Rijksinstituut voor Volksgezondheid en Milieu
Ministerie van Volksgezondheid, Welzijn en Sport

Stofdocument deel A

CAS-nr: 107-05-1 **Allylchloride** **C_3H_5Cl** **VN-nr: 1100** **GEVI: 336**

Synoniemen: 3-chloorpropeen, 3-chloorpropyleen (Engels: Allyl chloride)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	**VRW (mg/m^3)**	8,8	8,8	8,8	8,8	8,8	8,8
Alarmeringsgrenswaarden	**AGW (mg/m^3)**	6.700	1.100	330	110	33	11
Levensbedreigende waarden	**LBW (mg/m^3)**	20.000*	3.200	1.000	320	100	32

Datum vaststelling: 16-12-2010

1 mg/m^3 = 0,314 ppm; 1 ppm = 3,18 mg/m^3

Explosiegrens: LEL= 3,2 vol% ≈ 100.000 mg/m^3

* berekende interventiewaarde hoger dan 10% LEL

Geur: scherpe, knoflook-achtige geur

LOA: 150 mg/m^3

Fysisch-chemische eigenschappen

Uiterlijk: kleurloze vloeistof

Brand: zeer brandgevaarlijk

Relatieve dichtheid van verzadigd damp-lucht mengsel: 1,6

Molecuulmassa:	76,5 g/mol
Zuurgraad:	geen data
LogKow:	2,1
Wateroplosbaarheid:	0,36 g/100 ml (slecht)
Verzadigde dampdruk:	395 mbar

Overige informatie

Publieke grenswaarde: niet afgeleid

MAK: niet afgeleid

TLV-TWA: 3,2 mg/m^3

Toxicologische eigenschappen

Effecten bij inhalatoire blootstelling

Onder VRW:	geen klachten
VRW → AGW:	irritatie neus en luchtwegen, oogirritatie, tranenvloed, hoesten, benauwdheid, duizeligheid, hoofdpijn
AGW → LBW:	benauwdheid, longoedeem, bewustzijnsdaling, lever- en nierfunctiestoornissen
Boven LBW:	ademnood, coma, sterfte

Toxiciteit bij eenmalige, inhalatoire blootstelling

- Allylchloride werkt irriterend tot bijtend op ogen, neus en luchtwegen.
- Blootstelling aan allylchloride kan longoedeem en chemische pneumonitis veroorzaken. De verschijnselen hiervan kunnen vertraagd optreden en versterkt worden door lichamelijke inspanning.
- Allylchloride kan schade toebrengen aan de lever, nieren en het centrale zenuwstelsel.
- Sterfte door blootstelling aan allylchloride is waarschijnlijk het gevolg van ademhalingsfalen.

Effecten bij blootstelling aan vloeistof

Huidcontact: roodheid en pijn, bijtend, ernstige brandwonden. De inwerking van allychloride op de huid kan leiden tot een hevige, diepe pijn en openbaart zich soms pas na enkele uren.

Oogcontact: damp: roodheid en pijn, bijtend. Vloeistof: bijtend, corneabeschadiging, verlies van gezichtsvermogen.

Carcinogeniteit

IARC classificatie: 3

CRP: niet afgeleid

Beknopte medische informatie

Ontsmetting damp

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

Ontsmetting vloeistof

huid: PAS OP: HUIDOPNAME! verontreinigde kleding uittrekken, spoelen en wassen met water en zeep en direct spoedeisende medische hulp inzetten.

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

inslikken: mond laten spoelen (uitspugen!), GEEN braken opwekken en direct spoedeisende medische hulp inzetten.

Specifieke behandeling en materialen

Neem contact op met het NVIC (Tel: +31 (0)30 - 274 8888) voor informatie met betrekking tot medisch handelen.

Stofdocument deel B

CAS-nr: 107-05-1 **Allyl chloride** **C_3H_5Cl** **UN-nr: 1100**

Basis for the Dutch Intervention Values

VRW: AEGL values are adopted; 2h value added

AGW: Based on a different point of departure than used for derivation of the AEGL values

LBW: Based on a different point of departure than used for derivation of the AEGL values

Date: 16-12-2010 AEGL document: Interim, 2008

Dutch Intervention Values (mg/m^3)

	10 min	30 min	1 h	2 h	4 h	8 h	End point
VRW	8.8	8.8	8.8	8.8	8.8	8.8	Threshold for irritation in humans
AGW	6,700	1,100	330	110	33	11	One third of LBW
LBW	20,000*	3,200	1,000	320	100	32	Animal lethality

* value higher than 10% of LEL

Derivation of the Dutch Intervention Values

VRW: The VRW values are based on the sensory response experienced by an unknown number of unconditioned personnel during or following five minutes of exposure to allyl chloride. Exposure to 3-6 ppm (9.5-19 mg/m^3) did not cause respiratory, eye, or nose irritation. Nasal irritation and pulmonary discomfort occurred between 6 and 25 ppm (19 and 80 mg/m^3) in half of those tested and noticeable irritation of the sensory organs for most people occurred at concentrations ranging from 25-100 ppm (80 – 318 mg/m^3). An estimate of the threshold of irritation was calculated by dividing 25 ppm (80 mg/m^3) by a factor 3 to yield 8.3 ppm (26.4 mg/m^3). This was point of departure for the VRW levels.
An intraspecies uncertainty factor of 3 was applied instead of the default value of 10 because allyl chloride is a direct acting irritant and it would protect sensitive populations, those experiencing noticeable irritation below 25 ppm (80 mg/m^3). An uncertainty factor of 10 would result in VRW values that are lower than concentrations humans have been exposed to with no irritation or physiological changes. In two studies it was shown that humans did not report irritation after being exposed to 3-6 ppm of allyl chloride for 1-5 minutes. An occupational study found that workers exposed to 0.5-36 ppm allyl chloride for 6 months had normal liver enzyme activity levels.
An interspecies factor of 1 was applied because human data were used. The VRW value was held constant across all exposure time points. That approach was considered appropriate because mild irritant effects generally do not vary greatly over time.

AGW: Although some studies did report AGW type effects, these observations were in conflict with the lethality data used for the derivation of the LBW values. Therefore, the AGW values were derived by dividing the LBW values by 3.

In contrast to the AGW values, the AEGL-2 values were based on exposure data showing no incapacitating or irreversible effects at 300 ppm (955 mg/m^3) in female rats after 6-hr exposure. At the next highest concentration, 500 ppm (1590 mg/m^3), moderate eye closure and redness, lethargy, and reversible acute renal tubular degeneration were observed. An interspecies factor of 3 was used because allyl chloride is a direct acting irritant, and data from the more sensitive sex and species (female rat) were used as the point of departure. An intraspecies uncertainty factor of 3 was applied because human data suggested that allyl chloride is a direct-acting irritant and described effects similar to those seen in rats, guinea pigs, and mice. Time scaling was performed using the equation $C^n \times t = k$, using the default values of n =1 and n = 3 for extrapolation to longer and shorter exposure durations, respectively. The 10 minute AEGL-2 value was set equal to the 30 minute AEGL-2 value. The thus derived AEGL-2 values ranged from 220 mg/m^3 for 10 and 30 minutes exposure and 70 mg/m^3 for 8 hours exposure. It is noted that using this point of departure and the chemical specific value of n of 0.6 (see derivation LBW values) would result in values ranging from 37,000 mg/m^3 for 10 minutes exposure to 58 mg/m^3 for 8 hours of exposure. These values are higher than the derived

LBW values.

LBW: The LBW values are based on a rat lethality study, where 4 or 5 rats per group were exposed to (target) concentrations ranging from 1000 to 100,000 mg/m^3 for 15 to 540 minutes. In total 28 exposure-time combinations were tested. The target concentrations were considered to be sufficiently reliable for the following reasons: a) the relatively high vapour pressure of allyl chloride, and b) similar values were reported for the target and actual concentrations in a second study , where similar techniques as applied In the key study were applied to generate the exposure. The complete dataset was analyzed using DoseResp (Wil ten Berge, 2006) to derive the animal probit function. With the probit function the LC_{01} values have been determined to obtain the LBW values for the exposure durations of interest. The derived LC_{01} values for the 10-, 30-min, and 1-, 2-, 4-, and 8-hr durations are 200,200- 32,110- 10,120- 3189- 1005- and 317 mg/m^3. The probit analysis yielded an n-value of 0.60. An interspecies factor of 3 is considered appropriate, because allyl chloride is a direct acting irritant and human data described effects similar to those seen in rats, guinea pigs, and mice. An intraspecies uncertainty factor of 3 was applied. Although data on sensitive populations are lacking for allyl chloride, as a direct-acting irritant for acute exposures, the mode of action is not expected to differ among individuals.

In contrast to the LBW values, the derivation of the AEGL-3 values was based on another (6-hr) rat lethality study, which derived a higher LC_{50} value for the 6-hr duration. The experimental concentration of 800 ppm (2500 mg/m^3) was selected as the point of departure as this was the highest concentration at which no lethality was observed. The same uncertainty factors and time-scaling approach were used as described above for the derivation of the AEGL-2 values (using default values for n). The resulting AEGL-3 values ranged from 570 mg/m^3 for 10 and 30 minute exposure and 190 mg/m^3 for 8 hours exposure.

A reason to prefer the study selected for deriving the LBW over the study selected for deriving the AEGL-3 was that the former study included a mortality range from 0 to 100% and several concentration and time combinations. In the study selected for deriving the AEGL-3, the results in rats consisted primarily of 0 and 10% mortality and one group (females) with 100% mortality. Furthermore, a second reason for not choosing the study selected for deriving the AEGL-3 was the uncertainty in the lethality response in this study caused by variable observation periods. In most exposure groups, already after 24 hours the first five animals were sacrificed, whereas the remaining animals were sacrificed after a longer observation period. Hence, it is unknown whether the sacrificed animals at 24 hours post-exposure would have lived until 168 hours post-exposure, which according to the current standards is still too short.

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

The main target organs and tissues for inhalation exposure to allyl chloride are the respiratory tract and eyes. The health endpoints are irritation to the eyes and respiratory tract, but also damage to the liver and kidneys and central nervous system effects may result from allyl chloride exposure. Symptoms of high exposure are drowsiness, lacrimation, salivation, weakness, apnoea, pulmonary haemorrhage, pulmonary oedema and pneumonia. Lethality likely results from respiratory failure.

Allyl chloride does not appear to be reprotoxic.

H302: Harmful if swallowed; H312: Harmful in contact with skin; H315: Causes skin irritation; H319: Causes serious eye irritaion; H332: Harmful if inhaled; H335: May cause respiratory irritaion; H341: Suspected of causing genetic defects; H351: Suspected of causing cancer; H373: May cause damage to organs through prolonged or repeated exposure.

Carcinogenicity and derivation of the CRP value

IARC classification: 3 (not classifiable as to carcinogenicity to humans)

No carcinogenic risk potency (CRP) was derived.

There are no studies found addressing potential carcinogenicity of allyl chloride after inhalation exposure. There are no human carcinogenicity data.

Odour and derivation of the LOA value

Odour: Pungent garlic-like odour

OT_{50}: 9.5 mg/m^3 [Torkelson et al., 1959; AEGL]
LOA = 11.8 * OT_{50} * 1.33 = 150 mg/m^3

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

The LOA is higher than the VRW values, the 2-

	8 hr AGW values, and the 4-8 hr LBW values.

Other standards and guidelines *(1h values in mg/m^3, unless otherwise indicated)*				
VRW level **8.8**	*AEGL-1* 8.9	*ERPG-1* 9.5		*IDLH:* 800 (30 minutes)
AGW level **330**	*AEGL-2* 170	*ERPG-2* 130		
LBW level **1000**	*AEGL-3* 450	*ERPG-3* 950		