
1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Dibutylmagnesium (DBM) in Hexane
CHEMICAL FAMILY: Alkylmagnesiums
MOLECULAR FORMULA: (C₄H₉)₂Mg
SYNONYM(s): n-Butyl-1-Methylpropylmagnesium
GENERAL USE: Industrial Manufacturing

MANUFACTURER
FMC CORPORATION
Lithium Division
P.O. Box 795
Bessemer City, NC 28016-0795
General Information: (704) 868-5300

Emergency Telephone Numbers:
CHEMTREC (800) 424-9300
Emergency Phone (704) 629-5361 (Plant) Call Collect 24 Hr/Day
Emergency Phone (303) 595-9048 (Medical) Call Collect

2. HAZARDS IDENTIFICATION

CLASSIFICATION: Substances and mixtures, which on contact with water, emit flammable gases; Category 1
Flammable liquid; Category 2
Corrosive to skin; Category 1A
Reproductive toxicity; Category 2
Aspiration hazard; Category 1
Specific target organ systemic toxicity – Single exposure; Category 3
Specific target organ systemic toxicity – Repeated exposure; Category 2
Hazardous to the aquatic environment – Chronic; Category 1

LABELING:

SYMBOLS: Flame, corrosion, health hazard, environment, exclamation mark
SIGNAL WORD: Danger
HAZARD STATEMENTS: In contact with water releases flammable gases, which may ignite spontaneously
Highly flammable liquid and vapour
Causes severe skin burns and eye damage
Suspected of damaging fertility or the unborn child.
May be fatal if swallowed and enters airways
May cause drowsiness or dizziness
May cause damage to organs central nerve system, peripheral nerve system through prolonged or repeated exposure
Toxic to aquatic life with long lasting effects

PRECAUTIONARY STATEMENTS: **Prevention:**
Keep from any possible contact with water, because of violent reaction and possible flash fire.
Handle under inert gas, protect from moisture.
Wear chemical splash goggles with a face shield, rubber gloves and rubber clothing.
Keep away from heat/sparks/open flame -- No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical, ventilation and lighting equipment.
Use only non-sparking tools.

Take precautionary measures against static discharge.
Do not breathe dust or mist.
Wash thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.
Use only outdoors or in well-ventilated area.
Do not breathe vapors.
Avoid release to the environment.

Response

In case of fire, use dry chemical for extinction. DO NOT USE WATER OR CARBON DIOXIDE.

First Aid

See Section 4 of the MSDS.

Storage

See Section 7 of the MSDS.

Disposal

See Section 13 of the MSDS.

3. COMPOSITION / INFORMATION ON INGREDIENTS

<u>Chemical Name</u>	<u>CAS #</u>	<u>EC No</u>	<u>Wt.%</u>	<u>Classification, Hazard Statement</u> <u>Codes</u>
Dibutylmagnesium	39881-32-8	254-671-1	12 - 20	Water-react. Cat. 1 H260 Skin Corr. Cat 1A H314
Dioctylmagnesium	24219-37-2	246-087-0	2 - 5	Water-react. Cat. 1 H260 Skin Corr. Cat 1A H314
hexanes*	not available	203-777-6	70 - 90	Information is for hexane, CAS# 110-54-3: Flam liq. Cat. 2 H225 Repr. Cat. 2 H361f Asp. Tox. Cat. 1 H304 STOT Rep. Cat. 2 H373 Skin Irrit. Cat. 2 H315 STOT Single Cat. 3 H336 Aquatic Chronic H411 Cat. 2

4. FIRST AID MEASURES

EYES:

Immediately flush with water for at least 15 minutes, lifting the upper and lower eyelids intermittently. See a medical doctor or ophthalmologist immediately.

SKIN:

Quickly wipe off as much as possible, then immediately flush with plenty of water while removing contaminated clothing and/or shoes. Thoroughly wash with soap and water. Obtain immediate medical attention. Contact a medical doctor if necessary.

INGESTION:

Quickly wipe material from the mouth and rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. See a medical doctor immediately.

INHALATION:

Remove to fresh air. If breathing discomfort occurs and persists, see a medical doctor. If breathing has stopped, give artificial respiration and see a medical doctor immediately.

NOTES TO MEDICAL DOCTOR:

Dibutylmagnesium is expected to be corrosive to eyes, skin and mucous membranes. Contains hydrocarbons that can produce a severe pneumonitis or fatal pulmonary edema if aspirated. Consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Observation may be warranted. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

5. FIRE FIGHTING MEASURES

FLAMMABLE LIMITS:

Not applicable for formulation. For hexane: Upper: 7.7% Lower: 1.2%

GENERAL HAZARD:

Flammable liquid. Reacts violently with water to give off flammable fumes and corrosive dust.

EXTINGUISHING MEDIA:

DO NOT USE WATER OR CARBON DIOXIDE. Use dry chemical.

HAZARDOUS COMBUSTION PRODUCTS:

Magnesium oxide fumes, carbon monoxide, carbon dioxide.

FIRE FIGHTING PROCEDURES:

Wear full protective clothing and self-contained breathing apparatus (SCBA) approved for fire fighting. This is necessary to protect against the hazards of heat, products of combustion and oxygen deficiency. Do not breathe smoke, gases or vapors generated.

AUTOIGNITION TEMPERATURE:

Not available

PROPERTIES CONTRIBUTING TO

Water reactivity of product, and volatility of solvents.

FLAMMABILITY:

FLASH POINT:

Not applicable for formulation. The flashpoint of hexane is -26 C°.

SENSITIVITY TO STATIC DISCHARGE:

Yes

SENSITIVITY TO IMPACT:

Not applicable

COMMENTS:

(See Section 10, Stability and Reactivity)

6. ACCIDENTAL RELEASE MEASURES

RELEASE NOTES:

Remove all sources of ignition. Do not use water in the initial phases of clean up. Contain spill with absorbent. Transfer to approved transport container and clean up spillage with an absorbent. Dispose of waste according to local and Federal laws and regulations. Before cleanup measures begin, review the entire MSDS with particular attention to Section 3, Emergency Overview and Potential Health Effects; and Section 8, Recommended Personal Protective Equipment.

7. HANDLING AND STORAGE

HANDLING:

Use in a closed system under argon or nitrogen. Do not get in eyes, on skin or clothing. Do not breathe vapors or mist.

STORAGE:

Store in a cool place. Keep container closed. Keep away from sources of ignition, water, air, acids and oxidizing agents.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMITS

<u>Chemical Name</u>	<u>TWA (ACGIH)</u>	<u>STEL/Ceiling (ACGIH)</u>	<u>PEL (OSHA)</u>	<u>STEL/Ceiling (OSHA)</u>
Commercial n-Hexane	50 ppm, skin		500 ppm	
other hexanes	500 ppm	1000 ppm		
butane (aliphatic hydrocarbon gases: C ₁ – C ₄), hydrolysis product of dibutylmagnesium	1000 ppm			

ENGINEERING CONTROLS:

Use in closed system under argon or nitrogen. If personal contact can occur, use local exhaust ventilation (explosion-proof), to keep airborne concentrations below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT

<u>Eyes And Face:</u>	Chemical splash goggles with a face shield.
<u>Respiratory:</u>	When engineering controls are not adequate, wear a NIOSH/MSHA respirator approved for protection against organic vapors, dusts and mists.
<u>Protective Clothing:</u>	Rubber gloves and rubber clothing.
<u>Work Hygienic Practices:</u>	Quick-drench eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

<u>ODOR:</u>	Gasoline-like
<u>APPEARANCE:</u>	Clear, water-white to pale yellow liquid
<u>pH:</u>	Reacts violently with water giving mixture with pH >12
<u>PERCENT VOLATILE:</u>	80 to 88
<u>VAPOR PRESSURE:</u>	Hexane: 5.6 psi @ 38°C
<u>VAPOR DENSITY:</u>	(air=1): Approximately 3
<u>BOILING POINT:</u>	Hexane: 62-69°C
<u>MELTING POINT:</u>	Hexane: -95. C°
<u>SOLUBILITY IN WATER:</u>	Reacts violently with water
<u>EVAPORATION RATE(Butyl Acetate = 1):</u>	7.1 – 8.4 (hexane)
<u>SPECIFIC GRAVITY:</u>	0.705 g/ml
<u>MOLECULAR WEIGHT:</u>	138.54 (DBM); 250.74 (dioctylmagnesium)
<u>COEFF. OIL/WATER:</u>	Not available
<u>ODOR THRESHOLD:</u>	Not available
<u>FLAMMABLE LIMITS:</u>	Not applicable for formulation. For hexane: Upper: 7.7% Lower: 1.2%
<u>FLASH POINT:</u>	Not applicable. The flashpoint of hexane is -22°C (-9°F).
<u>AUTOIGNITION TEMPERATURE:</u>	Not available
<u>VISCOSITY:</u>	Not available
<u>FLAMMABILITY:</u>	Water reactive material in flammable liquid solvent
<u>DECOMPOSITION TEMPERATURE:</u>	Not available
<u>EXPLOSIVE PROPERTIES:</u>	Not explosive
<u>OXIDIZING PROPERTIES:</u>	Not an oxidizer

10. STABILITY AND REACTIVITY

<u>CONDITIONS TO AVOID:</u>	Contact with water, air
<u>STABILITY:</u>	Stable

POLYMERIZATION: Will not occur
HAZARDOUS DECOMPOSITION PRODUCTS: Magnesium oxide fumes, butane gas
INCOMPATIBLE MATERIALS: Water, air, strong oxidizers, acids

11. TOXICOLOGICAL INFORMATION

Eye Contact: No data available for the product.
DBM: Corrosive.

Skin Contact: No data available for the product.
DBM: Corrosive.

Skin Absorption: No data available for the product.
DBM: Corrosive.

Ingestion: No data available for the product.
DBM: Corrosive.

Inhalation: n-hexane: Oral LD₅₀ = 25 g/kg (rat) [RTECS]
No data available for the product.
DBM: Corrosive.
n-hexane: Inhalation LC₅₀ = 48000 ppm/4H (rat) [RTECS]
Butane (hydrolysis product):
LC₅₀ = 658 g/m³/4H (rat) [RTECS]

Acute Effects From Overexposure:

This product contains an alkylmagnesium compound which is extremely reactive and corrosive to the skin, eyes (may cause blindness), nose, throat and stomach. Inhalation of vapors may cause dizziness, nausea, anesthesia, numbness, burning sensation and motor weakness in fingers and toes, incoordination, and headache. Low viscosity material--if swallowed may enter the lungs and cause lung damage.
n-hexane: May cause peripheral nervous system disorder and/or damage. Blurred vision is associated with hexane polyneuropathy.

Chronic Effects From Overexposure:

No data available for product.
Hexane: Overexposure to n-hexane may cause progressive and potentially irreversible damage to the peripheral nervous system, particularly in the arms and legs. The neurotoxic effects of n-hexane vapour can be enhanced in rats by both methyl ethyl ketone (MEK) and lead acetate. The available information does not suggest that n-hexane is mutagenic. Negative results were obtained in most tests using live animals and relevant routes of exposure. n-Hexane has caused severe testicular damage in male rats at concentrations which have produced significant other toxicity.

Sensitization: No
n-hexane: There have been no reports of skin sensitization in people occupationally exposed to n-hexane.

Carcinogenicity: EH40: Not listed.
IARC: Not listed.
NTP: Not listed.
OSHA: Not considered a carcinogen under OSHA.
ACGIH: Not listed

Mutagenicity: No data available for product.
Hexane: The available information does not suggest that n-hexane is mutagenic. Negative mutagenicity results were obtained in most tests using live animals and relevant routes of exposure.
Butane: Negative results were reported on short-term tests using bacteria.

Reproductive Toxicity: No data available for product.
n-hexane: n-Hexane has caused severe testicular damage in male rats at concentrations which have produced significant other toxicity.

12. ECOLOGICAL INFORMATION

Ecotoxicological Information:

Environmental toxicity testing of the product has not been carried out.

n-hexane:

24h LC₅₀ 4 mg/L (goldfish) [Handbook Env. Data on Org. Chem., 4th Ed]

48h EC₅₀ 2.1mg/L (daphnia) [Handbook Env. Data on Org. Chem., 4th Ed]

96h LC₅₀ = 1079 mg/L (algae) [Handbook Env. Data on Org. Chem., 4th Ed]

Chemical Fate Information:

DBM: Dibutylmagnesium reacts violently with water to form butane, octane and magnesium hydroxide.

Hexane: Hexane readily volatilizes, biodegrades in soil, water and wastewater treatment plants, adsorbs to organic matter in aquatic systems, has low mobility in soil. Log BCF = 2.24 to 2.89.

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD:

Dispose of waste according to local and Federal laws and regulations.

14. TRANSPORT INFORMATION

UN NUMBER:

UN3399

PROPER SHIPPING NAME:

Organometallic substance, liquid, water reactive, flammable, N. O. S. (dibutylmagnesium in hexane, solution)

CLASSIFICATION:

4.3, Dangerous when wet, (3, flammable)

LABELS:

Dangerous when wet, flammable

PACKING GROUP:

I

FLASH POINT:

Not applicable. The flashpoint of hexane is -22°C (-9°F).

CUSTOM TARIFF NO:

2931.00.9160

MARINE POLLUTANT:

No

PIH:

Not designated Poison Inhalation Hazard by US DOT.

15. REGULATORY INFORMATION

UNITED STATES

SECTION 311 HAZARD CATEGORY (40 CFR 370):

Immediate (acute) health hazard, delayed (chronic) health hazard, fire hazard, reactive

SECTION 313 REPORTABLE INGREDIENTS (40 CFR 372):

This product contains hexane which is a substance subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986.

This information must be included in all MSDS's that are copied and distributed for this material.

SECTION 302 EXTREMELY HAZARDOUS

SUBSTANCES (40 CFR 355):

Not listed

CERCLA HAZARDOUS SUBSTANCE (40 CFR 302.4):

n-Hexane and hexanes are listed. The reportable quantity is 5000 pounds.

TSCA SEC 12B EXPORT NOTIFICATION:

This product is not subject to TSCA 12(b) Export Notification Requirements.

TSCA INVENTORY STATUS (40 CFR 710):

Listed.

CANADA
WHMIS:

Product Identification No.: 3399
Hazard Classification: Class B, Division 6 (Reactive
Flammable Materials)
Class E, (Corrosive)
Class D, Division 2B (Toxic Material with Chronic Effects)
Ingredient Disclosure List: Hexane is listed

16. OTHER INFORMATION

REVISION SUMMARY: Revision # 5: Regular review completed. Sections 2, 3, 9, 11, 14 & 16 revised.

NFPA RATING

HEALTH: 3
FLAMMABILITY: 4
REACTIVITY: 3
SPECIAL: ~~W~~

This MSDS has been prepared to meet U. S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.
type 2d

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