SPI Supplies Division
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Manufacturer's CAGE: 1P573

Safety Data Sheet

Date Effective: January 16, 2019

SPI Catalog # 02828-AF
SPI-Chem™ NMA (Nadic Methyl Anhydride) Hardener for Epoxy Resins

Component of 02660-AB SPI-Pon™ 812 Embedding Kit
Component of 02662-AB SPI-Chem™ Quetol™ 651 NSA Resin Kit
Component of 02663-AB SPI-Pon™ 812 Kit, BDMA Formulation

Section 1.1: Identification

Chemical Name/Synonyms ..... Nadic methyl anhydride; Methyl-(endo)-5-norbornene-2,3-dicarboxylic anhydride; 1,2,3,6-tetrahydromethyl-3,6-methanophthalic anhydride.

Product or Trade Name SPI-Chem™ NMA (Nadic Methyl Anhydride) Hardener for Epoxy Resins

CAS #'s 25134-21-8; 826-62-0

Chemical Formula..... $C_{10}H_{10}O_3$; $C_9H_8O_3$

Section 1.2: Relevant Uses/Restrictions

Laboratory chemical used as a hardener for epoxy resins.

Section 1.3: Supplier of the Safety Data Sheet

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Section 1.4: Emergency telephone number

Emergencies
Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...
Worldwide phone: 1-(703)-741-5970
Toll-free phone: 1-(800)-424-9300 USA + Canada only

Section 2: Hazard Identification

2.1 Classification of the substance

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, ingestion (category 4)
Acute toxicity, inhalation (category 3)
Skin corrosion/irritation (category 2)
Serious eye damage/ eye irritation (category 1)
Respiratory sensitization (category 1)
Skin sensitization (category 1)

2.2 Label elements

Pictogram

Signal Word: DANGER

Hazard statements:

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H302 Harmful if swallowed.
H318 Causes serious eye damage.
H331 Toxic if inhaled.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Precautionary statements:

P261 Avoid breathing vapors
P264 Wash face, hands and mouth thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves/ eye protection/ face protection. (see SDS).
P284 (In case of inadequate ventilation) wear respiratory protection. (see SDS)
P301 + P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 +P313 If skin irritation or rash occurs: Get medical advice/ attention.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER or doctor/ physician.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/ container to waste in accordance with national/ international regulation.

2.3 Other Hazards:

Hazardous Material Information System USA

Health 2
Fire Hazard 1
Reactivity 0
Personal Protection .....

NFPA Rating (estimated)

Health 2
Flammability..... 1
Reactivity 0

Section 3: Composition

3.1 Substances: This material is a mixture.

3.2 Mixtures:

1,2,3,6-tetrahydromethyl-3,6-methanophthalic anhydride $C_{10}H_{10}O_3$ >80%
CAS # 25134-21-8 EC # 246-344-8 REACH Reg. #: 01-2119979584-19-0000

1,2,3,6-tetrahydro-3,6methanophthalic anhydride $C_9H_8O_3$ <20%
CAS # 826-62-0 EC # 212-557-9 REACH Reg. #: Not pertinent

Section 4: First Aid Measures

4.1 Description of first aid measures:

Inhalation:

Move to fresh air.
Call a physician immediately.
If breathing is irregular or stopped, administer artificial respiration.

Skin Contact:

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

Eye Contact:

In case of contact with the 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:

No data available.

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

See Section 4.1.

Section 5: Fire Fighting Measures

5.1 Extinguishing media:

Foam, carbon dioxide (CO_2), powder, water spray.
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 Hazardous combustion products:

Carbon dioxide, Carbon monoxide.

5.4 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.

Special protective equipment and precautions for firefighters:

No additional information available.

Section 6: Accidental Release Measures

6.1 Personal precautions:

Move any people not authorized 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 cannot be vacuumed up with inert materials (sand, earth, absorbent materials, etc. 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 water courses or down drains.

6.4 Reference to other sections:

See Section 8 for information on personal protection.
See Section 13 for information on disposal.

Section 7: Handling and Storage

7.1 Precautions for safe handling:

Protective measures:

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

Advice on general hygiene conditions:

Do not eat, drink, or smoke when using this product.
Wash face, hands and mouth 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 Section 10.5).
Keep away from food, feed, and beverages.

7.3 Specific end uses:

Laboratory chemical used as a hardener for epoxy resins.

This material is not being offered for clinical or diagnostic applications, agricultural uses or for human or animal consumption.

Section 8: Exposure Controls and Personal Protection

8.1 Control parameter and Personal Protection:
Workplace exposure limits:

Contains no substances with occupational exposure limit values.

Biological limit values: No data available.

8.2 Exposure controls:

8.2.1 Appropriate engineering controls:

Handle in accordance with good industrial hygiene and safety practice.
Wash hands before breaks and at the end of workday.

8.2.2 Individual protection measures:

Eye/face protection: Wear goggles or protective visor.
Skin protection of the hand: Wear chemical-resistant gloves.
Skin protection of the body: Wear protective clothing resistant to chemical substances.
Respiratory protection: Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

8.2.3 Environmental exposure controls:

Do not let product enter the drains.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:

Appearance: pale yellow liquid

Odor: characteristic

Odor threshold: no data available

pH: not applicable

Melting point/Freezing point: < 25 °C

Boiling point/Boiling point range: 274.6 °C @ 101.3 kPa

Flash Point: 140.7 °C (open cup)

Evaporation rate: not available

Flammability (solid, gas): not available

Upper/lower flammability or explosive limits: not available

Vapor Pressure: 0.956 Pa @ 25 °C

Vapor density: not available

Relative density: 1.247 @ 20 °C

Solubility: not applicable (half life < 12 h)

Partition coefficient (n-octanol/water): 1.7 @ 40 °C

Auto-ignition temperature: 440 °C @ 98.3 kPa

Decomposition temperature: not available

Viscosity: 220-300 mPa.s @ 25 °C

Explosive properties: not explosive

Oxidizing Properties: not oxidizing

9.2 Other information: No further relevant information available.

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: None known.

Section 11: Toxicological Information

Information on the likely routes of exposure:

CAS # 25134-21-8: RTECS # RB9100000
CAS # 826-62-0: RTECS # DT5600000

11.1 Information on toxicological effects:
A. Acute toxicity: CAS # 25134-21-8

LD50	Oral (gavage), rat	1300 mg/kg
LD50	Oral, rat	914 mg/kg
LD50	Dermal, rat	4290 mg/kg

LCLo	Inhalation, rat	750 mg/m^3 / 4 h
LC50	Inhalation (aerosol), rat	1 mg/L / 4 h

B. Skin corrosion/irritation: CAS # 826-62-0

Draize	Skin, rabbit	500 mg / 24 h	Mild

C. Serious eye damage/irritation: CAS # 826-62-0

Draize	Eye, rabbit	2 mg / 24 h	Severe

D. Respiratory or skin sensitization: CAS # 926-62-0

Skin: Sensitizing, category 1
Respiratory: Sensitizing, category 1

E. Germ cell mutagenicity: No data available

F. Carcinogenicity:

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

G. Reproductive toxicity: No data available.

H. STOT-single exposure: No data available.

I.. STOT-repeated exposure: No data available.

J. Aspiration hazard: No data available.

Section 12: Ecological Information

12.1 Toxicity to aquatic environment:

LC50	Oryzias latipes	freshwater, semi-static	359 mg/L / 48 h	based on mortality
EC50	Daphnia magna	freshwater, static	100 mg/L / 24 h	based on mobility
EC50	Daphnia magna	reshwater, static	100 mg/L / 48 h	based on mobility
EC50	Pseudokirchnerella subcapitata	freshwater, static	100 mg/L /72 h	based on growth rate
EC50	Pseudokirchnerella subcapitata	freshwater, static	100 mg/L /72 h	based on biomass
EC50	Activated sludge, domestic	freshwater, static	311.82 mg/L/3 h	based on respiration rate
NOEC	Activated sludge, domestic	freshwater, static	13.3 mg/L / 3 h	based on respiration rate
NOEC	Daphnia magna	freshwater, semi-static	20 mg/L / 21 d	based on reproduction
LOEC	Daphnia magna	freshwater, semi-static	40 mg/L / 21 d	based on reproduction

12.2 Persistence and degradability:

Abiotic degradation:

Hydrolysis: Method:

OECD Guideline 111 (Hydrolysis as a Function of pH)
EU Method C.7 (Degradation: Abiotic Degradation: Hydrolysis as a Function of pH)
Results: Half-life (DT50): 7 min at 20 °C
Conclusions: Hydrolysis Half-life: 7 min at 20 °C

Phototransformation in air:

Method: QSARs and grouping of chemicals – May 2008
Results: Half-life (DT50): 6.35 h (24-hour day; 0.5E6 OH/cm^3)
Conclusions: Half-life in air: 6.35 h

Biotic degradation:

Aquatic environment:

Method:
OECD Guideline 301 C (Ready Biodegradability: Modified MITI Test (I))
Test type: ready biodegradability, mixture of sewage, soil and natural water
Results: Under test conditions no biodegradation observed
% Degradation of test substance:
0 after 28 d (O2 consumption)
1 after 28 d (TOC removal)
0 after 28 d (Test material analysis)
Conclusions: The substance is hydrolyzed in few minutes in the corresponding acid (estimated to be readily biodegradable); therefore exposure of the aquatic and terrestrial compartments for this substance are unlikely.

12.3 Bio-accumulative potential:

Aquatic environment:

Method:
OECD Guideline 305 C (Bioaccumulation: Test for the degree of Bio-concentration in Fish)
Cyprinus carpio, aqueous (freshwater), flow-through.
Results: BCF: 5.5 L/kg ww (or dimensionless)

Terrestrial environment: Data not available.

Conclusions: These data indicate that the substance is not bio-accumulative.

12.4 Mobility in soil:

Adsorption / desorption:

Method:
QSARs and grouping of chemicals – May 2008 – Study type: in silico.
Study type: adsorption (soil)
Results: Adsorption coefficient (soil): Koc: 10 (L/Kg) at 20 °C; log Koc: 1

Volatilization:

Method:
QSAR; HENRYWIN Program (v 3.20)
Results: Henry's Law constant H: 1.49 Pa m^3/mol at 25 °C

Distribution among environmental compartments:

Method:
Calculation according to Macay, Level III
Calculation program: EPI suite v4.10
Media: Air – biota – sediment(s) – soil – water;
Results: Percent distribution in media:
Air (%): 0.23
Water (%): 40.4
Soil (%): 59.3
Sediment (%): 0.09

12.5 Results of PBT and vPvB assessment:

Regarding all available data on biotic and abiotic degradation, bio-accumulation and toxicity, it can be stated that the substance does not fulfill the pBT criteria (not PBT) and not the vPvB criteria (not vpvB).

12.6 Other adverse effects: No additional data known.

Section 13: Disposal Considerations

13.1 Waste treatment methods:

Recycle if possible.
If not possible to recycle, 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.
Observe all local, state, and federal regulations in force.

Section 14: Transport Information

DOT:

UN Number:	UN 2810
Proper shipping name:	Toxic, liquids, organic, n.o.s. (Methyl-5-norbornene-2,3-dicarboxylic anhydride, mixture of isomers)
Class:	6.1
Packing group:	III

IATA:

UN Number:	UN 2810
Proper shipping name:	TOXIC LIQUID, ORGANIC, N.O.S. (Methyl-5-norbornene-2,3-dicarboxylic anhydride, mixture of isomers)
Class:	6.1
Packing group:	III

IMDG:

UN Number	UN 2810
Proper shipping name:	TOXIC LIQUID, ORGANIC, N.O.S. (Methyl-5-norbornene-2,3-dicarboxylic anhydride, mixture of isomers)
Class:	6.1
Packing group:	III

EMS Number: F-A, S-A

Environmental Hazards: Not applicable.

Section 15: Regulatory Information

15.1 Safety, health and environmental regulations/ legislation specific for the substance or mixture:

U.S. Government Regulations:
United States:

TSCA
CAS# 25134-21-8 is listed on the TSCA active inventory list.
CAS# 826-62-0 is listed on the TSCA active inventory list.

Health & Safety Reporting List
None of the chemicals in this material is on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product has a Chemical Test Rule.

Section 12b:
None of the chemicals in this product is listed in TSCA Section 12b.

TSCA Significant New Use Rule:
None of the chemicals in this product has a SNUR under TSCA.

CERCLA Section 103:
None of the chemicals in this product is listed under CERCLA Section 103.

SARA 311/312:
Acute Health Hazard

OSHA:
Harmful by ingestion, Skin and respiratory sensitizer, Corrosive

State Right-to Know:
CAS# 25134-21-8 is listed on the New Jersey and Pennsylvania Right-to-Know Lists.
CAS# 826-62-0 is listed on the New Jersey and Pennsylvania Right-to-Know Lists.

California Prop. 65:
None of the chemicals in this product is listed under California Prop. 65.

CANADA

CAS# 25134-21-8 is listed on the DSL List.
CAS# 826-62-0 is listed on the DSL List.

WHMIS: Class E - Corrosive

15.2 Chemical Safety Assessment: Has not been carried out.

Date of Preparation: 16 January 2018.

Abbreviations and acronyms
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
CMRG: Chemical Manufacturer's Recommended Guidelines
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
AIHA: American Industrial Hygiene Association
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bio-accumulative and Toxicological
vPvB: very Persistent and very Bio-accumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety Health
ATE: Acute Toxicity Estimates
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
STEL: Short Term Exposure Limit

CEIL: Ceiling
TSCA: Toxic Substances Control Act (USA)
DSL: Domestic Substances List (Canada)
PICCS: Philippine Inventory of Chemicals and Chemical Substances
ENCS: Existing and New Chemical Substances (Japan)
AICS: Australian Inventory of Chemical Substances
IECSC: Inventory of Existing Chemical Substances in China
KECL: Korea Existing Chemicals List

Section 16: Other Information

Disclaimer of Liability:

Caution! Do not use SPI Supplies products or materials in applications involving implantation within the body; direct or indirect contact with the blood pathway; contact with bone, tissue, tissue fluid, or blood; or prolonged contact with mucous membranes. Products offered by SPI Supplies are not designed or manufactured for use in implantation in the human body or in contact with internal body fluids or tissues. SPI Supplies will not provide to customers making devices for such applications any notice, certification, or information necessary for such medical device use required by US FDA (Food and Drug Administration) regulation or any other statute. SPI Supplies and Structure Probe, Inc. make no representation, promise, express warranty or implied warranty concerning the suitability of these materials for use in implantation in the human body or in contact with internal body tissues of fluids.

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