

Methacrylonitrile; CASRN 126-98-7

Human health assessment information on a chemical substance is included in the IRIS database only after a comprehensive review of toxicity data, as outlined in the [IRIS assessment development process](#). Sections I (Health Hazard Assessments for Noncarcinogenic Effects) and II (Carcinogenicity Assessment for Lifetime Exposure) present the conclusions that were reached during the assessment development process. Supporting information and explanations of the methods used to derive the values given in IRIS are provided in the [guidance documents located on the IRIS website](#).

STATUS OF DATA FOR Methacrylonitrile

File First On-Line 09/07/1988

Category (section)	Assessment Available?	Last Revised
Oral RfD (I.A.)	yes	09/07/1988
Inhalation RfC (I.B.)	not evaluated	
Carcinogenicity Assessment (II.)	not evaluated	

I. Chronic Health Hazard Assessments for Noncarcinogenic Effects

I.A. Reference Dose for Chronic Oral Exposure (RfD)

Substance Name — Methacrylonitrile

CASRN — 126-98-7

Last Revised — 09/07/1988

The oral Reference Dose (RfD) is based on the assumption that thresholds exist for certain toxic effects such as cellular necrosis. It is expressed in units of mg/kg-day. In general, the RfD is an estimate (with uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. Please refer to the Background Document for an elaboration of these concepts. RfDs can also be derived for the noncarcinogenic health effects of substances that are also carcinogens. Therefore, it is essential to refer to other sources of

information concerning the carcinogenicity of this substance. If the U.S. EPA has evaluated this substance for potential human carcinogenicity, a summary of that evaluation will be contained in Section II of this file.

I.A.1. Oral RfD Summary

Critical Effect	Experimental Doses*	UF	MF	RfD
Increased SGOT and SGPT levels	NOAEL: 3.2 ppm (9 mg/cu.m), converted to 0.34 mg/kg/day	3000	1	1E-4 mg/kg/day
Dog Subchronic Study	LOAEL: 8.8 ppm (24 mg/cu.m), converted to 0.85 mg/kg/day			
Pozzani et al., 1968				

* Conversion Factors: The inhalation concentration was multiplied by 7 hours/24 hours and 5 days/7 days, by 4.3 cu.m/day (dog inhalation rate), by an absorption factor of 0.5 and divided by 12.7 kg, the assumed dog body weight.

I.A.2. Principal and Supporting Studies (Oral RfD)

Pozzani, U.C., E.R. Kinhead and J.M. King. 1968. The mammalian toxicity of methacrylonitrile. *Am. Ind. Hyg. Assoc. J.* 29:202-210.

Groups of three male dogs were exposed by inhalation to methacrylonitrile at concentrations of 0, 3.2, 8.8, or 13.5 ppm (0, 9, 24, or 37 mg/cu.m) 7 hours/day, 5 days/week for 90 days. Endpoints of toxicity examined were body weight changes, overt signs, hematocrit, total and differential white cell counts, BUN, SGOT, SGPT, SAP, liver and kidney weights, and gross and histological examination of 27 tissues, including the brain. CNS toxicity, as evidenced by convulsions and loss of motor control of the hindlimbs, was observed in 2/3 dogs at 37 mg/cu.m. One of these dogs had histopathological brain lesions, including some demyelination of the corpus callosum. SGOT and SGPT levels were markedly elevated in 1/3 dogs at 24 mg/cu.m, but the elevations were transient. No effects were observed at 9 mg/cu.m. Thus, 24 and 9 mg/cu.m (7 hours/day, 5 days/week) are the LOAEL and NOAEL, respectively.

While methacrylonitrile is structurally related to acrylonitrile, the LD50 data indicates that methacrylonitrile is less toxic than acrylonitrile (acrylonitrile LD50 = 93 mg/kg; methacrylonitrile LD50 = 200 mg/kg).

I.A.3. Uncertainty and Modifying Factors (Oral RfD)

UF — An uncertainty factor of 3000 includes 10 for interspecies extrapolation, 10 to protect the most sensitive individuals and 10 for the use of a subchronic NOAEL and an additional factor of 3 because only inhalation studies are available, neurotoxicity was not examined and reproductive and chronic toxicity data are lacking.

MF — None

I.A.4. Additional Studies/Comments (Oral RfD)

Pozzani et al. (1968) also exposed rats (12/sex/group) inhalation to methacrylonitrile at concentrations of 0, 19.3, 52.6, and 109.3 ppm (0, 53, 144, and 200 mg/cu.m), 7 hours/day, 5 days/week for 91 days. Endpoints of toxicity examined were overt signs, body weight changes, liver and kidney weights, and gross and histopathological examination of 19 tissues, not including the brain. Deaths and increased relative liver weight occurred at greater than or equal to 144 mg/cu.m. No effects occurred at 53 mg/cu.m. These exposures are equivalent to oral doses of 9.6 and 3.5 mg/kg/day, respectively, which are much higher than the LOAEL in dogs, showing a large interspecies variation.

I.A.5. Confidence in the Oral RfD

Study — Low
Database — Low
RfD — Low

Low confidence was placed in the study because, although it was a well- conducted subchronic inhalation study using several exposure levels and defining a LOAEL and a NOAEL, only a few animals of one sex were used. Low confidence is placed in the database because only one supporting study is available, and there were no oral studies or data regarding chronic toxicity or developmental and reproductive effects. Therefore, confidence in the RfD is low.

I.A.6. EPA Documentation and Review of the Oral RfD

Source Document — U.S. EPA, 1987

Limited peer review and extensive Agency-wide review 1987.

Other EPA Documentation — None

Agency Work Group Review — 09/17/1987

Verification Date — 09/17/1987

Screening-Level Literature Review Findings — A screening-level review conducted by an EPA contractor of the more recent toxicology literature pertinent to the RfD for Methacrylonitrile conducted in August 2003 identified one or more significant new studies. IRIS users may request the references for those studies from the IRIS Hotline at hotline.iris@epa.gov or 202-566-1676.

I.A.7. EPA Contacts (Oral RfD)

Please contact the IRIS Hotline for all questions concerning this assessment or IRIS, in general, at (202)566-1676 (phone), (202)566-1749 (FAX) or hotline.iris@epa.gov (internet address).

I.B. Reference Concentration for Chronic Inhalation Exposure (RfC)

Substance Name — Methacrylonitrile
CASRN — 126-98-7

Not available at this time.

II. Carcinogenicity Assessment for Lifetime Exposure

Substance Name — Methacrylonitrile
CASRN — 126-98-7

This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.

III. [reserved]

IV. [reserved]

V. [reserved]

VI. Bibliography

Substance Name — Methacrylonitrile
CASRN — 126-98-7

VI.A. Oral RfD References

Pozzani, U.C., E.R. Kinhead and J.M. King. 1968. The mammalian toxicity of methacrylonitrile. *Am. Ind. Hyg. Assoc. J.* 29:202-210.

U.S. EPA. 1987. Health and Environmental Effects Document for Selected Nitriles. Prepared by the Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH for the Office of Solid Waste and Emergency Response, Washington, DC.

VI.B. Inhalation RfC References

None

VI.C. Carcinogenicity Assessment References

None

VII. Revision History

Substance Name — Methacrylonitrile
CASRN — 126-98-7

Date	Section	Description
09/07/1988	I.A.	Oral RfD summary on-line
10/28/2003	I.A.6.	Screening-Level Literature Review Findings message has been added.

VIII. Synonyms

Substance Name — Methacrylonitrile
CASRN — 126-98-7
Last Revised — 09/07/1988

- 126-98-7
- 2-cyanopropene
- isopropene cyanide
- isopropenyl nitrile
- Methacrylonitrile
- 2-methylacrylonitrile
- 2-methylpropenitrile