# Rosin core solder pyrolysis products

| CAS number: | 8050-09-7 |
| --- | --- |
| Synonyms: | RBSFF, colophony fume, resin acids |
| Chemical formula: | C15H20O6 |
| Structural formula: | — |

Workplace exposure standard (retained)

| TWA: | **0.1 mg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Sk., DSEN** |
| IDLH: | **—** |
| **Sampling and analysis:** There is uncertainty regarding quantification of the recommended value with available sampling and/or analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 0.1 mg/m3 is recommended to limit the potential for occupational asthma in exposed workers.

## Discussion and conclusions

Rosin or colophony is used in flux, welding and soldering agents. Rosin is reported for domestic use as an adhesive and binder. Rosin core solder is measured *via* pyrolysis products and include acetone, aliphatic aldehydes, methyl alcohol, methane, ethane and various abietic acids.

Critical effects of exposure are skin sensitisation, contact dermatitis and possible occupational asthma.

No exposure-response data is available. There are equivocal data showing that fumes from heated compounds containing rosin chemicals may cause occupational asthma. Respiratory symptoms including breathlessness, wheezing and tightness of the chest are reported in individuals exposed to fluxes or core solders containing rosins or rosin components. In some cases, short-term reversible airway obstruction was reported in exposed workers. While in other cases, workers were symptom free for an average of six years before developing chronic asthma (ACGIH, 2018; NICNAS, 2013).

Given the limited available data, the TWA of 0.1 mg/m3 is recommended to be retained to limit the potential for occupational asthma.

## 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 respiratory sensitiser according to the GHS. A review of this classification is recommended as evidence suggests occupational asthma as a result of exposure.

A skin notation is recommended based on systemic effects in humans following dermal exposure.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1991 TWA: 0.1 mg/m3 (as formaldehyde) | |
|  |
| ACGIH 2014 TLV-TWA: None |
| TLV-TWA is not recommended due to lack of data. Exposure by all routes to be controlled to levels as low as possible.  Lack of reliable workplace colophony air concentration data and analysis methods prevents a TLV‑TWA recommendation.  Summary of data:   * Previous TLV-TWA of 0.1 mg/m3; revised to ‘none’; advice to reduce exposure to resin acids colophony to as low as possible in 1993 * Principal flux in many commercial solders is colophony, a pine tree resin containing several whole resin acids; some which are considered etiological agents for skin sensitisation, contact dermatitis or occupational asthma reported in workers.   Human data:   * Immediate asthmatic reaction in some workers following inhalation of a few breaths of colophony; severity and duration of asthma symptoms related to degree of exposure; no further information * Studies in the electronics industry reported the development of permanent asthma in exposed workers who were previously symptom-free for an average of 6 yr: * exposure data unavailable * 3 case reports of allergic contact dermatitis associated with occupational exposure; no further information * Both irritant dermatitis and allergic contact dermatitis among workers in the electronics industry in Singapore * Case report of occupational asthma in a male worker: * 3 wk exposure breaking up solid unheated colophony by hitting it with a hammer.   Animal data:   * Skin sensitisation reported in animals and colophony-sensitive humans patch tested with commercial colophony.   RSEN and DSEN assigned to minimise the risk of adverse dermal effects or skin or pulmonary sensitisation. |
| DFG 1995 Not assigned |
| No MAK assigned. Considered a sensitising substance (dermal).  Summary of additional data:   * Bronchial asthma associated with inhalation exposure to rosin dusts or vapours, especially in soft welding work involving flux agents that contain rosin * Long latent period between exposure and the occurrence of complaints, and the fact that respiratory symptoms occur only in some of the exposed employees are an indication of an immunological mechanism. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN NA NA |
| No report. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| NICNAS |  | 2013 | * Review of group of structurally related rosin compounds: * rosin is a complex combination of chemicals derived from wood, especially pine wood * Toxicological data not available for all the chemicals in the group and available data have also been sourced from other structurally related rosins including rosin, reaction products with formaldehyde (CAS No. 91081-53-7) * Equivocal data to show that fumes from heated compounds containing rosin chemicals may cause occupational asthma * Respiratory symptoms including breathlessness, wheezing and tightness of the chest have been reported in individuals exposed to fluxes or core solders containing rosins or rosin components. |

### 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 | Skin sensitisation |
| EU Annex | Skin sensitisation – category 1 |
| ECHA | Skin Sens. 1 |
| ACGIH | NA |
| DFG | Sh (dermal sensitiser) |
| 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 | 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? | No |
| --- | --- |

## Additional information

| Molecular weight: | 302.45 |
| --- | --- |
| 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) (2002) Rosin (Colophony) – MAK value documentation.

European Chemicals Agency (ECHA) (2019) rosin; colophony [1] rosin; colophony [2] rosin; colophony [3] – REACH assessment.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2013) Rosin, hydrogenated rosin and salts: Human health tier II assessment – IMAP report.

Tenth Adaptation to Technical Progress Commission Regulation (EU) No 2017/776 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (the CLP Regulation).