

## Stofdocument deel A

CAS-nr: 75-07-0

**Aceetaldehyde**

CH<sub>3</sub>CHO

VN-nr: 1089

GEVI: 33

**Synoniemen:** acetylwaterstof, ethanal, ethylideenoxide (Engels: acetaldehyde)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	<b>VRW (mg/m<sup>3</sup>)</b>	82	82	82	82	82	82
Alarmeringsgrenswaarden	<b>AGW (mg/m<sup>3</sup>)</b>	910	630	500	400	320	210
Levensbedreigende waarden	<b>LBW (mg/m<sup>3</sup>)</b>	2800	1900	1500	1200	970	490
Datum vaststelling: 13-05-2009		1 mg/m <sup>3</sup> = 0,544 ppm; 1 ppm = 1,84 mg/m <sup>3</sup>					
<b>Explosiegrens:</b> LEL = 4.0 vol% ≈ 73.000 mg/m <sup>3</sup>		<b>Geur:</b> Stekend, fruitig <b>LOA:</b> 1,0 mg/m <sup>3</sup>					
Fysisch-chemische eigenschappen				Overige informatie			
<b>Uiterlijk:</b> kleurloze vloeistof		Molecuulmassa: 44,1 g/mol		Publieke grenswaarde:			
<b>Brand:</b> zeer brandgevaarlijk		Zuurgraad: Geen data		37 mg/m <sup>3</sup> (8-uur TGG)			
<b>Relatieve dichtheid van verzadigd damp/lucht mengsel:</b> 1,5		LogKow: 0,6		TLV-TWA: 183 mg/m <sup>3</sup>			
		Wateroplosbaarheid: volledig		MAK: 91 mg/m <sup>3</sup>			
		Verzadigde dampdruk: 1007 mbar					
Toxicologische eigenschappen							
<b>Effecten bij inhalatoire blootstelling</b>				<b>Toxiciteit bij eenmalige, inhalatoire blootstelling</b>			
<u>Onder VRW:</u> geen informatie				<ul style="list-style-type: none"> <li>▪ Aceetaldehyde veroorzaakt irritatie van de ogen en de bovenste luchtwegen.</li> <li>▪ Aceetaldehyde kan longoedeem veroorzaken. De verschijnselen hiervan kunnen vertraagd optreden en versterkt worden door lichamelijke inspanning.</li> <li>▪ In hoge concentraties kan aceetaldehyde verlamming van de ademhalingsspieren veroorzaken.</li> <li>▪ Aceetaldehyde is een genotoxische alkylerende verbinding met een beperkt vermogen om genmutaties te veroorzaken.</li> <li>▪ Personen met astma zijn mogelijk gevoeliger voor de effecten van aceetaldehyde.</li> </ul>			
<u>VRW → AGW:</u> oogirritatie, milde (bovenste) luchtwegirritatie, hoest							
<u>AGW → LBW:</u> tranenvloed, irritatie van bovenste luchtwegen, benauwdheid, longoedeem, verhoogde hartslag, bewustzijnsdaling							
<u>Boven LBW:</u> sterfte							
<b>Effecten bij blootstelling aan vloeistof</b>				<b>Carcinogeniteit</b>			
<u>Huidcontact:</u> roodheid en pijn				IARC classificatie: 2B			
<u>Oogcontact:</u> bijtend, tranenvloed, roodheid en pijn, slecht zien, hoornvliesbeschadiging, ernstige brandwonden				CRP: 9900 mg/m <sup>3</sup>			
Beknopte medische informatie							
<b>Ontsmetting damp</b>							
<u>algemeen:</u> frisse lucht, rust, halfzittende houding; arts raadplegen bij aanhoudende klachten (ademhaling, bewustzijnsverlaging)							
<u>ogen:</u> desgewenst spoelen met water (evt. contactlenzen verwijderen)							
<b>Ontsmetting vloeistof</b>							
<u>huid:</u> verontreinigde kleding uittrekken, minimaal 20 min. spoelen met veel water of douchen en arts raadplegen							
<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, niet laten drinken en direct spoedeisende medische hulp inzetten.							
<b>Specifieke behandeling en materialen:</b> geen.							
Neem contact op met het NVIC (Tel: 030 - 274 8888) voor informatie met betrekking tot medisch handelen							

## Stofdocument deel B

CAS-nr: 75-07-0

**Acetaldehyde**

CH<sub>3</sub>CHO

VN-nr: 1089

### Basis for the Dutch Intervention Values

**VRW:** AEGL value is adopted, 2h value added

**AGW:** AEGL value is adopted (except 10 min value for which time scaling was applied), 2h value added

**LBW:** AEGL value is adopted (except 10 min value for which time scaling was applied), 2h value added

Date: 13-05-2009

AEGL document: Interim, 2008

### 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>	82	82	82	82	82	82	Threshold for mild respiratory and eye irritation in humans
<b>AGW</b>	910	630	500	400	320	210	Histopathological changes in nasal epithelium in animals
<b>LBW</b>	2800	1900	1500	1200	970	490	Animal lethality

### Derivation of the Dutch Intervention Values

**VRW:** In a human study, mild respiratory irritation was observed at a measured concentration of 134 ppm (246 mg/m<sup>3</sup>) for 30 minutes. Subjects did not report eye irritation, like in another human study, but in the latter study only nominal concentrations were given. The concentration of 246 mg/m<sup>3</sup> for 30 minutes is chosen as the point of departure for VRW derivation. An uncertainty factor of 3 is applied to this concentration to account for intraspecies variability. A higher factor is not needed because little variation is expected for direct eye irritation effects. Also no time scaling is applied and the resulting value of 45 ppm (82 mg/m<sup>3</sup>) is held constant across all time points.

**AGW:** In a subacute rat study, degeneration of the nasal epithelium was observed after exposure to 410 ppm (752 mg/m<sup>3</sup>), 6 hours/day, 5 days/week for 4 weeks. This effect was not observed after a single exposure to 750 or 1500 ppm (1380 or 2750 mg/m<sup>3</sup>) for 6 hours, although some nasal changes were observed following exposure to 1380 or 2750 mg/m<sup>3</sup> on 3 consecutive days (6-h/day). The concentration of 1500 ppm (2750 mg/m<sup>3</sup>) for 6 hours is taken as the point of departure for AGW, this being the no effect level for sub-AGW damage to the nasal epithelium. A total uncertainty factor of 10 is applied, consisting of an interspecies factor of 3 and an intraspecies factor of 3. The intraspecies factor of 3 was considered sufficient to account for variability in human susceptibility to acetaldehyde. Default time-scaling was applied using C<sup>n</sup> x t = k with default values n=1 for extrapolation to longer time periods and n=3 for extrapolation to shorter time periods. In contrast to the 10 minute AEGL-2 value, time scaling was also applied for the 10 minute AGW value.

**LBW:** LBW derivation is based on animal data. Studies in hamsters and rats provide the most reliable basis for the LBW. Rats being the more sensitive species in these studies are the preferred species. Using the Benchmark software of the US-EPA, log-probit modeling was done on the results from acute and subacute rat studies. This led to a BMDL<sub>05</sub> of 5,295 ppm (9710 mg/m<sup>3</sup>) for a 4-hour exposure as point of departure. To this level a total uncertainty factor of 10 is applied, consisting of a factor of 3 for interspecies extrapolation and a factor of 3 for sensitive human subpopulations. Larger factors are considered not necessary given the typical irritative aldehyde toxic action by acetaldehyde. Time scaling was performed using C<sup>n</sup> x t = k with default values n=1 and n=3 for extrapolation to longer time periods and n=3 for extrapolation to shorter time periods. In contrast to the 10 minute AEGL-3 value, time scaling was also applied for the 10 minute LBW value.

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

Irritation of eyes, skin, and respiratory tract are the primary effects of acute acetaldehyde inhalation. In rats, sensory irritation has been observed. In addition, erythema, coughing, pulmonary edema and narcosis may develop. At high concentrations (not specified) paralysis leading to death may occur. Prolonged exposure to high concentrations (unspecified) may injure the corneal epithelium, causing persistent lacrymation, photophobia, and foreign body sensation. Fatalities following inhalation are due to anesthesia when prompt,

and to pulmonary edema when delayed. Asthmatic patients are considered a vulnerable group.

No inhalation studies were performed to determine the reprotoxic effects. The only data on reprotoxic effects of acetaldehyde are from a 90-day hamster inhalation study where reduced gonad weights were observed in both sexes at  $\geq 1340$  ppm ( $2460 \text{ mg/m}^3$ ).

H319: causes serious eye irritation; H335: may cause respiratory irritation; H351: suspected of causing cancer.

#### **Carcinogenicity and derivation of the CRP value**

IARC classification: 2B (possibly carcinogenic to humans).

Derivation of the carcinogenic risk potency (CRP):

$10^{-4}$  risk level after inhalation:  $0.045 \text{ mg/m}^3$

$\text{CRP} = (10^{-4} \text{ risk level} * \text{average life span in hours}) / \text{DRCF}$   
 $= (0.045 * 613.200) / 2.8 = 9900 \text{ mg/m}^3$

US-EPA (1991) provided a quantitative cancer risk estimation for inhalation of acetaldehyde based on incidences of nasal tumours as observed in the chronic rat study of Woutersen et al. (1986). A risk of  $1 \times 10^{-4}$  was calculated to be  $0.045 \text{ mg/m}^3$  (virtually safe dose).

#### **Odour and derivation of the LOA value**

Odour: pungent, suffocating, and fruity odor

$\text{OT}_{50}$ :  $0.0018 \text{ ppm}$  ( $0.00275 \text{ mg/m}^3$ ) [AEGL (2008); Nagata (2002)]

$\text{LOA} = 11.8 * \text{OT}_{50} * 1.33 = 1.0 \text{ mg/m}^3$

(The concentration level leading to distinct Odour Awareness ( $I=3$ ) is calculated using the formula:  $I = 2.33 * \log (C/\text{OT}_{50}) + 0.5$ . A correction factor of 1.33 is applied to this value)

The LOA is below the VRW, therefore subjects will be aware of the odour below the level where health effects may be expected.

#### **Other standards and guidelines (1h values in $\text{mg/m}^3$ , unless otherwise indicated)**

<b>VRW level</b>	<b>AEGL-1</b>	<b>ERPG-1</b>		<b>IDLH:</b> 3770 (10 min or 30 min)
<b>82</b>	81	18		
<b>AGW level</b>	<b>AEGL-2</b>	<b>ERPG-2</b>		
<b>500</b>	490	370		
<b>LBW level</b>	<b>AEGL-3</b>	<b>ERPG-3</b>		
<b>1500</b>	1500	1800		