



## RONNEL

**CAS number:** 299-84-3

**Synonyms:** O'-O-Dimethyl O-(2,4,5-trichlorophenyl)phosphorothioate, dimethyl trichlorophenyl thiophosphate, fenchlorophos

**Chemical formula:**  $C_8H_8Cl_3O_3PS$

### Workplace exposure standard (amended)

**TWA:** 5 mg/m<sup>3</sup> (inhalable and vapour)

**STEL:** —

**Peak limitation:** —

**Notations:** —

**IDLH:** 300 mg/m<sup>3</sup>

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

### Recommendation and basis for workplace exposure standard

A TWA of 5 mg/m<sup>3</sup> is recommended to protect for inhibition of red blood cell (RBC) cholinesterase (ChE) in exposed workers.

### Discussion and conclusions

Ronnel is an organophosphate pesticide used on cattle and as an a systemic antiparasitic in humans.

The critical effect of exposure is inhibition of RBC ChE that results in cholinergic effects.

Limited toxicological data are available. Five of 21 patients treated orally with 10 mg/kg/day for five or ten days for a parasitic skin infection reported transient nausea, weakness, blurred vision and seriginous ulcers. The ACGIH (2018) report this oral dose as an inhalation equivalent of 70 mg/m<sup>3</sup>. The reported symptoms disappeared immediately after Ronnel use was discontinued. Veterinarians treating cattle with topical liquid Ronnel in poorly ventilated spaces reported nausea, headaches and irritation of the throat and facial skin. No reduced plasma nor RBC ChE activity were noted. A one-year dietary study in dogs reported a NOAEL of 3 mg/kg/day. The ACGIH (2018) report this oral does is equivalent to a worker inhaling 21 mg/m<sup>3</sup> of Ronnel over an eight-hour shift (ACGIH, 2018).

Based on the evidence of transient adverse effects in humans at an estimated exposure concentration of 70 mg/m<sup>3</sup> and of no effects in animals at 21 mg/m<sup>3</sup> (estimated), a TWA of 5 mg/m<sup>3</sup> by ACGIH (2018) is recommended. This concentration is considered sufficiently low to minimise the inhibition of RBC acetylcholinesterase.

## **Recommendation for notations**

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

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

A skin notation is not recommended based on evidence in animals.

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## APPENDIX

### Primary sources with reports

Source	Year set	Standard
<b>SWA</b>	<b>1991</b>	<b>TWA: 10 mg/m<sup>3</sup></b>
<b>ACGIH</b>	<b>2006</b>	<b>TLV-TWA: 5 mg/m<sup>3</sup> (0.4 ppm), Inhalable fraction and vapour</b>
<p>TLV-TWA recommended to minimise inhibition of RBC ChE.</p> <p>Summary of data:</p> <p>Human data:</p> <ul style="list-style-type: none"> <li>No indication of sensitisation in a patch application study and challenge in 30 male and 20 female volunteers</li> <li>5/21 patients treated orally with 10 mg/kg/d for 5 or 10 d for creeping eruptions (larva migrans) reported nausea, weakness, blurred vision and/or serpiginous ulcers: <ul style="list-style-type: none"> <li>symptoms disappeared immediately after use discontinued</li> </ul> </li> <li>Nausea, headaches and irritation of the throat and facial skin in veterinarians treating cattle with liquid or other organic phosphorus pesticides in poorly ventilated areas: <ul style="list-style-type: none"> <li>no reduced plasma or RBC ChE activity in these cases</li> <li>alkyl phosphate metabolites were only occasionally found in the urine at time veterinarian blood sampling.</li> </ul> </li> </ul> <p>Animal data:</p> <ul style="list-style-type: none"> <li>LD<sub>50</sub>: 1,600–2,000 mg/kg (rabbit, dermal)</li> <li>LD<sub>50</sub>: 640 mg/kg (rabbits, oral)</li> <li>No adverse cholinergic effects reported in a sub-chronic oral diet study in rats given 0.5, 1.0, 3.0, 10.0, 30.0, 50.0 mg/kg/d: <ul style="list-style-type: none"> <li>significantly inhibited brain and RBC ChE at 30.0 and 50.0 mg/kg/d</li> </ul> </li> <li>A single female dog given 25 mg/kg/d for 11 mo (assumed per day) had no adverse effects although plasma, RBC and brain ChE activity reduced</li> <li>Dogs given 0.3, 1, 3, or 10 mg/kg/d in the diet for 1 yr: <ul style="list-style-type: none"> <li>no adverse effects except plasma and RBC ChE activity inhibited at 10 mg/kg/d</li> <li>NOAEL: 3 mg/kg/d</li> </ul> </li> <li>Rats fed doses of 0.5, 1.5, 5, 15, or 50 mg/kg/d for 2 yr: <ul style="list-style-type: none"> <li>no differences from controls in growth rate, food consumption, mortality rate or haematopoiesis</li> <li>some evidence of slight granular degeneration or cloudy swelling of parenchymal cells of liver and cloudy swelling and vacuolation of renal tubular epithelium of kidney</li> <li>plasma ChE was significantly inhibited in females given ≥1.5 mg/kg/d and in males given ≥15 mg/kg/d</li> <li>RBC and brain ChE significantly inhibited in both sexes at 15 or 50 mg/kg/d.</li> </ul> </li> </ul> <p>TLV-TWA justification:</p> <ul style="list-style-type: none"> <li>No effect levels for RBC ChE inhibition in dogs and rats reported as 3 and 5 mg/kg/d, respectively: <ul style="list-style-type: none"> <li>assuming an air exchange rate of 10m<sup>3</sup> per 8 h by a 70 kg worker, equivalent to inhaling to 21 and 35 mg/m<sup>3</sup>, respectively</li> </ul> </li> <li>Patients treated with 10 mg/kg/d for illness; associated with reversible signs of cholinergic toxicity in 5/21 subjects:</li> </ul>		



Source	Year set	Standard
		<ul style="list-style-type: none"> <li>○ equivalent to inhaling 70 mg/m<sup>3</sup>/d assuming an air exchange rate of 10 m<sup>3</sup> per 8 h by a 70 kg worker</li> <li>• Therefore, TLV-TWA of 5 mg/m<sup>3</sup> considered protective of cholinergic effects and any other effects.</li> </ul>
		Insufficient data to recommend a sensitiser notation or TLV-STEL.
<b>DFG</b>	<b>NA</b>	<b>NA</b>
		No report.
<b>SCOEL</b>	<b>NA</b>	<b>NA</b>
		No report.
<b>OARS/AIHA</b>	<b>NA</b>	<b>NA</b>
		No report.
<b>HCOTN</b>	<b>NA</b>	<b>NA</b>
		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	—
NICNAS	NA
EU Annex	NA
ECHA	—
ACGIH	Carcinogenicity – A4
DFG	NA
SCOEL	NA
HCOTN	NA
IARC	NA



Source	Notations
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:	no
Dermal LD <sub>50</sub> ≤ 1000 mg/kg:	no
Dermal repeat-dose NOAEL ≤ 200 mg/kg:	
Dermal LD <sub>50</sub> /Inhalation LD <sub>50</sub> < 10:	
<i>In vivo</i> dermal absorption rate > 10%:	
Estimated dermal exposure at WES > 10%:	
a skin notation is not warranted	

## IDLH

Is there a suitable IDLH value available? Yes

## Additional information

Molecular weight:	321.54
Conversion factors at 25°C and 101.3 kPa:	1 ppm = 13.1 mg/m <sup>3</sup> ; 1 mg/m <sup>3</sup> = 0.076 ppm
This chemical is used as a pesticide:	<input checked="" type="checkbox"/>
This chemical is a biological product:	<input type="checkbox"/>
This chemical is a by-product of a process:	<input type="checkbox"/>
A biological exposure index has been recommended by these agencies:	<input checked="" type="checkbox"/> ACGIH <input type="checkbox"/> DFG <input type="checkbox"/> SCOEL

## Workplace exposure standard history

Year	Standard
<a href="#">Click here to enter year</a>	

## References

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

European Chemicals Agency (ECHA) (2019) Ronnel – REACH assessment.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Ronnel.

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