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

Stofdocument deel A

CAS-nr: 107-11-9 **Allylamine** **CH_2=CHCH$_2$NH$_2$** **VN-nr: 2334** **GEVI: 663**

Synoniemen: 2-propeen-1-amine, 2-propenylamine (Engels: allylamine)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	**VRW (mg/m^3)**	1,0	1,0	1,0	1,0	1,0	1,0
Alarmeringsgrenswaarden	**AGW (mg/m^3)**	7,9	7,9	7,9	7,9	7,2	4,8
Levensbedreigende waarden	**LBW (mg/m^3)**	1500	430	200	89	40	18

Datum vaststelling: November 2015

1 mg/m^3 = 0,421 ppm; 1 ppm = 2,38 mg/m^3

Explosiegrens: LEL = 2,2 vol% ≈ 52.000 mg/m^3

Geur: scherpe, ammoniakachtige geur

LOA: niet afgeleid

Fysisch-chemische eigenschappen

Uiterlijk: kleurloze tot lichtgele vloeistof

Brand: zeer brandgevaarlijk, kans op ontsteking op afstand

Relatieve dichtheid van verzadigd damp-lucht mengsel: 1,3

Molecuulmassa: 57,1 g/mol
Zuurgraad: geen data
LogKow: 0,0
Wateroplosbaarheid: volledig
Verzadigde dampdruk: 257 mbar

Overige informatie

Publieke grenswaarde:
niet afgeleid.
MAK: niet afgeleid
TLV-TWA: niet afgeleid

Toxicologische eigenschappen

Effecten bij inhalatoire blootstelling

Onder VRW:	mogelijk lichte irritatie
VRW → AGW:	irritatie aan ogen, neus en luchtwegen, keelpijn, hoesten
AGW → LBW:	toenemende mate van irritatie, cardiovasculaire toxiciteit, onregelmatige ademhaling, benauwdheid, longoedeem, longbloedingen
Boven LBW:	ademnood, convulsies, coma, sterfte

Toxiciteit bij eenmalige, inhalatoire blootstelling

- Allylamine werkt primair irriterend op de ogen, neus, huid en luchtwegen.
- Bij hogere concentraties kan allylamine effecten op het centrale zenuwstelsel en het cardiovasculaire systeem veroorzaken.
- De cardiovasculaire effecten zijn waarschijnlijk het gevolg van omzetting van allylamine in acroleine, waterstofperoxide en ammonia.
- Allylamine kan longoedeem en chemische pneumonitis veroorzaken. De verschijnselen hiervan kunnen vertraagd optreden en versterkt worden door lichamelijke inspanning.

Effecten bij blootstelling aan vloeistof

Huidcontact: bijtend, roodheid, pijn

Oogcontact: bijtend, roodheid, slecht zien

Carcinogeniteit

IARC classificatie: niet geclassificeerd
CRP: niet afgeleid

Beknopte medische informatie

Ontsmetting damp

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

ogen: desgewenst spoelen met water (evt. contactlenzen verwijderen).

Ontsmetting vloeistof

huid: eerst spoelen met veel water, dan pas kleding uittrekken, daarna weer spoelen en arts raadplegen.

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

inslikken: mond laten spoelen (uitspugen!), rust, 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: 107-11-9 **Allylamine** **$CH_2=CHCH_2NH_2$** **UN-nr: 2334**

Basis for the Dutch Intervention Values

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

AGW: AEGL-value is adopted but using different uncertainty factors for 4- and 8-hour values, 2h value added

LBW: Same point of departure as for AEGL values but using different uncertainty factors and difference in time scaling, 2h value added

Date: November 2015 | AEGL document: Final, 2005

Dutch Intervention Values (mg/m^3)

	10 min	30 min	1 h	2 h	4 h	8 h	End point
VRW	1.0	1.0	1.0	1.0	1.0	1.0	Eye and nose irritation in humans
AGW	7.9	7.9	7.9	7.9	7.2	4.8	Eye and nose irritation 10-min, 30-min, 60-min, 2h values; threshold for cardio-toxicity (4h and 8h values)
LBW	1500	430	200	89	40	18	Lethality in animals

Derivation of the Dutch Intervention Values

VRW: VRW values were based on a study in which 35 young adult human volunteers were exposed for 5 minutes to 2.5, 5, 10 or 14 ppm (5.9, 11.9, 23.8, or 33.3 mg/m^3) allylamine, which caused dose-related increases in the incidence of slight or moderate eye irritation, nose irritation, and pulmonary discomfort, but not CNS effects. The VRW point of departure was 1.25 ppm (3.0 mg/m^3), which was obtained by applying a modifying factor of 2 to the lowest effect level of 2.5 ppm (5.9 mg/m^3). The modifying factor was used because exposure was for only 5 minutes and it is unclear whether "moderate" irritation and discomfort is comparable to "notable" irritation or discomfort, which exceeds the scope of the VRW. An intraspecies uncertainty factor of 3 was applied because allylamine is acting as a contact irritant, and the severity of its effects is not expected to vary greatly among humans. Also, use of a greater uncertainty factor would yield a concentration below 0.2 ppm (0.48 mg/m^3), which was a no-effect level for workers exposed for up to 4 hours. The same VRW value was used for 10 minutes to 8 hours because mild sensory irritation and discomfort do not generally vary greatly with time.

AGW: AGW values for the 10-, 30-, and 60-minute and 2-hour time points were derived from the human 5-minute exposure study that was used to derive VRW values, but using 10 ppm (23.8 mg/m^3) as the point of departure. Exposure to 10 ppm (23.8 mg/m^3) caused slight or moderate eye and nose irritation and pulmonary discomfort and was used as threshold for "intolerable" irritation that occurred at 14 ppm (33.3 mg/m^3). The same value was adopted for all time-points because the degree of irritation and discomfort was not expected to increase in time beyond the scope of AGW. An intraspecies uncertainty factor of 3 was used because allylamine is acting as a contact irritant, and the severity of its effects is not expected to vary greatly among humans.
AGW values for the 4- and 8-hour time points were derived from a rat study indicating cardiotoxicity of allylamine in rats because cardiotoxicity was considered to be a more sensitive end point for these time points. The threshold for cardiovascular lesions in this study was exposure to 40 ppm (95 mg/m^3) for 16 hours; exposure to 60 ppm for 14 hours induced myofibril fragment damage, perivascular oedema and cellular infiltration. Time scaling was performed using $C^n \times t = k$ and $n = 1.7$, which was calculated from the rat cardiotoxicity data. An interspecies uncertainty factor of 3 was applied because the mechanism of toxicity is similar among several species. An intraspecies uncertainty factor of 10 was used because the variability of the cardiotoxic response to allylamine among humans is undefined and potentially sensitive populations exist (diabetics, persons with congestive heart failure).

LBW: The derivation of LBW values was based on lethality data from a rat study in which animals were exposed to four different concentrations for each of three time points (1, 4 and 8 hours). Rats that died had stomachs distended with air, fluid-filled lungs, alveolar haemorrhage, and pulmonary oedema. The data were analysed using the Ten Berge DoseResp software (version 2006) to calculate the value of n (0.874) and the LC_{01} value for each time point. The 10-min, 30-min, 1-, 2-, 4- and 8-hour LC_{01} values were 240, 4335, 1961, 887, 401 and 182 mg/m^3, respectively. An overall uncertainty factor of 10 was applied to these LC_{01} values: 3 to account for interspecies variability and 3 for human variability (the steep dose-response (the approximate 2-fold increase in concentration caused mortality to increase from 0 to 100%)

indicates that the threshold for lethality due to direct destruction of lung tissue is not likely to vary greatly among humans).

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

In addition to being a severe respiratory, eye, and skin irritant, allylamine is cardiotoxic when administered at high doses orally, by inhalation, or by injection. It has been used to induce cardiac and vascular lesions in laboratory animals to model human cardiovascular disease. Allylamine cardiotoxicity is proposed to be related to its metabolism to acrolein and hydrogen peroxide in cardiac and vascular tissues. Several studies indicate that allylamine absorption through the skin can cause acute lethality. Allylamine is an irritant to the skin of experimental animals and can cause skin corrosion (necrosis).

Rats dying from exposure to allylamine had stomachs distended with air, fluid-filled lungs with haemorrhage in the alveolar spaces, and pulmonary oedema. Allylamine inhalation caused cardiotoxicity in rats in several single- and multiple exposure studies. Cardiovascular lesions were not found following inhalation exposure in species other than rats, but were induced in a variety of animal species by the oral, parenteral, and intravenous routes. In mice exposed to allylamine clinical signs, in order of appearance, were: naso-oral irritation, ear flushing, irregular respiration, cyanosis, delirium, convulsions, coma, and death.

No *in vivo* studies on the developmental or reproductive effects of allylamine or information on the developmental or reproductive effects of allylamine in humans were located.

H301: Toxic if swallowed; H311: Toxic in contact with skin; H331: Toxic if inhaled.

Carcinogenicity and derivation of the CRP value

IARC classification: not classified

No carcinogenic risk potency (CRP) was derived.

No studies on the carcinogenicity or genotoxicity of allylamine in humans were located (nor of its proposed metabolite, acrolein).

Odour and derivation of the LOA value

Odour: very sharp, ammonia-like odour

The calculated LOA for allylamine of 58 ppm exceeds a concentration (i.e. 14 ppm) found to be intolerable by humans. Therefore, the calculated LOA conflicts with human empirical data, as did the OT_{50}, and neither the LOA nor the OT_{50} are considered valid. Therefore, no LOA was derived due to lack of reliable data.

Other standards and guidelines (1h values in mg/m^3, unless otherwise indicated)

VRW level **1.0**	*AEGL-1* 1.00	*ERPG-1* not derived		*IDLH:* not derived
AGW level **7.9**	*AEGL-2* 7.8	*ERPG-2* not derived		
LBW level **200**	*AEGL-3* 43	*ERPG-3* not derived		