

Safety Data Sheet

Version 8.1

Revision Date 06/19/2017

SDS Number 300000005202

Print Date 12/16/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : BTBAS

Chemical formula : C₈H₂₂N₂Si

Synonyms : BTBS, BTBAS, N,N'-di-tert-butylsilanedi-amine

Product Use Description : Semiconductor Processing

Manufacturer/Importer/Distributor : Versum Materials US, LLC
8555 South River Parkway
Tempe, AZ 85284
Exporter EIN No.475632014
www.versummaterials.com

Telephone : (602)282-1000

Emergency telephone number (24h) : 800-523-9374 USA
+1 610 481 7711 International

2. HAZARDS IDENTIFICATION

GHS classification

Flammable liquids - Category 3
Substances and mixtures which in contact with water emit flammable gases - Category 1
Acute toxicity - Oral Category 3
Skin corrosion - Category 1B

GHS label elements

Hazard pictograms/symbols



Signal Word: Danger

Hazard Statements:

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H226:Flammable liquid and vapour.
H260:In contact with water releases flammable gases which may ignite spontaneously.
H301:Toxic if swallowed.
H314:Causes severe skin burns and eye damage.

Precautionary Statements:

Prevention : P210:Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking.
P231+P232:Handle under inert gas, protect from moisture.
P264:Wash hands thoroughly after handling.
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.
P305+P351+P338 :IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 :Immediately call a POISON CENTRE/doctor.
P335 + P334 :Brush off loose particles from skin. Immerse in cool water/wrap in wet bandages.
P370+P378 :In case of fire, use recommended extinguishing media for extinction.

Storage : P405:Store locked up.

Hazards not otherwise classified

Corrosive
Keep away from heat and sources of ignition.
Flammable.
Reacts violently with water.
Reaction with water releases heat.
May cause thermal burns.
Contact with water liberates highly flammable gases.
Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS Number	Concentration (Weight)
Silanediamine, N,N'-bis(1,1-dimethylethyl)-	186598-40-3	100 %

Concentration is nominal. For the exact product composition, please refer to technical specifications.

4. FIRST AID MEASURES

General advice : Seek medical advice. If breathing has stopped or is labored, give assisted respirations. Supplemental oxygen may be indicated. If the heart has stopped,

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	trained personnel should begin cardiopulmonary resuscitation immediately.
Eye contact	: Hold eyelids apart, initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour.
Skin contact	: Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Flush immediately with copious amounts of water. Initiate and maintain continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Cover wound with sterile dressing.
Ingestion	: Never give anything by mouth to an unconscious person. Prevent aspiration of vomit. Turn victim's head to the side.
Inhalation	: Move to fresh air.
Most important symptoms/effects - acute and delayed	: Breathing difficulties. Headache. Nausea. Cough. Vomiting. Burning sensation. Lethargy. Wheezing. Eye disease. Skin disorders and Allergies.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	: For smaller fires, use dry chemical or carbon dioxide, do not use water. For large fires, flood fire area with water from as far as possible, using a protective barrier and appropriate personal protective equipment. Carbon dioxide (CO2). Dry chemical. Dry sand. Limestone powder.
Extinguishing media which must not be used for safety reasons.	: Water. Alcohol-resistant foam.
Specific hazards	: Incomplete combustion may form carbon monoxide. May generate ammonia gas. May generate toxic nitrogen oxide gases. Burning produces noxious and toxic fumes. Downwind personnel must be evacuated. Fire or intense heat may cause violent rupture of packages. Flash back possible over considerable distance. May form explosive mixtures in air. Reacts violently with water.
Special protective equipment for fire-fighters	: Avoid contact with the skin. A face shield should be worn. Equipment constructed of butyl rubber is recommended. Use personal protective equipment. Wear self contained breathing apparatus for fire fighting if necessary.
Further information	: Do not allow run-off from firefighting to enter drains or water courses., Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

6. ACCIDENTAL RELEASE MEASURES

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Personal Precautions, Protective Equipment, and Emergency Procedures	: Wear suitable protective clothing, gloves and eye/face protection. Use self-contained breathing apparatus and chemically protective clothing. Remove all sources of ignition. Evacuate personnel to safe areas.
Environmental precautions	: Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained. Shut off or remove all ignition sources. Construct a dike to prevent spreading.
Methods for cleaning up	: Call Emergency Response number for advice. Approach suspected leak areas with caution. Absorb with inert absorbent materials such as: Dry sand. Vermiculite. Activated charcoal. Polypropylene. Note: Hydride, aliphatic amine and electrochemical detectors have demonstrated positive responses to this substance. Place in appropriate chemical waste container.
Additional advice	: Protect from water. If possible, stop flow of product.

7. HANDLING AND STORAGE

Handling

See "Flammable and Combustible Liquid Code" NFPA No. 30, National Fire Protection Association, Boston, MA. Avoid contact with skin and eyes. Emergency showers and eye wash stations should be readily accessible. Adhere to work practice rules established by government regulations. Use personal protective equipment. When using, do not eat, drink or smoke.

Storage

Do not store near acids. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Keep in a dry, cool place. Keep away from oxidizers. Store in an area suitable for water reactive materials. Minimize exposure to air. Exposure may cause material to degrade. Store under a nitrogen atmosphere.

Technical measures/Precautions

Keep away from open flames, hot surfaces and sources of ignition.

Storage Temperature : 32 - 104 °F (0 - 40 °C)

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures

Use explosion-proof equipment.

Apply process controls to ensure safe operating conditions. Assess potential flammability hazards based on flashpoint and potential ignition sources.

Hydride, aliphatic amine and electrochemical detectors have demonstrated positive responses to this substance. Use process enclosures, local exhaust ventilation with a minimum hood velocity of 100 linear feet per minute or a glove box to maintain airborne levels below Exposure Guidelines.

Provide readily accessible eye wash stations and safety showers.

Provide natural or explosion-proof ventilation adequate to ensure concentrations are kept below exposure limits.

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Personal protective equipment

- Respiratory protection : Use a NIOSH/MSHA approved full-face respirator with amine/HEPA cartridge(s).
- Hand protection : Nitrile rubber.
Neoprene gloves.
Polyvinyl Alcohol Gloves (PVA).
Impervious gloves.
Butyl-rubber
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Eye protection : Full face shield with goggles underneath.
- Skin and body protection : Impervious clothing.
Full rubber suit (rain gear).
Rubber or plastic boots.
Slicker Suit.
- Environmental exposure controls : Prevent spilled product from entering streams or drinking water supplies. Local authorities should be advised if significant spillages cannot be contained. Shut off or remove all ignition sources.
- Special instructions for protection and hygiene : Discard contaminated leather articles. Wash hands at the end of each workshift and before eating, smoking or using the toilet. Provide readily accessible eye wash stations and safety showers.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance : Liquid. Clear.
- Odor : Fishy.
- Odor threshold : No data available.
- pH : No data available.
- Melting point/range : < -58 °F (< -50 °C)
- Boiling point/range : 331 °F (166 °C)
- Flash point : 86 °F (30 °C)
- Evaporation rate : No data available.

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Flammability (solid, gas)	: Not applicable.
Upper/lower explosion/flammability limit	: Not applicable.
Vapor pressure	: 1.15 mmHg
Water solubility	: Reacts violently with water.
Relative vapor density	: Heavier than air.
Relative density	: 0.816 (water = 1)
Partition coefficient: n-octanol/water [log Kow]	: < 1
Auto-ignition temperature	: 190 °C
Decomposition temperature	: No data available.
Viscosity	: No data available.
Molecular Weight	: 174.36 g/mol

10. STABILITY AND REACTIVITY

Chemical Stability	: Stable under normal conditions.
Conditions to avoid	: Heat, flames and sparks. Exposure to moisture. Reaction with water releases heat. May cause thermal burns. Extreme heat.
Materials to avoid	: Organic acids (i.e. acetic acid, citric acid etc.). Mineral acids. Sodium hypochlorite. Reaction with peroxides may result in violent decomposition of peroxide possibly creating an explosion. Oxidizing agents. Humid air. Water. Acids. Alcohols. Silicone Rubber.
Hazardous decomposition products	: Hazardous combustion products: Carbon monoxide. Carbon dioxide (CO ₂). Nitrogen oxides (NO _x). Nitrogen oxide can react with water vapors to form corrosive nitric acid. Ammonia

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Hydrolysis products:

t-Butylamine.

Silicon Dioxide.

Hydrogen.

Possibility of hazardous Reactions/Reactivity : Reacts violently with water.

11. TOXICOLOGICAL INFORMATION

11.1. Information on toxicological effects

Likely routes of exposure

Effects on Eye : Causes eye burns. May cause blindness.

Effects on Skin : Causes skin burns. Skin absorption may cause nausea, headache and pain.

Inhalation Effects : Can cause severe eye, skin and respiratory tract burns.

Ingestion Effects : If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. May be fatal if swallowed. Toxic if swallowed.

Symptoms : Breathing difficulties. Headache. Nausea. Cough. Vomiting. Burning sensation. Lethargy. Wheezing. Eye disease., Skin disorders and Allergies.

Acute toxicity

Acute Oral Toxicity : LD50 : 250 - 500 mg/kg Species : (Rat) Toxic if swallowed.

Inhalation : LC50 (4 h) : 16.8 mg/l Species : Rat. (as aerosol) Observations during an acute inhalation toxicity study included breathing abnormalities, lethargy, squinting, and lung abnormalities. In the inhalation study, concentration of exposure was a more critical factor in mortality than time of exposure in this study.

Acute Dermal Toxicity : No data is available on the product itself.

Skin corrosion/irritation : Severe skin irritation., Corrosive to the skin of a rabbit.

Serious eye damage/eye irritation : Severe eye irritation., Corneal edema may give rise to a perception of "blue haze" or "fog" around lights. This effect is temporary and has no known residual effect.

Sensitization. : The results of a skin sensitization study showed that this substance does not have sufficient potential to cause sensitization by skin contact.

Chronic toxicity or effects from long term exposures

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- Carcinogenicity : No data available.
- Reproductive toxicity : No data is available on the product itself.
- Germ cell mutagenicity : Chromosome Aberration Assay: Negative (Activated and Nonactivated)
Bacterial assay for mutagenicity: negative results.
- Specific target organ systemic toxicity (single exposure) : No data available.
- Specific target organ systemic toxicity (repeated exposure) : No data available.
- Aspiration hazard : No data available.

Delayed and Immediate Effects and Chronic Effects from Short and Long Term Exposure

This product contains no listed carcinogens according to IARC, ACGIH, NTP and/or OSHA in concentrations of 0.1 percent or greater. Eye disease., Skin disorders and Allergies.

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

- Aquatic toxicity : No data is available on the product itself.
- Toxicity to fish - Components
Silanediamine, N,N'-bis(1,1-dimethylethyl)- LC50 (96 h) : 71.6 mg/IOECD Test Guideline 203 Species : Rainbow trout (Oncorhynchus mykiss).
- Toxicity to daphnia - Components
Silanediamine, N,N'-bis(1,1-dimethylethyl)- EC50 (48 h) : 40 mg/IOECD Test Guideline 202 Species : Daphnia magna.
- Toxicity to algae - Components
Silanediamine, N,N'-bis(1,1-dimethylethyl)- EC50 (72 h) : 24.6 mg/IOECD Test Guideline 201 Species : Selenastrum capricornutum (Pseudokirchneriella subcapitata)
- Toxicity to other organisms : No data available.
- Toxicity to other organisms - Components
Silanediamine, N,N'-bis(1,1-dimethylethyl)- : EC50 (3 h): 784 mg/l Species : Activated sewage sludge.

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Persistence and degradability

- Biodegradability : This substance is readily biodegradable, based on the measurement of inorganic carbon production. Conversion of this substance to inorganic carbon exceeded 60% of the theoretical yield at the applied concentration over the course of the 28 day incubation, and within ten days of reaching 10%. This substance is expected to biodegrade rapidly and completely in the aerobic environment.
- Mobility : No data available.
- Bioaccumulation : No data is available on the product itself.

13. DISPOSAL CONSIDERATIONS

- Waste from residues / unused products : Contact supplier if guidance is required.
- Contaminated packaging : Dispose of container and unused contents in accordance with federal, state, and local requirements.

14. TRANSPORT INFORMATION

DOT

- UN/ID No. : UN3129
- Proper shipping name : Water-reactive liquid, corrosive, n.o.s., (Silanedi-amine, N,N'-bis(1,1-dimethylethyl)-)
- Class or Division : 4.3
- Packing group : I
- Label(s) : 4.3 (8)
- Marine Pollutant : No

IATA

- UN/ID No. : UN3129
- Proper shipping name : Water-reactive liquid, corrosive, n.o.s., (Silanedi-amine, N,N'-bis(1,1-dimethylethyl)-)
- Class or Division : 4.3
- Packing group : I
- Label(s) : 4.3 (8)
- Marine Pollutant : No

IMDG

- UN/ID No. : UN3129
- Proper shipping name : WATER-REACTIVE LIQUID, CORROSIVE, N.O.S., (Silanedi-amine, N,N'-bis(1,1-dimethylethyl)-)
- Class or Division : 4.3

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Packing group : I
Label(s) : 4.3 (8)
Marine Pollutant : No

TDG

UN/ID No. : UN3129
Proper shipping name : WATER-REACTIVE LIQUID, CORROSIVE, N.O.S., (Silanediamine, N,N'-bis(1,1-dimethylethyl)-)
Class or Division : 4.3
Packing group : I
Label(s) : 4.3 (8)
Marine Pollutant : No

Further Information

The transportation information is not intended to convey all specific regulatory data relating to this material. For complete transportation information, contact customer service.

15. REGULATORY INFORMATION

Toxic Substance Control Act (TSCA) 12(b) Component(s):

None.

Country	Regulatory list	Notification
USA	TSCA	Included on Inventory.
EU	ELINCS	On ELINCS. Importation or manufacture may require notification to the sole representative.
Canada	DSL	Not on Inventory.
Australia	AICS	Not on Inventory.
Japan	ENCS	Covered by low volume exemption. Not on inventory.
South Korea	ECL	Included on Inventory.
China	SEPA	Air Products has received a simplified registration certificate from the Chinese government to import, manufacture or use.
Philippines	PICCS	Not on Inventory.

EPA SARA Title III Section 312 (40 CFR 370) Hazard Classification

Acute Health Hazard Chronic Health Hazard Fire Hazard. Reactivity Hazard.

US. California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)

This product does not contain any chemicals known to State of California to cause cancer, birth defects or any other harm.

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16. OTHER INFORMATION

NFPA Rating

Health : 2
Fire : 3
Instability : 0
Special : W 2

HMIS Rating

Health : 3
Flammability : 3
Physical hazard : 3

Prepared by : Versum Materials, Product Regulatory Department

Telephone : (602)282-1000

Preparation Date : 12/16/2017

For additional information, please visit Versum Materials' Product Stewardship web site.
<http://www.versummaterials.com/productstewardship/>
