

DIACETONE ALCOHOL

CAS number: 123-42-2

Synonyms: 4-Hydroxy-4-methyl-2-pentanone,

Chemical formula: $C_6H_{12}O_2$

Workplace exposure standard (amended)

TWA: 20 ppm (96 mg/m³)

STEL: —

Peak limitation: —

Notations: Sk.

IDLH: 1,800 ppm

Sampling and analysis: The recommended value is quantifiable through available sampling and analysis techniques.

Recommendation and basis for workplace exposure standard

A TWA of 20 ppm (96 mg/m³) is recommended to protect against effects on the kidney and sensory irritation in exposed workers.

Given the limited data available from the primary sources, it is recommended that a review of additional sources be conducted at the next scheduled review.

Discussion and conclusions

Diacetone alcohol is used as a solvent for nitrocellulose, cellulose acetate, celluloid, pigments, waxes, fats and oils. It has also been used as hydraulic brake fluid and an antifreeze (ACGIH, 2018). Critical effects include eye, respiratory and dermal irritation as well as impact on the renal system.

In a human sensory exposure study, most of subjects noted eye irritation after 15 minutes of exposure to 100 ppm of vapour. Some subjects had incidences of throat irritation and complained about odour. Most subjects suggested this would be tolerable over an eight-hour workday (ACGIH, 2018). A NOAEC of 50 ppm (233 mg/m³) and a LOAEC of 216 ppm (1,041 mg/m³) for effects on kidneys was reported in a sub-acute six-week inhalation study in rats. A NOAEL of 100 mg/kg/day was reported in a 44 day oral administration study in rats based on adverse renal effects of both male and female rats at a higher dose (DFG, 2001).

The recommended TWA of 20 ppm (96 mg/m³) aligns with the recommendations made by DFG (2001) and is lower than the identified NOAEC in humans and animals. Because of the lack of additional information, a broader review of data sources is recommended at the next scheduled review.

Recommendation for notations

Not classified as a carcinogen according to the Globally Harmonized System of Classification and Labelling on Chemicals (GHS).

Not classified as a skin or respiratory sensitiser according to the GHS.

A skin notation is recommended based on potential for contact dermatitis following prolonged or repeated contact.

DRAFT

APPENDIX

Primary sources with reports

Source	Year set	Standard
SWA	1991	TWA: 50 ppm (238 mg/m³)
ACGIH	2001	TLV-TWA: 50 ppm (238 mg/m³)
<p>TLV-TWA recommended for occupational exposure to minimise potential eye, respiratory and dermal irritation.</p> <p>Summary of Data:</p> <p>Human data:</p> <ul style="list-style-type: none"> Volunteers exposed at 100 ppm for 15 min; eye irritation in most; complaints of nose and throat irritation and objectional odour and taste Liquid diacetone alcohol defats the skin and has potential to cause dermatitis on prolonged or repeated contact. <p>Animal data:</p> <ul style="list-style-type: none"> Primarily a narcotic and anticonvulsant. Inhalation exposure for mice, rats, rabbits and cats of 2,100 ppm between 1–3 h caused somnolence after an initial period of excitability and mucous membrane irritation After a single dose of 2 mL/kg administered by gavage, haemolytic action persisted for several days, resulting in increased lymphocytes, swelling and granulation of the cytoplasm; reversible > 1 w. 		
DFG	2001	MAK: 20 ppm (96 mg/m³)
<p>Summary of additional data:</p> <p>Human data:</p> <p>Previous MAK of 50 ppm based evidence from same human study reported by ACGIH (2018); where 50 ppm considered by most volunteers tolerable for an 8-hour exposure; 50 ppm not considered a NOAEL.</p> <p>Animal Data:</p> <ul style="list-style-type: none"> LD₅₀: 3,950 mg/kg (oral, mouse) LD₅₀: 4,000 mg/kg (oral, rat) LD₅₀: 13,630 mg/kg (dermal, rabbits) 2,000 mg/kg administered to rats in an acute study over a few hours: <ul style="list-style-type: none"> >6 h, increased lymphocytes and Kupfer cells, as well as vacuolisation in the cells of the liver >7 d liver cells made a full recovery Male and female rats were exposed by inhalation at concentrations of 233, 1041 and 4,685 mg/m³ x 6 h/d for 5 d/wk over 6 wk. <ul style="list-style-type: none"> no adverse effects reported up to 4 wk of exposure; thereafter lethargy was noted in both sexes at the mid and high concentrations as well as significant reduced weight compared to controls and increase lactose hydrogenase concentrations in females: at these concentrations, adverse renal defects also were reported in both male and female rats 		



Source	Year set	Standard
<ul style="list-style-type: none"> ○ NOEL and LOEL identified at 233 mg/m³ (approx. 50 ppm) and 1041 mg/m³, respectively • A NOAEL of 100 mg/kg/d reported based on adverse renal effects in both sexes in an oral study in rats at doses of 30, 100, 300, 1,000 mg/kg for 44 d. <p>MAK provisionally set at 20 ppm based on evidence in humans (50 ppm tolerable for 8-h) and NOAEL in rats (~ 50 ppm).</p>		
SCOEL	NA	NA
No report.		
OARS/AIHA	NA	NA
No report.		
HCOTN	NA	NA
No report.		

Secondary source reports relied upon

NIL.

Carcinogenicity — non-threshold based genotoxic carcinogens

Is the chemical mutagenic?

No

The chemical is not a non-threshold based genotoxic carcinogen.

Notations

Source	Notations
SWA	—
HCIS	NA
NICNAS	NA
EU Annex	NA
ECHA	NA
ACGIH	—
DFG	H (skin)
SCOEL	NA
HCOTN	NA
IARC	NA
US NIOSH	NA

NA = not applicable (a recommendation has not been made by this Agency); — = the Agency has assessed available data for this chemical but has not recommended any notations



Skin notation assessment

Calculation

Adverse effects in human case study: yes

Dermal LD₅₀ ≤ 1000 mg/kg: no

Dermal repeat-dose NOAEL ≤ 200 mg/kg:

Dermal LD₅₀/Inhalation LD₅₀ < 10:

In vivo dermal absorption rate > 10%:

Estimated dermal exposure at WES > 10%:

a skin notation is warranted

IDLH

Is there a suitable IDLH value available? Yes

Additional information

Molecular weight: 116.16

Conversion factors at 25°C and 101.3 kPa: 1 ppm = 4.74 mg/m³; 1 mg/m³ = 0.211 ppm

This chemical is used as a pesticide: ☐

This chemical is a biological product: ☐

This chemical is a by-product of a process: ☐

A biological exposure index has been recommended by these agencies: ☐ ACGIH ☐ DFG ☐ SCOEL

Workplace exposure standard history

Year	Standard
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[Click here to enter year](#)

References

American Conference of Industrial Hygienists (ACGIH®) (2018) TLVs® and BEIs® with 7th Edition Documentation, CD-ROM, Single User Version. Copyright 2018. Reprinted with permission. See the [TLVs® and BEIs® Guidelines section](#) on the ACGIH website.

Deutsche Forschungsgemeinschaft (DFG) (2001) 4-Hydroxy-4-methylpentan-2-on – MAK value documentation.