

Section 1: Product and Company Identification:

1.1 Product Identifier

Product Form: Mixture
 Identification of Substance: Barium titanate dispersion in hydrocarbon liquid.
 Product Name: NYACOL® BtMin
 Synonym: None
 CAS Number: 12047-27-7
 Index Number: 056-002-00-7
 EINECS Number: 234-975-0
 REACH Registration Number: Not Registered.
 Formula: BaTiO₃

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

Recommended Use: Electronics.
 Restrictions on Use: For industrial use only, not for food, drug or home use.

1.3 Details of the supplier of the safety data sheet

Company Identification: Nyacol Nano Technologies, Incorporated
 Megunko Road, P.O. Box 349, Ashland, MA 01721 U.S.A.
 +1 508-881-2220
 Email Contact: info@nyacol.com
 Internet: www.nyacol.com

1.4 Emergency telephone number

In Case of Emergency: USA/Canada CHEMTREC: +1 (703) 527-3887
 International CHEMTREC: +1 (703) 741-5970
 24 Hours/Day: 7 Days/Week

Section 2: Hazard(s) Identification

2.1 Classification of the substance or mixture

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

Asp. Tox. 1; H304 May be fatal if swallowed and enters airways.
 Combustible Liquids; Category 4, H227 Combustible Liquid.
 Acute Tox. 4, Oral; H302 Harmful if swallowed.
 Acute Tox. 4, Inhalation; H332 Harmful if inhaled.

Classification according to Regulation (EC) No. 1272/2008 (CLP)

Asp. Tox. 1; H304 May be fatal if swallowed and enters airways.
 Acute Tox. 4, Oral; H302 Harmful if swallowed.
 Acute Tox. 4, Inhalation; H332 Harmful if inhaled.

2.2 Label Elements – Labelling according to Regulation (EC) No. 1272/2008



Signal Word: Danger

Hazard determining components of labelling: Isoparaffinic Hydrocarbon

Hazard Statement(s): H304 May be fatal if swallowed and enters airways.
 H302 Harmful if swallowed.
 H332 Harmful if inhaled.
 H227 Combustible liquid.

Precautionary Statement(s):

- P261 Avoid breathing dust/fume/gas/mist/vapors/spray.
- P264 Wash face, hands and any exposed skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P301+P310 IF SWALLOWED: immediately call a Poison Center or doctor/physician.
- P331 Do NOT induce vomiting.
- P304 +P340 IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
- P312 Call a POISON CENTER or doctor/physician if you feel unwell.
- P405 Store locked up.
- P501 Dispose of contents/container in accordance with all federal, state, and local environmental regulations.
- P210 Keep away from heat.
- P280 Wear protective gloves/protective clothing/eye protection/ face protection.
- P370+P378 In case of fire: Use carbon dioxide, foam, dry chemical and water fog.
- P403+P235 Store in a well ventilated place. Keep cool.

2.3 Other Hazards

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

2.4 Unknown acute toxicity (GHS US)

No data available.

Section 3: Composition / Information on Ingredients

Description: Mixture consisting of the following components.

Hazardous Component Name:	Product Identifier	GHS Classification	Percent By Weight
Isoparaffinic Hydrocarbon	CAS: 64742-48-9 EINECS: 265-150-3 Index: 649-327-00-6	Asp. Tox. Category 1 H304 Flammable Liquid Category 4 H227	50 – 67
Barium Titanate	CAS: 12047-27-7 EINECS: 234-975-0 Index: 056-002-00-7	Acute Tox. Ingestion, Category 4, H302 Acute Tox. Inhalation, Category 4, H332	30 – 40
Non-hazardous Component Name:	Product Identifier	GHS Classification	Percent By Weight
Polymer dispersant	Trade secret, not a hazardous substance	Not classified	3-10

Impurities: Present at a level below that to be taken into account for classification.

Stabilizing Additives: None

The supplier currently has no knowledge on additional ingredients that are classified and that contribute to the classification of this substance.

See Section 16 for a list of hazards if identified above.

Section 4: First-Aid Measures

4.1 Description of first aid measures

Eye Contact:	Immediately flush eyes with plenty of water for at least 15 minutes. Hold eyelids apart while flushing to rinse entire surface of the eye and lids with water. Get medical attention.
Skin Contact:	Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists. Remove contaminated clothing.
Inhalation:	Remove person from exposure. Seek immediate medical care if respiratory irritation, dizziness, nausea or unconsciousness occurs. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult medical professional.
Ingestion:	Seek immediate medical care. Do not induce vomiting. Never give anything by mouth to an unconscious person.
First Aid Facilities:	Eye wash station.
Advice to Physicians:	Petroleum distillate: If aspiration into the lungs, may cause chemical pneumonitis.

4.2 Most important symptoms and effects, both acute and delayed

Vapor/aerosol concentrations above recommended exposure levels are irritating to the eyes and respiratory tract, may cause headache, dizziness, anesthesia, drowsiness, unconsciousness and other central nervous system effects including death.

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

No further relevant information available.

Section 5: Fire-Fighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Carbon dioxide, foam, dry chemical and water fog.
Unsuitable extinguishing media:	No further relevant information available.

5.2 Special hazards arising from the substance or mixture

Flammability of the product:	Material is combustible. Containers can build pressure if exposed to heat or fire.
Special Hazard Arising from the Chemical:	Vapors may settle in low areas or travel along ground to ignition sources. Liquid will float and may re-ignite on surface waters.
Fire Hazard:	No further relevant information available.
Explosion Hazard	Product can accumulate static charge which may cause a fire or explosion.
Reactivity:	No further relevant information available.

5.3 Advice for firefighters

Special Protective Equipment for Fire-fighters:	Wear standard full firefighter turn-out gear (full bunker gear) and respiratory protection (SCBA).
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Section 6: Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Eye protection and impervious gloves. Wear self-contained breathing apparatus and protective clothing.

6.1.1 For non-emergency personnel

Wear protective equipment. Keep unprotected persons away.

6.2 Environmental precautions

Prevent entry into sewers/surface and ground water.

6.3 Methods and material for containment and cleaning up

Eliminate all ignition sources. Absorb and/or contain spill with inert materials such as sand, vermiculite. Not an RCRA hazardous waste. Ventilate area. Avoid breathing vapor. Wear appropriate personal protective equipment, including appropriate respiratory protection.

6.4 Reference to other sections

For more information on exposure controls and personal protection or disposal considerations, check section 8 and 13 of this SDS.

Section 7: Handling and Storage

7.1 Precautions for safe handling

Keep away from heat and flame and any other ignition source. Avoid contact with skin. Avoid generating mist or dust during use. Protect against electrostatic charges. Empty container may retain residue of liquid and vapors and can be dangerous. Do not cut, drill, grind or weld on or near container. Use only in well ventilated area.

7.1.1 Protective measures

Use only in well ventilated areas. As a precautionary measure, the wearing of standard work gear is suggested. Keep ignition sources away. Do not smoke. Protect from heat. Protect against electrostatic charges.

7.1.2 Advice on general occupational hygiene

Avoid inhalation or ingestion. General occupational hygiene measures are required to ensure a safe handling of the substance. These measures involve good personal and housekeeping practices (i.e. regular cleaning with suitable cleaning devices), no eating, drinking and smoking at the workplace and wearing standard working clothes and shoes unless otherwise stated. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas. Shower and change clothes at end of work shift. Do not wear contaminated clothing at home.

7.2 Conditions for safe storage, including any incompatibilities

Store in cool dry area. Do not freeze. Water contamination should be avoided. Provide sufficient ventilation in storage and workrooms.

7.3 Specific end use(s)

No additional information available. Refer to Section 1.2 of this SDS.

Section 8: Exposure Controls / Personal Protection

8.1 Control Parameters

Barium Titanate, CAS 12047-27-7

USA OSHA	OSHA PEL Ceiling (mg/M ³)	0.5 mg/m ³ (as Ba)
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Isoparaffinic Hydrocarbon, CAS: 64742-48-9

USA OSHA	OSHA PEL Ceiling (mg/M ³)	400 mg/m ³ TWA
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8.2 Exposure Controls

Engineering Controls:

Exhaust ventilation to keep airborne concentrations below exposure limits.

Hygiene Measures:

Workers should wash exposed skin several times daily with soap and water. Soiled work clothing should be laundered or dry-cleaned.

Respiratory:	Airborne concentrations should be kept to lowest levels possible. When respiratory protection is required or concentrations are unknown, use an approved air-purifying respirator with organic vapor cartridge.
Hands:	Wear impervious gloves such as neoprene.
Eyes:	Safety glasses, chemical type goggles, or face shield recommended to prevent eye contact.
Skin:	Wear clean body-covering clothing; impervious gloves such as neoprene. Workers should wash exposed skin several times daily with soap and water. Soiled work clothing should be laundered or dry-cleaned.
Environmental Exposure Controls:	Adverse effects of this material on the environment have not been evaluated. Proper disposal techniques to isolate and recover material should be implemented.

Section 9: Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance (Physical State, Color):	Whitish to tan liquid. The product is a mineral spirits-based material.
Upper/lower flammability or explosive limits:	Lel = .6; Uel = 7
Volatile by Volume:	60–70%
Odor:	Mineral spirits odor.
Vapor Pressure:	Approximately 0.06 kPa 0.5 mm Hg at 20° C
Odor Threshold:	Not determined.
Vapor Density:	>5
pH:	Not applicable.
Relative Density:	Not applicable.
Melting point/freezing point:	Not determined.
Solubility in Water:	Negligible.
Initial boiling point and boiling range:	185° – 211°C
Flashpoint:	>61 °C (142°F) ASTM D-93
Evaporation Rate:	<0.1 (Butyl Acetate = 1)
Partition Coefficient:	Not available.
Auto-ignition temperature:	335°C (635°F)
Decomposition temperature:	Not determined.
Viscosity:	Not determined.
Specific Gravity:	1.1–1.2
Freezing Point:	Not determined.
Explosion Limits:	Not determined.
Oxidizing Properties:	Not determined.

9.2 Other information

No further relevant information available.

Section 10: Stability and Reactivity

10.1 Reactivity

Not determined.

10.2 Chemical Stability

Stable under normal ambient and anticipated storage and handling conditions.

10.3 Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4 Conditions to avoid

No recommendation.

10.5 Incompatible materials

Strong oxidants; strong acids.

10.6 Hazardous decomposition products

Burning may produce irritating or toxic fumes, carbon monoxide, carbon dioxide.

Section 11: Toxicological Information

11.1 Information on toxicological effects

Acute toxicity:

LD50, Rat, Oral Values for classification:

Barium Titanate: >12000 mg/kg

Isoparaffinic Hydrocarbon: >5000 mg/kg

Skin corrosion/irritation:

Avoid contact with skin. Prolonged/repeated contact may cause irritation and/or dermatitis.

Eye damage/irritation:

Avoid contact with eyes. Irritating to eyes.

Inhalation:

Not determined. Use breathing protection when aerosol or mist is formed.

Aspiration:

May be fatal if swallowed and enters airways.

Sensitization:

No sensitizing effects known.

Chronic Effects:

No further relevant information available.

Carcinogenicity

No ingredients listed by NTP, IARC, or OSHA as carcinogen.

Section 12: Ecological Information

12.1 Aquatic Toxicity

No further relevant information available.

12.2 Persistence and degradability

No further relevant information available.

12.3 Bioaccumulative potential

No further relevant information available.

12.4 Mobility in soil

No further relevant information available.

12.5 Results of PBT and vPvB Assessment

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

12.6 Other adverse effects

No further relevant information available.

Section 13: Disposal Considerations

This information presented only applies to the materials as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

United States:

The product is not a RCRA hazardous waste.

Section 14: Transport Information

Transport may take place according to national regulation or ADR for transport by road, RID for transport by train, IMDG for transport by sea, IATA for transport by air.

Sections 14.1 – 14.4

Regulations

	<u>Shipping Name</u>	<u>UN Number</u>	<u>Hazard Class</u>	<u>Packing Group</u>
U.S. DOT (Greater than 119 gallon container):	Petroleum Distillates, N.O.S.	UN1268	Combustible Liquid	III
U.S. DOT (119 gallon container or less):	Not regulated.	Not regulated.	Not regulated.	Not regulated.
ICAO/IATA:	Not regulated.	Not regulated.	Not regulated.	Not regulated.
IMO/IMDG:	Not regulated.	Not regulated.	Not regulated.	Not regulated.
ADR:	Not regulated.	Not regulated.	Not regulated.	Not regulated.

14.5 Environmental Hazards

No further relevant information available.

14.6 Special precautions for users:

No further relevant information available.

14.7 Transport 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 substance or mixture:

Water hazard class:	Not determined.
EPA TSCA Inventory:	All ingredients listed.
State Right-to-Know Laws:	Section 3 of this SDS lists all components of the product.
SARA Section 311/312:	Aspiration hazard. Acute Toxicity.

SARA 313, 304 and CERCLA 102 (A): This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372:

<u>Chemical Name</u>	<u>CAS RN</u>	<u>Percent By Weight</u>
Barium Compound	N040	35

15.2 Chemical safety assessment:

A Chemical Safety Assessment has not been carried out.

15.3 International regulations

Canadian Regulations:

Domestic Substance List:	All ingredients listed.
Controlled Products Regulations:	This SDS contains all the information items specified in Schedule 1, Column 3 of the Controlled Products Regulations in a 16-heading format.

International Chemical Inventories:

EINECS (EU):	All ingredients listed
AICS (Australia):	All ingredients listed
NZIoC (New Zealand)	All ingredients listed
ENCS (Japan):	All ingredients listed
ECL (Korea):	All ingredients listed
PICCS (Philippines):	All ingredients listed
IECSC (China):	All ingredients listed

Section 16: Other Information

Full text of H statements referred to under sections 2 and 3:

H304 May be fatal if swallowed and enters airways.

H227 Combustible liquid.

H302 Harmful if swallowed.

H332 Harmful if inhaled.

National Fire Protection Association (U.S.A.) 704
 HMIS® Hazard Rating:

Health-1, Flammability-2, Reactivity-0, Special-None
 Health-1, Flammability-2, Reactivity-0, Protective
 Equipment-B; safety glasses, gloves.

Recommended Use:

The product is recommended for use in electronics. Other uses have not been investigated and may have other hazards. For industrial use only, not for food, drug or home use.

Work Alert:

Workers using the product should read and understand this SDS and be trained in the proper use of this material.

Other Special Considerations:
 SDS Prepared By:

None known.
 Andrew A. Guzelian
 Nyacol Nano Technologies, Incorporated
 Telephone: 508-881-2220 U.S.A.

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January 21, 2016

This SDS has been prepared with data from Nyacol Nano Technologies, Inc.'s laboratories, raw material suppliers, and government publications. Information herein is accurate to the best of our knowledge. Suggestions are made without warranty or guarantee of results. Before using, the user should determine the suitability of the products for the intended use, and the user assumes the risk and liability in connection therewith. We do not suggest violation of any existing patents or give permission to practice any patented invention without license.

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