# m-Phthalodinitrile

| CAS number: | 626-17-5 |
| --- | --- |
| Synonyms: | 1,3-Benzenedicarbonitrile, 1,3-dicyanobenzene, IPN, isophthalonitrile |
| Chemical formula: | C8H4N2 |
| Structural formula: | — |

Workplace exposure standard (retained)

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

## Recommendation and basis for workplace exposure standard

A TWA of 5 mg/m3 is recommended to protect for liver damage in exposed workers.

## Discussion and conclusions

m-Phthalodinitrile is used as an intermediate in the manufacture of polyurethane paints and varnishes, plastics and synthetic fibres. It is also used as a firming agent in epoxy resins and in some agricultural chemicals.

Critical effect of exposure are hepatic (liver) damage. No human toxicological data are available. A NOAEL of 5 mg/kg/day was identified in a 28-day rat feeding study with liver effects reported at 10 mg/kg/day. A NOAEL of 5 mg/kg/day for hepatic effects is reported in a 99-day feeding study in rats. This is reported as an equivalent workday concentration of 35 mg/m3 based on generic factors (ACGIH, 2018). Rhinorrhoea and diarrhoea in reported from a sub-chronic rat inhalation study, which is indicative of autonomic nervous system stimulation at 1,250 mg/m3 (ACGIH, 2018). However, the concentration at which these nervous system effects manifest is too high to be a critical effect.

The current TWA of 5 mg/m3 as derived by ACGIH (2018) and HCOTN (2001) is recommended to be retained. Based on the absence of liver damage at 5 mg/kg/day (approximately 35 mg/m3 human workday equivalent) in animals, this TWA is expected to be protective of liver damage and possible autonomic nervous system as reported in animals.

## 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 TWA: 5 mg/m3 | |
|  |
| ACGIH 2009 TLV-TWA: 5 mg/m3 |
| TLV-TWA recommended to protect against potential hepatic toxicity and autonomic nervous system stimulation.  Summary of data:  OEL based on NOAEL of 5 mg/kg/d for hepatic effects; equivalent to 35 mg/m3 (assuming 70 kg worker with respiratory volume of 10 m3) and autonomic nervous system stimulation at 1,250 mg/m3; no specific derivation provided.  No human data.  Animal data:   * Rhinorrhoea (runny nose) in rats exposed at ≤8,970 mg/m3 for 1 h * No deaths or evidence of erythema or oedema in rabbits when 2,000 mg/kg applied topically for 24 h * Male and female rats exposed at 190 mg/m3 or 1,500 mg/m3 for 6 h/d, 5 d/wk for 2 wk: * at 190 mg/m3 half the rats exhibited alopecia; no further information * at 1,500 mg/m3 alopecia, rhinorrhoea and diarrhoea were evident * rhinorrhoea and diarrhoea are indications of autonomic nervous system stimulation * Sub-chronic mouse feeding study; 259, 399 and 501 mg/kg/d in males, 305, 466 and 617 mg/kg/d in females for 34 d; increased liver weights, centrilobular hepatocytomegaly, increased activity and aggressiveness and reduced food consumption at all doses * A 28-day rat feeding study; 0, 5,10, 25 or 50 mg/kg/d: * decreased food consumption and body weight gain at 25 and 50 mg/kg/d in males and at 10 mg/kg/d and higher in females * significant increases in serum ALT, a liver function marker, seen in males fed 10 and 50 mg/kg/d and in females fed 10 mg/kg/d and higher * increases in centrilobular hepatocytomegaly seen at 50 mg/kg/d in both males and females and at 25 mg/kg/d in males only * NOAEL of 5 mg/kg/d; equivalent to 35 mg/m3 (assuming 70 kg worker with respiratory volume of 10 m3) * 90-day feeding study; males fed 0, 20, 200 and 400 mg/kg/d; females 0, 20, 200 and 360 mg/kg/d: * all dietary levels produced increased liver weights and centrilobular hepatocytomegaly, few or no faeces and increased aggression * LOAEL reported as 20 mg/kg/d (≡140 mg/m3) * 99-day feeding study in rats; 0, 1, 5 or 25 mg/kg/d in feed: * NOAEL of 5 mg/kg/d for males based on increased liver weights measured in rats fed 25 mg/kg/d (LOAEL) * NOAEL for female rats of 5 mg/kg/d; demonstrated increases in GGT and liver weights observed; centrilobular hepatocytomegaly and increases in urine volume at 25 mg/kg/d. |
| DFG NA NA |
| No report. |
| SCOEL NA NA |
| No report. |
| OARS/AIHA NA NA |
| No report. |
| HCOTN 2001 TWA: 5 mg/m3 |
| Administrative OEL; toxicological database insufficient to recommend a health-based OEL.  Summary of additional data:   * Not irritating to skin or eye of rabbits * No additional data. |

### 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 | NA |
| NICNAS | NA |
| EU Annex | NA |
| ECHA | NA |
| ACGIH | — |
| DFG | NA |
| 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? | No |
| --- | --- |

## Additional information

| Molecular weight: | 128.13 |
| --- | --- |
| 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.

Health Council of the Netherlands (HCOTN) (2001) m-Phthalodinitrile. Health-based calculated occupational cancer risk values. The Hague: Health Council of the Netherlands; publication no. 2000/15OSH/027.