

From: [Julie Harse](#)
To: [Elizabeth Rorie](#)
Subject: FW: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification
Date: Wednesday, December 13, 2017 3:13:49 PM

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From: Randy.Reed@albemarle.com [mailto:Randy.Reed@albemarle.com]
Sent: Monday, December 11, 2017 4:09 PM
To: Julie Harse
Cc: Darrell.Fisher@albemarle.com; John.Stewart@albemarle.com; Lee Bagby; Robert Crowley
Subject: RE: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

Hi Julie,

here are the SDSs for the 3 concentrations of MAO that can be stored in these portable tanks

Thanks,

Randy

Randy Reed |  **ALBEMARLE** | Senior Advisor, SPS PSA | 856 Foote Lane, New Johnsonville, TN 37134 | 📞: 931.535.6202 |
📠: 731.363.3750 | ✉: Randy.Reed@albemarle.com | www.albemarle.com

From: Julie Harse <Julie.Harse@tn.gov>
To: "Darrell.Fisher@albemarle.com" <Darrell.Fisher@albemarle.com>
Cc: Lee Bagby <Lee.Bagby@erm.com>, Robert Crowley <Robert.Crowley@erm.com>, "Randy.Reed@albemarle.com" <Randy.Reed@albemarle.com>, "John.Stewart@albemarle.com" <John.Stewart@albemarle.com>
Date: 12/11/2017 02:46 PM
Subject: RE: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

Do you have a material safety data sheet for the chemical that is stored in these tanks? Thanks.

From: Darrell.Fisher@albemarle.com [mailto:Darrell.Fisher@albemarle.com]
Sent: Thursday, December 7, 2017 4:33 PM
To: Julie Harse
Cc: Lee Bagby; Robert Crowley; Randy.Reed@albemarle.com; John.Stewart@albemarle.com
Subject: Albemarle New Johnsonville (NPDES Permit TN0062537) TDEC MAO Notification

***** This is an EXTERNAL email. Please exercise caution. DO NOT open attachments or click links from unknown senders or unexpected email - STS-Security. *****

Dear Ms. Harse

Please find attached a notification letter regarding Albemarle's New Johnsonville Site NPDES permit

TN0062537. I have also sent this to your attention via certified letter.

Regards,
Darrell Fisher

Darrell Fisher |  **ALBEMARLE**[®] | Operations Director Butyllithium & Specialties | 856 Foote Lane, New Johnsonville, TN 37134
| 📞: 931.535.6201 | 📠: 615.522.8976 | ✉️: Darrell.Fisher@albemarle.com | www.albemarle.com



www.albemarle-lithium.com

Please note that Rockwood Lithium has changed its brand to Albemarle and the legal company name from Rockwood Lithium Inc. to Albemarle U.S., Inc.
The e-Mail address of our users has now changed from **@rockwoodlithium.com** to **@albemarle.com**.

Make sure to update **your local directories**, master data and other files with the new e-Mail address and company name.

This e-mail and all attachments transmitted may contain confidential or legally privileged information. If you are not the intended recipient (or have received this e-mail in error) please notify the sender immediately and delete this e-mail. Any unauthorized copying, disclosure or distribution of the information contained in this e-mail or its attachments is strictly forbidden.



www.albemarle-lithium.com

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SAFETY DATA SHEET

MAO (HT) 10% in Toluene

Preparation Date : 04-Aug-2009

Revision Date: 29-May-2015

Revision Number: 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name MAO (HT) 10% in Toluene

Other means of identification

Chemical Family Organoaluminum Compound.

Recommended use of the chemical and restrictions on use

General function No information available.

Uses advised against No information available

Details of the supplier of the safety data sheet

Company Albemarle Corporation
451 Florida Street
Baton Rouge, LA 70801

For Non-Emergency 800-535-3030

'Competent Body for SDS' HSE@Albemarle.com

Emergency telephone number
Emergency Telephone Numbers +1-225-344-7147

2. HAZARDS IDENTIFICATION

Classification

Skin Corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3 - (H336)
Specific target organ toxicity (repeated exposure)	Category 2
Aspiration toxicity	Category 1
Flammable liquids	Category 2
Substances or mixtures which, in contact with water, emit flammable gases	Category 1

Label elements

Emergency Overview

Danger

Hazard Statements
 Causes severe skin burns and eye damage
 Suspected of damaging fertility or the unborn child
 May cause drowsiness or dizziness
 May cause damage to organs through prolonged or repeated exposure
 May be fatal if swallowed and enters airways
 Highly flammable liquid and vapor
 In contact with water releases flammable gases which may ignite spontaneously

**Appearance** Liquid**Color** Clear. Colourless.**Odor** Aromatic**Prevention**

Obtain special instructions before use
 Do not handle until all safety precautions have been read and understood
 Use personal protective equipment as required
 Do not breathe dust/fume/gas/mist/vapors/spray
 Wash face, hands and any exposed skin thoroughly after handling
 Use only outdoors or in a well-ventilated area
 Keep away from heat/sparks/open flames/hot surfaces. — No smoking
 Keep container tightly closed
 Ground/bond container and receiving equipment
 Use explosion-proof electrical/ventilating/lighting/equipment
 Use only non-sparking tools
 Take precautionary measures against static discharge
 Keep away from any possible contact with water, because of violent reaction and possible flash fire
 Handle under inert gas. Protect from moisture
 Keep cool

Response

Immediately call a POISON CENTER or doctor/physician
 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 or doctor/physician
 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
 Wash contaminated clothing before reuse
 Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Immediately call a POISON CENTER or doctor/physician Call a POISON CENTER or doctor/physician if you feel unwell
 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician Do not induce vomiting Rinse mouth
 In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up
 Store in a well-ventilated place. Keep container tightly closed
 Store in a dry place

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable

Other Information

- Reacts violently with water

3. COMPOSITION/INFORMATION ON INGREDIENTS

Pure substance/mixture Mixture

Component	CAS-No	Weight %
Toluene	108-88-3	>70
MAO	Proprietary.	<30
Trimethylaluminium	75-24-1	<5

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

4. FIRST AID MEASURES

First aid measures

General Advice

Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye contact

Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Immediately call a POISON CENTER or doctor/physician.

Skin Contact

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Contaminated clothing cannot be washed clean and should not be re-used for any purpose. Immediately call a POISON CENTER or doctor/physician. Metal alkyls and solutions of metal alkyls react with air and with body moisture. Immediate flushing with large volumes of water will kill residual alkyl, carry away the heat of reaction, and cool burned tissue. Such burns will be predominately thermal and should be treated medically as such. Immediate application of cold water has been found to reduce the severity of burns. For treatment of injury or shock, the services of a physician are required.

Inhalation

IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration, preferably mouth to mouth. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. If breathing is difficult, give oxygen. Seek immediate medical attention/advice.

Ingestion

Seek immediate medical attention/advice. Aspiration hazard if swallowed - can enter lungs and cause damage. IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Never give anything by mouth to an unconscious person.

Protection of First-aiders

Use personal protective equipment as required. Avoid contact with skin, eyes and clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

Most important symptoms and effects, both acute and delayed

Symptoms

Causes severe skin burns and eye damage. Immediate symptoms : ocular burning sensation, blinking, tearing and pain. Initial symptoms may be followed by chest tightness and coughing, burning of the tongue and mouth, salivation and vomiting. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. Repeated or prolonged exposure may cause central nervous system damage.

Indication of any immediate medical attention and special treatment needed

Notes to Physician

Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable extinguishing media (a) No standard methods have been developed for extinguishing large-scale aluminum alkyl solution fires. The use of dry chemical agents would typically require 10 units of dry chemical for every unit of alkyl. An appropriately designed water fog delivery system can be used to effectively control a burning or non-burning aluminum alkyl release. Water fog application will not extinguish the fire; however, water fog will accelerate the oxidation of the aluminum alkyl and is an effective media for controlling the temperature of the immediate surrounding area. The only sure way to extinguish the fire is to shut off the fuel (Alkyl) source.

Unsuitable Extinguishing Media Do not use direct application of concentrated water streams; application of water fog (mist) is quite acceptable. Water based foams, chemical foams, and halogenated extinguishers should NOT be used.

Specific Hazards Arising from the Chemical

Combustion/explosion hazards In case of fire and/or explosion do not breathe fumes. Highly volatile vapors which are heavier than air may accumulate in low areas and/or spread along ground away from handling site. A vapor accumulation may flash and/or explode if ignited.

Hazardous Combustion Products Flammable vapours and aluminium containing dust on exposure to water and moist air.

Explosion Data

Sensitivity to mechanical impact None.

Sensitivity to static discharge Yes.

Protective Equipment and Precautions for Firefighters

In those circumstances where there exists a high probability of contact with the liquid alkyls, personnel should wear aluminized safety suits over standard firefighting gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Ventilate the area. Spills of metal alkyl solutions may or may not spontaneously ignite depending upon conditions surrounding the spill. However most solutions will begin oxidizing and generating solvent vapors. As the solvent vaporizes the concentration of alkyl in the remaining solution may increase and possibly ignite. The flash point for solutions should be considered to be less than -48C. Additional precautions normally observed when handling the solvent should be followed when using solutions of metal alkyls Breathing of solvent vapors may cause headache, dizziness, nausea, vomiting and loss of consciousness. If signs or symptoms occur from breathing vapors, remove to fresh air. If breathing stops, apply artificial respiration, preferably mouth-to-mouth. Give oxygen, if needed. Get medical attention. Do NOT induce vomiting. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation

Environmental Precautions

Environmental precautions The following general procedures are recommended for spills or leaks involving portable containers of aluminum alkyl solutions. The runoff from a spill should be directed to a remote location away from any processing areas to a remotely located containment area and not allowed to enter closed sewers. The solution is reactive with water; therefore, any spillage could react violently with any free water. In the event of a spill or leak the areas should be isolated at a radius of 18 meters then evacuate the downwind area 0.16 km width and 0.32 km length.

Methods and material for containment and cleaning up

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for Cleaning up Remove all sources of ignition as there is potential for a solvent vapor cloud. Water fog may be used to hasten the oxidation of the aluminum alkyl; otherwise, the area should be kept clear of all personnel until alkyl has been completely oxidized. Once the alkyls are oxidized the cleanup should follow the procedures associated with a solvent cleanup.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling

Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Take necessary action to avoid static electricity discharge (which might cause ignition of organic vapours) To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded Do not allow aluminum alkyls, or solutions containing aluminum alkyls, to come into contact with any part of the body. The alkyls and alkyl solutions will react with the body moisture producing thermal burns. All lines and equipment that could possibly contain aluminum alkyls or aluminum alkyl solutions must be free of any residual moisture and oxygen. If a container is threatened by fire from an external source, the container should be moved from the area. Otherwise, the container and any other equipment in the area should be kept cool by the use of a water fog spray system.

Conditions for safe storage, including any incompatibilities

Storage

Keep away from heat and sources of ignition. Alkyl containers should be kept in a well-ventilated area. Efforts must be made to keep water from accumulating in the recessed dome during storage and while the container is connected to the process. Keep containers tightly closed in a dry, cool and well-ventilated place. Mechanical ventilation is recommended. Protect from water.

Incompatible Materials

Water. Avoid acid, alcohol, oxidizing agents, and halogenated compounds.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Component	ACGIH TLV (TWA)	OSHA PEL (TWA)	NIOSH IDLH
Toluene 108-88-3	TWA: 20 ppm	375MGM3; 100PPM 200PPM	IDLH: 500 ppm TWA: 100 ppm TWA: 375 mg/m ³ STEL: 150 ppm STEL: 560 mg/m ³
Trimethylaluminium 75-24-1	TWA: 1mg/m ³ (Al metal and insoluble compounds)	2MGM3 Al	TWA: 2 mg/m ³ Al

Appropriate engineering controls

Engineering Controls

Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face Protection

Chemical goggles and the aluminized hood of a safety suit. Goggles and face shield for small scale laboratory operation.

Skin Protection

Use full aluminized safety suit when transferring material (large scale) and whenever contact may occur. We recommend using a full-body aluminized proximity suit.

Respiratory protection

Approved dust, fume and organic respirator when working in irritating fumes from decomposition.

General Hygiene Considerations

Handle in accordance with good industrial hygiene and safety practice. Remove and wash contaminated clothing before re-use. Wash hands and face before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance

Liquid

Color

Clear. Colourless.

Odor	Aromatic
Odor Threshold	No information available
Molecular Weight	No information available
pH	Not available
Melting point/freezing point	-60 °C / -76 °F
Boiling Point/Range	111 °C / 232 °F
Flash Point	-11 °C / 12 (PMCC)
Evaporation Rate	No information available
Flammability (solid, gas)	No information available
Flammability Limit in Air	
Upper flammability limit:	No information available
Lower flammability limit:	No information available
Vapor Pressure	22 mm Hg (20°C)
Vapor Density	No information available
Relative density	0.88
Solubility(ies)	
Water Solubility	Reacts violently with water.
Solubility in other solvents	No information available
Partition coefficient	
Autoignition temperature	No information available
Decomposition temperature	No information available
Viscosity, kinematic	No information available
Dynamic viscosity	No information available
Explosive Properties	Not applicable
Oxidizing Properties	Not applicable

10. STABILITY AND REACTIVITY

Reactivity Hazard	Reacts violently with water
Stability	Stable under recommended storage conditions Handle under inert gas, protect from moisture. Reacts violently with water
Hazardous Reactions	No hazardous reaction expected under normal handling.
Conditions to Avoid	Exposure to air. Heat, flames and sparks. Protect from water.
Materials to avoid	Oxygen. Water. Avoid acid, alcohol, oxidizing agents, and halogenated compounds.
Hazardous decomposition products	Flammable vapours and aluminium containing dust on exposure to water and moist air.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Inhalation	Corrosive by inhalation. Causes burns. Inhalation of vapors from aluminum alkyl fires or decomposition may cause immediate irritation of the respiratory tract. Excessive or prolonged inhalation of vapors may cause "metal fume fever". Symptoms are throat irritation, headache, fever, chills, nausea, constricting sensation of the lungs. May cause central nervous system depression with nausea, headache, dizziness, vomiting, and incoordination. Exposure can cause lung damage including effects to the larynx, bronchi and pulmonary edema.
Eye contact	Causes burns. Such burns will be predominately thermal and should be treated medically as such.
Skin Contact	Causes burns. Such burns will be predominately thermal and should be treated medically as such. Immediate application of cold water has been found to reduce the severity of burns.

Ingestion

Aspiration hazard if swallowed - can enter lungs and cause damage. Aspiration may cause pulmonary edema and pneumonitis. Ingestion causes burns of the upper digestive and respiratory tracts. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation. May cause severe burning pain in the mouth and stomach with vomiting and diarrhea of dark blood. Blood pressure may decrease. Brownish or yellowish stains may be seen around the mouth. Swelling of the throat may cause shortness of breath and choking. May cause additional affects as listed under "Inhalation".

Potential Health Effects

Acute Effects

Skin Corrosion/Irritation

Causes burns.

Serious eye damage/eye irritation

Causes eye burns.

Respiratory irritation :

Causes burns

Sensitization

Not expected to be a sensitizer.

Chronic Effects

Mutagenic Effects

No information available.

Carcinogenicity

The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	ACGIH Carcinogens	IARC	NTP	OSHA Carcinogens
Toluene	108-88-3	-	Group 3	-	-
MAO	-	-	-	-	-
Trimethylaluminium	75-24-1	-	-	-	-

Reproductive Effects

Possible risk of harm to the unborn child. May impair fertility.

STOT - single exposure

May cause drowsiness or dizziness.

STOT - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

Chronic Effects

This product contains toluene. Literature data indicate that repeated or prolonged overexposure to high vapor concentrations of toluene causes central nervous system effects and possible kidney effects.

Target Organ Effects

Central nervous system (CNS), Kidney, Reproductive System.

Aspiration hazard

Risk of serious damage to the lungs (by aspiration). May be fatal if swallowed and enters airways.

Numerical measures of toxicity

Product Information

The following values are calculated based on chapter 3.1 of the GHS document .

ATEmix (oral) 2955 mg/kg
 ATEmix (dermal) 13636 mg/kg (rat)

Component Information

Component	Rat Oral LD50 :	Rabbit Dermal LD50 :	Rat Inhalation LC50:
Toluene 108-88-3	2600 mg/kg	12000 mg/kg	-

Other data

Excessive or prolonged inhalation of fumes may cause metal fume fever. Literature data indicate that toluene causes cardiac stimulation and arrhythmia (irregular heart beat) in the laboratory animal.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Toxic to aquatic life with long lasting effects

Component	Freshwater Algae EC50/72h :	Freshwater Fish LC50/96h :	Water Flea EC50/48h :
Toluene (CAS #: 108-88-3)	134 mg/l	5.89 mg/l	-

Persistence/Degradability No information available.**Bioaccumulation/ Accumulation** No information available.**Mobility in Environmental Media** No information available.

Component	log Pow :
Toluene 108-88-3	2.65

Other adverse effects No information available**13. DISPOSAL CONSIDERATIONS****Waste treatment methods****Waste Disposal Method**

Absorb and incinerate. Dispose of as hazardous waste in compliance with local and national regulations.

Contaminated Packaging

Do not reuse container.

14. TRANSPORT INFORMATION

DOT

Proper Shipping Name ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (methylaluminum, trimethylaluminum, toluene)
Hazard Class 4.3
Subsidiary Class 3
UN No. 3399
Packing Group I
Description UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminum, Trimethylaluminum, Toluene), 4.3 (3), I

IMDG/IMO

IMO Class 4.3 (3)
Subsidiary Risk 3
Packing Group I
UN-No 3399
IMO Labelling and Marking 4.3 + 3
Proper Shipping Name Organometallic substance, liquid, water-reactive, flammable (Methylaluminum, Trimethylaluminum, Toluene)
EmS F-G, S-N
Marpol - Annex II Not applicable
Marpol - Annex III Unregulated
Transport Description UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminum, Trimethylaluminum, Toluene), 4.3 (3), I

IATA/ICAO

IATA/ICAO Class 4.3 (3)
Subsidiary Risk 3
Packing Group I
UN-No 3399
IATA/ICAO Labelling/Marking 4.3 + 3
Passenger Aircraft Forbidden
Cargo aircraft only Maximum net quantity per package: 1 L
Proper shipping name Organometallic substance, liquid, water-reactive, flammable (Methylaluminum, Trimethylaluminum, Toluene)
Transport Description UN 3399 Organometallic substance, liquid, water-reactive, flammable (Methylaluminum, Trimethylaluminum, Toluene), 4.3 (3), I

15. REGULATORY INFORMATION											
International Inventories	TSCA	DSL	NDSL	AICS	EINECS	ELINCS	ENCS	KECL	PICCS	IECSC	NZIoC
MAO (HT) 10% in Toluene	X	-	-	-	X	-	X	X	-	X	-

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372:

Component	Weight %	SARA 313 - De minimis
Toluene (CAS #: 108-88-3)	>70	1.0 %

SARA 311/312 Hazardous Categorization

Acute Health Hazard Yes
Chronic Health Hazard Yes
Fire Hazard Yes
Sudden Release of Pressure Hazard No
Reactive Hazard Yes

Reportable and Threshold Planning Quantities

The following components have RQs and/or TPQs under SARA and/or CERCLA

Component	CERCLA RQ, lbs	SARA 302 RQ, lbs	SARA 302 TPQ, lbs

Toluene (CAS #: 108-88-3)	1000	-	-
Trimethylaluminium (CAS #: 75-24-1)	100	-	-

State Right-to-Know

This product contains the following chemicals regulated in the states listed below.

Component	California Prop. 65	New Jersey	Massachusetts	Pennsylvania
Toluene (CAS #: 108-88-3)	Listed.	Listed.	Listed.	Listed.
Trimethylaluminium (CAS #: 75-24-1)	-	Listed.	Listed.	Listed.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazards

- B2 Flammable liquid
- B6 Reactive flammable material
- E Corrosive material
- F Dangerously reactive material
- D2B Toxic materials
- D2A Very toxic materials

16. OTHER INFORMATION

NFPA	Health 3	Flammability 4	Instability 2	Physical Hazards W
HMIS	Health 3 *	Flammability 4	Physical Hazards 2	

Prepared By Health & Environment Department
Albemarle Corporation

FOR ADDITIONAL NONEMERGENCY PRODUCT INFORMATION, CONTACT:

HEALTH AND ENVIRONMENT DEPARTMENT
ALBEMARLE CORPORATION
451 FLORIDA ST.
BATON ROUGE, LA. 70801
(800) 535-3030

Preparation Date : 04-Aug-2009

Revision Date: 29-May-2015

Disclaimer:

The information contained herein is accurate to the best of our knowledge. The Company makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.

End of Safety Data Sheet