

DRAFT EUROPEAN COMMISSION DIRECTIVE ESTABLISHING A SECOND LIST OF INDICATIVE OCCUPATIONAL EXPOSURE LIMIT VALUES AT EUROPEAN COMMUNITY LEVEL IN IMPLEMENTATION OF COUNCIL DIRECTIVE 98/24/EC ON THE PROTECTION OF THE HEALTH AND SAFETY OF WORKERS FROM THE RISKS RELATED TO CHEMICAL AGENTS AT WORK

CONSULTATIVE DOCUMENT

SUMMARY

The second European Commission Directive on Indicative Occupational Exposure Limit Values (the 2nd IOELV Directive) is due to be adopted shortly. This Consultative Document sets out the Health and Safety Commission's (HSC's) proposals for establishing occupational exposure limits (OELs) for the 33 substances listed in the Directive, in advance of its formal adoption. Although there is some uncertainty regarding when formal adoption will take place, HSC has decided to seek views on the proposed limit values at this stage

The 33 substances are listed below:

Acetonitrile	Isopentane
2-Aminoethanol	Methanol
Barium (soluble compounds as Ba)	2-(2-Methoxyethoxy) ethanol
Bromine	Monochlorobenzene
2-(2-Butoxyethoxy) ethanol	Morpholine
Carbon dioxide	Neopentane
Chlorine	Nicotine
Chloroethane	Nitric acid
Chromium metal, inorganic chromium (II) compounds and inorganic chromium (III) compounds (insoluble)	Nitrobenzene
	Oxalic acid
Cyanamide	Pentane
Cyclohexane	Phosphine
Diethylamine	Phosphorus pentachloride
Diphosphorus pentasulphide	Pyrethrum (purified of sensitising lactones)
Diphosphorus pentoxide	Resorcinol
Formic acid	Silver (soluble compounds as Ag)
n-Hexane	Toluene

The proposals for the 33 substances appear in two ways:

- A substance by substance summary in Table A on pages 6-9;
- A more detailed description of the changes with questions for consultees on pages 10-15.

The HSC seeks to inform its decision making by consulting a wide range of interested bodies, and, although these proposals have already been discussed by a European

panel of experts, you may have views or further information of which it is not aware. For example, you may have data relating to whether a particular limit can reasonably be achieved in the workplace. Your comments are important. A form is included at the back of this document to help you in providing comments. It summarises the questions set out in the main text.

Please feel free to copy this Consultative Document more widely; hard copies are available from the address on the back cover, and are also available via the HSE's website (www.hse.gov.uk/aboutus/hsc/iacs/acts/300605/242005a.pdf).

THE BRITISH OCCUPATIONAL EXPOSURE LIMIT SYSTEM

1. In 2005 the Health and Safety Commission (HSC) introduced a new framework for setting occupational exposure limits (OELs) following an amendment to the COSHH Regulations 2002 (S.I. 2004 No. 3386). The new system dispenses with the previous system of Maximum Exposure Limits (MELs) and Occupational Exposure Standards (OESs) and replaces both with a single type of limit, the Workplace Exposure Limit or WEL.
2. The requirements for compliance with WELs are set out in regulation 7(7) of the COSHH Regulations 2002 (as amended). In essence, the emphasis in the new WEL system is on the need to control exposure to substances according to the principles of good practice. To help employers with this requirement, the general principles of good practice are set out in Schedule 2A of the 2004 amendment to the COSHH Regulations. These are reproduced in “***EH40/2005 Workplace Exposure Limits***” and are also listed in Annex 2 of the Regulatory Impact Assessment, which is at Appendix 2 of this document. In addition to these general principles of good practice, control advice sheets laying out step-by-step instructions for specific tasks and processes, are available via the electronic system of COSHH Essentials (www.coshh-essentials.org.uk). Broadly speaking, these control guidance sheets represent good practice for the control of hazardous substances. COSHH Essentials is available as guidance only, and employers are free to use other sources of advice on good practice, if they wish.
3. In addition to the need to control substances according to good practice, it is also a legal requirement that the WEL should not be exceeded. A WEL is defined as the concentration of a hazardous substance in the air that people breathe, averaged over a specified reference period referred to as a time-weighted average (TWA). Two periods are used: long-term (8 hours) and short-term (15 minutes).
4. WELs are published in the HSE publication “***EH40 Workplace Exposure Limits***”, the current edition of which was published in April 2005. The limit values are also available on the HSE website (www.hse.gov.uk/coshh/table1.pdf). In addition to the requirement to control exposures to the level of the WEL, employers must, if the substance is a carcinogen or a respiratory sensitiser, reduce exposures still further to a level which is as low as is reasonably practicable.
5. For more information on employers’ duties under COSHH, you should refer to HSE’s booklet “***COSHH - a brief guide to the regulations***” INDG136(rev3), available from HSE Books.

INDICATIVE OCCUPATIONAL EXPOSURE LIMIT VALUES (IOELVs)

6. IOELVs are European legal limits that are set to protect the health of workers in the European Union from the ill-health effects of hazardous substances in the workplace. Their legal status derives from Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work (the Chemical Agents Directive or CAD). The first European Commission Directive on Indicative Occupational Exposure Limit Values (1st IOELV Directive), containing limits for 63 substances, was adopted by the European Commission on 8 June 2000 and was implemented in Great Britain by the inclusion of the limits in the HSE publication “***EH40 Occupational Exposure Limits 2002***”.

7. The IOELV Directives require Member States to establish national OELs for the chemical agents in question, **taking into account** the Community values. In most cases this will mean that the British limit will be identical or very close to the IOELV (or in a number of cases more stringent). Only in very rare circumstances will the HSC consider establishing a WEL which is substantially higher than the IOELV.

PROPOSALS IN THE 2ND IOELV DIRECTIVE

8. The European Commission has now made proposals for IOELVs for a further 34 substances and these are nearing final agreement by Member States. Ongoing discussions, relating to the proposals for an IOELV for nitrogen monoxide, have prevented the adoption of the Directive. Since it is not clear when this issue will be resolved, the Health and Safety Commission (HSC) has decided to implement the IOELVs listed for the remaining 33 substances, in advance of the formal adoption of this Directive. The HSC is confident that there will be no changes to the IOELVs listed at this stage for these 33 substances.

9. A copy of the draft Directive is at Appendix 1. The Annex of this Appendix lists the IOELVs, substance by substance. The substances in the Annex are listed in CAS Number order; elsewhere in this Consultative Document we have used alphabetical order for ease of understanding. The limits for these substances are based on recommendations by the European Commission's Scientific Committee on Occupational Exposure Limits (SCOEL) which has considered the scientific information available on each substance. Member States must take into account the IOELV for a substance when establishing their national limit values.

10. The Health and Safety Commission's tripartite Advisory Committee on Toxic Substances (ACTS) is content that these recommendations are based on a thorough critical assessment by SCOEL of the available information on the substances in question and, where relevant, a consideration of the socio-economic aspects of the limit.

11. Supporting documentation prepared by SCOEL, is available for 22 of the substances covered by this draft Directive, on request from the Health and Safety Executive. To obtain copies, please contact Richard Pedersen, International Chemicals Unit, Health and Safety Executive – telephone 020 7717 6216 or email richard.pedersen@hse.gsi.gov.uk. Documentation is available for those substances listed below:

2-Aminoethanol
2-(2-Butoxyethoxy) ethanol
Chlorine
Chloroethane
Chromium metal, Inorganic Chromium II and Inorganic Chromium III compounds
Cyanamide
Cyclohexane
Diethylamine
Diphosphorus pentoxide
n-Hexane
2-(2-Methoxyethoxy) ethanol
Monochlorobenzene
Morpholine

Nitric acid
Nitrobenzene
Pentane, Isopentane and Neopentane
Phosphine
Pyrethrum (purified of sensitising lactones)
Silver (soluble compounds as Ag)
Toluene

There are no published SCOEL summaries for the other 11 substances.

PROPOSALS FOR IMPLEMENTING THE 2nd IOELV DIRECTIVE INTO THE NATIONAL LIMIT SETTING SYSTEM

12. The HSC proposes to implement the IOELVs in this Commission Directive through our domestic system of OELs. These OELs are set to help employers meet their legal responsibilities under the Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH) which require employers to prevent, or if this is not reasonably practicable, to adequately control, their employees' exposure to hazardous substances.

13. In certain cases, the HSC's proposals do not totally replicate what is in the draft Directive. These are described in Table A on pages 6-9.

14. The specific proposals appear in two ways:

- Table A on pages 6-9 is a summary of all the proposals substance by substance;
- Pages 10-15 set out the specific proposals with questions for the 33 substances.

TABLE A: SUMMARY OF PROPOSALS

SUBSTANCE NAME CAS Number	IOELV A) 8-hour TWA B) STEL C) Skin Notation	Existing UK WEL and notations A) 8-hour TWA B) STEL C) Skin Notation	HSC Proposal
Acetonitrile 75-05-8	A) 70 mg.m ⁻³ 40 ppm B) None C) Skin	A) 68 mg.m ⁻³ 40 ppm B) 102 mg.m ⁻³ 60 ppm C) None	Retain 8-hour TWA limit Retain STEL Add Sk notation
2-Aminoethanol 141-43-5	A) 2.5 mg.m ⁻³ 1 ppm B) 7.6 mg.m ⁻³ 3 ppm C) Skin	A) 7.6 mg.m ⁻³ 3 ppm B) 15 mg.m ⁻³ 6 ppm C) None	Adopt IOELV 8-hour TWA limit Adopt IOELV STEL Add Sk notation
Barium (soluble compounds as Ba) 7440-39-3	A) 0.5 mg.m ⁻³ B) None C) None	A) 0.5 mg.m ⁻³ B) None C) None	Retain existing WEL
Bromine 7726-95-6	A) 0.7 mg.m ⁻³ 0.1 ppm B) None C) None	A) 0.66 mg.m ⁻³ 0.1 ppm B) 2 mg.m ⁻³ 0.3 ppm C) None	Retain 8-hour TWA WEL Reduce STEL to 0.2 ppm (see paragraph 30)
2-(2-Butoxyethoxy) ethanol 112-34-5	A) 67.5 mg.m ⁻³ 10 ppm B) 101.2 mg.m ⁻³ 15 ppm C) None	A) None B) None C) None	Adopt IOELV 8-hour TWA limit Adopt IOELV STEL
Carbon dioxide 124-38-9	A) 9,000 mg.m ⁻³ 5,000 ppm B) None C) None	A) 9,150 mg.m ⁻³ 5,000 ppm B) 27,400 mg.m ⁻³ 15,000 ppm C) None	Retain 8-hour TWA WEL Retain STEL to protect asthmatics from effects of high exposures
Chlorine 7782-50-5	A) None B) 1.5 mg.m ⁻³ 0.5 ppm C) None	A) 1.5 mg.m ⁻³ 0.5 ppm B) 2.9 mg.m ⁻³ 1 ppm C) None	Withdraw 8-hour TWA WEL as no longer necessary Adopt IOELV STEL
Chloroethane 75-00-3	A) 268 mg.m ⁻³ 100 ppm B) None C) None	A) 50 ppm B) None C) None	Retain existing WEL

SUBSTANCE NAME CAS Number	IOELV A) 8-hour TWA B) STEL C) Skin Notation	Existing UK WEL and notations A) 8-hour TWA B) STEL C) Skin Notation	HSC Proposal
Chromium metal, inorganic chromium (II) compounds and inorganic chromium (III) compounds 7440-47-3	A) 2 mg.m ⁻³ B) None C) None	A) 0.5 mg.m ⁻³ B) None C) None	Retain existing WEL
Cyanamide 420-04-2	A) 1 mg.m ⁻³ 0.58 ppm B) None C) Skin	A) 2 mg.m ⁻³ B) None C) None	Adopt IOELV 8-hour TWA limit Add Sk notation
Cyclohexane 110-82-7	A) 700 mg.m ⁻³ 200 ppm B) None C) None	A) 350 mg.m ⁻³ 100 ppm B) 1050 mg.m ⁻³ 300 ppm C) None	Retain existing WELs
Diethylamine 109-89-7	A) 15 mg.m ⁻³ 5 ppm B) 30 mg.m ⁻³ 10 ppm C) None	A) 30 mg.m ⁻³ 10 ppm B) 76 mg.m ⁻³ 25 ppm C) None	Adopt IOELV 8-hour limit Adopt IOELV STEL
Diphosphorus pentasulphide 1314-80-3	A) 1 mg.m ⁻³ B) None C) None	A) 1 mg.m ⁻³ B) 3 mg.m ⁻³ C) None	No change required to 8-hour TWA WEL Revise STEL to 2 mg.m ⁻³ (see paragraph 31)
Diphosphorus pentoxide 1314-56-3	A) 1 mg.m ⁻³ B) None C) None	A) None B) 2 mg.m ⁻³ C) None	Introduce IOELV 8-hour TWA Retain current GB STEL.
Formic acid 64-18-6	A) 9 mg.m ⁻³ 5 ppm B) None C) None	A) 9.6 mg.m ⁻³ 5 ppm B) None C) None	No change required. Current GB WEL equates to IOELV
n-Hexane 1110-54-3	A) 72 mg.m ⁻³ 20 ppm B) None C) None	A) 72 mg.m ⁻³ 20 ppm B) None C) None	No change required. Current GB WEL equates to IOELV

SUBSTANCE NAME CAS Number	IOELV A) 8-hour TWA B) STEL C) Skin Notation	Existing UK WEL and notations A) 8-hour TWA B) STEL C) Skin Notation	HSC Proposal
Isopentane 78-78-4	A) 3,000 mg.m ⁻³ 1,000 ppm B) None C) None	A) None, but there is a guidance value of 1,800 mg.m ⁻³ ; 600 ppm B) None C) None	Introduce 8-hour TWA WEL at the level of the guidance value (600 ppm) since this value has been agreed by ACTS for use in setting in-house OELs for mixtures of hydrocarbon solvents (see paragraph 23).
Methanol 67-56-1	A) 260 mg.m ⁻³ 200 ppm B) None C) Skin	A) 266 mg.m ⁻³ 200 ppm B) 333 mg.m ⁻³ 250 ppm C) Skin	Retain existing WELs
2(2-Methoxyethoxy) ethanol 111-77-3	A) 50.1 mg.m ⁻³ 10 ppm B) None C) Skin	A) None B) None C) None	Adopt IOELV 8-hour TWA Add Skin notation
Monochlorobenzene 108-90-7	A) 23 mg.m ⁻³ 5 ppm B) 70 mg.m ⁻³ 15 ppm C) None	A) 1 ppm B) 3 ppm C) None	Retain existing WELs
Morpholine 110-91-8	A) 36 mg.m ⁻³ 10 ppm B) 72 mg.m ⁻³ 20 ppm C) None	A) 72 mg.m ⁻³ 20 ppm B) 109 mg.m ⁻³ 30 ppm C) Skin	Adopt IOELV 8-hour TWA Adopt IOELV STEL Retain Skin notation
Neopentane 590-35-2	A) 3,000 mg.m ⁻³ 1,000 ppm B) None C) None	A) None but there is a guidance value of 1,800 mg.m ⁻³ ; 600 ppm B) None C) None	Introduce 8-hour TWA at the level of the existing guidance value (600 ppm) since this value has been agreed by ACTS for use in setting in-house OELs for mixtures of hydrocarbon solvents (see para. 23).
Nicotine 54-11-5	A) 0.5 mg.m ⁻³ B) None C) Skin	A) 0.5 mg.m ⁻³ B) 1.5 mg.m ⁻³ C) Skin	Retain existing WELs (including STEL) and skin notation
Nitric acid 7697-37-2	A) None B) 2.6 mg.m ⁻³ 1 ppm C) None	A) 5.2 mg.m ⁻³ 2 ppm B) 10 mg.m ⁻³ 4 ppm C) None	Withdraw 8 hour TWA WEL Adopt IOELV STEL

SUBSTANCE NAME CAS Number	IOELV A) 8-hour TWA B) STEL C) Skin Notation	Existing UK WEL and notations A) 8-hour TWA B) STEL C) Skin Notation	HSC Proposal
Nitrobenzene 98-95-3	A) 1 mg.m ⁻³ 0.2 ppm B) None C) Skin	A) 5.1 mg.m ⁻³ 1 ppm B) 10 mg.m ⁻³ 2 ppm C) Skin	Adopt IOELV 8-hour TWA limit Withdraw existing GB STEL
Oxalic acid 144-62-6	A) 1 mg.m ⁻³ B) None C) None	A) 1 mg.m ⁻³ B) 2 mg.m ⁻³ C) None	No change required GB STEL retained
Pentane 109-66-0	A) 3,000 mg.m ⁻³ 1,000 ppm B) None C) None	A) None but there is a guidance value of 1,800 mg.m ⁻³ ; 600 ppm B) None C) None	Introduce 8-hour TWA at the level of the existing guidance value (600 ppm) since this value has been agreed by ACTS for use in setting in-house OELs for mixtures of hydrocarbon solvents (see para 23).
Phosphine 7803-51-2	A) 0.14 mg.m ⁻³ 0.1 ppm B) 0.28 mg.m ⁻³ 0.2 ppm C) None	A) None B) 0.42 mg.m ⁻³ 0.3 ppm C) None	Adopt IOELV 8-hour TWA limit Adopt IOELV STEL
Phosphorus pentachloride 10026-13-8	A) 1 mg.m ⁻³ 0.1 ppm B) None C) None	A) 0.87 mg.m ⁻³ 0.1 ppm B) None C) None	Retain existing GB 8-hour TWA WEL Adopt STEL of 2 mg.m ⁻³ (0.2 ppm) (see para. 32)
Pyrethrum (purified of sensitising lactones) 8003-34-7	A) 1 mg.m ⁻³ B) None C) None	A) 5 mg.m ⁻³ (as pyrethins) B) 10 mg.m ⁻³ (as pyrethrins) C) None	Adopt IOELV 8-hour TWA limit Withdraw existing GB STEL.
Resorcinol 108-46-3	A) 45 mg.m ⁻³ 10 ppm B) None C) Skin	A) 46 mg.m ⁻³ 10 ppm B) 92 mg.m ⁻³ 20 ppm C) None	Retain existing WELs Adopt Skin notation
Silver (soluble compounds as Ag) 7440-22-4	A) 0.01 mg.m ⁻³ B) None C) None	A) 0.01 mg.m ⁻³ B) None C) None	Retain existing WEL
Toluene 108-88-3	A) 192 mg.m ⁻³ 50 ppm B) 384 mg.m ⁻³ 100 ppm C) Skin	A) 191 mg.m ⁻³ 50 ppm B) 574 mg.m ⁻³ 150 ppm C) Skin	Retain existing 8-hour TWA WEL Adopt IOELV STEL Retain Sk notation

Description of the proposals with questions for consultees

Substances for which no limit change is necessary

15. Of the 33 substances, 14 have recommended IOELVs which are identical to or higher than the existing WEL, and HSC is not proposing any change to the current WEL. These substances are:

Acetonitrile (see also para 28)	n-Hexane
Barium (soluble compounds as Ba)	Methanol
Carbon dioxide	Monochlorobenzene
Chloroethane	Nicotine
Chromium metal, inorganic chromium (II) and chromium (III) compounds	Oxalic acid
Cyclohexane	Resorcinol (see also para 28)
Formic acid	Silver (soluble compounds as Ag)

Substances for which a reduction in the existing WEL is necessary

16. The following ten substances require reductions to be made to existing WELs in order to comply with the IOELV.

2-Aminoethanol	Nitric acid
Chlorine	Nitrobenzene
Cyanamide	Phosphine
Diethylamine	Pyrethrum
Morpholine	Toluene

Question 1: Do you agree that the WEL (8-hour TWA) for 2-aminoethanol should be reduced from 3 ppm (7.6 mg.m⁻³) to 1 ppm (2.5 mg.m⁻³) ? If you disagree, please explain why.

Question 2: Do you agree that the STEL for 2-aminoethanol should be reduced from 6 ppm (15 mg.m⁻³) to 3 ppm (7.6 mg.m⁻³) ? If you disagree, please explain why.

Question 3: Do you agree that the STEL for chlorine should be reduced from 1 ppm (2.9 mg.m⁻³) to 0.5 ppm (1.5 mg.m⁻³) ? If you disagree, please explain why.

17. Chlorine currently has a WEL of 0.5 ppm (1.5 mg.m⁻³) (8-hour TWA). The draft 2nd IOELV Directive does not recommend an 8-hour limit for chlorine and lists only a short-term exposure limit (STEL) in view of the acute effects of chlorine exposure. As this STEL equates to the existing WEL, the Health and Safety Commission proposes that the 8-hour limit be withdrawn.

Question 4: Do you agree that the WEL (8-hour TWA) for chlorine set at 0.5 ppm (1.5 mg.m⁻³) should be withdrawn ? If you disagree, please explain why.

Question 5: Do you agree that the WEL (8-hour TWA) for cyanamide should be reduced from 2 mg.m⁻³ to 1 mg.m⁻³ (0.58 ppm) ? If you disagree, please explain why.

Question 6: Do you agree that the WEL (8-hour TWA) for diethylamine should be reduced from 10 ppm (30 mg.m⁻³) to 5 ppm (15 mg.m⁻³) ? If you disagree, please explain why.

Question 7: Do you agree that the STEL for diethylamine should be reduced from 25 ppm (76 mg.m⁻³) to 10 ppm (30 mg.m⁻³) ? If you disagree, please explain why.

Question 8: Do you agree that the WEL (8-hour TWA) for morpholine should be reduced from 20 ppm (72 mg.m⁻³) to 10 ppm (36 mg.m⁻³) ? If you disagree, please explain why.

Question 9: Do you agree that the STEL for morpholine should be reduced from 30 ppm (109 mg.m⁻³) to 20 ppm (72 mg.m⁻³) ? If you disagree, please explain why.

Question 10: Do you agree that the STEL for nitric acid should be reduced from 4 ppm (10 mg.m⁻³) to 1 ppm (2.6 mg.m⁻³) ? If you disagree, please explain why.

18. Nitric acid currently has a WEL of 2 ppm (5.2 mg.m⁻³) (8-hour TWA). The Directive does not recommend an 8-hour limit for nitric acid and lists only a STEL in view of the acute effects of exposure to nitric acid. As this STEL is considerably lower than the existing 8-hour limit, the Health and Safety Commission proposes that the current 8-hour limit be withdrawn.

Question 11: Do you agree that the WEL (8-hour TWA) for nitric acid set at 2 ppm (5.2 mg.m⁻³) should be withdrawn ? If you disagree, please explain why.

Question 12: Do you agree that the WEL (8-hour TWA) for nitrobenzene should be reduced from 1 ppm (5.1 mg.m⁻³) to 0.2 ppm (1 mg.m⁻³) ? If you disagree, please explain why.

19. Nitrobenzene currently has a STEL of 2 ppm (10 mg.m⁻³). Because this STEL would be ten-times higher than the new 8-hour TWA WEL, the Health and Safety Commission proposes that it be withdrawn. To set a short-term limit, employers should follow the guidelines set out in paragraph 93 of EH40/2005, and use a figure that is three-times the 8-hour TWA limit.

Question 13: Do you agree that the STEL for nitrobenzene should be withdrawn ? If you disagree, please explain why.

Question 14: Do you agree that the STEL for phosphine should be reduced from 0.3 ppm (0.42 mg.m⁻³) to 0.2 ppm (0.28 mg.m⁻³)? If you disagree, please explain why. (See also paragraph 25).

20. Great Britain currently has an 8-hour TWA WEL for pyrethrins (CAS No. 8003-34-7) of 5 mg.m⁻³. The Directive lists a limit for pyrethrum (purified of sensitising lactones) with the identical CAS number. The Health and Safety Commission proposes that the existing limit be replaced by a new WEL in line with the recommended IOELV of 1 mg.m⁻³ (8-hour TWA) for pyrethrum (purified of sensitising lactones).

Question 15: Do you agree that the WEL for pyrethrins of 5 mg.m⁻³ (8-hour TWA) be amended to a WEL for pyrethrum (purified of sensitising lactones) of 1 mg.m⁻³ ? If you disagree, please explain why.

21. Pyrethrins currently have a STEL of 10 mg.m⁻³. Because this STEL would be ten-times higher than the new 8-hour TWA WEL, the Health and Safety Commission proposes that it be withdrawn. In order to set a short-term limit, employers should follow the guidelines set out in paragraph 93 of EH40/2005, and use a figure that is three-times the 8-hour TWA limit.

Question 16: Do you agree that the STEL for pyrethrins should be withdrawn ? If you disagree, please explain why.

Question 17: Do you agree that the STEL for toluene should be reduced from 150 ppm (574 mg.m⁻³) to 100 ppm (384 mg.m⁻³)? If you disagree, please explain why.

Substances for which a new or additional limit is required

22. To comply with the Directive, new 8-hour TWA and/or short-term limits are required for seven substances. The Health and Safety Commission therefore proposes the establishment of new WELs for these substances.

2(2-Butoxyethoxy) ethanol	Neopentane
Diphosphorus pentoxide	Pentane
Isopentane	Phosphine
2(2- Methoxyethoxy) ethanol	

23. The Directive recommends IOELVs for isopentane, neopentane and pentane of 1000 ppm (3000 mg.m⁻³). At the moment there are no WELs for these substances. However, they do have guidance values of 600 ppm (1800 mg.m⁻³). These guidance values were developed by an ACTS sub-group for use in setting in-house OELs for mixtures of hydrocarbon solvents, using a procedure known as the Reciprocal Calculation Procedure (RCP) (see paragraphs 119-121 in EH40/2005). These guidance values have been in use for over 10 years in Great Britain. The Health and Safety Commission is proposing to convert the guidance values assigned to these three isomers into WELs. This will result in WELs for these three substances that are lower than the IOELVs listed in the Directive.

Question 18: Do you agree with the introduction of new WELs for isopentane, neopentane and pentane of 600 ppm (1,800 mg.m⁻³) (8-hour TWA), based on the guidance values recommended for use in the reciprocal calculation procedure? If you disagree, please explain why.

24. The Directive recommends 8-hour TWA limits for two further substances that have never been subject to a British limit – 2(2-Butoxyethoxy) ethanol (DEGBE) and 2(2-Methoxyethoxy) ethanol (DEGME). The Health and Safety Commission proposes that new WELs, in line with the recommended IOELVs, be adopted in Great Britain.

Question 19: Do you agree with the introduction of a WEL (8-hour TWA) for 2-(2-Butoxyethoxy) ethanol set at 10 ppm (67.5 mg.m⁻³) ? If you disagree, please explain why.

Question 20: Do you agree with the introduction of a STEL for 2-(2-Butoxyethoxy) ethanol set at 15 ppm (101.2 mg.m⁻³) ? If you disagree, please explain why.

Question 21: Do you agree with the introduction of a WEL (8-hour TWA) for 2-(2-Methoxyethoxy) ethanol set at 10 ppm (50.1 mg.m⁻³) ? If you disagree, please explain why.

25. Diphosphorus pentoxide and phosphine do not currently have an 8-hour TWA limit, although both substances are currently subject to a STEL. The Health and Safety Commission proposes that WELs in line with the recommended 8-hour TWA IOELVs be adopted in Great Britain.

Question 22: Do you agree with the introduction of a new WEL (8-hour TWA) for diphosphorus pentoxide of 1 mg.m⁻³ ? If you disagree, please explain why.

Question 23: Do you agree with the introduction of a new WEL (8-hour TWA) for phosphine of 0.1 ppm (0.14 mg.m⁻³) (8-hour TWA) ? If you disagree, please explain why.

Skin notations

26. Nine of the substances listed in the Directive carry additional “skin” (Sk) notations signifying the possibility of significant uptake of the substance through the skin, leading to the potential for toxicity over and above that due to inhalation exposure alone. Great Britain is required to adopt these “skin” notations into its list of substances with occupational exposure limits.

27. The Health and Safety Commission proposes that Sk notations be retained for four substances where they already exist in GB limits. These substances are:

Methanol	Nitrobenzene
Nicotine	Toluene

Additionally, Great Britain currently has an Sk notation for morpholine while no such notation appears in the Directive. The Health and Safety Commission proposes that the GB Sk notation for morpholine be retained.

28. The Directive requires the introduction of an Sk notation for five substances where no current comparable GB notation exists. The Health and Safety Commission therefore proposes that Sk notations be introduced for the following substances:

Acetonitrile	2-(2-Methoxyethoxy)ethanol
2-Aminoethanol	Resorcinol
Cyanamide	

Question 24: Do you agree with the introduction of an Sk notation for acetonitrile, 2-aminoethanol, cyanamide, 2-(2-methoxyethoxy)ethanol and resorcinol ? If you disagree, please explain why.

Domestic limit changes

29. For three substances listed in the Annex to the 2nd IOELV Directive, no change is required to the existing WEL in order to comply with the Directive. However, the Health and Safety Commission is proposing minor changes to improve occupational health. For bromine, diphosphorus pentasulphide and phosphorus pentachloride, the Directive lists 8-hour TWA limits with no accompanying STELs. These limits derive from the 1st ILV Directive (91/322/EEC). No STELs were established for any substance in this Directive. These three substances have the potential to cause acute irritation of the respiratory tract if inhaled, and the HSC believes that, for worker health protection, it is appropriate that STELs should also be set for them.

30. In the case of bromine, a STEL of 0.3 ppm (2 mg.m⁻³) is currently listed in EH40/2005. This limit was derived prior to the implementation of COSHH. Data on the toxicity of bromine are sparse. However, data published since the current STEL was set suggest that 0.3 ppm may be above the irritant threshold for bromine. The evidence has been reviewed by the Expert Panel on Air Quality Standards (EPAQS) in its recent recommendations for “guideline levels” for halogen and hydrogen halides in ambient air. In the light of information contained within this review, the Health and Safety Commission proposes that the STEL for bromine be reduced from 0.3 ppm to 0.2 ppm.

Question 25: Do you agree that the STEL for bromine should be reduced from 0.3 ppm to 0.2 ppm ? If you disagree, please explain why.

31. In the case of diphosphorus pentasulphide, a STEL of 3 mg.m⁻³ is currently listed in EH40/2005. This limit was derived prior to the introduction of the COSHH Regulations. There is very little toxicity data for diphosphorus pentasulphide. In water it rapidly hydrolyses to orthophosphoric acid and hydrogen sulphide, and therefore its STEL was set by analogy with the STEL for orthophosphoric acid. In 1995, following a WATCH/ACTS review, the STEL for orthophosphoric acid was reduced to 2 mg.m⁻³. The Health and Safety Commission now proposes to align the STEL for diphosphorus pentasulphide with the lower STEL for orthophosphoric acid.

Question 26: Do you agree that the STEL for diphosphorus pentasulphide be reduced from 3 mg.m⁻³ to 2 mg.m⁻³ ? If you disagree, please explain why.

32. No STEL is currently in force for phosphorus pentachloride. However, this substance is classified as corrosive, and therefore it would be acutely irritating to the respiratory tract. In water, phosphorus pentachloride rapidly hydrolyses first to phosphorus oxychloride and hydrogen chloride. The phosphorus oxychloride then hydrolyses to orthophosphoric acid and more hydrogen chloride. For consistency with the WELs for orthophosphoric acid and diphosphorus pentoxide, the Health and Safety Commission proposes to introduce a STEL of 2 mg.m⁻³ for phosphorus pentachloride.

Question 27: Do you agree with the introduction of a STEL for phosphorus pentachloride at 2 mg.m⁻³ ? If you disagree, please explain why.

-

Implementation Date

33. The Health and Safety Commission proposes to apply the new limits as soon as possible after their formal agreement taking into account the comments received during this consultation exercise. It will also take account of the Common Commencement Dates of 6 April and 1 October, for the introduction of new legislation affecting industry.

Question 28: Do you agree with the Health and Safety Commission's proposal to apply the new and revised limits at the earliest possible opportunity ? If you disagree, please explain why.

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Regulatory Impact/ Cost Benefit Assessment

34. Before introducing any new piece of legislation, the Health and Safety Commission is obliged to carry out an assessment of the costs this legislation would impose on industry and other stakeholders, and of the benefits it is expected to bring. Since October 1998, this assessment has been included in the Regulatory Impact Assessment (RIA). An RIA is not carried out, however, when the legislation does not impose additional costs to industry.

35. In relation to the IOELV proposals for the substances set out in this Consultative Document, HSE has examined what costs and benefits would result from their implementation into the national limit-setting system Appendix 2). HSE estimates that, for most of the substances, no additional costs will arise, and that the major part of the estimated costs of £5.4 million (one-off) and £4.4 million (over ten years) will fall on the water utility industry because the short-term exposure limit for chlorine gas will be halved.

INVITATION TO COMMENT

36. The Health and Safety Commission invites comments on these proposals. For your convenience, a response form is included at Appendix 4, which contains all the questions on pages 10 to 15, and you may find it helpful to use this for your reply. We are happy, nevertheless, to receive your written comments in any form convenient to you. We will acknowledge receipt of all comments sent to us and will give them careful consideration. The Health and Safety Commission would also like to know what you think about this consultation, both in terms of content and layout. Your views may help us to improve future consultations.

37. Please send your comments by [date/month/ 2005] to Richard Pedersen whose contact details are below.

Richard Pedersen
International Chemicals Unit
Health and Safety Executive
8NW Rose Court
2 Southwark Bridge
London SE1 9HS

Email: richard.pedersen@hse.gsi.gov.uk

Telephone: 020 7717 6216

Fax: 020 7717 6437

EXPLANATORY MEMORANDUM

A great number of substances during their manufacture and professional use stages are hazardous to the workers health. Therefore, there is a need to reduce, to the extent needed, the exposure of workers to these substances in order to protect their health.

One of the main tools of an efficient prevention strategy to reduce occupational exposure is the establishment of occupational exposure limit values for all substances to which workers are exposed.

1. INTRODUCTION

a) General context

Council Directive 80/1107/EEC¹ on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work foresaw in its Article 8 (4) the establishment of indicative limit values by means of Commission directives.

In implementing Directive 80/1107/EEC, Commission Directive 91/322/EEC² was adopted laying down a first list of indicative limit values and Commission Directive 96/94/EC³ was adopted establishing a second list of indicative limit values.

Article 3 of Council Directive 98/24/EC⁴ on the protection of the health and safety of workers from the risks related to chemical agents at work mandates the Commission to propose European objectives in the form of indicative occupational exposure limit values (IOELVs) for the protection of workers from chemical risks, to be set at Community level, after first consulting the Advisory Committee on Safety, Hygiene and Health Protection at Work⁵.

It should be noted that Directive 80/1107/EEC was repealed by Directive 98/24/EC. However, Directives 91/322/EEC and 96/94/EC remained in force in accordance with Article 13 of Directive 98/24/EC.

In implementation of Directive 98/24/EC a first list of IOELVs was established by Commission Directive 2000/39/EC⁶, which repealed Directive 96/94/EC.

A second list of IOELVs in implementation of Directive 98/24/EC is adopted by the present Commission Directive.

The main difference between Directive 80/1107/EEC and Directive 98/24/EC relates to the fact that an evaluation of the relationship between the health effects of hazardous chemical agents and the level of occupational exposure by means of an independent scientific assessment of the latest available scientific data is required by Directive 98/24/EC before the Commission proposes IOELVs.

In carrying out its task, the Commission is assisted by the Scientific Committee on Occupational Exposure Limit Values (SCOEL) instituted by Commission Decision

¹ O.J. 327, 3.12.1980, p. 8, as amended by Directive 88/642/EEC (OJ L 356, 24.12.1988, p. 74)

² O.J. L 177, 5.7.1991, p. 22

³ O.J. L 388, 28.12.1996, p. 86

⁴ O.J. L 133, 5.5.1998, p. 11

⁵ New name: Advisory Committee on Safety and Health at Work

⁶ O.J. L 142, 16.6.2000, p. 47

95/320/EC⁷ which sets up a formal base for the work on the scientific evaluation of the risk at the workplace related to chemical agents.

The present Directive establishes therefore a second list of IOELVs in the light of the evaluation performed by SCOEL of the latest available scientific data. This list contains in total 33 substances. Out of these 33 substances, 17 substances were already listed in the Annex to the aforementioned Directive 91/322/EEC. For 4 of these substances, the recommendation of SCOEL supports the establishment of new indicative limit values and for 13 substances the maintaining of the previous limit values. Therefore, the 17 substances which are now included in the Annex to the present directive have to be eliminated from the Annex to Directive 91/322/EEC, whereas 10 substances will remain in the Annex to directive 91/322/EEC.

As regards the 10 substances remaining in the Annex to Directive 91/322/EEC for 9 of these substances SCOEL has not yet recommended an IOELV. This is because either there are insufficient new scientific data to revise the recommendation, or SCOEL cannot recommend a specific numerical value due to the carcinogenic or mutagenic properties of these substances. For the one remaining substance, NO, it is anticipated that additional scientific data will be available in the near future requiring further examination by SCOEL.

The list set out in the Annex to this Directive also incorporates 16 other substances for which indicative occupational exposure limit values have been recommended by SCOEL following the evaluation of the latest available scientific data on occupational health effects and taking into account the availability of measuring techniques, in accordance with the procedure laid down in Article 3 of Directive 98/24/EC.

b) Reasons for Community action

The Commission, in order to fulfil its obligation arising from the Council's mandate, has prepared this draft Commission Directive establishing a second list of IOELVs in implementation of Council Directive 98/24/EC.

Furthermore, the requirement for scientific assessment introduced by directive 98/24 obliges the Commission to reassess the substances listed in the annex to directive 91/322, which was established under the former directive 80/1107.

Therefore, the Commission in accordance with Directive 98/24/EC has undertaken action to review the IOELVs which had been established by Directive 91/322/EEC in the light of the evaluation of the latest available scientific data and to incorporate in the Annex to the draft Directive those for which SCOEL has recommended a health based value.

c) Streamlining of EU legislation

The Commission in preparing the draft has made an effort to streamline health and safety legislation on chemicals.

This aims to achieve a greater coherence and efficiency of the existing legislation on chemicals to which an IOELV is assigned. It contributes to the transparency of the process of setting limit values to protect the workers health and focuses on the better implementation of the legislation by the competent authorities of the Member States.

⁷ O.J. L 188, 9.8.1995, p. 14

2. PRINCIPAL ASPECTS OF THE DRAFT DIRECTIVE

The Annex of the Draft Directive consists of 33 substances. Out of these 33 substances, 16 are new substances for which IOELVs have been recommended by SCOEL following the evaluation of the latest available scientific data on occupational health effects. The 17 remaining substances were already included in the Annex of Commission Directive 91/322/EEC.

SCOEL in reviewing these 17 substances of Directive 91/322/EEC has performed an assessment based on the health effects of exposure to them. The SCOEL recommendations support the establishment of new IOELVs for 4 substances or the maintaining of the previous IOELVs for the remaining 13 of them.

The results of this assessment are as follows:

a. Substances for which SCOEL has recommended a new value.

Nitrobenzene, Diethylamine, Cyanamide and Pyrethrum.

b. Substances for which the existing values of Directive 91/322/EEC are maintained.

Nicotine, Formic Acid, Methanol, Acetonitrile, Resorcinol, Carbon Dioxide, Oxalic Acid, Diphosphorous pentaoxide, Diphosphorous Pentasulfide, Silver, Barium, Bromine, and Phosphorous Pentachloride.

Directive 91/322/EEC

Directive 91/322/EEC remains in force according to Article 13 (5) of Directive 98/24/EC. However, it is modified by this Directive. The substances mentioned in point 2.a and 2.b are deleted from the Annex to Directive 91/322/EEC, while the following substances remain in it:

Acetic acid, Picric acid, Naphthalene, Pyridine, Calcium dihydroxide, Cresols (all isomers), Platinum (metallic), Lithium hydride, Tin (inorganic compounds as Sn) and Nitrogen Monoxide.

According to the SCOEL evaluation Naphthalene and Pyridine are animal carcinogens and Picric acid is a mutagenic compound. SCOEL analysis of the health effects of these substances support a reduction of their indicative limit values. However, the available scientific data do not allow for the appropriate quantification of this reduction.

Therefore, if additional scientific data could support the carcinogenic potential of these substances for humans and allow to set up a numerical value, the Commission will consider the possibilities to include them in the Annex of Directive 90/394/EEC⁸ on the protection of workers from the risks related to carcinogens at work.

3. CONSULTATION PROCEDURE

a) Consultation of SCOEL

SCOEL gave its recommendations on the substances listed in the Annex after examination of the latest available toxicological data and the availability of adequate measuring techniques.

⁸ O.J. L 196, 26.7.1990, p. 1

The SCOEL recommendations are submitted for comments of the industry and reviewed accordingly before final adoption.

b) Consultation of the Advisory Committee on Safety, Hygiene and Health Protection at Work

The Commission draft Directive has been introduced for discussion in September 2002 in the Advisory Committee Ad-Hoc group "Policies on chemicals at the workplace" and it has been discussed in three meetings of this group.

The Advisory Committee delivered, in its plenary on 15 May 2003, an opinion (1048/1/03) on the Draft Directive. In this opinion general support has been given on the substances listed in the Annex to this Directive.

c) Consultation of SHCMOEI

The Safety and Health Commission on Mining and Other Extractive Industries (SHCMOEI) has prepared an opinion on Nitrogen Monoxide under the request of the Advisory Committee mentioned in point 6 of its opinion 1048/1/03. This substance is not included in the Annex to this Directive for the reasons stated in item 4.

d) Technical Progress Committee

In accordance with Article 17 of Council Directive 89/391/EEC⁹ on the introduction of measures to encourage improvements in the safety and health of workers at work, the Commission will convene a meeting with the Technical Progress Committee (TPC), to consider the content of the Draft Directive.

4. NITROGEN MONOXIDE (NO)

The Commission originally intended to include this substance in this Directive.

However, the Commission has been informed that for this substance additional scientific data will be available in the near future. It is anticipated that this will enable SCOEL to reconsider the conclusion of its scientific evaluation.

5. LEGAL BASIS

The Draft Directive is based on Directive 98/24/EC on chemical agents, which is the specific legal base for the Community's policy in the field of chemical substances to which an indicative occupational exposure limit value is assigned.

Directive 91/322/EEC, which remains in force in accordance with article 13 (5) of Directive 98/24/EC, has therefore to be amended.

⁹ O.J. L 183, 29.6.1989, p. 1

Proposal for a

**COMMISSION DIRECTIVE/.../EC
of (.....)**

**establishing a second list of indicative occupational exposure limit values in
implementation of Council Directive 98/24/EC on the protection of the health and safety
of workers from the risks related to chemical agents at work**

(Text with EEA relevance)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Community,

Having regard to Council Directive 98/24/EC¹⁰ of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work, and in particular Article 3 (2) thereof,

Having regard to the opinion of the Advisory Committee on Safety, Hygiene and Health Protection at Work,

Whereas:

- (1) Pursuant to Directive 98/24/EC, the Commission is to propose European objectives in the form of indicative occupational exposure limit values for the protection of workers from chemical risks, to be set at Community level.
- (2) The Commission in carrying out this task, is assisted by the Scientific Committee for occupational exposure limits to chemical agents (SCOEL) instituted by Commission Decision 95/320/EC¹¹
- (3) Community IOELVs are health-based, non-binding values, derived from the recent available scientific data and the availability of measurement techniques, which provide the threshold level of exposure below which no detrimental effects are expected for any given substance. They are objectives to be achieved and as such necessary for the determination and assessment of risks by the employer, in accordance to Article 4 of Directive 98/24/EC.
- (4) For any chemical agent for which indicative occupational exposure limit values are established at Community level, Member States are required to establish a national occupational exposure limit value, taking into account the Community limit value, determining its nature in accordance with national legislation and practice.

¹⁰ OJ L131, 5.5.1998, p. 11

¹¹ OJ L188, 9.8.1995, p.14

- (5) Indicative occupational exposure limit values should be regarded as an important part of the overall approach to ensuring the protection of the health of workers at the workplace, against the risks arising from hazardous chemicals.
- (6) A first and a second list of indicative occupational exposure limit values were established by Commission Directives 91/322/EEC¹² and 96/94/EC¹³ in the framework of Council Directive 80/1107/EEC of 27 November 1980 on the protection of workers from the risks related to exposure to chemical, physical and biological agents at work¹⁴.
- (7) Directive 80/1107/EEC has been repealed with effect from 5 May 2001, by Directive 98/24/EC.
- (8) Directive 98/24/EC establishes that Directives 91/322/EEC and 96/94/EEC remain in force.
- (9) Directive 96/94/EC has been repealed with effect from 31 December 2001 by Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC.
- (10) It is appropriate to review, in the framework of Directive 98/24/EC, the indicative occupational exposure limit values established by Directive 91/322/EEC, in the light of the evaluation of the latest available scientific data.
- (11) SCOEL has assessed, in accordance with the procedure laid down in Article 3 of Directive 98/24/EC in total 33 substances, listed in the Annex to the present Directive. Out of these 33 substances 17 substances were already listed in the Annex to the aforementioned Directive 91/322/EEC. For 4 of these substances, the recommendation of SCOEL supports the establishment of new indicative limit values and for 13 substances the maintaining of the previous limit values. Therefore the 17 substances which are now included in the Annex to the present directive have to be eliminated from the Annex to Directive 91/322/EEC, whereas 10 substances will remain in the Annex to directive 91/322/EEC.
- (12) As regards the 10 substances remaining in the Annex to directive 91/322/EEC firstly for 9 substances the SCOEL has not yet recommended an IOELV and, secondly, for the one remaining substance it is anticipated that additional scientific data to be available in the near future will be submitted to SCOEL for consideration.
- (13) The list set out in the Annex to this Directive also incorporates 16 other substances for which indicative occupational exposure limit values have been recommended by SCOEL following the evaluation of the latest available scientific data on occupational health effects and taking into account the availability of measuring techniques, in accordance with the procedure laid down in Article 3 of Directive 98/24/EC.
- (14) It is necessary to establish short-term exposure limit values for certain substances to take account of effects arising from short-term exposure.
- (15) For some substances, it is necessary to take into account the possibility of penetration through the skin, in order to ensure the best possible level of protection.

¹² OJ L177, 5.7.1991, p.22

¹³ OJ L338, 28.12.1996, p. 86

¹⁴ OJ L327, 3.12.1980, p. 8

- (16) This Directive constitutes a practical step towards the achievement of the social dimension of the internal market.
- (17) The measures provided for in this Directive are in accordance with the opinion of the Committee instituted by Article 17 of Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work,
- (18) Directive 91/322/EEC therefore has to be amended.

HAS ADOPTED THIS DIRECTIVE:

Article 1

In implementing Directive 98/24/EC a second list of Community indicative occupational exposure limit values is hereby established for the chemical agents set out in the Annex.

Article 2

Member States shall establish national occupational exposure limit values for the chemical agents listed in the Annex, taking into account the Community values.

Article 3

In the Annex to Directive 91/322/EEC, the reference to the substances Nicotine, Formic acid, Methanol, Acetonitrile, Nitrobenzene, Resorcinol, Diethylamine, Carbon dioxide, Oxalic acid, Cyanamide, Disphosphorus pentaoxide, Disphosphorus pentasulphide, Bromine, Phosphorus pentachloride, Pyrethrum, Barium (soluble compounds as Ba), Silver (soluble compounds as Ag) and their indicative limit values are deleted.

Article 4

1. Member States shall bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by ... at the latest. They shall forthwith communicate to the Commission the text of those provisions and a correlation table between those provisions and this Directive.

When Member States adopt those provisions, they shall contain a reference to this Directive or be accompanied by such a reference on the occasion of their official publication. Member States shall determine how such reference is to be made.

2. Member States shall communicate to the Commission the text of the provisions of national law which they adopt in the field covered by this Directive.

Article 5

This Directive shall enter into force on the twentieth day following its publication in the Official Journal of the European Union.

Article 6

This Directive is addressed to the Member States.

Done at Brussels, [...]

For the Commission
Member of the Commission
[...]

ANNEX

INDICATIVE OCCUPATIONAL EXPOSURE LIMIT VALUES

EINECS ⁽¹⁾	CAS ⁽²⁾	NAME OF AGENT	LIMIT VALUES				NOTATION ⁽³⁾
			8 hours ⁽⁴⁾		Short term ⁽⁵⁾		
			mg/m ³⁽⁶⁾	ppm ⁽⁷⁾	mg/m ³⁽⁶⁾	ppm ⁽⁷⁾	
200-193-3	54-11-5	Nicotine	0.5	-	-	-	skin
200-579-1	64-18-6	Formic acid	9	5	-	-	-
200-659-6	67-56-1	Methanol	260	200	-	-	skin
200-830-5	75-00-3	Chloroethane	268	100	-	-	-
200-835-2	75-05-8	Acetonitrile	70	40	-	-	skin
201-142-8	78-78-4	Isopentane	3000	1000	-	-	-
202-716-0	98-95-3	Nitrobenzene	1	0.2	-	-	skin
203-585-2	108-46-3	Resorcinol	45	10	-	-	skin
203-625-9	108-88-3	Toluene	192	50	384	100	skin
203-628-5	108-90-7	Monochlorobenzene	23	5	70	15	-
203-692-4	109-66-0	Pentane	3000	1000	-	-	-
203-716-3	109-89-7	Diethylamine	15	5	30	10	-
203-777-6	110-54-3	n-Hexane	72	20	-	-	-
203-806-2	110-82-7	Cyclohexane	700	200	-	-	-
203-815-1	110-91-8	Morpholine	36	10	72	20	-
203-906-6	111-77-3	2-(2-Methoxyethoxy)ethanol	50.1	10	-	-	skin
203-961-6	112-34-5	2-(2-Butoxyethoxy)ethanol	67.5	10	101,2	15	-
204-696-9	124-38-9	Carbon dioxide	9000	5000	-	-	-
205-483-3	141-43-5	2-Aminoethanol	2.5	1	7.6	3	skin
205-634-3	144-62-7	Oxalic acid	1	-	-	-	-
206-992-3	420-04-2	Cyanamide	1	0.58	-	-	skin
207-343-7	463-82-1	Neopentane	3000	1000	-	-	-
215-236-1	1314-56-3	Disphosphorus pentaoxide	1	-	-	-	-
215-242-4	1314-80-3	Diphosphorus pentasulphide	1	-	-	-	-
231-131-3	7440-22-4	Silver (soluble compounds as Ag)	0.01	-	-	-	-
	7440-39-3	Barium (soluble compounds as Ba)	0.5	-	-	-	-
	7440-47-3	Chromium Metal, Inorganic Chromium (II) Compounds and Inorganic Chromium (III) Compounds (insoluble)	2	-	-	-	-
231-714-2	7697-37-2	Nitric acid	-	-	2.6	1	-
231-778-1	7726-95-6	Bromine	0.7	0.1	-	-	-
231-959-5	7782-50-5	Chlorine	-	-	1.5	0.5	-
232-260-8	7803-51-2	Phosphine	0.14	0.1	0.28	0.2	-
	8003-34-7	Pyrethrum (purified of sensitising lactones)	1	-	-	-	-
233-060-3	10026-13-8	Phosphorus pentachloride	1	-	-	-	-

⁽¹⁾ EINECS : European Inventory of Existing Chemical Substances

⁽²⁾ CAS : Chemical Abstract Service Registry Number

⁽³⁾ A skin notation assigned to the OEL identifies the possibility of significant uptake through the skin

- (⁴) Measured or calculated in relation to a reference period of eight hours time weighted average
- (⁵) A limit value above which exposure should not occur and is related to a 15-minute period, unless otherwise specified
- (⁶) mg/m^3 : milligrams per cubic metre of air at 20°C and 101.3 KPa
- (⁷) ppm : parts per million by volume in air (ml/m^3)

REGULATORY IMPACT ASSESSMENT FOR IMPLEMENTING A PROPOSED EUROPEAN COMMISSION DIRECTIVE ESTABLISHING A SECOND LIST OF INDICATIVE OCCUPATIONAL EXPOSURE LIMIT VALUES (IOELVs) PARTIAL

PURPOSE AND INTENDED EFFECT

Objective

1. (i) To implement in Great Britain the 2nd Indicative Occupational Exposure Limit Values Directive (2nd IOELV Directive), a proposed European Commission Directive under the Chemical Agents Directive (98/24/EC), and to therefore ensure that occupational exposure limit values are in place to protect workers from chemical risks.
(ii) By the implementation of this Directive throughout the European Union, to take a practical step towards the achievement of the social dimension of the internal market.

Background

2. Implementation of the Directive will not require additional legislation, as the framework for setting occupational exposure limits already exists. The Control of Substances Hazardous to Health (COSHH) Regulations 2002 (as amended) provide the legal framework for setting Workplace Exposure Limits (WELs). WELs are approved by the Health and Safety Commission and are published by the Health and Safety Executive (HSE) in its publication "*EH40 Occupational Exposure Limits*".
3. A WEL is defined as the concentration of a hazardous substance in the air that people breathe, averaged over a specified reference period referred to as a time-weighted average (TWA). Two periods are used; long-term (8 hours) and short-term (15 minutes). When a WEL is assigned to a substance, this limit must not be exceeded.
4. The extent of work-related health damage from hazardous substances is not known. However, a report published by the HSE¹⁵ of a survey of households in England and Wales, carried out ten years ago, reported that nearly one fifth of respondents indicated that their current job sometimes exposed them to breathing fumes, dusts or other harmful substances, or required them to handle or touch harmful substances or materials. According to that survey, the occupations where people are most likely to be exposed are hairdressing and beauty treatment, nursing, farming, fishing, forestry, metal processing, construction, security and protective services, electrical processing and science and engineering.

¹⁵Self-reported working conditions in 1995 - results from a household survey. J R Jones, J T Hodgson and J Osman.

5. The 34 substances listed in the Annex to the proposed Directive are too numerous for a full risk assessment to be developed that covers them all. However, the hazards to human health of each substance, and the level of exposure at which each could cause harm to health, have been examined by the European Commission's Scientific Committee on Occupational Exposure Limits (SCOEL), a body of experts from throughout the European Union, including from the UK.

6. The Indicative Occupational Exposure Limit Values proposed by SCOEL are health-based, and are set at a level at which no harmful effects would be predicted to occur to workers or their progeny as a result of repeated exposure throughout their working lifetime. On this basis, implementation of the limits can be deemed to have an advantageous effect on health.

7. This Regulatory Impact Assessment deals with 33 of the 34 substances listed in the Annex to the proposed 2nd IOELV Directive. The remaining substance, nitrogen monoxide, will be the subject of a separate, individual Regulatory Impact Assessment, if it is included when the Directive is adopted.

8. Of the 33 substances considered in this Regulatory Impact Assessment, 12 have proposed occupational exposure limit values that are the same or higher than the existing Workplace Exposure Limit (WEL), and a further 3 are not deemed to be of concern, either because the limit change is so small as to be irrelevant in practice, or because there is no known use of the substance in the UK. A further 7 substances have no known UK manufacture. A further 3 substances are manufactured by one company only.

9. Annex 1 of this document lists 18 substances where there is a proposed change to the existing limit, with an indication of use patterns, and the control measures already in place. It has not, however, been possible to give a precise figure of those likely to be exposed in Great Britain. Measurement methods for all the substances are set out in detail in the Health and Safety Laboratory Report "*2nd Indicative Occupational Exposure Limit Value (IOELV) List: Workplace Measurement Method Summaries: OMS/2002/16*". This is available on the HSE website (www.hse.gov.uk/research/hsl_pdf/2002/hsl02-23.pdf).

Rationale for government intervention

10. Once the 2nd IOELV Directive is adopted by the European Commission, the United Kingdom will be required to implement it into domestic legislation, or risk infraction proceedings.

11. HSC/E has already established Occupational Exposure Limits (OELs) in Great Britain for the majority of substances covered by the Directive. These limits are workplace exposure limits (WELs), and form part of HSC/E's new OEL framework, which requires employers to ensure that any WEL is not exceeded and, for substances that can cause cancer or occupational asthma, to reduce exposure to a level as low as is reasonably practicable below the WEL. In addition, regardless of whether a WEL exists, employers must apply the eight principles of good practice,

set out in Schedule 2A of the COSHH Regulations, in order to control exposure to substances hazardous to health.¹⁶

CONSULTATION

12. Representatives of both industry and the trades unions have been consulted about this Directive, most recently in June 2005 through ACTS.

13. In November 2004, the Health and Safety Executive (HSE) consulted known interested Trade Associations, organisations representing small and medium-sized firms, and a number of companies known to use the substances in question. This was done using two questionnaires, one dealing with chlorine and the other dealing with 17 other substances. Information was sought on the size of the company responding, the uses of the substance and the likely costs of complying with the new limit value. Trade Associations and small firms organisations were requested to distribute the questionnaire to a selection of companies that they knew to be users of the substances. 14 chlorine questionnaires were distributed and 11 replies were received. For the other questionnaire, 90 copies were distributed and 20 responses were received.

14. This RIA will form part of a wider public consultation on the implementation of the Directive, which is planned for autumn 2005.

OPTIONS

Option 1: Do nothing

15. Non-implementation of the Directive would cause infraction proceedings from the European Union, which would lead to a fine. This is something that the Government would not want to occur, other than in extreme cases of national interest.

Option 2: Implementation of the Directive

16. The United Kingdom will be required under European law to implement this Commission Directive, once it has been formally adopted. In Great Britain we will do so by the Health and Safety Commission (HSC) approving national occupational exposure limits, which are published in the HSE publication "*EH40 Occupational Exposure Limits*". Occupational Exposure Limits are set by the HSC on the advice of its Advisory Committee on Toxic Substances (ACTS). Comparable implementation will take place in both Northern Ireland and Gibraltar.

17. The Directive requires Member States of the European Union to establish a national exposure limit value for any chemical agent for which an IOELV has been set at Community level, taking into account the Community limit value. Member States therefore have limited scope to establish a national limit that differs numerically from the IOELV. Any such deviation would require robust socio-economic justification. ACTS has agreed the limits on which the HSC is consulting.

¹⁶For more information on the "Principles of Good Practice", see Annex 2.

COSTS AND BENEFITS

18. Costs and benefits are calculated in 2004 prices over a 10-year period. The base year for appraisal is 2004. In arriving at 10-year cost figures, two assumptions are made. Firstly, earnings are assumed to rise by 1.8% a year in real terms, which is equal to the observed increase for the whole economy over the past 25 years or so. Secondly, costs are discounted to present value using the Treasury-recommended 3.5% discount rate.

Sectors and Groups Affected

19. Because the RIA covers 33 different substances, a large number of business sectors are affected. Key uses of the substances where there is a planned change to the occupational exposure limit, are in chemical, pesticide and pharmaceutical manufacture, rubber manufacturing and processing and the manufacture of paints, dyes and varnishes. Both large and small firms are likely to manufacture or use the substances in question. The Directive has no direct effect on other types of organisation, or on the general public.

20. We do not believe that any of the proposals will have differential impacts on any particular group, in terms of ethnicity, gender, disability or atypical work patterns.

BENEFITS

Health and safety benefits

21. It is expected that the implementation of IOELVs as WELs will have a positive impact on occupational ill-health. The effect will, however, be limited to substances without an existing exposure limit value¹⁷ or where current exposure limits are above the levels set by the Directive. Many of the substances covered in the Directive have the potential to cause irritation and possible damage to the respiratory tract. Hence, the implementation of the Directive may contribute to a reduction in respiratory ill-health as a result of reducing exposures to substances that can cause respiratory tract irritation and lung damage.

22. However, it is not possible to provide a quantification of these health benefits, because there is no information on the number of ill-health cases caused by current levels of occupational exposure to the substances concerned. It is therefore not possible to estimate the number of cases of ill-health that might be prevented due to implementation of the Directive.

23. Implementation of the Directive may also have some positive effect on the environment, but its effect cannot be quantified.

¹⁷ The substances concerned are: 2(2-Butoxyethoxy) ethanol, 2-(2-Methoxyethoxy) ethanol and the three pentanes. See Annex 1 for more detail.

COSTS

24. Of the 33 substances covered by this RIA, 12 have limit values that are the same or higher than the current WEL. For these substances, there will be no additional cost as a result of implementing the Directive. The substances are:

Barium (soluble compounds as Ba)
Carbon dioxide
Chloroethane
Chromium metal, Inorganic Chromium (II) Compounds and Inorganic Chromium (III) Compounds
Cyclohexane
Formic acid
n-Hexane
Methanol
Monochlorobenzene
Nicotine
Oxalic acid
Silver (soluble compounds as Ag)

25. Three further substances are not deemed to be of concern to UK industry, either because they are not used in the UK, or because the change to the limit is so minimal as to have no appreciable effect. These are:

Bromine
2-(2-Methoxyethoxy) ethanol (DEGME)
Phosphine

26. HSE investigated the implementation costs of the remaining 18 substances covered in this Regulatory Impact Assessment. These are:

Acetonitrile
Morpholine
2-Aminoethanol
Neopentane
2-(2-Butoxyethoxy) ethanol (DEGBE)
Nitric acid
Chlorine
Nitrobenzene
Cyanamide
Pentane
Diethylamine
Phosphorus pentachloride
Diphosphorus pentasulphide
Pyrethrum
Diphosphorus pentoxide
Resorcinol
Isopentane
Toluene

Information on the use profile and the consequences of implementing the Directive for each of these substances is at Annex 1.

27. Investigations conducted by HSE in November 2004 concluded that implementation of the Directive is unlikely to create additional costs to industry for most of the substances covered. The major part of the costs will fall on manufacturers and users of chlorine gas.

28. It has not been possible to estimate the total cost to industry of familiarisation with the new or revised limits resulting from the Directive. Nevertheless, it is unlikely that any one firm would need to familiarise itself with more than one or two new limits. Consequently HSE expects these costs to be very low.

Chlorine

29. The revised occupational exposure limit will affect the following sectors:

- chlorine manufacturers. There are three manufacturers of chlorine gas in the UK¹⁸;
- chemical manufacturing companies using chlorine
- suppliers of chlorine in compressed gas cylinders
- companies installing and maintaining chlorination equipment
- swimming pools using chlorine for disinfection
- water utilities.

30. HSE investigations revealed that the Directive would substantially affect only the water utility companies. No additional costs are anticipated for the five other sectors from the revised limit. There are, in Great Britain, nine major water companies and approximately 15 smaller companies¹⁹. Smaller companies are owned by, managed by or administered by, one or other of the main utilities. Only one part of these companies will need to make substantial changes to its working procedures to comply with the Directive. Furthermore, these costs vary significantly from one firm to another. According to HSE's findings, a proportion of water utility companies already complies with the lower exposure limit.

31. The detailed information received on the number of firms in the water utility sector enabled HSE to estimate familiarisation costs for this sector. On the assumption that a manager costing £20 per hour²⁰ spends an average of 1 hour familiarising him/herself with the revised limit for chlorine, the cost of familiarisation within the water utility sector will lie between £180 and £480²¹.

Assumptions²²

30. 1) 60% of companies will incur costs to comply with the Directive.

¹⁸ The smallest producer is due to cease production.

¹⁹ The following analysis considers smaller companies as part of the main water companies. Cost estimates take into account this simplification.

²⁰ Source: "Annual Survey of Hours and Earnings (ASHE)", Office of National Statistics, 2004

²¹ The range allows for each sub-company to familiarise itself individually with the new limit.

²² These assumptions are based on companies' replies to an HSE questionnaire sent out in 2004.

2) Only one third of those companies will incur recurring costs (20% of all firms).

3) Average one-off cost £1,000,000.²³

4) Average recurring cost £265,000.

31. The following table gives a breakdown of the costs.

Table 1: Chlorine compliance costs for a typical water company²⁴

Measure	Extra initial capital cost	Annual cost
LEV (Low Exhaust Ventilation)	£100,000	£40,000
Atmospheric Scrubbers	£500,000	£50,000
Training/supervisor	£100,000	£75,000
Atmospheric monitoring of gas areas	£300,000	£25,000
Remote closure systems improvement	£0	£25,000
Renewal of consumables	£0	£50,000
Total	£1,000,000	£265,000

32. Therefore, with the assumptions set out in paragraph 29, we arrive at the following estimates: first year cost: £5.4 million at 2004 prices²⁵; ten-year present value cost of £9.8 million at 2004 prices²⁶.

Other substances

33. *2-(2-Butoxyethoxy) ethanol, Cyanamide*. A number of companies expressed concerns about the need to develop analytical methods for exposure measurements. Such methods are already available for each substance covered by the Directive (see paragraph 8). This should not, therefore, create costs to industry.

34. *Pentanes*. A few companies within the construction sector estimated the need for a low capital investment to comply with the new pentane exposure limit values. The total capital cost was estimated at £4,000. This suggests that the impact of the Directive will not be significant with regard to these substances.

²³ This figure includes costs of changes to sub companies

²⁴ Source: HSE 2005.

²⁵ £5.4 million = £1 million capital costs x 9 water utility firms x 60% (proportion) of firms incurring costs.

²⁶ £9.8 million = £5.4 million + SUM (from year 1 to year 10) 9 firms x (60% x 33%) (20% proportion of firms having recurring costs) x £0.265 million adjusted to present value.

35. *Pyrethrum*. A body representing pyrethrum growers responded to HSE's questionnaire claiming that the inclusion of pyrethrum within the Directive would lead to its cessation of use by pesticide manufacturers with serious knock-on effects for the growers, who are based mostly in East Africa. Nevertheless, an individual company whom we know processes pyrethrum, and whom we contacted, did not respond to the questionnaire.

Compliance costs to business

36. (i) One-off costs

Table 2: One-off costs incurred by industry

Substance	Industries affected	One-off costs £m, 2004 prices
Pentane, Isopentane, Neopentane	Construction	0.004
Chlorine	Water utility companies	£5.4
TOTAL		£5.4

37. (ii) Recurring costs

Total recurring costs to society are equal to the Water Utility sector recurring compliance costs for chlorine. Total recurring costs are then:

- First year: £265,000
- Ten year present value £4.4 million

38. Total compliance costs

Table 3: Total costs to industry

	Substance	One-off costs, £m, 2004/05 prices	Recurring costs (over ten years) £m, 2004/05 prices	Annualised recurring costs, £m, 2004/05 prices
Implementation costs (familiarisation)	Chlorine	Not significant	£0	£0
Policy costs	Chlorine	£5	£4.4	£0.48
	Pentane, Isopentane, Neopentane	£0.004	£0	£0
	TOTAL	£5.4	£4.4	£0.48

Costs to HSE

39. There are not expected to be significant additional costs to HSE.

Total costs to society

40. Total costs to society are equal to compliance costs of the Directive. Over 10 years, costs to society are £9.8 million in present value terms.

SMALL FIRMS IMPACT TEST

41. When carrying out its evaluation of the likely cost of the Directive, HSE contacted all trade associations known or thought to be associated with the substances in question. The covering letter to those associations specifically asked them to distribute the costs questionnaire to a broad range of their member companies, both large and small. In addition, HSE wrote individually to a further 19 companies known to manufacture one or more of the substances. HSE also wrote to organisations representing small firms, such as the Federation of Small Businesses and the Institute of Directors, requesting their input. In respect of chlorine, an additional 7 user companies were contacted direct, in addition to the questionnaire being sent to relevant trade associations and local authorities.

42. A quarter of the firms who responded to HSE's questionnaire had less than 50 employees, and none of these anticipated any additional costs in complying with the limit changes in the Directive. HSE therefore believes that the Directive will not have a disproportionate effect on small companies.

COMPETITION ASSESSMENT

43. The Directive will affect many, diverse industrial sectors. Measuring the potential impact on competition in the numerous affected markets is difficult. In these circumstances, the Office of Fair Trading recommends to select markets with a high degree of supplier concentration, as adverse competition impacts are more likely to occur in such markets. In this case, the water utility industry is identified as a key sector.

44. There are, in Great Britain, 9 main water companies and approximately 15 smaller companies. Some of the smaller companies are owned by, managed by, under contract to or administered by, one or other of the main utilities.

45. The Directive will affect the market by lowering the short-term exposure limit for chlorine from 1 ppm to 0.5 ppm. This measure is likely to affect some water utility firms more than others. According to HSE investigations, some firms would incur substantial costs to comply with an occupational exposure limit of 0.5 ppm, while others already comply with the Directive. This may lead to a change in the existing market structure. Implementation of the Directive would not, however, have any differential impact on existing water utility companies compared to potential new entrants.

46. Production processes have been changing in recent years. The use of chlorine gas is declining within the industry, particularly in favour of SO₂ and hypochlorite. The Directive may accelerate this changing process. Finally, the Directive would not impose minimum requirements, thus not limiting firms' choices on the market.

ENFORCEMENT, SANCTIONS AND MONITORING

47. Compliance with this Directive will be through the enforcing authorities of the Health and Safety at Work etc. Act 1974. The enforcement of health and safety law is informed by the principles of *proportionality*, in applying the law and securing compliance, *consistency* of approach, *targeting* of enforcement action and *transparency* about how the regulator operates and what those regulated may expect.

ARRANGEMENTS FOR MONITORING AND EVALUATION

48. No formal evaluation of the effects of the imposition of the new limits is planned. However, the new limits will be implemented through the new OEL framework. This forms part of HSE's Disease Reduction Programme, which places more emphasis on activities that will have a direct impact on the workplace. The evaluation of some new limits will form part of the evaluation of the impact of key projects on skin and respiratory disease under the Disease Reduction Programme.

IMPLEMENTATION AND DELIVERY PLAN

To be included in the full RIA.

POST-IMPLEMENTATION REVIEW

To be included in the full RIA.

SUMMARY AND RECOMMENDATION

Balance of costs and benefits

49. Exposure to the chemical substances, for which the Directive sets IOELVs, can result in adverse health effects. Limiting exposure to the substances is therefore necessary to protect human health. However, the UK currently has regulations which place a limit on the level of permitted exposure and HSE considers that the lower limits set by the Directive are not expected to offer any additional quantifiable benefits. Over a ten-year period, total costs are estimated to be around £9.8 million in present value terms (2004 prices). It is worth noting that the costs in this RIA are subject to the uncertainties set out in the following section.

Uncertainties

50. The total costs of compliance are based on best estimates of the main uses of the substances, the number of firms affected and the number of people affected.

DECLARATION AND PUBLICATION

To be included in the full RIA.

Contact point

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Information on Individual Substances

1) Acetonitrile

Limit proposed in the Directive	70 mg.m ⁻³ / 40 ppm (8-hour TWA) Skin notation
Current GB limit	68 mg.m ⁻³ / 40 ppm (8-hour TWA) 102 mg.m ⁻³ / 60 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 75-05-8

EC No: 200-835-2

Empirical formula: C₂H₃N

Synonyms: Cyanomethane, ethyl nitrile, methanecarbonitrile, methyl cyanide, ethanenitrile

Molecular Weight: 41.05

Acetonitrile is classified in the Approved Supply List under the CHIP 2002 regulations as highly flammable, acutely harmful by all routes of exposure and irritant, and is assigned the risk (R) phrases: *R11, R20/21/22, R36*.

OCCURRENCE AND USE

Acetonitrile is a colourless liquid with an aromatic odour. It is used in organic synthesis as a starting material for acetophenone, alpha-naphthaleneacetic acid, thiamine, acetamidine, amides, amines, higher molecular weight mono- and dinitriles, halogenated nitriles, ketones, isocyanates and heterocycles.

It is used in the manufacture of acrylic fibres, pharmaceuticals, perfumes, nitrile rubber and pesticides. It is used to remove tars, phenols and colouring matter from petroleum hydrocarbons, to extract fatty acids from fish liver, animal and vegetable oils, and to recrystallise steroids. It is used wherever a polar solvent having a high dielectric constant is required, as a solvent in non-aqueous titrations, and as a non-aqueous solvent for inorganic salts.

There is no UK manufacture of acetonitrile. End-use is believed to be widespread. Dermal exposure is possible during sampling, filling and maintenance activities. Automatic systems are in widespread use for sampling and filling.

EFFECT OF DIRECTIVE

There will be an additional “skin” notation. The existing 8-hour TWA limit and STEL will remain unchanged.

2) 2-Aminoethanol

Limit proposed in the Directive	2.5 mg.m ⁻³ /1 ppm (8-hour TWA) 7.6 mg.m ⁻³ / 3 ppm (STEL) Skin notation
Current GB limit	7.6 mg.m ⁻³ / 3 ppm (8-hour TWA) 15 mg.m ⁻³ / 6 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 141-43-5

EC No: 205-483-3

Empirical formula: NH₂CH₂CH₂OH

Synonyms: Ethanolamine, monoethanolamine

Molecular Weight: 61.08

Conversion factor: (20°C, 101 kPa): 2.54 mg.m⁻³ = 1ppm

2-Aminoethanol is classified in the Approved Supply List (ASL) under the CHIP 2002 Regulations as acutely harmful by inhalation and irritant, and is assigned the risk (R) phrases *R20* and *R36/37/38*. Consultation has recently concluded on amendments to the ASL under which this will change to harmful by all routes of exposure and corrosive, with the R phrases *R20/21/22* and *R34*.

OCCURRENCE AND USE

2-Aminoethanol is a colourless liquid, with an ammoniacal odour. It has a melting-point of 10.5°C, a boiling point of 170°C and a vapour pressure of 0.05 kPa at 20°C. It has a vapour density of 2.1 times that of air and is explosive in the range of 2.5 to 17% in air. The odour threshold is 2 to 3 ppm (5 to 8 mg.m⁻³).

2-Aminoethanol is widely used in industry, including production of detergents and soaps, synthesis of dyestuffs, rubber vulcanisation and the removal of acidic gases from atmospheres, such as carbon dioxide from submarines. Use of the substance is believed to be diminishing. One cosmetics manufacturing company uses small amounts of 2-aminoethanol with good controls in place and very few people exposed.

There is no longer any UK manufacture of this substance.

EFFECT OF DIRECTIVE

The 8-hour TWA limit will be reduced by a factor of 3. The STEL will be halved. There will be an additional “skin” notation.

3) 2-(2-Butoxyethoxy) ethanol

Limit proposed in the Directive 67.5 mg.m⁻³/10ppm (8-hour TWA)
101.2 mg.m⁻³/ 15 ppm (STEL)

Current GB limit None

IDENTITY AND PROPERTIES

CAS No: 112-34-5

EC No: 203-961-6

Empirical formula: C₈H₁₈O₃

Synonyms: DEGBE, diethylene glycol butyl ether, butyl diglycol

Molecular Weight: 162.23

Conversion factor: (20°C, 101 kPa): 6.75 mg.m⁻³ = 1ppm

2-(2-Butoxyethoxy) ethanol is classified in the Approved Supply List under the CHIP 2002 regulations as irritating to eyes, and is assigned the risk (R) phrase R36.

OCCURRENCE AND USE

2-(2-Butoxyethoxy)ethanol (DEGBE) is a liquid. It is miscible with water (log Pow = 0.56). Mpt is -68°C, bpt 228-234°C at 1013 hPa, vapour pressure 0.027 hPa at 20°C.

DEGBE is used as a solvent in paints, dyes, inks, detergents and cleaners. It is also used as intermediate, as component of fire extinguisher foam and of hydraulic fluids. Two-thirds of the total tonnage of DEGBE is used in a range of formulated detergents, hard surface cleaners and metal cleaners used by professional trades and members of the public. The second largest usage of DEGBE is as a solvent in surface coatings.

There is one known UK manufacturer of DEGBE.

EFFECT OF DIRECTIVE

New limits (both 8-hour TWA and STEL) will be introduced where none so far exist.

4) Chlorine

Limit proposed in the Directive	1.5 mg.m ⁻³ / 0.5 ppm (STEL)
Current GB limit	1.5 mg.m ⁻³ / 0.5 ppm (8-hour TWA) 2.9 mg.m ⁻³ / 1 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 7782-50-5

EC No: 231-959-5

Empirical formula: Cl₂

Conversion factor: 1 ppm = 2.9 mg.m⁻³ at 25° C

Chlorine is classified in the Approved Supply List under the CHIP 2002 regulations as toxic by inhalation, irritating to eyes, respiratory system and skin, and very toxic to aquatic organisms, and is assigned the risk (R) phrases *R23, R36/37/38, R50*.

OCCURRENCE AND USE

Chlorine is a major tonnage chemical produced by the electrolysis of brine, and is used widely in the manufacture of plastics, agrochemicals, pharmaceuticals, flame retardants, bromine and titanium oxide and as a disinfectant. It is also released when using sodium hypochlorite solution for bleaching, water treatment and disinfection. Workers are exposed to chlorine during manufacture, in its use as a chemical intermediate, and its use as a disinfectant in water treatment systems.

The largest manufacturer of chlorine in Great Britain produces approximately 600,000 tonnes per annum, of which 70-80% is consumed on-site for the manufacture of other chemicals such as ethylene dichloride and sodium hypochlorite. The other manufacturer produces around 100,000 tonnes per annum of which 60% is used on-site for the manufacture of hydrochloric acid, hypochlorite and ferric chloride. Controls in chemical manufacturing using chlorine are believed to be more than adequate to ensure that exposures, if any, are below proposed limits. Full facepiece air-fed or filtered canister RPE is used for potential exposure from uncoupling during off-loading bulk chlorine deliveries to site storage, which is the most likely source of exposure.

There are believed to be 4 GB-based companies who install and maintain chlorination equipment. They usually supply equipment to water utilities, larger swimming pools and other chlorine gas users. Exposure only occurs if there are

leaks. The areas where chlorination equipment is located often have chlorine detectors as standard, and where this is not the case, air-fed RPE is worn during those parts of the set-up and testing and maintenance of the installation when a possibility of exposure exists.

Chlorine gas is still used in some municipal or large, privately-owned swimming pools as a direct means of disinfection. Direct chlorination has largely been superseded by the use of hypochlorite tablets and solutions.

There are believed to be two GB companies supplying chlorine as a compressed gas in cylinders obtained from chlorine manufacturers. Empty cylinders are subsequently returned for re-filling and, once filled, transported back to the supplier. Exposure is only possible if there is accidental release.

There are nine main water companies and approximately 15 smaller companies in GB, some of these being owned or managed under contract or administered by one or other of the main Utilities. Virtually all water companies use chlorine as the primary disinfection agent, as it is generally the most economic option. This is despite the additional control measures that need to be taken to ensure it is managed properly and safely. The number of people potentially exposed is declining as companies prefer to use specialist trained staff to manage the use of chlorine and other systems, rather than use generalist employees for whom changing gas cylinders etc. would only be part of their duty. Air-fed RPE is worn as standard when changing cylinders.

EFFECT OF DIRECTIVE

There will be a reduction of the STEL by one half. It is planned to additionally remove the current British 8-hour TWA limit, as it will cease to be relevant.

5) Cyanamide

Limit proposed in the Directive	0.58 ppm/ 1 mg.m ⁻³ (8-hour TWA) Sk notation
Current GB limit	2 mg.m ⁻³ (8-hour TWA)

IDENTITY AND PROPERTIES

CAS No: 420-04-2

EC No: 206-992-3

Empirical formula: CH₂N₂ H₂N-C≡N

Synonyms: Amidocyanogen, Carbimide, Carbamonitrile, Cyanoamine, N-cyanoamine, Cyanogenamide

Molecular Weight: 42.04

Conversion factor: (20°C, 101 kPa): 1 mg.m⁻³ = 0.58 ppm; 1 ppm = 1.72 mg.m⁻³

Cyanamide is classified in the Approved Supply List under the CHIP 2002 regulations as toxic by ingestion, harmful in contact with skin, irritating to eyes and skin, and a skin sensitiser, and is assigned the risk (R) phrases: *R21, R25, R36/38, R43.*

OCCURRENCE AND USE

At room temperature, cyanamide is a crystalline solid but is deliquescent and combustible. It is often stored as a 25 % liquid solution but can, by the evaporation of aqueous solutions to dryness, undergo explosive polymerisation. It is soluble in water (78g/100ml), alcohols, ethers, ketones, but is less soluble in benzene and halogenated hydrocarbons. Decomposition, which begins at 122°C, produces dicyandiamide (via dimerisation), hydrogen cyanide, oxides of nitrogen and carbon monoxide.

Cyanamide is used in chemical syntheses including as an intermediate for dicyandiamide in melamine production, as a fumigant, in metal cleaning and refining of ores and the production of synthetic rubber. Cyanamide and its calcium salt has been used as a therapeutic agent for its "Antabuse-like " effect in the treatment of alcoholics. It is not known which of these uses occur in the UK. There is no known UK manufacture of cyanamide.

EFFECT OF DIRECTIVE

The 8-hour TWA limit will be halved. There will be an additional “Skin” notation.

6) Diethylamine

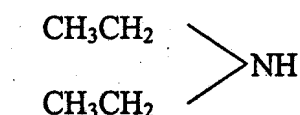
Limit proposed in the Directive	15 mg.m ⁻³ / 5 ppm (8-hour TWA) 30 mg.m ⁻³ / 10 ppm (STEL)
Current GB limit	30 mg.m ⁻³ / 10 ppm (8-hour TWA) 76 mg.m ⁻³ / 25 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 109-89-7

EC No: 203-716-3

Empirical formula:



Synonyms: DEA, Diethamine, N-Ethylethanamine, N,N-Diethylamine, Ethanamine, Amin, diethyl-

Conversion factor: 1 ppm=3.04 mg.m⁻³, 1 mg.m⁻³= 0.334 ppm

Diethylamine is classified in the Approved Supply List under the CHIP 2002 regulations as highly flammable, harmful by inhalation, contact with skin and ingestion, and corrosive, and is assigned the risk (R) phrases *R11*, *R20/21/22*, *R35*.

OCCURRENCE, PRODUCTION AND USE

Diethylamine (DEA) is an alkaline, colourless, volatile liquid with a strong ammoniacal odour. The human olfactory threshold for diethylamine is 0.14 ppm (0.42 mg.m⁻³), it is miscible in water and many organic solvents.

Diethylamine is used in the production of the corrosion inhibitor N, N-diethylethanolamine (DEAF), and in the production of some pesticides and insect repellents, pharmaceuticals (eg. the alcohol antagonist disulfiram ANTABUS®, flurazepam, lidocaine) and rubber processing chemicals. Diethylamine is also used in the paint, lacquer, and varnish industries. Workers who handle with triethylamine, a volatile amine used as a catalyst, are indirectly exposed to diethylamine, since it has been shown that triethylamine is metabolized to form diethylamine in humans (Akesson et al., 1989).

There is no UK manufacture of diethylamine. When used in the manufacture of acrylates at one known plant, only small amounts are used in fume cupboards or with the use of air-fed hoods in sealed vessels. Exposure is not therefore considered to be a problem.

EFFECT OF DIRECTIVE

The 8-hour TWA limit will be halved. The STEL will be reduced by slightly more than half.

7) Diphosphorus pentasulphide

Limit proposed in the Directive	1 mg.m ⁻³ (8-hour TWA) (No STEL)
Current GB limit	1 mg.m ⁻³ (8-hour TWA) 3 mg.m ⁻³ (STEL)
HSE recommendation	2 mg.m ⁻³ (STEL)

IDENTITY AND PROPERTIES

CAS No: 1314-80-3

EC No: 215-242-1

Empirical formula: P₄S₁₀

Synonyms: Phosphorus pentasulphide, phosphorus sulphide, thiophosphoric anhydride, phosphoric sulphide, phosphorus persulphide, sulphur phosphide, phosphorus (v) sulphide, tetraphosphorus decasulphide.

Molecular Weight: 444.54

Conversion factor:

Diphosphorus pentasulphide is classified in the Approved Supply List under the CHIP 2002 regulations as highly flammable, harmful by inhalation and ingestion, and very toxic to aquatic organisms, and is assigned the risk (R) phrases *R11*, *R20/22*, *R29*, *R50*.

OCCURRENCE AND USE

Diphosphorus pentasulphide is a yellow to green flammable, hygroscopic crystal. It is prepared by reaction of phosphorus with sulphur.

It is a starting material to produce a large number of compounds including lube-oil additives (mainly zinc dialkyldithiophosphates), rubber additives, insecticides and flotation agents.

There is no UK manufacture or large-scale use of diphosphorus pentasulphide. Only small-scale R&D use is known to occur in the UK.

EFFECT OF DIRECTIVE

None. However, HSE wishes to reduce the existing STEL by one third to comply with a recommendation by WATCH. All the phosphorus-containing compounds are then subject to the same limit.

8) Diphosphorus pentoxide

Limit proposed in the Directive	1 mg.m ⁻³ (8-hour TWA)
Current GB limit	2 mg.m ⁻³ (STEL)

IDENTITY AND PROPERTIES

CAS No: 1314-56-3

EC No: 215-236-1

Empirical formula: P₂O₂ (P₄O₁₀)

Synonyms: Diphosphorus pentoxide, phosphorus (V) oxide, phosphorus pentoxide

Diphosphorus pentoxide is classified in the Approved Supply List under the CHIP 2002 regulations as corrosive, and assigned the risk (R) phrase *R35*.

OCCURRENCE AND USE

Diphosphorus pentoxide is a white polymorphic solid which decomposes in water to form orthophosphoric acid. It is manufactured by burning elemental phosphorus in excess dry air at 200°C and it is used extensively as a dehydrating agent and in the manufacture of other phosphoric compounds. Workplace exposures are likely to be minimal due to containment of the process during manufacture and use. The principal risk of exposure is from inhalation of aerosol and from splashes and spillages. Exposure data are limited.

There is no known UK manufacture of diphosphorus pentoxide. HSE's discussions with user firms have revealed no concerns over the new 8-hour TWA limit because of the existing controls that are already in place.

EFFECT OF DIRECTIVE

There will be an 8-hour TWA limit where one does not exist at the moment. The existing STEL will remain unchanged.

9) Morpholine

Limit proposed in the Directive	36 mg.m ⁻³ / 10 ppm (8-hour TWA) 72 mg.m ⁻³ / 20 ppm (STEL)
Current GB limit	72 mg.m ⁻³ / 20 ppm (8-hour TWA) 109 mg.m ⁻³ / 30 ppm (STEL) Skin notation

IDENTITY AND PROPERTIES

CAS No: 110-91-8

EC No: 203-815-1

Empirical formula: C₄H₉NO

Synonyms: 1-oxa-4-azacyclohexane; tetra-2H-1,4-oxazine; diethylene oximide; diethyleneimide oxide.

Molecular Weight: 87.12

Conversion factor: (20°C, 101.3 kPa) 3.62 mg/m⁻³ = 1 ppm.

Morpholine is classified in the Approved Supply List under the CHIP 2002 regulations as flammable, harmful by inhalation, skin contact and ingestion, and corrosive, and is assigned the risk (R) phrases *R10*, *R20/21/22*, *R34*.

OCCURRENCE AND USE

Morpholine is a colourless, oily, hygroscopic, volatile liquid with a characteristic amine ('fishy') smell. The human olfactory threshold for morpholine is 0.036 mg.m⁻³. It is completely miscible with water, as well as with many organic solvents, but has limited solubility in alkaline aqueous solutions. Morpholine is a strong base, the 0.01% (w/w) mixtures having a pH of 9.4, and the 10% (w/w) mixtures having a pH of 11.2. It has an MPt of -3.1°C (-3.1 to -5), a BPt of 128.9°C (128-130) and a vapour pressure of 1.1 kPa at 20°C. The saturated vapour concentration is 38,000 mg/m⁻³ (20°C).

N-nitrosomorpholine (NMOR) can be formed by reaction of aqueous solutions of nitrite with morpholine or by reaction of gaseous nitrogen oxides in aqueous solutions of morpholine.

Morpholine is an extremely versatile chemical. It is most used as a chemical intermediary in the rubber industry, in corrosion control, and in the synthesis of a large number of drugs, crop protection agents, dyes and optical brighteners. It is also a solvent for a large variety of organic materials, including resins, dyes and waxes.

UK use is thought to be limited to detergent manufacture and tyre manufacture and additionally as a corrosion inhibitor and for medical purposes. There is one known UK manufacturer of morpholine, making around 5,000 tonnes each year.

EFFECT OF DIRECTIVE

The existing 8-hour TWA limit will be halved. The existing STEL will be reduced by one third. The skin notation will be retained.

10) Nitric Acid

Limit proposed in the Directive	2.6 mg.m ⁻³ /1 ppm (STEL)
Current GB limit	5.2 mg.m ⁻³ / 2 ppm (8-hour TWA) 10 mg.m ⁻³ / 4 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 7697-37-2

EC No: 231-714-2

Empirical formula: HNO₃

Synonyms: Hydrogen nitrate, nitrous fumes, nitryl hydroxide, aqua fortis

Molecular Weight: 63.01

Conversion factor: (20°C, 101 kPa): 2.62 mg.m⁻³ = 1 ppm

Nitric acid is classified in the Approved Supply List under the CHIP 2002 regulations as oxidising and corrosive, and is assigned the risk (R) phrases *R8*, *R35*.

OCCURRENCE AND USE

Nitric acid is a clear colourless or yellowish liquid with a characteristic choking odour. It has a MPt of -41.6°C, a BPt of 83°C and a vapour pressure of 6.2 kPa at 20°C. The vapour density is 2.2 that of air. The odour threshold is in the region of 0.3-1 ppm (0.75-2.5 mg.m⁻³). In moist air it forms a white fume, containing 0.1- 0.4 % NO₂, and when heated or in the presence of light it readily decomposes to red fuming nitric acid, containing 8-17 % NO₂.

Nitric acid is formed as a reaction product of water and nitrogen dioxide from various natural sources and ambient air. Nitric acid is a major industrial acid. It is used in the manufacture of fertilisers and in etching, dipping, plating and engraving processes. Exposure to nitric acid also occurs indirectly by exposure to nitrogen dioxide, a major air pollutant, which is converted to nitric acid in the aqueous environment of the upper respiratory tract. The production rate in the EU is in excess of 10,000 tonnes per annum.

EFFECT OF DIRECTIVE

The existing STEL will be reduced by a factor of 4. HSE plans, additionally, to remove the existing 8-hour TWA limit, as it will be higher than the new STEL.

11) Nitrobenzene

Limit proposed in the Directive	1 mg.m ⁻³ / 0.2 ppm (8-hour TWA) Skin notation
Current GB limit	5.1 mg.m ⁻³ / 1 ppm (8-hour TWA) 10 mg.m ⁻³ / 2 ppm (STEL) Skin notation

IDENTITY AND PROPERTIES

CAS No: 98-95-3

EC No: 202-716-0

Empirical formula: C₆H₅NO₂

Molecular Weight: 123.11

Nitrobenzene is classified in the Approved Supply List under the CHIP 2002 regulations as a Category 3 carcinogen and reprotoxin, acutely toxic by inhalation, skin contact and ingestion, toxic by prolonged exposure by inhalation and skin contact and toxic to aquatic organisms. Nitrobenzene is assigned the risk (R) phrases *R40, R62, R23/24/25, R48/23/24, R51, R53*.

OCCURRENCE AND USE

Nitrobenzene is used industrially as an intermediate in the production of aniline and aniline-derived products. Potential for human exposure is principally via inhalation and dermal uptake (Piotrowski 1967, Dorigan and Hushon 1976).

There is one known UK manufacturer of nitrobenzene, all of which is then used to make aniline. All exposures here are well below the current GB limit. Another company is known to import nitrobenzene for conversion to p-amino phenol, and again, exposures are normally well below the existing GB limit.

EFFECT OF DIRECTIVE

Reduction of the 8-hour TWA limit by a factor of 5. It is additionally planned to withdraw the existing British STEL.

12/13/14) Pentane, Isopentane and Neopentane

Limit proposed in the Directive 3000 mg.m⁻³/ 1000 ppm (8-hour TWA)

Current UK limit 1800 mg.m⁻³/ 600 ppm (8-hour TWA)
(non-statutory)

IDENTITY AND PROPERTIES

CAS No: Pentane: 109-66-0

Isopentane: 78-78-4

Neopentane: 463-82-1

EC No: Pentane: 203-692-4

Isopentane: 201-142-8

Neopentane: 207-343-7

Empirical formula: Pentane: CH₃-(CH₂)₃-CH₃

Isopentane: (CH₃)₂-CH-CH₂-CH₃

Neopentane: C(CH₃)₄

Synonyms: Pentane: n-pentane

Isopentane: 2-methylbutane

Neopentane: 2,2-dimethylpropane

Molecular Weight: 72.15

Conversion factor: (20°C, 101 kPa): 3.00 mg.m⁻³ = 1 ppm

Pentane and isopentane and neopentane are classified in the Approved Supply List under the CHIP 2002 regulations as extremely flammable, and toxic to aquatic organisms, and are assigned the risk (R) phrases *R12, R51/53*.

Pentane and isopentane are additionally classified in the Approved Supply List under the CHIP 2002 regulations as harmful to the lungs if swallowed, and as causative

agents of skin dryness, drowsiness and dizziness. They are assigned the additional risk (R) phrases *R65, R66, R67*.

OCCURRENCE AND USE

Pentane is a colourless liquid at room temperature, with an odour similar to that of petrol. It has a MPt of -129.7°C , a BPt of 36.1°C and a vapour pressure of 68.3 kPa at 25°C . The vapour density is 2.49 times that of air and it is explosive in the range 1.42 to 7.8% in air.

Isopentane is also a colourless liquid at room temperature. It has a MPt of -19.8°C , a BPt of 27.9°C and a vapour pressure of 91.7 kPa at 25°C . The vapour density is 2.49 times that of air and it is explosive in the range 1.32 to 8.3% in air.

Neopentane is gaseous at room temperature. It has a BPt of 95°C and a vapour pressure of 171 kPa at 25°C . The vapour density is 2.49 times that of air and it is explosive in the range 1.4 to 8.3% in air.

Pentane and its isomers are components of gasolines and different volatile fractions of petroleum distillation. They are used in many synthetic processes, including the manufacture of intermediate products, blowing agents and propellants, in polymerisation reactions and as extraction solvents. The most important application is in the production of petrol.

Data for production and use in the EU are not available. As commercial products, pentane and isopentane both exist as mixtures of saturated hydrocarbons with 5, 6 and 7 carbon atoms. They may be obtained as laboratory reagents with purity exceeding 99%.

Exposure levels to all pentanes are controlled to well below the proposed IOELV for reasons of flammability.

EFFECT OF DIRECTIVE

In order to comply with the Directive, specific OELs are required. Currently there are no formal OELs in place for these three pentane isomers. However, these isomers fall into one of the generic groups for which the Advisory Committee on Toxic Substances (ACTS) has recommended guidance values for use in the UK Reciprocal Calculation Procedure (RCP). Although it would be feasible to adopt the IOELV set at 1000 ppm, HSE has decided that a better option is to consult on adoption of the guidance values for these three isomers as formal limits. Guidance values for the remaining substances that fall into the generic groups for the purposes of the RCP will remain guidance values and will not become formal limits. This approach would follow the generic approach previously endorsed by ACTS and should not pose any problems of reasonable practicability.

15) Phosphorus pentachloride

Limit proposed in the Directive	1 mg.m ⁻³ (8-hour TWA) (No STEL)
Current GB limit	0.87 mg.m ⁻³ /0.1 ppm (8-hour TWA) (No STEL)
WATCH recommendation	2 mg.m ⁻³ (STEL)

IDENTITY AND PROPERTIES

CAS No: 10026-13-8

EC No: 233-060-3

Empirical formula: PCl₅

Synonyms: Phosphorus perchloride, phosphorus (v) chloride, pentachlorophosphorane, phosphoric chloride

Molecular Weight: 208.24

Phosphorus pentachloride is classified in the Approved Supply List under the CHIP 2002 regulations as very toxic by inhalation, acutely harmful by inhalation, harmful by prolonged exposure through inhalation, and corrosive. It is assigned the risk (R) phrases: *R14, R22, R26, R29, R34 and R48/20*.

OCCURRENCE AND USE

Phosphorus pentachloride is a pale yellow solid that fumes in moist air. It is prepared by direct union of phosphorus with excess chlorine.

Phosphorus pentachloride is used as a chlorinating agent and dehydrating agent for the synthesis of a variety of inorganic and organic phosphorus derivatives, used as pesticides, water treatment chemicals, flame retardants, phosphite antioxidants, plasticisers and stabilisers for plastic and elastomers, lube oil and paint additives. It is used to improve grain structure in metal casting.

There is no UK manufacture or large-scale use of phosphorus pentachloride. Only small-scale R&D use is known to occur in the UK.

EFFECT OF DIRECTIVE

None. However, HSE wishes introduce a STEL set at 2mg.m^{-3} to comply with a recommendation by WATCH. For reasons of consistency, HSE believes that it is appropriate for the STEL for this substance to be the same as those for the other phosphorus-containing compounds.

16) Pyrethrum (purified of sensitising lactones)

Limit proposed in the Directive	1 mg.m ⁻³ (8-hour TWA) (No STEL)
Current GB limit	5 mg.m ⁻³ (8-hour TWA) 10 mg.m ⁻³ (STEL)

IDENTITY AND PROPERTIES

CAS No: 8003-34-7

EC No: 232-319-8

Synonyms: Dalmatian insect flowers; pyrethrins; pyrenone.

The term "pyrethrum" identifies a natural insecticide produced by certain species of the chrysanthemum plant. Pyrethrum contains a variable mixture of pyrethrins, mainly cinerin I and II, jasmolin I and II, and pyrethrin I and II. Usually, pyrethrins account for around 25% of the mixture, with smaller amounts of the related cinerin and jasmolin.

Molecular Weight: 328.4

Conversion factor: (for pyrethrin I) 1 mg.m⁻³ = 0.074 ppm; 1 ppm = 13.51 mg.m⁻³

Pyrethrum itself does not appear in the Approved Supply List under the CHIP 2002 regulations, although several of its components including Pyrethrin I and II and Cinerin I and II are listed. Pyrethrin I and II are classified as harmful by inhalation, skin contact and ingestion and are assigned the risk (R) phrases R20/21/22, R50/53. Cinerin I and II are harmful by ingestion.

OCCURRENCE AND USE

The flowers of the plant are harvested shortly after blooming and are either dried and powdered or the oils within the flowers are extracted with solvents.

The resulting pyrethrin containing extracts usually have an active ingredient content of about 30%, the remaining consists of oleoresins containing glycoproteins and sesquiterpene lactones. These compounds are not usually present in the purified commercially available formulations.

After extraction with solvents, Pyrethrum is a viscous liquid or oil coloured from yellow to brown depending on state of purity.

Pyrethrum compounds have been used primarily to control human lice and scabies, mosquitoes, cockroaches, beetles and flies. Some "pyrethrin dusts", used to control insects in horticultural crops, contain from 0.3% to 0.5% pyrethrins, and are used at

rates of up to 50 lb/A. Other pyrethrin compounds may be used in grain storage and in poultry and on dogs and cats to control lice and fleas.

The natural pyrethrins are contact poisons that quickly penetrate the nerve system of the insect.

Pyrethrins, generally combined with a synergist, piperonyl butoxide, are used in sprays and aerosols against a wide range of flying insects.

The most common pyrethrum formulations are the following:

Public health purposes: 0.2-0.4% in dusty formulations; 0.2-0.4% dissolved in kerosene or petroleum distillate; 0.05-0.10% in solution, with additional agents, in kerosene as flying insects spray.

0.5-2% in shampoos for human and pet usage.

Household use

0.15-0.30% in dusty formulations

0.015-1.2% in aerosol pressure packs

0.05-0.10% in sprays

EFFECT OF DIRECTIVE

There will be a reduction of the 8-hour TWA limit (for pyrethrins) by a factor of 5. It is additionally planned to withdraw the existing STEL. The limit proposed in the Directive does not apply to unrefined pyrethrum.

17) Resorcinol

Limit proposed in the Directive	45 mg.m ⁻³ / 10 ppm (8-hour TWA) (No STEL)
Current GB limit	Skin notation 46 mg.m ⁻³ / 10 ppm (8-hour TWA) 92 mg.m ⁻³ / 20 ppm (STEL)

IDENTITY AND PROPERTIES

CAS No: 108-46-3

EEC No: 203-585-2

Empirical formula: C₆H₄(OH)₂ or C₆H₆O₂

Synonyms: Resorcin, m-dihydroxybenzene, 1,3-dihydroxybenzene, 1,3-benzenediol, 3-hydroxyphenol, m-hydroquinone

Molecular Weight: 110.11

Resorcinol is classified in the Approved Supply List under the CHIP 2002 regulations as harmful by ingestion and irritant to eyes and skin, and is assigned the risk (R) phrases *R22*, *R36/38*, *R50*.

OCCURRENCE AND USE

There are three isomeric compounds of dihydroxybenzene molecule structure. The meta (1,3) isomer is resorcinol, which forms clear needle crystals used in the production of diazo dyes and plasticisers. It is produced by sulfonating benzene with fuming sulphuric acid and fusing the resulting benzenedisulphonic acid with sodium hydroxide.

Resorcinol is used in resins as a UV absorber. It is used in manufacturing fluorescent and leather dyes and adhesives. Reaction with formaldehyde produces resins used to make rayon and nylon. It is used as a pharmaceutical to treat acne and other greasy skin conditions in combination with other treatments. It is used as an anti-dandruff agent in shampoo and sunscreen cosmetics. It is also used as a chemical intermediary to synthesise pharmaceuticals and other organic compounds.

EFFECT OF DIRECTIVE

There will be a new "Skin" notation. The existing GB limits (8-hour TWA and STEL) will remain unchanged.

18) Toluene

Limit proposed in the Directive	192 mg.m ⁻³ / 50 ppm (8-hour TWA) 384 mg.m ⁻³ / 100 ppm (STEL) Skin notation
Current GB limit	191 mg.m ⁻³ / 50 ppm (8-hour TWA) 574 mg.m ⁻³ / 150 ppm (STEL) Skin notation

IDENTITY AND PROPERTIES

CAS No: 108-88-3

EC No: 203-625-9

Empirical formula: C₈H₅CH₃

Synonyms: Methylbenzene, phenylmethane, toluol

Molecular Weight: 92.13

Conversion factor: (20°C, 101 kPa): 3.83 mg.m⁻³ = 1 ppm

Toluene is classified in the Approved Supply List (ASL) under the CHIP 2002 regulations as highly flammable and harmful by inhalation. Consultation has recently concluded on amendments to the ASL under which this will change to highly flammable, reprotoxic category 3, harmful by prolonged exposure by inhalation and because of aspiration hazard, and irritating to eyes. The risk (R) phrases assigned to toluene will be *R11, R63, R48/20, R65, R38* and *R67*.

OCCURRENCE AND USE

Toluene is a colourless flammable liquid with an unpleasant sour to burned aromatic odour. It has a melting point of - 95°C, a boiling point of 111 °C and a vapour pressure of 3.73 kPa at 25°C. It has a vapour density 3.2 times that of air and is explosive over the range 1.2 to 7.1 %. The odour threshold is about 5 ppm (18 mg.m⁻³).

The production rate of toluene in the European Union is in the order of 1 million tonnes per annum. It is used in many types of industry as a solvent for paints, lacquers, fats, resins and other applications. It is an additive in petrol and therefore occurs worldwide. Toluene often occurs together with other solvents. Occupational exposure levels reported recently are generally below 200 ppm (750 mg.m⁻³).

Occupational exposure is possible in the chemical industry and mineral oil and fuel industry where toluene and gasoline are produced, and where toluene is used as a

chemical agent or as an ingredient (e.g. in polymers, paints, lacquers and varnishes, pulp, paper and board and in textile processing).

Relevant working populations potentially exposed are workers in the chemical industry, the paint industry and workers using products containing toluene (e.g. painters). In particular, the workers with most direct contact with toluene are most likely involved in:

- the production, drumming and transferral of toluene and gasoline;
- the use of toluene as an intermediate, process regulator or solvent in the chemical industry;
- the production and drumming of products containing toluene;
- the maintenance and cleaning of production facilities; and
- the use of toluene-containing products such as in printing and cleaning.

EFFECT OF DIRECTIVE

There will be a reduction of the existing STEL by a third. The 8-hour TWA limit, and the Skin notation will remain unchanged.

Principles of Good Practice (Paragraph 11)

These eight principles of good practice apply regardless of whether a substance has an occupational exposure limit.

1. Design and operate processes and activities to minimise emission, release and spread of substances hazardous to health.
2. Take into account all relevant routes of exposure – inhalation, skin absorption and ingestion – when developing control measures.
3. Control exposure by measures that are proportionate to the health risk.
4. Choose the most effective and reliable control options which minimise the escape and spread of substances hazardous to health.
5. Where adequate control of exposure cannot be achieved by other means, provide, in combination with other control measures, suitable personal protective equipment.
6. Check and review regularly all elements of control measures for their continuing effectiveness.
7. Inform and train all employees on the hazards and risks from the substances with which they work, and the use of control measures developed to minimise the risks.
8. Ensure that the introduction of control measures does not increase the overall risk to health and safety.

List of Organisations and Individuals Consulted

Government Departments

Cabinet Office – European Secretariat
Cabinet Office – Office of Public Service
Cabinet Office – Regulatory Impact Unit
Central Office of Information
Crown Estate Commissioners
Department for Education and Skills
Department for Environment, Food and Rural Affairs
Agricultural Resources Policy Division
Central Directorate on Environmental Protection
Chemicals and Biotechnology Division
Global Atmosphere Division
Waste Policy Division
Department of Agriculture and Rural Development – Northern Ireland
Department of Health
Department of Trade and Industry
Department of Trade and Industry – Small Firms Policy Branch
Department of Transport
Department of Work and Pensions – HSSD
Foreign and Commonwealth Office
Health and Safety Agency for Northern Ireland
HM Customs and Excise
HM Prison Service
HM Treasury
Home Office
Law Officer's Department
Lord Chancellor's Department
Ministry of Defence
National Assembly for Wales
Northern Ireland Department of Economic Development
Northern Ireland Office
Office of the Deputy Prime Minister
Property Advisers to the Civil Estate
Scottish Executive

Public Bodies

Agricultural Training Board
British Broadcasting Corporation
Central Offices of Industrial Tribunals
Civil Aviation Authority
Countryside Commission
Environment Agency
Environment Council
Forestry Commission
Historic Royal Palaces Agency
House of Commons Library
House of Lords Library
Joint Nature Conservation Committee
Laboratory of the Government Chemist
Law Commission
Maritime and Coastguard Agency

National Consumer Council
Office for National Statistics
Rural Development Commission
Scottish Law Commission

European Union, Crown Dependencies and Overseas Territories

Government of Gibraltar
Health and Safety Authority – Republic of Ireland
Health and Safety Inspectorate, Guernsey
Isle of Man Local Government Board
Social Security Department, Jersey
UK Permanent Representation to the European Union

Local Government Organisations

Association of Local Authorities of Northern Ireland
Association of London Authorities
Convention of Scottish Local Authorities
Local Government Association
London Boroughs Association
National Association of Local Councils

Employers' Organisations and Small Firms' Representatives

Alliance of Independent Retailers
Association of British Chambers of Commerce
Association of Independent Businesses
British Pottery Managers Association
Building Employers Federation
Confederation of British Industry
CBI – Smaller Firms Council
Engineering Employers' Federation
Federation of Small Businesses
Institute of Directors
National Federation of Self-Employed and Small Businesses
Universities and Colleges Employers' Federation

Trade Unions and Employee Organisations

Amalgamated Union of Engineering Workers
Amicus
Association of Teachers and Lecturers
Bakers Food and Allied Workers Union
BECTU
BIFU
British Medical Association
Communications Workers Union
Confederation of Shipbuilding and Engineering Unions
Fire Brigades Union
General Federation of Trade Unions
GMB
Graphical Paper and Media Union
National Association of Colliery Overmen, Deputies and Shotfirers
National Association of Fire Officers
NUMAST
Police Federation of England and Wales
Prospect

Royal College of Nursing
Scottish Police Federation
Scottish Trades Union Congress
Society of Radiographers
Trades Union Congress
Transport and General Workers Union
UCATT
UNISON
USDAW

Trade Associations and Learned Bodies

Abrasive Industries Association
Adhesive Tape Manufacturers Association
Agricultural Engineers Association
Association of Bakery Ingredient Manufacturers
Association of British Launderers and Cleaners
Association of British Mining Equipment
Association of British Pharmaceutical Industry
Association of Light Alloy Refiners Ltd
Association of Light Metal Founders
Association of Manufacturers of Fermentation Enzyme Products
Bakery Allied Traders Association
BCL Leather Technology Centre
Brick Development Association
British Adhesives and Sealants Association
British Aerosol Manufacturers Association
British Aggregate Construction Materials Industries
British Agricultural and Garden Machinery Association
British Agrochemicals Association
British Apparel and Textile Confederation
British Association of Chemical Specialities
British Association of Feed Supplement Manufacturers
British Cable Makers Confederation
British Cast Iron Research Association
British Ceramic Confederation
British Chemical Distributors and Traders Association
British Chrome and Chemicals
British Coatings Federation
British Colour Makers Association
British Contract Furnishing Association
British Electrotechnical and Allied Manufacturers Association
British Floor Covering Manufacturers Association
British Fluid Power Association
British Foundry Association
British Furniture Manufacturers Association
British Glass
British Headwear Industries Association
British Institute of Professional Photography
British Iron Founders Association
British Jewellers Association
British Leather Confederation
British Lubricants Association
British Metal Castings Council
British Metal Finishing Suppliers Association
British Metallurgical Plant Constructors
British Non-Ferrous Metals Federation
British Pest Control Association
British Plastics Association

British Polymer Training Association
British Printing Industries Association
British Pump Manufacturers Association
British Pyrotechnists Association
British Rigid Urethane Foam Manufacturers
British Rubber Manufacturers Association
British Secondary Metals Association
British Surface Treatment Suppliers Association
British Textile Technology Group
British Veterinary Association
British Wood Preservation and Damp Proofing Association
Building Employers Federation
Castings Development Centre
Cast Metals Federation
Chemical Industries Association
Company Chemists Association
Composites Processing Association
Confederation of British Wool Textiles
Construction Industry Research Information Association
Cosmetics, Toiletries and Perfumeries Association
Crop Protection Association
Dairy Industry Federation Ltd
Electric Battery Manufacturers Association
Energy Institute
Engineering Employers' Federation
European Ceramic Fibres Industry Association
European Council of Vinyl Manufacturers
European Process Safety Centre
Explosives Industry Group - CBI
Farmers Union of Wales
Federation of Civil Engineering Contractors
Fertiliser Manufacturers Association
Food and Drink Federation
Foundry Trade Equipment and Supplies Association
Freight Transport Association
Friends of Pyrethrum
Glass and Glazing Federation
Grain and Feed Trade Association
Independent Tank Storage Association
Institute of Metal Finishing and Surface Engineers
Institution of Electrical Engineers
Law Society of England and Wales
Law Society of Scotland
National Metalforming Centre
National Farmers Union
National Farmers Union of Scotland
National Federation of Demolition Contractors
National Specialist Contractors Council
Offshore Contractors Association
Paint Research Association
Painting and Decorating Association
Paper Federation of Great Britain
Plastics and Board Industries Federation
Resin Flooring Association
Retail Motor Industry Federation
Road Haulage Association
Royal Agricultural Society of England
Royal Highland and Agricultural Society of Scotland
Royal Pharmaceutical Society of Great Britain
The Royal Society

Royal Society of Chemistry
Scotch Whisky Association
Scottish Pharmaceutical Federation
Scottish Seed and Nursery Trade Association
Scottish Steel Founders Association
Screen Printers Association (UK) Ltd
Seed Crushers and Oil Processors Association
Shipbuilders and Ship Repairers Association
Shoe and Allied Trades Research Association
Silica and Moulding Sands Association
Soap and Detergent Industry Association
Society of British Aerospace Companies
Society of British Gas Industries
Society of Chemical Industry
Society of Dyers and Colourists
Solvents Industry Association
Steel Castings Research and Trade Association
Surface Engineering Association
Textile Services Association
Tile Association
Timber Trade Association
Timber Packaging and Pallet Confederation
UK Cleaning Products Industry Association
UK Steel
United Kingdom Agricultural Supply Trade Association
Water Companies Association
Water Services Association of England and Wales
Welding Manufacturers Association

Police and Emergency Services Bodies

Association of Chief Police Officers of England, Wales and Northern Ireland
Association of Chief Police Officers of Scotland
Association of Scottish Police Superintendents
Chief and Assistant Chief Fire Officer' Association

Health and Safety Specialists

Association of Port Health Authorities
Biotechnology and Biological Sciences Research Council
British Industrial Biology Research Association
British Institute of Occupational Hygiene
British Occupational Hygiene Society
British Safety Council
Chartered Institute of Environmental Health Officers
Council of Independent Inspecting Authorities
Institute of Occupational Hygienists
Institute of Occupational Medicine
Institution of Occupational Safety and Health
Natural Environment Research Council
Newcastle Occupational Health
Royal Environmental Health Institute of Scotland
Royal Society for the Prevention of Accidents
Society/Faculty of Occupational Medicine

Individual Companies

Adshead Ratcliffe and Company Ltd

Agropharm Ltd
Airbus UK Ltd
Arkema
Avon Rubber plc
Caswell Adhesives
Cibas Specialty Chemicals
Dunlop Aircraft Tyres Ltd
Fenner Dunlop
Four D Rubber Co Ltd
Huntsman Corp. UK Ltd
International Paint Ltd
Kingspan Ltd
Kingspan Insulation Ltd
Luminescence
Mallinckrodt Chemical Ltd
PDM Neptec Ltd
Petrochem Carless
Pirelli UK Tyres Ltd
Safic-Alcan UK Ltd
Tennants Distribution Ltd

Academic Institutions

Imperial Cancer Research Fund
Institute of Cancer Research
University of Birmingham – Institute of Occupational Health
University of Dundee – Wolfson Institute of Occupational Health
University of Manchester – Department of Occupational Health
University of Newcastle-upon-Tyne – Department of Occupational Health

Other Organisations

The Consumers Association

RESPONSE FORM

Control of Substances Hazardous to Health Regulations 2002 Proposals for Workplace Exposure Limits to implement the 2nd European Commission Directive on Indicative Occupational Exposure Limit Values

We would like you to tell us what you think about the proposals set out in this consultative document. The proposals are summarised below in this reply form which you may wish to copy or tear out and use. Please add extra sheets if you wish.

Name of organisation or company	
Name of individual	
Address
Telephone number	

Question	Comment
CHANGES TO EXISTING WORKPLACE EXPOSURE LIMITS	
Question 1: Do you agree that the WEL (8-hour TWA) for 2-aminoethanol should be reduced from 3 ppm (7.6 mg.m ⁻³) to 1 ppm (2.5 mg.m ⁻³) ? If you disagree, please explain why.	
Question 2: Do you agree that the STEL for 2-aminoethanol should be reduced from 6 ppm (15 mg.m ⁻³) to 3 ppm (7.6 mg.m ⁻³) ? If you disagree, please explain why.	
Question 3: Do you agree that the STEL for chlorine should be reduced from 1 ppm (2.9 mg.m ⁻³) to 0.5 ppm (1.5 mg.m ⁻³) ? If you disagree, please explain why.	

<p>Question 4: Do you agree that the WEL (8-hour TWA) for chlorine, set at 0.5 ppm (1.5 mg.m⁻³) should be withdrawn? If you disagree, please explain why.</p>	
<p>Question 5: Do you agree that the WEL (8-hour TWA) for cyanamide should be reduced from 2 mg.m⁻³ to 1 mg.m⁻³ (0.58 ppm) ? If you disagree, please explain why.</p>	
<p>Question 6: Do you agree that the WEL (8-hour TWA) for diethylamine should be reduced from 10 ppm (30 mg.m⁻³) to 5 ppm (15 mg.m⁻³). If you disagree, please explain why.</p>	
<p>Question 7: Do you agree that the STEL for diethylamine should be reduced from 25 ppm (76 mg.m⁻³) to 10 ppm (30 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 8: Do you agree that the WEL (8-hour TWA) for morpholine should be reduced from 20 ppm (72 mg.m⁻³) to 10 ppm (36 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 9: Do you agree that the STEL for morpholine should be reduced from 30 ppm (109 mg.m⁻³) to 20 ppm (72 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 10: Do you agree that the STEL for nitric acid should be reduced from 4 ppm (10 mg.m⁻³) to 1 ppm (2.6 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 11: Do you agree that the WEL (8-hour TWA) for nitric acid set at 2 ppm (5.2 mg.m⁻³) should be withdrawn ? If you disagree, please explain why.</p>	

<p>Question 12: Do you agree that the WEL (8-hour TWA) for nitrobenzene should be reduced from 1 ppm (5.1 mg.m⁻³) to 0.2 ppm (1 mg.m⁻³) ? If you do not agree, please explain why.</p>	
<p>Question 13: Do you agree that the STEL for nitrobenzene should be withdrawn ? If you disagree, please explain why.</p>	
<p>Question 14: Do you agree that the STEL for phosphine should be reduced from 0.3 ppm (0.42 mg.m⁻³) to 0.2 ppm (0.28 mg.m⁻³)? If you disagree, please explain why. (see also Question 23)</p>	
<p>Question 15: Do you agree that the WEL for pyrethins of 5 mg.m⁻³ (8-hour TWA) be amended to a WEL for pyrethrum (purified of sensitising lactones) of 1 mg.m⁻³ ? If you do not agree, please explain why.</p>	
<p>Question 16: Do you agree that the STEL for pyrethrins should be withdrawn ? If you disagree, please explain why.</p>	
<p>Question 17: Do you agree that the STEL for toluene should be reduced from 150 ppm (574 mg.m⁻³) to 100 ppm (384 mg.m⁻³)? If you disagree, please explain why.</p>	
NEW WORKPLACE EXPOSURE LIMITS	
<p>Question 18: Do you agree with the introduction of new WELs for isopentane, neopentane and pentane of 600 ppm (1,800 mg.m⁻³) (8-hour TWA), derived from the reciprocal calculation procedure ? If you disagree, please explain why.</p>	

<p>Question 19: Do you agree with the introduction of a WEL (8-hour TWA) for 2-(2-Butoxyethoxy) ethanol set at 10 ppm (67.5 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 20: Do you agree with the introduction of a STEL for 2-(2-Butoxyethoxy) ethanol set at 15 ppm (101.2 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 21: Do you agree with the introduction of a WEL (8-hour TWA) for 2-(2-Methoxyethoxy) ethanol set at 10 ppm (50.1 mg.m⁻³) ? If you disagree, please explain why.</p>	
<p>Question 22: Do you agree with the introduction of a new WEL (8-hour TWA) for diphosphorus pentoxide of 1 mg.m⁻³ ? If you disagree, please explain why.</p>	
<p>Question 23: Do you agree with the introduction of a new WEL (8-hour TWA) for phosphine of 0.1 ppm (0.14 mg.m⁻³) ? If you disagree, please explain why.</p>	
SKIN NOTATIONS	
<p>Question 24: Do you agree with the introduction of an Sk notation for acetonitrile, 2-aminoethanol, cyanamide, 2-(2-methoxyethoxy)ethanol and resorcinol ? If you disagree, please explain why.</p>	
DOMESTIC LIMIT CHANGES	
<p>Question 25: Do you agree that the STEL for bromine should be reduced from 0.3 ppm to 0.2 ppm ? If you disagree, please explain why.</p>	

Question 26: Do you agree that the STEL for diphosphorus pentasulphide be reduced from 3 mg.m ⁻³ to 2 mg.m ⁻³ ? If you disagree, please explain why.	
Question 27: Do you agree with the introduction of a STEL for phosphorus pentachloride at 2 mg.m ⁻³ ? If you disagree, please explain why.	
IMPLEMENTATION DATE	
Question 28: Do you agree with the Health and Safety Commission's proposal to apply the new and revised limits at the earliest possible opportunity? If you disagree, please explain why.	
GENERAL	
Question 29. In your view how well does this consultation document present the different policy issues involved in this matter? Please tick one box.	<input type="checkbox"/> Very Well <input type="checkbox"/> Well <input type="checkbox"/> Not Well <input type="checkbox"/> Poorly
Question 30. Is there anything you particularly liked or disliked about this consultation? (Please add extra sheets if you wish)	

Please return to:

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To reach him no later than [day/month/2005]

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