U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

William Canterbury
Dangerous Goods SME
AlbemarleCongress Street Suite 900
Charlotte, NC 28209

April 28, 2020

Reference No. 19-0133

Dear Mr. Canterbury:

This letter is in response to your December 12, 2019, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the proper shipping name for a compound containing a mixture of hydrocarbons. You state that the safety data sheet (SDS) you included in your email lists the technical names as "(Lithium Diisopropylamide, Heptane (C7 hydrocarbon mixture))." Specifically, you ask whether the words "C7 hydrocarbon mixture" must appear as a part of the hazmat shipping description on the shipping paper.

The answer is no. The addition of "C7 hydrocarbon mixture" is not required because it is redundant with the listed technical name Heptane. Note that technical names must be included in parentheses with the hazardous material shipping description and generally, at least two components which most predominantly contribute to the hazard(s) of the mixture or solution must be entered on the shipping paper. See § 172.203(k).

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

Dirk Der Kinderen
Chief, Standards Development Branch
Standards and Rulemaking Division

January, Ikeya CTR (PHMSA) Casey-19-0133

From: INFOCNTR (PHMSA)
Sent: Thursday, December 12, 2019 2:28 PM
To: Hazmat Interps
Subject: FW: Hazmat Interpretation request - Technical name for UN 2924 Flammable liquids, corrosive, n.o.s
Attachments: SDS SKU 10000280.PDF; Canterbury_LOI.docx

Hello Alice and Ikeya,

Please see below for interpretation request, as well as attached notes document.

Please contact our office with any questions.

Thank you,
Kathryn, HMIC

From: William Canterbury [mailto:william.canterbury@albemarle.com]
Sent: Thursday, December 12, 2019 11:20 AM
To: INFOCNTR (PHMSA) <INFOCNTR.INFOCNTR@dot.gov>
Subject: Hazmat Interpretation request - Technical name for UN 2924 Flammable liquids, corrosive, n.o.s

DOT / PHMSA Team

We have a difference of opinion within our team here at Albemarle as to how to list the technical name for this compound and respectively submit this request for your advice.

The attached SDS list the technical name as (Lithium diisopropylamide, Heptane(C7 hydrocarbon mixture))

Another option being considered is (Tetrahyrdrofuran, Lithium Diisopropylamide, Heptane)

Please let me know if you need any additional information and note my contact info and mailing address are below.

Thank you and have a great day!

Just some notes for my personal ref
49 CFR 171.8

Technical name means a recognized chemical name or microbiological name currently used in scientific and technical handbooks, journals, and texts. Generic descriptions are authorized for use as technical names provided they readily identify the general chemical group, or microbiological group. Examples of acceptable generic chemical descriptions are organic phosphate compounds, petroleum aliphatic hydrocarbons and tertiary amines. For proficiency testing only, generic microbiological descriptions such as bacteria, mycobacteria, fungus, and viral samples may be used. Except for names which appear in subpart B of part 172 of this subchapter, trade names may not be used as technical names.

172.203 (K)(1)

(1) If a hazardous material is a mixture or solution of two or more hazardous materials, the technical names of at least two components most predominately contributing to the hazards of the mixture or solution must be entered on the shipping paper as required by paragraph (k) of this section. For example, "UN 2924, Flammable liquid, corrosive, n.o.s., 3 (8), II (contains Methanol, Potassium hydroxide)".

William Canterbury | ALBEMARLE | Dangerous Goods SME, US DOT PHMSA, IATA, IMO/IMDG Certified | 4250 Congress Street, Suite 900, Charlotte NC 28209 | ☎: Office: 704-417-0135| ☎: Cell: 704-287-7177 | ✉: William.canterbury@albemarle.com

Hello Alice and Ikeya,

The requester spoke with Lynsey in the HMIC. She pointed him to the guidance in 172.101(c)(10) about using the two components most predominantly contributing to the hazard and that it is the shipper's responsibility to properly classify. He insisted on moving forward with a LOI. After looking at his LOI, I gave him a call to clarify exactly what his question was and to provide him with letters 14-0244 and 03-0189 essentially, he still wants to verify his letter but I got a better idea for what he is looking for.

In the request, he lists the two options for technical names, his main question is on the inclusion of "C7 hydrocarbon mixture" after heptane. The SDS places it after the heptane in section 14 but he is unsure if he is required to include that because C7 hydrocarbon mixture is basically synonymous with heptane.

Please contact our office with any questions.

Thank you,

Kathryn, HMIC

Lithium Di-isoproplyamide abt. 27% in THF/ Heptane/ Ethylbenzene

SDS Number: RS_000001280

Version	Revision Date:	Date of last issue: 03/04/2019	Print Date:
1.1	10/09/2019	Date of first issue: 03/04/2019	12/09/2019

SECTION 1. IDENTIFICATION

Product name : Lithium Di-isoproplyamide abt. 27% in THF/ Heptane/ Ethylbenzene

Manufacturer or supplier's details

Company name of supplier : Albemarle Corporation

Address : 4250 Congress Street, Suite 900
Charlotte , NC 28209
United States of America (USA)

Telephone : 980.299.5700

Telefax : 980.299.5512

Emergency telephone : +32 (0) 70-233-201 (EUROPE)
(+1)225-344-7147 (US and WORLDWIDE)
+65-6733-1661 (ASIA PACIFIC)
+86-532-8388-9090 (CHINA)
+61 2 8014 4558 or 18000 74234 (Australia)

Contact person product safety : DEPARTMENT OF PRODUCT SAFETY

E-mail address : PRODUCTSAFETY@ALBEMARLE.COM

Recommended use of the chemical and restrictions on use

Recommended use : Reagent for organic synthesis.
Transported isolated intermediate

Restrictions on use : Use only in closed systems.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with 29 CFR 1910.1200

Flammable liquids : Category 2

Skin corrosion : Category 1A

Serious eye damage : Category 1

Carcinogenicity	:	Category 2
Specific target organ systemic toxicity - single exposure	:	Category 3 (Respiratory system, Central nervous system)
Specific target organ systemic toxicity - repeated exposure	:	Category 2
Aspiration hazard	:	Category 1
Acute aquatic toxicity	:	Category 2
Chronic aquatic toxicity	:	Category 2

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements :
H225 Highly flammable liquid and vapor.
H304 May be fatal if swallowed and enters airways.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H336 May cause drowsiness or dizziness.
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.
H411 Toxic to aquatic life with long lasting effects.

Precautionary Statements :

Prevention:

P201 Obtain special instructions before use.
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.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.

P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P378 In case of fire, use extinguish media on basis of NaCl or pulverized limestone. Never use water.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

The information required is contained in this Material Safety Data Sheet.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Chemical nature : Organoamide

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture))	64742-49-0	>= 30 - < 50

lithium diisopropylamide	4111-54-0	>= 20 - < 30
tetrahydrofuran	109-99-9	>= 20 - < 30
ethylbenzene	100-41-4	>= 10 - < 20
diisopropylamine	108-18-9	>= 3 - < 5

* Note: The exact concentrations of the above listed chemicals are being withheld as a trade secret.

SECTION 4. FIRST AID MEASURES

General advice :
First Aid responders should pay attention to self-protection and use the recommended protective clothing
Move out of dangerous area.
Take off contaminated clothing and shoes immediately.
Keep warm and in a quiet place.

If inhaled :
Move to fresh air.
If not breathing, give artificial respiration.
Keep the victim calm and in a semi-upright position.
Call a physician immediately.

In case of skin contact :
Wash off immediately with plenty of water for at least 15 minutes.
Call a physician immediately.

In case of eye contact :
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Call a physician immediately.

If swallowed :
Clean mouth with water and drink afterwards plenty of water.
Never give anything by mouth to an unconscious person.
Do NOT induce vomiting.
Call a physician immediately.

Most important symptoms and effects, both acute and delayed :
Headache
Nausea
Vomiting
Tiredness
Drowsiness
Dizziness
Unconsciousness
Risk of serious damage to the lungs (by aspiration).
Risk of product entering the lungs on vomiting after ingestion.
If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Notes to physician :
Treat symptomatically.
For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Dry extinguishing media based on NaCl or pulverized limestone.
Unsuitable extinguishing media	:	Water Carbon dioxide (CO2) Foam
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Vapors are heavier than air and may spread along floors. Flash back possible over considerable distance. Hazardous decomposition products formed under fire conditions.
Hazardous combustion products	:	Carbon monoxide Carbon dioxide (CO2)
Further information	:	Use a water spray to cool fully closed containers. Be aware of a dangerous reaction with water, if the container is ruptured. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.
Special protective equipment for fire-fighters	:	Wear full protective clothing and self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Remove all sources of ignition. Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe dust/ fume/ gas/ mist/ vapors/ spray. Keep people away from and upwind of spill/leak.
Environmental precautions	:	Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.
Methods and materials for containment and cleaning up	:	Do not allow contact with water. Cover spilled material with limestone powder. Pick up and transfer to properly labeled containers. Non-sparking tools should be used. Adequate disposal

SECTION 7. HANDLING AND STORAGE

Advice on protection against fire and explosion	:	Vapors may form explosive mixtures with air. Vapors are heavier than air and may spread along floors. Flash back possible over considerable distance. Use only explosion-proof equipment. Take precautionary measures against static discharge. Keep away from open flames, hot surfaces and sources of ignition. Uncleaned empty containers can contain product gases, which form explosive mixtures with air.
Advice on safe handling	:	Handle under inert gas. Protect from moisture. Use product only in closed system. Provide sufficient air exchange and/or exhaust in work rooms. Provide exhaust ventilation close to floor level. Avoid formation of aerosol. Wear personal protective equipment. Handle in accordance with good industrial hygiene and safety practice. In general, emissions are controlled and prevented by implementing an appropriate management system, including regular informing and training workers.
Conditions for safe storage	:	Keep under inert gas. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat. Keep away from direct sunlight. Protect from moisture. Protect from frost. Do not allow contact with air.
Materials to avoid	:	Never allow product to get in contact with water during storage. Incompatible with oxidizing agents. Do not store near acids.
Further information on storage stability	:	Keep at temperatures between 0°C and 15°C.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of	Control parameters / Permissible	Basis

		exposure)	concentration	
Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture))	64742-49-0	TWA	500 ppm 2,000 mg/m3	OSHA Z-1
		TWA	400 ppm 1,600 mg/m3	OSHA P0
tetrahydrofuran	109-99-9	TWA	50 ppm	ACGIH
		STEL	100 ppm	ACGIH
		ST	250 ppm 735 mg/m3	NIOSH REL
		TWA	200 ppm 590 mg/m3	NIOSH REL
		TWA	200 ppm 590 mg/m3	OSHA Z-1
		TWA	200 ppm 590 mg/m3	OSHA P0
		STEL	250 ppm 735 mg/m3	OSHA P0
ethylbenzene	100-41-4	TWA	20 ppm	ACGIH
		TWA	100 ppm 435 mg/m3	NIOSH REL
		ST	125 ppm 545 mg/m3	NIOSH REL
		TWA	100 ppm 435 mg/m3	OSHA Z-1
		TWA	100 ppm 435 mg/m3	OSHA P0
		STEL	125 ppm 545 mg/m3	OSHA P0
diisopropylamine	108-18-9	TWA	5 ppm	ACGIH
		TWA	5 ppm 20 mg/m3	NIOSH REL
		TWA	5 ppm 20 mg/m3	OSHA Z-1
		TWA	5 ppm 20 mg/m3	OSHA P0

Biological occupational exposure limits

Ingredients	CAS-No.	Control parameters	Biological specimen	Sam-pling time	Permissible concentra-tion	Basis
tetrahydrofuran	109-99-9	Tetrahydrofuran	Urine	End of shift (As soon as possible after exposure	2 mg/l	ACGIH BEI

				ceases)		
ethylbenzene	100-41-4	Sum of mandelic acid and phenyl glyoxylic acid	Urine	End of shift (As soon as possible after exposure ceases)	0.15 g/g creatinine	ACGIH BEI

Engineering measures : Use product only in closed system.
Provide sufficient air exchange and/or exhaust in work rooms.
Provide exhaust ventilation close to floor level.
Take precautionary measures against static discharge.
Electrical equipment should be protected to the appropriate standard.

Personal protective equipment

Respiratory protection : In case of inadequate ventilation wear respiratory protection.
Recommended Filter type:
ABEK-P2-filter
When prolonged exposure is expected:
Wear full protective clothing and self-contained breathing apparatus.

Hand protection
Material : Wear suitable gloves.

Material : Flame retardant gloves

Remarks : Protective gloves and
Protective gloves against thermal risks The choice of an appropriate glove does not only depend on its material but also on other quality features and is different from one producer to the other. The exact break through time can be obtained from the protective glove producer and this has to be observed. Protective gloves have to be replaced at the first sign of deterioration.

Eye protection : Tightly fitting safety goggles
Face-shield

Skin and body protection : Flame retardant antistatic protective clothing.
Complete suit protecting against chemicals

Protective measures : Handle in accordance with good industrial hygiene and safety practice.

Ensure that eye flushing systems and safety showers are located close to the working place.

Hygiene measures : Take off contaminated clothing and shoes immediately.
Avoid contact with skin, eyes and clothing.
Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
Keep away from food, drink and animal feedingstuffs.
Smoking, eating and drinking should be prohibited in the application area.
Wash hands before breaks and at the end of workday.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	slight, yellow, to, red brown
Odor	:	solvent
Odor Threshold	:	No data available
pH	:	alkaline
Crystallization temperature	:	< 32 °F / < 0 °C
Boiling point/boiling range	:	151 °F / 66 °C Tetrahydrofuran
Flash point	:	-6.2 °F / -21.2 °C (1,013 hPa) Method: closed cup Tetrahydrofuran
Evaporation rate	:	No data available
Flammability (solid, gas)	:	No data available
Flammability (liquids)	:	Flammability (liquids) Remarks: Highly flammable liquid and vapor.
Self-ignition	:	not auto-flammable
Upper explosion limit / Upper flammability limit	:	12 %(V) Tetrahydrofuran
Lower explosion limit / Lower flammability limit	:	1.5 %(V) Tetrahydrofuran

Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Density	:	ca. 0.80 g/cm3 (68 °F / 20 °C)
Solubility(ies)		
Water solubility	:	Not applicable, Reacts violently with water.
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Autoignition temperature	:	419 °F / 215 °C Heptane
Decomposition temperature	:	> 104 °F / > 40 °C To avoid thermal decomposition, do not overheat.
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	No data available
Explosive properties	:	Vapors may form explosive mixtures with air.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Risk of violent reaction.
Chemical stability	:	Sensitive to air. Decomposes on heating. Decomposition under influence of moisture is highly accelerated by heating.
Possibility of hazardous reactions	:	Reacts violently with water. Vapors may form explosive mixture with air. May form explosive peroxides.
Conditions to avoid	:	Keep away from open flames, hot surfaces and sources of ignition. Protect from moisture. Do not allow contact with air. Take action to prevent static discharges. Protect from frost, heat and sunlight.

Incompatible materials	:	Water Acids Oxidizing agents
Hazardous decomposition products	:	Decomposes in contact with water. Lithium hydroxide Diisopropylamine

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Acute oral toxicity	:	LD50 (Rat): > 5,840 mg/kg Method: OECD Test Guideline 401 Test substance: Read-across (Analogy)
Acute inhalation toxicity	:	LC50 (Rat): > 23.3 mg/l Exposure time: 4 h Test atmosphere: vapor Method: OECD Test Guideline 403 Test substance: Read-across (Analogy) GLP: yes
Acute dermal toxicity	:	LD50 (Rat): > 2,800 mg/kg Method: OECD Test Guideline 402 Test substance: Read-across (Analogy)

tetrahydrofuran:

Acute oral toxicity	:	LD50 (Rat, male and female): 1,650 mg/kg
Acute inhalation toxicity	:	LC50 (Rat, male and female): > 14.7 mg/l Exposure time: 6 h Test atmosphere: vapor Remarks: Information taken from reference works and the literature.
Acute dermal toxicity	:	LD50 (Rat, male and female): > 2,000 mg/kg Method: OECD Test Guideline 402 GLP: yes Remarks: Limit Test

ethylbenzene:

Acute oral toxicity	:	LD50 (Rat): 3,500 mg/kg

Acute inhalation toxicity	:	LC50 (Rat): 17.2 mg/l Exposure time: 4 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 15,354 mg/kg

diisopropylamine:

Acute oral toxicity	:	LD50 (Rat, male and female): 420 mg/kg Method: US EPA Test Guideline OPP 81-1
Acute inhalation toxicity	:	LC50 (Rat, male and female): 5.35 mg/l Exposure time: 4 h Test atmosphere: vapor Method: OECD Test Guideline 403

Skin corrosion/irritation

Product:

Remarks	:	Causes severe burns.

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Species	:	Rabbit
Exposure time	:	4 h
Method	:	OECD Test Guideline 404
Result	:	Skin irritation
Test substance	:	Read-across (Analogy)

lithium diisopropylamide:

Result	:	Causes severe burns.

tetrahydrofuran:

Species	:	Rabbit
Exposure time	:	72 h
Method	:	Draize Test
Result	:	No skin irritation

diisopropylamine:

Species	:	Rabbit
Exposure time	:	3 min
Method	:	OECD Test Guideline 404
Result	:	Causes severe burns.

GLP : yes

Serious eye damage/eye irritation

Product:

Remarks : Causes serious eye damage.

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Species : Rabbit
Result : No eye irritation
Test substance : Read-across (Analogy)

lithium diisopropylamide:

Result : Risk of serious damage to eyes.

tetrahydrofuran:

Result : Irritating to eyes.
Remarks : Information taken from reference works and the literature.

diisopropylamine:

Species : Rabbit
Result : Irreversible effects on the eye
Exposure time : 24 h
Method : OECD Test Guideline 405

Respiratory or skin sensitization

Product:

Remarks : No data available

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Test Type : Maximization Test
Routes of exposure : Skin contact
Species : Guinea pig
Method : OECD Test Guideline 406
Result : Did not cause sensitization on laboratory animals.
Test substance : Read-across (Analogy)

tetrahydrofuran:

Test Type	:	Local lymph node assay (LLNA)
Species	:	Mouse
Method	:	OECD Test Guideline 429
Result	:	Did not cause sensitization on laboratory animals.
GLP	:	yes

diisopropylamine:

Test Type	:	Maximization Test
Routes of exposure	:	Skin contact
Species	:	Guinea pig
Method	:	OECD Test Guideline 406
Result	:	Does not cause skin sensitization.
GLP	:	yes

Germ cell mutagenicity

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test substance: Read-across (Analogy)

Test Type: reverse mutation assay
Test system: Escherichia coli
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test substance: Read-across (Analogy)

tetrahydrofuran:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
GLP: yes

Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

GLP: yes

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse (male and female)
Strain: B6C3F1
Application Route: inhalation (vapor)
Method: OECD Test Guideline 474
Result: negative

ethylbenzene:

Genotoxicity in vitro : Test Type: In vitro Mammalian Cell Gene Mutation Test
Test system: mouse lymphoma cells
Method: OECD Test Guideline 476
Result: negative

Test Type: Ames test
Test system: Salmonella typhimurium
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Species: Mouse (male and female)
Application Route: Inhalation
Method: OECD Test Guideline 474
Result: negative

diisopropylamine:

Genotoxicity in vitro : Test Type: reverse mutation assay
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
GLP: yes

Carcinogenicity

Ingredients:

tetrahydrofuran:

Species	:	Rat, male and female
Application Route	:	inhalation (vapor)
Exposure time	:	2 Years
Group	:	yes
Frequency of Treatment	:	5 days/week
NOAEC	:	1,800 ppm
GLP	:	yes

Carcinogenicity - Assess- : Limited evidence of carcinogenicity in animal studies

ment

IARC	Group 2B: Possibly carcinogenic to humans 109-99-9	Not Assigned
	Group 2B: Possibly carcinogenic to humans 100-41-4	Not Assigned
OSHA	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.	
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.	

Reproductive toxicity

Ingredients:

tetrahydrofuran:

Effects on fertility : Test Type: Two-generation study
Species: Rat, male and female
Strain: wistar
Application Route: Oral
General Toxicity Parent: NOAEL: 305 mg/kg bw/day
General Toxicity F1: NOAEL: 305 mg/kg body weight
Fertility: NOAEL: 782 mg/kg bw/day
Method: OECD Test Guideline 416
GLP: yes

Effects on fetal development : Test Type: Pre-natal
Species: Rat
Strain: Sprague-Dawley
Application Route: inhalation (vapor)
Frequency of Treatment: 7 days/week
General Toxicity Maternal: NOAEL: 1,800 ppm
Developmental Toxicity: NOAEL: 1,800 ppm
Method: OECD Test Guideline 414
Result: Animal testing did not show any effects on fetal development.
GLP: yes

STOT-single exposure

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Routes of exposure : Inhalation
Assessment : The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with narcotic effects.

tetrahydrofuran:

Routes of exposure	:	Inhalation
Assessment	:	The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

diisopropylamine:

Assessment	:	The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation., May cause respiratory irritation.

STOT-repeated exposure

Ingredients:

ethylbenzene:

Assessment	:	The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Repeated dose toxicity

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Species	:	Rat, male and female
NOAEL	:	12.35 mg/l
Application Route	:	Inhalation
Test atmosphere	:	vapor
Exposure time	:	90 d
Method	:	OECD Test Guideline 413
Test substance	:	Read-across (Analogy)

tetrahydrofuran:

Species	:	Rat, male and female
NOAEL	:	1,000 mg/l
Application Route	:	Oral
Exposure time	:	28 d
Group	:	yes
Method	:	OECD Test Guideline 407

Species	:	Rat, male and female
NOAEC	:	1800 ppm
Application Route	:	Inhalation
Test atmosphere	:	vapor
Exposure time	:	90 d

Group	:	yes
Method	:	Sub-chronic toxicity study (90-day)
GLP	:	yes

ethylbenzene:

Species	:	Rat, male and female
NOAEL	:	75 mg/kg
LOAEL	:	250 mg/kg
Application Route	:	Oral
Exposure time	:	90 d
Method	:	OECD Test Guideline 408

diisopropylamine:

Species	:	Rat, male and female
NOAEL	:	50 mg/kg bw/day
Application Route	:	Oral
Exposure time	:	33 d
Method	:	Regulation (EC) No. 440/2008, Annex, B.7

Species	:	Rat, male and female
NOAEL	:	>150 mg/kg bw/day
Application Route	:	Skin contact
Exposure time	:	28 d
Number of exposures	:	5 d/wk
Method	:	OECD Test Guideline 410
GLP	:	yes

Aspiration toxicity

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

ethylbenzene:
The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

Further information

Product:

Remarks	:	If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach. Evaporation of solvents may cause irritation to eyes and mu-

cous membranes.
Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 13.4 mg/l End point: mortality Exposure time: 96 h Test Type: semi-static test Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): 3 mg/l End point: Immobilization Exposure time: 48 h Test Type: static test Test substance: Read-across (Analogy) Method: OECD Test Guideline 202 GLP: yes
Toxicity to algae	:	EL50 (Pseudokirchneriella subcapitata (green algae)): 10 mg/l End point: Growth rate Exposure time: 72 h Test Type: static test Test substance: Read-across (Analogy) Method: OECD Test Guideline 201 GLP: yes
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.017 mg/l Exposure time: 21 d Test Type: static test Analytical monitoring: yes Test substance: Read-across (Analogy) Method: OECD Test Guideline 211 GLP: yes
Toxicity to microorganisms	:	EL50 (Tetrahymena pyriformis): 26.8 mg/l End point: Growth rate Exposure time: 48 h Method: QSAR GLP:

tetrahydrofuran:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): 2,160 mg/l End point: mortality Exposure time: 96 h Test Type: flow-through test Analytical monitoring: yes Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3,485 mg/l End point: mortality Exposure time: 48 h Test Type: static test Method: OECD Test Guideline 202
Toxicity to algae	:	TTC (Scenedesmus quadricauda (Green algae)): 3,700 mg/l End point: Growth rate Exposure time: 8 d Test Type: static test Remarks: Information taken from reference works and the literature.
Toxicity to fish (Chronic toxicity)	:	NOEC (Pimephales promelas (fathead minnow)): 216 mg/l End point: Growth inhibition Exposure time: 33 d Test Type: flow-through test Analytical monitoring: yes Remarks: Information taken from reference works and the literature.
Toxicity to microorganisms	:	IC50 (activated sludge): 460 mg/l End point: Respiration inhibition Exposure time: 3 h Test Type: static test Method: OECD Test Guideline 209

ethylbenzene:

Toxicity to algae	:	IC50 (Selenastrum capricornutum (green algae)): 4.6 mg/l Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50 (Photobacterium phosphoreum): 9.68 mg/l Exposure time: 30 min

diisopropylamine:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 26 mg/l End point: mortality Exposure time: 96 h Test Type: static test

Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates : LC50 (Daphnia magna (Water flea)): 110 mg/l
End point: Immobilization
Exposure time: 48 h
Test Type: static test

Toxicity to algae : EC50 (Selenastrum capricornutum (green algae)): 20 mg/l
End point: Growth rate
Exposure time: 96 h
Test Type: static test

Toxicity to microorganisms : EC50 (activated sludge): > 100 mg/l
End point: Respiration inhibition
Exposure time: 3 h
Test Type: static test
Method: OECD Test Guideline 209

Persistence and degradability

Product:

Biodegradability : Remarks: No data available

Physico-chemical removability : Remarks: No data available

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 100 mg/l
Result: Readily biodegradable.
Biodegradation: 98 %
Exposure time: 28 d
Method: OECD Test Guideline 301F
Test substance: Read-across (Analogy)
GLP: yes

tetrahydrofuran:

Biodegradability : aerobic
Inoculum: activated sludge
Concentration: 100 mg/l
Result: Biodegradable
Biodegradation: 82 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

GLP: yes

ethylbenzene:

Chemical Oxygen Demand (COD) : 1,780 mg/g

Bioaccumulative potential

Product:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

Ingredients:

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture)):

Bioaccumulation : Remarks: No data available

lithium diisopropylamide:

Bioaccumulation : Remarks: Bioaccumulation is unlikely.

tetrahydrofuran:

Bioaccumulation : Remarks: No bioaccumulation is to be expected (log Pow <= 4).

Partition coefficient: n-octanol/water : log Pow: 0.45 (77 °F / 25 °C)
Method: OECD Test Guideline 107

ethylbenzene:

Partition coefficient: n-octanol/water : log Pow: 3.15

diisopropylamine:

Partition coefficient: n-octanol/water : log Pow: 0.4 (68 °F / 20 °C)
pH: 12
Method: OECD Test Guideline 107

Mobility in soil

Ingredients:

ethylbenzene:

Distribution among environmental compartments : log Koc: 2.31
Remarks: The product is insoluble and floats on water.

Other adverse effects

Product:

Ozone-Depletion Potential	:	Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
Additional ecological information	:	Toxic to aquatic life with long lasting effects. Avoid subsoil penetration. Do not flush into surface water or sanitary sewer system.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations.
Contaminated packaging	:	Refer to manufacturer/ supplier for information on recovery/ recycling.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 2924
Proper shipping name	:	FLAMMABLE LIQUID, CORROSIVE, N.O.S. (Lithium diisopropylamide, Heptane (C7 hydrocarbon mixture))
Class	:	3
Subsidiary risk	:	8
Packing group	:	II
Labels	:	3 (8)

IATA-DGR

UN/ID No.	:	UN 2924
Proper shipping name	:	Flammable liquid, corrosive, n.o.s. (Lithium diisopropylamide, Heptane (C7 hydrocarbon mixture))
Class	:	3
Subsidiary risk	:	8
Packing group	:	II
Labels	:	Flammable Liquids, Corrosive
Packing instruction (cargo	:	363

aircraft)
Packing instruction (passenger aircraft) : 352

IMDG-Code

UN number	:	UN 2924
Proper shipping name	:	FLAMMABLE LIQUID, CORROSIVE, N.O.S. (Lithium diisopropylamide, Heptane (C7 hydrocarbon mixture))
Class	:	3
Subsidiary risk	:	8
Packing group	:	II
Labels	:	3 (8)
EmS Code	:	F-E, S-C
Marine pollutant	:	yes
Remarks	:	Alkalis

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	:	UN 2924
Proper shipping name	:	Flammable liquids, corrosive, n.o.s. (Lithium diisopropylamide, Heptane (C7 hydrocarbon mixture))
Class	:	3
Subsidiary risk	:	8
Packing group	:	II
Labels	:	FLAMMABLE LIQUID, CORROSIVE
ERG Code	:	132
Marine pollutant	:	yes(Heptane (C7 hydrocarbon mixture))

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

Ingredients	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
tetrahydrofuran	109-99-9	1000	4347
ethylbenzene	100-41-4	100	100 (F003)

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Flammable (gases, aerosols, liquids, or solids)
Skin corrosion or irritation
Serious eye damage or eye irritation
Carcinogenicity
Specific target organ toxicity (single or repeated exposure)
Aspiration hazard

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

ethylbenzene	100-41-4	>= 10 - < 20 %

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 12 (40 CFR 61):

ethylbenzene	100-41-4	>= 10 - < 20 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

ethylbenzene	100-41-4	>= 10 - < 20 %

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

ethylbenzene	100-41-4	>= 10 - < 20 %

The following Hazardous Chemicals are listed under the U.S. CleanWater Act, Section 311, Table 117.3:

ethylbenzene	100-41-4	>= 10 - < 20 %

This product contains the following toxic pollutants listed under the U.S. Clean Water Act Section 307

ethylbenzene	100-41-4	>= 10 - < 20 %

US State Regulations

Massachusetts Right To Know

tetrahydrofuran	109-99-9
ethylbenzene	100-41-4
diisopropylamine	108-18-9

Pennsylvania Right To Know

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydro-	64742-49-0

carbon mixture))	
lithium diisopropylamide	4111-54-0
tetrahydrofuran	109-99-9
ethylbenzene	100-41-4
diisopropylamine	108-18-9

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

ethylbenzene	100-41-4

Washington Chemicals of High Concern

ethylbenzene	100-41-4

California Prop. 65

WARNING: This product can expose you to chemicals including ethylbenzene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California List of Hazardous Substances

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture))	64742-49-0
tetrahydrofuran	109-99-9
ethylbenzene	100-41-4
diisopropylamine	108-18-9

California Permissible Exposure Limits for Chemical Contaminants

Naphtha (petroleum), hydrotreated light (Heptane (C7 hydrocarbon mixture))	64742-49-0
tetrahydrofuran	109-99-9
ethylbenzene	100-41-4
diisopropylamine	108-18-9

The ingredients of this product are reported in the following inventories:

EINECS	:	On the inventory, or in compliance with the inventory
DSL	:	All components of this product are on the Canadian DSL
AICS	:	On the inventory, or in compliance with the inventory
NZIoC	:	Not in compliance with the inventory
ENCS	:	Not in compliance with the inventory
ISHL	:	Not in compliance with the inventory
KECI	:	Not in compliance with the inventory
PICCS	:	On the inventory, or in compliance with the inventory

IECSC	:	On the inventory, or in compliance with the inventory
TCSI	:	On the inventory, or in compliance with the inventory
TSCA	:	On TSCA Inventory

TSCA list

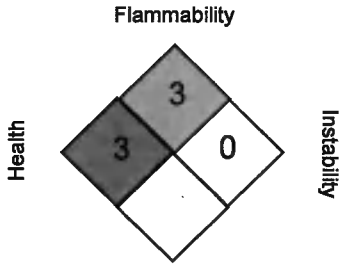
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



HMIS® IV:

HEALTH	*	3
FLAMMABILITY		3
PHYSICAL HAZARD		0

HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA P0	:	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek

NIOSH REL / ST	:	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA P0 / TWA	:	8-hour time weighted average
OSHA P0 / STEL	:	Short-term exposure limit
OSHA Z-1 / TWA	:	8-hour time weighted average

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date : 10/09/2019

The information provided in this Material Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

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