

Safety Data Sheet
Methylhexahydrophthalic anhydride



Revision 9

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SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Commercial name: **Methylhexahydrophthalic anhydride**
REACH registration number: 01-2119510879-29-0000
Index number: 607-241-00-6
International Chemical Identification: hexahydro-4-methylphthalic anhydride
CAS number: 19438-60-9
EC number: 243-072-0

1.2. Relevant identified uses of the substance or mixture and uses advised against

Formulation
Industrial use as a hardener for epoxy resins, as such or in a mixture

1.3. Details of the supplier of the safety data sheet

Producer: Polynt S.p.A.
Via Enrico Fermi 51
24020 Scanzorosciate (BG)
ITALY
Telephone number: +39 035 652 111
msds@polynt.com

Supplier: Polynt S.p.A.
Via Enrico Fermi 51
24020 Scanzorosciate (BG)
ITALY
Telephone number: +39 035 652 111

1.4. Emergency telephone number

+39 035 652 276

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Reg CE 1272/2008

Hazard classes and Hazard statement Code(s)	Hazard Class and Category Code(s)
Serious eye damage/eye irritation H318: Causes serious eye damage.	Eye Dam. 1
Respiratory/skin sensitization H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.	Resp. Sens. 1
Respiratory/skin sensitization H317: May cause an allergic skin reaction.	Skin Sens. 1

(*)2.2. Label elements

Labelling according to Regulation 1272/2008/EC.

Contains: hexahydro-4-methylphthalic anhydride
INDEX N° 607-241-00-6
CAS N° 19438-60-9
EC N° 243-072-0

Pictograms:

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DANGER

Hazard statement:

H317: May cause an allergic skin reaction.

H318: Causes serious eye damage.

H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary statements:

P272: Contaminated work clothing should not be allowed out of the workplace.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P501: Dispose of contents/container to waste in accordance with national/international regulation.

P261: Avoid breathing vapours.

P333+P313: If skin irritation or rash occurs: Get medical advice/attention.

P284: (In case of inadequate ventilation) wear respiratory protection. (see MSDS).

P304+P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P280: Wear protective gloves/eye protection/face protection. (see MSDS).

P302+P352: IF ON SKIN: Wash with plenty of soap and water.

P362+P364: Take off contaminated clothing and wash it before reuse.

P342+P311: If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician.

2.3. Other hazards

No other known.

For PBT and/or vPvB see section 12.5.

SECTION 3: Composition/information on ingredients

3.1. Substances

Hexahydro-4-methylphthalic anhydride

International Chemical Identification: hexahydro-4-methylphthalic anhydride

Index number: 607-241-00-6

Chemical formula: C₉H₁₂O₃

Concentration range: > 99 %

REACH registration number: 01-2119510879-29-0000

CAS number: 19438-60-9

EC number: 243-072-0

SECTION 4: First aid measures

(*)4.1. Description of first aid measures

Inhalation:

Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.

Skin:

After contact with skin, wash immediately with plenty of soap and water. Consult a physician.

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Eye:

In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Call a physician immediately.

Ingestion:

Call a physician immediately. Clean mouth with water. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

4.2. Most important symptoms and effects, both acute and delayed

There is no data available for this product.

4.3. Indication of any immediate medical attention and special treatment needed

See section 4.1.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate fire-fighting equipment:

Foam, carbon dioxide (CO₂), powder, water spray.

Inappropriate fire-fighting equipment:

Do not use water jets as they can disperse and spread fire.

5.2. Special hazards arising from the substance or mixture

In combustion emits toxic fumes of carbon dioxide / carbon monoxide.

5.3. Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

Water mist may be used to cool closed containers.

Use personal protective equipment to protect skin/eyes.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Move any people not authorised to contain the emergency out of the area.

Avoid coming in contact with the substance or handling containers without adequate protection.

Use the personal protective equipment described in section 8.

Use a respirator in the event of emissions/spillage of large quantities.

Eliminate all sources of ignition.

Remove all incompatible materials as outlined in section 10.5 of SDS.

6.2. Environmental precautions

Contain the spillage as far as possible.

Prevent spilled materials getting into the drainage system, wells, surface water or groundwater.

In the case of leaks into a water course, drains, or if the product has contaminated the ground or vegetation, contact the local authorities.

6.3. Methods and material for containment and cleaning up

Do not use equipment that can generate sources of ignition when cleaning.

If possible, vacuum up the spilled material and/or absorb parts that can't be vacuumed up with inert materials (sand, earth, absorbent materials...) and place in suitable containers (separate liquids and solids) for disposal in accordance with section 13. After collection, ventilate and clean the affected area with water before granting access.

Do not flush the water used for cleaning into watercourses or down drains.

6.4. Reference to other sections



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See sections 8 and 13.

SECTION 7: Handling and storage

(*)7.1. Precautions for safe handling

Recommendations for safe use:

Provide sufficient air exchange and/or exhaust in work rooms.
Avoid contact with skin and eyes.
Avoid breathing vapours.

Advice on general occupational hygiene:

Do not eat, drink or smoke when using this product.
Wash hands thoroughly after handling.
Take off contaminated clothing and wash it before reuse.
Contaminated work clothing should not be allowed out of the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Eliminate all sources of combustion.
Keep container hermetically closed in a dry and well ventilated environment.
Do not store near heat sources or expose to direct sunlight, to preserve the quality of the product.
Keep away from incompatible materials (see point 10.5).
Keep away from food, feed and beverages.

7.3. Specific end use(s)

None identified.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DERIVED NO EFFECT LEVEL (DNEL) / DERIVED MINIMUM EFFECT LEVEL (DMEL)

Workers:

Long term systemic effects:

Inhalation: DNEL 79.3 mg/m³ Assessment factor 5
Dermal: DNEL 90 mg/kg bw/day Assessment factor 5

General population:

Long term systemic effects:

Inhalation: DNEL 19.6 mg/m³ Assessment factor 10
Dermal: DNEL 45 mg/kg bw/day Assessment factor 10
Oral: DNEL 45 mg/kg bw/day Assessment factor 10

PREDICTED No EFFECT CONCENTRATION (PNEC)

Environment:

Water:

PNEC water (freshwater): 0.1 mg/l Assessment factor 1000
PNEC water (marine water): 0.01 mg/l Assessment factor 10000
PNEC water (intermittent releases): 1 mg/l Assessment factor 100

Sediment:

PNEC sediment (freshwater): 1.64 mg/kg sediment dw
PNEC sediment (marine water): 0.164 mg/kg sediment dw

Soil:

PNEC soil: 0.2685 mg/kg soil dw

STP:



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PNEC STP: 2.19 mg/l Assesment factor 100

Occupational Exposure limit values: Data not available

8.2. Exposure controls

Appropriate engineering controls:

See annexe of this file.

Eye / face protection:

Goggles or protective visor.

Skin protection / of the Hand:

The material the gloves are made of must be impermeable and stable when in contact with the substance. No specific information available on the suitability of the material and thickness of the gloves. Consult the glove manufacturer for specific information on the suitability of the gloves. Replace the gloves in the case of internal contamination, when punctured, or if external contamination cannot be removed. The actual duration of protection depends on the conditions of use.

Skin protection / of the body:

Wear protective clothing resistant to chemical substances.

Respiratory protection:

Mask with A type filter for vapours and organic gases with a boiling point >65°C. (EN 149)

Environmental exposure controls:

See annexe of this file.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- a1) Appearance: Liquid
- a2) Color: Colourless
- b) Odour: Characteristics
- c) Odour threshold: NOT AVAILABLE
- d) pH: NOT APPLICABLE (pKa1=4.2 pKa2=6.6 @20°C)
- e2) Freezing point: -61.5 °C
- f1) Initial boiling point: 295.5 °C
- g) Flash point: 159.8 °C CC
- h) Evaporation rate: NOT AVAILABLE
- i) Flammability (solid, gas): NOT APPLICABLE
- j1) Upper flammability limits: NOT AVAILABLE
- j2) Lower flammability limits: NOT AVAILABLE
- j3) Upper explosive limits: NOT AVAILABLE



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- j4) Lowerexplosive limits: NOT AVAILABLE
- k) Vapour pressure: 0.33 Pa @ 25°C
- l) Vapour density: NOT AVAILABLE
- m) Relative density: 1.151 @ 20°C
- n) Water solubility: 8.4 g/l @ 20°C (as acid form)
- o) Partition coefficient: n-octanol/water: 2.09 @ 40°C
- p) Auto-ignition temperature: 430 °C @ 998.3 hPa
- q) Decomposition temperature: NOT AVAILABLE
- r) Viscosity: 101.4 mPa.s @ 20°C

NOT EXPLOSIVE

NOT OXIDIZING

9.2. Other information

Not any.

SECTION 10: Stability and reactivity

10.1. Reactivity

Stable under normal conditions.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None known in normal conditions.

10.4. Conditions to avoid

Avoid exposure to heat sources.

10.5. Incompatible materials

Strong acids, strong bases, oxidizing agents.

10.6. Hazardous decomposition products

Unknown

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity:

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Oral:

Method:

EU Method B.1 tris (Acute Oral Toxicity - Acute Toxic Class Method)
OECD Guideline 423 (Acute Oral toxicity - Acute Toxic Class Method)
rat (Sprague-Dawley) female; oral: gavage

Results:

LD50: > 2000 mg/kg bw (female) based on: test mat.

Dermal:

Method:

Read-across from supporting substance (structural analogue or surrogate)
OECD Guideline 402 (Acute Dermal Toxicity) (1981);
EU Method B.3 (Acute Toxicity (Dermal) (84/449/EEC)
rat (Sprague-Dawley); male/femmale; semioclusivo

Results:

LD50: > 2000 mg/kg bw (male/femmale)

Skin corrosion/irritation:

Method:

FHSA - 16CFR1500.41; rabbit (Albino) Coverage: occlusive (shaved)

Results: moderately irritating

Serious eye damage/eye irritation:

Results: Irritating

Respiratory or skin sensitisation:

Respiratory Sensitisation:

Results:

Sensitising Category 1

Skin Sensitisation:

Results:

Sensitising Category 1

Germ cell mutagenicity:

In Vitro:

bacterial reverse mutation assay (e.g. Ames test) (gene mutation)

Method:

OECD Guideline 471 (Bacterial Reverse Mutation Assay)
EU Method B.13/14 (Mutagenicity - Reverse Mutation Test Using Bacteria)
S. typhimurium TA 1535, TA 1537, TA 98 and TA 100 (met. act.: with and without)
E. coli WP2 uvr A (met. act.: with and without)

Results: negative

mammalian cell gene mutation assay (gene mutation) mouse lymphoma L5178Y cells:

Method:

EU Method B.17 (Mutagenicity - In Vitro Mammalian Cell Gene Mutation Test)
OECD Guideline 476 (In vitro Mammalian Cell Gene Mutation Test)
mammalian cell gene mutation assay (gene mutation)
mouse lymphoma L5178Y cells (met. act.: with and without)

Results: negative

mammalian chromosome aberration test (chromosome aberration) lymphocytes: human:

Method:

EU Method B.10 (Mutagenicity - In Vitro Mammalian Chromosome Aberration Test)
OECD Guideline 473 (In vitro Mammalian Chromosome Aberration Test)
in vitro mammalian chromosome aberration test (chromosome aberration)
lymphocytes: human (met. act.: with and without)

Results: negative

In Vivo: Data Not available

Carcinogenicity: Not available

Reproductive toxicity:



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Effects on sexual function and fertility:

Method:

OECD Guideline 421 (Reproduction / Developmental Toxicity Screening Test)
rat (Sprague-Dawley) male/female; screening oral: gavage

Results:

NOAEL (P): 450 mg/kg bw/day (actual dose received)
(male/female) based on: test mat.
NOAEL (f1): 450 mg/kg bw/day (actual dose received)
(male/female) based on: test mat.

Conclusions: not classified

Specific target organ toxicity (STOT) - Single exposure:

Not available

Specific target organ toxicity (STOT) - Repeated exposure:

Oral:

Method:

OECD Guideline 407 (Repeated Dose 28-Day Oral Toxicity in Rodents)
EU Method B.7 (Repeated Dose (28 Days) Toxicity (Oral))
rat (Sprague-Dawley) male/female, subacute (oral: gavage)

Results:

NOAEL: 450 mg/kg bw/day (nominal) (male/female) based on: test mat.
(Macroscopic/microscopic pathology of the stomach)
NOEL: 50 mg/kg bw/day (nominal) (male/female) based on: test mat.
(Macroscopic/microscopic pathology of the stomach)

Conclusions: not classified

Aspiration hazard: Not available

SECTION 12: Ecological information

12.1. Toxicity

Toxicity to aquatic environment:

Short-term toxicity to the aquatic environment:

Fish:

Method:

EU Method C.1 (Acute Toxicity for Fish)
OECD Guideline 203 (Fish, Acute Toxicity Test)
Oncorhynchus mykiss freshwater static

Results:

LC50 (24 h): > 100 mg/L test mat. (nominal)
LC50 (48 h): > 100 mg/L test mat. (nominal)
LC50 (72 h): > 100 mg/L test mat. (nominal)
LC50 (96 h): > 100 mg/L test mat. (nominal)

Aquatic invertebrates:

Method:

EU Method C.2 (Acute Toxicity for Daphnia)
OECD Guideline 202 (Daphnia sp. Acute Immobilisation Test)
Daphnia magna freshwater static

Results:

EC50 (24 h): > 100 mg/L test mat. (nominal) based on: mobility
EC50 (48 h): > 100 mg/L test mat. (nominal) based on: mobility

Algae or other aquatic plants:

Method:

EU Method C.3 (Algal Inhibition test)
OECD Guideline 201 (Alga, Growth Inhibition Test)
Pseudokirchnerella subcapitata (algae) freshwater static

Results:

EC50 (72 h): 135 test mat. (nominal) based on: growthrate
EC50 (72 h): 81.3 test mat. (nominal) based on: biomass
NOEC (72 h): 32 mg/L test mat. (nominal) based on: growth rate
NOEC (72 h): 32 test mat. (nominal) based on: biomass

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LOEC (72 h): 100 test mat. (nominal) based on: growth rate
LOEC (72 h): 100 test mat. (nominal) based on: biomass
EC10 (72 h): 77.5 test mat. (nominal) based on: growth rate
EC10 (72 h): 42 test mat. (nominal) based on: biomass
EC20 (72 h): 95.7 test mat. (nominal) based on: growth rate
EC20 (72 h): 57.3 test mat. (nominal) based on: biomass

Aquatic microorganisms:

Method:

EU Method C.11 (Biodegradation: Activated Sludge Respiration Inhibition Test)
OECD Guideline 209 (Activated Sludge, Respiration Inhibition Test)
activated sludge, domestic freshwater static

Results:

EC50 (3 h): 218.8 mg/L test mat. (nominal) based on: respiration rate

Long-term toxicity to aquatic environmental: Data not available

Toxicity to the Terrestrial environment: Data not available

12.2. Persistence and degradability

Degradability:

Abiotic degradation:

Hydrolysis:

Method:

EU Method C.7 (Degradation: Abiotic Degradation: Hydrolysis as a Function of pH)
OECD Guideline 111 (Hydrolysis as a Function of pH)

Results:

Half-life (DT50):

t_{1/2} (pH 4): 1.43 min at 20 °C; Rate constant
t_{1/2} (pH 4): 2.04 min at 30 °C; Rate constant:
t_{1/2} (pH 4): 0.692 min at 50 °C; Rate constant:
t_{1/2} (pH 7): 1.9 min at 20 °C; Rate constant:
t_{1/2} (pH 7): 1.26 min at 30 °C; Rate constant:
t_{1/2} (pH 7): 0.327 min at 50 °C; Rate constant:
t_{1/2} (pH 9): 1.27 min at 20 °C; Rate constant:
t_{1/2} (pH 9): 1.18 min at 30 °C; Rate constant:
t_{1/2} (pH 9): 0.233 min at 50 °C; Rate constant:
Value used for CSA: 1.9 min at 20 °C = 3.6 min at 12 °C

Phototransformation in air:

Method:

EPIWIN (v 4.0), AOPWIN Program (v 1.92) PHOTOCHEMICAL REACTION WITH OH RADICALS

Results:

Half-life (DT50): 45.268 h (24-hour day; 0.5E6 OH/cm³)
Value used for CSA: Half-life in air: 45.268 h

Biotic degradation:

Aquatic environment:

Method:

EU Method C.4-D (Determination of the 'Ready' Biodegradability - Manometric Respirometry Test).
OECD Guideline 301 F (Ready Biodegradability: Manometric Respirometry Test)
Test type: ready biodegradability activated sludge, non-adapted

Results:

under test conditions no biodegradation observed % Degradation of test substance:
ca. 2 after 28 d (O₂ consumption)
Value used for CSA: Not ready biodegradable

Conclusions: The substance is hydrolysed rapidly in a few minutes; therefore exposure of the aquatic and terrestrial compartments for this substance are unlikely.

12.3. Bioaccumulative potential

Bioaccumulation:

Aquatic environment:

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Method:

US EPA EPIWIN (v 4.0)

Results:

BCF: 11.12 L/kg

LogBCF: 1.05

Value used for CSA: BCF: 11.12 L/kg ww (L/kg ww or dimensionless)

Terrestrial environment: Data not available

Conclusions: These data indicate that the substance is not bioaccumulative (B).

12.4. Mobility in soil

Adsorption/desorption:

Method:

Calculation method US EPA EPIWIN (v 4.0); Study type: adsorption/desorption.

Results:

Adsorption coefficient: Koc: 41.94; LogKoc: 1.62

Value used for CSA: Koc = 41.94; logKoc = 1.62 at 20 °C

Volatilisation:

Method:

EPIWIN (v 4.0), HENRYWIN Program (v 3.20)

Results:

Henry's Law constant: 2.9 Pa m³/mol at 25 °C

Distribution among environmental compartments:

Method:

Calculation programme: EPIWIN (v.4.0).

Calculation according to Mackay, Level III

Media: air - biota - sediment(s) - soil - water;

Results:

Percent distribution in media:

Air (%) : 4.79

Water (%) : 39.1

Soil (%) : 56

Sediment (%) : 0.008

12.5. Results of PBT and vPvB assessment

Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity it can be stated that the substance does not fulfil the PBT criteria (not PBT) and not the vPvB criteria (not vPvB).

12.6. Other adverse effects

No other known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Recycle if possible, or send to an authorized incinerator. Follow the instructions in sections 6 and 7 when handling waste spillages, taking the steps indicated in the same sections. We recommend recycling containers instead of disposal. Observe the local and national legislation in force.

SECTION 14: Transport information

14.1. UN number

NOT APPLICABLE

14.2. UN proper shipping name

NOT APPLICABLE

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14.3. Transport hazard class(es)

NOT APPLICABLE

14.4. Packing group

NOT APPLICABLE

14.5. Environmental hazards

NOT APPLICABLE

14.6. Special precautions for user

NOT APPLICABLE

ADR/RID

- Tunnel restriction code: NOT APPLICABLE
- Category - limited quantities per transport unit: NOT APPLICABLE
- LQ code - limited quantities per pack unit: NOT APPLICABLE
- E code excepted quantities: NOT APPLICABLE

IMDG

- LQ code - limited quantities per pack unit: NOT APPLICABLE
- E code excepted quantities: NOT APPLICABLE
- Ems: NOT APPLICABLE

ICAO/IATA

- Packing Instructions / max. net quantities per package per plane - combi and cargo: NOT APPLICABLE
- Packing Instructions / max. net quantities per package in limited quantity regime: NOT APPLICABLE
- EQ code for excepted quantities regime: NOT APPLICABLE

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

NOT APPLICABLE

SECTION 15: Regulatory information

(*)15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

European Regulation 1907/2006/EC (Reach);
European Regulation 1272/2008/EC (CLP);
European Regulation 453/2010/EU;
DIRECTIVE 24/1998/EC;
DIRECTIVE 37/2004/EC;
DIRECTIVE 92/1999/EC;
DIRECTIVE 18/2012/EU;

Methylhexahydrophthalic anhydride (CAS 19438-60-9) is listed in the Candidate List

(list of SVHC substances) published by ECHA on 19 December 2012.

It meets the criteria of Article 57 (f) of REACH because it is a substance with respiratory sensitising properties, for which there is scientific evidence of probable serious effects to human health which give rise to an equivalent level of concern to those of other substances listed in points (a) to (e) of Article 57 of REACH.

Companies may have legal obligations resulting from the inclusion of substances in the Candidate List.

These obligations refer not only to the listed substances on their own or in mixtures but also to their presence in articles.

For further information see:

http://echa.europa.eu/chem_data/candidate_list_en.asp

<http://echa.europa.eu/it/candidate-list-obligations>

15.2. Chemical safety assessment

CSA available.

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SECTION 16: Other information

Safety Data Sheet compiled according to Regulation 453/2010/EU.

Exposure Scenarios in local languages will be published as soon as they are available.

(*) on the left indicate the modifications with respect to the last version.

References:

GESTIS International Limit Values.

Acronyms:

ACGIH: American Conference of Governmental Industrial Hygienist.
ADN: European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways.
ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
ASTM: American Society of Testing and Materials.
B: Bioaccumulabile.
BCF: BioConcentration Factor.
BSAF: Biological Soil Accumulation Factor.
CSA: Chemical Safety Assessment.
CSR: Chemical Safety Report.
DIN: Deutsches Institut für Normung.
DMEL: Derived Minimal Effect Level.
DNEL: Derived No Effect Level.
Ec: Effective concentration.
EC50: Effective Concentration 50 (that produces an effect (other than death) for 50% of organisms test).
ECx: Effective Concentration 50 (that produces an effect (other than death) for X% of organisms test).
EPA: Environmental Protection Agency.
IATA: International Air Transport Association.
IBC: International code for the construction and equipment of ships carrying dangerous Bulk Chemicals.
ICAO: International Civil Air-transport Organisation.
IMGD: International Maritime Dangerous Goods code.
ISO: International Standards Organisation.
KoC: organic carbon/water partition coefficient (adsorption coefficient).
KoW: n-octanol/water partition coefficient.
LC50: Lethal Concentration for 50% of animal test.
LCx: Lethal Concentration for X% of animal test.
LD50: Lethal Dose for 50% test animal.
LDx: Lethal Dose for X% test animal.
LLNA: Local Lymph Node Assay.
LOAEC: Lowest Observed Adverse Effect Concentration.
LOAEL: Lowest Observed Adverse Effect Level.
LOEC: Lowest Observed Effect Concentration.
LOEL: Lowest Observed Effect Level.
MARPOL: International Convention for the Prevention of Pollution from Ships.
NOAEC: No Observed Adverse Effects Concentration.
NOAEL: No Observed Adverse Effect Level.
NOEC: No Observed Effect Concentration.
NOEL: No Observed Effect Level.
OECD-OCSE: Organisation for Economic Co-operation and Development.
P: Persistent.
PBT: Persistent Bioaccumulabile and Toxic.
PNEC: Predicted No Effect Concentration.
(Q)SAR: Quantitative Structure-Activity Relationship.
RID: Regulations concerning the International carriage of Dangerous goods by rail.
SDS: Safety Data Sheet.
STP: Sewage Treatment Plant.
TLV: Threshold Limit Value.
TLV-C: Threshold Limit Value - Ceiling.
TLV-STEL: Threshold Limit Value - Short Term Exposure Limit.
TLV-TWA: Threshold Limit Value - Time Weighted Average.
vPvB: very Persistent and very Bio-accumulative.

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The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Annex Safety Data Sheet

Methylhexahydrophthalic anhydride



Substance name: Hexahydro-4-methylphthalic anhydride (4-MHHPA)													
EC Number: 243-072-0						CAS Number: 19438-60-9							
Exposure Scenario: Industrial Use													
Exposure route of relevance: Industrial													
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant		
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered		
	Long term, systemic effects	79.3 mg/m3	90 mg/kg bw/day	79.3 mg/m3	90 mg/kg bw/day	90 mg/kg bw/day	Freshwater: 0.1 mg/L; Marine water: 0.1 mg/L; Aquatic freshwater food chain: not applicable; Aquatic marine water food chain: Not applicable	Not applicable (*1)	Agricultural soil: 0.27 mg/kg dwt; Grassland: 0.27 mg/kg dwt; Terrestrial food chain: not applicable	Freshwater sediments: 1.64 mg/kg; Marine water sediments: 0.16 mg/kg	2.19 mg/L		
	Short term, local effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered		
	Short term, systemic effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered		
Use descriptors		PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 15: Use as laboratory reagent			ERC 2: Formulation of preparations								
Operating conditions		Pure substance Liquid form Duration max 8 h/d (workers) Frequency max 350 d/year			Emission days per site: 350 days/year Continuous release								
Risk Management Measures (RMM)		Local exhaust ventilation is installed (90% emission reduction). Prevent formation of aerosols. Keep container tightly closed in a cool and dry place. Store away from foodstuffs, alkali and mines, protected from humidity and water. All personnel are trained. Keep away from foodstuffs, beverages and food. Take off immediately all contaminated clothing. Clean skin thoroughly immediately after handling the product. Ensure that washing facilities are available in the work place. Avoid contact with the eyes and skin. Do not inhale gases / fumes / aerosols. Breathing equipment: in case of brief exposure or low pollution use breathing filter apparatus (P2 APF 10 mask, 90% efficiency). In case of intensive or longer exposure use breathing apparatus that is independent of circulating air. Protection of hands: PVC or other plastic material gloves (90% efficiency). Eye protection: tightly sealed safety glasses. Body protection: light weight protective clothing (Boots, Apron).			Emissions to air reduced by technical equipment (95% removal efficiency, e.g. thermal oxidizer) No direct release to water and soil. Incineration of waste and cleaning solutions. Keep container tightly closed in a cool and dry place. All personnel are trained.								
Risk Characterisation Ratio (RCR) (*2)		0.0619	0.0107	6.89E-06	5.53E-05	2.08E-03	Freshwater: 0.04893Mar	Not applicable	Agricultural soil: 0.1904	Freshwater sediments: 0	0		
(*1): methods for the determination of effects of chemicals on species arising from atmospheric contamination have not yet been fully developed, except for inhalation studies with mammals. Therefore, the methodology used for hazard assessment (and subsequently the risk characterisation) of chemicals in water and soil cannot be applied to the atmosphere													
(*2): in the table Risk Characterization Ratios ("RCRs") were calculated using the most conservative DNELs and the highest estimated exposure concentrations. As a worst-case, only long term systemic exposures were considered. Thus, the derived RCRs represent worst-case scenarios.													
(*3): not relevant for this life cycle step													
Critical physical parameters: solubility, flammability, corrosivity. Solubility: 8400 mg/L; flammability: not highly flammable; corrosivity: not corrosive													
Exposure route of relevance: Professional (*3)													
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant		
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	-	-	-	-	-	-	-	-	-	-		
	Long term, systemic effects	-	-	-	-	-	-	-	-	-	-		
	Short term, local effects	-	-	-	-	-	-	-	-	-	-		
	Short term, systemic effects	-	-	-	-	-	-	-	-	-	-		
Use descriptors		-											
Operating conditions		-											
Risk Management Measures (RMM)		-											
Risk Characterisation Ratio (RCR)		-											
Exposure route of relevance: Consumer (*3)													
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant		
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	-	-	-	-	-	-	-	-	-	-		
	Long term, systemic effects	-	-	-	-	-	-	-	-	-	-		
	Short term, local effects	-	-	-	-	-	-	-	-	-	-		
	Short term, systemic effects	-	-	-	-	-	-	-	-	-	-		
Use descriptors		-											
Operating conditions		-											
Risk Management Measures (RMM)		-											
Risk Characterisation Ratio (RCR)		-											

Annex Safety Data Sheet

Methylhexahydrophthalic anhydride



Substance name: Hexahydro-4-methylphthalic anhydride (4-MHHPA)												
EC Number: 243-072-0						CAS Number: 19438-60-9						
Exposure Scenario: Industrial Use												
Exposure route of relevance: Industrial												
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant	
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	
	Long term, systemic effects	79.3 mg/m ³	90 mg/kg bw/day	79.3 mg/m ³	90 mg/kg bw/day	90 mg/kg bw/day	Freshwater: 0.1 mg/L; Marine water: 0.1 mg/L; Aquatic freshwater food chain: not applicable; Aquatic marine water food chain: Not applicable	Not applicable (*1)	Agricultural soil: 0.27 mg/kg dwt; Grassland: 0.27 mg/kg dwt; Terrestrial food chain: not applicable	Freshwater sediments: 1.64 mg/kg; Marine water sediments: 0.16 mg/kg	2.19 mg/L	
	Short term, local effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	
	Short term, systemic effects	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	not considered	
Use descriptors	PROC 1: Use in closed process, no likelihood of exposure PROC 2: Use in closed, continuous process with occasional controlled exposure PROC 3: Use in closed batch process (synthesis or formulation) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC 5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying, Air dispersive techniques PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC 9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC 10: Roller application PROC 13: Treatment of articles by dipping and pouring PROC 15: Use as laboratory reagent			ERC 4: Industrial use of processing aids in processes and products, not becoming part of articles ERC 5: Industrial use resulting in inclusion into or onto a matrix ERC 6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC 6b: Industrial use of reactive processing aids ERC 6c: Industrial use of monomers for manufacture of thermoplastics ERC 6d: Industrial use of process regulators for polymerisation processes in production of resins, rubbers, polymers								
Operating conditions	Pure substance Liquid form Duration max 8 h/d (workers) Frequency max 350 d/year			Emission days per site: 350 days/year Continuous release								
Risk Management Measures (RMM)	Local exhaust ventilation is installed (90% emission reduction). Prevent formation of aerosols. Keep container tightly closed in a cool and dry place. Store away from foodstuffs, alkali and mines, protected from humidity and water. All personnel are trained. Keep away from foodstuffs, beverages and food. Take off immediately all contaminated clothing. Clean skin thoroughly immediately after handling the product. Ensure that washing facilities are available in the work place. Avoid contact with the eyes and skin. Do not inhale gases / fumes / aerosols. Breathing equipment: in case of brief exposure or low pollution use breathing filter apparatus (P2 APP 10 mask, 90% efficiency). In case of intensive or longer exposure use breathing apparatus that is independent of circulating air. Protection of hands: PVC or other plastic material gloves (90% efficiency). Eye protection: tightly sealed safety glasses. Body protection: light weight protective clothing (Boots, Apron).			Local exhaust ventilation is installed, with exhaust air scrubbers/filters (95 % removal efficiency). No direct release to water and soil. Incineration of waste and cleaning solutions. Keep container tightly closed in a cool and dry place. All personnel are trained.								
Risk Characterisation Ratio (RCR) (*2)	0.6186	0.03333	4.34E-07 - 2.69E-04;	5.53E-05	5.50E-05 - 6.39E-03	Freshwater: 0.0489 Marine water: 0.0489 Aquatic freshwater food chain: not applicable Aquatic marine water food chain: not applicable	Not applicable	Agricultural soil: 0.2044 - 0.7333 Grassland: 0.1770 - 0.7741 Terrestrial food chain: not applicable	Freshwater sediments: 0.0105 Marine water sediments: 0.0108	0		
(*1): methods for the determination of effects of chemicals on species arising from atmospheric contamination have not yet been fully developed, except for inhalation studies with mammals. Therefore, the methodology used for hazard assessment (and subsequently the risk characterisation) of chemicals in water and soil cannot be applied to the atmosphere (*2): in the table Risk Characterization Ratios ("RCRs") were calculated using the most conservative DNELs and the highest estimated exposure concentrations. As a worst-case, only long term systemic exposures were considered. Thus, the derived RCRs represent worst-case scenarios. (*3): not relevant for this life cycle step												
Critical physical parameters: solubility, flammability, corrosivity. Solubility: 8400 mg/L; flammability: not highly flammable; corrosivity: not corrosive												
Exposure route of relevance: Professional (*3)												
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant	
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	-	-	-	-	-	-	-	-	-	-	
	Long term, systemic effects	-	-	-	-	-	-	-	-	-	-	
	Short term, local effects	-	-	-	-	-	-	-	-	-	-	
	Short term, systemic effects	-	-	-	-	-	-	-	-	-	-	
Use descriptors	-											
Operating conditions	-											
Risk Management Measures (RMM)	-											
Risk Characterisation Ratio (RCR)	-											
Exposure route of relevance: Consumer (*3)												
		Human inhalation	Human dermal	Human indirect exposure via environment: inhalation	Human indirect exposure via environment: dermal	Human indirect exposure via environment: oral	Environmental: water	Environmental: air	Environmental: soil	Environmental: sediment	Environmental: Sewage Treatment Plant	
DNELs, DMELs, PNECs (Derived No Effect Levels, Derived Minimal Effect Levels, Predicted No Effect Levels)	Long term, local effects	-	-	-	-	-	-	-	-	-	-	
	Long term, systemic effects	-	-	-	-	-	-	-	-	-	-	
	Short term, local effects	-	-	-	-	-	-	-	-	-	-	
	Short term, systemic effects	-	-	-	-	-	-	-	-	-	-	
Use descriptors	-											
Operating conditions	-											
Risk Management Measures (RMM)	-											
Risk Characterisation Ratio (RCR)	-											