.

Long-term and short-term exposure limits

(55) Effects of exposure to substances hazardous to health vary considerably depending on the nature of the substance and the pattern of exposure. Some effects require prolonged or accumulated exposure. The long-term (8-hour TWA) exposure limit is intended to control such effects by restricting the total intake by inhalation over one or more workshifts, depending on the length of the shift. Other effects may be seen after brief exposures. Short-term exposure limits (usually 15 minutes) may be applied to control these effects. For those substances for which no short-term limit is specified, it is recommended that a figure of three times the long-term limit be used as a guideline for controlling short-term peaks in exposure. Some workplace activities give rise to frequent short (less than 15 minutes) periods of high exposure which, if averaged over time, do not exceed either an 8-hour TWA or a 15-minute TWA. Such exposures have the potential to cause harm and should be subject to reasonably practicable means of control unless a 'suitable and sufficient' risk assessment shows no risk to health from such exposures.

(56) In some situations such as in submarines and saturation diving, the occupational exposure is essentially continuous. In these cases, a continuous exposure limit should be derived by dividing the 8-hour TWA exposure limit by a factor of 5.

(57) Both the long-term and short-term exposure limits are expressed as airborne concentrations averaged over a specified period of time. The period for the long-term limit is normally eight hours, when a different period is used this is stated. The averaging period for the short-term exposure limit is normally 15 minutes, such a limit applying to any 15-minute period throughout the working shift. Exposure to substances hazardous to health should be calculated according to the approved method, which is reproduced in Annexure 4.

Limitations to the application of exposure limits

(58) The list of OELs, unless otherwise stated, relates to personal exposure to substances hazardous to health in the air of the workplace. The limits cannot be adapted readily to evaluate or control non-occupational exposure, e.g. levels of contamination in the neighbourhood close to an industrial plant. OELs are approved only for application to people at work. OELs are approved only for use where the atmospheric pressure is between 85 kPa and 101.325 kPa. This covers the normal range of meteorological variations and slightly pressurised workplaces such as clean rooms, but not the hyperbaric conditions which may be encountered in, for example, tunnelling or diving. To enable OELs to be applied in hyperbaric conditions, the limits should be expressed as a partial pressure or mass/volume concentration at higher pressures. Such situations require special assessments.

(59) Occupational exposure limits, as set out in Tables 2 and 3 of Annexure 2, are intended to be used for normal working conditions in workplaces. Employers should also take into account their duties and the provisions of the Environmental Conservation Act. OELs are not, however, designed to deal with serious accidents or emergencies, particularly where employees may be exposed to rapidly rising concentrations of gas, as may arise from a major escape due to plant failure. Over and above their responsibilities to ensure that the requirements of the HCA Regulations are met, employers also have a clear responsibility to ensure that the plant is designed, operated and maintained in a way that avoids accidents and emergencies. Where appropriate, detection, alarm and response measures should be used in order to minimise the effect of any such unplanned events. To help maintain adequate operational control, employers may find it helpful to select their own indicators of control when undertaking investigations or corrective action.

Exposure in mines

(60) The HCA Regulations and the occupational exposure limits in this publication do not apply to exposure to agents hazardous to health in mines.

Lead and asbestos

(61) Work with asbestos or lead is not subject to the HCA Regulations. The exposure limits for various types of asbestos and lead are specified in the Asbestos Regulations and the Lead Regulations.

Pesticides

(62) Agents used as active ingredients in pesticides are listed under their chemical names and/or their common (ISO) names. These names may sometimes be used as parts of the names of proprietary pesticide formulations. In all cases the exposure limit applies to the specific active ingredients and not to the formulation as a whole.

Dusts

(63) The general approach necessary to control occupational exposure to dusts is as follows: not all dusts have been assigned occupational exposure limits but the lack of such limits should not be taken to imply an absence of hazard. In the absence of a specific exposure limit for a particular dust, exposure should be adequately controlled. Where there is no indication of the need for a lower value, personal exposure should be kept below both 10 mg/m³ 8-hour time-weighted average total airborne dust and 5 mg/m³ time-weighted average respirable dust. Such, or greater, dust concentrations should be taken as excessive concentrations.

(64) Where dusts contain components which have their own assigned occupational exposure limits, all the relevant limits should be complied with.

Particle size selective criteria for sampling of total airborne particulate and respirable particulate

(65) Unless specified otherwise, OELs for all airborne particulates (HCAs comprising of airborne particulates) refer to the total airborne particulate fraction of that substance. Sampling of these airborne particulates must be carried out with a technique specifically designed to collect the total airborne particulate size fraction of the HCA. Total Airborne particulate matter approximates to the particle size fraction of particulates that can be suspended in air with an upper size limit of approximately 100 micro metre (µm) in aerodynamic diameter.

(66) Respirable particulate approximates to the the mass fraction of inhaled airborne particles that penetrates to the unciliated airways (lower gas exchange regions/ the lower bronchioles and alveolar regions) in the lung. Respirable particulates generally have an aerodynamic diameter of less than 10µm and the median for the respirable size fraction is 4µm aerodynamic diameter.

(67) Sampling for respirable airborne particulate must be performed according to a technique that will collect airborne particulates conforming to the following size fraction distribution:

Particle equivalent aerodynamic diameter (µm)	***Respirability (mass percent)***
0	100
1	97
2	91
3	74
4	50
5	30
6	17
7	9
8	5
10	1

Wood dust

(68) Wood dust is a general term covering a wide variety of airborne wood dusts. The health effects of wood dust differ between dust generated from the processing of different species of trees. Specific species of both hard and soft woods induce sensitisation and so the categorisation of woods into hard and soft woods to indicate relative toxicity is not useful. For this reason, OELs are indicated by species and not hard/soft wood categorisation. Oak and beech are listed with an A1 (confirmed human) carcinogenic potential and birch, mahogany, teak and walnut are listed with an A2 (suspected human) carcinogenic potential by ACGIH. For further information on health effects of woods refer to the Health & Safety Executive UK Woodworking Sheet No 30 as well as ACGIH TLVs & BEIs APPENDIX D, which provides information on tree species suspected of inducing sensitisation.

(69) Dust is generated by the machining and working of wood and wood-containing materials such as chipboard and fibreboard. Operations such as sawing, turning and routing produce relatively coarse dust, while sanding and assembly operations generate fine dust.

Fume

(70) Where a separate OEL has been set for fume, it should normally be applied to solid particles generated by chemical reactions or condensed from the gaseous state, usually after volatilisation from melted agents. The generation of fume is often accompanied by a chemical reaction such as oxidation or thermal breakdown.

Absorption through the skin

(71) In general, for most agents the main route of entry into the body is by inhalation. The OELs given in these regulations solely relate to exposure by this route. Certain agents such as phenol, aniline and certain pesticides (marked in the Tables with an SK notation) have the ability to penetrate the intact skin and thus become absorbed into the body. Absorption through the skin can result from localised contamination, for example, from a splash on the skin or clothing, or in certain cases from exposure to high atmospheric concentrations of vapour. Serious effects can result in little or no warning and it is necessary to take special precautions to prevent skin contact when handling these agents. Where the properties of the agents and the methods of use provide a potential exposure route via skin absorption, these factors should be taken into account in determining the adequacy of the control measures.

Sensitisers

(72) Certain agents may cause sensitisation of the respiratory tract if inhaled or skin contact occurs. Respiratory sensitisers can cause asthma, rhinitis, or extrinsic allergic alveolitis. Skin sensitisers cause allergic contact dermatitis. Agents which cause skin sensitations are not necessarily respiratory sensitisers or vice-versa. Only a proportion of the exposed population will become sensitised, and those who do become sensitised, will not have been identified in advance. Individuals who become sensitised may produce symptoms of ill health after exposure even to minute concentrations of the sensitiser.

(73) Where it is reasonably practicable, exposure to sensitisers should be prevented. Where this cannot be achieved, exposure should be kept as low as is reasonably practicable and activities giving rise to short-term peak-concentrations should receive particular attention. As with other agents, the spread of contamination by sensitisers to other working areas should also be prevented, as far as is reasonably practicable.

(74) The Sen notation (marked in the Tables with a Sen notation) has been assigned only to those sensitisers that may cause sensitisation by inhalation. Remember that other agents not contained in these Tables can act as respiratory sensitisers.

Other factors

(75) Working conditions which impose additional stress on the body, such as exposure to ultra-violet radiation, high temperatures, pressures and humidity, may increase the toxic response to a agent. In such cases, specialist advice may be necessary to evaluate the effect of these factors.

Mixed Exposures

General

(76) The majority of OELs listed in Tables 1 and 2 of Annexure 1 are for single compounds or for agents containing a common element or radical, e.g. tungsten and compounds, and isocyanates. A few of the limits relate to agents commonly encountered as complex mixtures or compounds e.g. white spirit, rubber fume, and welding fume. However, workers are frequently subject to other mixed exposures involving solids, liquids, aerosols or gases. These exposures can arise as a result of work with materials containing a mixture of agents, or from work with several individual agents, simultaneously or successively, in a workshift. Mixed exposures require careful assessment of their health effects and the appropriateness of control standards. The following paragraphs provide a brief summary of the advice on the application of exposure limits in these circumstances. In all cases of doubt, specialist advice should be sought.

Effects of mixed exposures

(77) The ways in which the constituent agents of a mixed exposure interact, vary considerably. Some mixed exposures involve agents that act on different body tissues or organs, or by different toxilogical mechanisms, these various effects being independent of each other. Other mixtures will include agents that act on the same organs, or by similar mechanisms, so that the effects reinforce each other and the agents are additive in their effect. In some cases the overall effect is considerably greater than the sum of the individual effects and the system is synergistic. This may arise from mutual enhancement of the effects of the constituents or because one agent potentiates another, causing it to act in a way which it would not do alone.

Assessment and control

(78) With All types of mixed exposures, it is essential that assessments be based on the concentrations of each of the constituents in air to which workers are exposed. Depending on the nature of the constituents and the circumstances of use, the relative concentrations of the constituents in air may differ considerably from those in the liquid or solid source material. The composition of the bulk material should not be relied on for assessment unless there is good evidence for doing so.

(79) Where mixed exposures occur, the first step is to ensure adequate control of exposure for each individual agent. However, the nature and amount of the other agents in a mixture can influence the level to which it is reasonably practicable to reduce exposure to a agent subject to an OEL-ML. When limits for specific mixtures have been established, they should be used only where they are applicable, and in addition to any relevant individual limits. They should not be extended to inappropriate situations. It is then necessary to assess whether further control is needed to counteract any increased risk from the agents acting in conjunction. Expert assessments for some particular mixed exposures may be available and can be used as guidelines in similar cases. In other cases, close examination of the toxicological data will be necessary to determine which of the main types of interaction (if any) are likely for the particular combination of agents concerned. The various types should be considered in the following order:

(a) **Synergistic agents:** Known cases of synergism and potentiation are considerably less common than the other types of behaviour in mixed exposures. However, they are the most serious in their effects and require the strictest control. They are also the most difficult to assess and wherever there is reason to suspect such interaction, specialist advice should be obtained;

(b) **Additive substances:** Where there is reason to believe that the effects of the constituents are additive, and where the exposure limits are based on the same health effects, the mixed exposure should be assessed by means of the formula-

$$E_m = \frac{(C1)}{(OEL1)} + \frac{(C2)}{(OEL2)} + \frac{(Cn...)}{(OELn...}$$

Here, E_m is the exposure for the mixture and C1, C2, etc. are the time-weighted average (TWA) concentrations of constituents in air. OEL1, OEL2, etc. are the corresponding exposure limits. The use of this formula is only applicable where the additive agents have been assigned OELs, which relate to the same reference period in the list of promulgated OELs. If the equation generates a result that is >1, then the exposure limit for the mixture (E_m) has been exceeded. If one of the constituents has been assigned an OEL-ML, then the additive effect should be taken into account in deciding the extent to which it is reasonably practicable to further reduce exposure; and

(c) **Independent substances:** Where no synergistic or additive effects are known or considered likely, the constituents can be regarded as acting independently. It is then sufficient to ensure compliance with each of the OELs individually.

(80) The above steps provide basic protocol for assessment of mixed exposures. It is open to persons responsible for control of exposure to treat all non-synergistic systems as though they were additive. This avoids the need to distinguish additive and independent systems and can be regarded as the most prudent course, particularly where the toxicity data are scarce or difficult to assess.

Monitoring mixed exposure

(81) Further information on monitoring airborne contaminants is given in paragraphs 52 and 53. The number of components of a mixed exposure for which routine air monitoring is required, can be reduced if their relative concentrations can be shown to be constant. This involves the selection of a key or marker, which may be one of the constituents, as a measure of the total contamination. Exposure to the marker is controlled at a level selected so that exposures to all components will be controlled in accordance with the criteria in paragraphs 48(a) and (b). However, if one of the components has been assigned an OEL-ML, the level of the exposure to that agent should always be reduced as far as is reasonably practicable. If this approach is to be used, it should take place under the guidance of suitable specialist advice.

Complicating factors

(82) Several factors that complicate the assessment and control of exposure to individual agents will also affect cases of mixed exposures and will require similar special consideration. Such factors include-

(a) exposure to a agent for which there is no established limit or for which an OEL-ML has been set;
(b) the relevance of factors such as alcohol, medication, smoking and additional stresses;
(c) exposure of the skin to one or more agents that can be absorbed by this route, as well as by inhalation; and
(d) agents in mixture may mutually affect the extent of their absorption, as well as their health effects, at a given level of exposure.

Monitoring exposure

(83) Regulation 5 (4) of the HCA Regulations imposes a duty on the employer to monitor the exposure of employees to agents hazardous to health. Details of routine sampling strategies for individual agents are outside the scope of this document. However, advice is available in HSG 173, which provides practical guidance on monitoring agents hazardous to health in air.

Calculation of exposure with regard to the specified reference periods

(84) The following guidance is provided as an approved method for the calculation of exposure in relation to the 8-hour, short-term and one-year reference periods.

(85) The 8-hour reference period

85.1. The term '8-hour reference period' relates to the procedure whereby the occupational exposures in any 24-hour period are treated as equivalent to a single uniform exposure for 8 hours [the 8-hour time weighted average (TWA) exposure].

85.2. The 8-hour TWA may be represented mathematically by:

$$\frac{C_1T_1 + C_2T_2 + .. + C_nT_n}{8}$$

where C(1) is the occupational exposure value (concentration) and T(1) is the associated exposure time in hours in any 24-hour period.

Examples

(a) The operator works for 7h20 min. on a process in which he is exposed to a agent hazardous to health. The average exposure during that period is measured as 0.12 mg/m³.

The 8 - hour TWA therefore is - 7h20min (7.33h) at 0.12mg/m³
40 min (0.67h) at 0mg/m³

That is -

$$\frac{(0.12 \times 7.33) + (0 \times 0.67)}{8}$$

$= 0.11\ mg/m^3$

(b) The operator works for eight hours on a process in which he is exposed to a agent hazardous to health. The average exposure during that period is measured as 0,15mg/m³.

The 8-hour TWA therefore is –

$$\frac{0.15 \times 8}{8}$$

$= 0.15\ mg/m^3$

(c) Working periods may be split into several sessions for the purpose of sampling to take account of rest and meal breaks, etc. This is illustrated by the following example:

Exposure is assumed to be zero during the period 10:30 to 10:45, 12:45 to 13:30 and 15:30 to 15:45.

Working period	**Exposure {mg/m³)**	**Duration of sampling (h)**
08:00 - 10:30	0.32	2.5
10:45 - 12:45	0.07	2
13:30 - 1 5:30	0.20	2
15:45 - 17:15	0.10	1.5

The 8-hour TWA therefore is -

$$\frac{(0.32 \times 2.5) + (0.07 \times 2) + (0.20 \times 2) + (0.10 \times 1.5) + (0 \times 1.25)}{8}$$

$= 0.19\ mg/m^3$

(d) An operator works for eight hours during the night shift on a process in which he is intermittently exposed to a agent hazardous to health. The operators work pattern during the working period should be known and the best available data relating to each period of exposure should be applied in calculating the 8-hour TWA. This data should be based on direct measurement, estimates based on data already available or reasonable assumptions.

Working period	**Task**	**Exposure (mg/m³)**
22:00 - 24:00	Helping in workshop	1. 10 (known to be the exposure of full-time group in the workshop)
24:00 - 01:00	Cleaning elsewhere in factory	0 (assumed)
1.00 - 04:00	Working in canteen	0 (assumed)
04:00 - 06:00	Cleaning up after breakdown in workshop	0.21 (assumed)

The 8-hour TWA therefore is -

$$\frac{(0.10 \times 2) + (0.21 \times 2) + (0 \times 4)}{8}$$

$= 0.78\ mg/m^3$

(e) The operator works a 12-hour shift each day for five days, and then has seven days' rest. The exposure limits are based on an 8-hour reference period in each 24 hours in which an exposure occurs; the seven days' rest makes no difference. While at work, the operator is exposed to 4 $mg.m^{-3}$.

The 8-hour TWA =

$$\frac{(4 \times 12)}{8}$$

= 6 mg.m^{-3}.

(86) The short-term reference period

Exposure should be recorded as the average over the specified short-term reference period, normally 15 minutes, and should be determined by sampling over that period. For short emissions of less than the reference period, which still may have the potential to cause harm, appropriate action should be taken to ensure that a 'suitable and sufficient' risk assessment is carried out to ensure that there is no risk to health from such exposures.

Example where the short-term reference period is 15 minutes

a. Exposure period is less than 15 minutes:

The sampling result should be averaged over 15 minutes. For example, if a 5-minute sample produces a level of 600 ppm and is immediately followed by a period of zero exposure, then the 15-minute average exposure will be 200 ppm:

b. Exposure period is 15 minutes or longer

Measurements should be taken over a 15-minute period and the result is the 15-minute average exposure. Measurements for periods greater than 15 minutes should not be used to calculate a 15-minute average exposure, but if the average exposure over the longer period exceeds the 15-minute exposure limit, then this limit must have been exceeded over some 1 5-minute period.

Methods of measurement and calculation for determining fibre concentrations of manmade mineral fibre

(87) Refractory ceramic fibre (RCF)

RCFs are man-made vitreous (silicate) fibres with random orientation with alkaline oxide and alkali earth oxide (Na2O+K2O+CaO+MgO+BaO) content less or equal to 18% by weight. The term 'RCF' also includes non-oxide ceramic fibre such as boron and silicon carbides and nitrides. Fibre concentrations of RCF must be measured or calculated by a method approved by HSE.

Cotton dust

(88) Cotton is the cellulose fibre that grows inside the seed pods (or bolls) of the cotton plant. When mature, the boll breaks and the cotton appears as a soft wad of fine fibres. After picking, the cotton is separated from the seed etc., and is packed and compressed into bales.

(89) The OELs, which are based on exposure to dust during the handling of raw and waste cotton including blends containing raw or waste cotton, with the following exceptions:

(a) dust from weaving, knitting, braiding and subsequent processes;
(b) dust from bleached or dyed cotton; and
(c) dust from finished articles, for example garments.

(Where the OEL does not apply, exposure should still be adequately controlled.)

Two OELs apply:

(a) Cotton dust less fly; and
(b) Cotton dust inhalable airborne particulate.

(90) Cotton dust less fly
Area concentrations of cotton dust less fly must be measured using a vertical elutriator in accordance with OSHA Analytical Method Appendix A 29 CFR 1910.1043, as updated from time to time.

(91) Cotton dust inhalable airborne particulate
Personal exposure concentrations must be measured by means of an Institute of UK Occupational Medicine (IOM) inhalable dust sampler in accordance with MDHS14/3 or any other sampler giving equivalent results, as updated from time to time.

Asphyxiants

(92) Some gases and vapours, when present at high concentration in air, act as simple asphyxiants by reducing the oxygen content by dilution to such an extent that life cannot be supported. Many asphyxiants are odourless, colourless and not readily detectable. 68. Monitoring the oxygen content of the air is often the best means of ensuring safety. The oxygen content of air in the workplace should never be allowed to fall below a minimum of 19% by volume under normal atmospheric pressure. Particular care is necessary when dense asphyxiants, e.g. argon, are used, since very high localised concentrations can arise owing to their collecting in pits, confined spaces and other low-lying areas where ventilation is likely to be poor.

Particular care is necessary when dense asphyxiants, eg argon, are used since localised very high concentrations can arise due to their collecting in pits, confined spaces and other low-lying areas where ventilation is likely to be poor. Many asphyxiants present a fire or explosion risk. The concentration at which these risks can arise are liable to be well below those levels at which asphyxiation is likely to occur and should be taken into account when assessing the hazards.

Rubber fume and rubber process dust

(93) Rubber fume is fume evolved in the mixing, milling and blending of natural rubber or synthetic elastomers, or of natural rubber and synthetic polymers combined with chemicals, and in the processes which convert the resultant blends into finished products or parts thereof, and including any inspection procedures where fume continues to be evolved.

(94) Rubber process dust is evolved during the manufacture of intermediates or articles from natural rubber and/or synthetic elastomers. This definition does not include dusts, which, for occupational purposes, can be dealt with individually. In each case the relevant OEL will apply.

(95) Dust produced by the abrasion of cured rubber should be dealt with as Particles not otherwise classified [PNOC], i.e. dust of any kind when present at a substantial concentration in air.

Flour dust

(96) Flour dust is taken to be finely ground particles of cereals or pulses (including contaminants) that result from any grinding process and from any subsequent handling and use of that 'flour'. Any additives (e.g. flour improvers) are included in this definition only after they have been added to the final product mix.

Grain Dust

(97) Grain dust is taken to be dust arising from the harvesting, drying, handling, storage or processing of barley, wheat, oats, maize and rye, including contaminants.

Halogeno-platinum compounds

(98) These are co-ordination compounds in which a platinum atom or ion is directly co-ordinated to one or more halide (i.e. fluoride, chloride, bromide or iodide) ions. These compounds are subject to a OEL and cause sensitisation.

(99) For substances which, although they contain platinum and halide ions, the halogen is not directly co-coordinated by a chemical bond to the platinum, the OEL for soluble platinum compounds is applicable.

Fume

(100) The word 'fume' is often used to include gases and vapours. This is not the case for exposure limits where 'fume' should normally be applied to solid particles generated by chemical reactions or condensed from the gaseous state, usually after volatilisation from melted substances. The generation of fume is often accompanied by a chemical reaction such as oxidation or thermal breakdown.

Globally Harmonised System (GHS)

(101) As SANS 10234 is aligned with the UN Globally Harmonized System (GHS), SANS 10234 may be used as alternate guide to HCA classification, preparation of Safety Data Sheets and Labelling. However, it is noted that version differences may exist between SANS 1024 and GHS, Purple Book that is updated biennially. By implication, if SANS 10234 is used by the manufacturer or importer of chemical agent for the classification of an HCA or preparation of a SDS or labelling, the requirement for conformance to the latest version of GHS remains. The GHS requirements for classification, labelling and SDS are not applicable to foodstuffs, cosmetics or pharmaceutical in their final form.

UN Number and Proper Shipping Name

(102) The UN proper shipping name is the standard technical name to describe the hazard properties and the composition of dangerous goods. You need to choose a UN number (usually, 4 digits) and a proper shipping name from UN Transport of Dangerous Goods, Dangerous Goods List that can most accurately describe your dangerous goods. They will be used to label dangerous goods. They also need to be included in Dangerous Goods Declaration and the section 14 of Safety Data Sheets.