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GOVERNMENT NOTICES

DEPARTMENT OF LABOUR

No. R. 1179 **25 August 1995**

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993

REGULATIONS FOR HAZARDOUS CHEMICAL SUBSTANCES

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

SCHEDULE

Definitions

1. 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 otherwise indicates—

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

"Asbestos Regulations" means the *Asbestos Regulations* published by Government Notice No. R. 773 of 10 April 1987 under section 43 (5) of the Act;

"assessment" means a programme to determine any risk from exposure to a hazardous chemical substance 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;

GOEWERMENTSKENNISGEWINGS

DEPARTEMENT VAN ARBEID

No. R. 1179 **25 Augustus 1995**

WET OP BEROEPSGESONDHEID EN VEILIGHEID, 1993

REGULASIES VIR GEVAARLIKE CHEMIESE SUBSTANSIES

Die Minister van Arbeid het kragtens artikel 43 van die Wet op Beroepsgesondheid en Veiligheid, 1993 (Wet No. 85 van 1993), na oorleg met die Adviesraad vir Beroepsgesondheid en Veiligheid, die regulasies in die Bylae uitgevaardig.

BYLAE

Woordomskrywings

1. In hierdie Bylae het 'n woord of uitdrukking waaraan in die Wet 'n betekenis geheg word, die betekenis aldus daaraan geheg en, tensy uit die samehang anders blyk, beteken—

"Algemene Administratiewe Regulasies" die *Algemene Administratiewe Regulasies* gepubliseer by Goewermentskennisgewing No. R. 2206 van 5 Oktober 1984 kragtens artikel 43 (5) van die Wet;

"Asbesregulasies" die *Asbesregulasies* gepubliseer by Goewermentskennisgewing No. R. 773 van 10 April 1987 kragtens artikel 43 (5) van die Wet;

"asemhalingsbeskermingstoerusting" 'n toestel wat oor minstens die mond en neus gedra word om die inaseming van luggedraagde gevaarlike chemiese substansies te verhoed en wat van 'n tipe is of voldoen aan 'n standaard wat deur die Minister goedgekeur is;

"BEI" or **"biological exposure index"** is a reference value intended as a guideline for the evaluation of potential health hazards as listed in Table 3 of Annexure 1 hereby as revised from time to time and listed in the *Government Gazette*;

"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 substance whilst at the workplace and "exposure" has a corresponding meaning;

"EH 42" means the Guidance Note *EH 42 of the Health and Safety Executive* of the United Kingdom : *Monitoring Strategies for Toxic Substances* 1989 HSE ISBN 0 11885412 7 as revised from time to time and published in the *Government Gazette*;

"Facilities Regulations" means the Facilities Regulations published by Government Notice No. R. 2362 of 5 October 1990 under section 43 (5) of the Act;

"General Administrative Regulations" means the *General Administrative Regulations* published by Government Notice No. R. 2206 of 5 October 1984 under section 43 (5) of the Act;

"HCS" or **"hazardous chemical substance"** means any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture of such substances for which—

(a) an occupational exposure limit is prescribed; or

(b) an occupational exposure limit is not prescribed, but which creates a hazard to health;

"intake" includes inhalation, ingestion or absorption through the skin or mucous membranes;

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

"measurement programme" means a programme according to the monitoring strategy as contemplated in EH 42;

"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 for a stress factor in the workplace as revised from time to time by notice in the *Government Gazette;*

"OEL—CL" or **"occupational exposure limit—control limit"** means the occupational exposure limit for a hazardous chemical substance as listed in Table 1 of Annexure 1 hereby and "control limit" has a corresponding meaning;

"OEL—RL" or **"occupational exposure limit—recommended limit"** means the occupational exposure limit for a hazardous chemical substance as listed in Table 2 of Annexure 1 hereby and "recommended limit" has a corresponding meaning;

"BBd" of **"beroepsblootstellingsdrempel"** 'n drempelwaarde deur die Minister gestel vir 'n stresfaktor in die werkplek soos van tyd tot tyd hersien en in die *Staatskoerkant* gelys;

"BBd — Ad" of **"beroepsblootstellingsdrempel—aanbevole drempel"** die beroepsblootstellingsdrempel vir 'n gevaarlike chemiese substansie soos gelys in Tabel 2 van Aanhangsel 1 hierby, en "aanbevole drempel" het 'n ooreenstemmende betekenis;

"BBd — Bd" of **"beroepsblootstellingsdrempel—beheerdrempel"** die beroepsblootstellingsdrempel vir 'n gevaarlike chemiese substansie soos gelys in Tabel 1 van Aanhangsel 1 hierby, en "beheerdrempel" het 'n ooreenstemmende betekenis;

"BBi" of **"biologiese blootstellingsindeks"** 'n verwysingswaarde bedoel as 'n riglyn vir die evaluering van potensiële gesondheidsgevare soos gelys in Tabel 3 van Aanhangsel 1 hierby soos van tyd tot tyd hersien en in die *Staatskoerant* gelys;

"beraming" 'n program om enige risiko van blootstelling aan 'n gevaarlike chemiese substansie geassosieer met enige bedreiging daarvan by die werkplek te bepaal ten einde die stappe wat geneem moet word te identifiseer wat nodig is om sodanige bedreiging te verwyder, te verminder of te beheer;

"blootgestel" blootgestel aan 'n gevaarlike chemiese substansie terwyl by die werkplek en "blootstelling" het 'n ooreenstemmende betekenis;

"EH 42" die Gidsnota EH 42 van die *Health and Safety Executive* van die Verenigde Koningkryk: *Monitoring strategies for Toxic Substances* 1989 HSE ISBN 0 11 885412 7 soos van tyd tot tyd hersien en in die *Staatskoerant* gelys;

"Fasiliteiteregulasies" die *Fasiliteiteregulasies* gepubliseer by Goewermentskennisgewing No. R. 2362 van 5 Oktober 1990 kragtens artikel 43 (5) van die Wet;

"GCS" of **"gevaarlike chemiese substansie"** enige toksiese, skadelike, verwerende, irriterende of versmorende substansie of mengsel van sodanige substansies waarvoor—

(a) 'n beroepsblootstellingsdrempel voorgeskryf is; of

(b) 'n beroepsblootstellingsdrempel nie voorgeskryf is nie, maar wat 'n bedreiging vir gesondheid skep;

"ingenieursbeheermaatreëls" beheermaatreëls wat die blootstelling van persone by die werkplek deur middel van ingenieursmetodes verwyder of verminder;

"inname" ook inaseming, ingestie of absorpsie deur die vel of slymvliese;

"Loodregulasies" die *Loodregulasies* gepubliseer by Goewermentskennisgewing No. R. 586 van 22 Maart 1991 kragtens artikel 43 (5) van die Wet;

"lugmonitering" die monitering van die konsentrasies luggedraagde gevaarlike chemiese substansies;

"**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;

"**regional director**" means the regional director as defined in regulation 1 of the *General Administrative Regulations;*

"**respiratory protective equipment**" means a device which is worn over at least the mouth and nose to prevent the inhalation of airborne hazardous chemical substances 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 hazardous chemical substance exceeds the recommended limit for that substance;

"**SABS 072**" the Code of Practice for the Safe Handling of Pesticides, SABS 072, published by the South African Bureau of Standards (SABS);

"**SABS 0228**" the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228, published by the South African Bureau of Standards (SABS);

"**SABS 0229**" the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SABS);

Scope of application

2. (1) Subject to the provisions of subregulation (2), these regulations shall apply to an employer or a self-employed person who carries out work at a workplace which may expose any person to the intake of an HCS at that 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 or Asbestos Regulations apply.

Information and training

3. (1) An employer 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, ensure that the employee is adequately and comprehensively informed and trained, as well as thereafter informed and trained at intervals as may be recommended by that health and safety committee, with regard to—

(a) the contents and scope of these regulations;

(b) the potential source of exposure;

(c) the potential risks to health caused by exposure;

(d) the potential detrimental effect of exposure on his or her reproductive ability;

"**metingsprogram**" 'n program ooreenkomstig die moniteringstrategie bedoel in EH42;

"**monitering**" die beplanning, uitvoering en rekordhouding van die resultate van 'n metingsprogram;

"**OESSM**" die *Occupational Exposure Sampling Strategy Manual* soos gepubliseer deur die National Institute for Occupational Safety and Health (NIOSH), Publikasie No. 77–173 van 1977, Verenigde State van Amerika: Departement van Gesondheid, Onderwys en Welsyn;

"**respiratorsone**" 'n gebied waar die konsentrasie van n luggedraagde gevaarlike chemiese substansie die aanbevole drempel vir daardie substansie oorskry;

"**SABS 072**" die Gebruikskode vir die Veilige Hantering van Plaagdoders, SABS 072, gepubliseer deur die Suid-Afrikaanse Buro vir Standaarde (SABS);

"**SABS 0228**" die Gebruikskode vir die Identifisering en Klassifisering van Gevaarlike Substanse en Goedere, SABS 0228, gepubliseer deur die Suid-Afrikaanse Buro vir Standaarde (SABS);

"**SABS 0229**" die Gebruikskode vir die Verpakking van Gevaarlike Goedere vir Pad- en Spoorvervoer in Suid-Afrika, SABS 0229, gepubliseer deur die Suid-Afrikaanse Buro vir Standaarde (SABS);

"**streekdirekteur**" die streekdirekteur soos omskryf in regulasie 1 van die *Algemene Administratiewe Regulasies.*

Toepassingsbestek

2. (1) Behoudens die bepalings van subregulasie (2), is hierdie regulasies van toepassing op 'n werkgewer of 'n persoon in eie diens wat by 'n werkplek werk verrig wat enige persoon aan die inname van 'n GCS by die betrokke werkplek kan blootstel.

(2) Die bepalings van regulasies 3 (1), 6 en 7 is nie van toepassing nie op—

(a) 'n persoon in eie diens; of

(b) iemand wat 'n werkplek bedoel in subregulasie (1), besoek.

(3) In die geval waar die Loodregulasies of Asbesregulasies van toepassing is, is die bepalings van hierdie regulasies nie van toepassing nie.

Inligting en opleiding

3. (1) 'n Werkgewer moet, voordat enige werknemer blootgestel word of blootgestel kan word, na oorlegpleging met die betrokke gesondheids- en veiligheidskomitee wat vir daardie deel van die werkplek ingestel is, verseker dat die werknemer doelmatig en volledig ingelig en opgelei is, asook daarna met tussenposes ingelig en opgelei word soos wat deur daardie gesondheids- en veiligheidskomitee aanbeveel kan word, betreffende—

(a) die inhoud en bestek van hierdie regulasies;

(b) die potensiële bron van blootstelling;

(c) die potensiële gesondheidsrisiko's veroorsaak deur blootstelling;

(d) die potensiële nadelige uitwerking van blootstelling op sy of haar voortplantingsvermoë;

(e) the measures to be taken by the employers to protect an employee against any risk from exposure;

(f) the precautions to be taken by an employee to protect himself or herself against the health risks associated with the exposure, including the wearing and use of protective clothing and respiratory protective equipment;

(g) the necessity, correct use, maintenance and potential of safety equipment, facilities and engineering control measures provided;

(h) the necessity of personal air sampling and medical surveillance;

(i) the importance of good housekeeping at the workplace and personal hygiene;

(j) the safe working procedures regarding the use, handling, storage and labelling of the HCS at the workplace; and

(k) procedures to be followed in the event of spillages, leakages or any similar emergency situation which could take place by accident;

(2) An employer or a self-employed person shall give written instructions of the procedures contemplated in paragraph (k) of subregulation (1) to the drivers of vehicles carrying the HCS.

(3) An employer or a self-employed person shall ensure that he himself or she herself or any person who in any manner assists him or her in the carrying out or the conducting of his or her business, have the necessary information and has undergone sufficient training in order for him or her to identify the potential risks and the precautions which should be taken.

Duties of persons who may be exposed to hazardous chemical substances

4. A 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 HCS 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 HCS;

(f) housekeeping at the workplace, personal hygiene and environmental and health practices; and

(g) information and training as contemplated in regulation 3.

(e) die maatreëls wat die werkgewer moet neem om 'n werknemer teen enige risiko van blootstelling te beskerm;

(f) die voorsorgmaatreëls wat deur 'n werknemer getref moet word om homself of haarself te beskerm teen die gesondheidsrisiko's verbonde aan blootstelling met inbegrip van die dra en gebruik van beskermende klerasie en asemhalingsbeskermingstoerusting;

(g) die noodsaaklikheid, korrekte gebruik, instandhouding en vermoëns van veiligheidstoerusting, fasiliteite en ingenieursbeheermaatreëls wat voorsien is;

(h) die noodsaaklikheid van persoonlike lugmonsterneming en mediese waaktoesig;

(i) die belangrikheid van goeie huishouding by die werkplek en persoonlike higiëne;

(j) veilige werkprosedures betreffende die gebruik, hantering, berging en etikettering van die GCS by die werkplek; en

(k) prosedures wat gevolg moet word in die geval van stortings, lekkasies of derglike noodsituasies wat per abuis plaasvind;

(2) 'n Werkgewer of 'n persoon in eie diens moet geskrewe instruksies van die prosedures bedoel in paragraaf (k) van subregulasie (1) aan die bestuurders van voertuie wat die GCS vervoer, gee.

(3) 'n Werkgewer of 'n persoon in eie diens moet verseker dat hy of sy of enige persoon wat hom of haar op enige wyse bystaan in die uitvoering of onderneming van sy of haar besigheid, oor die nodige inligting beskik en voldoende opleiding ondergaan het ten einde hom of haar in staat te stel om potensiële risiko's en die nodige voorsorg wat getref moet word, te kan identifiseer.

Pligte van persone wat aan gevaarlike chemiese substansies blootgestel kan word

4. 'n Persoon wat blootgestel word of kan word, moet 'n wettige opdrag gehoorsaam wat deur of namens die werkgewer of 'n persoon in eie diens gegee word, betreffende—

(a) die voorkoming van vrystelling van 'n GCS;

(b) die dra van persoonlike beskermingstoerusting;

(c) die dra van moniteringstoerusting om persoonlike blootstelling te meet;

(d) die aanmelding vir gesondheidsevaluasies en biologiese toetse soos deur hierdie regulasies vereis word;

(e) die opruiming of wegdoening van GCS-bevattende materiaal;

(f) huishouding by die werkplek, persoonlike higiëne en omgewings- en gesondheidspraktyke; en

(g) inligting en opleiding soos in regulasie 3 bedoel.

Assessment of potential exposure

5. (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) An 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 representative or committee 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 HCS to which an employee may be exposed;

(b) what effects the HCS can have on an employee;

(c) where the HCS 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 HCS or in the methods, equipment or procedures in the use, handling, control or processing of the HCS,

and the provisions of subregulations (2) and (3) shall apply.

Air monitoring

6. (1) Where the inhalation of an HCS is concerned, an employer contemplated in regulation 5 (4) shall ensure that the measurement programme of the airborne concentrations of the HCS 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;

Beraming van potensiële blootstelling

5. (1) 'n Werkgewer of persoon in eie diens moet na oorlegpleging met die betrokke gesondheids- en veiligheidsverteenwoordiger of betrokke gesondheids- en veiligheidskomitee, toesien dat 'n beraming onmiddellik en daarna met tussenposes van hoogstens twee jaar gemaak word, om vas te stel of enige werknemer deur enige inname-roete blootgestel kan word;

(2) 'n Werkgewer moet die betrokke gesondheids- en veiligheidsverteenwoordiger of betrokke gesondheids- en veiligheidskomitee skriftelik in kennis stel van die reëlings wat vir die beraming bedoel in subregulasie (1) getref word, 'n redelike tyd gee om daarop kommentaar te lewer en verseker dat die resultate van die beraming beskikbaar gestel word aan die betrokke verteenwoordiger of komitee wat daarop kommentaar kan lewer.

(3) Wanneer die beraming gedoen word, moet 'n werkgewer of persoon in eie diens rekord daarvan hou en die volgende aangeleenthede in ag neem, naamlik—

(a) die GCS waaraan 'n werknemer blootgestel kan word;

(b) watter effekte die GCS op 'n werknemer kan hê;

(c) waar die GCS teenwoordig kan wees en in watter fisiese vorm dit waarskynlik sal wees;

(d) die roete van inname waardeur en die mate waarin 'n werknemer blootgestel kan word; en

(e) die aard van die werk, proses en enige redelike agteruitgang of faling van enige beheermaatreëls.

(4) Indien die beraming wat ooreenkomstig subregulasie (3) gedoen is, aantoon dat 'n werknemer blootgestel kan word, moet die werkgewer verseker dat monitering ooreenkomstig die bepalings van regulasies 6 en 7 uitgevoer word en dat die blootstelling beheer word soos bedoel in regulasie 10.

(5) 'n Werkgewer moet die beraming deur subregulasie (1) vereis, onverwyld hersien indien—

(a) daar rede is om te vermoed dat die vorige beraming nie meer geldig is nie; of

(b) daar 'n verandering was in 'n proses waarby 'n GCS betrokke is, of in die metodes, toerusting of prosedures by die gebruik, hantering, beheer of prosessering van die GCS,

en die bepalings van subregulasies (2) en (3) is in so 'n geval van toepassing.

Lugmonitering

6. (1) Waar daar sprake van inaseming van 'n GCS is, moet elke werkgewer bedoel in regulasie 5 (4) toesien dat die metingsprogram van die luggedraagde konsentrasies van die GCS waaraan 'n werknemer blootgestel word—

(a) uitgevoer word ooreenkomstig die bepalings van hierdie regulasies;

(b) uitgevoer word slegs nadat die betrokke gesondheids- en veiligheidsverteenwoordiger of betrokke gesondheids- en veiligheidskomitee daaroor ingelig is en 'n redelike geleentheid gebied is om kommentaar daarop te lewer;

(c) carried out by an approved inspection authority or by a person whose ability to do the measurements is verified by an approved inspection authority;

(d) representative of the exposure of employees to the airborne HCS in accordance with the provisions of subregulation (2); and

(e) verified in accordance with the provisions of subregulation (3) if the measurements are carried out by a person who is not an approved inspection authority.

(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 HCS with a control limit and for the top 10% of the group at the 90% confidence level for an HCS with a recommended limit; and

(b) carry out representative measurements at least every 12 months for an HCS with a control limit and at least every 24 months for an HCS with a recommended limit: Provided that whenever the control limit or recommended limit which has been prescribed for an HCS is exceeded, the provisions of regulation 10 shall apply.

(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;

(b) carry out the measurements prescribed by subregulations (1) and (2) for any one group; and

(c) enter the results of the investigation and measurements, as contemplated in paragraphs (a) and (b) respectively, in the record required by regulation 9.

Medical surveillance

7. (1) An employer shall ensure that an employee is under medical surveillance if—

(a) the employee may be exposed to a substance listed in Table 3 of Annexure 1;

(b) the exposure of the employee to any substance 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) uitgevoer word deur 'n goedgekeurde inspeksie-owerheid of deur 'n persoon wie se vermoë om die metings te doen geverifieer is deur 'n goedgekeurde inspeksie-owerheid;

(d) ooreenkomstig die bepalings van subregulasie (2) verteenwoordigend is van die blootstelling van werknemers aan die luggedraagde GCS; en

(e) geverifieer is ooreenkomstig die bepalings van subregulasie (3) indien die metings uitgevoer word deur 'n persoon wat nie 'n goedgekeurde inspeksie-owerheid is nie.

(2) Ten einde aan die bepalings van subregulasie (1) (d) te voldoen, moet 'n werkgewer—

(a) toesien dat die metingsprogram, in die geval van 'n groepmeting, voorsiening maak dat die aantal persone wat vir 'n steekproef gekies word, gedoen word soos bedoel in hoofstukke 3 en 4 en Tegniese Aanhangsel A van die OESSM: Met dien verstande dat die steekproefgrootte gekies moet word vir die boonste 10% van daardie groep by die 95%-vertrouenspeil vir 'n GCS met 'n beheerdrempel en vir die boonste 10% van daardie groep by die 90%-vertrouenspeil vir 'n GCS met 'n aanbevole drempel; en

(b) verteenwoordigende metings minstens elke 12 maande vir 'n GCS met 'n beheerdrempel en minstens elke 24 maande vir 'n GCS met 'n aanbevole drempel, uitvoer: Met dien verstande dat wanneer die beheerdrempel of aanbevole drempel wat vir 'n GCS voorgeskryf is, oorskry word, die bepalings van regulasie 10 van toepassing is.

(3) Ten einde aan die bepalings van subregulasie (1) (e) te voldoen, moet 'n werkgewer die dienste van 'n goedgekeurde inspeksie-owerheid verkry wat met tussenposes van hoogstens 24 maande—

(a) moet verifieer of die metingsprogram bedoel in subregulasie (2) voldoen aan die bepalings van hierdie regulasie, deur die metings- en ontledingstoerusting van die werkgewer te ondersoek en deur die persoon bedoel in subregulasie (1) (c), te ondervra aangaande die uitvoering van die metingsprogram;

(b) die metings soos in subregulasies (1) en (2) voorgeskryf vir enige enkele groep uitvoer; en

(c) die uitslae van die ondersoek en metings in onderskeidelik paragrawe (a) en (b) bedoel, aanteken in die rekord soos deur regulasie 9 vereis.

Mediese waaktoesig

7. (1) 'n Werkgewer moet verseker dat 'n werknemer onder mediese waaktoesig is indien—

(a) die werknemer blootgestel kan word aan 'n substansie gelys in Tabel 3 van Aanhangsel 1;

(b) die blootstelling van die werknemer aan 'n substansie wat 'n bedreiging vir sy of haar gesondheid is, sodanig is dat 'n identifiseerbare siekte of nadelige uitwerking op sy of haar gesondheid met die blootstelling verband mag hou, daar 'n redelike moontlikheid bestaan dat die siekte of uitwerking onder die bepaalde toestande van sy of haar werk mag voorkom, en daar tegnieke is om aanduidings van die siekte of uitwerking, vir sover redelikerwys uitvoerbaar is, te diagnoseer; of

(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 employee's 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 paragraph (a), the relevant employee undergoes examinations as contemplated in paragraph (a) (ii) and (iii), at intervals not exceeding two years, or at intervals specified by an occupational medicine 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.

Respirator zone

8. An employer shall ensure—

(a) that any workplace or part of a workplace under his or her control, where the concentration of an HCS 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 respiratory 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 respiratory protective equipment.

(c) 'n beroepsgesondheidspraktisyn aanbeveel dat die betrokke werknemer onder mediese waaktoesig behoort te wees, in welke geval die werkgewer 'n beroepsgeneeskundige kan versoek om die toepaslikheid van die aanbeveling te bekragtig.

(2) Ten einde aan die bepalings van subregulasie (1) te voldoen, moet 'n werkgewer, vir sover dit redelikerwys uitvoerbaar is, verseker—

(a) dat waar enige blootstelling bestaan of kan bestaan, daar onmiddellik voor of binne 14 dae na 'n werknemer se diensaanvaarding, 'n aanvanklike gesondheidsevaluering deur 'n beroepsgesondheidspraktisyn op die werknemer uitgevoer word wat insluit—

(i) 'n evaluering van die werknemer se mediese en beroepsgeskiedenis;

(ii) 'n fisiese ondersoek; en

(iii) enige ander noodsaaklike mediese ondersoek wat na die oordeel van die beroepsgesondheidspraktisyn gewens is ten einde die praktisyn in staat te stel om 'n behoorlike evaluering te maak;

(b) dat na die gesondheidsevaluering bedoel in paragraaf (a), die betrokke werknemer met tussenposes van hoogstens twee jaar of met tussenposes soos deur 'n beroepsgeneeskundige aanbeveel, die ondersoeke bedoel in paragraaf (a) (ii) en (iii) moet ondergaan.

(3) 'n Werkgewer mag nie 'n werknemer wat deur 'n beroepsgeneeskundige as ongeskik vir werk gesertifiseer is, in 'n werkplek of deel van 'n werkplek toelaat waar hy of sy blootgestel kan word nie: Met dien verstande dat die betrokke werknemer toegelaat kan word om terug te keer na die werk wat hom of haar blootstel, indien hy of sy vooraf deur 'n beroepsgeneeskundige as geskik vir daardie werk gesertifiseer is.

(4) Die werkgewer moet die voorval bedoel in subregulasie (3) ooreenkomstig regulasie 8 van die Algemene Administratiewe Regulasies aanteken en ondersoek.

Respiratorsone

8. 'n Werkgewer moet verseker—

(a) dat enige werkplek of deel van 'n werkplek onder sy of haar beheer, waar die konsentrasie van 'n GCS in die lug sodanig is, of sodanig kan wees, dat, sonder die dra van asemhalingsbeskermingstoerusting, die blootstelling van werknemers wat in daardie werkplek werk die aanbevole drempel oorskry, as 'n respiratorsone gesoneer is;

(b) dat 'n respiratorsone duidelik afgebaken en geïdentifiseer is by wyse van 'n kennisgewing wat aandui dat die betrokke gebied 'n respiratorsone is en dat asemhalingsbeskermingstoerusting soos bedoel in regulasie 11 aldaar gedra moet word; en

(c) dat geen persoon die respiratorsone mag binnegaan of daarbinne bly tensy hy of sy die persoonlike beskermingstoerusting soos vereis, dra nie.

Records

9. 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 paragraph (c), make the records contemplated in paragraph (a), excluding personal medical records, available for inspection by an inspector;

(c) allow any person subject to formal 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 representative or relevant health and safety committee;

(e) keep all records of assessments and air monitoring for a minimum period of 30 years;

(f) keep all medical surveillance records for a 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 (1) (b) and of any repairs resulting from these investigations and tests, and the records shall be kept for at least three years.

Control of exposure to HCS

10. (1) An employer shall ensure that the exposure of an employee is either prevented or, where this is not reasonable practicable, adequately controlled: Provided that—

(a) where there is exposure for which there is a recommended 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 recommended 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 control 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 control 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;

Rekords

9. 'n Werkgewer moet—

(a) rekords hou van die uitslae van alle beramings, lugmoniterings, en van mediesewaaktoesigverslae vereis deur onderskeidelik regulasies 5, 6 en 7: Met dien verstande dat persoonlike mediese rekords net tot beskikking gestel word aan 'n beroepsgesondheidspraktisyn;

(b) behoudens die bepalings van paragraaf (c) die rekords bedoel in paragraaf (a), uitgesonderd persoonlike mediese rekords van werknemers, beskikbaar stel vir inspeksie deur 'n inspekteur;

(c) op formele skriftelike toestemming van 'n werknemer, enige persoon toelaat om die rekords met betrekking tot die betrokke werknemer te ondersoek;

(d) die rekords van alle beramings en lugmonitering beskikbaar stel ter insae van die betrokke gesondheids- en veiligheidsverteenwoordiger of betrokke gesondheids- en veiligheidskomitee;

(e) alle rekords van beramings en lugmoniterings vir minstens 30 jaar bewaar;

(f) alle mediesewaaktoesigrekords vir minstens 30 jaar bewaar en, indien 'n werkgewer sy of haar bedrywighede staak, moet al daardie rekords aan die betrokke streekdirekteur oorhandig of per registreerde pos gestuur word; en

(g) rekord hou van die ondersoeke en toetse wat ingevolge regulasie 12 (1) (b) uitgevoer is en van herstelwerk wat uit daardie ondersoeke en toetse voortgespruit het, en die rekords moet vir minstens drie jaar bewaar word.

Beheer oor blootstelling aan GCS

10. (1) 'n Werkgewer moet verseker dat die blootstelling van 'n werknemer óf voorkom word óf, waar dit nie redelikerwys uitvoerbaar is nie, voldoende beheer word: Met dien verstande dat—

(a) waar daar blootstelling is waarvoor daar 'n aanbevole drempel is, die beheer oor die blootstelling as voldoende beskou word indien die blootstellingsvlak onder daardie drempel is, of indien die betrokke gebied gesoneer is en die blootstellingsvlak met behulp van voldoende persoonlike beskermingstoerusting tot onder daardie aanbevole drempel verminder is slegs nadat die vlak verminder is tot so laag as wat redelikerwys uitvoerbaar is met behulp van enige ander metode behalwe persoonlike beskermingstoerusting; of

(b) waar daar blootstelling is waarvoor daar 'n beheerdrempel is, die beheer oor die blootstelling as voldoende beskou word indien die blootstelling verminder word tot 'n vlak so laag onder daardie beheerdrempel as wat redelikerwys uitvoerbaar is: Met dien verstande dat 'n beheerdrempel per geleentheid oorskry kan word indien die werkgewer verseker—

(i) dat die oorskryding sonder 'n beduidende risiko van blootstelling is;

(ii) dat die oorskryding nie 'n aanduiding is van 'n versuim om voldoende beheer uit te oefen nie;

(iii) that during the excursion, the area is temporarily demarcated as prescribed in regulation 8 (b); and

(iv) the provisions of regulation 11 are complied with.

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

(a) by limiting the amount of an HCS used which may contaminate the working environment;

(b) by limiting the number of employees who will be exposed or may be exposed;

(c) by limiting the period during which an employee will be exposed or may be exposed;

(d) by using a substitute for an HCS;

(e) by 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 HCS;

(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 HCS 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 HCS into the atmosphere comply with the provisions of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).

Personal protective equipment and facilities

11. (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 HCS, provide the employee with suitable respiratory protective equipment and protective clothing; and

(b) in the case of an HCS which can be absorbed through the skin, provide the employee with suitable non-HCS impermeable protective equipment.

(iii) dat gedurende die oorskryding, die betrokke werkplek tydelik afgebaken is soos in regulasie 8 (b) voorgeskryf; en

(iv) dat die bepalings van regulasie 11 nagekom is.

(2) Waar redelikerwys uitvoerbaar, moet die werkgewer die blootstelling van 'n werknemer beheer—

(a) deur die hoeveelheid van GCS wat gebruik word en wat die werkplek kan kontamineer, te beperk;

(b) deur die aantal werknemers te beperk wat blootgestel word, of blootgestel kan word;

(c) deur die tydperk te beperk waartydens 'n werknemer blootgestel word, of blootgestel kan word;

(d) deur 'n substituut vir 'n GCS te gebruik;

(e) deur ingenieursbeheermaatreëls vir die beheer van blootstelling in te stel, wat die volgende kan insluit:

(i) Prosesskeiding, outomatisasie of insluiting;

(ii) die installering van plaaslike uitsuigventilasiestelsels aan prosesse, toerusting en gereedskap vir die beheer van die vrylating van 'n luggedraagde GCS;

(iii) die gebruik van nat metodes; en

(iv) afsonderlike werkplekke vir verskillende prosesse;

(f) deur geskikte werkprosedures in te stel wat 'n werknemer moet volg in die geval waar materiale gebruik word of prosesse uitgevoer word, wat blootstelling van 'n werknemer tot gevolg kan hê, welke prosedures skriftelike instruksies moet insluit om te verseker—

(i) dat 'n GCS veilig gehanteer, gebruik en mee weggedoen word;

(ii) dat prosesmasjinerie, installasies, toerusting, gereedskap en plaaslike uitsuig- en algemene ventilasiestelsels veilig gebruik en in stand gehou word;

(iii) dat masjinerie en werkgebiede skoongehou word; en

(iv) dat vroegtydige korrektiewe optrede, geredelik geïdentifiseer kan word.

(3) 'n Werkgewer moet verseker dat die vrylating van 'n GCS in die atmosfeer voldoen aan die bepalings van die Wet op die Voorkoming van Lugbesoedeling, 1965 (Wet No. 45 van 1965).

Persoonlike beskermingstoerusting en fasiliteite

11. (1) Indien dit nie redelikerwys uitvoerbaar is om te verseker dat die blootstelling van 'n werknemer voldoende beheer word soos bedoel in regulasie 10 nie, moet 'n werkgewer—

(a) in die geval van 'n luggedraagde GCS, die werknemer voorsien van geskikte asemhalingsbeskermingstoerusting en beskermende klerasie; en

(b) in die geval van 'n GCS wat deur die vel geabsorbeer kan word, die werknemer voorsien van geskikte nie-GCS-deurlatende beskermende toerusting.

(2) 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 HCS;

(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.

(3) 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 therefor.

(4) 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 the 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—

(i) the equipment shall be packed in impermeable containers;

(ii) the containers shall be tightly sealed and have clear indication thereon that the contents thereof are contaminated; and

(iii) 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 HCS 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

(2) Waar asemhalingsbeskermingstoerusting voorsien word, moet 'n werkgewer verseker—

(a) dat die betrokke toerusting geskik is om blootstelling te beheer tot onder die BBd vir die betrokke GCS;

(b) dat die betrokke toerusting korrek gekies en behoorlik gebruik word;

(c) dat die inligting, instruksies, opleiding en toesighouding wat nodig is ten opsigte van die gebruik van die toerusting aan die werknemers bekend is; en

(d) dat die toerusting in 'n goeie en doeltreffende werkende toestand gehou word.

(3) 'n Werkgewer moet, vir sover dit redelikerwys uitvoerbaar is—

(a) geen persoonlike beskermende toerusting wat gebruik was, aan 'n werknemer uitreik nie, tensy die betrokke beskermende toerusting gedekontamineer en gesteriliseer is;

(b) afsonderlike houers of bergingsfasiliteite vir persoonlike beskermende toerusting voorsien wanneer dit nie in gebruik is nie; en

(c) verseker dat alle persoonlike beskermende toerusting wat nie in gebruik is nie, slegs in die plek geberg is wat daarvoor voorsien is.

(4) 'n Werkgewer moet, vir sover dit redelikerwys uitvoerbaar is, verseker dat alle gekontamineerde persoonlike beskermende toerusting skoongemaak en hanteer word ooreenkomstig die volgende prosedures:

(a) Waar die toerusting op 'n werkgewer se perseel skoongemaak word, moet sorg gedra word dat kontaminasie tydens hantering, vervoer en skoonmaak voorkom word;

(b) waar die toerusting vir skoonmaakdoeleindes van die perseel af weg na 'n kontrakteur gestuur word—

(i) moet die toerusting in nie-deurlatende houers verpak word;

(ii) moet die houers dig verseël word en moet duidelik daarop aangedui word dat die inhoud daarvan gekontamineerd is; en

(iii) moet die betrokke kontrakteur ten volle ingelig word oor die vereistes van hierdie regulasies en die voorsorg wat getref moet word vir die hantering van die gekontamineerde toerusting.

(5) Behoudens die bepalings van subregulasie (4) (b), moet 'n werkgewer voorkom dat niemand vuil of gekontamineerde persoonlike beskermingstoerusting van die werkplek verwyder nie: Met dien verstande dat waar gekontamineerde persoonlike beskermende toerusting mee weggedoen moet word, dit as GCS-afval hanteer moet word soos bedoel in regulasie 15.

(6) Behoudens die bepalings van die Fasiliteiteregulasies moet 'n werkgewer, waar redelikerwys uitvoerbaar, 'n werknemer wat persoonlike beskermingstoerusting gebruik soos bedoel in subregulasie (1), voorsien van—

(a) toereikende wasfasiliteite wat geredelik toeganklik moet wees en in 'n gebied geleë moet wees waar die fasiliteite nie gekontamineer sal

enable the employees to meet a standard of personal hygiene consistent with the adequate control of exposure, and to avoid the spread of an HCS;

(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 HCS to the extent that the HCS could endanger the health of persons outside the workplace.

Maintenance of control measures

12. 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 or by a person whose ability to do the measurements and tests is verified by an approved inspection authority.

Prohibitions

13. 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 HCS from any surface or person; or

(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.

Labelling, packaging, transportation and storage

14. An employer shall, in order to avoid the spread of contamination of an HCS, take steps, as far as is reasonably practicable, to ensure—

(a) that the HCS in storage or distributed are properly identified, classified and handled in accordance with SABS 072 and SABS 0228;

(b) that a container or a vehicle in which an HCS is transported, is clearly identified, classified and packed in accordance with SABS 0228 and SABS 0229; and

(c) that any container into which an HCS is decanted, is clearly labelled with regard to the contents thereof.

Disposal of hazardous chemical substances

15. An employer shall as far as is reasonably practicable—

(a) recycle all HCS waste;

(b) ensure that all collected HCS waste is placed into containers that will prevent the likelihood of exposure during handling;

word nie ten einde dit vir die werknemer moontlik te maak om te voldoen aan 'n standaard van persoonlike higiëne wat in ooreenstemming is met die toereikende beheer van blootstelling, en om die verspreiding van 'n GCS te vermy;

(b) twee afsonderlike sluitkaste wat onderskeidelik gemerk is "beskermende klerasie" en "persoonlike klerasie", en verseker dat die klerasie afsonderlik in die betrokke sluitkas gehou word; en

(c) afsonderlike "skoon" en "vuil" kleedkamers indien 'n werkgewer 'n GCS gebruik of prosesseer in die mate dat die GCS die gesondheid van persone buite die werkplek in gevaar kan stel.

Instandhouding van beheermaatreëls

12. 'n Werkgewer moet verseker—

(a) dat alle beheertoerusting en fasiliteite wat ingevolge regulasies 10 en 11 voorsien is, in 'n goeie werkende toestand gehou word; en

(b) dat deeglike ondersoeke en toetse van ingenieursbeheermaatreëls met tussenposes van hoogstens 24 maande uitgevoer word, deur 'n goedgekeurde inspeksie-owerheid of deur 'n persoon wie se vermoë om die ondersoeke en toetse uit te voer, deur 'n goedgekeurde inspeksie-owerheid geverifieer is.

Verbodsbepalings

13. Niemand mag, vir sover dit redelikerwys uitvoerbaar is—

(a) saamgeperste lug gebruik of toelaat dat saamgeperste lug gebruik word om deeltjies van 'n GCS van enige oppervlak of persoon te verwyder nie; of

(b) in 'n respiratorsone rook, eet, drink of kos of drank aanhou nie, of toelaat dat iemand in daardie sone rook, eet, drink of kos of drank aanhou nie.

Etikettering, verpakking, vervoer en berging

14. Ten einde die verspreiding van kontaminasie van 'n GCS te voorkom, moet die werkgewer, vir sover dit redelikerwys uitvoerbaar is, stappe doen om te verseker—

(a) dat die GCS wat geberg, of versprei word, behoorlik geïdentifiseer, geklassifiseer en hanteer word ooreenkomstig SABS 072 en SABS 0228;

(b) dat 'n houer of 'n voertuig waarin of waarop 'n GCS vervoer word, duidelik geïdentifiseer, geklassifiseer en verpak word ooreenkomstig SABS 0228 en SABS 0229; en

(c) dat enige houer waarin 'n GCS gegooi word, duidelik geëtikeer is ten opsigte van die inhoud daarvan.

Wegdoening van gevaarlike chemiese substansies

15. 'n Werkgewer moet, vir sover dit redelikerwys uitvoerbaar is—

(a) alle GCS-afval hersirkuleer;

(b) verseker dat alle versamelde GCS-afval in houers geplaas word wat die moontlikheid van blootstelling tydens hantering, sal voorkom;

(c) ensure that all vehicles, re-usable containers and covers which have been in contact with HCS 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;

(d) ensure that all HCS waste which can cause exposure, is disposed of only on sites specifically designated for this purpose in terms of the Environmental Conservation Act, 1989 (Act No. 73 of 1989), in such a manner that it does not cause a hazard inside or outside the site concerned;

(e) ensure that all employees occupied in the collection, transport and disposal of HCS waste, who may be exposed to that waste, are provided with suitable personal protective equipment; and

(f) 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.

Offences and penalties

16. 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 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 R200 for each day on which the offence continues or additional imprisonment of one day for each day on which the offence continues: Provided that the period of such additional imprisonment in no case exceeds 90 days.

Short title

17. These regulations shall be called the **Regulations for Hazardous Chemical Substances, 1995.**

ANNEXURE 1

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993

HCS GUIDE LINES

PREVENTION AND CONTROL OF EXPOSURE

1. Exposure of employees to substances 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 Substances (HCS), 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 HCS Regulations.

(c) verseker dat alle voertuie, herbruikbare hours en bedekkings wat met GCS-afval in aanraking was, na gebruik op so 'n wyse skoongemaak en gedekontamineer word dat die voertuie, houers of bedekkings nie 'n bedreiging binne of buite die betrokke perseel is nie;

(d) verseker dat alle GCS-afval wat blootstelling kan veroorsaak, slegs op 'n plek wat spesifiek vir daardie doel ingevolge die Wet op Omgewingsbewaring, 1989 (Wet No. 73 van 1989), aangewys is, mee weggedoen word op so 'n wyse dat dit nie 'n bedreiging binne of buite die betrokke plek is nie;

(e) verseker dat alle werknemers betrokke by die versameling, vervoer en wegdoening van GCS-afval, wat blootgestel kan word aan daardie afval, voorsien is van geskikte persoonlike beskermingstoerusting; en

(f) verseker dat indien daar gebruik gemaak word van die dienste van 'n afvalwegdoeningskontrakteur vir die wegdoening van afval, 'n bepaling in die betrokke kontrak geïnkorporeer word wat stipuleer dat die kontrakteur aan die bepalings van hierdie regulasies moet voldoen.

Oortredings en strawwe

16. Iemand wat enige bepaling van regulasie 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 of 15 oortree of versuim om daaraan te voldoen, is aan 'n misdryf skuldig en by skuldigbevinding strafbaar met 'n boete of met gevangenisstraf vir 'n tydperk van hoogstens ses maande, en, in die geval van 'n aanhoudende misdryf, met 'n bykomende boete van R200 vir elke dag waarop die misdryf voortduur of bykomende gevangenisstraf van een dag vir elke dag waarop die misdryf voortduur: Met dien verstande dat die tydperk van sodanige bykomende gevangenisstraf in geen geval 90 dae oorskry nie.

Kort titel

17. Hierdie regulasies heet die **Regulasies vir Gevaarlike Chemiese Substansies, 1995.**

AANHANGSEL 1

WET OP BEROEPSGESONDHEID EN VEILIGHEID, 1993

GIDSNOTAS VIR GCS'e

VOORKOMING VAN EN BEHEER OOR BLOOTSTELLING

1. Die blootstelling van werknemers aan substansies wat gevaarlik is vir die gesondheid behoort voorkom te word of, waar dit nie redelikerwys uitvoerbaar is nie, toereikend beheer te word. Dit is 'n fundamentele vereiste van die Regulasies vir Gevaarlike Chemiese Substansies (GCS'e), 1995. Blootstelling kan deur inaseming, ingestie of absorpsie deur die vel plaasvind, maar inaseming is gewoonlik die hoofroete van toegang tot die liggaam. Tabelle 1 en 2 van Aanhangsel 1 bevat 'n lys van die beroepsblootstellingsdrempels wat gebruik moet word om die toereikendheid van beheer oor blootstelling deur inaseming, soos deur die GCS Regulasies vereis, vas te stel.

2. The advice in this document should be taken in the context of the requirements of the HCS Regulations, especially regulation 5 (Assesment of potential exposure), regulation 10 (Control of exposure), regulation 12 (Maintenance of control measures) and regulation 6 (Air monitoring). Substances hazardous to health are defined in regulation 1. There is separate legislation for lead and asbestos and these substances 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 HCS Regulations. Control by personal protective equipment should be applied only when other means are not reasonably practicable.

MEDICAL SURVEILLANCE

4. Medical surveillance of employees is often an important addition to the control measures in the workplace. Regulation 7 (1) of the HCS Regulations specifies where medical surveillance is appropriate for the protection of the health of employees.

4.1 Medical surveillance is defined in the Regulations to cover the *spectrum* of potential effects of an HCS on an employee, from absorption of the substances through to clinical disease. Medical surveillance may be grouped broadly into—

(a) biological monitoring, to measure the extent of absorption of an HCS by the employee.

(b) medical screening, to detect any adverse affects of an HCS on the employee.

4.2 BIOLOGICAL MONITORING OF EXPOSURE

4.2.1 Objectives

Biological monitoring of exposure can be divided into two types of testing:

(a) Biological monitoring: Measures the biochemical concentrations of HCSs and/or their metabolites in biological samples of exposed individuals, e.g. blood lead for inorganic lead exposure, or urinary arsenic for inorganic arsenic exposure. The aim is to measure the degree of absorption into the body by measuring indicators in representative biological samples, typically urine or blood (usually not related to the target organ).

(b) Biological effect monitoring: Determines the intensity of biochemical or physiological change due to exposure, e.g. red cell cholinesterase for exposure to organosphosphate pesticides, or zinc protoporphyrin (ZPP) for exposure to inorganic lead.

2. Die advies in hierdie dokument moet gevolg word in samehang met die vereistes van die GCS Regulasies, veral regulasie 5 (Beraming van potensiële blootstelling), regulasie 10 (Beheer oor blootstelling), regulasie 12 (Instandhouding van beheermaatreëls) en regulasie 6 (Lugmonitering). Substansies wat gevaarlik is vir die gesondheid word in regulasie 1 omskryf. Daar is afsonderlike wetgewing vir lood en asbes en hierdie substansies word nie in besonderhede in hierdie dokument gedek nie. Hierdie dokument is ook nie op blootstelling ondergronds in myne of blootstelling aan mikro-organismes van toepassing nie.

3. Toereikende beheer oor blootstelling (wanneer voorkoming nie redelikerwys uitvoerbaar is nie) behoort verkry te word deur 'n hiërargie van beheermaatreëls wat in regulasie 10 van die Regulasies vir GCS'e beskryf word. Beheer deur persoonlike beskermingstoerusting behoort toegepas te word slegs wanneer ander middele nie redelikerwys uitvoerbaar is nie.

MEDIESE WAAKTOESIG

4. Mediese waaktoesig oor werknemers is dikwels 'n belangrike aanvulling by beheermaatreëls in die werkplek. Regulasie 7 (1) van die GCS Regulasies spesifiseer waar mediese waaktoesig vir die beskerming van die gesondheid van werknemers toepaslik is.

4.1 Mediese waaktoesig is in die Regulasies omskryf om die *spektrum* van potensiële uitwerkings van 'n GCS op 'n werknemer te dek van die absorpsie van die substansie tot die opdoening van 'n kliniese siekte. Mediese waaktoesig kan in die breë gegroepeer word in—

(a) biologiese monitering, om die mate van absorpsie van 'n GCS deur die werknemer te meet; en

(b) mediese sifting, om enige skadelike uitwerking van 'n GCS op die werknemer op te spoor.

4.2 BIOLOGIESE MONITERING VAN BLOOTSTELLING

4.2.1 Doelwitte

Die biologiese monitering van blootstelling kan in twee soorte toetsings verdeel word:

(a) Biologiese Monitering: Meet die biochemiese konsentrasie van GCS'e en/of hul metaboliete in biologiese monsters van blootgestelde individue, bv. bloedlood vir anorganiese loodblootstelling, of urinêre arseen vir anorganiese arseen blootstelling. Die doel is om die graad van absorpsie in die liggaam vas te stel deur die meting van indikators in verteenwoordigende biologiese monsters, kenmerkend urine of bloed (gewoonlik nie verwant aan die teikenorgaan nie).

(b) Biologiese uitwerking monitering: Bepaal die intensiteit van biochemiese of fisiologiese verandering veroorsaak deur blootstelling, bv. rooi-sel-cholinesterase vir blootstelling aan organofosfaat-plaagdoders of sinkproporfirien (ZPP) vir blootstelling aan anorganiese lood.

4.2.2 Uses of biological monitoring

Biological monitoring tests are indices of an individual's exposure and they may be a useful tool for the occupational health and safety team. They give information on the overall level of exposure, regardless of whether an HCS has been absorbed by the respiratory, oral, or cutaneous route. Cutaneous absorption can play a significant role in the case of some organic compounds. The amounts absorbed through the skin may be comparable to or even higher than those absorbed via the respiratory tract.

Where appropriate, environmental control measures may thus be supplemented, with biological monitoring. Knowledge of the real individual exposure permits targeted applications of preventive measures.

4.2.3 Important considerations in biological monitoring

(a) In choosing a test to meet the above objectives, it is important to have an understanding of the relationship between environmental exposure and the concentration of an HCS in biological samples. This includes an understanding of the principles of absorption, biotransformation, distribution and excretion of an HCS.

(b) In addition, there should be analytical methods available of sufficient sensitivity and specificity to detect concentrations of the substance in urine, blood or exhaled air in the range likely to be encountered in industry.

(c) The HCSs listed in Table 3 of Annexure 1 are those for which the above criteria have a reasonable change of being met.

4.2.4 Biological Exposure Indices (BEIs)

BEIs are reference values intended as guidelines for the evaluation of potential health hazards in the practice of industrial hygiene. A BEI represents in theory the level of an HCS or metabolite most likely to be observed in a specimen collected from a healthy worker who has been exposed to an HCS 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 effects below the BEI.

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.

4.2.2 Nut van biolobiese monitering

Biologiese moniteringstoetse is indekse van 'n individu se blootstelling en hulle kan nuttige middele vir die gesondheids- en veiligheidspan wees. Hulle gee inligting oor die algehele vlak van blootstelling, ongeag of 'n GCS deur die asemhalings-, mond- of velroete geabsorbeer is. Velabsorpsie kan in die geval van sommige organiese verbindings 'n betekenisvolle rol speel. Die hoeveelhede deur die vel geabsorbeer, kan vergelykbaar wees aan of selfs hoër as dié deur die asemhalingskanaal geabsorbeer.

Waar toepaslik, mag omgewingsbeheermaatreëls dus met biologiese monitering aangevul word. Kennis van die werklike individuele blootstelling maak die beoogde toepassing van voorkomingsmaatreëls moontlik.

4.2.3 Belangrike oorwegings vir biologiese monitering

(a) Wanneer 'n toets gekies word om bogenoemde doelwitte na te kom, is dit belangrik om 'n begrip te hê van die verhouding tussen omgewingsblootstelling en die konsentrasie van 'n GCS in biologiese monsters. Dit sluit 'n begrip van die beginsels van absorpsie, biotransformasie, verspreiding en uitskeiding van 'n GCS in.

(b) Daarbenewens behoort daar ontledingsmetodes beskikbaar te wees wat van voldoende sensitiwiteit en spesifisiteit is om konsentrasies van die substansie in urine, bloed of uitgeasemde lug in die reeks wat moontlik in industrie teëgekom kan word, op te spoor.

(c) Die GCS'e wat in Tabel 3 van Aanhangsel 1 gelys word, is dié waarvoor daar vir bogenoemde kriteria 'n redelike kans van nakoming is.

4.2.4 Biologiese Blootstellingsindekse (BBi's)

BBi's is verwysingswaardes bedoel as riglyne vir die evaluering van potensiële gesondheidsbedrygings in die nywerheidshigiënepraktyk. 'n BBi verteenwoordig teoreties die vlak van 'n GCS of metaboliet wat die grootste waarskynlikheid het om waargeneem te word in 'n monster versamel van 'n gesonde werker wat in dieselfde mate as die werker met inasemingsblootstelling aan die BBd-TBG, aan die GCS blootgestel is. BBi's verteenwoordig nie 'n duidelike onderskeid tussen bedreigende en nie-bedreigende blootstellings nie. Byvoorbeeld, as gevolg van biologiese veranderlikheid, is dit moontlik dat 'n individu se metings die BBi kan oorskry sonder om 'n groter gesondheidsrisiko te loop. Daarteenoor mag daar sommige vatbare individue wees wat geaffekteer mag word by uitwerkings onder die BBi.

Indien metings in monsters by verskillende geleenthede van 'n werker verkry, aanhoudend die BBi oorskry, of indien die meerderheid metings in monsters verkry van werkers by dieselfde werkplek, die BBi oorskry, moet die oorsaak van die oormatige waardes ondersoek word en moet daar behoorlik opgetree word om blootstelling te verminder.

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 illness.

4.3 MEDICAL SCREENING

4.3.1 Objectives

(a) The principle of general medical screening is to detect a disease at an early subclinical or presymptomatic stage in order to take action to reverse these effects or to slow progression of the disease. The abnormalities sought, include pathophysiological or histopathological changes. Such tests are well established in general preventative medicine, e.g. PAP smears for cervical cancer, cholesterol screening, faecal occult blood for lower bowel cancer, etc.

(b) In medical surveillance in industry one is interested not only in detecting adverse effects in the individual, but also in the implication of the findings for the effectiveness of workplace control measures. Medical surveillance is thus directed not only at early adverse effects but also at established disease.

4.3.2 Types of examination

(a) The number of validated screening tests with regard to HCSs is smaller than in general preventive medicine, but is likely to grow in the future. Examples of subclinical tests include urinary cytology for bladder cancer among workers exposed to potential bladder carcinogens, or full blood counts for employees exposed to an HCS toxic for the bloodforming organs.

(b) Medical surveillance may include simple clinical examination, such as examination of the skin of employees exposed to contact irritants or allergens, or of the nasal septum of employees exposed to chromates.

(c) Chest X-rays for silicosis are an example of screening for irreversible (although potentially progressive) disease. Lung function testing is well established as a non-specific test for the possible effect of respiratory irritants, sensitisers and fibrogenic agents.

4.4 DESIGNING AND IMPLEMENTING A PROGRAMME OF MEDICAL SURVEILLANCE

4.4.1 The following steps should be included in any programme:

(a) *Risk assessment* to determine the potential exposure to and routes of absorption of any HCS, as required by regulation 5.

(b) *Identification of target-organ toxicity,* so as to direct medical screening.

BBi's is van toepassing op agtuurblootstellings, vyf dae per week BBi's vir veranderende werkskedules mag egter op farmakokinetiese basisse geëkstrapoleer word. BBi's behoort nie gebruik te word om nieberoepsverwante blootstelling aan lug- en waterbesoedelende stowwe te bepaal nie. Die BBi's is nie bedoel as 'n maatreël vir skadelike uitwerkings of vir die diagnose van beroepsiektes nie.

4.3.1 MEDIESE SIFTING

4.3 Doelwitte

(a) Die beginsel van algemene mediese sifting is om 'n siekte op 'n vroeë subkliniese of presimptomatiese stadium op te spoor ten einde op te tree om hierdie uitwerkings om te keer of om progressie van die siekte te vertraag. Die abnormaliteite wat gesoek word, sluit patofisiologiese of histopatologiese veranderinge in. Sulke toetse is goed gevestig in algemene voorkomende geneeskunde, bv. PAP-smere vir servikale kanker, cholesterolsifting en ontlastingsverborge bloed vir dikdermkanker, ens.

(b) Met mediese waaktoesig in die nywerheid stel 'n mens nie net belang in die opsporing van skadelike uitwerkings op die individu nie, maar ook in die implikasie van die bevindings vir die doeltreffendheid van werkplekbeheermaatreëls. Mediese waaktoesig is dus nie net op vroeë skadelike uitwerkings gerig nie, maar ook op gevestigde siektes.

4.3.2 Soorte ondersoeke

(a) Die aantal geldigverklaarde siftingstoetse ten opsigte van GCS'e is kleiner as in algemene voorkomende geneeskunde, maar sal waarskynlik toeneem in die toekoms. Voorbeelde van subkliniese toetse sluit in urinêre sitologie vir blaaskanker onder werkers wat aan potensiële blaaskarsinogene blootgestel word bv. volle bloedtellings vir werknemers blootgestel aan 'n GCS wat giftig is vir die bloedvormende organe.

(b) Mediese waaktoesig kan eenvoudige ondersoeke insluit soos die ondersoek van die vel van werknemers wat blootgestel word aan kontakprikkelstowwe of allergene, of van die nasale septum van werknemers wat aan chromate blootgestel word.

(c) Bors-X-strale vir silikose is 'n voorbeeld van sifting vir onomkeerbare (alhoewel potensieël progressiewe) siektes. Longfunksietoetsing is goed gevestig as 'n nie-spesifieke toets vir die moontlike uitwerking van asemhalingsprikkelstowwe, sensitiseerders en fibrogeniese agense.

4.4 DIE ONTWERP EN IMPLEMENTERING VAN 'N PROGRAM VAN MEDIESE WAAKTOESIG

4.4.1 Die volgende stappe behoort by enige program ingesluit te word:

(a) *Risikoberaming* om die potensiële blootstelling aan en roete van absorpsie van enige GCS, soos vereis by regulasie 5, te bepaal.

(b) *Identifisering van teikenorgaan-toksisiteit,* om mediese sifting te rig.

(c) *Selection of appropriate tests and testing schedule.* Tests should have the desirable operating characteristics of high sensitivity, specificity, reliability and predictive value. The frequency of testing is 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.

(d) *Development of action criteria.* These are provided for some HCSs in the form of BEIs in Table 3 of Annexure 1. Criteria for interpreting lung function testing have also been published in the medical literature. However, in many cases, the occupational health practitioners 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 in the testing site and in the laboratory contracted to carry out analyses. Consistency over time should be sought so as to make longitudinal measurements comparable.

(f) *Ethical considerations.* 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. An employee must be notified of the results and interpretation of his/her tests and any recommendations made. The confidentiality of personal medical records is laid down by regulation 9.

(g) *Determination of employee's fitness to remain in that job.* [Regulation 7 (3)]. Results may be compared against the action criteria (BEI if relevant), and preferably also the employee's previous results to determine whether individual action needs to be taken. Action may include repeating the test, further medical examination, removal of the employee from further exposure, and notification of the employer. 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.

(h) *Evaluation of control.* An abnormal finding in an employee, or a pattern of findings in a group of employees, may point to inadequate primary control of exposure. In such cases the employer needs to be notified of such details of the medical findings as are necessary to evaluate the workplace problem and take remedial action.

(i) *Recordkeeping.* This includes both medical records and exposure information for every employee. While the employer is responsible for recordkeeping in terms of regulation 9, the contents of personal medical records may be accessible to the occupational medicine practitioner, the employee, and any person nominated by the employee in writing.

(c) *Seleksie van toepaslike toetse en toetsskedules.* Toetse behoort die gewensde bedryfeienskappe van hoë sensitiwiteit, spesifisiteit, betroubaarheid en voorspelbaarheid te hê. Die frekwensie van toetsing word neergelê ingevolge regulasie 7 (2), maar behoort in enige geval op 'n begrip van die aard van die bedreiging en die natuurlike geskiedenis van enige nadelige uitwerkings gebaseer te word.

(d) *Ontwikkeling van aksiekriteria.* Hierdie kriteria word vir sommige GCS'e voorsien in die vorm van BBi's in Tabel 3 van Aanhangsel 1. Kriteria vir die interpretering van longfunksietoetsing verskyn ook in mediese literatuur. In baie gevalle sal die beroepsgesondheidspraktisyns egter pragmatiese kriteria binne die konteks van 'n bepaalde werkplek moet ontwikkel.

(e) *Standaardisering van toetsproses.* Gehalteheer moet beide op die toetsterrein en in die laboratorium wat uitgekontrakteer is om ontledings uit te voer, uitgeoefen word. Konsekwentheid behoort oor tyd nagestreef te word om longitudinale metings vergelykbaar te maak;

(f) *Etiese oorwegings.* Die inligting en opleiding van werknemers soos vereis deur regulasie 3 (1), behoort die rasionaal om mesiese waaktoesig te doen en die gevolg van abnormale bevindings, in te sluit. Die werknemer moet van die uitslae en interpretasie van sy/haar toetse en enige aanbevelings wat gemaak is, in kennis gestel word. Die vertroulikheid van persoonlike mediese rekords word in regulasie 9 neergelê.

(g) *Bepaling van werknemer se geskiktheid om daardie werk te bly doen.* [Regulasie 7 (3)]. Uitslae kan teen die aksiekriteria (BBi indien relevant), en verkieslik ook die werknemer se vorige uitslae, vergelyk word om te bepaal of individuele aksie geneem moet word. Aksie kan die herhaling van die toets, verdere mediese ondersoeke, verwydering van die werknemer van verdere blootstelling, en die inkennisstelling van die werkgewer, insluit. Samewerking van werknemers kan die beste verseker word deur 'n beleid van beskerming van diensvoorwaardes in die geval van mediese verwydering van 'n bepaalde werk.

(h) *Evaluering van beheer.* 'n Abnormale bevinding in 'n werknemer, of 'n patroon van bevindings in 'n groep werknemers, kan dui op onvoldoende primêre beheer van blootstelling. In sulke gevalle, moet die werkgewer in kennis gestel word van die details van die mediese bevindings wat nodig is om die werkplek-probleem te evalueer en regstellende aksie te neem.

(i) *Rekordhou.* Dit sluit beide mediese rekords en blootstellingsinligting vir elke werknemer in. Terwyl die werkgewer ingevolge regulasie 9 verantwoordelik is vir rekordhouding, mag die inhoud van persoonlike mediese rekords toeganklik wees vir 'n beroepsgeneeskundige, die werknemer en enige persoon skriftelik deur die werknemer benoem.

4.4.2 The onus is on the occupational health practitioner carrying out medical surveillance to be familiar with the latest scientific information regarding the HCS and tests that might be useful. The aim should be to design a programme that is rational, ethical and effective. This may have to be done in the face of incomplete information or uncertainty regarding exposures, toxicity and test performance.

LEGAL BACKGROUND TO EXPOSURE LIMITS

5. Two types of occupational exposure limits are defined in regulation 1 of the HCS Regulations. The two types are *occupational exposure limit—control limit* (OEL—CL), and *occupational exposure—limit recommended* limit (OEL—RL), as listed in Tables 1 and 2 of Annexure 1. 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—CL, a residual risk may exist and the level set, takes socio-economic factors into account. Further details are given in paragraphs 8 to 16.

6. Regulation 10 of the HCS Regulations lays down the requirements for the use of an OEL—CL and an OEL—RL for HCS for the purpose of achieving adequate control. Regulation 10 (1) requires that, where there is exposure to a substance for which an OEL—CL is specified in Table 1 of Annexure 1, the control of exposure shall, so far as inhalation of that substance 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—CL.

7. Regulation 10 (1) of the HCS Regulations requires that, where there is exposure to a substance for which an OEL—RL has been approved, the control of exposure shall, so far as inhalation of that substance 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

8. OEL—RL and OEL—CL 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 (TC 7) of the Advisory Council for Occupational Health and Safety.

9. TC 7 must first consider what *type* of limit is appropriate, OEL—RL or OEL—CL, 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. If, however, TC 7 decides that an OEL—CL is more appropriate, consideration of the level at which to set the limit passes to the Advisory Council, since it involves socio-economic judgments, balancing risk to health against the cost and effort of reducing exposure.

4.4.2 Die onus rus op die beroepsgesondheidspraktisyn wat die mediese waaktoesig uitoefen om met die nuutste wetenskaplike inligting met betrekking tot die GCS en toetse wat nuttig mag wees, vertroud te raak. Die doel behoort te wees om 'n program te ontwerp wat rasioneel, eties en doeltreffend is. Dit moet dalk ten spyte van onvoltooide inligting of onsekerheid rakende blootstellings, toksisiteit en toetsuitvoering gedoen word.

WETLIKE AGTERGROND VAN BLOOTSTELLINGSDREMPELS

5. Twee soorte beroepsblootstellingsdrempels word in regulasie 1 van die GCS Regulasies omskryf. Die twee soorte is *beroepsblootstellingsdrempel — beheerdrempel* (BBd—Bd) en *beroepsblootstellingsdrempel — aanbevole drempel* (BBd—Ad) soos gelys in Tabelle 1 en 2 van Aanhangsel 1. Die hoofverskil tussen die twee soorte drempels is dat 'n BBd — Ad gestel word op 'n vlak waarby daar geen aanduiding van 'n risiko vir gesondheid is nie; vir 'n BBd—Bd mag 'n oorblywende risiko bestaan en by die gestelde vlak word sosio-ekonomiese faktore in ag geneem. Meer besonderhede word in paragrawe 8 tot 16 gegee.

6. Regulasie 10 van die GCS Regulasies bepaal die vereistes vir die gebruik van BBd—Bd en BBd—Ad vir GCS met die oog op die bereiking van toereikende beheer. Regulasie 10 (1) vereis dat waar daar blootstelling is aan 'n substansie waarvoor 'n BBd—Bd in Tabel 1 van Aanhangsel 1 gespesifiseer word, die beheer oor blootstelling, wat die inaseming van daardie substansie betref, as voldoende behandel moet word slegs indien die blootstellingsvlak verminder word tot sover as redelikerwys uitvoerbaar en in enige geval onder die BBd—Bd.

7. Regulasie 10 (1) van die GCS Regulasies vereis dat, waar daar blootstelling is aan 'n substansie waarvoor 'n BBd—Ad goedgekeur is, die beheer oor blootstelling, wat die inaseming van daardie substansie betref, as toereikend behandel moet word indien—

(a) daardie BBd—Ad nie oorskry word nie; of

(b) waar daardie BBd—Ad oorskry word, die werkgewer die redes vir die oorskryding van die standaard identifiseer en toepaslike stappe doen om die situasie so gou redelikerwys uitvoerbaar, reg te stel.

DIE STEL VAN BEROEPSBLOOTSTELLINGSDREMPELS

ADVIESRAAD EN STAANDE KOMITEE

8. BBd—Ad en BBd—Bd word deur die hoofinspekteur op aanbeveling van die Adviesraad vir Beroepsgesondheid en Veiligheid (die Adviesraad), na beraming deur die Staande Komitee No. 7 (TK 7), gestel.

9. TK 7 moet eerstens oorweeg watter *soort* drempel toepaslik is, BBd—Ad of BBd—Bd, en tweedens, by watter *konsentrasie* die drempel gestel behoort te word. Die stel van 'n BBd—Ad is die eerste opsie wat oorweeg moet word en TK 7 kom tot 'n besluit gebaseer op 'n wetenskaplike beoordeling van die beskikbare inligting oor gesondheidseffekte. Indien TK 7 egter besluit dat 'n BBd—Bd meer toepaslik is, word die oorweging van die vlak waarby die drempel gestel moet word, deur die Adviesraad gedoen, aangesien dit sosio-ekonomiese oorwegings behels waar die risiko vir die gesondheid opgeweeg moet word teen die koste en werk verbonde aan blootstellingsvermindering.

Following public consultation, new OEL—CLs and OEL—RLs are listed in Table 1 and Table 2 of Annexure 1 respectively with the approval of the chief inspector.

THE INDICATIVE CRITERIA

10. An OEL—RL can be assigned to a substance, if all three the following criteria are complied with:

There is a no-risk at the exposure limit

Criterion 1: The available scientific evidence allows for the identification, with reasonable certainty, of a concentration 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.

Likely excursions above the exposure limit are unlikely

Criterion 2: Exposure to concentrations higher than that derived under criterion 1 and which could reasonably occur in practice, is unlikely to produce serious short or long-term effects on health over the period of time it might reasonably be expected to take to identify and remedy the cause of excessive exposure.

Compliance is reasonably practicable

Criterion 3: The available evidence indicates that compliance with an OEL—RL, as derived under criterion 1, is reasonably practicable.

11. A substance which does not meet criteria 1,2 and 3, can be assigned an OEL—CL and must meet either of the following criteria:

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

Criterion 5: Socio-economic factors indicate that although the substance meets criteria 1 and 2 for an OEL—RL, a numerically higher value is necessary if the controls associated with certain uses are to be regarded as reasonably practicable.

SETTING AN OEL—RL

12. 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.

Na openbare oorlegpleging, word nuwe BBd—Bd en BBd—Ad met die goedkeuring van die hoofinspekteur in onderskeidelik Tabel 1 en Tabel 2 van Aanhangsel 2 gelys.

DIE AANDUIDENDE KRITERIA

10. 'n BBd—Ad kan aan 'n substansie toegewys word, indien aan al drie die volgende kriteria voldoen word:

Daar is 'n geen-risiko beheerdrempel

Kriterium 1: Die beskikbare wetenskaplike bewyse laat, met redelike sekerheid, die identifisering toe van 'n konsentrasie, waarvan die gemiddelde oor 'n verwysingsperiode bereken is, waarby daar geen aanduiding is nie dat die substansie waarskynlik skadelik vir werknemers sal wees indien hulle dag na dag deur inaseming aan daardie konsentrasie blootgestel word.

Moontlike oorskryding van die blootstellingsdrempel is onwaarskynlik

Kriterium 2: Dit is onwaarskynlik dat blootstelling aan konsentrasies hoër as dié by kriterium 1 afgelei en wat redelikerwys in die praktyk kan plaasvind, ernstige kort- of langtermyneffekte op die gesondheid sal hê oor die tydperk wat daar redelikerwys verwag kan word wat dit sal duur om die oorsaak van oormatige blootstelling te identifiseer en reg te stel.

Voldoening is redelikerwys uitvoerbaar

Kriterium 3: Die beskikbare bewyse dui aan dat voldoening aan die BBd—Ad, soos afgelei uit kriterium 1, redelikerwys uitvoerbaar is.

11. Aan 'n Substansie wat nie aan kriteria 1, 2 en 3 voldoen nie, kan daar 'n BBd—Bd toegewys word en dan moet daar aan albei die volgende kriteria voldoen word:

Kriterium 4: Die beskikbare bewyse oor die substansie bevredig nie kriterium 1 en/of 2 vir 'n BBd—Ad nie en blootstelling aan die substansie het ernstige gesondheidsimplikasies vir werkers, of kan dit moontlik hê; of

Kriterium 5: Sosio-ekonomiese faktore dui daarop dat alhoewel die substansie aan kriteria 1 en 2 vir 'n BBd—Ad voldoen, 'n numeries hoër waarde nodig is indien die beheermaatreëls verbonde aan sekere gebruike as redelikerwys uitvoerbaar beskou word.

DIE STEL VAN 'N BBd—Ad

12. Kriterium 1 sit die fundamentele grondslag vir die vasstelling van so 'n drempel uiteen: Die bestaan van 'n drempel waarbo daar bewyse van beduidende effekte op die gesondheid kan wees, maar waaronder daar, op grond van bestaande kennis, na vermoede geen nadelige effekte is nie.

13. Criterion 2 is necessary in order to take account of HCS Regulation 10 (1) of the HCS 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 reasonbly 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.

14. 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—CL

15. To be assigned an OEL—RL, a substance must meet all the first three criteria; if it does not, then it can be considered for an OEL—CL. To be assigned an OEL—CL, there should be serious implications for the health of workers exposed to the substance. 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—CL has been most often allocated to carcinogens and to other substances for which no threshold of effect can be identified and about which there is no doubt about the seriousness of the effects of exposure.

16. An OEL—CL 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—CL this is still the primary consideration but socio-economic factors are also taken into account.

17. The indicative criteria, then, provide the framework within which the discussions at the various stages of limit-setting can be conducted.

APPLYING OCCUPATIONAL EXPOSURE LIMITS

GENERAL

18. The lists of occupational exposure limits given in Tables 1 and 2 of Annexure 1, unless otherwise stated, relate to personal exposure to substances hazardous to health in the air of the workplace.

13. Kriterium 2 is noodsaaklik ten einde rekening te hou met regulasie 10 (1) van die GCS Regulasies waarby blootstellings bo 'n BBd—Ad toegelaat word op die voorwaarde dat die werkgewer die redes vir die oorskryding van die standaard identifiseer en stappe doen om blootstelling aan die BBd—Ad so gou redelikerwys uitvoerbaar te verminder. Dit is duidelik noodsaaklik om rekening te hou met die waarskynlikheid en waarskynlike omvang van gevalle wanneer daar besluit word of 'n BBd—Ad toepaslik is. Die gesondheidseffekte wat in ag geneem word, sluit in sensoriese en ander effekte soos die vertraging van reflekse wat die belemmering van veiligheid tot gevolg kan hê.

14. Kriterium 3 neem in ag of die nywerheid redelikerwys kan voldoen aan die blootstellingsdrempel afgelei by kriterium 1. Dit het geen nut om 'n BBd—Ad te stel wat eenvoudig nie in die praktyk bereik kan word nie. Let daarop dat die nywerheid se vermoë om daaraan te voldoen, die besluit of 'n BBd—Ad gestel moet word, beïnvloed, maar beïnvloed nie die vlak waarby die BBd—Ad gestel word nie.

DIE STEL VAN 'N BBd—Bd

15. Ten einde 'n BBd—Ad toegewys te word, moet 'n substansie aan al drie die eerste kriteria voldoen; so nie, kan dit vir 'n BBd—Bd oorweeg word. Ten einde 'n BBd—Bd toegewys te word, moet daar ernstige implikasies wees vir die gesondheid van werkers wat aan die substansie blootgestel word. Ernstige gesondheidsimplikasies sluit beide die risiko van ernstige gesondheidseffekte vir 'n klein populasie werkers en die risiko van betreklik geringe gesondheidseffekte vir 'n groot populasie in. In die praktyk word 'n BBd—Bd hoofsaaklik toegewys aan karsinogene en aan ander substansies waarvoor geen effekdrempel geïdentifiseer kan word nie en ten opsigte waarvan daar geen twyfel oor die ernstigheid van die effekte van blootstelling bestaan nie.

16. 'n BBd—Bd en 'n BBd—Ad verskil dus nie net ten opsigte van hul regstatus nie, maar ook ten opsigte van die wyse waarop hulle gestel word. Vir 'n BBd—Ad is die enigste oorweging vir die stel van die drempel die beskerming van die gesondheid van die werknemer; vir 'n BBd—Bd is dit steeds die primêre oorweging, maar sosio-ekonomiese faktore word ook in ag geneem.

17. Die aanduidende kriteria verskaf dus die raamwerk waarbinne die besprekings in die verskillende stadia van drempelstelling gevoer kan word.

TOEPASSING VAN BEROEPSBLOOTSTELLINGSDREMPELS

ALGEMEEN

18. Die lyste beroepsblootstellingsdrempels aangegee in Tabelle 1 en 2 van Aanhangsel 1 het, tensy anders vermeld, betrekking op persoonlike blootstelling aan gesondheidsgevaarlike substansies in die lug van die werkplek.

UNITS OF MEASUREMENT

19. In occupational exposure limits, concentrations of gases and vapours in air are usually expressed in parts per million (ppm), a measure of concentration by volume, as well as in milligrams per cubic metre of air (mg m^{-3}), a measure of concentration by mass. In converting from ppm to mg m^{-3} a temperature of 25 °C and an atmospheric pressure of 101,325 kPa are used. Concentrations of airborne particles (fume, dust, etc) are usually expressed in mg m^{-3}. In the case of dust, the limits in the tables refer to the *total inhalable* fraction unless specifically indicated as referring to the *respirable* fraction (see paragraph 36). In the case of a man-made mineral fibre, the limit is expressed as fibres per millilitre of air (fibres $m\ell^{-1}$).

OCCUPATIONAL EXPOSURE LIMITS — CONTROL LIMITS: OEL—CL (TABLE 1)

20. An OEL—CL is the maximum concentration of an airborne substance, 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 1 of Annexure 1.

21. Regulation 19 (1) of the HCS 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—CL as is reasonably practicable.

22. To comply with this duty, in the case of substances with an 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—CL 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—CL. For substances assigned a short-term limit, such value should never be exceeded.

23. The assessment should also be used to determine the extent to which it is reasonably practicable to reduce exposure further below an OEL—CL as required by regulation 10 (1). In assessing reasonable practicability, the nature of the risk presented by the substance 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 2)

24. An OEL-RL is the concentration of an airborne substance, 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.

METINGSEENHEDE

19. By beroepsblootstellingsdrempels word konsentrasies van gasse en dampe in die lug gewoonlik uitgedruk in dele per miljoen (dpm), 'n meting van konsentrasie volgens volume, asook in milligram per kubieke meter lug (mg m^{-3}), 'n meting van konsentrasie volgens massa. By die omskakeling van dpm na mg m^{-3}, word 'n temperatuur van 25 °C en 'n atmosferiese druk van 101,325 kPa gebruik. Konsentrasies luggedraagde deeltjies (dampe, stof, ens) word gewoonlik in mg m^{-3} uitgedruk. In die geval van stof, verwys die drempels in die tabelle na die *totale inasembare* fraksie tensy spesifiek aangedui as verwysende na die *respireerbare* fraksie (kyk paragraaf 36). Die drempels vir mensgemaakte mineraalvesel word as vesels per milliliter lug (vesels ml^{-1}) uitgedruk.

BEROEPSBLOOTSTELLINGSDREMPELS—BEHEERDREMPELS: BBd—Bd (TABEL 1)

20. 'n BBd—Bd is die maksimum konsentrasie van 'n luggedraagde substansie, waarvan die gemiddelde oor 'n verwysingsperiode bepaal is, waaraan werknemers deur inaseming onder enige omstandighede blootgestel mag word, en word tesame met die toepaslike verwysingsperiode in Tabel 1 van Aanhangsel 1, gespesifiseer.

21. Regulasie 19 (1) van die GCS Regulasies, wanneer saam met die Wet gelees, lê 'n plig op die werkgewer om alle redelike voorsorgmaatreëls te tref en om alle nodige noulettendheid aan die dag te lê om te verseker dat blootstelling so ver onder die BBd—Bd gehou word as wat redelikerwys uitvoerbaar is.

22. Om hierdie plig na te kom, behoort werknemers in die geval van substansies met 'n 8-uurverwysingsperiode, 'n moniteringsprogram ooreenkomstig regulasie 6 te onderneem sodat hulle kan toon (indien dit die geval is) dat die BBd—Bd nie oorskry word nie. So 'n moniteringsprogram hoef nie onderneem te word indien die beraming wat ooreenkomstig regulasie 5 uitgevoer is, toon dat dit hoogs onwaarskynlik is dat die blootstellingsvlak ooit die BBd—Bd sal oorskry nie. Vir substansies waarvoor 'n korttermyndrempel toegewys is, moet sodanige waarde nooit oorskry word nie.

23. Die beraming behoort ook gebruik te word om te bepaal in watter mate dit redelikerwys uitvoerbaar is om blootstelling te verminder tot verder onder die BBd—Bd soos vereis by regulasie 10 (1). Met die beraming van redelik uitvoerbaarheid, moet die aard van die risiko wat die betrokke substansie inhou, opgeweeg word teen die koste en werk verbonde aan die tref van maatreëls om die risiko te verminder. (Kyk ook na die woordomskrywing van "redelikerwys uitvoerbaar" soos in die Wet omskryf.)

BEROEPSBLOOTSTELLINGSDREMPEL—AANBEVOLE DREMPEL: BBd—Ad (TABEL 2)

24. 'n BBd—Ad is die konsentrasie van 'n luggedraagde substansie, waarvan die gemiddelde oor 'n verwysingsperiode bepaal is, waarby, op grond van huidige kennis, daar geen bewyse is nie dat dit waarskynlik skadelik vir werknemers sal wees indien hulle dag na dag deur inaseming aan daardie konsentrasie blootgestel word.

25. For a substance 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 employer's 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.

26. Control of an OEL—RL as prescribed in regulation 10 (1) (a) can always be regarded as adequate control of that substance for the purposes of the HCS Regulations, so far as exposure from inhalation is concerned. However, due to the variations in process control and the fluctuations in substance concentrations in the workplace, it will be prudent for employers to reduce exposure below an OEL—RL so 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

27. The pattern of effects due to exposure to substances hazardous to health varies considerably depending on the nature of the substance and the exposure. Some effects require prolonged or accumulated exposure. The long-term (8-hour time weighted average) exposure limit is intended to control such effects by restricting the total intake by inhalation over one or more workshifts. Other effects may be seen after brief exposures which have occurred once or repeatedly. Short-term limits (usually 15 minute) may be aplied to such substances. Where long-term limits also apply, the short-term limits restrict the magnitude of excursion above the average concentration during longer exposures. 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 sort-term excursions in exposure. With some other substances, brief exposure may be critical and the exposure limit necessary to prevent these excursions will also control any other effects. A separate long-term limit is not considered necessary in such cases and the short-term limit applies throughout the shift.

28. 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 applies to any 15 minute period throughout the working shift.

25. Vir 'n substansie waaraan 'n BBd—Ad toegewys is, moet blootstelling deur inaseming tot daardie standaard verminder word. Indien blootstelling deur inaseming egter die BBd—Ad oorskry, word beheer steeds toereikend geag mits die werkgewer vasgestel het hoekom die BBd—Ad oorskry is en toepaslike stappe doen om so gou redelikerwys uitvoerbaar aan die Bbd—Ad te voldoen. In so 'n geval moet dit die werkgewer se doelwit wees om blootstelling aan die BBd—Ad te verminder, maar die uiteindelike bereiking van hierdie doelwit kan 'n tydjie kos. Die beraming kragtens regulasie 5 sal die dringendheid van die nodige optrede bepaal, met inagneming van die omvang en koste van die vereiste maatreëls in verhouding tot die aard en graad van die betrokke blootstelling.

26. Beheer oor 'n BBd—Ad soos by Regulasie 10 (1) (a) voorgeskryf kan, wat blootstelling deur inaseming betref, vir die doeleindes van die GCS Regulasies altyd as toereikende beheer oor daardie substansie beskou word. Weens die variasies in prosesbeheer en die wisselinge in substansiekonsentrasies in die werkplek sal dit egter verstandig wees as werkgewers blootstelling tot onder die BBd—Ad verminder om sodoende te verseker dat die blootstelling van alle werknemers nie die BBd—Ad oorskry nie. Eweneens, is dit nie die bedoeling dat die statutêre vereistes by regulasie 10 (1) die verdere toepassing ontmoedig van goeie beroepshigiënebeginsels om blootstelling tot onder die BBd—Ad te verminder nie.

LANGTERMYN- EN KORTTERMYNBLOOTSTELLINGSDREMPELS

27. Die patroon van effekte weens blootstelling aan substansies wat gevaarlik is vir die gesondheid, wissel aansienlik na gelang van die aard van die substansie en die blootstelling. Sommige effekte vereis langdurige of opgelope blootstelling. Die langtermyn- (8-uur tydsbeswaarde gemiddelde) blootstellingsdrempel is bedoel om sodanige effekte te beheer deur die totale inname deur inaseming oor een of meer werkskofte te beperk. Ander effekte kan gesien word na kortstondige blootstellings wat eenmalig of herhaaldelik plaasgevind het. Korttermyndrempels (gewoonlik 15 minute) kan op sodanige substansies toegepas word. Waar langtermyndrempels ook van toepassing is, beperk die korttermyndrempels die grootte van afdwalings bo die gemiddelde konsentrasie gedurende langer blootstellings. Vir daardie substansies waarvoor geen korttermyndrempel gespesifiseer word nie, word aanbeveel dat 'n syfer drie maal die langtermyndrempel gebruik word as riglyn om korttermynafdwalings in blootstelling te beheer. By sommige ander substansies kan 'n kortstondige blootstelling kritiek wees en die blootstellingsdrempel wat nodig is om hierdie afdwalings te verhoed, sal ook enige ander effekte beheer. 'n Afsonderlike langtermyndrempel word nie in sodanige gevalle nodig geag nie en die korttermyndrempel is deur die hele skof van toepassing.

28. Blootstellingsdrempels word uitgedruk as luggedraagde konsentrasies waarvan die gemiddelde oor 'n gespesifiseerde tydperk bepaal is. Die tydperk vir die langtermyndrempel is gewoonlik agt uur. Wanneer 'n ander tydperk gebruik word, word dit gemeld. Die gemiddelde tydperk vir die korttermynblootstellingsdrempel is gewoonlik 15 minute. So 'n drempel is van toepassing op enige 15-minuuttydperk deur die hele werkskof.

LIMITATIONS TO THE APPLICATION OF EXPOSURE LIMITS

29. The exposure limits relate to personal exposure with the exception of the annual OEL—CL for vinyl chloride which should be recorded as the time-weighted average of vinyl chloride in the atmosphere of a working place over a period of one year (see Annexure 2) and the OEL—RL for cotton dust is not a personal exposure standard, but a static air standard (see Annexure 4).

30. The limits cannot readily be extrapolated to evaluate or control non-occupational exposure, e.g. levels of contamination in the neighbourhood close to an industrial plant. OELs only apply to persons at work. Employers should also take into account their duties under the Environmental Protection Act. The OELs are also only approved 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 cleaning rooms, but not the higher pressures that may be encountered in, for example, tunnelling or underwater hyperbaric chambers. Such situations require special assessments.

31. Occupational exposure limits, as set out in Tables 1 and 2 of Annexure 1, 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 HCS 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.

32. 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

33. The HCS Regulations and the occupational exposure limits in this publication do not apply to exposure to substances hazardous to health in mines.

LEAD AND ASBESTOS

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

BEPERKINGS BY DIE TOEPASSING VAN BLOOTSTELLINGSDREMPELS

29. Die blootstellingsdrempels hou verband met persoonlike blootstelling, met uitsondering van die jaarlikse BBd—Bd vir vinielchloried, wat aangeteken moet word as die tydbeswaardegemiddelde van vinielchloried in die atmosfeer van 'n werkplek oor 'n tydperk van een jaar (kyk Aanhangsel 2), en die BBd—Ad vir katoenstof, wat nie 'n persoonlike blootstellingstandaard is nie, maar 'n standaard vir statiese lug (kyk Aanhangsel 4).

30. Die drempels kan nie geredelik geëkstrapoleer word om nie-beroepsblootstelling, bv. kontaminasievlakke in die omgewing naby industriële bedryfstoerusting, te evalueer of te beheer nie. BBd's is slegs op persone by die werk van toepassing. Werkgewers moet ook hul pligte kragtens die Wet op Omgewingsbewaring in ag neem. Die BBd's word ook slegs vir gebruik by atmosferiese druk tussen 85 kPa en 101,325 kPa goedgekeur. Dit dek die normale spanwydte van meteorologiese variasies en werkplekke wat effens onder druk is soos skoonmaakkamers, maar nie die hoër drukke wat byvoorbeeld in tonnelbou- of onderwater hiperbariese kamers ondervind mag word nie. Sodanige situasies vereis spesiale beraming.

31. Beroepsblootstellingsdrempels, soos uiteengesit in Tabelle 1 en 2 van Aanhangsel 1, is bedoel vir gebruik vir normale werkstoestande in werkplekke. Werkgewers moet ook hul pligte kragtens die bepalings van die Wet op Omgewingsbewaring in ag neem. BBd's is egter nie ontwerp om ernstige ongelukke of noodgevalle, veral waar werknemers blootgestel mag word aan vinnig stygende konsentrasies gas, te hanteer nie soos wat kan voortspruit uit 'n groot ontsnapping weens die weiering van bedryfstoerusting. Bo en behalwe hul verantwoordelikhede om te verseker dat die vereistes van die GCS Regulasies nagekom word, het werkgewers ook 'n verantwoordelikheid om te verseker dat bedryfstoerusting ontwerp, bedien en in stand gehou word op 'n manier wat ongelukke en noodgevalle vermy. Waar toepaslik, behoort opsporings-, waarskuwings- en reaksiemaatreëls gebruik te word ten einde die uitwerking van enige sodanige onbeplande gebeure te minimeer.

32. Om toereikende bedryfsbeheer te help handhaaf, mag werkgewers dit nuttig vind om hul eie beheeraanwysers te kies wanneer ondersoeke of korrektiewe optrede onderneem word.

BLOOTSTELLING IN MYNE

33. Die GCS Regulasies en die beroepsblootstellingsdrempels in hierdie publikasie is nie van toepassing op myne waar daar blootstelling aan gesondheidsgevaarlike substansies is nie.

LOOD EN ASBES

34. Werk met asbes of lood is nie aan die GCS Regulasies onderhewig nie. Die beheerdrempels vir verskeie tipes asbes en lood word in die Asbesregulasies en die Loodregulasies gespesifiseer.

PESTICIDES

35. Substances 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

36. 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 m^{-3} 8-hour time-weighted average total inhalable dust and 5 mg m^{-3} time-weighted average respirable dust. Such, or greater, dust concentrations should be taken as the *substantial concentrations.* A *substantial* concentration of dust should be taken as a concentration of 10 mg m^3, 8-hour time-weighted average, of total inhalable dust or 5 mg m^3, 8-hour time-weighted average, of respirable dust, where there is no indication of the need for a lower value, and as such they are referred to as *substances hazardous to health.*

TOTAL INHALABLE DUST AND RESPIRABLE DUST

37. *Total inhalable dust* approximates to the fraction of airborne material that enters the nose and mouth during breathing and is therefore available for deposition in the respiratory tract. *Respirable dust* approximates to the fraction which penetrates to the gas exchange region of the lung. A fuller definition is given at the end of Table 2 of Annexure 1 (Abbreviations).

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

FUME

39. 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 substances. The generation of fume is often accompanied by a chemical reaction such as oxidation or thermal breakdown.

ABSORPTION THROUGH THE SKIN

40. In general, for most substances 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 substances 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 atmos-

PLAAGDODERS

35. Substansies wat as aktiewe bestanddele in plaagdoders gebruik word, word onder hul chemiese name en/of hul gewone (ISO) name gelys. Hierdie name kan soms as dele van die name van patentregtelike plaagdoderformulerings gebruik word. In alle gevalle is die blootstellingsdrempel van toepassing op die spesifieke aktiewe bestanddeel en nie op die formulering in die geheel nie.

STOWWE

36. Die algemene benadering wat nodig is om beroepsblootstelling aan stowwe te beheer, is soos volg: beroepsblootstellingsdrempels is nie aan alle stowwe toegewys nie, maar die gebrek aan sodanige drempels impliseer nie die afwesigheid van 'n bedreiging nie. By die afwesigheid van 'n spesifieke blootstellingsdrempel vir 'n bepaalde stof, moet blootstelling toereikend beheer word. Waar daar geen aanduiding van die behoefte aan 'n laer waarde is nie, moet persoonlike blootstelling sowel onder 1 mg m^{-3} 8-uur tydbeswaarde gemiddelde totaal inasembare stof as onder 5 mg/m^{-3} tyd-beswaarde gemiddelde stof, gehou word. Sodanige of groter stofkonsentrasies, moet as die *aansienlike konsentrasies* beskou word. 'n *Aansienlike* konsentrasie stof moet beskou word as 'n konsentrasie van 10 mg/m^{-3}, 8-uur tydbeswaarde gemiddelde, totale inasembare stof of 5 mg/m^{-3}, 8-uur tydsbeswaarde gemiddelde, respireerbare stof, waar daar geen aanduiding van die behoefte aan 'n laer waarde is nie, en as sodanig word dit *gesondheidsgevaarlike substansies* genoem.

TOTAAL INASEMBARE STOF EN RESPIREERBARE STOF

37. Die *Totaal inasembare stof* benader die gedeelte luggedraagde materiaal wat die neus of mond tydens asemhaling binnegaan en dus beskikbaar is vir afsetting in die asemhalingskanaal. *Respireerbare stof* benader die gedeelte wat binnedring tot in die gasuitruilstreek van die long. 'n Meer omvattende omskrywing word aan die einde van Tabel 2 van Aanhangsel 1 (Afkortings) gegee.

38. Waar stowwe komponente bevat wat hul eie toegewese beroepsblootstellingsdrempels het, moet daar aan alle relevante drempels voldoen word.

DAMP

39. Waar 'n afsonderlike blootstellingsdrempel vir *damp* gestel is, moet dit normaalweg toegepas word op soliede partikels wat ontwikkel deur chemiese reaksies of gekondenseer uit die gastoestand, gewoonlik na vervlugtiging van gesmelte substansies. Die ontwikkeling van dampe gaan dikwels vergesel van 'n chemiese reaksie soos oksidasie of termiese afbreking.

ABSORPSIE DEUR DIE VEL

40. In die algemeen is die hoofingangsroete in die liggaam vir die meeste substansies dié deur inaseming. Die beroepsblootstellingsdrempels in hierdie regulasies aangedui, hou uitsluitlik met blootstelling langs hierdie roete verband. Sekere substansies, soos fenol, anilien en sekere plaagdoders (in die Tabelle gemerk met 'n *SK*-notasie) het die vermoë om die onbeskadigde vel binne te dring om sodoende in die liggaam geabsorbeer te word. Absorpsie deur die vel kan plaas-

pheric 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 substances. Where the properties of the substances 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

41. Certain substances 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. Substances 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.

42. 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 substances, the spread of contamination by sensitisers to other working areas should also be prevented, as far as is reasonably practicable.

43. 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 substances not contained in these Tables can act as respiratory sensitisers.

OTHER FACTORS

44. 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 substance. In such cases, specialist advice may be necessary to evaluate the effects of these factors.

MIXED EXPOSURES

GENERAL

45. The majority of OELs listed in Tables 1 and 2 of Annexure 1 are for single compounds or for substances containing a common element or radical, e.g. *tungsten and compounds, and isocyanates.* A few of the limits relate to substances 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

vind weens gelokaliseerde kontaminasie, byvoorbeeld deur 'n spatsel op die vel of klere, of in sekere gevalle weens blootstelling aan hoë atmosferiese konsentrasies damp. Ernstige effekte kan weinig of geen waarskuwing tot gevolg hê en dit is noodsaaklik om spesiale voorsorgmaatreëls te tref om velkontak te voorkom wanneer hierdie substansies gehanteer word. Waar die eienskappe van die substansies en die gebruiksmetodes 'n potensiële blootstellingsroete deur velabsorpsie bied, moet hierdie faktore in ag geneem word wanneer die toereikendheid van die beheermaatreëls bepaal word.

SENSITISEERDERS

41. Sekere substansies kan sensitisering van die asemhalingskanaal veroorsaak indien dit ingeasem word of kontak met die vel plaasvind. Respiratoriese sensitiseerders kan asma, neusslymvliesontsteking of ekstrinsieke allergiese longblasieontsteking veroorsaak. Velsensitiseerders veroorsaak allergiese kontakdermatitis. Substansies wat velsensitisering veroorsaak is nie noodwendig respiratoriese sensitiseerders of andersom nie. Slegs 'n proporsie van die blootgestelde populasie sal gesensitiseer word, en diegene wat wel gesensitiseer word, sou nie vooraf geïdentifiseer gewees het nie. Individue wat gesensitiseer word, kan simptome van swak gesondheid toon na blootstelling selfs aan geringe konsentrasies van die sensitiseerder.

42. Wanneer dit redelikerwys uitvoerbaar is, moet blootstelling aan sensitiseerders voorkom word. Waar dit nie haalbaar is nie, moet blootstelling so laag as redelikerwys uitvoerbaar gehou word en moet aan bedrywighede wat aanleiding gee tot korttermyn-piekkonsentrasies besondere aandag geskenk word. Soos by ander substansies, moet die verspreiding van kontaminasie deur sensitiseerders na ander werksgebiede, sover dit redelikerwys uitvoerbaar is, ook voorkom word.

43. Die *Sen*-notasie (in die Tabelle gemerk met 'n *Sen*-notasie) is toegewys slegs aan dié sensitiseerders wat sensitisering deur inaseming kan veroorsaak. Onthou dat ander substansies wat nie in hierdie Tabelle vervat is nie, as respiratoriese sensitiseerders kan optree.

ANDER FAKTORE

44. Werkstoestande wat addisionele stres op die liggaam plaas soos blootstelling aan ultravioletstraling en hoë temperature, druk en humiditeit, kan die toksiese reaksie op 'n substansie verhoog. In sodanige gevalle mag spesialis-advies nodig wees om die effekte van hierdie faktore te evalueer.

GEMENGDE BLOOTSTELLINGS

ALGEMEEN

45. Die meerderheid BBd's gelys in Tabelle 1 en 2 van Aanhangsel 1 is vir enkelsamestellings of vir substansies wat 'n gemeenskaplike element of radikaal, bv. *wolfram en verbindings, en isosianate,* bevat. 'n Paar van die drempels hou verband met substansies wat gewoonlik aangetref word as komplekse mengsels of samestellings, bv. *witblits, rubberdamp en sweisdamp.* Werkers is egter dikwels onderhewig aan ander gemengde blootstellings waarby vaste stowwe, vloei-

solids, liquids, aerosols or gases. These exposures can arise as a result of work with materials containing a mixture of substances, or from work with several individual substances, 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

46. The ways in which the constituent substances of a mixed exposure interact, vary considerably. Some mixed exposures involve substances that act on different body tissues or organs, or by different toxicological mechanisms, these various effects being independent of each other. Other mixtures will include substances that act on the same organs, or by similar mechanisms, so that the effects reinforce each other and the substances 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 substance potentiates another, causing it to act in a way which it would not do alone.

ASSESSMENT AND CONTROL

47. 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 consituents 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.

48. Where mixed exposure occur, the first step is to ensure adequate control of exposure for each individual substance. However, the nature and amount of the other substances in a mixture can influence the level to which it is reasonable practicable to reduce exposure to a substance subject to an OEL–CL. 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 substances 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 substances concerned. The various types should be considered in the following order:

(a) **Synergistic substances:** Known cases of synergism and potentiation are considerably less common than the other types of behaviour in

stowwe, aërosols of gasse betrokke is. Hierdie blootstellings kan voortspruit uit werk met materiale wat 'n mengsel van substansies bevat, of uit werk met etlike individuele substansies, gelyktydig of agtereenvolgens, in 'n werkskof. Gemengde blootstellings vereis versigtige beraming van hul gesondheidseffekte en die toepaslikheid van beheerstandaarde. Die volgende paragrawe verskaf 'n kort opsomming van die advies oor die toepassing van blootstellingsdrempels in hierdie omstandighede. In alle gevalle waar daar twyfel is, mot spesialis-advies bekom word.

EFFEKTE VAN GEMENGDE BLOOTSTELLINGS

46. Die wyses waarop die samestellende substansies van 'n gemengde blootstelling 'n wisselwerking uitoefen, varieer aansienlik. Sommige gemengde blootstellings behels substansies wat inwerk op verskillende liggaamsweefsels of -organe, of deur verskillende toksikologiese meganismes, terwyl hierdie verskillende effekte onafhanklik van mekaar is. Ander mengsels sal substansies insluit wat op dieselfde organe of deur soortgelyke meganismes inwerk sodat die effekte mekaar versterk en die substansies 'n gesommeerde effek het. In sommige gevalle is die algehele effek aansienlik groter as die som van die individuele effekte en die stelsel is sinergisties. Dit kan voortspruit uit wedersydse versterking van die effekte van die samestellende dele of omdat een substansie 'n ander potensieer en daardeur veroorsaak dat dit op 'n manier optree wat dit nie alleen sal doen nie.

BERAMING EN BEHEER

47. By al die soorte gemengde blootstellings is dit noodsaaklik dat beramings gebaseer word op die konsentrasies van elkeen van die samestellende dele in die lug waaraan werkers blootgestel word. Na gelang van die aard van die samestellende dele en die gebruiksomstandighede, kan die relatiewe konsentrasies van die samestellende dele in die lug aansienlik verskil van dié in die vloeistof- of vaste bronmateriaal. Daar moet nie vir beraming staat gemaak word op die samestelling van die grootmaatmateriaal nie, tensy daar goeie bewyse daarvoor is.

48. Waar gemengde blootstellings plaasvind, is die eerste stap die versekering van toereikende beheer oor blootstelling vir elke individuele substansie. Die aard en hoeveelheid van die ander substansies in 'n mengsel kan egter 'n invloed hê op die vlak tot waar dit redelikerwys uitvoerbaar is om blootstelling aan 'n substansie wat onderworpe is aan 'n BBd–Bd te verminder. Wanneer drempels vir spesifieke mengsels vasgestel is, moet hulle slegs waar hulle toepaslik is, en bykomend by enige relevante individuele drempels, gebruik word. Hulle behoort nie na ontoepaslike situasies uitgebrei word nie. Dit is dan nodig om te beraam of verdere beheer nodig is om enige verhoogde risiko van die substansies wat saamwerk, teen te werk. Kundige beramings vir sommige bepaalde gemengde blootstellings kan beskikbaar wees en kan in soortgelyke gevalle as riglyne gebruik word. In ander gevalle sal 'n deeglike ondersoek van die toksikologiese data nodig wees om te bepaal watter van die hooftipes interaksie (indien daar is) waarskynlik is vir die bepaalde kombinasie van betrokke substansies. Die onderskeie tipes moet in die volgende volgorde oorweeg word:

(a) **Sinergistiese substansies:** Bekende gevalle van sinergisme en potensiëring is aansienlik minder algemeen as die ander tipes gedrag

mixed exposures. However, they are the most serious in their effects and require the most strict 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—

$$C_1/L_1+C_2/L_2+C_3/L_3 \ldots <1$$

here C_1, C_2, etc are the time-weighted average (TWA) concentrations of constituents in air and L_1, L_2, etc are the corresponding exposure limits. The use of this formula is only applicable where the additive substances have been assigned OELs, and L_1, L_2, etc. relate to the same reference period in the list of approved OELs. Where the sum of the C/L fractions does not exceed one, the exposure is considered not to exceed the national OELs. If one of the constituents has been assigned an OEL—CL, 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.

49. 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 more prudent course, particularly where the toxicity data are scarce or difficult to assess.

MONITORING MIXED EXPOSURE

50. 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—CL, the level of the exposure to that substance 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.

in gemengde blootstellings. Hul effekte is egter die ernstigste en hulle vereis die strengste beheer. Hulle is ook die moeilikste om te beraam, en wanneer daar rede is om sodanige interaksie te vermoed, moet spesialis-advies verkry word;

(b) **Additiewe substansies:** Waar daar rede is om aan te neem dat die effekte van die samestellende dele sommerend is, en waar die blootstellingsdrempels op dieselfde gesondheidseffekte gebaseer is, moet die gemengde blootstelling bepaal word met behulp van die formule—

$$C_1/L_1+C_2/L_2+C_3/L_3 \ldots <1$$

waar C_1, C_2, ens die tydbeswaarde gemiddelde (TBG) konsentrasies van samestellende dele in die lug is en L_1, L_2, ens die ooreenstemmende blootstellingsdrempels is. Die gebruik van hierdie formule is slegs van toepassing waar BBd's aan substansies met sommerende effekte toegewys is, en L_1, L_2, ens hou verband met dieselfde verwysingsperiode in die lys goedgekeurde BBd's. Waar die som van die C/L-breukdele nie een oorskry nie, word die blootstelling geag nie die ideële BBd's te oorskry nie. Indien aan een van die samestellende dele 'n BBd–Bd toegewys is, moet die sommerende effek in ag geneem word wanneer daar besluit word in watter mate dit redelikerwys uitvoerbaar is om blootstelling verder te verminder; en

(c) **Onafhanklike substansies:** Waar geen sinergistiese of sommerende effekte bekend is of waarskynlik geag word nie, kan die samestellende dele geag word onafhanklik op te tree. Dit is dan voldoende om nakoming van elkeen van die blootstellingsdrempels individueel te verseker.

49. Die stappe hier bo voorsien basiese protokol vir die beraming van gemengde blootstellings. Dit staan persone wat vir beheer oor blootstelling verantwoordelik is vry om alle nie-sinergistiese stelsels te hanteer asof hulle sommerend is. Dit skakel die behoefte om sommerende en onafhanklike stelsels te onderskei uit en kan as die verstandigste weg beskou word, veral waar die toksisiteitsdata skaars is of moeilik is om te beraam.

MONITERING VAN GEMENGDE BLOOTSTELLING

50. Paragrawe 52 en 53 bevat verdere inligting oor die monitering van luggedraagde kontaminante. Die aantal komponente van 'n gemengde blootstelling waarvoor roetinelugmonitering vereis word, kan verminder word indien hul relatiewe konsentrasies as konstant bewys kan word. Dit behels die kies van 'n sleutel of merker, wat een van die samestellende dele kan wees, as 'n maatstaf van die totale kontaminasie. Blootstelling aan die merker word beheer by 'n vlak so gekies dat blootstellings aan alle komponente ooreenkomstig die kriteria in paragraaf 48 (a) en (b) beheer sal word. Indien een van die komponente egter as 'n BBd—Bd beskryf is, moet die vlak van die blootstelling aan daardie substansie altyd sover dit redelikerwys uitvoerbaar is, verminder word. Indien hierdie benadering gevolg word, moet dit onder leiding van geskikte spesialis-advies geskied.

COMPLICATING FACTORS

51. Several factors that complicate the assessment and control of exposure to individual substances wil also affect cases of mixed exposures and will require similar special consideration. Such factors include—

(a) exposure to a substance for which there is no established limit or for which an OEL—CL 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 substances that can be absorbed by this route, as well as by inhalation; and

(d) substances in mixture may mutually affect the extent of their absorption, as well as their health effects, at a given level of exposure.

MONITORING EXPOSURE

52. Regulation 5 (4) of the HCS Regulations imposes a duty on the employer to monitor the exposure of employees to substances hazardous to health.

53. Details of routine sampling strategies for individual substances are outside the scope of this document. However, advice is available in EH 42, which provides practical guidance on monitoring substances hazardous to health in air.

KOMPLISERENDE FAKTORE

51. Verskeie faktore wat die beraming van en beheer oor blootstelling aan individuele substansies kompliseer, sal ook gevalle van gemengde blootstellings beïnvloed en sal soortgelyke spesiale oorweging vereis. Sodanige faktore sluit in—

(a) blootstelling aan 'n substansie waarvoor daar geen vasgestelde drempel is nie of waarvoor 'n BBd—Bd gestel is;

(b) die relevansie van faktore soos alkohol, medisyne, rook en bykomende stres;

(c) blootstelling van die vel aan een of meer substansies wat langs hierdie roete sowel as deur inaseming geabsorbeer kan word; en

(d) substansies in 'n mengsel kan die mate van hul absorpsie, sowel as hul gesondheidseffekte, by 'n gegewe blootstellingsvlak onderling beïnvloed.

MONITERING VAN BLOOTSTELLING

52. Regulasie 5 (4) van die GCS Regulasies lê 'n plig op die werkgewer om die blootstelling van werknemers aan substansies wat vir die gesondheid gevaarlik is, te moniteer.

53. Besonderhede van roetine monsternemingstrategieë vir individuele substansies val buite die bestek van hierdie dokument. Advies is egter beskikbaar in EH 42, wat praktiese leiding bied oor die monitering van gesondheidsgevaarlike substansies in die lug.

REGULATIONS FOR HAZARDOUS CHEMICAL SUBSTANCES, 1995

TABLE 1 - p 1

OCCUPATIONAL EXPOSURE LIMITS - CONTROL LIMITS FOR HAZARDOUS CHEMICAL SUBSTANCES

Substance	Formula	TWA OEL-CL		SHORT TERM OEL-CL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Acrylamide	$CH_2=CHCONH_2$	-	0.3	-	-	Sk
Acrylonitrile	$CH_2=CHCN$	2	4	-	-	Sk
Arsenic & compounds, except arsine (as As)	As	-	0.1	-	-	
Asbestos	See Asbestos Regulations					
Benzene	C_6H_6	5	16	-	-	
Bis (chloromethyl) ether (BCME)	$ClCH_2OCH_2Cl$	0.001	0.005		-	New
Buta-1,3-diene	$CH_2=CHCH=CH_2$	10	22	-	-	
2-Butoxyethanol	$C_4H_9OCH_2CH_2OH$	25	120	-	-	Sk
Cadmium & cadmium compounds, except cadmium oxide fume and cadmium sulphide pigments (as Cd)	Cd	-	0.05	-	-	
Cadmium oxide fume (as Cd)	CdO	-	0.05	-	0.05	
Cadmium sulphide pigments (respirable dust Cd)	CdS	-	0.04	-	-	
Carbon disulphide	CS_2	10	30	-	-	Sk
Chromium (VI) compounds (as Cr)	Cr		0.05	-	-	
1,2-Dibromoethane (ethylene dibromide)	$BrCH_2CH_2Br$	0.5	4	-	-	Sk
Dichloromethane	CH_2Cl_2	100	350	-	-	
2,2'-Dichloro-4,4'-methylene dianiline (MbOCA)	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
2-Ethoxyethanol	$C_2H_5OCH_2CH_2OH$	10	37	-	-	Sk
2-Ethoxyethyl acetate	$C_2H_5OCH_2CH_2OOCCH_3$	10	54	-	-	Sk
Ethylene oxide	CH_2CH_2O	5	10	-	-	
Formaldehyde	HCHO	2	2.5	2	2.5	
Grain dust	See Annexure 7	-	10	-	-	Sen
Hydrogen cyanide	HCN	-	-	10	10	Sk
Isocyanates, all (as-NCO)		-	0.02	-	0.07	Sen
Lead and compounds	See Lead Regulations					

TABLE 1 - p 2

Substance	Formula	TWA OEL-CL		SHORT TERM OEL-CL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
2-Methoxyethanol	$CH_3OCH_2CH_2OH$	5	16	-	-	Sk
2-Methoxyethyl acetate	$CH_3COOCH_2CH_2OCH_3$	5	24	-	-	Sk
Nickel	Ni	-	0.5	-	-	
Nickel, inorganic compounds (as Ni)	Ni					
soluble compounds		-	0.1	-	-	
insoluble compounds		-	0.5	-	-	
Rubber process dust	See Annexure 6	-	8	-	-	
Rubber fume		-	0.6	-	-	
Silica, crystalline respirable dust	SiO_2	-	0.4	-	-	
Styrene	$C_6H_5CH=CH_2$	100	420	250	1050	
1,1,1-Trichloroethane	CH_3CCl_3	350	1900	450	2450	
Trichloroethylene	$CCl_2=CHCl$	100	535	150	802	Sk
** Vinyl chloride	$CH_2=CHCl$	7	-	-	-	
Vinylidene chloride	$CH_2=CCl_2$	10	40	-	-	
Wood dust (hard wood)		-	5	-	-	Sen

** Vinyl chloride is also subject to an overriding annual TWA OEL-CL of 3 ppm.

REGULATIONS FOR HAZARDOUS CHEMICAL SUBSTANCES, 1995

TABLE 2 - p 1

OEL-RL: OCCUPATIONAL EXPOSURE LIMIT -
RECOMMENDED LIMIT FOR HAZARDOUS CHEMICAL SUBSTANCES

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-CL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Acetaldehyde	CH_3=CHO	100	180	150	270	
Acetic acid	CH_3COOH	10	25	15	37	
Acetic anhydride	$(CH_3CO)_2O$	-	-	5	20	
Acetone	CH_3COCH_3	750	1780	1500	3560	
Acetonitrile	CH_3CN	40	70	60	105	
o-Acetylsalicylic acid	$CH_3COOC_6H_4COOH$	-	5	-	-	
Acrylaldehyde (Acrolein)	CH_2=CHCHO	0.1	0.25	0.3	0.8	
Acrylic acid	CH_2=CHCOOH	10	30	20	60	
Aldrin (ISO)	$C_{12}H_8Cl_6$	-	0.25	-	0.75	Sk
Allyl alcohol	CH_2=$CHCH_2OH$	2	5	4	10	Sk
Allyl chloride	CH_2=$CHCH_2Cl$	1	3	2	6	
Allyl 2,3-epoxypropyl ether	CH_2=$CHCH_2OCH_2CHCH_2O$	5	22	10	44	Sk
Allyl glycidyl ether (AGE)	CH_2=$CHCH_2OCH_2CHCH_2O$	5	22	10	44	Sk
Aluminium alkyl compounds		-	2	-	-	
*Aluminium metal	Al					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
*Aluminium oxides	Al_2O_3,$Al(OH)_3$ and AlOOH					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Aluminium salts, soluble		-	2	-	-	
Aminodimethylbenzene	$(CH_3)_2C_6H_3NH_2$	2	10	10	50	Sk
2-Aminoethanol	$NH_2CH_2CH_2OH$	3	8	6	15	
2-Aminopyridine	$NH_2C_5H_4N$	0.5	2	2	8	
Ammonia	NH_3	25	17	35	24	
Ammonium chloride, fume	NH_4Cl	-	10	-	20	
Ammonium sulphamidate	$NH_2SO_3NH_4$	-	10	-	20	
n-Amyl acetate	$CH_3COOC_5H_{11}$	100	530	150	800	
sec-Amyl acetate	$CH_3COOCH(CH_3)C_3H_7$	-	-	150	800	
Aniline	$C_6H_5NH_2$	2	10	5	20	Sk
Anisidines, *o*- and *p*- isomers	$NH_2C_6H_4OCH_3$	0.1	0.5	-	-	Sk
Antimony & compounds (as Sb)	Sb	-	0.5	-	-	
Arsine	AsH_3	0.05	0.2	-	-	
Asphalt, petroleum fumes		-	5	-	10	
Aspirin	$CH_3COOC_6H_4COOH$	-	5	-	-	
Atrazine (ISO)	$C_8Hl_4ClN_5$	-	10	-	-	
Azinphos-methyl (ISO)	$(CH_3O)_2PSSCH_2(C_7H_4N_3O)$	-	0.2	0.6	-	Sk
Aziridine	CH_2CH_2NH	-	10	-	-	
y-BHC (ISO)	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk
Barium compounds, soluble (as Ba)	Ba	-	0.5	-	-	
Barium sulphate, respirable dust	$BaSO_4$	-	2	-	-	
Benomyl (ISO)	$C_{14}H_{18}N_4O_3$	-	10	-	15	
Benzenethiol	C_6H_5SH	0.5	2	-	-	
Benzene-1,2,4-tricarboxylic acid 1,2-anhydride	$C_9H_4O_5$	-	0.04	-	-	Sen

* The OEL-RL for aluminium does not include exposure to aluminium coated with mineral oil, or to fume arising from aluminium welding processes.

TABLE 2 - p 2

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
p-Benzoquinone	$C_6H_4O_2$	0.1	0.4	0.3	1.2	
Benzoyl peroxide	$(C_6H_5CO)_2O_2$	-	5	-	-	
Benzyl butyl phthalate	$C_6H_5CH_2COOC_6H_4$-$COOC_4H_9$	-	5	-	-	
Benzyl chloride	$C_6H_5CH_2Cl$	1	5	-	-	
Beryllium	Be	-	0.002	-	-	
Biphenyl	$(C_6H_5)_2$	0.2	1.5	0.6	4	
2,2-Bis(p-methoxyphenyl) -1,1,1-trichloroethane	$C_{14}H_9Cl_5$	-	1	-	3	
Bis(2,3-epoxypropyl) ether	$(OCH_2CHCH_2)_2O$	0.1	0.6	-	-	
Bis(2-ethylhexyl phthalate)	$C_6H_4[COOCH_2CH(C_2H_5)$-$C_4H_9]_2$	-	5	-	10	
2,2-Bis(p-methoxyphenyl) -1,1,1-trichloroethane	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
Bismuth telluride	Bi_2Te_3	-	10	-	20	
Bismuth telluride, selenium-doped	Bi_2Te_3	-	5	-	10	
Borates, (tetra) sodium salts						
anhydrous	$Na_2B_4O_7$	-	1	-	-	
decahydrate	$Na_2B_4O_7.10H_2O$	-	5	-	-	
pentahydrate	$Na_2B_4O_7.5H_2O$	-	1	-	-	
Bornan-2-one	$C_{10}H_{16}O$	2	12	3	18	
Boron oxide	B_2O_3	-	10	-	20	
Boron tribromide	BBr_3	-	-	1	10	
Boron trifluoride	BF_3	-	-	1	3	
Bromacil (ISO)	$C_9H_{13}BrN_2O_2$	1	10	2	20	
Bromine	Br_2	0.1	0.7	0.3	2	
Bromine pentafluoride	BrF_5	0.1	0.7	0.3	2	
Bromochloromethane	CH_2BrCl	200	1050	250	1300	
Bromoethane	C_2H_5Br	200	890	250	1110	
Bromoethylene	CH_2=$CHBr$	5	20	-	-	
Bromoform	$CHBr_3$	0.5	5	-	-	Sk
Bromomethane	CH_3Br	5	20	15	60	Sk
Bromotrifluoromethane	CF_3Br	1000	6100	1200	7300	
Butane	C_4H_{10}	600	1430	750	1780	
Butan-1-ol	$CH_3CH_2CH_2CH_2OH$	-	-	50	150	Sk
Butan-2-ol	$CH_3CH_2CHOHCH_3$	100	300	150	450	
Butan-2-one	$CH_3COC_2H_5$	200	590	300	885	
trans-But-2-enal	CH_3CH=$CHCHO$	2	6	6	18	
Butyl acetate	$CH_3COO(CH_2)_3CH_3$	150	710	200	950	
sec-Butyl acetate	$CH_3COOCH(CH_3)CH_2CH_3$	200	950	250	1190	
tert-Butyl acetate	$CH_3COOC(CH_3)_3$	200	950	250	1190	
Butyl acrelate	$C_7H_{12}O_2$	10	55	-	-	
n-Butyl alcohol	$CH_3CH_2CH_2CH_2OH$	-	-	50	150	Sk
sec-Butyl alcohol	$CH_3CH_2CHOHCH_3$	100	300	150	450	
tert-Butyl alcohol	$(CH_3)_3COH$	100	300	150	450	
n-Butylamine	$CH_3CH_2CH_2CH_2NH_2$	-	-	5	15	

TABLE 2 - p 3

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Butyl benzyl phthalate	$C_6H_5CH_2COOC_6H_4$-$COOC_4H_9$	-	5	-	-	
n-Butyl chloroformate	$ClCO_2C_4H_{10}$	1	5.6	-	-	
Butyl-2,3-epoxypropyl ether	$C_4H_9OCH_2CHCH_2O$	25	135	-	-	
n-Butyl glycidyl ether (BGE)	$C_4H_9OCH_2CHCH_2O$	25	135	-	-	
Butyl lactate	$C_7H_{14}O_3$	5	25	-	-	
2-*sec*-Butylphenol	$C_2H_5(CH_3)CHC_6H_4OH$	5	30	-	-	Sk
Caesium hydroxide	CsOH	-	2	-	-	
Calcium carbonate	$CaCO_3$					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Calcium cyanamide	$CaNC{\equiv}N$	-	0.5	-	1	
Calcium hydroxide	$Ca(OH)_2$	-	5	-	-	
Calcium oxide	CaO	-	2	-	-	
Calcium silicate						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Camphor, synthetic	$C_{10}H_{16}O$	2	12	3	18	
ε-Caprolactam	$NH(CH_2)_5CO$					
dust		-	1	-	3	
vapour		5	20	10	40	
Captafol (ISO)	$C_{10}H_9Cl_4NO_2S$	-	0.1	-	-	Sk
Captan (ISO)	$C_9H_8Cl_3NO_2S$	-	5	-	15	
Carbaryl (ISO)	$C_{10}H_7OCONHCH_3$	-	5	-	10	
Carbuforan (ISO)	$C_{12}H_{15}NO_3$	-	0.1	-	-	
Carbon black	C	-	3.5	-	7	
Carbon dioxide	CO_2	5000	9000	15000	27000	
Carbon monoxide	CO	50	55	300	330	
Carbon tetrabromide	CBr_4	0.1	1.4	0.3	4	
Carbon tetrachloride	CCl_4	2	12.6	-	-	Sk
Carbonyl chloride	$COCl_2$		0.4	-	-	Sk
Catechol	$C_6H_4(OH)_2$	5	20	-	-	
Cellulose						
total inhalable dust		-	10	-	20	
respirable dust		-	5	-	-	
Cement						
total inhalable dust	-	-	10	-		
respirable dust	-	-	5	-		
Chlordane (ISO)	$C_{10}H_6Cl_8$	-	0.5	-	2	Sk
Chlorinated biphenyls (42% chlorine)	$C_{12}H_7Cl_3$ (approx)	-	1	-	2	Sk Sk
Chlorinated biphenyls (54% chlorine)	$C_6H_2Cl_3C_6H_3Cl_2$	-	0.5	-	1	Sk Sk
Chlorine	Cl_2	0.5	1.5	1	3	
Chlorine dioxide	ClO_2	0.1	0.3	0.3	0.9	
Chlorine trifluoride	ClF_3	-	-	0.1	0.4	

TABLE 2 - p 4

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Chloroacetaldehyde	$ClCH_2CHO$	-	-	1	3	
2-Chloroacetophenone	$C_6H_5COCH_2Cl$	0.05	0.3	-	-	
Chloroacetyl chloride	$ClCH_2COCl$	0.05	0.2	-	-	
Chlorobenzene	C_6H_5Cl	50	230	-	-	
Chlorobromomethane	CH_2BrCl	200	1050	250	1300	
2-Chlorobuta-1,3-diene	$CH_2=CClCH=CH_2$	10	36	-	-	Sk
Chlorodifluoromethane	$CHClF_2$	1000	3500	-	-	
1-Chloro-2,3-epoxy-propane	OCH_2CHCH_2Cl	2	8	5	20	Sk
Chloroethane	C_2H_5Cl	1000	2600	1250	3250	
2-Chloroethanol	$ClCH_2CH_2OH$	-	-	1	3	Sk
Chloroethylene	$CH_2=CHCl$ +	7	-	-	-	
Chloroform	$CHCl_3$	2	9.8	-	-	Sk
Chloromethane	CH_3Cl	50	105	100	210	
1-Chloro-4-nitrobenzene	$ClC_6H_4NO_2$	-	1	-	2	Sk
Chloropentafluoroethane	$CClF_2CF_3$	1000	6320	-	-	
Chloropicrin	CCl_3NO_2	0.1	0.7	0.3	2	
β-Chloroprene	$CH_2=CClCH=CH_2$	10	36	-	-	Sk
3-Chloropropene	$CH_2=CHCH_2Cl$	1	3	2	6	
Chlorosulphonic acid	HSO_3Cl	-	1	-	-	
α-Chlorotoluene	$C_6H_5CH_2Cl$	1	5	-	-	
2-Chlorotoluene	C_7H_7Cl	50	250	-	-	
2-Chloro-6-(trichloromethyl) pyridine	$C_6H_3Cl_4N$	-	10	-	20	
Chlorpyrifos (ISO)	$C_9H_{11}Cl_3NO_3PS$	-	0.2	-	0.6	Sk
Chromium	Cr	-	0.5	-	-	
Chromium (II) compounds (as Cr)	Cr	-	0.5	-	-	
Chromium (III) compounds (as Cr)	Cr	-	0.5	-	-	
Coal dust						
respirable dust		-	2	-	-	
Coal tar pitch volatiles (as cyclohexane solubles)		-	0.14	-	-	
Cobalt and compounds (as Co)	Co	-	0.1	-	-	
Copper	Cu					
fume		-	0.2	-	-	
dusts and mists (as Cu)		-	1	-	2	
Cotton dust	See Annexure 4	-	0.5	-	-	
Cresols, all isomers	$CH_3C_6H_4OH$	5	22	-	-	Sk
Cristobalite, respirable dust	SiO_2					
Crotonaldehyde	$CH_3CH=CHCHO$	2	6	6	18	
Cryofluorane (INN)	$CClF_2CClF_2$	1000	7000	1250	8750	
Cumene	$C_6H_5CH(CH_3)_2$	25	120	75	370	Sk
Cyanamide	H_2NCN	-	2	-	-	
Cyanides, except hydrogen cyanide, cyanogen & cyanogen chloride, (as-CN)		-	5	-	-	Sk

TABLE 2 - p 5

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Cyanogen	$(CN)_2$	10	20	-	-	
Cyanogen chloride	ClCN	-	-	0.3	0.6	
Cychlohexane	C_6H_{12}	100	340	300	1030	
Cyclohexanol	$C_6H_{11}OH$	50	200	-	-	
Cyclohexanone	$C_6H_{10}O$	25	100	100	400	
Cyclohexene	C_6H_{10}	300	1015	-	-	
Cyclohexylamine	$C_6H_{11}NH_2$	10	40	-	-	Sk
Cyclonite (RDX)	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Cyhexatin (ISO)	$(C_6H_{11})_3SnOH$	-	5	-	10	
2,4D (ISO)	$C_6H_3Cl_2OCH_2COOH$	-	10	-	20	
DDM	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
DDT	$C_{14}H_9Cl_5$	-	1	-	3	
DDVP	$(CH_3O)_2POOCH{\equiv}CCl_2$	0.1	1	-	3	Sk
2,4-DES	$C_8H_7Cl_2NaO_5S$	-	10	-	20	
DMDT	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
Derris, commercial	$C_{23}H_{22}O_6$	-	5	-	10	
Diacetone alcohol	$CH_3COCH_2C(CH_3)_2OH$	50	240	75	360	
Dialkyl 79 phthalate	$C_6H_4(COOC_{7-9}H_{15-19})_2$	-	5	-	-	
Dialkyl phthalate	$C_6H_4(COOCH_2CHCH)_2$	-	5	-	-	
2,2'-Diaminodiethylamine	$(NH_2CH_2CH_2)_2NH$	1	4	-	-	Sk
4-4'-Diaminodiphenyl-methane (DADPM)	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
1,2-Diaminoethane	$NH_2CH_2CH_2NH_2$	10	25	-	-	
Diammonium peroxodisulphate (measured as $[S_2O_8]$	$(NH_4)_2S_2O_8$	-	1	-	-	
Diatomaceous earth, natural respirable dust		-	1.5	-	-	
Diazinon (ISO)	$C_{12}H_{21}N_2O_3PS$	-	0.1	-	0.3	Sk
Diazomethane	$CH_2{=}N_2$	0.2	0.4	-	-	
Dibenzoyl peroxide	$(C_6H_5CO)_2O_2$	-	5	-	-	
Dibismuth tritelluride	Bi_2Te_3	-	10	-	20	
Dibismuth tritelluride, selenium doped	Bi_2Te_3	-	5	-	10	
		-	-	-	10	
Diborane	B_2H_6	0.1	0.1	-	-	
Diboron trioxide	B_2O_3	-	10	-	20	
Dibrom	$C_4H_7Br_2Cl_2O_4P$	-	3	-	6	
1,2-Dibromo-2,2-dichloroethyl dimethyl phosphate	$C_4H_7Br_2Cl_2O_4P$	-	3	-	6	
Dibromodifluoromethane	CBr_2F_2	100	860	150	1290	
Dibutyl hydrogen phosphate	$(n\text{-}C_4H_9O)_2(OH)PO$	1	5	2	10	
Di-n-butyl phosphate	$(n\text{-}C_4H_9O)_2(OH)PO$	1	5	2	10	
Dibutyl phthalate	$C_6H_4(CO_2C_4H_9)_2$	-	5	-	10	
6,6'-Di-tert-butyl-4,4'-thiodi-m-cresol	$C_{22}H_{30}O_2S$	-	10	-	20	
Dichloroacetylene	$ClC{\equiv}CCl$	-	-	0.1	0.4	
1,2-Dichlorobenzene	$C_6H_4Cl_2$	-	-	50	300	
1,4-Dichlorobenzene	$C_6H_4Cl_2$	25	150	50	300	

TABLE 2 - p 6

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Dichlorodifluoromethane	CCl_2F_2	1000	4950	1250	6200	
1,3-Dichloro-5,5-dimethyl-hydantoin	$C_5H_6Cl_2N_2O_2$	-	0.2	-	0.4	
Dichlorodiphenyl-trichloroethane	$C_{14}H_9Cl_5$	-	1	-	3	
1,1-Dichloroethane	CH_3CHCl_2	200	810	400	1620	
1,2-Dichloroethane	CH_2ClCH_2Cl	10	40	15	60	
1,1-Dichloroethylene	$CH_2=CCl_2$	10	40	-	-	
1,2-Dichloroethylene, *cis:trans* isomers 60:40	ClCH=CHCl	200	790	250	1000	
Dichlorofluoromethane	$CHCl_2F$	10	40	-	-	
2,4-Dichlorophenoxyacetic acid	$C_6H_3Cl_2OCH_2COOH$	-	10	-	20	
1,3-Dichloropropene, *cis* and *trans* isomers	$CHCl=CHCH_2Cl$	1	5	10	50	Sk
1,2-Dichlorotetra-fluoroethane	$CClF_2CClF_2$	1000	7000	1250	8750	
Dichlorvos (ISO)	$(CH_3O)_2POOCH=CCl_2$	0.1	1	0.3	3	Sk
Dicyclohexyl phthalate	$C_6H_4(COOC_6H_{11})_2$	-	5	-	-	
Dicyclopentadiene	$C_{10}H_{12}$	5	30	-	-	
Dicyclopentadienyliron	$C_{10}H_{10}Fe$	-	10	-	20	
Dieldrin (ISO)	$C_{12}H_8Cl_6O$	-	0.25	-	0.75	Sk
Diethanolamine	$HO(CH_2)_2NH(CH_2)_2OH$	3	15	-	-	
Diethylamine	$(C_2H_5)_2NH$	10	30	25	75	
2-Diethylaminoethanol	$(C_2H_5)_2NCH_2CH_2OH$	10	50	-	-	Sk
Diethylene glycol	$(HOCH_2CH_2)_2O$	23	100	-	-	
Diethylene triamine	$(NH_2CH_2CH_2)_2OH$	1	4	-	-	Sk
Diethyl ether	$C_2H_5OC_2H_5$	400	1200	500	1500	
Di-(2-ethylhexyl) phthalate	$C_6H_4[COOCH_2CH(C_2H_5)-C_4H_9]_2$	-	5	-	10	
Diethyl ketone	$C_2H_5COC_2H_5$	200	700	250	875	
Diethyl phthalate	$C_6H_4(COOC_2H_5)_2$	-	5	-	10	
Difluorochloromethane	$CHClF_2$	1000	3500	-	-	
Diglycidyl ether (DGE)	$(OCH_2CHCH_2)_2O$	0.1	0.6	-	-	
o-Dihydroxybenzene	$C_6H_4(OH)_2$	5	20	-	-	
m-Dihydroxybenzene	$C_6H_4(OH)_2$	10	45	20	90	
p-Dihydroxybenzene	$C_6H_4(OH)_2$	-	2	-	4	
1,2-Dihydroxyethane	CH_2OHCH_2OH					
particulate		-	10	-	-	
vapour		-	60	-	125	
Diisobutyl ketone	$[(CH_3)_2CHCH_2]_2CO$	25	150	-	-	
Diisobutyl phthalate	$C_6H_4[COOCH_2CH(CH_3)_2]_2$	-	5	-	-	
Diisodecyl phthalate	$(C_{10}H_{21}CO_2)_2C_6H_4$	-	5	-	-	
Diisononyl phthalate	$C_6H_4(COOC_9H_{19})_2$	-	5	-	-	
Diisooctyl phthalate	$C_6H_4(CO_2C_8H_{17})_2$	-	5	-	-	

TABLE 2 - p 7

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Diisopropylamine	$(CH_3)_2CHNHCH(CH_3)_2$	5	20	-	-	Sk
Diisoppropyl ether	$(CH_3)_2CHOCH(CH_3)_2$	250	1050	310	1320	
Di-linear 79 phthalate	$C_6H_4(COOC_{7-9}H_{15-19})_2$	-	5	-	-	
Dimethoxymethane	$CH_2(OCH_3)_2$	1000	3100	1250	3880	
NN-Dimethylacetamide	$CH_3CON(CH_3)_2$	10	36	20	71	Sk
Dimethylamine	$(CH_3)_2NH$	10	18	-	-	
NN-Dimethylaniline	$C_6H_5N(CH_3)_2$	5	25	10	50	Sk
1,3-Dimethylbutyl acetate	$CH_3CO_2CH(CH_3)CH_2CH(CH_3)_2$	50	300	100	600	
NN-Dimethylethylamine	$C_2H_5(CH_3)_2N$	10	30	15	45	
Dimethylformamide	$HCON(CH_3)_2$	10	30	20	60	Sk
2,6-Dimethylheptan-4-one	$[(CH_3)_2CHCH_2]_2CO$	25	150	-	-	
Dimethyl phthalate	$C_6H_4(COOCH_3)_2$	-	5	-	10	
Dimethyl sulphate	$(CH_3)_2SO_4$	0.1	0.5	0.1	0.5	Sk
Dinitrobenzene, all isomers	$C_6H_4(NO_2)_2$	0.15	1	0.5	3	Sk
Dinitro-o-cresol	$CH_3C_6H_2(OH)(NO_2)_2$	-	0.2	-	0.6	Sk
2,4-Dinitrotoluene	$CH_3C_6H_3(NO_2)_2$	-	1.5	-	5	Sk
Dinonyl phthalate	$C_6H_4(COOC_9H_{19})_2$	-	5	-	-	
Di-*sec*-octyl phthalate	$C_6H_4[COOCH_2CH(C_2H_5)C_4H_9]_2$	-	5	-	10	
1,4-Dioxane, tech. grade	$OCH_2CH_2OCH_2CH_2$	25	90	100	360	Sk
Dioxathion (ISO)	$C_{12}H_{26}O_6P_2S_2$	-	0.2	-	-	Sk
Diphenyl	$(C_6H_5)_2$	0.2	1.5	0.6	4	
Diphenylamine	$(C_6H_5)_2NH$	-	10	-	20	
Diphenyl ether (vapour)	$C_6H_5OC_6H_5$	1	7	-	-	
Diphosphorus pentasulphide	P_2S_5	-	1	-	3	
Dipotassium peroxodisulphate measured as (S_2O_8)	$K_2S_2O_8$	-	1	-	-	
Diquat dibromide (ISO)	$C_{12}H_{12}Br_2N_2$	-	0.5	-	1	
Disodium disulphite	$Na_2S_2O_5$	-	5	-	-	
Disodium peroxodisulphate (measured as (S_2O_8)	$Na_2S_2O_8$	-	1	-	-	
Disodium tetraborate,						
anhydrous	$Na_2B_4O_7$	-	1	-	-	
decahydrate	$Na_2B_4O_7.10H_2O$	-	5	-	-	
pentahydrate	$Na_2B_4O_7.5H_2O$	-	1	-	-	
Disulfoton (ISO)	$(C_2H_5O)_2PSCH_2CH_2SC_2H_5$	-	0.1	-	0.3	
Disulphur dichloride	S_2Cl_2	-	-	1	6	
Disulphur decafluoride	S_2F_{10}	0.025	0.25	0.075	0.75	
2,6-Ditertiary-butyl-para-cresol	$(C_4H_9)_2CH_3C_6H_2OH$	-	10	-	-	
Diuron (ISO)	$C_9H_{10}Cl_2N_2O$	-	10	-	-	
Divanadium pentaoxide (as V)	V_2O_5					
total inhalable dust		-	0.5	-	-	
fume and respirable dust		-	0.05	-	-	
Divinylbenzene	$C_8H_4(CHCH_2)_2$	10	50	-	-	
Dusts	See paragraph 36 of Annexure 1					

TABLE 2 - p 8

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Emery						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Endosulfan (ISO)	$C_9H_6Cl_6O_3S$	-	0.1	-	0.3	Sk
Endrin (ISO)	$C_{12}H_8Cl_6O$	-	0.1	-	0.3	Sk
Enflurane	$CHFCl\text{-}CF_2\text{-}O\text{-}CF_2H$	20	150	-	-	
Epichlorohydrin	OCH_2CHCH_2Cl	2	8	5	20	Sk
1,2-Epoxy-4-epoxyethyl-cyclohexane	$C_8H_{12}O2$	10	60	-	-	
2,3-Epoxypropyl isopropyl ether	$C_3H_7OCH_2CHCH_2$	50	240	75	360	
Ethane-1,2-diol,	CH_2OHCH_2OH					
particulate		-	10	-	-	
vapour		-	60	-	125	
Ethanethiol	C_2H_5SH	0.5	1	2	3	
Ethanol	C_2H_5OH	1000	1900	-	-	
Ethanolamine	$NH_2CH_2CH_2OH$	3	8	500	1500	
Ether	$C_2H_5OC_2H_5$	400	1200	-	-	
Ethyl acetate	$CH_3COOC_2H_5$	400	1400	-	-	
Ethyl acrylate	$CH_2=CHCOOC_2H_5$	5	20	15	60	Sk
Ethyl alcohol	C_2H_5OH	1000	1900	-	-	
Ethylamine	$C_2H_5NH_2$	10	18			
Ethyl amyl ketone	$CH_3CH_2COCH_2CH_3$ $CHCH_2CH_3$	25	130	-	-	
Ethylbenzene	$C_6H_5C_2H_5$	100	435	125	545	
Ethyl bromide	C_2H_5Br	200	890	250	1110	
Ethyl butyl ketone	$CH_3CH_2CO(CH_2)_3CH_3$	50	230	75	345	
Ethyl chloride	C_2H_5Cl	1000	2600	1250	3250	
Ethyl chloroformate	$ClCO_2C_2H_5$	1	4.4	-	-	
Ethylene chlorohydrin	$ClCH_2CH_2OH$	-	-	1	3	Sk
Ethylenediamine	$NH_2CH_2CH_2NH_2$	10	25	-	-	
Ethylene dibromide	$BrCH_2CH_2Br$	0.5	4	-	-	Sk
Ethylene dichloride	CH_2ClCH_2Cl	10	40	15	60	
Ethylene dinitrate	$CH_2NO_3CH_2NO_3$	0.2	1.2	0.2	1.2	Sk
Ethylene glycol	CH_2OHCH_2OH					
particulate		-	10	-	-	
vapour		-	60	-	125	
Ethylene glycol dinitrate (EGDN)	$CH_2NO_3CH_2NO_3$	0.2	1.2	0.2	1.2	Sk
Ethylene glycol monobutyl ether	$C_4H_9OCH_2CH_2OH$	25	120	-	-	Sk
Ethylene glycol monoethyl ether	$C_2H_5OCH_2CH_2OH$	10	37	-	-	Sk
Ethylene glycol monoethyl ether acetate	$C_2H_5OCH_2CH_2OOCCH_3$	10	54	-	-	Sk
Ethylene glycol monomethyl ether acetate	$CH_3COOCH_2CH_2OCH_3$	5	24	-	-	Sk

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Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Ethylene glycol monomethyl ether	$CH_3OCH_2CH_2OH$	5	16	-	-	Sk
Ethyleneimine	CH_2CH_2NH	0.5	1	-	-	Sk
Ethylene oxide	CH_2CH_2O	5	10	-	-	
Ethyl ether	$C_2H_5OC_2H_5$	400	1200	500	1500	
Ethyl formate	$HCOOC_2H_5$	100	300	150	450	
2-Ethylhexyl chloroformate	$ClCO_2CH_2CH(CH_2)_3CH_3$ C_2H_5	1	7.9	-	-	
Ethylidene dichloride	CH_3CHCl_2	200	810	400	1620	
Ethyl mercaptan	C_2H_5SH	0.5	1	2	3	
4-Ethylmorpholine	$C_6H_{13}NO$	5	23	20	95	Sk
Ethyl silicate	$Si(OC_2H_5)_4$	10	85	30	255	
Fenchlorphos (ISO)	$(CH_3O)_2PSOC_6H_2Cl_3$	-	10	-	-	
Ferbam (ISO)	$[(CH_3)_2NCSS]_3Fe$	-	10	-	20	
Ferrocene	$C_{10}H_{10}Fe$	-	10	-	20	
Fluoride (as F)	F	-	2.5	-	-	
Fluorine	F_2	-	-	1	1.5	
Fluorodichloromethane	$CHCl_2F$	10	40	-	-	
Fluorotrichloromethane	CCl_3F	1000	5600	1250	7000	
Formamide	$HCONH_2$	20	30	30	45	
Formic acid	HCOOH	5	9	-	-	
2-Furaldehyde (Furfural)	$C_5H_4O_2$	2	8	10	40	Sk
Furfuryl alcohol	$OCH{=}CHCH{=}CCH_2OH$	5	20	15	60	Sk
Germane	GeH_4	0.2	0.6	0.6	1.8	
Germanium tetrahydride	GeH_4	0.2	0.6	0.6	1.8	
Glutaraldehyde	$OCH(CH_2)_3CHO$	-	-	0.2	0.7	
Glycerol, mist	$CH_2OHCHOHCH_2OH$	-	10	-	-	
Glycerol trinitrate	$CH_2NO_3CHNO_3CH_2NO_3$	0.2	2	0.2	2	Sk
Glycol monoethyl ether	$C_2H_5OCH_2CH_2OH$	10	37	0.2	2	Sk
Graphite	C					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Guthion	$(CH_3O)_2PSSCH_2(C_7H_4N_3O)$	-	0.2	0.6	-	Sk
Gypsum	$CaSO_4.2H_2O$					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Halothane	$CHBrCl\text{-}CF_3$	10	80	-	-	
y-HCH (ISO)	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk
Hafnium	Hf	-	0.5	-	1.5	
Heptachlor	$C_{10}H_5Cl_7$	-	0.5	-	2	Sk
n-Heptane	C_7H_{16}	400	1600	500	2000	
Heptan-2-one	$CH_3(CH_2)_4COCH_3$	50	240	-	-	
Heptan-3-one	$CH_3CH_2CO(CH_2)_3CH_3$	50	230	75	345	
y-Hexachlorocyclohexane	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk

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Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Hexachloroethane	CCl_3CCl_3					
vapour		5	50	-	-	
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Hexahydro-1,3,5-trinitro-1,3,5-triazine	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Hexane, all isomers except n-Hexane	C_6H_{14}	500	1800	1000	3600	
n-Hexane	C_6H_{14}	20	70	-	-	
1,6 Hexanolactam	$NH(CH_2)_5CO$					
dust		-	1	-	3	
vapour		5	20	10	40	
Hexan-2-one	$CH_3(CH_2)_3COCH_3$	5	20	-	-	Sk
Hexone	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Hexylene glycol	$(CH_3)_2COHCH_2CHOHCH_3$	25	125	25	125	
Hydrazine	NH_2NH_2	0.1	0.1	-	-	Sk
Hydrazoic acid (as vapour)	HN_3	-	-	0.1	-	
Hydrogen bromide	HBr	-	-	3	10	
Hydrogen chloride	HCl	-	-	5	7	
Hydrogenfluoride (as F)	HF	-	-	3	2.5	
Hydrogen peroxide	H_2O_2	1	1.5	2	3	
Hydrogen selenide (as Se)	H_2Se	0.05	0.2	-	-	
Hydrogen sulphide	H_2S	10	14	15	21	
Hydroquinone	$C_6H_4(OH)_2$	-	2	-	4	
4-Hydroxy-4-methyl-pentan-2-one	$CH_3COCH_2C(CH_3)_2OH$	50	240	75	360	
2-Hydroxypropyl acrylate	$CH_2CHCOOCH_2CHOHCH_3$	0.5	3	-	-	Sk
2,2'-Iminodiethanol	$HO(CH_2)_2NH(CH_2)_2OH$	3	15	-	-	
2,2'-Iminodi(ethylamine)	$(NH_2CH_2CH_2)_2NH$	1	4	-	-	Sk
Indene	C_9H_8	10	45	15	70	
Indium & compounds (as In)	In	-	0.1	-	0.3	
Iodine	I_2	-	-	0.1	1	
Iodoform	CHI_3	0.6	10	1	20	
Iodomethane	CH_3I	5	28	10	56	Sk
Iron oxide, fume (as Fe)	Fe_2O_3	-	5	-	10	
Iron pentacarbonyl	$FE(CO)_5$	0.01	0.08	-	-	
Iron salts (as Fe)	Fe	-	1	-	2	
Isoamyl acetate	$CH_3COOCH_2CH_2CH(CH_3)_2$	100	525	125	655	
Isoamyl alcohol	$(CH_3)_2CHCH_2CH_2OH$	100	360	125	450	
Isoamyl methyl ketone	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Isobutyl acetate	$CH_3COOCH_2CH(CH_3)_2$	150	700	187	875	
Isobutyl alcohol	$(CH_3)_2CHCH_2OH$	50	150	75	225	
Isobutyl methyl ketone	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Isoflurane	CF_3-CHCl-O-CHF_2	50	380	-	-	
Isooctyl alcohol (mixed isomers)	$C_8H_{17}OH$	50	270	-	-	
Isopentyl acetate	$CH_3COOCH_2CH_2CH(CH_3)_2$	100	525	125	655	

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Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Isophorone	$C_9H_{14}O$	-	-	5	25	
Isophorone diisocyanate (IPDI)		-	0.2	-	0.07	Sen
Isopropyl acetate	$CH_3COOCH(CH_3)_2$	-	-	200	840	
Isopropyl alcohol	$(CH_3)_2CHOH$	400	980	500	1225	Sk
Isopropyl benzene	$C_6H_5CH(CH_2)_2$	25	120	75	370	Sk
Isopropyl chloroformate	$ClCO_2CH(CH_3)_2$	1	5	-	-	
Isopropyl ether	$(CH_3)_2CHOCH(CH_3)_2$	250	1050	310	1320	
Isopropyl glycidyl ether (IGE)	$C_3H_7OCH_2CHCH_2$ (O)	50	240	75	360	
Ketene	$CH_2=CO$	0.5	0.9	1.5	3	
Limestone						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Lindane	$C_6H_5Cl_6$	-	0.5	-	1.9	Sk
Liquified petroleum gas (LPG)	Mixture: C_3H_6;C_3H_8;C_4H_8;C_4H_{10}	1000	1800	1250	2250	
Lithium hydride	LiH	-	0.025	-	-	
Lithium hydroxide	LiOH	-	-	-	1	
MbOCA	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
MDA	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
MDI		-	0.02	-	0.07	Sen
Magnesite						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Magnesium oxide (as Mg)	MgO					
fume and respirable dust		-	5	-	10	
respirable dust		-	10	-	-	
Malathion (ISO)	$C_{10}H_{19}O_6PS_2$	-	10	-	-	Sk
Maleic anhydride	$C_4H_2O_3$	0.25	1	-	-	
Manganese, fume (as Mn)	Mn	-	1	-	3	
Manganese and compounds (as Mn)	Mn	-	5	-	-	
Manganese cyclopentadienyl tricarbonyl	C_5HC_5—$Mn(CO)_3$	-	0.1	-	0.3	Sk
Manganese tetroxide	Mn_3O_4	-	1	-	-	
*Man made mineral fibre	See Annexure 3					
Marble						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Mequinol (INN)	$CH_3OC_6H_4OH$	-	5	-	-	
Mercaptoacetic acid	$C_2H_4O_2S$	1	5	-	-	
Mercury alkyls (as Hg)		-	0.01	-	0.03	Sk
Mercury & compounds, except mercury alkyls, (as Hg)	Hg	-	0.05	-	0.15	

* The OEL-RL for man-made mineral fibre is set at 2 fibres ml^{-1}, 8 hour TWA, when measured by the AIA RTM1 method.

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Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Mesityl oxide	$CH_3COCH=C(CH_3)_2$	15	60	25	100	
Methacrylic acid	$CH_2=C(CH_3)COOH$	20	70	40	140	
Methacrylonitrile	$CH_2=C(CH_3)CN$	1	3	-	-	Sk
Methanethiol	CH_3SH	0.5	1	-	-	
Methanol	CH_3OH	200	260	250	310	Sk
Methomyl (ISO)	$C_5H_{10}N_2O_2S$	-	2.5	-	-	Sk
Methoxychlor (ISO)	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
1-Methoxypropan-2-ol	$CH_3OCH_2CHOHCH_3$	100	360	300	1080	Sk
Methyl acetate	CH_3COOCH_3	200	610	250	760	
Methyl acrylate	$CH_2=CHCOOCH_3$	10	35	-	-	
Methylal	$CH_2(OCH_3)_2$	1000	3100	1250	3880	
Methyl alcohol	CH_3OH	200	260	250	310	Sk
Methylamine	CH_3NH_2	10	12	-	-	
Methyl-n-amyl-ketone	$CH_3(CH_2)_4COCH_3$	50	240	-	-	
N-Methylaniline	$C_6H_5NHCH_3$	0.5	2	-	-	Sk
Methyl bromide	CH_3Br	5	20	15	60	Sk
3-Methylbutan-1-ol	$(CH_3)_2CHCH_2CH_2OH$	100	360	125	450	
1-Methylbutyl acetate	$CH_3COOCH(CH_3)C_3H_7$	-	-	150	800	
Methyl-n-butyl ketone	$CH_3(CH_2)_3COCH_3$	5	20	-	-	Sk
Methyl chloride	CH_3Cl	50	105	100	210	
Methyl chloroform	CH_3CCl_3	350	1900	450	2450	
Methyl 2-cyanoacrylate	$CH_2=C(CN)COOCH_3$	2	8	4	16	
Methylcyclohexane	C_7H_{14}	400	1600	500	2000	
Methylcyclohexanol	$CH_3C_6H_{10}OH$	50	235	75	350	
2-Methylcyclohexanone	$CH_3CHCO(CH_2)_3CH_2$	50	230	75	345	Sk
Methylcyclopentadienyl manganese, tricarbonyl (as Mn)	$C_5HC_5—Mn(CO)_3$ $(CH_3)C_5H_4—Mn(CO)_3$	-	0.1	-	0.6	Sk
2-Methyl-4,6-dinitrophenol	$CH_3C_6H_2(OH)(NO_2)_2$	-	0.2	-	0.6	Sk
4,4'-Methylenebis-(2-chloroaniline) (MbOCA)	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
Methylene chloride	CH_2Cl_2	100	350	250	780	
4,4'-Methylene-diphenyl diisocyanate (MDI)		-	0.02	-	0.07	Sen
4,4'-Methylenedianiline (MDA)	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
Methyl ethyl ketone (MEK)	$CH_3COC_2H_5$	200	590	300	885	
Methyl ethyl ketone peroxides (MEKP)	$C_8H_{16}O_4$ or $C_8H_{18}O_6$	-	-	0.2	1.5	
Methyl formate	$HCOOCH_3$	100	250	150	375	
5-Methylheptan-3-one	$CH_3CH_2COCH_2CH_3$-$CHCH_2CH_3$	25	130	-	-	
5-Methylhexan-2-one	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Methyl iodide	CH_3I	5	28	10	56	Sk
Methyl isoamyl ketone	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Methyl isobutyl carbinol	$CH_3CHOHCH_2CH(CH_3)_2$	25	100	40	160	Sk

TABLE 2 - p 13

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Methyl isobutyl ketone (MIBK)	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Methyl isocyanate		-	0.02	-	0.07	Sen
Methyl mercaptan	CH_3SH	0.5	1	-	-	
Methyl methacrylate	$CH_2=C(CH_3)COOCH_3$	100	410	125	510	
Methyl parathion	$C_8H_{10}NO_5PS$	-	0.2	-	0.6	Sk
2-Methylpentane-2,4-diol	$(CH_3)_2COHCH_2CHOHCH_3$	25	125	25	125	
4-Methylpentan-2-ol	$CH_3CHOHCH_2CH(CH_3)_2$	25	100	40	160	Sk
4-Methylpentan-2-one	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
4-Methylpent-3-and-2-one	$CH_3COCH=C(CH_3)_2$	15	60	25	100	
4-Methyl-m-phenylene diisocyanate		-	0.02	-	0.07	Sen
2-Methylpropan-1-ol	$(CH_3)_2CHCH_2OH$	50	150	75	225	
2-Methylpropan-2-ol	$(CH_3)_3COH$	100	300	150	450	
Methyl propyl ketone	$CH_3COC_3H_7$	200	700	250	875	
1-Methyl-2-pyrrolidone	$CH_3N(CH_2)_3CO$	100	400	-	-	
Methyl silicate	$(CH_3O)_4Si$	1	6	5	30	
α-Methylstyrene	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Methylstyrenes, all isomers except α-methylstyrene	$CH_3C_6H_4CH=CH_2$	100	480	150	720	
N-*Methyl*-N, 2,4,6-tetranitroaniline	$(NO_2)_3C_6H_2N(NO_2)CH_3$	-	1.5	-	3	Sk
Mevinphos (ISO)	$C_7H_{13}O_6P$	0.01	0.1	0.03	0.3	Sk
Mica						
total inhalable dust		-	10	-	-	
respirable dust		-	1	-	-	
Molybdenum compounds (as Mo)	Mo					
soluble compounds		-	5	-	10	
insoluble compounds		-	10	-	20	
Monochloroacetic acid	$ClCH_2CO_2H$	0.3	1	-	-	Sk
Morpholine	C_4H_9NO	20	70	30	105	Sk
Naled (ISO)	$C_4H_7Br_2Cl_2O_4P$	-	3	-	6	
Naphtalene	$C_{10}H_8$	10	50	15	75	
1,5-Naphtylene diisocyanate		-	0.02	-	0.07	Sen
Nickel carbonyl	$Ni(CO)_4$	-	-	0.1	0.24	
Nickel, organic compounds (as Ni)	Ni	-	1	-	3	
Nicotine	$C_{10}H_{14}N_2$	-	0.5	-	1.5	Sk
Nitrapyrin	$C_6H_3Cl_4N$	-	10	-	20	
Nitric acid	HNO_3	2	5	4	10	
Nitric oxide	NO	25	30	35	45	
4-Nitroaniline	$NO_2C_6H_4NH_2$	-	6	-	-	Sk
Nitrobenzene	$C_6H_5NO_2$	1	5	2	10	Sk
Nitroethane	$C_2H_5NO_2$	100	310	-	-	
Nitrogen dioxide	NO_2	3	5	5	9	
Nitrogen monoxide	NO	25	30	35	45	
Nitrogen trifluoride	NF_3	10	30	15	45	

TABLE 2 - p 14

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Nitroglycerine	$CH_2NO_2CHNO_3CH_2NO_3$	0.2	2	0.2	2	Sk
Nitromethane	CH_3NO_2	100	250	150	375	
1-Nitropropane	$C_3H_7NO_2$	25	90	-	-	
2-Nitropropane	$CH_3CH(NO_2)CH_3$	10	36	20	72	
Nitrotoluene, all isomers	$CH_3C_6H_4NO_2$	5	30	10	60	Sk
Nitrous oxide	N_2O	100	180	-	-	
Octachloronaphtalene	$C_{10}Cl_8$	-	0.1	-	0.3	Sk
n-Octane	$CH_3(CH_2)_6CH_3$	300	1450	375	1800	
Orthophosphoric acid	H_3PO_4	-	1	-	3	
Osmium tetraoxide (as Os)	OsO_4	0.0002	0.002	0.0006	0.006	
Oxalic acid	COOHCOOH	-	1	-	2	
Oxalonitrile	$(CN)_2$	10	20	-	-	
2,2'-Oxydiethanol	$(HOCH_2CH_2)_2O$	23	100	-	-	
Ozone	O_3	0.1	0.2	0.3	0.6	
PCBs						
Chlorinated biphenyls (42% chlorine)	$C_{12}H_7Cl_3$ (approx)	-	1	-	2	Sk
Chlorinated biphenyls (54% chlorine)	$C_6H_2Ci_3C_6H_3Cl_2$	-	0.5	-	1	Sk
Paraffin wax, fume		-	2	-	6	
Paraquat dichloride (ISO)	$[CH_3(C_5H_4N_+)_2CH_3]$-$(Cl\text{-}_2)$					
respirable dust		-	0.1	-	-	
Parathion (ISO)	$(C_2H_5O)_2PSOC_6H_4NO_2$	-	0.1	-	0.3	Sk
Parathion-methyl (ISO)	$C_8H_{10}NO_5PS$	-	0.2	-	0.6	Sk
Pentacarbonyliron (as Fe)	$FE(CO)_5$	0.01	0.08	-	-	
Pentachlorophenol	C_6Cl_5OH	-	0.5	-	1.5	Sk
Pentaerythritol	$C(CH_2OH)_4$					
total inhalable dust		-	10	-	20	
respirable dust		-	5	-	-	
Pentane, all isomers	C_5H_{12}	600	1800	750	2250	
Pentan-2-one	$CH_3COC_3H_7$	200	700	250	875	
Pentan-3-one	$C_2H_5COC_2H_5$	200	700	250	875	
Pentyl acetate	$CH_3COOC_5H_{11}$	100	530	150	800	
Perchloroethylene	$CCl=CCl_2$	50	335	150	1000	
Perchloryl fluoride	ClO_3F	3	14	6	28	
Phenacyl chloride	$C_6H_5COCH_2Cl$	0.05	0.3	-	-	
Phenol	C_6H_5OH	5	19	10	38	Sk
p-Phenylenediamine	$C_6H_4(NH_2)_2$	-	0.1	-	-	Sk
Phenyl-2,3-epoxypropyl ether	$C_6H_5OCH_2CHCH_2$ (\ / O)	1	6	-	-	
Phenylethylene	$C_6H_5CH=CH_2$	100	420	250	1050	
Phenylhydrazine	$C_6H_5NHNH_2$	5	20	10	45	Sk
2-Phenylpropene	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Phorate (ISO)	$C_7H_{17}O_2PS_3$	-	0.05	-	0.2	Sk
Phosdrin	$C_7H_{13}O_6P$	0.01	0.1	0.03	0.3	Sk
Phosgene	$COCl_2$	0.1	0.4	-	-	
Phosphine	PH_3	-	-	0.3	0.4	

TABLE 2 - p 15

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Phosphorus, yellow	P_4	-	0.1	-	0.3	
Phosphorus pentachloride	PCl_5	0.1	1	-	-	
Phosphorus pentasulphide	P_2S_5	-	1	-	3	
Phosphorus trichloride	PCl_3	0.2	1.5	0.5	3	
Phosporyl trichloride	$POCl_3$	0.2	1.2	0.6	3.6	
Phthalic anhydride	$C_6H_4(CO)_2O$	1	6	4	24	Sen
Picloram (ISO)	$C_6H_3Cl_3N_2O_2$	-	10	-	20	
Picric acid	$HOC_6H_2(NO_2)_3$	-	0.1	-	0.3	Sk
Piperazine dihydrochloride	$C_4H_{10}N_2.2HCl$	-	5	-	-	
Piperidine	$C_5H_{11}N$	1	3.5	-	-	Sk
Plaster of Paris	$(CaSO_4)_2.H_2O$					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Platinum metal	Pt	-	5	-	-	
Platinum salts, soluble (as Pt)	Pt	-	0.002	-	-	Sen
Polychlorinated biphenyls (PCBs)	See PCB's					
Polyvinyl chloride (PVC)						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Portland Cement						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Potassium hydroxide	KOH	-	-	-	2	
Propane-1,2-diol	$CH_3CHOHCH_2OH$					
total (vapour and particulates)		150	470	-	-	
particulates		-	10	-	-	
n-Propanol	$CH_3CH_2CH_2OH$	200	500	250	625	Sk
Propan-1-ol	$CH_3CH_2CH_2OH$	200	500	250	625	Sk
Propan-2-ol	$(CH_3)_2CHOH$	400	980	500	1225	Sk
Propargyl alcohol	$HC{\equiv}CCH_2OH$	1	2	3	6	Sk
Propionic acid	CH_3CH_2COOH	10	30	15	45	
Propoxur (ISO)	$H_3CNHCOOC_6H_4OCH(CH_3)_2$	-	0.5	-	2	
n-Propyl acetate	$CH_3COOC_3H_7$	200	840	250	1050	
Propylene dinitrate	$CH_2NO_3CHNO_3CH_3$	0.2	1.2	0.2	1.2	Sk
Propylene glycol	$CH_3CHOHCH_2OH$					
total (vapour and particulates)		150	470	-	-	
particulates		-	10	-	-	
Propylene glycol dinitrate (PGDN)	$CH_2NO_3CHNO_3CH_3$	0.2	1.2	0.2	1.2	Sk
Propylene glycol monomethyl ether	$CH_3OCH_2CHOHCH_3$	100	360	300	1080	Sk
Prop-2-yn-1-ol	$HC{\equiv}CCH_2OH$	1	2	3	6	Sk

TABLE 2 - p 16

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Pulverised Fuel Ash						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Pyrethrins (ISO)		-	5	-	10	
Pyridine	C_5H_5N	5	15	10	30	
2-Pyridylamine	$NH_2C_5H_4N$	0.5	2	2	8	
Pyrocatechol	$C_6H_4(OH)_2$	5	20	-	-	
Quartz, crystalline	SiO_2					
respirable dust		-	0.4	-	-	
Quinone	$C_6H_4O_2$	0.1	0.4	0.3	1.2	
RDX	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Resorcinol	$C_6H_4(OH)_2$	10	45	20	90	
Rhodium (as Rh),	Rh					
metal fume and dust		-	0.1	-	0.3	
soluble salts		-	0.001	-	0.003	
Ronnel	$(CH_3O)_2PSOC_6H_2Cl_3$	-	10	-	-	
Rosin core solder pyrolysis products as formaldehyde		-	0.1	-	0.3	Sen
Rotenone (ISO)	$C_{23}H_{22}O_6$	-	5	-	10	
Rouge						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Selenium and compounds, except hydrogen selenide (as Se)	Se	-	0.1	-	-	
Silane	SiH_4	0.5	0.7	1	1.5	
Silica, amorphous	SiO_2					
total inhalable dust		-	6	-	-	
respirable dust		-	3	-	-	
Silica, fused	SiO_2					
respirable dust		-	0.1	-	-	
Silicon	Si					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Silicon carbide	SiC					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Silicon tetrahydride	SiH_4	0.5	0.7	1	1.5	
Silver	Ag	-	0.1	-	-	
Silver compounds (as Ag)	Ag	-	0.01	-	-	
Sodium azide	NaN_3	-	-	-	0.3	
Sodium 2-(2,4-dichlorophenoxy)ethyl sulphate	$C_8H_7Cl_2NaO_5S$	-	10	-	20	
Sodium fluoroacetate	$CH_2FCOONa$	-	0.05	-	0.15	Sk
Sodium hydrogensulphite	$NaHSO_3$	-	5	-	-	
Sodium hydroxide	NaOH	-	-	-	2	

TABLE 2 - p 17

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Sodium metabisulphate	$Na_2S_2O_5$	-	5	-	-	
Starch						
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Stibine	SbH_3	0.1	0.5	0.3	1.5	
Strychnine	$C_{21}H_{22}N_2O_2$	-	0.15	-	0.45	
Styrene	$C_6H_5CH=CH_2$	100	420	250	1050	
Subtilisins (Proteolytic enzymes as 100 % pure crystalline enzyme)		-	0.00006	-	0.00006	
Sucrose	$C_{12}H_{22}O_{11}$	-	10	-	20	
Sulfotep (ISO)	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
Sulphur dioxide	SO_2	2	5	5	13	
Sulphur hexafluoride	SF_6	1000	6000	1250	7500	
Sulphuric acid	H_2SO_4	-	1	-	-	
Sulphur monochloride	S_2Cl_2	-	-	1	6	
Sulphur pentachloride	S_2F_{10}	0.025	0.25	0.075	0.75	
Sulphur tetrafluoride	SF_4	0.1	0.4	0.3	1	
Sulphuryl difluoride	SO_2F_2	5	20	10	40	
2.4.5-T (ISO)	$C_8H_5Cl_3O_3$	-	10	-	20	
TDI		-	0.02	-	0.07	Sen
TEDP	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
TEPP (ISO)	$(C_2H_5)_4P_2O_7$	0.004	0.05	0.01	0.2	Sk
TNT	$CH_3C_6H_2(NO_2)_3$	-	0.5	-	-	Sk
Talc						
total inhalable dust		-	10	-	-	
respirable dust		-	1	-	-	
Tantalum	Ta	-	5	-	10	
Tellurium & compounds, except hydrogen telluride, (as Te)	Te	-	0.1	-	-	
Terphenyls, all isomers	$C_{18}H_{14}$	-	-	0.5	5	
1,1,2,2-Tetrabromoethane	$CHBr_2CHBr_2$	0.5	7	-	-	Sk
Tetrabromomethane	CBr_4	0.1	1.4	0.3	4	
Tetracarbonylnickel (as Ni)	$Ni(CO)_4$	-	-	0.1	0.24	
1,1,1,2-Tetrachloro-2,2-difluoroethane	CCl_3CClF_2	100	834	100	834	
1,1,2,2-Tetrachloro 1,2-difluoroethane	CCl_2FCCl_2F	100	834	100	834	
Tertrachloroethylene	$CCl=CCl_2$	50	335	150	1000	
Tetrachloromethane	CCl_4	2	12.6	-	-	Sk
Tetrachloronaphthalenes, all isomers	$C_{10}H_4Cl4$	-	2	-	4	
O,O,O',O'-Tetraethyl dithiopyrophosphate	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
O,O,O',O'-Tetraethyl pyrophosphate	$(C_2H_5)_4P_2O_7$	0.004	0.05	0.01	0.2	Sk
Tetraethyl orthosilicate	$Si(OC_2H_5)_4$	10	85	30	255	
Tetrafluorodichloroethane	$CClF_2CClF_2$	1000	7000	1250	8750	

TABLE 2 - p 18

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Tetrahydrofuran	$(C_2H_4)_2O$	200	590	250	735	
Tetramethyl orthosilicate	$(CH_3O)_4Si$	1	6	5	30	
Tetramethyl succinonitrile	$C_8H_{12}N_2$	0.5	3	2	9	Sk
Tetrasodium pyrophosphate	$Na_4P_2O_7$	-	5	-	-	
Tetryl	$(NO_2)_3C_6H_2N(NO_2)CH_3$	-	1.5	-	3	Sk
Thallium, soluble compounds (as Ti)	Tl	-	0.1	-	-	Sk
4,4'-Thiobis(6-tert-butyl-m-cresol)	$C_{22}H_{30}O_2S$	-	10	-	20	
Thioglycollic acid	$C_2H_4O_2S$	1	5	-	-	
Thionyl chloride	$SOCl_2$	-	-	1	5	
Thiram (ISO)	$(CH_3)_2NCS_2CS_2N(CH_3)_2$	-	5	-	10	
Tin, compounds, inorganic, except SnH_4, (as Sn)	Sn	-	2	-	4	
Tin compounds, organic, except Cyhexatin (ISO), (as Sn)	Sn	-	0.1	-	0.2	Sk
Titanium dioxide	TiO_2					
total inhalable dust		-	10	-	-	
respirable dust		-	5	-	-	
Toluene	$C_6H_5CH_3$	50	188	150	560	Sk
Toluene diisocyanate (TDI)		-	0.2	-	0.07	Sen
p-Toluenesulphonyl chloride	$CH_3C_6H_4SO_2Cl$	-	-	-	5	
1,4,7-Tri-(aza)-heptane	$(NH_2CH_2CH_2)_2OH$	1	4	-	-	Sk
Tribromomethane	$CHBr_3$	0.5	5	-	-	Sk
Tributyl phosphate, all isomers	$(C_4H_9)_3PO_4$	-	5	-	5	
Tricarbonyl (eta-cyclopentadienyl) manganese (as Mn)	$(C_5H_5)—Mn(CO)_3$	-	0.1	-	0.3	Sk
Tricarbonyl (methylcyclopentadienyl) manganese (as Mn)	$(CH_3)C_5H_4—Mn(CO)_3$	-	0.2	-	0.6	Sk
Trichloroacetic acid	CCl_3COOH	1	5	-	-	
1,2,4-Trichlorobenzene	$C_6H_3Cl_3$	5	40	5	40	
1,1,1-Trichlorobis (chlorophenyl) ethane	$C_{14}H_9Cl_5$	-	1	-	3	
1,1,2-Trichloroethane	$CH_2ClCHCl_2$	10	45	20	90	Sk
Trichlorofluoromethane	CCl_3F	1000	5600	1250	7000	
Trichloromethane	$CHCl_3$	2	9.8	-	-	
Trichloronitromethane	CCl_3NO_2	0.1	0.7	0.3	2	
2,4,5-Trichlorophenoxyacetic acid	$C_8H_5Cl_3O_3$	-	10	-	20	
1,2,3-Trichloropropane	$CH_2ClCHClCH_2Cl$	50	300	75	450	
1,1,2-Trichlorotrifluoroethane	CCl_2FCClF_2	1000	7600	1250	9500	
Tri-o-cresyl phosphate	$(CH_3C_6H_4O)_3P=O$	-	0.1	-	0.3	
Tricyclohexyltin hydroxide	$(C_6H_{11})_3SnOH$	-	5	-	10	
Tridymite, respirable dust	SiO_2	-	0.4	-	-	

TABLE 2 - p 19

Substance	Formula	TWA OEL-RL		SHORT TERM OEL-RL		1995
		ppm	mg/m³	ppm	mg/m³	Notes
Triethylamine	$(C_2H_5)_3N$	10	40	15	60	
Trifluorobromomethane	CF_3Br	1000	6100	1200	7300	
Trimanganese tetraoxide	Mn_3O_4	-	1	-	-	
Trimellitic anhydride	$C_9H_4O_5$	-	0.04	-	-	Sen
Trimethylamine	$(CH_3)_3N$	10	24	15	36	
Trimethylbenzenes, all isomers or mixtures	$C_6H_3(CH_3)_3$	25	123	-	-	
3,5,5-Trimethylcyclohex-2-enone	$C_9H_{14}O$	-	-	5	25	
Trimethyl phosphite	$(CH_3O)_3P$	2	10	-	-	
2,4,6-Trinitrophenol	$HOC_6H_2(NO_2)_3$	-	0.1	-	0.3	Sk
2,4,6-Trinitrotoluene	$CH_3C_6H_2(NO_2)_3$	-	0.5	-	-	Sk
Triphenyl phosphate	$(C_6H_5)_3PO_4$	-	3	-	6	
Tripoli, respirable dust	SiO_2	-	0.4	-	-	
Tri-o-tolyl phosphate	$(CH_3C_6H_4O)_3P=O$	-	0.1	-	0.3	
Tungsten & compounds (as W).	W					
soluble		-	1	-	3	
insoluble		-	5	-	10	
Turpentine	-$C_{10}H_{16}$	100	560	150	840	
Uranium compounds, natural, soluble, (as U)	U	-	0.2	-	0.6	
Vanadium pentoxide	V_2O_5					
total inhalable dust		-	0.5	-	-	
fume and respirable dust		-	0.05	-	-	
Vinyl acetate	$CH_3COOCH=CH_2$	10	30	20	60	
Vinyl benzene	$C_6H_5CH=CH_2$	100	420	250	1050	
Vinyl bromide	$CH_2=CHBr$	5	20	-	-	
4-Vinylcyclohexene dioxide	$C_8H_{12}O2$	10	60	-	-	
Vinyl toluenes, all isomers	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Warfarin (ISO)	$C_{19}H_{16}O_4$	-	0.1	-	0.3	
White spirit		100	575	125	720	
Xylene, o-, m-, p- or mixed isomers	$C_6H_4(CH_3)_2$	100	435	150	650	Sk
Xylidine, all isomers	$(CH_3)_2C_6H_3NH_2$	2	10	10	50	Sk
Yttrium	Y	-	1	-	3	
Zinc chloride, fume	$ZnCl_2$	-	1	-	2	
Zinc distearate	$Zn(C_{18}H_{35}O_2)_2$					
total inhalable dust		-	10	-	20	
respirable dust		-	5	-	-	
Zinc oxide, fume	ZnO	-	5	-	10	
Zirconium compounds (as Zr)	Zr	-	5	-	10	

TABLE2-LIST/cvv

TABLE 2 - p 20

ABBREVIATIONS

1. OEL - CL Occupational Exposure Limit - Control Limit.
   OEL - RL Occupational Exposure Limit - Recommended Limit.
2. ppm Parts per million.
3. mg/m^3 Milligrams per cubic meter.
4. SK Skin absorption.
5. Sen Capable of causing respiratory sensitisation.
6. ISO International Standards Organisation.

NOTE

(a) The concentration of "respirable dust" shall be determined from the fraction passing a size selector with an efficiency that will allow -

(i) 100 % particles of 1 µm aerodynamic diameter,
(ii) 50 % particles of 5 µm aerodynamic diameter,
(iii) 20 % particles of 6 µm aerodynamic diameter,
(iv) 0 % of particles of 7 µm aerodynamic diameter and larger to pass through the size selector.

(b) For asphyxiant substances, see Annexure 5.

TABLE2-LIST/cvv

REGULATIONS FOR HAZARDOUS CHEMICAL SUBSTANCES, 1995

TABLE 3 - p 1

BIOLOGICAL EXPOSURE INDICES (BEI)

1995

CHEMICAL DETERMINANT	SAMPLING TIME	BEI	NOTATION
ANILINE			
Total p-aminophenol in urine	End of shift	50 mg/g creatinine	C
Methemoglobin in blood	During or end of shift	1,5% of hemoglobin	B, C, D
ARSENIC AND SOLUBLE COMPOUNDS INCLUDING ARSINE			
Inorganic arsenic metabolites in urine	End of workweek	50 µg/g creatinine	B
BENZENE			
Total phenol in urine	End of shift	50 mg/g creatinine	B, C
Benzene in exhaled air:	Prior to next shift		
mixed-exhaled		0,08 ppm	D
end-exhaled		0,12 ppm	D
CADMIUM			
Cadmium in urine	Not critical	10 µg/g creatinine	B
Cadmium in blood	Not critical	10 µg/ℓ	B
CARBON DISULFIDE			
2-Thiothiazolidine-4-carboxylic acid in urine	End of shift	5 mg/g creatinine	-
CARBON MONOXIDE			
Carboxyhemaglobin in blood	End of shift	less than 8% of homoglobin	B, C
Carbon monoxide in end-exhaled air	End of shift	less than 40 ppm	B, C
CHLOROBENZENE			
Total 4-chlorocatechol in urine	End of shift	150mg/g creatinine	C
Total p-clorophenol in urine	End of shift	25mg/g creatinine	C
CHROMIUM (VI),			
Water soluble fume	Increase during shift	10 µg/g creatinine	B
Total chromium in urine	End of shift at end of workweek	30 µg/g creatinine	B
N,N-DIMETHYLFORMAMIDE (DMF)			
N-Methylformamide in urine	End of shift	40 mg/g creatinine	B
ETHYL BENZENE			
Mandelic acid in urine	End of shift at end of workweek	1,5 g/g creatinine	A
Ethyl benzene in end-exhaled air			D
FLUORIDES			
Fluorides in urine	Prior to shift	3 mg/g creatinine	B, C
	End of shift	10 mg/g creatinine	B, C
FURFURAL			
Total furoic acid in urine	End of shift	200 mg/g creatinine	B, C
n-HEXANE			
2,5-Hexanedione in urine	End of shift	5 mg/g creatinine	C
n-Hexane in end-exhaled air			D
MERCURY			
Total inorganic mercury in urine	Prior to shift	35 µg/g creatinine	B
Total inorganic mercury in blood	End of shift at end of workweek	15 µg/ℓ	B
METHEMOGLOBIN INDUCERS			
Methemoglobin in blood	During or end of shift	1,5% of hemoglobin	B, C, D
METHANOL			
Methanol in urine	End of shift	15 mg/ℓ	B, C
Formic acid in urine	Before shift at end of workweek	80 mg/g creatinine	B, C
METHYL CHLOROFORM			
Methyl chloroform in end-exhaled air	Prior to the last shift of workweek	40 ppm	-

TABLE 3 - p 2

CHEMICAL DETERMINANT	SAMPLING TIME	BEI	1995 NOTATION
Trichloroacetic acid in urine	End of workweek	10 mg/ℓ	C, D
Total trichloroethanol in urine	End of shift at end of workweek	30 mg/ℓ	C, D
Total trichloroethanol in blood	End of shift at end of workweek	1 mg/ℓ	C
METHYL ETHYLKETONE			
MEK in urine	End of shift	2 mg/ℓ	-
METHYL ISOBUTYL KETONE			
MIBK in urine	End of shift	2 mg/ℓ	-
NITROBENZENE			
Total p-nitrophenol in urine	End of shift at end of workweek	5 mg/g creatinine	C
Methemoglobin in urine	End of shift	1,5% of hemoglobin	B, C, D
ORGANOPHOSPHORUS CHOLINESTERASE INHIBITORS			
Cholinesterase activity in red cells	Discretionary	70% of individual's baseline	B, C, D
PARATHION			
Total p-nitrophenol in urine	End of shift	0,5 mg/g creatinine	C, D
Cholinesterase activity in red cells	Discretionary	70% of individual's baseline	B, C, D
PENTACHLOROPHENOL			
Total PCP in urine	Prior to the last shift of workweek	2 mg/g creatinine	B
Free PCP in plasma	End of shift	5 mg/ℓ	B
PERCHLOROETHYLENE			
Perchloroethylene in end-exhaled air	Prior to the last shift of workweek	10 ppm	-
Perchloroethylene in blood	Prior to the last shift of workweek	1 mg/ℓ	-
Trichlorocetic acid in urine	End of workweek	7 mg/ℓ	C, D
PHENOL			
Total phenol in urine	End of shift	250 mg/g creatinine	B, C
STYRENE			
Mandelic acid in urine	End of shift	800 mg/g creatine	C
	Prior to next shift	300 mg/g creatinine	C
Phenylglyoxylic acid in urine	End of shift	240 mg/g creatinine	B, C
	Prior to next shift	100 mg/g creatinine	B, C
Styrene in venous blood	End of shift	0,55 mg/ℓ	D
	Prior to next shift	0,02 mg/ℓ	D
TOLUENE			
Hippuric acid in urine	End of shift	2,5 g/g creatinine	B, C
Toluene in venous blood	End of shift	1 mg/ℓ	D
o-Cresol in urine	End of shift	1 mg/g creatinine	C
TRICHLOROETHYLENE			
Trichloroacetic acid in urine	End of workweek	100 mg/g creatinine	C
Trichloroacetic acid and trichloroethanol in urine	End of shift at end of workweek	300 mg/g creatinine	C
Free trichloroethanol in blood	End of shift at end of workweek	4 mg/ℓ	C
Trichloroethylene in end-exhaled air			D
XYLENE			
Methylhippuric acid in urine	End of shift	1,5 g/g creatinine	-
	Last four hours of shift	2 mg/min	-

TABLE 3 - p 3

NOTATIONS

"A" notation: This notation indicates that an identifiable population group might have an increased susceptibility to the effect of the chemical, thus leaving the population group unprotected by the recommended BEI.

"B" notation: This notation indicates that the determinant is usually present in a significant amount in biological specimens collected from subjects who have not been occupationally exposed. Such background levels are included in the BEI value.

"C" notation: This notation indicates that the determinant is non-specific, since it is observed after exposure to some other chemicals. These non-specific tests are preferred because they are easy to use and usually offer a better correlation with exposure than specific tests. In such instances, a BEI for a specific, less quantitative biological determinant is recommended as a confirmatory test.

"D" notation: This notation indicates that the biological determinant is an indicator of exposure to the chemical, but the quantitative interpretation of the measurement is ambiguous (semi-quantitative). These biological determinants should be used as a screening test if a quantitative test is not practical or a confirmatory test if the quantitative test is not specific and the origin of the determinant is in question.

TABLE3-NEW/REG/cvv

REGULASIES VIR GEVAARLIKE CHEMIESE SUBSTANSIES, 1995

TABEL 1 - p 1

BEROEPSBLOOTSTELLINGSDREMPELS - BEHEERDREMPELS
VIR GEVAARLIKE CHEMIESE SUBSTANSIES

Substansie	Formule	TBG BBd-Bd		KORTTERMYN BBd-Bd 1995		
		dpm	mg/m³	dpm	mg/m³	Notas
Akrielamied	$CH_2=CHCONH_2$	-	0.3	-	-	Sk
Akrielnitriel	$CH_2=CHCN$	2	4	-	-	Sk
Arseen en verbindings behalwe arsien (as As)	As Kyk Asbesregulasies	-	0.1	-	-	
Asbes						
Benseen	C_6H_6	5	16	-	-	
Bis (chlorometiel) eter (BCME)	$ClCH_2CH_2Cl$	0.001	0.005		-	New
Buta-1,3-dieen	$CH_2=CHCH=CH_2$	10	22	-	-	
2-Butoksie-etanol	$C_4H_9OCH_2CH_2OH$	25	120	-	-	Sk
Chroom (VI) verbindings (as Cr)	Cr		0.05	-	-	
1,2-Dibroometaan (etileen dibromied)	$BrCH_2CH_2Br$	0.5	4	-	-	Sk
Dichlorometaan	CH_2Cl_2	100	350	-	-	
2,2'-Dichloro-4,4'-metileen dianilien (MboCA)	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
Etileenoksied	CH_2CH_2O	5	10	-	-	
2-Etoksie-etanol	$C_2H_5OCH_2CH_2OH$	10	37	-	-	Sk
2-Etoksie-etielasetaat	$C_2H_5OCH_2CH_2OOCCH_3$	10	54	-	-	Sk
Formaldehied	HCHO	2	2.5	2	2.5	
Graanstof	Kyk Aanhangsel 7	-	10	-	-	Sen
Houtstof (harde hout)		-	5	-	-	Sen
Isosianate, alle (as-NCO)		-	0.02	-	0.07	Sen
Kadmium en kadmiumverbindings behalwe kadmiumoksied-damp en kadmiumsulfied-pigmente (as Cd)	Cd	-	0.05	-	-	
Kadmiumoksied-damp (as Cd)	CdO	-	0.05	-	0.05	
Kadmiumsulfied-pigmente (respireerbare stof Cd)	CdS	-	0.04	-	-	
Koolstofdisulfied	CS_2	10	30	-	-	Sk
Lood en verbindings	Kyk Lood Regulasies					

TABEL 1 - p 2

Substansie	Formule	TBG BBd-Bd		KORTTERMYN BBd-Bd		1995
		dpm	mg/m³	dpm	mg/m³	Notas
2-Metoksie-etanol	$CH_3OCH_2CH_2OH$	5	16	-	-	Sk
2-Metoksie-etielasetaat	$CH_3COOCH_2CH_2OCH_3$	5	24	-	-	Sk
Nikkel	Ni	-	0.5	-	-	
Nikkel, anorganiese verbindings (as Ni)	Ni					
oplosbare verbindings		-	0.1	-	-	
onoplosbare verbindings		-	0.5	-	-	
Rubberprosesstof	Kyk Aanhangsel 6	-	8	-	-	
Rubberdamp		-	0.6	-	-	
Silika, kristallyn	SiO_2					
respireerbare stof		-	0.4	-	-	
Stireen	$C_6H_5CH=CH_2$	100	420	250	1050	
1,1,1-Trichlooretaan	CH_3CCl_3	350	1900	450	2450	
Trichlooretileen	$CCl_2=CHCl$	100	535	150	802	Sk
Vinielchloried	$CH_2=CHCl$	7	-	-	-	
Vinielideenchloried	$CH_2=CCl_2$	10	40	-	-	
Waterstofsianied	HCN	-	-	10	10	Sk

** Vinielchloried is ook onderhewig aan 'n oorheersende jaarlikse TBG BBd-Bd van 3 dpm.

TABEL1/cvv

REGULASIES VIR GEVAARLIKE CHEMIESE SUBSTANSIES, 1995

TABEL 2 - p 1

BBd-Ad: BEROEPSBLOOTSTELLINGSDREMPEL -
AANBEVOLE DREMPEL VIR GEVAARLIKE CHEMIESE SUBSTANSIES

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Akrielaldehied (Akroleïen)	CH_2=CHCHO	0.1	0.25	0.3	0.8	
Akrielsuur	CH_2=CHCOOH	10	30	20	60	
Aldrien (ISO)	$C_{12}H_8Cl_6$	-	0.25	-	0.75	Sk
Alliel 2,3-epoksiepropiel-eter	CH_2=CHCH$_2$OCH$_2$CHCH$_2$O	5	22	10	44	Sk
Allielalkohol	CH_2=CHCH$_2$OH	2	5	4	10	Sk
Allielchloried	CH_2=CHCH$_2$Cl	1	3	2	6	
Allielglisidieleter (AGE)	CH_2=CHCH$_2$OCH$_2$CHCH$_2$O	5	22	10	44	Sk
* Aluminium-alkiel verbindings		-	2	-	-	
Aluminium-metaal	Al					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
* Aluminiumoksiede	Al_2O_3,Al(OH)$_3$ en AlOOH					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Aluminiumsoute, oplosbaar		-	2	-	-	
Aminodimetielbenseen	$(CH_3)_2C_6H_3NH_2$	2	10	10	50	Sk
n-Amielasetaat	$CH_3COOC_5H_{11}$	100	530	150	800	
sec-Amielasetaat	$CH_3COOCH(CH_3)C_3H_7$	-	-	150	800	
2-Amino-etanol	$NH_2CH_2CH_2OH$	3	8	6	15	
2-Aminopirideen	$NH_2C_5H_4N$	0.5	2	2	8	
Ammoniak	NH_3	25	17	35	24	
Ammoniumchloried, damp	NH_4Cl	-	10	-	20	
Ammoniumsulfamidaat	$NH_2SO_3NH_4$	-	10	-	20	
Anilien	$C_6H_5NH_2$	2	10	5	20	Sk
Anisidine, *o*- en *p*-isomere	$NH_2C_6H_4OCH_3$	0.1	0.5	-	-	Sk
		-	0.5	-	-	
Antimoon & verbindings (as Sb)		-	0.5	-	-	
Arsien	AsH_3	0.05	0.2	-	-	
Asetaldehied	CH_3=CHO	100	180	150	270	
o-Asetielsalisielsuur	$CH_3COOC_6H_4COOH$	-	5	-	-	
Asetonitriel	CH_3CN	40	70	60	105	
Asetoon	CH_3COCH_3	750	1780	1500	3560	
Asfalt, petroleumdampe		-	5	-	10	
Asienfos-metiel (ISO)	$(CH_3O)_2PSSCH_2(C_7H_4N_3O)$	-	0.2	0.6	-	Sk
Asiridien	CH_2CH_2NH	-	10	-	-	
Aspirien	$CH_3COOC_6H_4COOH$	-	5	-	-	
Asynsuur	CH_3COOH	10	25	15	37	

* Die BBd-Ad vir aluminium sluit nie blootstelling aan aluminium bedek met mineraalolie, of aan damp wat uit sweisprosesse ontstaan, in nie.

TABEL 2 - p 2

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Asynsuur anhidried	$(CH_3CO)_2O$	-	-	5	20	
Atrasien (ISO)	$C_8Hl_4ClN_5$	-	10	-	-	
y-BHC (ISO)	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk
Bariumsulfaat, respireerbare stof	$BaSO_4$	-	2	-	-	
Barium verbindings, oplosbaar (as Ba)	Ba	-	0.5	-	-	
Benomiel (ISO)	$C_{14}H_{18}N_4O_3$	-	10	-	15	
Benseentiol	C_6H_5SH	0.5	2	-	-	
Benseen-1,2,4-trikarboksielsuur 1,2-anhidried	$C_9H_4O_5$	-	0.04	-	-	Sen
Bensielbutielftalaat	$C_6H_5CH_2COOC_6H_4$-$COOC_4H_9$	-	5	-	-	
Bensielchloried	$C_6H_5CH_2Cl$	1	5	-	-	
Bensoielperoksied	$(C_6H_5CO)_2O_2$	-	5	-	-	
p-Bensokinoon	$C_6H_4O_2$	0.1	0.4	0.3	1.2	
Berillium	Be	-	0.002	-	-	
Bifeniel	$(C_6H_5)_2$	0.2	1.5	0.6	4	
2,2-Bis(p-metoksiefeniel) -1,1,1-trichlooretaan	$C_{14}H_9Cl_5$	-	1	-	3	
Bis(2,3-epoksiepropiel) eter	$(OCH_2CHCH_2)_2O$	0.1	0.6	-	-	
Bis(2-etielheksielftalaat)	$C_6H_4[COOCH_2CH(C_2H_5)$-$C_4H_9]_2$	-	5	-	10	
2,2-Bis(p-metoksiefeniel) -1,1,1-trichlooretaan	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
Bismuttelluried	Bi_2Te_3	-	10	-	20	
Bismuttelluried, seleniumtoegedien	Bi_2Te_3	-	5	-	10	
Booroksied	B_2O_3	-	10	-	20	
Boortribromied	BBr_3	-	-	1	10	
Boortrifluoried	BF_3	-	-	1	3	
Borate						
anhidries	$Na_2B_4O_7$	-	1	-	-	
dekahidraat	$Na_2B_4O_7.10H_2O$	-	5	-	-	
pentahidraat	$Na_2B_4O_7.5H_2O$	-	1	-	-	
Bornan-2-oon	$C_{10}H_{16}O$	2	12	3	18	
Bromoform	$CHBr_3$	0.5	5	-	-	Sk
Bromometaan	CH_3Br	5	20	15	60	Sk
Bromotrifluorometaan	CF_3Br	1000	6100	1200	7300	
Broom	Br_2	0.1	0.7	0.3	2	
Broomasiel (ISO)	$C_9H_{13}BrN_2O_2$	1	10	2	20	
Broomchlorometaan	CH_2BrCl	200	1050	250	1300	
Broometaan	C_2H_5Br	200	890	250	1110	
Broometileen	$CH_2=CHBr$	5	20	-	-	
Broompentafluoried	BrF_5	0.1	0.7	0.3	2	

TABEL 2 - p 3

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Butaan	C_4H_{10}	600	1430	750	1780	
Butaan-1-ol	$CH_3CH_2CH_2CH_2OH$	-	-	50	150	Sk
Butaan-2-ol	$CH_3CH_2CHOHCH_3$	100	300	150	450	
Butaan-2-oon	$CH_3COC_2H_5$	200	590	300	885	
trans-But-2-enal	$CH_3CH=CHCHO$	2	6	6	18	
Butielakrelaat	$C_7H_{12}O_2$	10	55	-	-	
n-Butielalkohol	$CH_3CH_2CH_2CH_2OH$	-	-	50	150	Sk
sec-Butielalkohol	$CH_3CH_2CHOHCH_3$	100	300	150	450	
tert-Butielalkohol	$(CH_3)_3COH$	100	300	150	450	
n-Butielamien	$CH_3CH_2CH_2CH_2NH_2$	-	-	5	15	
Butielasetaat	$CH_3COO(CH_2)_3CH_3$	150	710	200	950	
sec-Butielasetaat	$CH_3COOCH(CH_3)CH_2CH_3$	200	950	250	1190	
tert-Butielasetaat	$CH_3COOC(CH_3)_3$	200	950	250	1190	
Butielbensielftalaat	$C_6H_5CH_2COOC_6H_4$-$COOC_4H_9$	-	5	-	-	
n-Butielchloroformaat	$ClCO_2C_4H_{10}$	1	5.6	-	-	
Butiel-2,3-epoksiepropiel-eter	$C_4H_9OCH_2CHCH_2O$	25	135	-	-	
2-*sec*Butielfenol	$C_2H_5(CH_3)CHC_6H_4OH$	5	30	-	-	
n-Butielglisedieleter (BGE)	$C_4H_9OCH_2CHCH_2O$	25	135	-	-	
Butiellaktaat	$C_7H_{14}O_3$	5	25	-	-	
Chloordaan (ISO)	$C_{10}H_6Cl_8$	-	0.5	-	2	Sk
Chloor	Cl_2	0.5	1.5	1	3	
Chloordioksied	ClO_2	0.1	0.3	0.3	0.9	
Chloortrifluoried	ClF_3	-	-	0.1	0.4	
Chloorasetaldehied	$ClCH_2CHO$	-	-	1	3	
2-Chloorasetofenoon	$C_6H_5COCH_2Cl$	0.05	0.3	-	-	
Chloorasetielchloried	$ClCH_2COCl$	0.05	0.2	-	-	
Chloorbenseen	C_6H_5Cl	50	230	-	-	
Chlorobromometaan	CH_2BrCl	200	1050	250	1300	
2-Chlorobuta-1,3-dieen	$CH_2=CClCH=CH_2$	10	36	-	-	Sk
Chlorodifluorometaan	$CHClF_2$	1000	3500	-	-	
1-Chloro-2,3-epoksiepropaan	OCH_2CHCH_2Cl	2	8	5	20	Sk
Chlooretaan	C_2H_5Cl	1000	2600	1250	3250	
2-Chlooretanol	$ClCH_2CH_2OH$	-	-	1	3	Sk
Chlooretileen	$CH_2=CHCl$ +	7	-	-	-	
Chloroform	$CHCl_3$	2	9.8	-	-	Sk
Chlorometaan	CH_3Cl	50	105	100	210	
1-Chloro-4-nitrobenseen	$ClC_6H_4NO_2$	-	1	-	2	Sk
Chloropentafluooretaan	$CClF_2CF_3$	1000	6320	-	-	
Chloorpikrien	CCl_3NO_2	0.1	0.7	0.3	2	
β-Chloropreen	$CH_2=CClCH=CH_2$	10	36	-	-	Sk
3-Chloorpropeen	$CH_2=CHCH_2Cl$	1	3	2	6	
Chloorsulfoniese suur	HSO_3Cl	-	1	-	-	
α-Chloortolueen	$C_6H_5CH_2Cl$	1	5	-	-	
2-Chloortolueen	C_7H_7Cl	50	250	-	-	

TABEL 2 - p 4

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
2-Chloro-6-(trichloormetiel) piridien	$C_6H_3Cl_4N$	-	10	-	20	
Chloorpirifos (ISO)	$C_9H_{11}Cl_3NO_3PS$	-	0.2	-	0.6	Sk
Chroom	Cr	-	0.5	-	-	
Chroom (II) verbindings (as Cr)	Cr	-	0.5	-	-	
Chroom (III) verbindings (as Cr)	Cr	-	0.5	-	-	
2,4D (ISO)	$C_6H_3Cl_2OCH_2COOH$	-	10	-	20	
DDM	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
DDT	$C_{14}H_9Cl_5$	-	1	-	3	
DDVP	$(CH_3O)_2POOCH{\equiv}CCl_2$	0.1	1	-	3	Sk
2,4-DES	$C_8H_7ClNaO_5S$	-	10		20	
DMDT	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
Derris, kommersieel	$C_{23}H_{22}O_6$	-	5	-	10	
Diasetoonalkohol	$CH_3COCH_2C(CH_3)_2OH$	50	240	75	360	
Dialkiel 79 ftalaat	$C_6H_4(COOC_{7-9}H_{15-19})_2$	-	5	-	-	
Dialkielftalaat	$C_6H_4(COOCH_2CHCH)_2$	-	5	-	-	
2,2'-Diaminodiëtielamien	$(NH_2CH_2CH_2)_2NH$	1	4	-	-	Sk
4-4'-Diaminodifeniel-metaan (DADPM)	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
1,2-Diamino-etaan	$NH_2CH_2CH_2NH_2$	10	25	-	-	
Diammonium peroksodisulfaat (gemeet as $[S_2O_8]$	$(NH_4)_2S_2O_8$	-	1	-	-	
Diasinoon (ISO)	$C_{12}H_{21}N_2O_3PS$	-	0.1	-	0.3	Sk
Diasometaan	$CH_2{=}N_2$	0.2	0.4	-	-	
Dibensoiel-peroksied	$(C_6H_5CO)_2O_2$	-	5	-	-	
Dibismut-tritelluried	Bi_2Te_3	-	10	-	20	
Dibismut-tritelluried, selenium toegedien	Bi_2Te_3	-	5	-	10	
Diboraan	B_2H_6	0.1	0.1	-	10	
Diboortrioksied	B_2O_3	-	10	-	-	
Dibroom	$C_4H_7Br_2Cl_2O_4P$	-	3	-	20	
1,2-Dibromo-2,2-dichlooretiel dimetiel-fosfaat	$C_4H_7Br_2Cl_2O_4P$	-	3	-	6	
Dibromodifluorometaan	BBr_2F_2	100	860	150	1290	
Dibutielwaterstoffosfaat	$(n\text{-}C_4H_9O)_2(OH)PO$	1	5	2	10	
Di-n-butielfosfaat	$(n\text{-}C_4H_9O)_2(OH)PO$	1	5	2	10	
Dibutielftalaat	$C_6H_4(CO_2C_4H_9)_2$	-	5	-	10	
6,6'-Di-tert-butiel-4,4'-tiodi-m-kresol	$C_{22}H_{30}O_2S$	-	10	-	20	
Dichloorasetileen	$ClC{\equiv}CCl$	-	-	0.1	0.4	
1,2-Dichlorobenseen	$C_6H_4Cl_2$	-	-	50	300	
1,4-Dichlorobenseen	$C_6H_4Cl_2$	25	150	50	300	
Dichlorodifluorometaan	CCl_2F_2	1000	4950	1250	6200	
1,3-Dichloro-5,5-dimetiel-hidantoien	$C_5H_6Cl_2N_2O_2$	-	0.2	-	0.4	

TABEL 2 - p 5

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Dichlorodifeniel-trichloor-etaan	$C_{14}H_9Cl_5$	-	1	-	3	
1,1-Dichlooretaan	CH_3CHCl_2	200	810	400	1620	
1,2-Dichlooretaan	CH_2ClCH_2Cl	10	40	15	60	
1,1-Dichlooretileen	$CH_2=CCl_2$	10	40	-	-	
1,2-Dichlooretileen, *cis:trans* isomere 60:40	ClCH=CHCl	200	790	250	1000	
Dichlorofluorometaan	$CHCl_2F$	10	40	-	-	
2,4-Dichlorofenoksie-asynsuur	$C_6H_3Cl_2OCH_2COOH$	-	10	-	20	
1,3-Dichloropropeen, *cis* and *trans* isomere	$CHCl=CHCH_2Cl$	1	5	10	50	Sk
1,2-Dichlorotetra-fluoor-etaan	$CClF_2CClF_2$	1000	7000	1250	8750	
Dichlorovos (ISO)	$(CH_3O)_2POOCH{\equiv}CCl_2$	0.1	1	0.3	3	Sk
Dieldrien (ISO)	$C_{12}H_8Cl_6O$	-	0.25	-	0.75	Sk
Diëtanolamien	$HO(CH_2)_2NH(CH_2)_2OH$	3	15	-	-	
Diëtilamien	$(C_2H_5)_2NH$	10	30	25	75	
2-Diëtilamino-etanol	$(C_2H_5)_2NCH_2CH_2OH$	10	50	-	-	Sk
Diëtileenglikol	$(HOCH_2CH_2)_2O$	23	100	-	-	
Diëtileentriamien	$(NH_2CH_2CH_2)_2OH$	1	4	-	-	Sk
Diëtieleter	$C_2H_5OC_2H_5$	400	1200	500	1500	
Di-(2-etielheksiel) ftalaat	$C_6H_4[COOCH_2CH(C_2H_5)-C_4H_9]$	-	5	-	10	
Diëtielketoon	$C_2H_5COC_2H_5$	200	700	250	875	
Diëtielftalaat	$C_6H_4(COOC_2H_5)_2$	-	5	-	10	
Difluorochlorometaan	$CHClF_2$	1000	3500	-	-	
Difluorodibromometaan	CBr_2F_2	100	860	150	1290	
Difluorodichlorometaan	CCl_2F_2	1000	4950	1250	6200	
Diglisidieleter (DGE)	$(OCH_2CHCH_2)_2O$	0.1	0.6	-	-	
o-Dihidroksiebenseen	$C_6H_4(OH)_2$	5	20	-	-	
m-Dihidroksiebenseen	$C_6H_4(OH)_2$	10	45	20	90	
p-Dihidroksiebenseen	$C_6H_4(OH)_2$	-	2	-	4	
1,2-Dihidroksie-etaan	CH_2OHCH_2OH					
partikulate		-	10	-	-	
damp		-	60	-	125	
Di-isobutielketaan	$[(CH_3)_2CHCH_2]_2CO$	25	150	-	-	
Di-isobutielftalaat	$C_6H_4[COOCH_2CH(CH_3)_2]_2$	-	5	-	-	
Di-isodesielftalaat	$C_{10}H_{21}CO_2)_2C_6H_4$	-	5	-	-	
Di-isononielftalaat	$C_6H_4(COOC_9H_{19})_2$	-	5	-	-	
Di-iso-oktielftalaat	$C_6H_4(CO_2C_8H_{17})_2$	-	5	-	-	
Di-isopropielamien	$(CH_3)_2CHNHCH(CH_3)_2$	5	20	-	-	Sk
Di-isopropieleter	$(CH_3)_2CHOCH(CH_3)_2$	250	1050	310	1320	
Di-liniêre 79 ftalaat	$C_6H_4(COOC_{7-9}H_{15-19})_2$	-	5	-	-	
Dimetoksiemetaan	$CH_2(OCH_3)_2$	1000	3100	1250	3880	

TABEL 2 - p 6

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
NN-Dimetielasetamied	$CH_3CON(CH_3)_2$	10	36	20	71	Sk
Dimetielamien	$(CH_3)_2NH$	10	18	-	-	
NN-Dimetielanilien	$C_6H_5N(CH_3)_2$	5	25	10	50	Sk
1,3-Dimetielbutielasetaat	$CH_3CO_2CH(CH_3)CH_2CH-(CH_3)_2$	50	300	100	600	
NN-Dimetieletielamien	$C_2H_5(CH_3)_2N$	10	30	15	45	
Dimetielformamied	$HCON(CH_3)_2$	10	30	20	60	Sk
2,6-Dimetielheptaan-4-oon	$[(CH_3)_2CHCH_2]_2CO$	25	150	-	-	
Dimetielftalaat	$C_6H_4(COOCH_3)_2$	-	5	-	10	
Dimetielsulfaat	$(CH_3)_2SO_4$	0.1	0.5	0.1	0.5	Sk
Dinitrobenseen, alle isomere	$C_6H_4(NO_2)_2$	0.15	1	0.5	3	Sk
Dinitro-o-kresol	$CH_3C_6H_2(OH)(NO_2)_2$	-	0.2	-	0.6	Sk
2,4-Dinitrotolueen	$CH_3C_6H_3(NO_2)_2$	-	1.5	-	5	Sk
Dinonielftalaat	$C_6H_4(COOC_9H_{19})_2$	-	5	-	-	
Di-sec-oktielftalaat	$C_6H_4(COOCH_2CH(C_2H_5)-C_4H_9)_2$	-	5	-	10	
1,4-Dioksaan, teg. graad	$OCH_2CH_2OCH_2CH_2$	25	90	100	360	Sk
Dioksatioon (ISO)	$C_{12}H_{26}O_6P_2S_2$	-	0.2	-	-	Sk
Difeniel	$(C_6H_5)_2$	0.2	1.5	0.6	4	
Difenielamien	$(C_6H_5)_2NH$	-	10	-	20	
Difenieleter (damp)	$C_6H_5OC_6H_5$	1	7	-	-	
Difosfor pentasulfied	P_2S_5	-	1	-	3	
Dikaliumperoksodisulfaat gemeet as (S_2O_8)	$K_2S_2O_8$	-	1	-	-	
Dikwatdibromied (ISO)	$C_{12}H_{12}Br_2N_2$	-	0.5	-	1	
Dinatrium disulfiet	$Na_2S_2O_5$	-	5	-	-	
Disikloheksielftalaat	$C_6H_4(COOC_6H_{11})_2$	-	5	-	-	
Disiklopentadieen	$C_{10}H_{12}$	5	30	-	-	
Disiklopentadieeniliron	$C_{10}H_{10}Fe$	-	10	-	20	
Dinatriumperoksodisulfaat (gemeet as S_2O_8)	$Na_2S_2O_8$	-	1	-	-	
Dinatrium tetraboraat,						
anhidries	$Na_2B_4O_7$	-	1	-	-	
dekahidraat	$Na_2B_4O_7.10H_2O$	-	5	-	-	
pentahidraat	$Na_2B_4O_7.5H_2O$	-	1	-	-	
Disulfoton (ISO)	$(C_2H_5O)_2PSCH_2CH_2SC_2H_5$	-	0.1	-	0.3	
Diswaeldichloried	S_2Cl_2	-	-	1	6	
Diswaeldekafluoried	S_2F_{10}	0.025	0.25	0.075	0.75	
2,6-Ditersiêre-butiel-para-kresol	$(C_4H_9)_2CH_3C_6H_2OH$	-	10	-	-	
Diuron (ISO)	$C_9H_{10}Cl_2N_2O$	-	10	-	-	
Divanadium pentaoksied (as V)	V_2O_5					
totaal inasembare stof		-	0.5	-	-	
dampe en respireerbare stof		-	0.05	-	-	
Divinielbenseen	$C_8H_4(CHCH_2)_2$	10	50	-	-	

TABEL 2 - p 7

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Emerie						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Endosulfaan (ISO)	$C_9H_6Cl_6O_3S$	-	0.1	-	0.3	Sk
Endrien (ISO)	$C_{12}H_8Cl_6O$	-	0.1	-	0.3	Sk
Enfluraan	$CHFCl\text{-}CF_2\text{-}O\text{-}CF_2H$	20	150	-	-	
Epichlorohidrien	OCH_2CHCH_2Cl	2	8	5	20	Sk
1,2-Epoksie-4-epoksie-etiel-sikloheksaan	$C_8H_{12}O2$	10	60	-	-	
2,3-Epoksiepropielisopropiel-eter	$C_3H_7OCH_2CHCH_2$	50	240	75	360	
Etaan-1,2-diol,	CH_2OHCH_2OH					
partikulaat		-	10	-	-	
damp		-	60	-	125	
Etanetiol	C_2H_5SH	0.5	1	2	3	
Etanol	C_2H_5OH	1000	1900	-	-	
Etanolamien	$NH_2CH_2CH_2OH$	3	8	500	1500	
Eter	$C_2H_5OC_2H_5$	400	1200	-	-	
Etielasetaat	$CH_3COOC_2H_5$	400	1400	-	-	
Etielakrilaat	$CH_2=CHCOOC_2H_5$	5	20	15	60	Sk
Etielalkohol	C_2H_5OH	1000	1900	-	-	
Etielamien	$C_2H_5NH_2$	10	18			
Etielamielalkohol	$CH_3CH_2COCH_2CH_3$ $CHCH_2CH_3$	25	130	-	-	
Etielbenseen	$C_6H_5C_2H_5$	100	435	125	545	
Etielbromied	C_2H_5Br	200	890	250	1110	
Etielbutielketoon	$CH_3CH_2CO(CH_2)_3CH_3$	50	230	75	345	
Etielchloried	C_2H_5Cl	1000	2600	1250	3250	
Etielchloroformaat	$ClCO_2C_2H_5$	1	4.4	-	-	
Etileenchlorohidrien	$ClCH_2CH_2OH_2$	-	-	1	3	Sk
Etileendiamien	$NH_2CH_2CH_2NH_2$	10	25	-	-	
Etileendibromied	$BrCH_2CH_2Br$	0.5	4	-	-	Sk
Etileendichloried	CH_2ClCH_2Cl	10	40	15	60	
Etileendinitraat	$CH_2NO_3CH_2NO_3$	0.2	1.2	0.2	1.2	Sk
Etileenglikol	CH_2OHCH_2OH					
partikulate		-	10	-	-	
damp		-	60	-	125	
Etileenglikoldinitraat (EGDN)	$CH_2NO_3CH_2NO_3$	0.2	1.2	0.2	1.2	Sk
Etileenglikolmonobutieleter	$C_4H_9OCH_2CH_2OH$	25	120	-	-	Sk
Etileenglikolmono-etieleterasetaat	$C_2H_5OCH_2CH_2OOCCH_3$	10	54	-	-	Sk
Etileenglikolmono-etieleter	$C_2H_5OCH_2CH_2OH$	10	37	-	-	Sk
Etileenglikolmonometieleterasetaat	$CH_3COOCH_2CH_2OCH_3$	5	24	-	-	Sk

TABEL 2 - p 8

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Etileenglikolmonometieleter	$CH_3OCH_2CH_2OH$	5	16	-		Sk
Etileenimien	CH_2CH_2NH (ring)	0.5	1	-	-	Sk
Etileenoksied	CH_2CH_5O (ring)	5	10	-	-	
Etieleter	$C_2H_5OC_2H_5$	400	1200	500	1500	
Etielformaat	$HCOOC_2H_5$	100	300	150	450	
2-Etielheksielchloroformaat	$ClCO_2CH_2CH(CH_2)_3CH_3$ (met C_2H_5 sytak)	1	7.9	-	-	
Etilideendichloried	CH_3CHCl_2	200	810	400	1620	
Etielmerkaptaan	C_2H_5SH	0.5	1	2	3	
4-Etielmorfolien	$C_6H_{13}NO$	5	23	20	95	Sk
Etielsilikaat	$Si(OC_2H_5)_4$	10	85	30	255	
Fenchlorphos (ISO)	$(CH_3O)_2PSOC_6H_2Cl_3$	-	10	-	-	
Ferbam (ISO)	$[(CH_3)_2NCSS]_3Fe$	-	10	-	20	
Ferroseen	$C_{10}H_{10}Fe$	-	10	-	20	
Fluoried (as F)	F	-	2.5	-	-	
Fluorien	F_2	-	-	1	1.5	
Fluorodichlorometaan	$CHCl_2F$	10	40	-	-	
Fluorotrichlorometaan	CCl_3F	1000	5600	1250	7000	
Formamied	$HCONH_2$	20	30	30	45	
2-Furaldehied (Furfural)	$C_5H_4O_2$	2	8	10	40	Sk
Furfurielalkohol	$OCH=CHCH=CCH_2OH$ (ring)	5	20	15	60	Sk
Fenasielchloried	$C_6H_5COCH_2Cl$	0.05	0.3	-	-	
Fenol	C_6H_5OH	5	19	10	38	Sk
p-Fenileendiamien	$C_6H_4(NH_2)_2$	-	0.1	-	-	Sk
Feniel-2,3-epoksiepropieleter	$C_6H_5OCH_2CHCH_2$ (met O-brug)	1	6	-	-	
Fenieletileen	$C_6H_5CH=CH_2$	100	420	250	1050	
Fenielhidrasien	$C_6H_5NHNH_2$	5	20	10	45	Sk
2-Fenielpropeen	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Foraat (ISO)	$C_7H_{17}O_2PS_3$	-	0.05	-	0.2	Sk
Fosdrien	$C_7H_{13}O_6P$	0.01	0.1	0.03	0.3	Sk
Fosgeen	$COCl_2$	0.1	0.4	-	-	
Fosfien	PH_3	-	-	0.3	0.4	
Fosfor, geel	P_4	-	0.1	-	0.3	
Fosforpentachloried	PCl_5	0.1	1	-	-	
Fosforpentasulfied	P_2S_5	-	1	-	3	
Fosfortrichloried	PCl_3	0.2	1.5	0.5	3	
Fosforieltrichloried	$POCl_3$	0.2	1.2	0.6	3.6	
Ftalaatanhidried	$C_6H_4(CO)_2O$	1	6	4	24	Sen
Gechlorineerde bifeniele (42% chloor)	$C_{12}H_7Cl_3$ (ongeveer)	-	1	-	2	Sk

TABEL 2 - p 9

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Gechlorineerde bifeniele (54% chloor)	$C_6H_2Cl_3C_6H_3Cl_2$	-	0.5	-	1	Sk
Germanium	GeH_4	0.2	0.6	0.6	1.8	
Germaniumtetrahidried	GeH_4	0.2	0.6	0.6	1.8	
Gips	$(CaSO_4)_2.H_2O$					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Gliserol, mis	$CH_2OHCHOHCH_2OH$	-	10	-	-	
Gliserol, trinitraat	$CH_2NO_2CHNO_3CH_2NO_3$	0.2	2	0.2	2	Sk
Glikolmono-etieleter	$C_2H_5OCH_2CH_2OH$	10	37	0.2	2	Sk
Gluteraldehied	$OCH(CH_2)_3CHO$	-	-	0.2	0.7	
Grafiet	C					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Gution	$(CH_3O)_2PSSCH_2(C_7H_4N_3O)$	-	0.2	0.6	-	Sk
Halotaan	$CHBrCl\text{-}CF_3$	10	80	-	-	
y-HCH (ISO)	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk
Hafnium	Hf	-	0.5	-	1.5	
Harpuis: kernsoldeerpiroliseprodukte soos formaldehied		-	0.1	-	0.3	Sen
Heptachloor	$C_{10}H_5Cl_7$	-	0.5	-	2	Sk
n-Heptaan	C_7H_{16}	400	1600	500	2000	
Heptaan-2-oon	$CH_3(CH_2)_4COCH_3$	50	240	-	-	
Heptaan-3-oon	$CH_3CH_2CO(CH_2)_3CH_3$	50	230	75	345	
y-Heksachlorosikloheksaan	$C_6H_5Cl_6$	-	0.5	-	1.5	Sk
Heksachlooretaan	CCl_3CCl_3					
damp		5	50	-	-	
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Heksahidro-1,3,5-trinitro-1,3 5-triasien	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Heksaan, alle isomere behalwe n-Heksaan	C_6H_{14}	500	1800	1000	3600	
n-Heksaan	C_6H_{14}	20	70	-	-	
1,6 Heksanolaktaam	$NH(CH_2)_5CO$					
stof		-	1	-	3	
damp		5	20	10	40	
Heksaan-2-oon	$CH_3(CH_2)_3COCH_3$	5	20	-	-	Sk
Heksoon	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Heksileenglikol	$(CH_3)_2COHCH_2CHOHCH_3$	25	125	25	125	
Hidrasien	NH_2NH_2	0.1	0.1	-	-	Sk
Hidrasoësuur	HN_3	-	-	0.1	-	
4-Hidroksie-4-metiel-pentaan-2-oon	$CH_3COCH_2C(CH_3)_2OH$	50	240	75	360	
2-Hidroksiepropielakrilaat	$CH_2CHCOOCH_2CHOHCH_3$	0.5	3	-	-	Sk
2,2'-Iminodiëtanol	$HO(CH_2)_2NH(CH_2)_2OH$	3	15	-	-	

TABEL 2 - p 10

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
2,2'-Iminodi (etilamien)	$(NH_2CH_2CH_2)_2OH$	1	4	-	-	Sk
Indeen	C_9H_8	10	45	15	70	
Indium & verbindings (as In)	In	-	0.1	-	0.3	
Infusorieë aarde, natuurlike respireerbare stof		-	1.5			
Isoamielasetaat	$CH_3COOCH_2CH_2CH(CH_3)_2$	100	525	125	655	
Isoamielalkohol	$(CH_3)_2CHCH_2CH_2OH$	100	360	125	450	
Isoamielmetielketoon	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Isobutielasetaat	$CH_3COOCH_2CH(CH_3)_2$	150	700	187	875	
Isobutielalkohol	$(CH_3)_2CHCH_2CH$	50	150	150	450	
Isobutielmetielketoon	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Isofluraan	CF_3-CHCl-O-CHF_2	50	380	-	-	
Iso-oktielalkohol (gemengde isomere)	$C_8H_{17}OH$	50	270	-	-	
Isopentielasetaat	$CH_3COOCH_2CH_2CH(CH_3)_2$	100	525	125	655	
Isoforoon	$C_9H_{14}O$	-	-	5	25	
Isoforoondi-isosianaat (IPDI)		-	0.2	-	0.07	Sen
Isopropielasetaat	$CH_3COOCH(CH_3)_2$	-	-	200	840	
Isopropielalkohol	$(CH_3)_2CHOH$	400	980	500	1225	Sk
Isopropielbenseen	$C_6H_5CH(CH_2)_2$	25	120	75	370	Sk
Isopropielchloroformaat	$ClCO_2CH(CH_3)_2$	1	5	-	-	
Isopropieleter	$(CH_3)_2CHOCH(CH_3)_2$	250	1050	310	1320	
Isopropielglisidieleter (IGE)	$C_3H_7OCH_2CHCH_2$ (O)	50	240	75	360	
Ittrium	Y	-	1	-	3	
Jodium	I_2	-	-	0.1	1	
Jodoform	CHI_3	0.6	10	1	20	
Jodometaan	CH_3I	5	28	10	56	Sk
Kaliumhidroksied	KOH	-	-	-	2	
Kalksteen						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Kalsiumhidroksied	$Ca(OH)_2$	-	5	-	-	
Kalsiumkarbonaat	$CaCO_3$					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Kalsiumoksied	CaO	-	2	-	-	
Kalsiumsianamied	$CaNC{\equiv}N$	-	0.5	-	1	
Kalsiumsilikaat						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Kamfer, sinteties	$C_{10}H_{16}O$	2	12	3	18	
ε-Kaprolaktaam	$NH(CH_2)_5CO$					
stof		-	1	-	3	
damp		5	20	10	40	
Kaptaan (ISO)	$C_9H_8Cl_3NO_2S$	-	5	-	15	

TABEL 2 - p 11

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Kaptafol (ISO)	$C_{10}H_9Cl_4NO_2S$	-	0.1	-	-	Sk
Karbariel (ISO)	$C_{10}H_7OCONHCH_3$	-	5	-	10	
Karbonielchloried	$COCl_2$		0.4	-	-	Sk
Karbuforaan (ISO)	$C_{12}H_{15}NO_3$	-	0.1	-	-	
Katekol	$C_6H_4(OH)_2$	5	20	-	-	
Katoenstof	Kyk Aanhangsel 4					
Keteen	$CH_2=CO$	0.5	0.9	1.5	3	
Kinoon	$C_6H_4O_2$	0.1	0.4	0.3	1.2	
Kobalt en verbindings (as Co)	Co	-	0.1	-	-	
Koper	Cu					
damp		-	0.2	-	-	
stof en mis (as Cu)		-	1	-	2	
Koolstof swart	C	-	3.5	-	7	
Koolstofdioksied	CO_2	5000	9000	15000	27000	
Koolstofmonoksied	CO	50	55	300	330	
Koolstoftetrabromied	CBr_4	0.1	1.4	0.3	4	
Koolstoftetrachloried	CCl_4	2	12.6	-	-	Sk
Koolteerpikvlugstowwe (as sikloheksaan oplosbaar)		-	0.14	-	-	
Kresols, alle isomere	$CH_3C_6H_4OH$	5	22	-	-	Sk
Kriofluraan (INN)	$CClF_2CClF_2$	1000	7000	1250	8750	
Kristobaliet, respireerbare stof	SiO_2					
Krotonaldehied	$CH_3CH=CHCHO$	2	6	6	18	
Kumeen	$C_6H_5CH(CH_3)_2$	25	120	75	370	Sk
Kwarts, kristallyn	SiO_2	-	0.01	-	0.03	
respireerbare stof		-	0.4	-	-	
Kwikalkiele (as Hg)		-	0.01	-	0.03	Sk
Kwik en verbindings, behalwe Hg		-	0.05	-	0.15	
Lindaan	$C_6H_5Cl_6$	-	0.5	-	1.9	Sk
Litiumhidried	LiH	-	0.025	-	-	
Litiumhidroksied	LiOH	-	-	-	1	
MbOCA	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
MDA	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
MDI		-	0.02	-	0.07	Sen
Magnesiet						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Magnesiumoksied (as Mg)	MgO					
damp en respireerbare stof		-	5	-	10	
respireerbare stof		-	10	-	-	
Malatioon (ISO)	$C_{10}H_{19}O_6PS_2$	-	10	-	-	Sk
Maleïensuuranhidried	$C_4H_2O_3$	0.25	1	-	-	
Mangaan, damp (as Mn)	Mn	-	1	-	3	
Mangaan en verbindings (as Mn)	Mn	-	5	-	-	
Mangaan siklopentadiëniel trikarboniel	$C_5HC_5—Mn(CO)_3$	-	0.1	-	0.3	Sk

TABEL 2 - p 12

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Mangaantetroksied	Mn_3O_4	-	1	-	-	
Marmer						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Mekwinol (INN)	$CH_3OC_6H_4OH$	-	5	-	-	
Merkaptoasynsuur	$C_2H_4O_2S$	1	5	-	-	
*Mensgemaakte mineraal vesel	Kyk Aanhangsel 3					
Mesitieloksied	$CH_3COCH=C(CH_3)_2$	15	60	25	100	
Meta-akrielsuur	$CH_2=C(CH_3)COOH$	20	70	40	140	
Metakrienlonitriel	$CH_2=C(CH_3)CN$	1	3	-	-	Sk
Metanetiol	CH_3SH	0.5	1	-	-	
Metanol	CH_3OH	200	260	250	310	Sk
Metomiel (ISO)	$C_5H_{10}N_2O_2S$	-	2.5	-	-	Sk
Metoksiechloor (ISO)	$C_{16}H_{15}Cl_3O_2$	-	10	-	-	
1-Metoksiepropaan-2-ol	$CH_3OCH_2CHOHCH_3$	100	360	300	1080	Sk
Metielasetaat	CH_3COOCH_3	200	610	250	760	
Metielakrilaat	$CH_2=CHCOOCH_3$	10	35	-	-	
Metielal	$CH_2(OCH_3)_2$	1000	3100	1250	3880	
Metielalkohol	CH_3OH	200	260	250	310	Sk
Metielamien	CH_3NH_2	10	12	-	-	
Metiel-n-amiel-ketoon	$CH_3(CH_2)_4COCH_3$	50	240	-	-	
N-Metielanilien	$C_6H_5NHCH_3$	0.5	2	-	-	Sk
Metielbromied	CH_3Br	5	20	15	60	Sk
3-Metielbutaan-1-ol	$(CH_2)_2CHCH_2CH_2OH$	100	360	125	450	
1-Metielbutielasetaat	$CH_3COOCH(CH_3)C_3H_7$	-	-	150	800	
Metiel-n-butielketoon	$CH_3(CH_2)_3COCH_3$	5	20	-	-	Sk
Metielchloried	CH_3Cl	50	105	100	210	
Metielchloroform	CH_3CCl_3	350	1900	450	2450	
Metiel 2-sianoakrilaat	$CH_2=C(CN)COOCH_3$	2	8	4	16	
Metielsikloheksaan	C_7H_{14}	400	1600	500	2000	
Metielsikloheksanol	$CH_3C_6H_{10}OH$	50	235	75	350	
5-Metielheptaan-3-oon	$CH_3CH_2COCH_2CH_3$-$CHCH_2CH_3$	25	130	-	-	
5-Metielheksaan-2-oon	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Metieljodied	CH_3I	5	28	10	56	Sk
Metielisoamielketoon	$CH_3COCH_2CH_2CH(CH_3)_2$	50	240	75	360	
Metielisobutielkarbinol	$CH_3CHOHCH_2CH(CH_3)_2$	25	100	40	160	Sk
Metielisobutielketoon (MIBK)	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk
Metielisosianaat		-	0.02	-	0.07	Sen
Metielmerkaptaan	CH_3SH	0.5	1	-	-	
Metielmetakrilaat	$CH_2=C(CH_3)COOCH_3$	100	410	125	510	
Metielparatioon	$C_8H_{10}NO_5PS$	-	0.2	-	0.6	Sk
2-Metielpentaan-2,4-diol	$(CH_3)_2COHCH_2CHOHCH_3$	25	125	25	125	
4-Metielpentaan-2-ol	$CH_3CHOHCH_2CH(CH_3)_2$	25	100	40	160	Sk
4-Metielpentaan-2-oon	$(CH_3)_2CHCH_2COCH_3$	50	205	75	300	Sk

* Die BBd-Ad vir mensgemaakte mineraalvesel word by 2 vesels ml^{-1}, 8-uur TBG gestel, wanneer volgens die AIA RTM1 metode gemeet.

TABEL 2 - p 13

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
4-Metielpent-3-en-2-one	$CH_3COCH=C(CH_3)_2$	15	60	25	100	
4-Metiel-m-fenileen di-isosianaat		-	0.02	-	0.07	Sen
2-Metielpropaan-1-ol	$(CH_3)_2CHCH_2OH$	50	150	75	225	
2-Metielpropaan-2-ol	$(CH_3)_3COH$	100	300	150	450	
Metielpropielketoon	$CH_3COC_3H_7$	200	700	250	875	
1-Metiel-2-pirrolidoon	$CH_3N(CH_2)_3CO$	100	400	-	-	
Metielsilikaat	$(CH_3O)_4Si$	1	6	5	30	
α-Metielstireen	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Metielstirene, alle isomere behalwe α-metielstireen	$CH_3C_6H_4CH=CH_2$	100	480	150	720	
N-*Metiel*-N, 2,4,6-tetranitroanilien	$(NO_2)_3C_6H_2N(NO_2)CH_3$	-	1.5	-	3	Sk
Mevinfos (ISO)	$C_7H_{13}O_6P$	0.01	0.1	0.03	0.3	Sk
2-Metielsikloheksanoon	$CH_3CHCO(CH_2)_3CH_2$	50	230	75	345	Sk
Metielsiklopentadiëniel mangaan, trikarboniel (as Mn)	$C_5HC_5—Mn(CO)_3$	-	0.1	-	0.6	Sk
2-Metiel-4,6-dinitrofenol	$CH_3C_6H_2(OH)(NO_2)_2$	-	0.2	-	0.6	Sk
4,4'-Metileenbis- (2-chloroanilien) (MbOCA)	$CH_2(C_6H_3ClNH_2)_2$	-	0.005	-	-	Sk
Metileenchloried	CH_2Cl_2	100	350	250	780	
4,4'-Metileendifeniel di-isosianaat (MDI)		-	0.02	-	0.07	Sen
4,4'-Metileendianilien (MDA)	$H_2NC_6H_4CH_2C_6H_4NH_2$	0.1	0.8	0.5	4	
Metieletielketoon (MEK)	$CH_3COC_2H_5$	200	590	300	885	
Metieletielketoonperoksiede (MEKP)	$C_8H_{16}O_4$ or $C_8H_{16}O_6$	-	-	0.2	1.5	
Metielformaat	$HCOOCH_3$	100	250	150	375	
Mika						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	1	-	-	
Mieresuur	HHOOH	5	9	-	-	
Molibdeenverbindings (as Mo)	Mo					
oplosbare verbindings		-	5	-	10	
onoplosbare verbindings		-	10	-	20	
Monochloorasynsuur	$ClCH_2CO_2H$	0.3	1	-	-	Sk
Morfolien	C_4H_9NO	20	70	30	105	Sk
Naled (ISO)	$C_4H_7Br_2Cl_2O_4P$	-	3	-	6	
Naftaleen	$C_{10}H_8$	10	50	15	75	
1,5-Naftaleen disosianaat		-	0.02	-	0.07	Sen
Natrium 2-(2,4-dichlorofenoksie) etielsulfaat	$C_8H_7Cl_2NaO_5S$	-	10	-	20	

TABEL 2 - p 14

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Natriumasied (as NaN_3)	NaN_3	-	-	-	0.3	
Natriumfluoorasetaat	$CH_2FCOONa$	-	0.05	-	0.15	Sk
Natriumhidroksied	NaOH	-	-	-	2	
Natriummetabisulfaat	$Na_2S_2O_5$	-	5	-	-	
Natriumwaterstofsulfiet	$NaHSO_3$	-	5	-	-	
Nikkelkarboniel	$Ni(CO)_4$	-	-	0.1	0.24	
Nikkel, organiese verbindings (as Ni)	Ni	-	1	-	3	
Nikotien	$C_{10}H_{14}N_2$	-	0.5	-	1.5	Sk
Nitrapirien	$C_6H_3Cl_4N$	-	10	-	20	
4-Nitroanilien	$NO_2C_6H_4NH_2$	-	6	-	-	Sk
Nitrobenseen	$C_6H_5NO_2$	1	5	2	10	Sk
Nitro-etaan	$C_2H_5NO_2$	100	310	-	-	
Nitrometaan	CH_3NO_2	100	250	150	375	
1-Nitropropaan	$C_3H_7NO_2$	25	90	-	-	
2-Nitropropaan	$CH_3CH(NO_2)CH_3$	10	36	20	72	
Nitrotolueen, alle isomere	$CH_3C_6H_4NO_2$	5	30	10	60	Sk
Oktochloronaftaleen	$C_{10}Cl_8$	-	0.1	-	0.3	Sk
n-Oktaan	$CH_3(CH_2)_6CH_3$	300	1450	375	1800	
Ortofosforsuur	H_3PO_4	-	1	-	3	
Osmiumtetraoksied (as Os)	OsO_4	0.0002	0.002	0.0006	0.006	
Oksaalsuur	COOHCOOH	-	1	-	2	
Oksalonitriel	$(CN)_2$	10	20	-	-	
2,2'-Oksiediëtanol	$(HOCH_2CH_2)_2O$	23	100	-	-	
Osoon	O_3	0.1	0.2	0.3	0.6	
PCB's						
Gechlorineerde bifeniele (42 % chloor)	$C_{12}H_7Cl_3$ (ongeveer)	-	1	-	2	Sk
Gechlorineerde bifeniele (54 % chloor)	$C_6H_2Ci_3C_6H_3Cl_2$	-	0.5	-	1	Sk
Paraffienwas, damp		-	2	-	6	
Parakwatdichloried (ISO) respireerbare stof	$[CH_3(C_5H_4N_+)_2CH_3]$. $(Cl\text{-}_2)$	-	0.1	-	-	
Paration (ISO)	$(C_2H_5O)_2PSOC_6H_4NO_2$	-	0.1	-	0.3	Sk
Parationmetiel (ISO)	$C_8H_{10}NO_5PS$	-	0.2	-	0.6	Sk
Pentaan, alle isomere	C_5H_{12}	600	1800	750	2250	
Pentaan-2-oon	$CH_3COC_3H_7$	200	700	250	875	
Pentaan-3-oon	$C_2H_5COC_2H_5$	200	700	250	875	
Pentachlorofenol	C_6Cl_5OH	-	0.5	-	1.5	Sk
Pentaeritritol	$C(CH_2OH)_4$					
totaal inasembare stof		-	10	-	20	
respireerbare stof		-	5	-	-	
Pentakarboniliron (as Fe)	$FE(CO)_5$	0.01	0.08	-	-	
Pentielasetaat	$CH_3COOC_5H_{11}$	100	530	150	800	
Perchloro-etileen	$CCl=CCl_2$	50	335	150	1000	
Perchlorielfluoried	ClO_3F	3	14	6	28	
2-Piridilamien	$NH_2C_5H_4N$	0.5	2	2	8	
Pikloram (ISO)	$C_6H_3CI_3N_2O_2$	-	10	-	20	
Pikriensuur	$HOC_6H_2(NO_2)_3$	-	0.1	-	0.3	Sk

TABEL 2 - p 15

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Piperasiendihidrochloried	$C_4H_{10}N_2.2HCl$	-	5	-	-	
Piperidien	$C_5H_{11}N$	1	3.5	-	-	Sk
Piretrine		-	5	-	10	
Piridien	C_5H_5N	5	15	10	30	
Pirokatekol	$C_6H_4(OH)_2$	5	20	-	-	
Platinum-metaal	Pt	-	5	-	-	
Platinumsoute (as Pt)	Pt	-	0.002	-	-	Sen
Poligechlorineerde bifeniele (PCB's)	Kyk PCB's					
Polivienielchloried (PVC)						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Portland Sement						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Prop-2-in-1-ol	$HC{\equiv}CCH_2OH$	1	2	3	6	Sk
Propaan-1,2-diol	$CH_3CHOHCH_2OH$					
totaal (damp en partikulate)		150	470	-	-	
partikulate		-	10	-	-	
Propaan-1-ol	$CH_3CH_2CH_2OH$	200	500	250	625	Sk
Propaan-2-ol	$(CH_3)_2CHOH$	400	980	500	1225	Sk
n-Propanol	$CH_3CH_2CH_2OH$	200	500	250	625	Sk
Propargielalkohol	$HC{\equiv}CCH_2OH$	1	2	3	6	Sk
n-Propielasetaat	$CH_3COOC_3H_7$	200	840	250	1050	
Propileendinitraat	$CH_2NO_3CHNO_3CH_3$	0.2	1.2	0.2	1.2	Sk
Propileenglikol	$CH_3CHOHCH_2OH$					
totaal (damp en partikulate)		150	470	-	-	
partikulate		-	10	-	-	
Propileenglikoldinitraat (PGDN)	$CH_2NO_3CHNO_3CH_3$	0.2	1.2	0.2	1.2	Sk
Propileenglikolmonometieleter	$CH_3OCH_2CHOHCH_3$	100	360	300	1080	Sk
Propioonsuur	CH_3CH_2COOH	10	30	15	45	
Propoksur (ISO)	$H_3CNHCOOC_6H_4OCH(CH_3)_2$	-	0.5	-	2	
RDX	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Resorsinol	$C_6H_4(OH)_2$	10	45	20	90	
Rodium (as Rh),	Rh					
metaaldamp en -stof		-	0.1	-	0.3	
oplosbare stof		-	0.001	-	0.003	
Ronnel	$(CH_3O)_2PSOC_6H_2Cl_3$	-	10	-	-	
Rotenoon (ISO)	$C_{23}H_{22}O_6$	-	5	-	10	

TABEL 2 - p 16

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Rouge						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Selenium en verbindings, behalwe waterstofselenied (as Se)	Se	-	0.1	-	-	
Sellulose						
totaal inasembare stof		-	10	-	20	
respireerbare stof		-	5	-	-	
Sement						
Sesiumhidroksied	CsOH	-	2	-	-	
Silaan	SiH_4	0.5	0.7	1	1.5	
Silika, amorfies	SiO_2					
totaal inasembare stof		-	6	-	-	
respireerbare stof		-	3	-	-	
Silika, gesmelt	SiO_2					
respireerbare stof		-	0.1	-	-	
Silikon	Si					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Silikonkarbied	SiC					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Silikontetrahidried	SiH_4	0.5	0.7	1	1.5	
Silwer	Ag	-	0.1	-	-	
Silwer verbindings (as Ag)	Ag	-	0.01	-	-	
Steenkoolstof						
respireerbare stof		-	2	-	-	
Stysel						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Stibien	SbH_3	0.1	0.5	0.3	1.5	
Stireen	$C_6H_5CH=CH_2$	100	420	250	1 050	
Stowwe	Kyk paragraaf 36 van Aanhangsel 1					
Strignien	$C_{21}H_{22}N_2O_2$	-	0.15	-	0.45	
Subtilisiene (Proteolitiese ensieme as 100 % suiwer kristallyn ensiem)		-	0.00006	-	0.00006	
Sukrose	$C_{12}H_{22}O_{11}$	-	10	-	20	
Sulfotep (ISO)	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
Swaeldioksied	SO_2	2	5	5	13	
Swaelheksafluoried	SF_6	1000	6000	1250	7500	
Swaelsuur	H_2SO_4	-	1	-	-	
Swaelmonochloried	S_2Cl_2	-	-	1	6	
Swaelpentachloried	S_2F_{10}	0.025	0.25	0.075	0.75	
Swaeltetrafluoried	SF_4	0.1	0.4	0.3	1	

TABEL 2 - p 17

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Sulfurieldifluoried	SO_2F_2	5	20	10	40	
Sianamied	H_2NCN	-	2	-	-	
Sianiede, behalwe waterstofsianied, sianogeen & sianogeen-chloried, (as-CN)		-	5	-	-	Sk
Sianogeen	$(CN)_2$	10	20	-	-	
Sianogeenchloried	ClCN	-	-	0.3	0.6	
Sikloheksaan	C_6H_{12}	100	340	300	1030	
Sikloheksanol	$C_6H_{11}OH$	50	200	-	-	
Sikloheksanoon	$C_6H_{10}O$	25	100	100	400	
Siklohekseen	C_6H_{10}	300	1015	-	-	
Salpetersuur	HNO_3	2	5	4	10	
Salpeteroksied	NO	25	30	35	45	
Stikstofdioksied	NO_2	3	5	5	9	
Stikstofmonoksied	NO	25	30	35	45	
Stikstoftrifluoried	NF_3	10	30	15	45	
Stikstofgliserien	$CH_2NO_2CHNO_3CH_2NO_3$	0.2	2	0.2	2	Sk
Stikstofoksied	N_2O	100	180	-	-	
Sikloheksilamien	$C_6H_{11}NH_2$	10	40	-	-	Sk
Sikloniet (RDX)	$C_3H_6N_6O_6$	-	1.5	-	3	Sk
Siheksatien (ISO)	$(C_6H_{11})_3SnOH$	-	5	-	10	
Sinkchloried, damp	$ZnCl_2$	-	1	-	2	
Sinkdistearaat	$Zn(C_{16}H_{35}O_2)_2$					
totaal inasembare stof		-	10	-	20	
respireerbare stof		-	5	-	-	
Sinkoksied, damp	ZnO	-	5	-	10	
Sirkonium verbindings (as Zr)	Zr	-	5	-	10	
2.4.5-T (ISO)	$C_8H_5Cl_3O_3$	-	10	-	20	
TDI		-	0.02	-	0.07	Sen
TEDP	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
TEPP (ISO)	$(C_2H_5)_4P_2O_7$	0.004	0.05	0.01	0.8	Sk
TNT	$CH_3C_6H_2(NO_2)_3$	-	0.5	-	-	Sk
Talk						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	1	-	-	
Tantaal	Ta	-	5	-	10	
Telluur & verbindings, behalwe waterstoftelluur, (as Te)	Te	-	0.1	-	-	
Terfeniele, alle isomere	$C_{18}H_{14}$	-	-	0.5	5	
1,1,2,2-Tetrabroometaan	$CHBr_2CHBr_2$	0.5	7	-	-	Sk
Tetrabromometaan	CBr_4	0.1	1.4	0.3	4	
Tetrakarbonielnikkel (as Ni)	$Ni(CO)_4$	-	-	0.1	0.24	

TABEL 2 - p 18

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
1,1,1,2-Tetrachloro-2,2-difluooretaan	CCl_3CClF_2	100	834	100	834	
1,1,2,2-Tetrachloro-1,2-difluooretaan	CCl_2FCCl_2F	100	834	100	834	
Tetrachlooretileen	$CCl=CCl_2$	50	335	150	1000	
Tetrachlorometaan	CCl_4	2	12.6	-	-	Sk
Tetrachloronaftaleen, alle isomere	$C_{10}H_4Cl4$	-	2	-	4	
O,O,O',O'-Tetraetiel-ditiopirofosfaat	$(C_2H_5)_4P_2S_2O_5$	-	0.2	-	-	Sk
O,O,O',O'-Tetraetielpirofosfaat	$(C_2H_5)_4P_2O_7$	0.004	0.05	0.01	0.2	Sk
Tetraetielortosilikaat	$Si(OC_2H_5)_4$	10	85	30	255	
Tetrafluorodichlooretaan	$CClF_2CClF_2$	1000	7000	1250	8750	
Tetrahidrofuraan	$(C_2H_4)_2O$	200	590	250	735	
Tetrametielortosilikaat	$(CH_3O)_4Si$	1	6	5	30	
Tetrametielsuksinotriel	$C_8H_{12}N_2$	0.5	3	2	9	Sk
Tetranatriumpirofosfaat	$Na_2P_2O_7$	-	5	-	-	
Tetriel	$(NO_2)_3C_6H_2N(NO_2)CH_3$	-	1.5	-	3	Sk
Tallium, oplosbare verbindings (as Ti)	Tl	-	0.1	-	-	Sk
4,4'-Tiobis(6-ters-butiel-m-kresol)	$C_{22}H_{30}O_2S$	-	10	-	20	
Tioglikolsuur	$C_2H_4O_2S$	1	5	-	-	
Tionielchloried	$SOCl_2$	-	-	1	5	
Tiram (ISO)	$(CH_3)_2NCS_2CS_2N(CH_3)_2$	-	5	-	10	
Tin, verbindings, anorganies, behalwe SnH_4, (as Sn)	Sn	-	2	-	4	
Tin, verbindings, organies, behalwe Siheksatien (ISO), (as Sn)	Sn	-	0.1	-	0.2	Sk
Titaniumdioksied	TiO_2					
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Tolueen	$C_6H_5CH_3$	50	188	150	560	Sk
Tolueendi-isosianaat (TDI)		-	0.2	-	0.07	Sen
p-Tolueensulfonielchloried	$CH_3C_6H_4SO_2Cl$	-	-	-	5	
1,4,7-Tri-(asa)-heptaan	$(NH_2CH_2CH_2)_2OH$	1	4	-	-	Sk
Tribromometaan	$CHBr_3$	0.5	5	-	-	Sk
Tributielfosfaat, alle isomere	$(C_4H_9)_3PO_4$	-	5	-	5	
Trikarboniel (eta-siklopentadiniel) mangaan (as Mn)	$(C_5H_5)—Mn(CO)_3$	-	0.1	-	0.3	Sk
Trikarboniel (metielsiklopentadiniel) mangaan (as Mn)	$(CH_3)C_5H_4—Mn(CO)_3$	-	0.2	-	0.6	Sk

TABEL 2 - p 19

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
Trichloorasynsuur	CCl_3COOH	1	5	-	-	
1,2,4-Trichloorbenseen	$C_6H_3Cl_3$	5	40	5	40	
1,1,1-Trichlorobis (chloro-feniel) etaan	$C_6H_3Cl_3$	5	40	5	40	
	$C_{14}H_9Cl_5$	-	1	-	3	
1,1,2-Trichloroetaan	$CH_2ClCHCl_2$	10	45	20	90	Sk
Trichlorofluorometaan	CCl_3F	1000	5600	1250	7000	
Trichlorometaan	$CHCl_3$	2	9.8	-	-	
Trichloronitrometaan	CCl_3NO_2	0.1	0.7	0.3	2	
2,4,5-Trichlorofenoksie-asynsuur	$C_8H_5Cl_3O_3$	-	10	-	20	
1,2,3-Trichloropropaan	$CH_2ClCHClCH_2Cl$	50	300	75	450	
1,1,2-Trichlorotrifluoor-etaan	CCl_2FCClF_2	1000	7600	1250	9500	
Tri-o-kresielfosfaat	$(CH_3C_6H_4O)_3P=O$	-	0.1	-	0.3	
Trisikloheksieltienhidroksied	$(C_6H_{11})_3SnOH$	-	5	-	10	
Tridimiet, respireerbare stof	SiO_2	-	0.4	-	-	
Triëtielamien	$(C_2H_5)_3N$	10	40	15	60	
Trifluorobromometaan	CF_3Br	1000	6100	1200	7300	
Trimangaantetraoksied	Mn_3O_4	-	1	-	-	
Tetramellitiese anhidried	$C_9H_4O_5$	-	0.04	-	-	Sen
Trimetielamien	$(CH_3)_3N$	10	24	15	36	
Trimetielbenseen, alle iso-mere of mengsels	$C_6H_3(CH_3)_3$	25	123	-	-	
3,5,5-Trimetielsikloheks-2-enoon	$C_9H_{14}O$	-	-	5	25	
Trimetielfosfiet	$(CH_3O)_3P$	2	10	-	-	
2,4,6-Trinitrofenol	$HOC_6H_2(NO_2)_3$	-	0.1	-	0.3	Sk
2,4,6-Trinitrotolueen	$CH_3C_6H_2(NO_2)_3$	-	0.5	-	-	Sk
Trifenielfosfaat	$(C_6H_5)_3PO_4$	-	3	-	6	
Tripoli, respireerbare stof	SiO_2	-	0.4	-	-	
Tri-o-tolielfosfaat	$(CH_3C_6H_4O)_3P=O$	-	0.1	-	0.3	
Tungsten & verbindings (as W)	W					
oplosbaar		-	1	-	3	
onoplosbaar		-	5	-	10	
Terpentyn	$-C_{10}H_{16}$	100	560	150	840	
Uraanverbindings, natuurlik,	U					
oplosbaar (as U)		-	0.2	-	0.6	
Vanadiumpentoksied	V_2O_5					
totaal inasembare stof		-	0.5	-	-	
damp en respireerbare stof		-	0.05	-	-	
Vinielasetaat	$CH_3COOCH=CH_2$	10	30	20	60	
Vinielbenseen	$C_6H_5CH=CH_2$	100	420	250	1050	
Vinielbromied	$CH_2=CHBr$	5	20	-	-	

TABEL 2 - p 20

Substansie	Formule	TBG BBd-Ad		KORTTERMYN BBd-Ad		1995
		dpm	mg/m³	dpm	mg/m³	Notas
4-Vinielsikloheksеendioksied	$C_8H_{12}O2$	10	60	-	-	
Vinieltoluene, alle isomere	$C_6H_5C(CH_3)=CH_2$	-	-	100	480	
Vloeibare petroleumgas	Mengsel: $C_3H_6;C_3H_8;C_4H_8;C_4H_{10}$	1000	1800	1250	2250	
Verpoeierde brandstof as						
totaal inasembare stof		-	10	-	-	
respireerbare stof		-	5	-	-	
Warfarien (ISO)	$C_{19}H_{16}O_4$	-	0.1	-	0.3	
Waterstofbromied	HBr	-	-	3	10	
Waterstofchloried	HCl	-	-	5	7	
Waterstoffluoried (as F)	HF	-	-	3	2.5	
Waterstofperoksied	H_2O_2	1	1.5	2	3	
Waterstofselenied (as Se)	H_2Se	0.05	0.2	-	-	
Waterstofsulfied	H_2S	10	14	15	21	
Waterstofkinoon	$C_6H_4(OH)_2$	-	2	-	4	
Wit spiritus		100	575	125	720	
Xileen, o-, m-, p- of gemengde isomere	$C_6H_4(CH_3)_2$	100	435	150	650	Sk
Xilidien, alle isomere	$(CH_3)_2C_6H_3NH_2$	2	10	10	50	Sk
Ysteroksied, damp (as Fe)	Fe_2O_3	-	5	-	10	
Ysterpentakarboniel	$FE(CO)_5$	0.01	0.08	-	-	
Ystersoute (as Fe)	Fe	-	1	-	2	

TABEL 2 - p 21

AFKORTINGS

1. BBd-Bd Beroepsblootstellingsdrempel - Beheerdrempel.
   BBd-Ad Beroepsblootstellingsdrempel - Aanbevole Drempel.

2. dpm Dele per miljoen.

3. mg/m^3 Milligram per kubieke meter.

4. Sk Velabsorpsie.

5. Sen In staat om respiratoriese sensitisering te veroorsaak.

6. ISO Internasionale Standaarde Organisasie.

NOTA

(a) Die konsentrasie "inasembare stof" sal bepaal word deur die fraksie wat deur 'n grootteselektor beweeg met 'n doeltreffendheid wat sal toelaat dat -

(i) 100 % partikels van 1 µm aerodinamiese diameter,
(ii) 50 % partikels van 5 µm aerodinamiese diameter,
(iii) 20 % partikels van 6 µm aerodinamiese diameter,
(iv) 0 % partikels van 7 µm aerodinamiese diameter en groter om deur die grootteselektor te beweeg.

(b) Vir asfikserende substansies, sien Aanhangsel 5.

TABEL2-VER/cvv

REGULASIES VIR GEVAARLIKE CHEMIESE SUBSTANSIES, 1995

TABEL 3 - p 1

BIOLOGIESE BLOOTSTELLINGSINDEKSE (BBi)

1995

CHEMIESE DETERMINANT	MONSTERNEMINGSTYD	BBI	NOTASIE
ANILIEN			
Totaal p-aminofenol in urine	Einde van skof	50 mg/g kreatinien	C
Methemoglobien in bloed	Tydens of aan einde van skof	1,5% hemoglobien	B, C, D
ARSEEN EN OPLOSBARE SAMESTELLINGS INSLUITEND ARSIEN			
Anorganiese arseen metabolites in urine	Einde van werkweek	50 µg/g kreatinien	B
BENSEEN			
Totaal fenol in urine	Einde van skof	50 mg/g kreatinien	B, C
Benseen in uitgeasemde lug:	Voor volgende skof		
gemeng-uitgeasem		0,08 dpm	D
einde-uitgeasem		0,12 dpm	D
CHLOROBENSEEN			
Totaal 4-chlorokatesjol in urine	Einde van skof	150 mg/g kreatinien	C
Totale p-chlorofenol in urine	Einde van skof	25 mg/g kreatinien	C
CHROOM (VI)			
Wateroplosbare damp	Vermeerder tydens skof	10 µg/g kreatinien	B
Totaal chroom in urine	Einde van skof aan einde van werkweek	30 µg/g kreatinien	B
N,N-DIMETIELFORMAMIED (DMF)			
N-Metielformamied in urine	Einde van skof	40 mg/g kreatinien	B
ETIELBENSEEN			
Amandelsuur in urine	Einde van skof of werkweek	1,5 g/g kreatinien	A
Etielbenseen in einde-uitgeasemde lug			D
FENOL			
Totale fenol in urine	Einde van skof	250 mg/g kreatinien	B, C
FLUORIED			
Fluoried in urine	Voor skof	3 mg/g kreatinien	B, C
	Einde van skof	10 mg/g kreatinien	B, C
FURFURAL			
Totaal furoësuur in urine	Einde van skof	200 mg/g kreatinien	B, C
n-HEKSAAN			
2,5 - Heksaandioon in urine	Einde van skof	5 mg/g kreatinien	C
n-Heksaan in einde-uitgeasemde lug			D
KADMIUM			
Kadmium in urine	Nie krities	10 µg/g kreatinien	B
Kadmium in bloed	Nie krities	10 µg/ℓ	B
KOOLSTOFDISULFIED			
2-Tiotiasolidien-4-karboksielsuur in urine	Einde van skof	5 mg/g kreatinien	-
KOOLSTOFMONOKSIED			
Karboksihemoglobien in bloed	Einde van skof	minder as 8 % hemoglobien	B, C
Koolstofmonoksied in einde-uitgeasemde lug	Einde van skof	minder as 40 dpm	B, C

TABEL 3 - p 2

			1995
CHEMIESE DETERMINANT	**MONSTERNEMINGSTYD**	**BBI**	**NOTAS**
KWIK			
Totaal anorganiese kwik in urine	Voor skof	35 µg/g kreatinien	B
Totaal anorganiese kwik in bloed	Einde van skof aan einde van werkweek	15 µg/ℓ	B
METHEMOGLOBIEN INDUSEERDERS			
Methemoglobien in bloed	Tydens of aan einde van skof	1,5% van hemoglobien	B, C, D
METANOL			
Metanol in urine	Einde van skof	15 mg/ℓ	B, C
Mieresuur in urine	Voor die skof aan die einde van die werkweek	80 mg/g kreatinien	B, C
METIELCHLOROFORM			
Metielchloroform in einde-uitgeasemde lug	Voor die laaste skof van werkweek	40 dpm	-
Trichloorasynsuur in urine	Einde van werkweek	10 mg/ℓ	C, D
Totaal trichlooretanol in urine	Einde van skof aan einde van werkweek	30 mg/ℓ	C, D
Totaal trichlooretanol in bloed	Einde van skof aan einde van werkweek	1 mg/ℓ	C
METIELETIELKETOON			
MEK in urine	Einde van skof	2 mg/ℓ	-
METIELISOBUTIELKETOON			
MIBK in urine	Einde van skof	2 mg/ℓ	-
NITROBENSEEN			
Totaal p-nitrofenol in urine	Einde van skof aan einde van werkweek	5 mg/g kreatinien	C
Methemoglobien in bloed	Einde van skof	1,5% hemoglobien	B, C, D
ORGANOFOSFORCHOLINESTERASE-INHIBEERDERS			
Cholinesterase-aktiwiteit in rooi selle	Na goeddunke	70% van individu se basislyn	B, C, D
PARATION			
Totaal p-nitrofenol in urine	Einde van skof	0,5 mg/g kreatinien	C, D
Cholinesteraseaktiwiteit in rooi selle	Na goeddunke	70% van individu se basislyn	B, C, D
PENTACHLOROFENOL			
Totaal PCF in urine	Voor die laaste skof van werkweek	2 mg/g kreatinien	B
Vrye PCF in plasma	Einde van skof	5 mg/ℓ	B
PERCHLOORETILEEN			
Perchlooretileen in einde-uitgeasemde lug	Voor die laaste skof van werkweek	10 dpm	-
Perchlooretileen in bloed	Voor die laaste skof van werkweek	1 mg/ℓ	-
Trichloorasynsuur in urine	Einde van werkweek	7 mg/ℓ	C, D

TABEL 3 - p 3

			1995
CHEMIESE DETERMINANT	**MONSTERNEMINGSTYD**	**BBI**	**NOTAS**
STIREEN			
Amandelsuur in urine	Einde van skof	800 mg/g kreatinien	C
	Voor volgende skof	300 mg/g kreatinien	C
Fenielglioksielsuur	Einde van skof	240 mg/g kreatinien	B, C
	Voor volgende skof	100 mg/g kreatinien	-
Stireen in veneuse bloed	Einde van skof	0,55 mg/ℓ	D
	Voor volgende skof	0,02 mg/ℓ	D
TOLUEEN			
Hippuursuur in urine	Einde van skof	2,5 g/g kreatinien	B, C
Tolueen in veneuse bloed	Einde van skof	1 mg/ℓ	D
O-Kresol in urine	Einde van skof	1 mg/g kreatinien	C
TRICHLOORETILEEN			
Trichloorasynsuur in urine	Einde van werkweek	100 mg/g kreatinien	C
Trichloorasynsuur en trichlooretanol in urine	Einde van skof aan einde van werkweek	300 mg/g kreatinien	C
Vrye trichlooretanol in bloed	Einde van skof aan einde van werkweek	4 mg/ℓ	C
Trichlooretileen in einde-uitgeasemde lug			D
XILEEN			
Metielhippuursuur in urine	Einde van skof	1,5 g/g kreatinien	-
	Laaste 4 ure van skof	2 mg/min	-

TABEL3-NUWE/cvv

TABEL 3 - p 4

NOTASIES

"A" notasie: Hierdie notasie dui aan dat 'n identifiseerbare bevolkingsgroep meer vatbaar is vir die uitwerking van die chemikalie, welke bevolkingsgroep dan deur die BBi onbeskermd gelaat word.

"B" notasie: Hierdie notasie dui aan dat die determinant gewoonlik in 'n beduidende hoeveelheid aanwesig is in biologiese monsters wat van proefpersone versamel is wat nie beroepsblootgestel is nie. Sodanige agtergrond-vlakke word by die BBi waarde ingesluit.

"C" notasie: Hierdie notasie dui aan dat die determinant nie-spesifiek is, aangesien dit waargeneem is na blootstelling aan sommige ander chemikalieë. Hierdie nie-spesifieke toetse word verkies omdat hulle maklik is om te gebuik en gewoonlik 'n beter korrelasie met blootstelling bied as spesifieke toetse. In sodanige gevalle, word 'n BBi vir 'n spesifieke, minder kwantitatiewe biologiese determinant aanbeveel as 'n bevestigingstoets.

"D" notasie: Hierdie notasie dui aan dat die biologiese determinant 'n indikator is van die blootstelling aan die chemikalie, maar die kwantitatiewe interpretasie van die meting is dubbelsinnig (semi-kwantitatief). Hierdie biologiese determinante behoort as 'n siftingstoets gebruik te word indien 'n kwantitatiewe toets nie spesifiek is nie en die oorsprong van die determinant bevraagteken word.

TABEL3-NUWE/REG/cvv

NOTATIONS

"A" notation: This notation indicates that an identifiable population group might have an increased susceptibility to the effect of the chemical, thus leaving it unprotected by the recommended BEI.

"B" notation: This notation indicates that the determinant is usually present in a significant amount in biological specimens collected from subjects who have not been occupationally exposed. Such background levels are included in the BEI value.

"C" notation: This notation indicates that the determinant is non-specific, since it is observed after exposure to some other chemicals. These non-specific tests are preferred because they are easy to use and usually offer a better correlation with exposure than specific tests. In such instances a BEI for a specific, less quantitative biological determinant is recommended as a confirmatory test.

"D" notation: This notation indicates that the biological determinant is an indicator of exposure to the chemical, but the quantitative interpretation of the measurement is ambiguous (semi-quantitative). These biological determinants should be used as a screening test if a quantitative test is not practical or a confirmatory test if the quantitave test is not specific and the origin of the determinant is in question.

ANNEXURE 2

CALCULATION OF EXPOSURE WITH REGARD TO THE SPECIFIED REFERENCE PERIODS

This Annexure reproduces the approved method for the calculation of exposure in relation to the 8-hour, short-term and one-year reference periods.

1. THE 8-HOUR REFERENCE PERIOD

1.1 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].

1.2 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 substance hazardous to health. The average exposure during that period is measured as 0,12 mg m^{-3}.

NOTASIES

"A" notasie: Hierdie notasie dui aan dat 'n indentifiseerbare bevolkingsgroep meer vatbaar is vir die uitwerking van die chemikalie, welke bevolkingsgroep dan deur die BBi onbeskermd gelaat word.

"B" notasie: Hierdie notasie dui aan dat die determinant gewoonlik in 'n beduidende hoeveelheid aanwesig is in biologiese monsters wat van proefpersone versamel is wat nie beroepsblootgestel is nie. Sodanige agtergrond-vlakke word by die BBi waarde ingesluit.

"C" notasie: Hierdie notasie dui aan dat die determinant nie-spesifiek is, aangesien dit waargeneem is na blootstelling aan sommige ander chemikalieë. Hierdie nie-spesifieke toetse word verkies omdat hulle maklik is om te gebruik en gewoonlik 'n beter korrelasie met blootstelling bied as spesifieke toetse. In sulke gevalle, word 'n BBi vir 'n spesifieke, minder kwantitatiewe biologiese determinant aanbeveel as 'n bevestigingstoets.

"D" notasie: Hierdie notasie dui aan dat die biologiese determinant 'n indikator is van die blootstelling aan die chemikalie, maar die kwantitatiewe interpretasie van die meting is dubbelsinnig (semi-kwantitatief). Hierdie biologiese determinante behoort as 'n siftingstoets gebruik te word indien 'n kwantitatiewe toets nie spesifiek is nie en die oorsprong van die determinant bevraagteken word.

AANHANGSEL 2

BEREKENING VAN BLOOTSTELLING TEN OPSIGTE VAN DIE SPESIFIEKE VERWYSINGSPERIODES

Hierdie Aanhangsel reproduseer die goedgekeurde metode vir die bereking van blootstelling in verhouding tot die 8-uur, korttermyn- en eenjaarverwysingsperiodes.

1. DIE 8-UURVERWYSINGSPERIODE

1.1 Die term *"8-uur verwysingsperiode"* hou verband met die prosedure waarvolgens die beroepsblootstellings in enige 24-uurperiode as gelykwaardig aan 'n enkele eenvormige blootstelling van 8 uur lank behandel word [die 8-uur tydbeswaarde gemiddelde (TBG) blootstelling].

1.2 Die 8-uur-TBG kan wiskundig voorgestel word deur:

$$\frac{C^1T^1+C^2T^2+..+C_nT_n}{8}$$

waar C_1 die beroepsblootstellingwaarde is en T_1 die geassosieerde blootstellingstyd in ure in enige 24-uur periode.

Voorbeelde

(a) Die operateur werk 7h20 min lank aan 'n proses waarin hy blootgestel word aan 'n substansie wat gevaarlik is vir die gesondheid. Die gemiddelde blootstelling gedurende daardie periode word gemeet as 0,12 mg m^{-3}.

The 8-hour TWA therefore is—

7h20 min (7,33h) at 0,12 mg m^{-3}.

40 min (0,67h) at 0 mg m^{-3}.

That is—

$$\frac{(0{,}12 \times 7{,}33) + (0 \times 0{,}67)}{8}$$

$$= 0{,}11 \text{ mg } m^{-3}$$

(b) The operator works for eight hours on a process in which he is exposed to a substance hazardous to health. The average exposure during that period is measured as 0,15 mg m^{-3}.

The 8-hour TWA therefore is—

$$\frac{0{,}15 \times 8}{8} = 0{,}15 \text{ mg } m^{-3}$$

(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:

Working period	*Exposure (mg m^{-3})*	*Duration of sampling (h)*
08:00–10:30	0,32	2,5
10:45–12:45	0,07	2
13:30–15:30	0,20	2
15:45–17:15	0,10	1,5

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.

The 8-hour TWA therefore is—

$$\frac{(0{,}32 \times 2{,}5) + (0{,}07 \times 2) + (0{,}20 \times 2) + (0{,}10 \times 1{,}5) + (0 \times 1{,}25)}{8}$$

$$= \frac{0{,}80 + 0{,}14 + 0{,}40 + 0{,}15 + 0}{8}$$

$$= 0{,}19 \text{ mg } m^{-3}$$

(d) An operator works for eight hours during the night shift on a process in which he is intermittently exposed to a substance hazardous to health. The operator's 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 m^{-3})*
22:00 to 24:00	Helping in workshop	1,10 (known to be exposure of full-time group in workshop)
24:00 to 01:00	Cleaning elsewhere in factory	0 (assumed)
01:00 to 04:00	Working in canteen	0 (assumed)
04:00 to 06:00	Cleaning-up after breakdown in workshop	0,21 (assumed)

Die 8-uur TBG is dus—

7h20 min (7,33h) teen 0,12 mg m^{-3}.

40 min (0,67h) teen 0 mg m^{-3}.

Dit is—

$$\frac{(0{,}12 \times 7{,}33) + (0 \times 0{,}67)}{8}$$

$$= 0{,}11 \text{ mg } m^{-3}$$

(b) Die operateur werk agt uur lank aan 'n proses waarin hy blootgestel word aan 'n substansie wat gevaarlik is vir die gesondheid. Die gemiddelde blootstelling tydens daardie periode word gemeet as 0,15 mg m^{-3}.

Die 8-uur TBG is dus—

$$\frac{0{,}15 \times 8}{8} = 0{,}15 \text{ mg } m^{-3}$$

(c) Werkperiodes kan vir die doeleindes van monsterneming in 'n aantal sessies verdeel word om rus-en etenspouses, ens. in ag te neem.

Dit word deur die volgende voorbeeld geïllustreer:

Werkperiode	*Blootstelling (mg m^{-3})*	*Duur van monsterneming (h)*
08:00–10:30	0,32	2,5
10:45–12:45	0,07	2
13:30–15:30	0,20	2
15:45–17:15	0,10	1,5

Daar word aangeneem dat blootstelling tydens die periodes 10:30 tot 10:45, 12:45 tot 13:30 en 15:30 tot 15:45.

Die 8-uur TBG is dus—

$$\frac{(0{,}32 \times 2{,}5) + (0{,}07 \times 2) + (0{,}20 \times 2) + (0{,}10 \times 1{,}5) + (0 \times 1{,}25)}{8}$$

$$= \frac{0{,}80 + 0{,}14 + 0{,}40 + 0{,}15 + 0}{8}$$

$$= 0{,}19 \text{ mg } m^{-3}$$

(d) 'n Operateur werk agt uur lank gedurende die nagskof aan 'n proses waartydens hy van tyd tot tyd aan 'n substansie wat vir die gesondheid gevaarlik is, blootgestel word. Die operateur se werkspatroon gedurende die werkperiode moet bekend wees en die beste beskikbare data wat met elke blootstellingsperiode verband hou, moet aangewend word om die 8-uur TBG te bereken. Hierdie data moet gebaseer word op direkte meting, ramings gegrond op reeds beskikbare data of redelike aannames.

Werk periode	*Taak*	*Blootstelling (mg m^{-3})*
22:00 tot 24:00	Help in werkswinkel	1,10 (bekend dat dit blootstelling is van voltydse groepe in werkswinkel)
24:00 tot 01:00	Maak elders in fabriek skoon	0 (aangeneem)
01:00 tot 04:00	Werk in kantien	0 (aangeneem)
04:00 tot 06:00	Ruim op na onklaarraking in werkswinkel	0,21 (aangeneem)

The 8-hour TWA therefore is—

$$\frac{(0{,}10 \times 2) + (0{,}21 \times 2) + (0 \times 4)}{8}$$

$$= 0{,}78 \text{ mg m}^{-3}$$

2. THE SHORT-TERM REFERENCE PERIOD

Exposure should be recorded as the average over the specified short-term reference period and should normally be determined by sampling over that period.

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 mut have been exceeded over some 15-minute period.

3. THE ONE-YEAR REFERENCE PERIOD FOR VINYL CHLORIDE

Exposure should be recorded as the time-weighted average of vinyl chloride in the atmosphere of a working area over a period of one year. At enclosed vinyl chloride polymerisation plants, continuous or permanent sequential sampling methods must be used. Where discontinuous measurements are made, the frequency of measurements and the number per year should be such that it is possible to state with a statistical confidence coefficient of at least 95% that the true mean annual concentration did not exceed the annual maximum exposure limit. Only periods of plant operation including, where necessary, maintenance time should be taken into account.

ANNEXURE 3

METHODS OF MEASUREMENT AND CALCULATION FOR DETERMINING THE FIBRE CONCENTRATIONS OF MANMADE MINERAL FIBRE

1. The method must determine the exposure of employees by sampling in the breathing zone of the employee exposed.

2. *Fibre* means a particle with a length > 5 µm, an average diameter < 3 µm, and a ratio of length to diameter > 3 to 1, which can be seen using the system specified in paragraph 3.

3. Fibres shall be counted in accordance with AIA RTM 1.

Die 8-uur TBG is dus—

$$\frac{(0{,}10 \times 2) + (0{,}21 \times 2) + (0 \times 4)}{8}$$

$$= 0{,}078 \text{ mg m}^{-3}$$

2. DIE KORTTERMYN-VERWYSINGSPERIODE

Blootstelling behoort as die gemiddelde oor die gespesifiseerde korttermyn-verwysingsperiode aangeteken te word en behoort gewoonlik deur monsterneming oor daardie periode bepaal te word.

Voorbeeld waar die korttermyn-verwysingsperiode 15 minute is.

(a) *Blootstellingsperiode is minder as 15 minute*

Die gemiddelde van die monsternemingsresultaat moet oor 15 minute geneem word. Byvoorbeeld, indien 'n 5-minuutmonster 'n vlak van 600 dpm lewer en onmiddellik deur 'n periode van nulblootstelling gevolg word, sal die 15-minuutgemiddelde blootstelling 200 dpm wees.

(b) *Blootstellingsperiode is 15 minute of langer*

Metings moet oor 'n 15-minuutperiode gedoen word en die resultaat is die 15-minuutgemiddelde blootstelling. Metings vir periodes langer as 15 minute moet nie gebruik word om 'n 15-minuutgemiddelde blootstelling te bereken nie, maar indien die gemiddelde blootstelling oor die langer periode die 15-minuut blootstellingsdrempel oorskry, dan moes hierdie drempel oor die een of ander 15-minuutperiode oorskry gewees het.

3. DIE EENJAAR-VERWYSINGSPERIODE VIR VINIELCHLORIED

Blootstelling moet aangeteken word as die tydbeswaarde gemiddelde van vinielchloried in die atmosfeer van 'n werkgebied oor 'n periode van een jaar. By ingeslote vinielchloried-polimeriseeraanlegte moet aaneenlopende of permanente sekwensiële monsternemingsmetodes gebruik word. Waar nie-aaneenlopende metings gedoen word, moet die frekwensie van metings en die aantal per jaar sodanig wees dat dit moontlik is om met 'n statistiese vertrouenskoëffisiënt van minstens 95% vas te stel dat die werklike gemiddelde jaarlikse konsentrasie nie die jaarlikse maksimum blootstellingsdrempel oorskry het nie. Slegs periodes wanneer die bedryfstoerusting in bedryf is, met inbegrip, waar nodig, van instandhoudingstyd, moet in ag geneem word.

AANHANGSEL 3

METINGS- EN BEREKENINGSMETODES OM DIE VESELKONSENTRASIES VAN MENSGEMAAKTE MINERAALVESEL TE BEPAAL

1. Die metode bepaal die blootstelling van werknemers bepaal deur monsterneming in die asemhalingsone van die blootgestelde werknemer.

2. *Vesel* beteken 'n partikel met 'n lengte > 5 µm, 'n gemiddelde diameter < 3 µm en 'n verhouding van lengte tot diameter > 3 tot 1, wat met behulp van die stelsel gespesifiseer in paragraaf 3 gesien kan word.

3. Vesels moet ooreenkomstig AIA RTM 1 getel word.

4. The results shall be regularly tested by quality assurance procedures to ensure that the results are in satisfactory agreement with the average of results, obtained by approved inspection authorities (AIA) participating in a national quality assurance scheme, using the method specified in paragraphs 1 to 3 above.

ANNEXURE 4

COTTON DUST

1. The OEL for cotton dust is 0,5 mg m^{-3} total dust less fly, 8-hour TWA. This figures is not a personal exposure limit but a background air standard determined by using static samplers. This OEL—RL applies to dust from the processing and 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; and

(b) dust from bleached or dyed cotton.

2. Under the HCS Regulations, assessors must satisfy themselves that the assessment takes account of people who work intensively with the material e.g. at bale opening, waste handling, maintenance of dust extraction equipment and cleaning procedures, and who are therefore likely to be exposed to dust.

3. Where the OEL—RL does not apply, exposure should be kept below both 10 mg m^{-3} 8-hour TWA *total inhalable dust* and 5 mg m^{-3} 8-hour TWA *respirable dust*, determined by a personal sampling method.

ANNEXURE 5

ASPHYXIANTS

1. 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. 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 18% 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.

2. 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.

3. Although asphyxiants are listed in Table 2 of Annexure 1, they are not substances hazardous to health for the purpose of the HCS Regulations.

4. Die resultate moet gereeld volgens kwaliteitsversekeringsprosedures getoets word om te verseker dat die resultate in bevredigende ooreenstemming is met die gemiddelde van resultate deur goedgekeurde inspeksie-owerhede (AIA) wat deelneem aan 'n nasionale kwaliteitsversekeringskema verkry met behulp van die metode gespesifiseer in paragrawe 1 tot 3 hierbo.

AANHANGSEL 4

KATOENSTOF

1. Die BBd vir katoenstof is 0,5 mg m^{-3} totale stofvrye vlieg, 8-uur TBG. Hierdie syfer is nie 'n persoonlike blootstellingstandaard nie, maar 'n agtergrondlugstandaard bepaal deur die gebruik van statiese monsters. Hierdie BBd — Ad is van toepassing op stof van die prosessering en hantering van ru- en afvalkatoen, met inbegrip van mengsels wat ru- of afvalkatoen bevat, met die volgende uitsonderings:

(a) Stof van weefwerk, breiwerk, vlegwerk en daaropvolgende prosesse; en

(b) stof van gebleikte of gekleurde katoen.

2. Kragtens die GCS Regulasies moet beramers hul daarvan vergewis dat die beraming rekening hou met mense wat intensief met die materiaal werk, byvoorbeeld by die oopmaak van bale, afvalhantering, die instandhouding van ontstoffingstoerusting en skoonmaakprosedures, en wat dus waarskynlik aan stof blootgestel sal word.

3. Waar die BBd—Ad nie van toepassing is nie, behoort blootstelling onder 10 mg m^{-3} 8-uur TBG totaal inasembare stof sowel as onder 5 mg $^{-3}$ 8-uur TBG respireerbare stof gehou te word, wat deur 'n persoonlike monsternemingsmetode bepaal word.

AANHANGSEL 5

ASFIKSEERDERS

1. Sommige gasse en dampe, wanneer in 'n hoë konsentrasie in die lug aanwesig, tree as eenvoudige asfikseerders op deur die suurstofinhoud in so 'n mate deur verdunning te verminder dat daar nie meer aan die lewe gebly kan word nie. Baie asfikseerders is reukloos, kleurloos en nie geredelik bespeurbaar nie. Die monitering van die suurstofinhoud van die lug is dikwels die beste manier om veiligheid te verseker. Die suurstofinhoud van lug in die werkplek moet nooit toegelaat word om onder 'n minimum van 18% per volume onder normale atmosferiese druk te daal nie. Besondere sorg is nodig wanneer digte asfikseerders, byvoorbeeld argon, gebruik word, aangesien baie hoë gelokaliseerde konsentrasies kan ontstaan as gevolg van versameling in putte, beperkte ruimtes en ander laagliggende gebiede waar ventilasie waarskynlik swak is.

2. Baie asfikseerders hou 'n brand- of ontploffingsrisiko in. Die konsentrasie waarby hierdie risiko's kan ontstaan, kan moontlik ver onder die vlakke wees waarby asfiksie waarskynlik sal plaasvind en moet by die beraming van die bedreigings in ag geneem word.

3. Alhoewel asfikseerders in Tabel 2 van Aanhangsel 1 gelys word, is hulle nie substansies wat vir die doel van die GCS Regulasies gevaarlik is vir die gesondheid nie.

ANNEXURE 6

RUBBER FUME AND RUBBER PROCESS DUST

1. 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.

2. The limit relates to cyclohexane soluble material determined by the method described in *Rubber fume in air, measured as total particulates* and *cyclohexane soluble material.*

3. 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 relavent OEL will apply. Otherwise, where a substance with an OEL is present in a mixed dust, the OEL for that substance will apply, in addition to the rubber process dust limit.

4. Methods for personal sampling and measurement of total inhalable dusts are available in *General method for the gravimetric determination of respirable and total inhalable dust and Rubber fume in air measures as total particulates and cyclohexane soluble material.*

ANNEXURE 7

THE DEFINITION OF GRAIN DUST

1. *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.

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LIST OF MATERIAL

1. Guidance note S20
2. HS(G)61
3. MDHS 14
4. MDHS 47
5. INDG(G)64-L
6. COSSH assessments
7. Pesticides: Code of Practice
8. EH14

AANHANGSEL 6

RUBBERDAMP EN RUBBERPROSESSTOF

1. Rubberdamp is damp wat ontwikkel uit die meng, maal en ineensmelting van natuurlike rubber of sintetiese elastomere, of van natuurlike rubber en sintetiese polimere gekombineer met chemikalieë, en uit die prosesse wat die gevolglike mengsels omsit in voltooide produkte of dele daarvan, asook uit enige inspeksieprosedures waar die ontwikkeling van damp voortduur.

2. Die drempel hou verband met sikloheksaanoplosbare materiaal vasgestel deur die metode beskryf in *Rubber fume in air, measured as total particulates* and *cyclohexane soluble material.*

3. Rubberprosesstof ontwikkel tydens die vervaardiging van tussenartikels of artikels van natuurlike rubber en/of sintetiese elastomere. Hierdie omskrywing omvat nie stowwe wat vir beroepshigiënedoeleindes individueel gehanteer kan word nie. In elke sodanige geval sal die relevante beroepsblootstellingsdrempel van toepassing wees. Andersins, waar 'n substansie met 'n toegewese BBd in 'n gemengde stof aanwesig is, sal die blootstellingsdrempel vir daardie substansie, asook die rubberprosesstofdrempel van toepassing wees.

4. Metodes vir die persoonlike monsterneming en meting van totaal inasembare stowwe is beskikbaar in *"General method for the gravimetric determination of respirable and total inhalable dust and Rubber fume in air measures as total particulates and cyclohexane soluble material".*

AANHANGSEL 7

DIE OMSKRYWING VAN GRAANSTOF

1. *Graanstof* word beskou as stof wat ontstaan uit die oes, droogmaking, hantering, opberging of prosessering van gras, koring, hawer, mielies en rog, met inbegrip van kontaminante.

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7. Pesticides: Code of Practice
8. EH14

9. EH22
10. EH23
11. EH25
12. EH28
13. EH40
14. EH42
15. EH44
16. EH56

No. R. 1180 **25 August 1995**

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993

WITHDRAWAL OF RESTRICTION AS TO EMPLOYMENT IN CERTAIN PROCESSES, ISSUED IN TERMS OF SECTION 24 (3) OF THE FACTORIES, MACHINERY AND BUILDING WORK, 1941

Under and by virtue of the powers vested in me by section 21 (3) of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), I, Tito Titus Mboweni, Minister of Labour, hereby withdraw the restrictions stipulated in the Notice under section 24 (3) of The Factories, Machinery and Building Work Act, 1941 (Act No. 22 of 1941), as published under Government Notice No. 1230, dated 14 June 1946.

T. T. MBOWENI,
Minister of Labour.

9. EH22
10. EH23
11. EH25
12. EH28
13. EH40
14. EH42
15. EH44
16. EH56

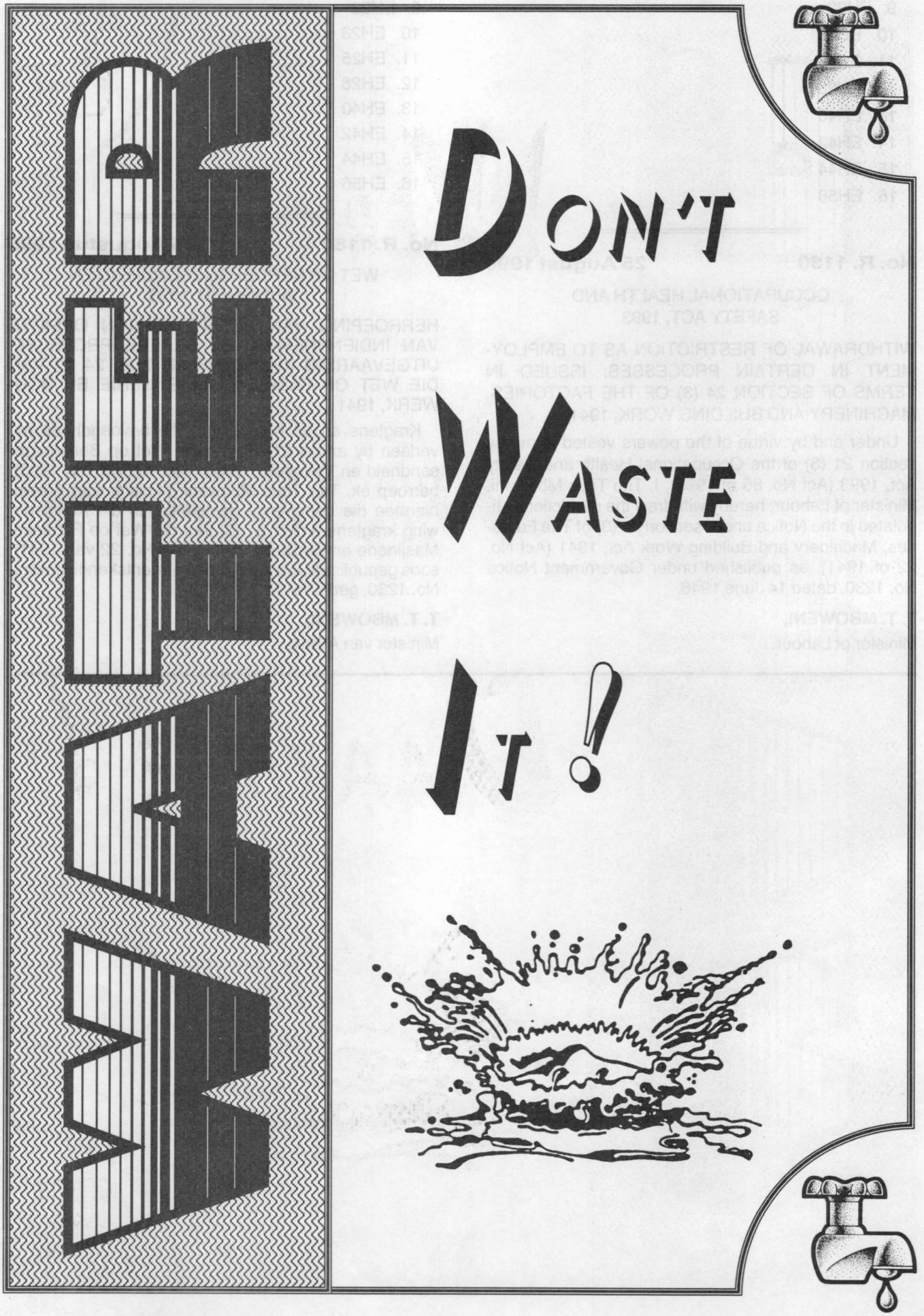
No. R. 1180 **25 Augustus 1995**

WET OP BEROEPSGESONDHEID EN VEILIGHEID, 1993

HERROEPING VAN BEPERKING TEN OPSIGTE VAN INDIENSNEMING BY SEKERE PROSESSE, UITGEVAARDIG KRAGTENS ARTIKEL 24 (3) VAN DIE WET OP FABRIEKE, MASJINERIE EN BOUWERK, 1941

Kragtens en uit hoofde van die bevoegdhede my verleen by artikel 21 (3) van die Wet op Beroepsgesondheid en Veiligheid, 1993 (Wet No. 85 van 1993), herroep ek, Tito Titus Mboweni, Minister van Arbeid, hiermee die beperkings gestipuleer in die Kennisgewing kragtens artikel 24 (3) van die Wet op Fabrieke, Masjinerie en Bouwerk, 1941 (Wet No. 22 van 1941), soos gepubliseer kragtens Goewermentskennisgewing No. 1230, gedateer 14 Junie 1946.

T. T. MBOWENI,
Minister van Arbeid.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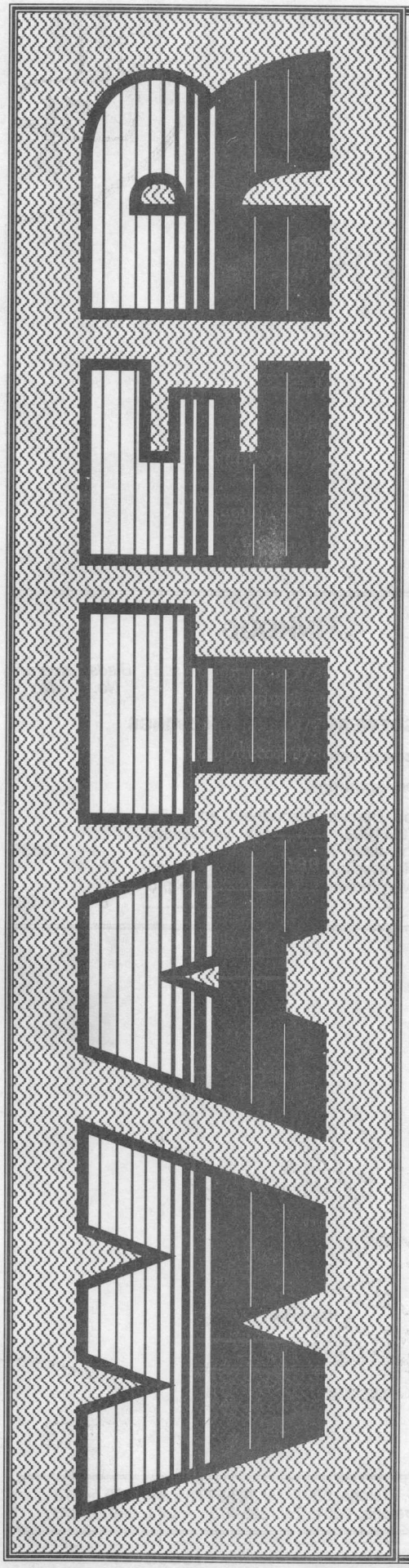

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