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# **2-sec-Butylphenol**

(CAS No: 89-72-5)

Health-based Reassessment Administrative  
Occupational Exposure Limit

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

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No. 2000/15OSH/044, The Hague, 31 October 2002

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## 1 Introduction

The present document contains the assessment of the health hazard of 2-*sec*-butylphenol 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).

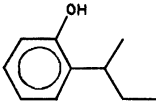
Literature was retrieved from the databases Medline, Chemical Abstracts and Embase (starting from 1966, 1970, and 1988, respectively), and Poltox (Toxline, Cambridge Sc Abstr, FSTA; from 1994 backwards), HSEline, and NIOSHTIC (from 1997 backwards), using the following key words: butylphenol, phenol *o*-*sec*-butyl, and 89-72-5. The final search was carried out in November 1997.

In December 1998, the President of the Health Council released a draft of the document for public review. Comments were received by the following individuals and organisations: P Wardenbach, Ph.D. (Bundesanstalt für Arbeitsschutz und Arbeitsmedizin, Dortmund, Germany). These comments were taken into account in deciding on the final version of the document.

An additional literature search in May 2002 did not result in information changing the committee's conclusions.

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## 2 Identity

name	:	2- <i>sec</i> -butylphenol
synonyms	:	<i>o</i> - <i>sec</i> -butylphenol; 2-(1-methylpropyl)phenol; phenol, <i>o</i> - <i>sec</i> -butyl-
structural formula	:	C <sub>10</sub> H <sub>14</sub> O
molecular formula	:	
CAS number	:	89-72-5

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### 3 Physical and chemical properties

molecular weight	:	150.22
boiling point	:	224-237°C
melting point	:	14°C
flash point	:	107°C
vapour pressure	:	at 25°C: 6.7 Pa (estimated)
solubility in water	:	insoluble (0.2 g/100 mL)
Log P <sub>octanol/water</sub>	:	3.27 (experimental); 3.46 (estimated)
conversion factors (20°C, 101.3 kPa)	:	1 mg/m <sup>3</sup> = 0.16 ppm 1 ppm = 6.24 mg/m <sup>3</sup>

Data from ACG96, NLM02, <http://esc.syrres.com>.

2-*sec*-Butylphenol is a slightly volatile liquid. The odour threshold is not known.

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### 4 Uses

2-*sec*-Butylphenol is a chemical intermediate in the production of resins, plasticisers, and other products.

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### 5 Biotransformation and kinetics

The committee did not find data on the biotransformation and kinetics of 2-*sec*-butylphenol.

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### 6 Effects and mechanism of action

#### Human data

Citing unpublished information, ACGIH stated that acute occupational exposure to 2-*sec*-butylphenol has resulted in mild respiratory irritation and skin burns (ACG96)

The committee did not find other data on effects in humans due to exposure to 2-*sec*-butylphenol.

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## Animal data

Instillation of 50 µg of 2-*sec*-butylphenol into the eyes of rabbits for 24 hours caused severe injury (ACG96).

Application of 500 mg to the skin of rabbits for 24 hours resulted in severe burns (ACG96).

In rats, the 4-hour LC<sub>50</sub> was reported to be >1810 mg/m<sup>3</sup> (290 ppm) (NIO02). Citing unpublished information, ACGIH stated that no mortality occurred in rats exposed for 7 hours to an atmosphere saturated with 2-*sec*-butylphenol vapour (ACG96).

Citing unpublished information, ACGIH reported oral and dermal LD<sub>50</sub>s between 600 and 2400 mg/kg bw in guinea pigs (ACG96).

A dermal LD<sub>50</sub> of 5560 mg/kg bw has been listed for rabbits (NIO02).

An oral LD<sub>50</sub> of 320 mg/kg bw has been determined in rats. Effects observed were somnolence and respiratory depression (NIO02).

An intravenous LD<sub>50</sub> of 60 mg/kg bw was reported in mice. Sleep effects were observed. The intraperitoneal LD<sub>50</sub> in mice was 63 mg/kg bw (NIO02).

The committee did not find data from repeated-dose toxicity studies, including carcinogenicity and reproduction toxicity.

2-*sec*-Butylphenol was negative when tested in *S. typhimurium* strains TA98, TA100, TA1535, and TA1537 with and without adding a metabolic activation system from induced rat and hamster livers at concentrations of 3 to 166 µg/plate (Mor86).

The committee did not find data from other mutagenicity or genotoxicity tests.

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## 7 Existing guidelines

The current administrative occupational exposure limit (MAC) of 2-*sec*-butylphenol in the Netherlands is 30 mg/m<sup>3</sup> (5 ppm), 8-hour TWA, with a skin notation.

Existing occupational exposure limits for this substance in some European countries and in the USA are summarised in the annex.

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## 8 Assessment on health hazard

The committee found only very limited information on the acute toxicity of 2-*sec*-butylphenol in animals suggesting that it is severely irritating to eyes and skin. In rats, no mortality occurred at a 7-hour exposure to a saturated atmosphere; the 4-hour LC<sub>50</sub> and the oral LD<sub>50</sub> were >1810 mg/m<sup>3</sup> (290 ppm) and 320 mg/kg bw, respectively. In rabbits, the dermal LD<sub>50</sub> was 5560 mg/kg bw.

2-*sec*-Butylphenol was negative when tested with and without metabolic activation in several strains of *S. typhimurium*.

The committee did not find data from repeated-dose toxicity studies, including carcinogenicity and reproduction toxicity, or from other mutagenicity or genotoxicity tests.

The committee considers the toxicological database on 2-*sec*-butylphenol 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.

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## References

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- CEC00 Commission of the European Communities (CEC). 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 on the protection of the health and safety of workers from the risks related to chemical agents at work. Official Journal of the European Communities 2000; L142 (16/06/2000): 47-50.
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- Mor86 Mortelmans K, Haworth S, Lawlor T, et al. Salmonella mutagenicity tests: II. Results from the testing of 270 chemicals. Environ Mutagen 1986; 8 (suppl 7): 1-119.
- NIO02 US National Institute of Occupational Safety and Health (NIOSH), ed. Phenol, o-sec-butyl-. In: Registry of Toxic Effects of Chemical Substances (RTECS) (last update 2-sec-butylphenol file: July 2000); <http://www.cdc.gov/niosh>.
- NLM02 US National Library of Medicine (NLM), ed. 2-(1-Methylpropyl)phenol. In: Hazardous Substances Data Bank (HSDB) (last review date 2-sec-butylphenol file: 31 January 1996); <http://www.toxnet.nlm.nih.gov>.
- SZW02 Ministerie van Sociale Zaken en Werkgelegenheid (SZW). Nationale MAC-lijst 2002. The Hague, the Netherlands: Sdu, Servicecentrum Uitgevers, 2002: 19.
- TRG00 TRGS 900. Grenzwerte in der Luft am Arbeitsplatz; Technische Regeln für Gefahrstoffe. BArbBl 2000; 2.

## Annex

Occupational exposure limits for 2-*sec*-butylphenol in various countries.

country -organisation	occupational exposure limit		time-weighted average	type of exposure limit	note <sup>a</sup>	reference <sup>b</sup>
	ppm	mg/m <sup>3</sup>				
the Netherlands -Ministry of Social Affairs and Employment	5	30	8 h	administrative	S	SZW02
Germany -AGS	-	30	8 h			TRG00
-DFG MAK-Kommission	-	-				DFG02
Great-Britain -HSE	5	31	8 h	OES		HSE02
Sweden	-	-				Arb00b
Denmark	5	30	8 h		S	Arb00a
USA -ACGIH	5	-	8 h	TLV	S	ACG02b
-OSHA	-	-				ACG02a
-NIOSH	5	30	10 h	REL	S	ACG02a
European Union -SCOEL	-	-				CEC00

<sup>a</sup> S = skin notation; which mean that skin absorption may contribute considerably to body burden; sens = substance can cause sensitisation.

<sup>b</sup> Reference to the most recent official publication of occupational exposure limits.