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

Stofdocument deel A

CAS-nr: 78-93-3 **methylethylketon** $CH_3COCH_2CH_3$ **VN-nr: 1193**
GEVI: 33

Synoniemen: MEK, ethylmethylketon, 2-butanon (Engels: methyl ethyl ketone)

Interventiewaarden		10 min.	30 min.	1 uur	2 uur	4 uur	8 uur
Voorlichtingsrichtwaarden	**VRW (mg/m^3)**	600	600	NA	NA	NA	NA
Alarmeringsgrenswaarden	**AGW (mg/m^3)**	1000	720	570	450	360	260
Levensbedreigende waarden	**LBW (mg/m^3)**	18000*	18000*	9200*	4600	2300	1100
Datum vaststelling: November 2015				1 mg/m^3 = 0,333 ppm; 1 ppm = 3,00 mg/m^3			

Explosiegrens:
LEL = 1,8 Vol% ≈ 54.000 mg/m^3
* berekende interventiewaarde hoger dan 10% LEL

Geur: onaangename, scherpe, zoete geur
LOA: 366 mg/m^3

Fysisch-chemische eigenschappen

Uiterlijk: kleurloze vloeistof
Brand: zeer brandgevaarlijk

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

Molecuulmassa: 72,1 g/mol
Zuurgraad: pH 7
LogKow: 0,3
Wateroplosbaarheid: 29 g/100 ml
Verzadigde dampdruk: 105 mbar

Overige informatie

Publieke grenswaarde:
590 mg/m^3 (8 uur)
900 mg/m^3 (15 min)
(huid)
MAK: 600 mg/m^3
TLV-TWA: 600 mg/m^3

Toxicologische eigenschappen

Effecten bij inhalatoire blootstelling

Onder VRW: geen effecten

VRW → AGW: irritatie van ogen, huid en luchtwegen, hoesten

AGW → LBW: hoofdpijn, ernstige irritatie van luchtwegen en ogen, duizeligheid, misselijkheid, sufheid, bewustzijnsdaling, effecten op ongeboren vrucht

Boven LBW: sterfte

Toxiciteit bij eenmalige, inhalatoire blootstelling

- De stof werkt irriterend op de ogen en de luchtwegen.
- De stof kan inwerken op het centrale zenuwstelsel met als gevolg hoofdpijn, duizeligheid en bewustzijnsdaling.
- Blootstelling kan tot bewusteloosheid leiden.
- Methylethylketon kan embryotoxiciteit veroorzaken

Effecten bij blootstelling aan vloeistof

Huidcontact: droge huid

Oogcontact: roodheid, pijn, branderig gevoel, (reversibele) hoornvliesbeschadiging

Carcinogeniteit

IARC classificatie: niet geclassificeerd
CRP: niet afgeleid

Beknopte medische informatie

Ontsmetting damp
algemeen: frisse lucht, rust en onmiddellijk arts raadplegen

Ontsmetting vloeistof
huid: verontreinigde kleding uittrekken, minimaal 20 min. spoelen met veel water of douchen.
ogen: minimaal 15 min. spoelen met water (evt. contactlenzen verwijderen), dan naar oogarts brengen.
inslikken: mond laten spoelen (uitspugen!), GEEN braken opwekken en onmiddellijk arts raadplegen.

Specifieke behandeling en materialen*: geen.*
Neem contact op met het NVIC (Tel:+31 (0)30 274 8888) voor informatie met betrekking tot medisch handelen

National Institute for Public Health and the Environment
Ministry of Health, Welfare and Sport

Stofdocument deel B

CAS-nr: 78-93-3 **methyl ethyl ketone** **$CH_3COCH_2CH_3$** **UN-nr: 1193**

Basis for the Dutch Intervention Values

VRW: AEGL value is adopted, 1 hour value and longer durations not applicable

AGW: Different point of departure, different uncertainty factors, 2 hour value added and time scaling across all time points

LBW: Different point of departure, different uncertainty factors, 2 hour value added and time scaling across all time points

Date: November 2015	AEGL document: Final, 2011

Dutch Intervention Values (mg/m^3)

	10 min	30 min	1 h	2 h	4 h	8 h	End point
VRW	600	600	NA	NA	NA	NA	NOAEL for sensory irritation and CNS effects in humans
AGW	1,000	720	570	450	360	260	Threshold for developmental effects in rats and mice
LBW	18,000*	18,000*	9,200*	4,600	2,300	1,100	Threshold for lethality in rats

* value higher than 10% of LEL

Derivation of the Dutch Intervention Values

VRW: Several clinical studies revealed that exposure to methyl ethyl ketone at variable concentrations ranging from 10 ppm (30 mg/m^3) to 380 ppm (1,136 mg/m^3) over 4 hours (with five 8-minute peaks to 380 ppm, TWA is 188 ppm) did not result in adverse effects. Also continuous exposure to 100 (300 mg/m^3) or 200 ppm (598 mg/m^3) for 2 or 4 hours did not result in sensory irritation or CNS effects. Because a steady-state would be approached relatively fast at low concentrations and methyl ethyl ketone is rapidly metabolized the 200 ppm (598 mg/m^3) concentration was considered to be appropriate as a NOAEL level for sensory irritation and CNS effects for all VRW durations. However, this would not result in VRW effects below AGW levels at all time points. Therefore, VRW values were not applicable for exposure durations longer than 30 minutes.

AGW: Two developmental toxicity studies in rats and two studies in mice, where animals were exposed to 0, 400, 1,000 or 3,000 ppm (0, 1200, 3,000 or 9,000 mg/m^3, respectively) for 7 hr /day during gestation day 6-15, showed a significant increase in fetal malformations (e.g. delayed ossification, skeletal effects and soft tissue anomalies) at 3000 ppm (9000 mg/m^3) in both species as compared to controls. It was concluded that 1,000 ppm (3,000 mg/m^3) could be considered a NOAEL for developmental effects. The default total uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences. The AGW values were time-scaled from the 7-h POD value using default values for n of 1 and 3 for extrapolation to longer and shorter exposure durations, respectively.

LBW: The LBWs were based on a 4 hour rat lethality study. The 4 hour LC_{01} of 22,900 mg/m^3 calculated using DoseResp was used as point of departure. The default total uncertainty factor of 10 (3x3) was considered sufficient to account for inter- and intraspecies differences. Time-scaling was performed using the equation $C^n \times t = k$, using the default values of n=1 for all timepoints based on the finding that no mortality was observed after a 30 min exposure at 92,239 ppm (275,795 mg/m^3). Because timescaling would lead to a 10 min value (55,000 mg/m^3) above the LEL of 54,000 mg/m^3, the 10 min value was set equal the 30 min value.

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

Methyl ethyl ketone is a hydrophilic solvent which in relatively high concentrations could lead to irritation of the nose and eyes and depression of the central nervous system (CNS). The anesthetic action of methyl ethyl ketone is not well understood, however it may involve interaction with cell

membranes or changes in the membrane-bound receptors.

No data on developmental and reprotoxic effects in humans were located. Results in a series of developmental studies in mice and rats determined that 3,000 ppm (9,000 mg/m^3) was toxic to the fetus, which resulted in a reduction of the fetal body weight and bone abnormalities.

H319: Causes serious eye irritation, H336: May cause drowsiness or dizziness

Carcinogenicity and derivation of the CRP value	***Odour and derivation of the LOA value***
IARC classification: not classified No carcinogenic risk potency (CRP) was derived	Odour: unpleasant, sharp, sweet odour Odour threshold: 23.4 mg/m^3 [Devos et al., 1990] LOA = 11.8 * 23 mg/m^3 * 1.33 =366 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 lies below the VRW values.

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

VRW level **NA**	*AEGL-1* 586	*ERPG-1* -		*IDLH: 8,900 (30 min)*
AGW level **570**	*AEGL-2* 7,911	*ERPG-2* -		
LBW level **9,200**	*AEGL-3* 11,720	*ERPG-3* -		