

Stofdocument deel A

CAS-nr: 110-00-9

Furaan

C₄H₄O, cyclisch

VN-nr: 2389

GEVI: 33

Synoniemen: divinyleenoxyde, furfuraan, oxacyclopentadien (Eng.: Furan)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	VRW (mg/m³)	NA	NA	NA	NA	NA	NA
Alarmeringsgrenswaarden	AGW (mg/m³)	160	113	88	44	22	11
Levensbedreigende waarden	LBW (mg/m³)	480	340	270	130	67	33
Datum vaststelling: 28-11-2008		1 mg/m ³ = 0,353 ppm; 1 ppm = 2,83 mg/m ³					
Explosiegrens: LEL = 2,3 vol% ≈ 65 000 mg/m³			Geur: typerende etherische lucht				
			LOA: 440 mg/m ³				

Fysisch-chemische eigenschappen		Overige informatie
Uiterlijk: kleurloze vloeistof, die na lang staan bruin wordt	Molecuulmassa: 68,1 g/mol	Publieke grenswaarde: niet afgeleid MAK: niet afgeleid TLV-TWA: niet afgeleid
Brand: zeer brandgevaarlijk	Zuurgraad: Geen data	
	LogKow: 1,5 (berekend)	
	Wateroplosbaarheid: 1 g/100 ml (matig)	
Relatieve dichtheid van verzadigd damp-lucht mengsel: 1,9	Verzadigde dampdruk: 670 mbar	

Toxicologische eigenschappen	
Effecten bij inhalatoire blootstelling <u>Onder AGW:</u> irriterende effecten niet uitgesloten <u>AGW → LBW:</u> oog- en bovenste luchtwegirritatie tranenvloed, hoesten, duizeligheid, bewustzijnsdaling <u>Boven LBW:</u> ademnood, coma, sterfte LET OP: De afwezigheid van een VRW betekent niet dat blootstelling onder de AGW zonder effecten is.	Toxiciteit bij eenmalige, inhalatoire blootstelling <ul style="list-style-type: none"> Furaan is irriterend voor de huid, ogen en de bovenste luchtwegen. Furaan veroorzaakt depressie van het centraal zenuwstelsel. De stof heeft een steile concentratie-respons curve.
Effecten bij blootstelling aan vloeistof <u>Huidcontact:</u> (alleen bij hogere concentraties) roodheid, pijn <u>Oogcontact:</u> roodheid, pijn	Carcinogeniteit IARC classificatie: 2B CRP: niet afgeleid

Beknopte medische informatie
Ontsmetting damp <u>algemeen:</u> frisse lucht, rust, halfzittende houding en arts raadplegen. <u>ogen:</u> desgewenst spoelen met water (evt. contactlenzen verwijderen)
Ontsmetting vloeistof <u>huid:</u> verontreinigde kleding uittrekken, minimaal 20 min. spoelen met veel water of douchen <u>ogen:</u> minimaal 15 min. spoelen met water (evt. contactlenzen verwijderen), dan naar oogarts brengen. <u>inslikken:</u> mond laten spoelen (uitspugen!), GEEN braken opwekken en direct spoedeisende medische hulp inzetten.
Specifieke behandeling en materialen: geen.
Neem contact op met het NVIC (Tel: 030 - 274 8888) voor informatie met betrekking tot medisch handelen

Stofdocument deel B

CAS-nr: 110-00-9

Furan

C₄H₄O, cyclisch

UN-nr: 2389

Basis for the Dutch Intervention Values

VRW: Not recommended due to insufficient data, in accordance with AEGL.

AGW: Different point of departure as for AEGL, 2 hr value added

LBW: Same point of departure as for AEGL values but using different uncertainty factors, 2 hr value added

Date: 28-11-2008

AEGL document: Final, 2010

Dutch Intervention Values (mg/m³)

	10 min	30 min	1 h	2 h	4 h	8 h	End Point
VRW	NR	NR	NR	NR	NR	NR	Not recommended
AGW	160	110	88	44	22	11	1/3 LBW
LBW	480	340	270	130	67	33	Threshold for lethality (animals)

Derivation of the Dutch Intervention Values

VRW: VRW values are not recommended based on the available information.

AGW: Toxicity signs, including respiratory distress, increased secretory response and death, during exposure in a 1-hour rat inhalation lethality study were observed. However, the specific response at each tested concentration was not described. Furthermore, the dose response curve in the given study was steep; no deaths after 1 hour exposure at 1014 (2873 mg/m³) and 2851 ppm (8077 mg/m³), and 9/10 deaths at 4049 ppm (11470 mg/m³). Based on these two aspects and considering the lack of further data, the AGW was based on 1/3 of the LBW in stead of the very conservative approach of the AEGL, using the 1014 ppm (2873 mg/m³) level as point of departure and a total uncertainty factor of 150.

LBW: The LBW is based on the 1-hour rat inhalation study (same as for AGW). The exposure concentration of 2851 ppm (8077 mg/m³), the highest non-lethal concentration in male and female rats, was used as starting point for the derivation of the LBW. An overall factor of 10 for intraspecies and interspecies differences (3 each) was implied. An additional modifying factor 3 was applied to compensate for the sparse data set. Time scaling was performed using the equation $C^n \times t = k$, with $n=1$ to extrapolate to long term exposures and $n=3$ to extrapolate to shorter exposure durations. In contrast to the 10 min AEGL-3 value, time scaling was also applied for the 10 min AGW value.

Additional toxicological information (including relevant results of a general literature search, if any)

Furan acts as a narcotic agent causing an increase in respiratory rate, decrease of blood pressure, convulsions, complete anesthesia, followed by asphyxia due to inhibition of the medulla. In addition, according to chemical safety data sheet, the substance acts as a local irritant on the eyes, skin and respiratory tract. According to the AEGL document, the liver is the major target organ for furan-induced toxicity following oral exposure. Although there is no direct evidence that inhaled furan causes hepatotoxicity, based on the available literature and PBPK-modeling it may be reasonable to expect that the liver is a target organ of inhaled furan as well. The dose-response curve is very steep, and little can be said about the sensitive subpopulations.

No information available regarding the reproductive and developmental toxicity of furan.

H302: Harmful if swallowed; H315: Causes skin irritation; H332: Harmful if inhaled; H341: Suspected of causing genetic damage; H350: May cause cancer; H373: May cause damage to organs.

Carcinogenicity and derivation of the CRP value

IARC classification: 2B (possibly carcinogenic to humans)

No carcinogenic risk potency (CRP) was derived.

A cancer risk assessment was not conducted because the studies were limited to repeated exposure by oral gavage in rats and mice. Furthermore, if an epigenetic mechanism is responsible for the furan-induced hepatocarcinogenicity

Odour and derivation of the LOA value

Ethereal odour

Odour threshold: 10 ppm (28 mg/m³) [Nagata (2003)]

LOA = 11.8 * 28 * 1.33 = 440 mg/m³

(The concentration L level leading to distinct O odour Awareness (I=3) is calculated using the formula: $I = 2.33 \times$



it is not expected that a one-time exposure up to 8 hours would induce cancer. *In vivo* and *in vitro* data as well as PBPK modeling predictions indicate that the integrated liver exposure to furan metabolites following a single inhalation exposure to the LBW exposure concentrations would not be sufficient to cause genotoxicity.

$\log(C/OT_{50}) + 0.5$. A correction factor of 1.33 is applied to this value)

Apart from the 10 min LBW, the LOA is higher than the Dutch Intervention values.

Other standards and guidelines (1h values in mg/m³, unless otherwise indicated)

VRW level NR	AEGL-1 NR	ERPG-1 -	IDLH: not determined
AGW level 88	AEGL-2 19	ERPG-2 -	
LBW level 270	AEGL-3 54	ERPG-3 -	