# Dinitro-o-cresol

| CAS number: | 534-52-1 |
| --- | --- |
| Synonyms: | DNOC, 2-methyl-4,6-dinitrophenol, 4,6-dintro-o-cresol |
| Chemical formula: | C7H6N2O5 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **0.2 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **Sk., DSEN** |
| Notations: | **—** |
| IDLH: | **5 mg/m3** |
| **Sampling and analysis:** The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

The current TWA of 0.2 mg/m3 is recommended to protect for the accumulation of dinitro-o-cresol in the blood and the disruption of metabolic processes and metabolic rate that can lead to elevated body temperature, headache and malaise in exposed workers.

## Discussion and conclusions

Dinitro-o-cresol (DNOC) is used as a herbicide and insecticide and is a cumulative poison in humans that is absorbed through the skin.

Limited toxicological data exists. Critical effects include metabolic processes and hyperpyrexia. There are reports of death from exposure in manufacturing of DNOC and in agricultural workers. Symptoms of poisoning include emesis and headache, jaundiced skin, especially on the limbs, tachypnoea, weak heartbeat and severe general depression. Industrial reports noted non-fatal intoxication from exposure to 4.7 mg/m3 with no difficulties reported in workers at 2.5 mg/m3 (ACGIH, 2018).

The current TWA of 0.2 mg/m3 is recommended; based on the weight of evidence presented it is considered protective for metabolic related effects reported in workers.

## Recommendation for notations

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

Classified as a skin sensitiser and not a respiratory sensitiser according to the GHS.

A skin notation is recommended based on evidence of dermal absorption and systemic effects in humans.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 0.2 mg/m3 | |
|  |
| ACGIH 2001 TLV-TWA: 0.2 mg/m3 |
| TLV-TWA recommended to minimise the potential for disruption of metabolic processes and rate that can lead to elevated body temperature (hyperpyrexia), headache and malaise.  Summary of data:  Human data:   * Absorbed through the respiratory system, GIT and through the skin: * accumulates in blood * Reports of death from exposure in manufacturing and in agriculture workers * Cumulative poison in humans when absorbed through the skin * Symptoms from case study of poisoning via skin absorption of a child included: * emesis and headache, jaundiced skin, especially on the limbs, tachypnoea, weak heartbeat and severe general depression * autopsy revealed focal haemorrhages in the intestinal mucosa, pronounced capillary blood (plethora) in the brain, liver, lungs, intestinal walls, myocardium, and kidneys as well as oedema of the lung and brain * Blood levels of 15–20 µg/g in volunteers resulted in symptoms of poisoning: * systemic levels are from considerable accumulation * single dose of 75 mg caused no toxic effect * 5 doses resulted in headache, lassitude and malaise * Non-fatal intoxication at 4.7 mg/m3; no difficulties reported in workers at 2.5 mg/m3.   Animal data:   * Cats survived 4 h exposure to 1.4 mg/m3 aerosol; 3 cats survived daily exposure of 0.2 mg/m3 for 3 mo * In a feeding study, rats tolerated 100 ppm for 6 mo; ≡350 mg/kg/d in humans.   Insufficient data to recommend sensitisation or carcinogenicity notations or a TLV-STEL. |
| DFG 1997 Not assigned |
| Additional information:   * Previous MAK of 0.2 mg/m3 withdrawn due to long half-life in human blood compared to animals * No further information. |
| SCOEL 2004 Not assigned |
| Additional information:   * No adequate inhalation studies in animals which would enable derivation of a TWA * Considered not possible to derive a scientifically-based OEL in air * Blood levels up to 20 µg/mL unlikely to result in adverse health effects. |
| 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 | Skin sensitisation – category 1 |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | Skin Sens. 1 |
| ACGIH | Skin |
| DFG | H (skin) |
| SCOEL | Skin |
| HCOTN | NA |
| IARC | NA |
| US NIOSH | SK:SYS |

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 | 4.00 |  | | Dermal LD50 ≤1000 mg/kg: |  |  |  | | 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: | 198.13 |
| --- | --- |
| Conversion factors at 25°C and 101.3 kPa: | 1 ppm = Number mg/m3; 1 mg/m3 = Number 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 |
| --- | --- |
| 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*](http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations) on the ACGIH website.

Deutsche Forschungsgemeinschaft (DFG) (1997) 4,6-Dinitro-o-cresol – MAK value documentation.

European Chemicals Agency (ECHA) (2019) Dinitro-o-cresol – REACH assessment.

EU Scientific Committee on Occupational Exposure Limits (SCOEL) (2004) Recommendation from the Scientific Committee on Occupational Exposure Limits for 4,6-dinitro-o-cresol. SCOEL/SUM/60.

US National Institute for Occupational Safety and Health (NIOSH) (2015) NIOSH Skin Notation Profiles: Dinitro-o-cresol.