

Aan de Staatssecretaris van Sociale Zaken en Werkgelegenheid

Onderwerp : Aanbieding adviezen herevaluatie bestuurlijke MAC-waarden
Uw kenmerk : ARBO/AMIL/97/00648
Ons kenmerk : U 2706/CB/MP/563-O3
Bijlagen : 18
Datum : 14 december 2000

Mijnheer de staatssecretaris,

Op verzoek van uw ambtsvoorganger bied ik u hierbij de eerste adviezen aan van een reeks over de gezondheidkundige basis van uit het buitenland overgenomen grenswaarden voor beroepsmatige blootstelling aan stoffen. Het verzoek om deze adviezen is in algemene zin vervat in brief nr ARBO/AMIL/97/00648 en in latere stadia door uw departement toegespitst op afzonderlijke stoffen. De adviezen zijn opgesteld door een daartoe door mij geformeerde internationale commissie van de Gezondheidsraad en beoordeeld door de Beraadsgroep Gezondheid en Omgeving.

De beoogde reeks van in het Engels gestelde adviezen zal losbladig worden gepubliceerd onder ons publicatienummer 2000/15OSH en, conform de aan de Gezondheidsraad voorgelegde toespitsingen van de adviesaanvraag, betrekking hebben op 168 stoffen. Het u thans aangeboden eerste pakket bestaat uit een Algemene Inleiding (publicatienummer 2000/15OSH/000) en uit de adviezen genummerd 2000/15OSH/001 tot en met 2000/15OSH/017, respectievelijk betrekking hebbend op:

cesiumhydroxide, cyclopentaan, diboraan, dimethoxymethaan, dipropylketon, fenylfosfine, germaniumtetrahydride, hexachloor-naftaleen, methaanthiol, methylcyclohexanol, methylisopropylketon, mica, natriumhydroxide, octachloor-naftaleen, silaan, tetrachloor-naftaleen, en yttrium en yttriumverbindingen.

Bij afronding van de werkzaamheden van de hierboven bedoelde commissie ontvangt u een Nederlandstalige samenvatting van de in de gehele reeks van adviezen neergelegde bevindingen.

Gezondheidsraad

Health Council of the Netherlands

Onderwerp : Herevaluatie uit het buitenland overgenomen grenswaarden
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De u thans aangeboden adviezen heb ik vandaag ter informatie doen toekomen aan de Minister van Volksgezondheid, Welzijn en Sport en aan de Minister van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer.

Hoogachtend,

prof. dr JJ Sixma

Cesium hydroxide

(CAS reg. nr: 21351-79-1)

Health-based Reassessment of Administrative
Occupational Exposure Limits

Committee on Updating of Occupational Exposure Limits,
a committee of the Health Council of the Netherlands

No. 2000/15OSH/001, The Hague, 14 December 2000

Preferred citation:

Health Council of the Netherlands: Committee on Updating of Occupational Exposure Limits. Cesium hydroxide; Health-based Reassessment of Administrative Occupational Exposure Limits. The Hague: Health Council of the Netherlands, 2000; 2000/15OSH/001.

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1 Introduction

The present document contains the assessment of the health hazard of cesium hydroxide by the Committee on Updating of Occupational Exposure Limits, a committee of the Health Council of the Netherlands. The first draft of this document was prepared by AAE Wibowo, Ph.D. (Coronel Institute of the Academic Medical Centre, Amsterdam, the Netherlands).

Literature was retrieved from the data bases Medline, Embase and Chemical Abstracts, starting from 1966, 1988 and 1970, respectively, and using the following key words: cesium hydroxide, cesiumhydrate or 21351-79-1. Also Current Contents (from January to November 1997) and the CD-ROMs Poltox (from 1994 backwards), HSEline, Cisdoc, Mhidas and NIOSHtic were consulted (from 1997 backwards). Data considered to be critical were evaluated by reviewing the original publications. The final literature search has been carried out in November 1997.

In March 2000, the President of the Health Council released a draft of the document for public review. Comments were received by the following individuals and organizations: A Aalto (Ministry of Social Affairs and Health, Tampere, Finland), dr P Wardenbach (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund, Germany). These comments were taken into account in deciding on the final version of the document.

2 Identity

name	:	cesium hydroxide
synonyms	:	cesiumhydrate cesium hydroxide dimer
molecular formula	:	CsOH
CAS reg nr	:	21351 - 79 - 1

3 Physical and chemical properties

molecular weight	:	149.92
boiling point	:	not known
melting point	:	272.3°C
vapour pressure	:	-
solubility in water	:	15°C: 395 g/100 ml
log P _{oct/water}	:	not known
conversion factors	:	-

Data from ACG96.

Cesium hydroxide is a strongly hygroscopic, colourless or yellowish, fused, deliquescent, crystalline mass with a strongly alkaline reaction. The compound is extremely corrosive (Bel94).

4 Uses

Cesium hydroxide is used as a catalyst in the polymerization of cyclic siloxanes and for electrolytes in storage-batteries, and in colour photography (ACG96).

5 Biotransformation and kinetics

No data are available on the biotransformation and kinetics of this compound.

6 Effects and mechanism of action

Human data

No data on human (occupational) exposure to cesium hydroxide have been found.

Animal data

There are almost no animal toxicity data on this compound. The only information concerns acute toxicity. Cesium hydroxide is the strongest base known and is extremely corrosive.

Cochran *et al.* (Coc50) reported an i.p. LD₅₀ of 100 mg/kg bw cesium hydroxide in rats with a 10 days observation period. It was the most toxic cesium compound when compared to other compounds, including cesium chloride, cesium bromide, cesium iodide and cesium nitrate. Johnson *et al.* (Joh75) reported a single oral LD₅₀ of 1026 mg/kg bw cesium hydroxide in rats (95% confidence limits 929-1133) with a 14 days observation period. Lethal and sublethal doses of the compound induced stomach and intestinal hemorrhage and adhesions of abdominal organs (stomach, pancreas, spleen, liver and small intestines) in rats. At the higher doses, death was related to the degree of blockage of the gastrointestinal tract from the resultant adhesions and/or leakage of bloody fluid exudate into the peritoneal cavity. Behavioural effects noted for surviving rats of the LD₅₀ study were initial hyperexcitability followed by apathy and weakness which persisted throughout the 14-day observation period. Other clinical signs were increased respiration rate, ruffled fur, eye closing and huddling together.

A primary skin irritation study in rabbits showed that 5% cesium hydroxide was non-irritant to intact skin but mildly irritant to abraded skin (Joh75). From an eye irritation study in rabbits it was concluded that 5% cesium hydroxide for 5 minutes was extremely irritant and corrosive to the eyes. However, 0.5% cesium hydroxide did not induce any effect on the rabbit's eyes, even during 24 hours exposure. There was no evidence that cesium hydroxide may induce cutaneous sensitization (Joh75).

No data on long-term exposure, genotoxicity, mutagenicity, carcinogenicity and reproduction toxicity have been found.

7 Existing guidelines

The current administrative occupational exposure limit (MAC) for cesium hydroxide in the Netherlands is 2 mg/m³, 8 h TWA.

Existing occupational exposure limits for cesium hydroxide in some European countries and the USA are summarized in the annex.

8 Assessment of health hazard

There are hardly any data on the toxicity of cesium hydroxide. Human data are completely absent. The only animal studies available show that cesium hydroxide is extremely irritating and corrosive to the eyes and skin after acute exposure.

No data on long-term exposure, genotoxicity, mutagenicity, carcinogenicity and reproduction toxicity have been found.

The committee considers the toxicological data base on cesium hydroxide too poor to justify recommendation of a health-based occupational exposure limit.

The committee concludes that there is insufficient information to comment on the level of the present MAC-value.

References

- ACG96 American Conference of Governmental Industrial Hygienists (ACGIH). TLVs and other occupational exposure values - 1996 (CD ROM, version 1.7-s4 02/01/95). Cincinnati OH, USA: ACGIH 1996.
- ACG00 American Conference of Governmental Industrial Hygienists (ACGIH). 2000 TLVs and BEIs. Threshold limit values for chemical and physical agents. Biological Exposure Indices. Cincinnati OH, USA: ACGIH, 2000.
- Arb96 Arbejdstilsynet. Exposure limit values for substances and materials. Copenhagen, Denmark: The Working Environment Service: Instruction no. 3.1.0.2. 1996.
- Bel94 Beliles RP. The metals. In: Patty's industrial hygiene and toxicology, Fourth edition, Vol II, Part C., Clayton GD, Clayton FE, editors, New York: John Wiley & Sons, Inc., 1994; 1968-73.
- Coc50 Cochran KW, Doull J, Mazur M, DuBois KP. Acute toxicity of zirconium, columbium, strontium, lanthanum, cesium, tantalum and Yttrium. Arch Ind Hyg Occup Med 1950; 1: 637-50.
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- HSE99 Health and Safety Executive (HSE). EH40/99 Occupational exposure limits 1999. Sudbury (Suffolk), England: HSE Books, 1999.
- Joh75 Johnson GT, Lewis TR, Wagner WD. Acute toxicity of cesium and rubidium compounds. Toxicol Appl Pharmacol 1975; 32: 239-45.
- NBO96 National Board for Occupational Safety and Health. Occupational exposure limit values. Solna, Sweden: NBOSH, 1996; Ordinance AFS1996/2.
- SZW00 Ministerie van Sociale Zaken en Werkgelegenheid (SZW). Nationale MAC-lijst 2000. The Hague, the Netherlands: Servicecentrum Sdu Uitgevers, 2000.
- TRG00 TRG 900: Grenzwerte in der Luft am Arbeitsplatz; Technische Regeln für Gefahrstoffe; B Arb B1 2000; 2.

Annex

Occupational exposure standards for cesium hydroxide in various countries.

country -organisation	occupational exposure limit		time-weighted average	type of exposure limit	note ^a	lit ref ^b
	ppm	mg/m ³				
The Netherlands -Ministry	-	2	8 h	administrative		SZW00
Germany -AGS	-	2 ^c	8 h			TRG00
-DFG MAK-Kom.	-	-				DFG00
Great-Britain -HSE	-	2	8 h	OES		HSE99
Sweden	-	-				NBO96
Denmark	-	2	8 h			Arb96
USA -ACGIH	-	2	8 h	TLV		ACG00
-OSHA	-	-	-			
-NIOSH	-	2	10 h	REL		
European Union -SCOEL						

^a S = skin notation; which means that skin absorption may contribute considerably to body burden; sens = substance can cause sensitisation

^b Reference to the most recent official publication of occupational exposure limits

^c Inhalable dust