

SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Vitride® Reducing Agent

Chemical Abstracts Registry No: MIXTURE

REACH Registration Number: 01-2119957848-15-0000 (vitride), 01-2119471310-51-0092 (toluene)

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

Reducing agent used in chemical synthesis.

1.3. Details of the supplier of the safety data sheet

Vertellus LLC
201 N. Illinois Street, Suite 1800
Indianapolis, IN 46204 USA
1-800-223-0453

Only Representative:
Vertellus Specialties UK Ltd.
Seal Sands Road, Seal Sands
Middlesbrough, TS2 1UB England
Phone: +44 1642 546 546

e-mail Address: sds@vertellus.com

1.4. Emergency telephone number

Vertellus: 1-800-223-0453

CHEMTREC (USA): +1-800-424-9300 (collect calls accepted)

CHEMTREC (International): +1-703-527-3887 (collect calls accepted)

NRCC (China): +86 532 83889090

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture (According to Regulation (EC) No 1272/2008, 29 CFR 1910.1200 and the Globally Harmonized System)

Skin Corrosion Category 1B
Serious Eye Damage Category 1
Flammable Liquids Category 2
Contact With Water Emit Flammable Gases Category 1
Reproductive Toxicity Category 2
Acute Toxicity Oral Category 4
Specific Target Organ Systemic Toxicity Repeated Exposure Category 2
Specific Target Organ Systemic Toxicity Single Exposure Category 3
EUH014 - Reacts violently with water.
EUH071 - Corrosive to the respiratory tract.

2.2. Label elements

Hazard Symbols (Pictogram):



Signal Word:

Danger

Hazard Precautions:

H225 - Highly flammable liquid and vapour.

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H260 - In contact with water releases flammable gases which may ignite spontaneously.
H302 - Harmful if swallowed.
H314 - Causes severe skin burns and eye damage.
H336 - May cause drowsiness or dizziness.
H361d - Suspected of damaging the unborn child.
H373 - May cause damage to organs through prolonged or repeated exposure.
EUH014 - Reacts violently with water.
EUH071 - Corrosive to the respiratory tract.

Prevention Precautionary Statements: P201 - Obtain special instructions before use.
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/telecommunication/computer/ equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P281 - Use personal protective equipment as required.

First Aid Precautionary Statements: P301+P330+P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313 - IF exposed or concerned: Get medical advice/attention.
P310 - Immediately call a POISON CENTER or doctor/physician.
P363 - Wash contaminated clothing before reuse.
P370+P378 - In case of fire: Use dry chemical powder for extinction.

Storage Precautionary Statements: P402+P404 - Store in a dry place. Store in a closed container.

SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

Ingredient	CAS Number	Concentration (weight %)	EC Number	CLP Inventory/ Annex VI	EU CLP Classification (1272/2008)
Sodium dihydrobis(2-methoxyethoxy) aluminate	22722-98-1	70	245-178-2	Not listed	Eye Dam. 1; H318 Flam. Sol. 1; H228 Skin Corr. 1B; H314 STOT SE 3; H335 Water-react. 2; H261
Toluene	108-88-3	30	203-625-9	601-021-00-3	Asp. Tox. 1; H304 Flam. Liq. 2; H225 Repr. 2; H361d Skin Irrit. 2; H315 STOT RE 2; H373 STOT SE 3; H336

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NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable). See Section 16 for the full text of the R-phrases above.

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact:	Immediately flush with water for 15 minutes. Wash the contaminated skin with soap and water. If irritation develops, call a physician. Get medical attention if irritation develops or persists.
Eye Contact:	Immediately flush eyes with plenty of water for at least 20 minutes. Get immediate medical attention. Hold eyelids apart periodically while flushing. Quickly and gently blot or brush chemical off the face. Continue to rinse until medical personnel arrive.
Inhalation:	Remove the victim from the contaminated area while protecting yourself from exposure by wearing an appropriate respirator. Put a similar respirator on the victim. Get medical attention immediately.
Ingestion:	GET MEDICAL ATTENTION IMMEDIATELY due to the corrosion potential of this material. Do not give anything by mouth to an unconscious person. Do NOT induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration.

4.2 Most important symptoms and effects, both acute and delayed

Acute:	Inhalation: High vapor concentrations may cause CNS effects characterized by dizziness, weakness, drowsiness, headache, nausea, or vomiting. Causes severe respiratory irritation. Ingestion: Causes severe irritation, nausea, and vomiting. May cause systematic effects similar to inhalation overexposure. Skin: Corrosive to the skin. Direct contact with the skin can cause severe irritation and burns particularly when the skin is wet. Eyes: Causes severe and burns. May cause permanent corneal damage.
Delayed Effects:	None known.

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

Note to Physician:	No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.
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SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media:	Carbon dioxide, Dry chemical, Do not use water because of violent reaction.
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5.2. Special hazards arising from the substance or mixture

Hazardous Products of Combustion:	Irritating and/or toxic fumes may be released if this material is burned.
Potential for Dust Explosion:	Not applicable.
Special Flammability Hazards:	Vapor may be ignited by a static discharge. Possible explosion hazard. Do not use water, halon, or foam directly on product. Reacts rapidly with water to form flammable hydrogen gas and strong caustic solution. Product begins to self heat at 190°C with violent decomposition at 320°C. Closed containers may rupture violently when heated, due to thermal expansion. Vapors may form explosive mixtures with air. Avoid all static, flame, heat and spark

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producing equipment. Vapors are heavier than air and may travel to a source of ignition and flash back. Concentrated solutions (> 70%) may ignite when large surface areas are exposed to air. Dried residues flash on contact with moisture. Ignites rapidly if exposed to ignition sources.

5.3. Advice for firefighters

Basic Fire Fighting Guidance: Wear a pressure-demand, self-contained breathing apparatus and full, chemical resistant protective gear.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuation Procedures: Isolate the hazard area and deny entry to unnecessary and unprotected personnel.

Special Instructions: See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. Contain spilled liquid with sand or vermiculite and place in chemical waste container. Prevent runoff from entering drains, sewers, and streams. After collection of material, flush area with water. Dispose of contents & container in accordance with local, regional, national or international regulations.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for Unique Hazards: Avoid contact with water; will violently decompose evolving flammable hydrogen gas.

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.

Special Handling Equipment: Not applicable.

7.2. Conditions for safe storage, including any incompatibilities

Storage Precautions & Recommendations: This product should be stored at ambient temperature in a dry, well-ventilated location. Protect containers against physical damage. Keep away from heat, sparks, and flame. Should be periodically inspected. Outside or detached storage is preferable. Inside storage should be in standard flammable liquids storage room or cabinet.

Dangerous Incompatibility Reactions: Contact with water and other compounds which possess active hydrogen (e.g. protic solvents such as alcohols, etc.), will rapidly decompose this product forming hydrogen, 2-methoxyethanol, aluminum and

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sodium hydroxide. Avoid contact with paper, cloth and other cellulose based materials. Contact with water liberates highly flammable gases

Incompatibilities with Materials of Construction:

This product will corrode aluminum, Teflon and other plastics.

7.3. Specific end use(s)

If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Country	Occupational Exposure Limit
Australia, S. Korea Singapore	50 ppm as 8-hour time-weighted average; 150 ppm as 15-minute short-term limit (Toluene)
Canada-Ontario, Japan	20 ppm as 8-hour time-weighted average (Toluene)
Belgium, France	20 ppm as 8-hour time-weighted average; 100 ppm as 15-minute short-term limit (Toluene)
Canada - Quebec, Italy, New Zealand, Singapore	50 ppm as 8-hour time-weighted average (Toluene)
Austria, EU, Ireland, Spain, Sweden, UK	50 ppm as 8-hour time-weighted average; 100 ppm as 15-minute short-term limit (Toluene)
Germany (AGS), Germany (DFG), Switzerland	50 ppm as 8-hour time-weighted average; 200 ppm as 15-minute short-term limit (Toluene)
Denmark	25 ppm as 8-hour time-weighted average; 50 ppm as 15-minute short-term limit (Toluene)
Finland	25 ppm as 8-hour time-weighted average; 100 ppm as 15-minute short-term limit (Toluene)
USA NIOSH	100 ppm as 8-hour time-weighted average; 150 ppm as 15-minute short-term limit (Toluene)
USA OSHA	200 ppm as 8-hour time-weighted average; 300 ppm as 15-minute short-term limit (Toluene)

Air Monitoring Method: Collection media: Charcoal; Analysis Method: GC/FID

8.2. Exposure controls

Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

Other Engineering Controls:	All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.
Personal Protective Equipment:	Impervious gloves, boots, and clothing, chemical goggles or face shield where necessary, and a NIOSH approved chemical cartridge respirator or supplied air breathing apparatus with organic vapour/acid gas cartridges with particle filters. Where splashing, misting or contact with eyes is likely, wear a face shield. Use Viton gloves when working with Toluene.
Respirator Caution:	Observe OSHA regulations for respirator use (29 CFR 1910.134). Air-purifying respirators must not be used in oxygen-deficient atmospheres.
Thermal Hazards:	Not applicable.
Environmental Exposure Controls:	The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance, State & Odor (ambient temperature):	Nearly colorless to light amber liquid with a sweet, pungent odor		
Molecular Formula:	Mixture	Molecular Weight:	Mixture
Vapor Pressure:	~ 28 MMHG @ 25°C	Evaporation Rate:	No data available.
Specific Gravity or Density:	1.036 g/ml (20°C)	Vapor Density (air = 1):	3.1 (air = 1)
Boiling Point:	111 °C	Freezing / Melting Point:	4 °C
Solubility in Water:	Reacts violently with	Octanol / Water Coefficient:	No data available.
pH:	water. No data available.	Odor Threshold:	2.5 ppm
Viscosity:	65 cps @ 25°C	Autoignition Temperature:	-480°C (toluene)
Flash Point and Method:	40°F (4°C) Closed Cup	Flammable Limits:	1.1% (LEL) -7.1% (Toluene) (UEL)
Flammability (solid, gas):	Not applicable	Decomposition Temperature:	No data available.
Explosive Properties:	Not explosive	Oxidizing Properties:	Not an oxidizer

SECTION 10: Stability and reactivity

<u>10.1. Reactivity</u>	Reacts violently with water.
<u>10.2. Chemical stability</u>	Can react violently with water. Can violently decompose at high temperatures
<u>10.3. Possibility of hazardous reactions</u>	Polymerization is not expected to occur
<u>10.4. Conditions to avoid</u>	Any ignition source, including static discharge. Strong oxidizers. Contact with water (reacts with water).
<u>10.5. Incompatible materials</u>	Contact with water and other compounds which possess active hydrogen (e.g. protic solvents such as alcohols, etc.), will rapidly decompose this product forming hydrogen, 2-methoxyethanol, aluminum and sodium hydroxide. Avoid contact with paper, cloth and other cellulose based materials.; Contact with water liberates highly flammable gases
<u>10.6. Hazardous decomposition products</u>	Hydrogen, 2-methoxyethanol, aluminum and sodium hydroxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD ₅₀ :	639 mg/kg (rat)	Vitride
Acute Dermal LD ₅₀ :	> 400 mg/kg (rat)	Vitride
Acute Inhalation LC ₅₀ :	2.2 mg/m ³ /1-hour (rat)	Vitride

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Skin Irritation:	Corrosive to skin.
Eye Irritation:	Corrosive to eyes.
Skin Sensitization:	No data available.
Mutagenicity:	No data available.
Reproductive / Developmental Toxicity:	Toluene is classified as a Reproductive Hazard 2
Carcinogenicity:	None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as being carcinogens.
Target Organs:	Central nervous system
Aspiration Hazard:	Based on physical properties, not likely to be an aspiration hazard.
Primary Route(s) of Exposure:	Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.
Most important symptoms and effects, both acute and delayed	Inhalation: High vapor concentrations may cause CNS effects characterized by dizziness, weakness, drowsiness, headache, nausea, or vomiting. Causes severe respiratory irritation. Ingestion: Causes severe irritation, nausea, and vomiting. May cause systematic effects similar to inhalation overexposure. Skin: Corrosive to the skin. Direct contact with the skin can cause severe irritation and burns particularly when the skin is wet. Eyes: Causes severe and burns. May cause permanent corneal damage. Delayed Effects: None known.
Additive or Synergistic effects:	None known.

SECTION 12: Ecological information

<u>12.1. Toxicity</u>	No data available.
<u>12.2. Persistence and degradability</u>	Readily biodegradable. Not expected to bioaccumulate.
<u>12.3. Bioaccumulative potential</u>	No data available
<u>12.4. Mobility in soil</u>	No data available
<u>12.5. Results of PBT and vPvB assessment</u>	This substance is not a PBT or vPvB.
<u>12.6. Other adverse effects</u>	Water-reactive substance

SECTION 13: Disposal considerations

13.1. Waste treatment methods

US EPA Waste Number:	D003, D001
Waste Classification: (per US regulations)	The waste is a listed and/or characteristic hazardous waste. The waste is ignitable. The waste is reactive.
Waste Disposal:	NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by

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applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

14.1. UN number	UN3399	14.2. UN proper shipping name	Organometallic Substance, Liquid, Water-Reactive, Flammable (Sodium Dihydrobis(2-methoxyethoxy)aluminate, Toluene)
14.3. Transport hazard class(es)	4.3 (3)	14.4. Packing group	PG I
14.5. Environmental hazards	Not applicable		
14.6. Special precautions for user	CANADA: ERAP 2-1008-146; 1-800-567-7455 (24 Hr).		
NA Emergency Guidebook Numbers:	138	IMDG EMS:	S-N; F-G
14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.		

SECTION 15: Regulatory information

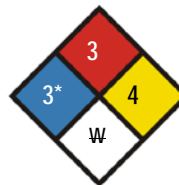
15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:	Status:		
USA TSCA:	Listed	EINECS:	Listed
Canada(DSL/NDSL):	Listed	Japan:	Listed
Korea:	Listed	Australia:	Listed
China:	Listed	Philippines:	Listed
Taiwan:	Listed	New Zealand:	Listed
SARA 313:	Toluene 1.0 percent de minimis concentration		
Reportable Quantities:	1000 lbs (toluene)		
State Regulations:	This product contains chemicals known to the State of California to cause birth defects or other reproductive harm.		
Other Regulatory Listings:	This product contains a substance listed as a Hazardous Air Pollutant (HAP) and Volatile Organic Compound (VOC) by U.S. EPA. Seveso P5c: Flammable liquids, categories 2 or 3		

HMIS IV:

HEALTH	3*
FLAMMABILITY	3
PHYSICAL HAZARD	4

NFPA:



15.2. Chemical safety assessment

A chemical safety assessment has not been prepared for this mixture of substances.

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SECTION 16: Other information

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.

CAS = Chemical Abstracts Service.

CFR = Code of Federal Regulations.

DSL/NDL = Domestic Substances List/Non-Domestic Substances List.

EC = European Community.

EINECS = European Inventory of Existing Commercial Chemical Substances.

ELINCS = European List of Notified Chemical Substances.

EU = European Union.

GHS = Globally Harmonized System.

LC = Lethal Concentration.

LD = Lethal Dose.

NFPA = National Fire Protection Association.

NIOSH = National Institute of Occupational Safety and Health.

NTP = National Toxicology Program.

OSHA = Occupational Safety and Health Administration

PEL = Permissible Exposure Limit.

RQ = Reportable Quantity.

SARA = Superfund Amendments and Reauthorization Act of 1986.

TLV = Threshold Limit Value.

WHMIS = Workplace Hazardous Materials Information System.

Important Note: Please note that the information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers. Recipients are advised to confirm in advance of need that the information is current, applicable, and suitable to their circumstances. The information contained herein may change without prior notice. THIS SAFETY DATA SHEET SUPERSEDES ALL PREVIOUS EDITIONS.

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