

**Stofdocument deel A**

CAS-nr: 107-06-2      1,2-Dichloorethaan      CICH<sub>2</sub>-CH<sub>2</sub>-Cl      VN-nr: 1184  
GEVI: 336

**Synoniemen:** ethyleendichloride, ethyleenchloride, glycoldichloride (Engels: 1,2-dichloroethane)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	<b>VRW (mg/m<sup>3</sup>)</b>	160	110	87	69	55	44
Alarmeringsgrenswaarden	<b>AGW (mg/m<sup>3</sup>)</b>	2500	890	470	250	250	130
Levensbedreigende waarden	<b>LBW (mg/m<sup>3</sup>)</b>	7200	2700	1400	760	410	220

Datum vaststelling: 31-10-2017      1 mg/m<sup>3</sup> = 0,243 ppm; 1 ppm = 4,118 mg/m<sup>3</sup>

**Explosiegrens:** 4,2 vol% ≈ 42000 ppm = 170000 mg/m<sup>3</sup>      **Geur:** typerende zoete chloroformachtige geur  
Damp met lucht is explosief.      **LOA:** 1679 mg/m<sup>3</sup>

**Fysisch-chemische eigenschappen**

**Uiterlijk:** kleurloze vloeistof, die donker wordt bij blootstelling aan licht en (vochtige) lucht.

**Brand:** zeer brandgevaarlijk

**Relatieve dichtheid van verzadigd damp-lucht mengsel:** 1,2

Molecuulmassa: 99,0 g/mol

Zuurgraad: geen data

LogKow: 1,5

Wateroplosbaarheid: 0,8 g/100 ml

Verzadigde dampdruk: 87 mbar

**Overige informatie**

Publieke grenswaarde: 7 mg/m<sup>3</sup>

MAK: - (H)

TLV-TWA: 41 mg/m<sup>3</sup>

**Toxicologische eigenschappen**

**Effecten bij inhalatoire blootstelling**

Onder VRW: niet bekend

VRW → AGW: lichte irritatie ogen, neus en keel, euforie, duizeligheid, misselijkheid

AGW → LBW: keelpijn en hoesten, sufheid, zwakte, irritatie ogen, neus en keel

Boven LBW: bewusteloosheid, sterfte

**Toxiciteit bij eenmalige, inhalatoire blootstelling**

- 1,2-dichloorethaan veroorzaakt irritatie van ogen, neus en keel
- Ethyleendichloride veroorzaakt depressie van het gastro-intestinale systeem en het centrale zenuwstelsel met als gevolg verlaagd bewustzijn.
- Bij blootstelling aan hoge concentraties, hersenoedeem bewusteloosheid en effecten op lever en nieren.
- Sterfte bij acute hoge blootstelling door respiratoire en circulatoire collaps met congestie, necrose en bloedingen in de meeste inwendige organen.

**Effecten bij blootstelling aan vloeistof**

Huidcontact: roodheid, prikkeling

Oogcontact: roodheid en pijn, slecht zien, hoornvliesbeschadiging

**Carcinogeniteit**

IARC classificatie: 2B

CRP: 15390 mg/m<sup>3</sup>

**Beknopte medische informatie**

**Ontsmetting damp**

*algemeen:* frisse lucht, rust, en direct spoedeisende medische hulp inzetten.

**Ontsmetting vloeistof**

*huid:* spoelen met veel water/kleding verwijderen, spoelen en wassen met water en zeep.

*ogen:* minimaal 15 min. spoelen met water (evt. contactlenzen verwijderen), dan naar oogarts brengen.

*inslikken:* 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:+31 (0)30 274 8888) voor informatie met betrekking tot medisch handelen

**Stofdocument deel B**

CAS-nr: **1,2-dichloroethane** **C1CH<sub>2</sub>-CH<sub>2</sub>-C** UN-nr: **1184**

**Basis for the Dutch Intervention Values**

**VRW:** Based on additional information to that described in ERPG-document, other time points added.  
**AGW:** Based on additional information to that described in ERPG-document, other time points added.  
**LBW:** Based on information as described in ERPG-document, different values are derived, other time-points added

Date: 31-10-2017

ERPG 2014

**Dutch Intervention Values (mg/m<sup>3</sup>)**

	10 min	30 min	1 h	2 h	4 h	8 h	End point
<b>VRW</b>	160	110	87	69	55	44	Very slight degeneration of nasal tissue in rats
<b>AGW</b>	2500	890	470	250	250	130	Neurobehavioral effects in rats
<b>LBW</b>	7200	2600	1400	720	380	200	Rat lethality data

**Derivation of the Dutch Intervention Values**

**VRW:** In an acute toxicity study in rats only very slight degeneration of the nasal tissue was observed following an 8-hour exposure to 435 mg/m<sup>3</sup> (see additional information for study details). In the absence of human data, 435 mg/m<sup>3</sup> was used as point of departure for derivation of VRW values. The default uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences. Time scaling was performed using the equation  $C^n \times t = k$  with the default  $n = 3$  to calculate to shorter durations. The chemical specific factor of 1.08 was not used, because the slight generation of nasal tissue is expected to be the result of a different mode of action than the effects observed at AGW and LBW level. The derived values are in line with the anecdotal human data as described in the rationale for the AGW.

**AGW:** Studies in animals, including developmental toxicity studies, show no or little toxicity up until levels causing death. Human studies are anecdotal and show signs of irritation of the mucous membranes of mouth, throat and bronchi in workers after long term exposure at 62-247 mg/m<sup>3</sup> and in another study eye irritation, anorexia, nausea, weakness, tiredness and tremor at 250-825 mg/m<sup>3</sup> after 2-8 months of exposure. An acute (neuro)toxicity study in rats (see additional information for study details) was used for derivation of the AGW values. The local effects observed at concentrations above 435 mg/m<sup>3</sup> (the PoD for the VRW) increased somewhat in intensity and frequency, but remained sub AGW effects. Therefore, the threshold for neurobehavioural effects of 2460 mg/m<sup>3</sup> (4-hour exposure), derived from the same study was used as point of departure for derivation of the AGW values. The default uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences. In general, neurobehavioural effects are concentration dependent rather than concentration x time dependent. However, data show that a steady state is reached after approximately 2-3 hours. Therefore, time scaling was applied for exposure durations shorter than 2 hours, using the equation  $C^n \times t = k$  and the chemical specific value of 1.08 for  $n$ , based on the rat lethality data (see LBW). Because the 8 hour value would come into conflict with the 8 hour LBW the 8-hour value was extrapolated from the 4-hour value, using  $n = 1.08$ .

**LBW:** In an acute inhalation toxicity study rats (10-54 rats/group) were exposed to several concentrations of 1,2-dichloroethane (actual concentrations tested were 1235, 2471, 3294, 4118, 6177, 12354, 49416, and 82360 mg/m<sup>3</sup>) at various time exposure durations of 6 to 480 minutes (1 to 9 exposure durations per concentration level). The lethality data are numerous and reported in the primary publication<sup>a</sup>. The LBW values were determined by calculating the LC<sub>01</sub> values for each time point using DoseResp. The default uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences.

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

1,2-Dichloroethane is irritating to the skin, eye and respiratory tract at high concentrations.

No reprotoxic or teratogenic effects were seen in rats, rabbits or mice.

An additional acute (neuro)toxicity study in rats (Hotchkiss et al, 2010)<sup>b</sup> was retrieved and used for selection of point of departure for both the VRW and AGW values. Rats (5/sex/concentration) were exposed, whole body, to actual

<sup>a</sup> Spencer et al, (1951) Vapor toxicity of ethylene dichloride determined by experiments on laboratory animals AMA Archives of Industrial Hygiene and Occupational Medicine, Volume 4 (5): pp 482-493,

<sup>b</sup> Hotchkiss, J.A., Anrus, A.K., Johnson, K.A., Krieger, S.M., Woolhiser, M.R., Maurissen, J.P. 2010. Acute toxicologic and neurotoxic effects of inhaled 1,2-dichloroethane in adult Fischer 344 rats. Food and Chemical Toxicology 48 (2010) 470-481.

concentrations of 0, 52.8 (local effects only), 196.4, 607.8, or 2029 ppm (corresponding to 0, 214, 795, 2460, and 8211 mg/m<sup>3</sup>, respectively) for 4 hours or 0, 52.8, 107.5 or 155.8 ppm (corresponding to 0, 214, 435, or 631 mg/m<sup>3</sup>, respectively) for 8 hours. Conversions from ppm to mg/m<sup>3</sup> are based on the laboratory specific conversion factor of 4.047. Acute toxic effects were assessed by broncho-alveolar lavage and histopathology of the respiratory tract and selected target organs. Based on olfactory epithelial degeneration/necrosis at 795 mg/m<sup>3</sup> ppm after 4 hours and at 435 mg/m<sup>3</sup> after 8 hours, the most sensitive indicator of toxicity in this study, the overall NOEC was assessed to be 52.8 ppm (214 mg/m<sup>3</sup>) 1,2-dichloroethane for up to 8 h in rats. For derivation of intervention values the effects observed at 435 mg/m<sup>3</sup> after 8 hours of exposure were considered to be marginal effects (very slight degeneration unilateral in one male and 3 females). At 631 mg/m<sup>3</sup> (8 hour) and 795 mg/m<sup>3</sup> for 4 hours the effects were still very slight to slight, but observed in more animals (4 males and 5 females and 3 males and 4 females, respectively). All effects were reversible. This was considered the effect level for local effects, leading to a point of departure for VRW of 435 mg/m<sup>3</sup> for 8 hours.

Neurobehavioural effects consistent with central nervous system (CNS) depression were present at concentrations of 2460 mg/m<sup>3</sup> and higher and were restricted to day 1. The effects observed at 2460 mg/m<sup>3</sup> consisted only of urination in males and females. At the next concentration (8211 mg/m<sup>3</sup>) the effects developed to significant effects on resistance to removal, palpebral closure, lacrimation (females only), extensor thrust, response to sharp noise, response to tail pinch (males only), urination, defecation (males only) and slight incoordination of gait. The exposure concentration of 2460 mg/m<sup>3</sup> was considered a NOAEL for neurobehavioural effects and was chosen as point of departure for AGW values.

H302 (Harmful if swallowed), H315 (Causes skin irritation), H319 (Causes serious eye irritation), H335 (May cause respiratory irritation) and H350 (May cause cancer).

<b>Carcinogenicity and derivation of the CRP value</b>	<b>Odour and derivation of the LOA value</b>
<p>IARC classification: 2B (possibly carcinogenic to humans)</p> <p>Derivation of the carcinogenic risk potency (CRP):</p> <p>The BMD<sub>10</sub> of 37.8 ppm (corresponding with 394 mg/m<sup>3</sup>) based on a 6-h/day; 5-day/week exposure and as established by SCOEL, (SCOEL, 2016) was used to determine the CRP. This value was corrected to continuous human lifetime exposure (BMD<sub>10</sub> × 6/24 × 5/7) and excess lifetime cancer risk of 10<sup>-4</sup> (/1000)= 0.070 mg/m<sup>3</sup></p> <p>CRP = (10<sup>-4</sup> risk level * 613.000)/DRCF = (0.070 * 613.000)/2.8 = 15390 mg/m<sup>3</sup></p> <p>The URF of the SCOEL was based on the BMD<sub>10</sub> calculation on the data of Nagano, 2006 (6 hr/day, 5 d/wk, 104 wks mice inhalation study), which was not yet available during the EPA and WHO evaluation in 1999 and 1998, resp. These evaluations were based on an NCI study (1978) in rats and mice, 78 wks gavage study). The data by Nagano have been evaluated by other authors leading to comparable BMD<sub>10</sub> values.</p>	<p>Odour: chloroform-like, pleasant odour</p> <p>OT<sub>50</sub>: 107 mg/m<sup>3</sup> [AIHA, 1989] LOA = 11.8 * OT<sub>50</sub> * 1.33 = 1679 mg/m<sup>3</sup></p> <p>(The concentration <u>L</u> level leading to distinct <u>O</u> odour <u>A</u>wareness (I=3) is calculated using the formula: I = 2.33 * log (C/OT<sub>50</sub>) + 0.5. A correction factor of 1.33 is applied to this value)</p> <p>The LOA is below the 30 and 10 minute LBW value.</p>

<b>Other standards and guidelines (1h values in mg/m<sup>3</sup>, unless otherwise indicated)<sup>c</sup></b>			
<b>VRW level</b> 87	AEGL-1 -	ERPG-1 202	IDLH: 200 mg/m <sup>3</sup> (30 minutes)
<b>AGW level</b> 470	AEGL-2 -	ERPG-2 810	
<b>LBW level</b> 1400	AEGL-3 -	ERPG-3 1210	

<sup>c</sup> Note that the ERPG values as presented here (in mg/m<sup>3</sup>) are derived using the conversion factors of the ERPG.