

Stofdocument deel A

CAS-nr: 115-21-9

Ethyltrichloorsilaan

$C_2H_5Cl_3Si$

VN-nr: 1196

GEVI: X338

Synoniemen: silaan, ethyltrichloor, trichloorethylsilaan (Engels: ethyl trichlorosilane)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	VRW (mg/m³)	4,1	4,1	4,1	4,1	4,1	4,1
Alarmeringsgrenswaarden	AGW (mg/m³)	250	120	76	47	30	30
Levensbedreigende waarden	LBW (mg/m³)	760	360	230	140	89	89
Datum vaststelling: November 2015		1 mg/m ³ = 0,147 ppm; 1 ppm = 6,80 mg/m ³					
Explosiegrens: LEL = 2,7 vol% ≈ 184.000 mg/m ³			Geur: scherpe stekende geur				
			LOA: niet afgeleid				

Fysisch-chemische eigenschappen		Overige informatie
Uiterlijk: kleurloze rokende vloeistof	Molecuulmassa: 163,5 g/mol	Publiek grenswaarde: niet afgeleid MAK: niet afgeleid TLV-TWA: niet afgeleid
Brand: zeer brandgevaarlijk	Zuurgraad: geen data	
	LogKow: geen data	
Relatieve dichtheid van verzadigd damp-lucht mengsel: 1,3	Wateroplosbaarheid: reactie	
	Verzadigde dampdruk: 56 mbar	

Toxicologische eigenschappen	
Effecten bij inhalatoire blootstelling	Toxiciteit bij eenmalige, inhalatoire blootstelling
<u>Onder VRW</u> : geen informatie	<ul style="list-style-type: none"> Chloorsilanen reageren zeer snel met water onder vorming van chloorwaterstof (HCl). De acute toxiciteit van ethyltrichloorsilaan wordt veroorzaakt door chloorwaterstof. Inhalatie van chloorwaterstof veroorzaakt een type I inhalatie intoxicatie. Chloorwaterstof veroorzaakt irritatie van de slijmvliezen van ogen en luchtwegen. Chloorwaterstof kan bij inhalatie longontsteking en/of longoedeem veroorzaken. De verschijnselen hiervan kunnen vertraagd optreden en versterkt worden door lichamelijke inspanning.
<u>VRW → AGW</u> : oog- en luchtwegirritatie, tranenvloed, hoesten, lichte benauwdheid	
<u>AGW → LBW</u> : ernstige oog- en luchtwegirritatie, pijn op de borst, benauwdheid, longontsteking, longoedeem	
<u>Boven LBW</u> : ademnood, sterfte	

Effecten bij blootstelling aan vloeistof	Carcinogeniteit
<u>Huidcontact</u> : bijtend, roodheid en pijn, blaren, brandwonden.	IARC classificatie: niet geclassificeerd.
<u>Oogcontact</u> : bijtend, roodheid en pijn, hoornvliesbeschadiging, ernstige brandwonden.	CRP: niet afgeleid.

Beknopte medische informatie
Ontsmetting damp
<i>algemeen</i> : frisse lucht, rust; in geval van rode ogen halfzittende houding en direct spoedeisende medische hulp inzetten.
Ontsmetting vloeistof
<i>huid</i> : verontreinigde kleding uittrekken (voorzichtig i.v.m. mogelijk reeds beschadigde huid), minimaal 20 min. spoelen met veel water of douchen, en direct spoedeisende medische hulp inzetten.
<i>ogen</i> : minimaal 15 min. spoelen met water (evt. contactlenzen verwijderen), dan naar oogarts brengen, blijven spoelen tijdens vervoer.
<i>inslikken</i> : mond laten spoelen (uitspugen!), GEEN braken opwekken en direct spoedeisende medische hulp inzetten.
Specifieke behandeling en materialen:
Neem contact op met het NVIC (Tel: 030 - 274 8888) voor informatie met betrekking tot medisch handelen

Stofdocument deel B

CAS-nr: 115-21-9

Ethyl trichlorosilane

$C_2H_5Cl_3Si$

UN-nr: 1196

Basis for the Dutch Intervention Values

VRW: AEGL value is adopted, 2h value added

AGW: Same rationale as AEGL (analogy with HCl), 2h value added

LBW: Same rationale as AEGL (analogy with HCl), 2h value added

Date: November 2015

AEGL document: Final, 2012

Dutch Intervention Values (mg/m^3)

	10 min	30 min	1 h	2 h	4 h	8 h	End point
VRW	4.1	4.1	4.1	4.1	4.1	4.1	Based on HCl (Threshold for irritation in humans)
AGW	250	120	76	47	30	30	Based on HCl (one-third of LBW)
LBW	760	360	230	140	89	89	Based on HCl (Calculated threshold for lethality in animals)

Derivation of the Dutch Intervention Values

VRW: Since no appropriate data exist for ethyl trichlorosilane, VRW values for hydrogen chloride will be used (on ppm-basis) to derive VRW values for ethyl trichlorosilane. The use of hydrogen chloride as a surrogate for ethyl trichlorosilane was deemed appropriate since it is believed that the hydrolysis product, HCl, is responsible for the adverse effects. Because three moles of hydrogen chloride are produced for every mole of ethyl trichlorosilane, a molar adjustment factor of 3 was applied to the hydrogen chloride VRW values.

Derivation of VRW values for HCl

The hydrogen chloride VRW values were based on a no-adverse-effect-level of 1.8 ppm ($2.73 mg/m^3$) in exercising asthmatics with an exposure duration of 45 min. Because the test subjects were considered a sensitive subpopulation and the endpoint was essentially a no-effect level, no uncertainty factor was applied to account for sensitive human subpopulations. The VRW values were held constant for all specified exposure periods since mild irritant effects represent threshold effects and generally do not vary over time.

AGW: Since no appropriate data exist for ethyl trichlorosilane, AGW values for hydrogen chloride will be used (on ppm-basis) to derive AGW values for ethyl trichlorosilane. Because three moles of hydrogen chloride are produced for every mole of ethyl trichlorosilane, a molar adjustment factor of 3 was applied to the hydrogen chloride AGW values.

Derivation of AGW values for HCl

The AGW values of HCl for the 10-min, 30-min, 1-, 2-, 4- and 8-hour time points were derived by dividing the LBW values by a factor of 3 due to the absence of suitable data. The only study of HCl that addressed effects that meet the definition of an AGW, severe nasal lesions, was a study on hydrogen halides by Stavert et al. (1991). Nevertheless, this study was not considered a suitable basis for derivation of AGW values because 6% of the animals died after exposure to HCl at 1300 ppm ($1974 mg/m^3$), only one concentration was tested and the number of animals tested was inconsistent.

LBW: Since no appropriate data exist for ethyl trichlorosilane, LBW values for hydrogen chloride will be used (on ppm-basis) to derive LBW values for ethyl trichlorosilane. Because three moles of hydrogen chloride are produced for every mole of ethyl trichlorosilane, a molar adjustment factor of 3 was applied to the hydrogen chloride LBW values.

Derivation of LBW values for HCl

The LBW values were based on a lethality study in rats. The rat study included six exposure durations and various concentrations. Probit analyses using DoseResp was performed and yielded

LC₀₁ values for the 10 min, 30 min, 1-, 2-,4-, and 8hrs exposure durations of 3370, 1602, 1002, 627, 393 and 246 ppm (5116, 2433, 1522, 952, 596, and 373 mg/m³), respectively, which were used as point of departure for LBW derivation. The default total uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences. The probit analyses yielded an n-value of 1.48, which was supported by the n-value of 1.59 calculated by Arts *et al.* (2000) from the C*t study. To maintain consistency with other hydrogen halogenides, the 8 hour value was set equal to the 4 hour value, as performed for the most potent hydrogen halogenide HF.

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

No data concerning lethality or nonlethal toxicity in humans from ethyl tichlorosilane were located in the available literature.

Chlorosilanes react violently with water to produce hydrogen chloride gas. Data suggest that the acute toxicity of chlorosilanes is due to the hydrogen chloride hydrolysis product; acute toxicity of the chlorosilanes is both qualitatively (based on clinical signs) and quantitatively (based on molar equivalents of hydrogen chloride) similar to that of HCl.

Although toxicity data are limited for individual chlorosilanes, well-conducted 1-hr inhalation toxicity studies in rats are available for a series of chlorosilanes. In general, LC₅₀ values for monochlorosilanes were approximately twice the LC₅₀ values for dichlorosilanes and three times the LC₅₀ values for trichlorosilanes. Clinical signs were consistent with hydrogen chloride exposure and included lacrimation, salivation, dried material around or on the eyes and/or nose, green staining around the nose and mouth, and perineal urine staining. Labored breathing, rales, hypoactivity, closed or partially closed eyes, prostration, corneal opacity or opaqueness, and swollen and/or necrotic paws were also observed. Hemorrhage, congestion and/or consolidation of the lungs, ectasia of the lungs, gaseous distension of the gastrointestinal tract, absence of body fat, obstruction of nostrils, dried and/or firm nares, alopecia around the eyes and discoloration of hair were observed at necropsy.

No data concerning developmental/reproductive toxicity for exposure to ethyl trichlorosilane were located in the available literature.

No harmonized H-sentences for human health.

Carcinogenicity and derivation of the CRP value

IARC classification: not classified.
No carcinogenic risk potency (CRP) was derived
No data concerning carcinogenicity for exposure to ethyl trichlorosilane were located in the available literature.

Odour and derivation of the LOA value

Odour: pungent odour
No LOA was derived due to lack of data.

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

VRW level 4.1	AEGL-1 4.1	ERPG-1 not derived	IDLH: not derived
AGW level 76	AEGL-2 50	ERPG-2 not derived	
LBW level 230	AEGL-3 220	ERPG-3 not derived	