Material Safety Data Sheet

Version 1.2
Revision Date 4/21/23

1. PRODUCT AND COMPANY IDENTIFICATION

Product name:
co-[DMA, NAS, MAPS] dissolved in in Dimethylformamide

Product number: MCP-4

Company: Lucidant Polymers, LLC
1230 Bordeaux Dr.
Sunnyvale, CA 94089-1202
Telephone: 408-569-8607
Emergency Phone #: 408-569-8607

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

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

Flammable Liquids (Category 3)
Acute Toxicity, Inhalation (Category 4)
Acute Toxicity, Dermal (Category 4)
Eye Irritation (Category 2A)
Carcinogenicity (Category 1B)
Reproductive Toxicity (Category 1B)

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula: copolymer- $(DMA)_n$ - $(NAS)_m$ - $(MAPS)_p$, dissolved in dimethylformamide (DMF)
Molecular Weight: approx. 1,000,000 g/mol

CAS-No.	EC No.	Index-No.	Concentration
co-[DMA, NAS, MAPS]	-	-	0.36g/mL
dimethylformamide (68-12-2)	200-679 -5	-	-

4. FIRST AID MEASURES

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and rinse immediately with plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIRE-FIGHTING MEASURES

Flammable properties

Flash point	no data available
Ignition temperature	no data available

Suitable extinguishing media
water spray, alcohol-resistant foam, carbon dioxide, dry chemical

Special protective equipment for fire-fighters
Wear self-contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid breathing vapors, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Use only in area provided with appropriate exhaust ventilation. Wear personal protective equipment for liquid handling, and operate under a fume hood.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature: -20°C or lower

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
N,N-dimethylformamide	68-12-2	Total N-Methylformamide	30 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		N-Acetyl-S-(N-methylcarbamoyl) cysteine	30 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

Derived No Effect Level (DNEL)

Application Area	Routes of exposure	Health effect	Value
Workers	Skin contact	Acute systemic effects	26.3mg/kg BW/d
Workers	Inhalation	Acute systemic effects	30 mg/m3
Workers	Skin contact	Long-term systemic effects	3.31mg/kg BW/d
Workers	Inhalation	Long-term systemic effects	15 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Water	30 mg/l
Soil	16.235 mg/kg
Sea water	3 mg/kg
Fresh water	30 mg/l
Fresh water sediment	25.05 mg/kg
Onsite sewage treatment plant	123 mg/l

Personal protective equipment

Respiratory protection
Respiratory protection is not required except when handling dry powder. Wear dust masks.

Hand protection
Use protective gloves.

Eye protection
Wear safety glasses.

Skin and body protection
Observe general industrial hygiene practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	amine-like
c)	Odor Threshold	0.329 ppm
d)	pH	7 at 200 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: -61 °C (-78 °F)
f)	Initial boiling point and boiling range	153 °C 307 °F
g)	Flash point	57.5 °C (135.5 °F) - closed cup - DIN 51755 Part 2
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 16 %(V) Lower explosion limit: 2.2 %(V)
k)	Vapor pressure	3.77 hPa at 20 °C (68 °F)
l)	Vapor density	2.52 - (Air = 1.0)
m)	Density	0.944 g/mL
	Relative density	No data available
n)	Water solubility	1,000 g/l at 20 °C (68 °F)completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0.85 at 25 °C (77 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	435 °C (815 °F) at 1,013 hPa - DIN 51794
q)	Decomposition temperature	> 350 °C (> 662 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Relative vapor density	2.52 - (Air = 1.0)

10. STABILITY AND REACTIVITY

Chemical stability
Stable under ambient conditions (room temperature) and in cold storage (-80C, -20C, 4C).

Conditions to avoid
Keep away from open flames, hot surfaces, and sources of ignition.

Materials to avoid
Strong oxidizing agents, copper, copper alloys, tin, various plastics.

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions: carbon oxides.

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 3,010 mg/kg
(OECD Test Guideline 401)
Acute toxicity estimate Inhalation - 4 h - 11.1 mg/l - vapor

(Expert judgment)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)
LD50 Dermal - Rabbit - 1,500 mg/kg
Remarks: (Regulation (EC) No 1272/2008, Annex VI)
(IUCLID)

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 20 h
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes.
(OECD Test Guideline 405)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)
Test Type: unscheduled DNA synthesis assay
Test system: human diploid fibroblasts
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: Intraperitoneal injection

Result: negative
Remarks: (ECHA)

Carcinogenicity

IARC:	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No ingredient 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 on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage the unborn child.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Poly DMA-MAPS-NAS is nontoxic. However, trace residual acrylamide monomer is a neurotoxin and is a suspected carcinogen. Residual dimethylacrylamide and other monomers have been removed from this product by a series of extraction steps, so their content is minimized, and the biggest hazard to an operator using this product would be Dimethylformamide solution.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Lepomis macrochirus (Bluegill sunfish) - 7,100 mg/l - 96 h (US-EPA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 13,100 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - > 1,000 mg/l - 72 h (DIN 38412)
Toxicity to bacteria	static test EC50 - Vibrio fischeri - 12,300 - 17,500 mg/l - 5 min Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 1,500 mg/l - 21 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 21 d Result: 100 % - Readily biodegradable. (OECD Test Guideline 301E)
Biochemical Oxygen Demand (BOD)	900 mg/g Remarks: (Lit.)
Theoretical oxygen demand	1,863 mg/g Remarks: (Lit.)

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 56 d at 25 °C - 0.002 mg/l(N,N-dimethylformamide) Bioconcentration factor (BCF): 0.3 - 1.2 (OECD Test Guideline 305C) Remarks: Does not significantly accumulate in organisms.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations.

Contaminated packaging
Rinse thoroughly to remove all product, dispose of rinse water in accordance with local regulations.

14. TRANSPORT INFORMATION

Dimethylformamide (DMF) in solution – this product is shipped according to packaging specifications outlined for DMF

DOT (US)
UN number: 2265 Class: 3 Packing group: III
Proper shipping name: N,N-Dimethylformamide
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2265 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: N,N-DIMETHYLFORMAMIDE

IATA
UN number: 2265 Class: 3 Packing group: III
Proper shipping name: N,N-Dimethylformamide

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

TSCA Status
Not on TSCA Inventory

DSL Status
This chemical is not on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components listed.

Pennsylvania Right To Know Components
No components listed.

New Jersey Right To Know Components
No components listed.

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Lucidant Polymers, LLC, shall not be held liable for any damage resulting from handling or from contact with the above product.