# Rhodium, METAL and compounds (as Rh)

| CAS number: | 7440-16-6 |
| --- | --- |
| Synonyms: | — |
| Chemical formula: | Rh |

Workplace exposure standard (retained)

| TWA: | **Rhodium metal: 1 mg/m3**  **Rhodium, insoluble compounds: 1 mg/m3**  **Rhodium, soluble compounds: 0.01 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: |  |
| IDLH: | **100 mg Rh/m3** |
| **Sampling and analysis:** The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 1 mg/m3 for rhodium metal and insoluble rhodium compounds and a TWA of 0.01 mg/m3 soluble rhodium compounds are recommended to protect for potential respiratory effects in workers.

## Discussion and conclusions

Rhodium is used in alloys for a range of industrial and commercial applications such as electrical contacts, scientific instruments and jewellery.

Critical effects of exposure are adverse respiratory effects.

Limited toxicological data are available in humans and animals.

Rhodium metal is a member of the platinum group metals and its toxicity profile is like platinum. ACGIH (2018) recommend standards analogous to platinum standards. While rhodium and compounds are considered genotoxic, there are no positive carcinogenicity studies in the primary sources; however, some carcinogenic effects in animals have been reported for rhodium compounds.

No adverse human effects are reported during the handling of highly soluble rhodium(l) carbonyl acetylacetonate (ACGIH, 2018). There are some indications of carcinogenicity attributed to rhodium trichloride based on lifetime drinking water study in rats from weaning until death. However, this is not considered relevant to human occupational exposures (DFG, 2003).

Given the absence of data, the TWA of 1 mg/m3 for rhodium metal and insoluble rhodium compounds, and a TWA of 0.01 mg/m3 soluble rhodium compounds by SWA and ACGIH are recommended to be retained. The recommended TWA is considered to protect for potential respiratory effects in exposed workers.

## 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 Rhodium metal TWA: 1 mg/m3  Rhodium, insoluble compounds TWA: 1 mg/m3  Rhodium, soluble compounds TWA: 0.01 mg/m3 | |
|  |
| ACGIH 2001 TLV-TWA: 1 mg/m3- Metal  TLV-TWA: 1 mg/m3 as Rh – Insoluble compounds  TLV-TWA: 0.01 mg/m3 as Rh – Soluble compounds |
| TLV-TWAs recommended to minimise the potential for adverse respiratory effects.  Summary of data:  Toxicological data in humans and animals are limited. Rh metal is a member of the Pt metals. Toxicity of Rh metal and its compounds similar to that of Pt metal.  TLV-TWA for Rh metal and insoluble compounds is recommended by analogy to that for Pt (TLV-TWA of 1 mg/m3). TLV–TWA of 0.01 mg /m3 (Rh) for the soluble compounds based on evidence that none of the Pt metals, other than Pt, are known to produce respiratory disease and handling of significantly soluble Rh complex, Rh(l) carbonyl acetylacetonate.  Human data:   * No issues reported during the handling of highly soluble Rh(l) carbonyl acetylacetonate. |
| DFG 2003 Not assigned |
| No suitable data to establish a MAK value.  Summary of additional data:   * Indications of some carcinogenicity of RhCl3 based on lifetime drinking water study in rats from weaning until death. * DNA bonding *in vivo* is assumed based on analogy to Pt compounds * RhCl3 is considered genotoxic: * caused reverse mutations in *E. coli* WP2 and *S. typhimurium* TA98 * not in *E. coli* B/r WP2 and *S. typhimurium* TA1535, TA100, TA1537, TA1538 * Assumed the release of Rh ions is responsible for genotoxic effect in all Rh compounds and complexes: * cannot be excluded that ions are released from the metallic form as well, Rh and inorganic Rh compounds are also classified in Carcinogen category 3B, analogous to RhCl3. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2002 Not assigned |
| No further information. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| NICNAS |  | ND | * Human health tier 1 assessment. |
| ECHA |  | 2019 | * No further information. |

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Insufficient data |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | 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 | Carcinogenicity – A4 |
| DFG | Carcinogenicity – 3B |
| SCOEL | NA |
| HCOTN | — |
| 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 |
| --- |
| Insufficient data to assign a skin notation. |

### IDLH

| Is there a suitable IDLH value available? | Yes |
| --- | --- |

## Additional information

| Molecular weight: | 102.9055 u |
| --- | --- |
| 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) (2007) Rhodium and its inorganic compounds – MAK value documentation.

European Chemicals Agency Regulation (ECHA) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Health Council of the Netherlands (HCOTN) (2002) Rhodium and compounds. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2002/08OSH.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (No Date) Rhodium: Human health tier I assessment – IMAP report.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Rhodium (metal fume and insoluble compounds, as Rh).