# Methyl acetylene-propadiene mixture (MAPP)

| CAS number: | 59355-75-8 |
| --- | --- |
| Synonyms: | Propyne-allene mixture, MAPP gas |
| Chemical formula: | C3H4 |

Workplace exposure standard (retained)

| TWA: | **1,000 ppm (1,640 mg/m3)** |
| --- | --- |
| STEL: | **1,250 ppm (2,050 mg/m3)** |
| Peak limitation: | **—** |
| Notations: | **—** |
| IDLH: | **3,400 ppm (LEL)** |
| **Sampling and analysis:** The recommended value is quantifiable through available sampling and analysis techniques. | |

## Recommendation and basis for workplace exposure standard

A TWA of 1,000 ppm (1,640 mg/m3) is recommended to protect for anaesthesia effects in exposed workers.

A STEL of 1,250 ppm (2,050 mg/m3) is recommended to protect for asphyxia in exposed workers.

## Discussion and conclusions

Methyl acetylene-propadiene mixtures (MAPP) are used as industrial cutting fuel.

Critical effects of exposure are anaesthesia, and at higher concentrations, asphyxiation. The odour threshold in humans is 100 ppm. Human and animal exposure data are extremely limited and some primary sources recommend a TWA based on analogy to methylacetylene. A NOAEC of 1,000 ppm for body weight and organ weight changes, with a corresponding LOAEC of 5,000 ppm, are reported in a subchronic inhalation study in animals (ACGIH, 2018; HCOTN, 2004).

The TWA of 1,000 ppm and STEL of 1,250 ppm are recommended to be retained as they are considered sufficiently protective of the critical effects and align with the assessment presented by the ACGIH (2018).

## 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 2016 TWA: 1,000 ppm (1,640 mg/m3); STEL: 1,250 ppm (2,050 mg/m3) | |
|  |
| ACGIH 2018 TLV-TWA: 1,000 ppm; TLV-STEL: 1,250 ppm |
| TLV-TWA and TLV-STEL recommended to minimise potential for anaesthetic effects and, at higher concentrations, asphyxiation.  Summary of data:  Human and animal exposure data are very limited.  Mixtures typically contain 68–70% methylacetylene.  Workplace exposures near the TLV-TWA and TLV-STEL should consider the 10% LEL of 3,400 ppm.  TLV-TWA and TLV-STEL based on very limited animal data and by analogy to methylacetylene.  Human data:   * Odour threshold: 100 ppm.   Animal data:   * No adverse effects at 1,000 ppm measured by mortality, growth, haematological parameters and histopathology (rats, rabbits, dogs, guinea pigs, 7 h/d, 5 d/wk, 16 wk); decreased bw and organ weight at 5,000 ppm only in male rats and guinea pigs   + effects at 5,000 ppm considered non-specific and not detected in clinical chemistry or histopathological parameters.   Insufficient data to recommend notations for carcinogenicity, skin absorption or sensitisation. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2004 TWA: 1,000 ppm (1,800 mg/m3) |
| Summary of additional data:  Current administrative OEL of 1,000 ppm considered too high; proposed HBROEL derived from NOAEL of 1,000 ppm for non-specific bw and organ weight changes in male guinea pigs (also cited by ACGIH, 2018). A factor of 3 is applied to account for intraspecies differences and rounded down to arrive at the proposed HBROEL of 300 ppm as a TWA.  Animal data:   * Anaesthesia at 100,000–150,000 ppm methylacetylene (rats, cats, duration/frequency not specified); cardiac irregularities and convulsions reported * Liver damage and narcosis at 113,500 mg/m3 (acute) 82,000 mg/m3 (chronic) for a C3-C4 alkane-alkene mixture containing 45% methylacetylene and 25.6% propadiene (rats, duration/frequency not specified) * Signs of narcosis and anaesthesia, and, at necropsy, dark-red colouration of lungs, bronchial contraction, and alveolar haemorrhage at 42,000 ppm (rats, 6 h); bronchiolitis and pneumonitis noted during 9 d observation period * Rapidly reversible excess salivation, excitability, muscular fasciculation and some mortality at 28,700 ppm methylacetylene (rats, dogs, 6 h/d, 5 d/wk, 6 mo):   + bw loss reported; transient in dogs   + no macro- or microscopic changes observed during autopsy of dogs   + distention, dark-red colouration, oedema, haemorrhages, and signs of irritation in lungs of rats * Equivocal mutagenicity data *in vitro* in *Salmonella* strains and *E. Coli*. |

### Secondary source reports relied upon

| Source |  | Year | Additional information |
| --- | --- | --- | --- |
| US NIOSH |  | 1994 | 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? | Insufficient data |
| **Insufficient data are available to determine if the chemical is a non-threshold based genotoxic carcinogen.** | |

## Notations

| Source | Notations |
| --- | --- |
| SWA | NA |
| HCIS | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | NA |
| DFG | NA |
| 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 |
| --- |
| Insufficient data to assign a skin notation. |

### IDLH

| Is there a suitable IDLH value available? | Yes, based on LEL |
| --- | --- |

## Additional information

| Molecular weight: | 40.07 |
| --- | --- |
| 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.

Health Council of the Netherlands (HCOTN) (2004) Propyne-allene mixture (MAPP gasHealth-based Reassessment of Administrative Occupational Exposure Limits. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/129.

US National Institute for Occupational Safety and Health (NIOSH) (1994) Immediately dangerous to life or health concentrations – Methyl acetylene-propadiene mixture (MAPP).