ÅRSBERÄTTELSE för 2009

Nordiska expertgruppen för kriteriedokument om kemiska hälsorisker (NEG)

19 januari 2010

Gunnar Johanson, ordförande

Inledning

Föreliggande årsberättelse för Nordiska expertgruppen för kriteriedokument om kemiska hälsorisker (NEG) omfattar verksamhetsåret 2009. Verksamhetens huvudsakliga syfte är att producera kriteriedokument som används av de nordiska tillsynsmyndigheterna som vetenskapligt underlag för att fastställa nationella hygieniska gränsvärden för kemiska ämnen. Beställare är de nordiska tillsynsmyndigheterna. NEG består av vetenskapliga experter från de nordiska länderna samt ett sekretariat som är förlagt till Sverige.

NEGs styrgrupp

Styrgruppens huvudsakliga uppgifter är att utse ordförande och experter, initiera utvärdering och ta ställning till verksamhetsberättelse, verksamhetsplan och budget. Styrgruppens ledamöter utgjordes under 2009 av generaldirektör Mikael Sjöberg och Barbro Köhler Krantz, Arbetsmiljöverket, direktör Trygve Eklund, Statens Arbeidsmiljøinstitutt och avdelningsdirektör Stig Magnar Løvås, Arbeidstilsynet.

NEGs sammansättning

NEG-experterna representerar olika ämnesområden inom toxikologi, yrkesmedicin och epidemiologi. Norge och Sverige har två ledamöter vardera medan Danmark och Finland har varsin ledamot. NEG utser författare till kriteriedokumenten som diskuteras när gruppen sammanträder. Beslut om godkännande fattas genom konsensus.

Sekretariatet, som drivs av Arbetsmiljöverket och är förlagt till Karolinska Institutet, har under 2009 bestått av två vetenskapliga sekreterare (tillika science writers) samt ordföranden. Sekretariatet administrerar gruppens möten och håller i den löpande kontakten med ledamöter, författare samt andra samarbetspartners och organisationer. Sekretariatet ansvarar för fakta- och språkgranskning samt redigering av kriteriedokumenten och bidrar även som författare. Vidare ansvarar sekretariatet för att informera om NEGs verksamhet via gruppens hemsida och genom deltagande i konferenser och dylikt.

NEGs nuvarande sammansättning är listad nedan.

Experter	
Gunnar Johanson, ordf.	Professor, Institutet för miljömedicin, Karolinska Institutet, Stockholm, Sverige
Kristina Kjærheim	Överläkare, Kreftregisteret, Oslo, Norge
Tiina Santonen	Fil Dr, Arbetshälsoinstitutet, Helsingfors, Finland
Vidar Skaug	Överläkare, Statens Arbeidsmiljøinstitutt, Oslo, Norge
Anne Thoustrup Saber	Fil Dr, forskare, Det Nationale Forskningscenter for Arbejdsmiljø, Köpenhamn, Danmark
Mattias Öberg	Med Dr, senior forskare, Institutet för miljömedicin, Karolinska Institutet, Stockholm, Sverige
Sekreterare	
Jill Järnberg	Dr Med vet, Arbetsmiljöverket, Stockholm, Sverige
Anna-Karin Alexandrie	Dr Med vet, Arbetsmiljöverket, Stockholm, Sverige

NEGs struktur och finansiering

NEGs verksamhet finansierades under 2009 huvudsakligen av svenska Arbetsmiljöverket och norska Arbeids- og inkluderingsdepartementet men även av det finska Arbetshälsoinstitutet och Det Nationale Forskningscenter for Arbejdsmiljø i Danmark. Medel som utbetalas till NEG via Arbetsmiljöverket avsätts från den ordinarie budgeten medan medel via det norska departementet anvisas efter årlig begäran från Arbetsmiljöverket.

Arbetsmiljöverket bidrog till NEGs verksamhet med cirka 1 600 000 SEK och Arbeids- og inkluderingsdepartementet med 500 000 NOK. Danmark och Finland finansierar sina respektive experters medverkan i samband med möten (tid, resor och uppehälle) och andra NEG-aktiviteter.

De största utgiftsposterna under året var lönekostnader för sekretariatet, kostnader i samband med gruppens möten och författararvoden. Därutöver tillkom löpande kostnader för lokalhyra, kontorsmaterial, datorsupport och biblioteksservice.

NEG-möten under 2009

2-3 februari, Sunnersta Herrgård, Uppsala
Dokumentet om *yrkesmässig exponering för kemikalier och hörselpåverkan* som samproduceras med US NIOSH diskuterades liksom ett reviderat utkast om *PCB*.

25 maj, Radisson SAS Arlandia Hotel
Ett reviderat utkast om *fosfattriestrar med flamskyddande egenskaper* diskuterades.

28 september, Radisson SAS Arlandia Hotel
Dokumentet om *fosfattriestrar med flamskyddande egenskaper* och ett första utkast om *kolmonoxid* diskuterades. Det förstnämnda godkändes med revidering av sammanfattningen.

15 december, Radisson SAS Arlandia Hotel
Tre dokument diskuterades. Den reviderade sammanfattningen för *fosfattriestrar med flamskyddande egenskaper* blev godkänd liksom dokumentet om *yrkesmässig exponering för kemikalier och hörselpåverkan*. Vidare beslutades att *PCB*-dokumentet efter revidering ska skickas ut med e-post till NEG-experterna för att ge möjlighet att lämna synpunkter före slutgiltigt godkännande.

Utöver detaljerad genomgång av utkast till kriteriedokument tas en rad andra frågor upp under NEGs möten. Bland annat diskuteras behov av dokumentering av nya ämnen, förslag på nya författare och arrangemang av konferenser och kurser. Dessutom avges rapporter från möten med t ex tillsynsmyndigheter och EUs vetenskapliga kommitté för yrkeshygieniska gränsvärden (SCOEL).

NEG-aktiviteter under 2009

Under året har arbete pågått med 16 kriteriedokument (Bilaga 1). Två dokument (*svavel-, salt-, salpeter- och fosforsyra* respektive *isofluran, sevofluran och desfluran*) publicerades i tidskriftserien Arbete och Hälsa (Bilaga 2). Vidare godkändes två dokument (*fosfattriestrar med flamskyddande egenskaper* och *yrkesmässig exponering för kemikalier och hörselpåverkan*) och tre dokument är under slutgiltig revidering

(*PCB, endotoxiner* och *aluminium och aluminiumföreningar)*. Under 2010 beräknas tre NEG-dokument publiceras i Arbete och Hälsa.

För att nå en bredare publik publiceras även en del NEG-dokument i internationella tidskrifter. Två manuskript baserade på NEG-dokument (*mikrobiella flyktiga organiska föreningar* och *svampsporer*) publicerades i Critical Reviews in Toxicology under 2009 (Bilaga 3). Ytterligare två manuskript (*isofluran, sevofluran och desfluran* respektive *yrkesmässig exponering för kemikalier och hörselpåverkan*) avses att skickas till samma tidskrift under 2010.

NEG-dokumenten synliggörs även genom presentationer vid relevanta konferenser. En poster om NEGs dokument om *svavel-, salt-, salpeter- och fosforsyra* presenterades på Nordiska Arbetsmiljömötet, 31 augusti-2 september, 2009 i Espoo, Finland (Bilaga 4). Under 2010 kommer bl.a. NEG-dokumentet om *isofluran, sevofluran och desfluran* presenteras som poster vid International Occupational Hygiene Association 2010, Rom, Italien (Bilaga 5).

Samtliga publicerade kriteriedokument finns listade i Bilaga 6. På NEGs hemsida (www.nordicexpertgroup.org) som uppdateras kontinuerligt finns alla dokument tillgängliga för nedladdning.

Samarbete/internationella kontakter

Samarbetet i NEG stärker de nordiska ländernas kunskaper och positioner vid gränsvärdesarbete på internationell och europeisk nivå. Det nordiska arbetsmiljötänkandet kan få inflytande inom EU genom att NEG-dokumenten används som utgångspunkt för diskussion om gränsvärden i kommissionens expertkommitté (SCOEL).

NEG försöker därutöver ytterligare förbättra sin relevanssäkring bland annat genom att verka för närmare kontakter med sina nordiska uppdragsgivare, det vill säga lagstiftande myndigheter, och andra intressenter och etablera närmare samarbete med andra internationella aktörer som den holländska expertgruppen DECOS och US NIOSH.

SCOEL/EU
Under 2009 fick NEGs ordförande, Johanson, förnyat mandat som vetenskaplig expert i SCOEL för perioden 2010-2012. Även NEGs finländska expert, Santonen, utsågs till ledamot i SCOEL. Av de sammanfattningar (summary documents) som SCOEL arbetat med under 2009 är ftalsyraanhydrid, litiumhydrid, perkloretylen och platina baserade på NEG-dokument. SCOELs dokument om mjöldamm baseras till stora delar på motsvarande NEG-dokument.

DECOS, Nederländerna
Ett flertal dokument har samproducerats under åren. För närvarande pågår samarbete kring endotoxiner samt aluminium och aluminiumföreningar.

NIOSH, USA
NEG har under senare år återetablerat ett samarbete med NIOSH. Dokumentet om yrkesmässig exponering för kemikalier och hörselpåverkan är ett resultat av detta samarbete.

WHO/IPCS
NEG-dokument har används som underlag för WHOs produktion av internationella kort-dokument (CICADs).

AEGL
NEGs svenske expert Öberg ingår sedan 2009 i AEGL-kommittén vid amerikanska National Academies of Sciences. Kommittén tar fram s.k. Acute Exposure Guidance Levels.

ACGIH/AIHA, USA and *DFG/MAK, Tyskland*
NEG har nära kontakter med flera ledamöter samt nuvarande och tidigare ordförande.

Bilagor

Bilaga 1 Pågående och publicerade NEG-dokument, 2009.

Bilaga 2 NEG-dokument publicerade under 2009:

van der Hagen M, Järnberg J. *The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals. 140. Sulphuric, hydrochloric, nitric and phosphoric acids.* Arbete och Hälsa 2009;43(7):1-122.

Saber AT and Hougaard KS. *The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals. 141. Isoflurane, sevoflurane and desflurane.* Arbete och Hälsa 2009;43(9):1-117.

Bilaga 3 Artiklar publicerade 2009 baserade på NEG-dokument:

Korpi A, Järnberg J, Pasanen A-L. Microbial Volatile Organic Compounds. *Crit Rev Toxicol* 2009; 39(2):139-193.

Eduard W. Fungal spores: a critical review of the toxicological and epidemiological evidence as a basis for occupational exposure limit setting. *Crit Rev Toxicol* 2009;39(10):799-864.

Bilaga 4 Poster presenterad vid Nordiska Arbetsmiljömötet (NAM) 2009:

Järnberg J, Alexandrie AK, Johanson G, van der Hagen M. *Sulphuric, hydrochloric, nitric and phosphoric acids - A new criteria document from the Nordic Expert Group.*

Bilaga 5 Sammanfattning till posterpresentation vid International Occupational Hygiene Association (IOHA) 2010:

Johanson G, Saber AT, Hougaard KS, Alexandrie AK, Järnberg J. *Isoflurane, sevoflurane and desflurane - A new criteria document for OEL setting from the Nordic Expert Group.*

Bilaga 6 Samtliga publicerade NEG-dokument, 1978-2009.

Bilaga 1

Pågående och publicerade NEG-dokument, 2009.

Substance	*Author/s*	*Countries requesting/ supporting document*	*Present status*
Sulphuric, hydrochloric, nitric and phosphoric acids	Marianne van der Hagen, Norway, Jill Järnberg, Sweden	Norway, Sweden and Iceland	Published, Arbete och Hälsa 2009;43(7):1-122
Isoflurane, sevoflurane, and desflurane	Anne Thoustrup Saber, Karin Sørig Hougaard, Denmark	Norway, Denmark and Iceland	Published, Arbete och Hälsa 2009;43(9):1-117
Phosphate triesters with flame retardant properties	Bengt Sjögren, Anders Iregren, Jill Järnberg, Sweden	Norway and Sweden	Accepted, Sept 28, 2009
Occupational exposure to chemicals and hearing impairment	Ann-Christin Johnson, Sweden, Thais Morata, USA	Sweden, joint document NEG-NIOSH	Accepted, Dec 15, 2009
Polychlorinated biphenyls (PCBs)	Birgitta Lindell, Sweden	Sweden	Final revision
Endotoxins	DECOS, The Netherlands	Sweden, joint document NEG-DECOS	Final revision
Aluminium and aluminium compounds	DECOS, The Netherlands	Joint document NEG-DECOS	Final revision
Secondhand smoke (ETS)	Kirsti Husgafvel-Pursiainen, Antti Zitting, Finland	Issue raised in NEG	Being revised
Carbon monoxide	Helene Stockmann-Juvala, Finland	Sweden and Iceland	Being revised
Halogens (bromine, chlorine, fluorine and iodine)	Anna-Karin Alexandrie, Jill Järnberg, Sweden	Norway and Sweden	Awaiting draft
Silicon carbide production	Solveig Foreland, Merete Bugge, Norway, invited	Norway and Iceland	Decided, start 2010
Occupational exposure to chemicals and coronary heart disease	Bengt Sjögren, Sweden	Issue raised in NEG, Sweden and Denmark	Decided
Unusual working hours and implications in risk assessment of chemicals	Shanbeh Zienolddiny, Jenny Anne Lie, Norway, suggested	Sweden Issue raised in NEG	Decided
Carbon nanotubes	Not appointed	Issue raised in NEG, Sweden, Denmark and Norway	Decided
Oxygen (effects of reduced levels)	Not appointed	Issue raised in NEG, Sweden and Denmark	Decided
Diesel exhaust	Not appointed	Denmark and Sweden	Decided
Tunnel work	Berit Bakke, Bente Ulvestad, Norway, invited	Norway and Iceland	Postponed

NR 2009;43(7)

The Nordic Expert Group for Criteria Documentation
of Health Risks from Chemicals

140. Sulphuric, hydrochloric, nitric and phosphoric acids

Marianne van der Hagen
Jill Järnberg

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NR 2009;43(9)

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Microbial Volatile Organic Compounds

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Microbial volatile organic compounds (MVOCs) are a variety of compounds formed in the metabolism of fungi and bacteria. Of more than 200 compounds identified as MVOCs in laboratory experiments, none can be regarded as exclusively of microbial origin or as specific for certain microbial species. Thus, the recognition of microbially contaminated areas by MVOC measurements is not successful with current methods. In this review, the basic physical and chemical properties of 96 typical MVOCs have been summarised. Of these, toxicological and exposure data were gathered for the 15 MVOCs most often analysed and reported in buildings with moisture and microbial damage. The most obvious health effect of MVOC exposure is eye and upper-airway irritation. However, in human experimental exposure studies, symptoms of irritation have appeared at MVOC concentrations several orders of magnitude higher than those measured indoors (single MVOC levels in indoor environments have ranged from a few ng/m^3 up to 1 mg/m^3). This is also supported by dose-dependent sensory-irritation response, as determined by the American Society for Testing and Materials mouse bioassay. On the other hand, the toxicological database is poor even for the 15 examined MVOCs. There may be more potent compounds and other endpoints not yet evaluated

Keywords Health effect, occupational exposure limit, risk assessment, sensory irritation, toxicity

INTRODUCTION

Microbial volatile organic compounds (MVOCs) are produced in the metabolism of micro-organisms such as fungi and bacteria. They are formed during both the primary metabolism (from the synthesis of DNA and amino and fatty acids, for example) and the secondary metabolism (from intermediates of the primary metabolism) as side-products, mainly in the metabolic oxidation of glucose from various intermediates (Berry, 1988). Thus, the production of MVOCs is greatly affected by microbial species, growth phase and conditions such as nutrients, pH, humidity, and temperature (Larsen and Frisvad, 1994; Batterman, 1995; Whillans and Lamont, 1995). More than 200 compounds are regarded as MVOCs in the literature. The compounds also have other environmental sources besides microbial metabolism. Thus, compounds originating solely from microbial metabolism hardly exist.

The interest in using MVOCs as indicators of biocontamination was originally raised by the food-processing industry in the 1970s, when analysis of unpleasant-smelling MVOCs was suggested as a practical and rapid tool to detect undesirable or spoilage processes caused by micro-organisms during the storage or processing of foodstuffs (Kaminski et al., 1972, 1974; Miller et al., 1973; Lee et al., 1979; Dainty et al., 1984, 1989; Börjesson et al., 1989, 1992; Wilkins and Scholl, 1989). Later, MVOC analyses and profiles were applied to the taxonomy research to identify and separate microbial (mainly fungal) species or strains (Zeringue et al., 1993; Jelen et al., 1995; Larsen and Frisvad, 1995a, 1995b; Fischer et al., 1999; Wilkins et al., 2000; Karlshøj and Larsen, 2005). MVOCs were analysed in indoor-air environments for the first time in the 1990s (Bayer and Crow, 1994; Ström et al., 1994; Wessén and Schoeps, 1996a, 1996b; Morey et al., 1997; Wilkins et al., 1997). With MVOC analysis, a possible means of detecting hidden microbial growth

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Critical Reviews in Toxicology, 2009; 39(10): 799–864

informa healthcare

REVIEW ARTICLE

Fungal spores: A critical review of the toxicological and epidemiological evidence as a basis for occupational exposure limit setting

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Abstract

Fungal spores are ubiquitous in the environment. However, exposure levels in workplaces where mouldy materials are handled are much higher than in common indoor and outdoor environments. Spores of all tested species induced inflammation in experimental studies. The response to mycotoxin-producing and pathogenic species was much stronger. In animal studies, nonallergic responses dominated after a single dose. Allergic responses also occurred, especially to mycotoxin-producing and pathogenic species, and after repeated exposures. Inhalation of a single spore dose by subjects with sick building syndrome indicated no observed effect levels of 4×10^5 *Trichoderma harzianum* spores/m³ and 8×10^5 *Penicillium chrysogenum* spores/m³ for lung function, respiratory symptoms, and inflammatory cells in the blood. In asthmatic patients allergic to *Penicillium* sp. or *Alternaria alternata*, lowest observed effect levels (LOELs) for reduced airway conductance were 1×10^4 and 2×10^4 spores/m³, respectively. In epidemiological studies of highly exposed working populations lung function decline, respiratory symptoms and airway inflammation began to appear at exposure levels of 10^5 spores/m³. Thus, human challenge and epidemiological studies support fairly consistent LOELs of approximately 10^5 spores/m³ for diverse fungal species in nonsensitised populations. Mycotoxin-producing and pathogenic species have to be detected specifically, however, because of their higher toxicity.

Keywords: *Hypersensitivity pneumonitis; irritation; occupational exposure limit; organic dust toxic syndrome; review; toxicity*

Contents

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http://www.informahealthcare.com/txc

Sulphuric, hydrochloric, nitric and phosphoric acids - A new criteria document from the Nordic Expert Group

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Introduction

The present abstract is based on a criteria document[1] produced by the Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals (NEG). The NEG criteria documents are used by the Nordic regulatory authorities as the scientific basis for setting occupational exposure limits.

Properties and occurrence

Sulphuric, hydrochloric, nitric and phosphoric acids are important industrial chemicals used in a variety of applications. The relatively non-volatile sulphuric and phosphoric acids will occur in air primarily as aerosols and the more volatile hydrochloric and nitric acids as vapours or aerosols.

Health effects

The acids are corrosive and will cause chemical burns when in contact with eyes, skin and mucous membranes. Acid vapours and aerosols are respiratory tract irritants and may cause pulmonary impairment, as well as dental erosion. Strong inorganic acid mists containing sulphuric acid have been shown to cause laryngeal cancer in workers, which seems to be secondary to the severe local airway irritation caused by the acid.

Sulphuric acid

The critical effects are altered bronchial mucociliary clearance, impaired pulmonary function and airway and eye irritation observed after exposure to 0.1 mg/m^3 in humans. At slightly higher levels, dental erosion and pathological changes in the nasal mucosa have been reported in humans.

The development of laryngeal cancer from sulphuric acid exposure is likely to have a threshold and is thought to be secondary to local irritation and damage of the respiratory tract epithelium. Such damage resulting in cancer development is unlikely at exposure levels below those affecting mucociliary clearance.

Hydrochloric acid

The critical effect is airway irritation. No airway irritation at 2.5 mg/m^3 was reported in asthmatics but initial mild irritation, which regressed rapidly, at 5 mg/m^3 in workers. Tracheal and laryngeal hyperplasia observed in animals after chronic exposure to 14 mg/m^3 is regarded secondary to airway irritation in analogy with sulphuric acid.

Nitric acid

There is a general lack of data. No effects on pulmonary function and inflammatory response were noted in healthy volunteers after a 4-hour exposure to 0.5 mg/m^3. Following a 2-hour exposure, the defence functions of alveolar macrophages were effected. The potency of nitric acid seems to be similar to that of sulphuric acid.

Phosphoric acid

As data are lacking, the assessment has to be based on comparison with the stronger irritant phosphorous pentoxide, which is converted to the acid in the airways. Fumes of phosphorous pentoxide at concentrations 0.8-5.4 mg/m^3 are unlikely to produce significant irritation.

References
1. van der Hagen M, Järnberg J. *The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals. 140. Sulphuric, hydrochloric, nitric and phosphoric acids. Arbete och Hälsa 2009;43(7).*
2. *http://www.nordicexpertgroup.org (all NEG documents available)*

NEG THE NORDIC EXPERT GROUP

ARBETSMILJÖ VERKET

Bilaga 5

Sammanfattning till posterpresentation vid IOHA 2010.

ISOFLURANE, SEVOFLURANE AND DESFLURANE - A NEW CRITERIA DOCUMENT FOR OEL SETTING FROM THE NORDIC EXPERT GROUP

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The Nordic Expert Group for Criteria Documentation of Health Risks from Chemicals (NEG) is a non-profit group that consists of scientific experts from the Nordic countries representing different fields of science. The main task is to produce criteria documents for the Nordic regulatory authorities as the scientific basis for setting occupational exposure limits (OELs). The documents are published in the scientific serial Arbete och Hälsa and are also available as pdf downloads via the NEG website www.nordicexpertgroup.org.

NEG has recently published a document on the anesthetic agents isoflurane, sevoflurane and desflurane (Saber and Hougaard. Arbete och Hälsa 2009;43(9):1-117). These halogenated ethers are stable, clear, and colorless volatile liquids at room temperature. None of them occur naturally and the sole use is as inhalation anesthetics. Isoflurane is the most potent and desflurane the least potent anesthetic, the MAC (median anesthetic concentration) values being 12 000, 21 000 and 60 000 ppm, respectively. Occupational exposure occurs mainly by inhalation of contaminated air in operating theaters. The exposures are generally below 2 ppm in the most recent assessments.

Adverse effects have primarily been studied at anesthetic dose levels and at a single occasions and no t in subjects exposed to low concentrations for long periods. Isoflurane is the most studied of the three compounds, whereas the toxicological database on sevoflurane is limited and the one on desflurane is very poor. Due to the properties of the three fluranes, i.e. low irritancy and low frequency of side-effects even at the anesthetic level, neurotoxicity is considered to be the critical effect for acute exposure. For isoflurane, the acute human lowest observed adverse effect level (LOAEL) is 600 ppm (eye movement). An overall LOAEL can be set at 150 ppm, at which continuous exposure for 35 days was associated with reduced body weight gain in mice. For sevoflurane, an acute effect on neuropsychological function in humans was observed at 1 000 ppm. Sevoflurane also caused analgesia at 1 050 ppm in rats. In rats, impaired cognitive function was observed at acute exposure to 4 400 ppm desflurane. A few studies of subjects exposed occupationally or during anesthesia have shown genotoxicity. In some of the studies, co-exposure to nitrous oxide or premedication hampers interpretation. The few animal studies on carcinogenicity do not indicate that isoflurane is carcinogenic. Irritative effects would not be expected to occur at exposure levels present in the workplace, whereas at anesthetic dose levels, especially desflurane but also isoflurane irritates the airways. Sevoflurane seems to irritate the airways to a lesser extent. Only a few cases of contact dermatitis, occupational asthma and allergy to isoflurane and sevoflurane have been described.

Samtliga publicerade NEG-dokument, 1978-2009.

Alla dokument är publicerade i den vetenskapliga rapport serie *Arbete och Hälsa* och finns tillgängliga som pdf-filer på NEGs webbsida *www.nordicexpertgroup.org.*

Substance/Agent	*Arbete och Hälsa issue*
Acetonitrile	1989:22, 1989:37*
Acid aerosols, inorganic	1992:33, 1993:1*
Acrylonitrile	1985:4
Allyl alcohol	1986:8
Aluminium	1992:45, 1993:1*
Ammonia	1986:31, 2005:13*
Antimony	1998:11*
Arsenic, inorganic	1981:22, 1991:9, 1991:50*
Arsine	1986:41
Asbestos	1982:29
Benomyl	1984:28
Benzene	1981:11
1,2,3-Benzotriazole	2000:24*D
Boric acid, Borax	1980:13
1,3-Butadiene	1994:36*, 1994:42
1-Butanol	1980:20
γ-Butyrolactone	2004:7*D
Cadmium	1981:29, 1992:26, 1993:1*
7/8 Carbon chain aliphatic monoketones	1990:2*D
Carbon monoxide	1980:8
Ceramic Fibres, Refractory	1996:30*, 1998:20
Chlorine, Chlorine dioxide	1980:6
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n-Decane	1987:25, 1987:40*
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Diethylamine	1994:23*, 1994:42
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Diisocyanates	1979:34, 1985:19
Dimethylamine	1994:23*, 1994:42
Dimethyldithiocarbamates	1990:26, 1991:2*
Dimethylethylamine	1991:26, 1991:50*
Dimethylformamide	1983:28
Dimethylsulfoxide	1991:37, 1991:50*
Dioxane	1982:6
Enzymes, industrial	1994:28*, 1994:42
Epichlorohydrin	1981:10

Substance/Agent	*Arbete och Hälsa issue*
Ethyl acetate	1990:35*
Ethylbenzene	1986:19
Ethylenediamine	1994:23*, 1994:42
Ethylenebisdithiocarbamates and Ethylenethiourea	1993:24, 1993:35*
Ethylene glycol	1980:14
Ethylene glycol monoalkyl ethers	1985:34
Ethylene oxide	1982:7
Ethyl ether	1992:30* N
2-Ethylhexanoic acid	1994:31*, 1994:42
Flour dust	1996:27*, 1998:20
Formaldehyde	1978:21, 1982:27, 2003:11*D
Fungal spores	2006:21*
Furfuryl alcohol	1984:24
Gasoline	1984:7
Glutaraldehyde	1997:20*D, 1998:20
Glyoxal	1995:2*, 1995:27
Halothane	1984:17
n-Hexane	1980:19, 1986:20
Hydrazine, Hydrazine salts	1985:6
Hydrogen fluoride	1983:7
Hydrogen sulphide	1982:31, 2001:14*D
Hydroquinone	1989:15, 1989:37*
Industrial enzymes	1994:28*
Isoflurane, sevoflurane and desflurane	2009;43(9)*
Isophorone	1991:14, 1991:50*
Isopropanol	1980:18
Lead, inorganic	1979:24, 1992:43, 1993:1*
Limonene	1993:14, 1993:35*
Lithium and lithium compounds	2002:16*
Manganese	1982:10
Mercury, inorganic	1985:20
Methacrylates	1983:21
Methanol	1984:41
Methyl bromide	1987:18, 1987:40*
Methyl chloride	1992:27*D
Methyl chloroform	1981:12
Methylcyclopentadienyl manganese tricarbonyl	1982:10
Methylene chloride	1979:15, 1987:29, 1987:40*
Methyl ethyl ketone	1983:25
Methyl formate	1989:29, 1989:37*
Methyl isobutyl ketone	1988:20, 1988:33*
Methyl methacrylate	1991:36*D
N-Methyl-2-pyrrolidone	1994:40*, 1994:42
Methyl-tert-butyl ether	1994:22*D
Microbial volatile organic compounds (MVOCs)	2006:13*
Microorganisms	1991:44, 1991:50*
Mineral fibers	1981:26
Nickel	1981:28, 1995:26*, 1995:27
Nitrilotriacetic acid	1989:16, 1989:37*
Nitroalkanes	1988:29, 1988:33*
Nitrogen oxides	1983:28
N-Nitroso compounds	1990:33, 1991:2*
Nitrous oxide	1982:20

Substance/Agent	*Arbete och Hälsa issue*
Oil mist	1985:13
Organic acid anhydrides	1990:48, 1991:2*
Ozone	1986:28
Paper dust	1989:30, 1989:37*
Penicillins	2004:6*
Permethrin	1982:22
Petrol	1984:7
Phenol	1984:33
Phthalate esters	1982:12
Platinum	1997:14*D, 1998:20
Polyethylene,	1998:12*
Polypropylene, Thermal degradation products in the processing of plastics	1998:12*
Polystyrene, Thermal degradation products in the processing of plastics	1998:12*
Polyvinylchloride, Thermal degradation products in the processing of plastics	1998:12*
Polytetrafluoroethylene, Thermal degradation products in the processing of plastics	1998:12*
Propene	1995:7*, 1995:27
Propylene glycol	1983:27
Propylene glycol ethers and their acetates	1990:32*N
Propylene oxide	1985:23
Refined petroleum solvents	1982:21
Refractory Ceramic Fibres	1996:30*
Selenium	1992:35, 1993:1*
Silica, crystalline	1993:2, 1993:35*
Styrene	1979:14, 1990:49*, 1991:2
Sulphur dioxide	1984:18
Sulphuric, hydrochloric, nitric and phosphoric acids	2009;43(7)*
Synthetic pyretroids	1982:22
Tetrachloroethane	1996:28*D
Tetrachloroethylene	1979:25, 2003:14*D
Thermal degradation products of plastics	1998:12*
Thiurams	1990:26, 1991:2*
Tin and inorganic tin compounds	2002:10*D
Toluene	1979:5, 1989:3, 1989:37*, 2000:19*
1,1,1-Trichloroethane	1981:12
Trichloroethylene	1979:13, 1991:43, 1991:50*
Triglycidyl isocyanurate	2001:18*
n-Undecane	1987:25, 1987:40*
Vanadium	1982:18
Vinyl acetate	1988:26, 1988:33*
Vinyl chloride	1986:17
Welding gases and fumes	1990:28, 1991:2*
White spirit	1986:1
Wood dust	1987:36
Xylene	1979:35
Zinc	1981:13

* in English, remaining documents are in a Scandinavian language.
D = collaboration with the Dutch Expert Committee on Occupational Standards (DECOS).
N = collaboration with NIOSH, USA.