# coal tar pitch volatiles

| CAS number: | 65996-93-2 |
| --- | --- |
| Synonyms: | Mixture contains - anthracene, benz[a]anthracene, benzo(a)pyrene (B[a]P), benzo[b]fluoranthene, phenanthrene, acridine, chrysene, or pyrene |
| Chemical formula: | Various |

Workplace exposure standard (amended)

| TWA: | **0.1 µg/m3** |
| --- | --- |
| STEL: | **—** |
| Peak limitation: | **—** |
| Notations: | **Carc. 1A, 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

The TWA of 0.1 µg/m3 is recommended to minimise the potential for lung cancers and other tumours in exposed workers.

## Discussion and conclusions

Coal tar pitch is a dark brown or black residue remaining after redistillation process. The volatiles contain lower molecular weight polycyclic hydrocarbons (PAHs) which sublime into air. The composition of coal tar pitch changes depending on the original raw materials and temperatures used in production. Coal tar is used as a base for coatings and paints, for roofing and paving and as a binder for carbon electrodes used in aluminium smelting. It has often been found as a contaminant in bitumen products.

Based on the available data, the critical effects of exposure to coal tar pitch volatiles are unclear as separation of the various components is not practicable. As such, an assessment of coal tar pitch exposures is based on the identified key solvent components (benzo(a)pyrene, benzene and others) which based on the mode of action for their carcinogenicity, are characterised as non-threshold based genotoxic carcinogens (ACGIH, 2018; NICNAS, 2015). The carcinogenicity of benzo(a)pyrene is demonstrated to act *via* a mutagenic mode of action (US EPA, 2017).

As such, the recommended TWA of 0.1 µg/m3 is derived at a minimal cancer risk level using the US EPA Inhalation Unit Risk (IUR) for benzo(a)pyrene (US EPA, 2017). This provides a concentration of 0.13 µg/m3 which has been rounded down to obtain a TWA of 0.1 µg/m3.

## Recommendation for notations

Classified as a category 1A 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.

There are insufficient data to recommend a skin notation.

# Appendix

### Primary sources with reports

| Source Year set Standard |
| --- |
| SWA 1995 TWA: 0.2 mg/m3 | |
|  |
| ACGIH 2001 TLV-TWA: 0.2 mg/m3 (as benzene solubles) |
| TLV-TWA intended to minimise the incidence of lung cancers and other tumours.  TLV-TWA based on solvent components (benzene or others) of coal tar pitch aerosols responsible for carcinogenic effects.  Summary of data:  Human data:   * Kidney and lung cancers reported in gas workers, coke oven workers and aluminium plant workers.   Animal data:   * Tumours reported in mice after 465 days following dermal application of benzene extracts (no further detail available).   Confirmed human carcinogen notation assigned due to dermal, lung and kidney tumours observed in animals treated with benzene extracts of coal tars aerosols.  Insufficient data available to recommend skin or sensitisation notation. |
| DFG NA NA |
| Assigned to Section III – Carcinogens, with reference to Polycyclic Aromatic Hydrocarbons (PAH)  No further specific information.  Summary of additional data:   * Extremely complex mixture containing carcinogenic components which promote cancer development and fractions that inhibit carcinogenic effects of other components * Many PAH in pyrolysis products are carcinogenic in animal studies * Carcinogenic effect demonstrated in epidemiological studies. |
| 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 |  | 2015 | * Critical health effects of high temperature coal tar pitch exposure are systemic long-term effects such as carcinogenicity and reproductive/developmental toxicity * Occupational exposure to coal tars considered to cause skin, scrotal and lung cancer * Positive results for genotoxicity in an Ames test in *S. typhimurium* strains TA 98, 100 and 1537 * Skin and eye irritation in humans reported * International exposure standards in some European and Asian countries with some countries noted to be lower than current SWA WES * Dermal sensitisation noted in mice and guinea pigs which support classification when using B[a]P as the basis. * STEL of 0.03 mg/m3 noted in Mexico * Low dermal acute toxicity in animal tests * LD50: >2,000 mg/kg body weight (rats). |
| US EPA |  | 2017 | * An extensive database of *in vitro* and *in vivo* studies demonstrating the genotoxicity and mutagenicity of benzo[a]pyrene following metabolic activation provides supporting evidence of a mutagenic mode of action for benzo[a]pyrene carcinogenicity*.* |

### Carcinogenicity — non-threshold based genotoxic carcinogens

| Is the chemical mutagenic? | Yes |
| --- | --- |
| Is the chemical carcinogenic with a mutagenic mechanism of action? | Yes |
| **The chemical is a non-threshold based genotoxic carcinogen.** |  |
| Is a cancer slope factor or inhalation unit risk value available? | Yes |
| Inhalation unit risk value (1/(µg/m³)) | 6 x 10-4 |
| Calculated TWA value (µg/m3) | 0.133 µg/m3 |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| HCIS | Carcinogenicity – category 1A, Skin sensitisation – category 1 |
| NICNAS | Carc. Cat 1, Skin Sensitiser |
| EU Annex | Carcinogenicity – category 1A |
| ECHA | Carcinogenicity – category 1B |
| ACGIH | Carcinogenicity – A1 |
| DFG | NA |
| SCOEL | NA |
| HCOTN | NA |
| IARC | Carcinogenicity – Group 1 |
| 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

Insufficient data to assign a skin notation.

### IDLH

| Is there a suitable IDLH value available? | No, the chemical is a genotoxic carcinogen |
| --- | --- |

## Additional information

| Molecular weight: | NA |
| --- | --- |
| 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.

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).

International Agency for Research on Cancer (IARC) (2012) Volume 100F Chemical agents and related occupations. IARC Monographs on the evaluation of the carcinogenic risk to humans.

National Industrial Chemicals Notification and Assessment Scheme (NICNAS) (2015) Coal Tar and Coal Tar Pitch: 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).

US Environmental Protection Authority (US EPA) (2017),   Integrated Risk Information System (IRIS) - Toxicological Review of Benzo[a]pyrene.

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