SECTION 1: PRODUCT & COMPANY IDENTIFICATION

1.1 Product Identifiers

NEI Product ID: NANOMYTE® FGA-1ND

Product Description: Graphene dispersion in NMP

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against

Identified Uses: Laboratory chemicals, research & development

1.3 Details of the Supplier of the Safety Data Sheet

Company: NEI Corporation

Address: 400 Apgar Drive, Unit E – Somerset, NJ 08873 – United States of America

Phone: +1 (732) 868-3141 Fax: +1 (732) 868-3143

Email: productinfo@neicorporation.com

1.4 Emergency Telephone Number

Supplier: +1 (732) 868-3142 (9am to 6pm EST / UTC -0500)

U.S. Poison Control Center: +1-800-222-1222

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture

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

Flammable liquids (Category 4), H227

Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Reproductive toxicity (Category 1B), H360

Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

2.2 GHS Label elements, including precautionary statements

Pictogram(s):

Signal Word: Danger

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Hazard Statement(s):

H227	Combustible liquid
H315	Causes skin irritation
H319	Causes serious eye irritation
H335	May cause respiratory irritation
H360	May damage fertility or the unborn child

Precautionary Statement(s):

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat / sparks / open flames / hot surfaces — no smoking
P261	Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection, face protection
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233 + P235	Store in a well-ventilated place. Keep container tightly closed. Keep cool.
P405	Store locked up
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Contains N-methyl-2-pyrrolidone ("NMP"), a substance that is included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substances

Component Name	Synonyms	Formula	CAS #	Weight %
N-methyl-2-pyrrolidone	NMP	C_5H_9NO	872-50-4	> 92%
Hazards: Flam. Liq. (Cat. 4); Skin Irrit. (Cat. 2); Eye Irrit. (Cat. 2A); Repr. (Cat. 1B); STOT SE (Cat. 3); SVHC				
Graphite (graphene)	Carbon	C	7782-42-5	~ 7%
Hazards: Not a hazardous substance or mixture				
Poly(vinylidene fluoride)	PVDF	$(C_2H_2F_2)_{x-}$	24937-79-9	< 1%
Hazards: Not a hazardous substance or mixture				

SECTION 4: FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice:

Move out of exposed area. Seek medical attention of irritation occurs. Show this SDS to the doctor in attendance.

After Inhalation:

If breathed in, move person into fresh air. If not breathing, give artificial respiration and seek medical attention.

After Skin Contact:

Wash off with soap and plenty of water. Consult a physician.

After Eye Contact:

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

After Swallowing:

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or section 11.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

No Data Available

SECTION 5: FIREFIGHTING MEASURES

5.1 Suitable Extinguishing Media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide

5.2 Hazardous Combustion Products

Carbon oxides, Hydrogen fluoride

5.3 Advice for Firefighters

Wear self-contained breathing apparatus for firefighting if necessary

5.4 Other Information

Use water spray to cool unopened containers.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, Protective Equipment, and Emergency Procedures

Use personal protective equipment at all times. Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

6.2 Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and Materials for Containment and Cleaning Up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations. Keep in suitable, closed containers for disposal.

6.4 Reference to Other Sections

For safe handling, see Section 7; for personal protection, see Section 8; for disposal, see Section 13.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for Safe Handling

Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep away from sources of ignition - no smoking. Take measures to prevent the buildup of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for Safe Storage (including any incompatibilities)

Keep container tightly closed in a dry and well-ventilated place. Do not store together with volatile chemicals as they may be adsorbed onto product. Keep in properly labeled containers. Containers that are opened must be carefully resealed and kept upright to prevent leakage. Store under inert gas. Moisture sensitive.

7.3 Specific End Uses

A part from the uses mentioned in section 1.2 no other specific uses are stipulated.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control Parameters

Components with workplace control parameters:

Component Name	CAS #	Value	Control Parameters	Basis
NMP	872-50-4	TWA	15 ppm 60 mg/m3	USA. Workplace Environmental Exposure Levels (WEEL)
		STEL	30 ppm 120 mg/m3	USA. Workplace Environmental Exposure Levels (WEEL)
		PEL	1 ppm 4 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
Remarks:	Skin			
Graphite (graphene)	7782-42-5	TWA	5 – 15 mg/m^3	OSHA Permissible Exposure Limit (PEL)
		TWA	2.5 mg/m^3	NIOSH Recommended Exposure Limit (REL)
		TWA	2 mg/m^3	(ACGIH) Threshold Limit Value (TLV) (inhalable particulate matter)
		PEL	2.5 – 10 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Notes: TWA – Time Weighted Average; **PEL** – Permissible Exposure Limit; **STEL** – Short-Term Exposure Limit

8.2 Exposure Controls

Appropriate Engineering Controls

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

Personal Protective Equipment

Eye / Face Protection:

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin Protection:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection:

Impervious clothing, the type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory Protection:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of Environmental Exposure

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

Appearance/Form:	Black Liquid
Odor:	Odorless
Odor Threshold:	No Data Available
pH:	No Data Available
Melting Point / Range:	No Data Available
Boiling Point / Range:	No Data Available
Flash Point:	No Data Available
Evaporation Rate:	No Data Available
Flammability:	No Data Available
Upper Explosion Limit:	No Data Available
Lower Explosion Limit:	No Data Available
Vapor Pressure:	No Data Available
Density:	No Data Available
Relative Density:	No Data Available
Water Solubility:	No Data Available
Auto-ignition Temperature:	No Data Available
Decomposition Temperature:	No Data Available
Viscosity:	No Data Available
Explosive Properties:	No Data Available

9.2 Other Safety Information

None

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity

Forms explosive mixtures with air on intense heating.

10.2 Chemical Stability

Stable under ambient storage conditions (see Section 7.2)

10.3 Possibility of Hazardous Reactions

No Data

10.4 Conditions to Avoid

Strong heating

10.5 Incompatible Materials

Strong acids, Strong oxidizing agents, Strong reducing agents

10.6 Hazardous Decomposition Products

In the event of fire, see Section 5

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

Acute Toxicity

Component	Oral LD50	Dermal LD50	Inhalation LC50
N-methyl-2-pyrrolidone	4,150 mg/kg (Rat)	> 5,000 mg/kg (Rat)	> 5.1 mg/l – aerosol (Rat 4hr)
Graphite (graphene)	> 2,000 mg/kg (rat, female)	No Data Available	2,000 mg/m3 - dust/mist (rat, 4hrs)
Poly(vinylidene fluoride)	> 6,000 mg/kg (Rat)	No data available	No data available

Skin corrosion/irritation

May cause skin irritation (NMP)

Serious eye damage/eye irritation

May cause eye irritation (NMP)

Respiratory or skin sensitization

No Data Available

Germ cell mutagenicity

No Data Available

Carcinogenicity

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

Reproductive Toxicity

May cause possible damage to fetus (NMP)

Teratogenicity

No Data Available

Specific Target Organ Toxicity - Single Exposure (Globally Harmonized System)

May cause respiratory irritation

Specific Target Organ Toxicity - Repeated Exposure (Globally Harmonized System)

Effects not known

Additional Information

NMP: Prolonged or repeated exposure can cause vomiting, diarrhea, abdominal pain. Rats exposed to N-methyl-2-pyrrolidinone at a concentration of 1 mg/l as an aerosol for 10 days, showed depletion of hematopoietic cells in the bone marrow and atrophy of the lymphoid tissues of the thymus, spleen, and lymph nodes. (RTECS: UY5790000)

This substance should be handled with particular care.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Component	**Algae** (OECD 201)	**Freshwater Fish** (OECD 203)	**Daphnia** (OECD 202)
N-methyl-2-pyrrolidone	672.8 mg/l - 72 hr	> 500 mg/l - 96 hr (rainbow trout)	4,897 mg/l - 48 hr
Graphite (graphene)	100 mg/l – 72 hours Pseudokirchneriella subcapitata	100 mg/l – 96 hours Danio rerio (zebra fish)	100 mg/l – 48 hours Daphnia magna (Water flea)
Poly(vinylidene fluoride)	No data available	No data available	No data available

12.2 Persistence and Degradability

No Data Available

12.3 Bioaccumulative Potential

No Data Available

12.4 Mobility in Soil

No Data Available

12.5 PBT and vPvB Assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted.

12.6 Other Adverse Effects

No Data Available

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods – Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

13.2 Waste Treatment Methods – Contaminated Packaging

Dispose of properly as you would with unused product.

SECTION 14: TRANSPORT INFORMATION

14.1 Department of Transportation (DOT - US)

NA-Number: 1993 Class: NONE Packing group: III

Proper shipping name: Combustible liquid, n.o.s. (N-methyl-2-pyrrolidone)

14.2 International Maritime Dangerous Goods (IMDG)

Not regulated for transport

14.3 International Air Transport Association (IATA)

Not regulated for transport

14.4 Additional Transport Information

Poison Inhalation Hazard: No

HS Code: 3801.20 | **Schedule B:** 3801.20.0000

SECTION 15: REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

SARA 302 Components

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

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

N-methyl-2-pyrrolidone (CAS #872-50-4)

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Right to Know Components

Component	CAS #	List Citations
N-methyl-2-pyrrolidone	872-50-4	PA, MA, NJ Right to Know
Graphite (graphene)	7782-42-5	MA, PA Right to Know
Poly(vinylidene fluoride)	249347-79-9	NJ, PA

California Proposition 65

This product contains a chemical known to the State of California to cause birth defects or other reproductive harm: N-methyl-2-pyrrolidone (CAS #872-50-4)

Candidate List of Substances of Very High Concern (SVHC)

N-methyl-2-pyrrolidone (CAS #872-50-4)

Toxic Substances Control Act (TSCA) Chemical Substance Inventory

N-methyl-2-pyrrolidone (CAS #872-50-4); Graphite (CAS #7782-42-5)

15.2 Chemical Safety Assessment

A chemical safety assessment was not carried out for this product

SECTION 16: OTHER INFORMATION

REACH Number

A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

Further Information

NEI has attempted to provide current and accurate information to the best of its knowledge. NEI makes no representations regarding the accuracy or completeness of the information and assumes no liability for any loss, damage, injury of any kind which may result from or arise out of the use of or reliance on the information by any person. Employers should use this information only as a supplement to other information gathered by them and should make independent judgment of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty and any use of the product not in conformance with this Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

– END OF SDS –