



8210 N. Austin Avenue, Morton Grove, IL 60053-0519, U.S.A.
 847-967-6000 800-323-8144
 (Monday - Friday: 7:30 a.m. - 4:00 p.m. CST)

Emergency Contact:
 INFOTRAC 800-535-5053 [U.S.A.]

Name: Col Treet
 Code: 970130, 970131

..... **MATERIAL SAFETY DATA SHEET**

SECTION 1 PRODUCT IDENTIFICATION

Name: Col Treet
 Code: 970130, 970131

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

Synonyms

BSTFA + HMDS + TMSDEA (1:1:1)

CAS #: not assigned CAS #: 25561-30-2 ... MF : ..C₈H₁₈F₃NOSi₂. BSTFA: N, O-Bis(trimethylsilyl)trifluoroacetamide
 CAS #: 999-97-3 MF : ..C₆H₁₉NSi₂ HMDS; 1,1,1,3,3,3-Hexamethyldisilazane
 CAS #: 996-50-9 MF : ..C₇H₁₉NSi TMSDEA; Trimethylsilyldiethylamine

Ingredients

	<i>Concentration (%/wt)</i>
BSTFA (25561-30-2).....	33.0 %
HMDS (999-97-3).....	33.0 %
TMCS (75-77-4).....	33.0 %
Manufacturing Impurities.....	trace <1.0 %

SECTION 3 HAZARDS IDENTIFICATION

Precautionary Statements

See Sections 8 and 11 for further details.

Flammable Liquid, Corrosive, Lachrymator

..... **Emergency Overview**

NFPA Ratings (Scale 0-4); Health = 3; Fire = 3; Reactivity = 2; ~~W~~ (avoid water)

Liquid: Clear, colorless. Irritating odor.

Extremely flammable and corrosive liquid and vapor. May cause flash fire. Keep away from ignition sources. Protect from static electricity as it may accumulate and ignite vapors. Difficult to ignition-ignition may occur.

Reacts violently with water to produce ammonia or hydrogen fluoride gas which in contact with metal can generate flammable/explosive hydrogen gas.

At temperatures above 150°C in the presence of air, formaldehyde vapors can form.

Formaldehyde (50-00-0) is a potential cancer hazard.

The properties of this material have not been fully investigated. Use due caution in handling and use of this material.

Toxic, lachrymator, and corrosive--Causes burns to all body tissues. Permanent eye damage possible. May be fatal of toxic if swallowed or inhaled or in contact with skin.

Readily absorbed through skin. Anesthesia effects possible, including dizziness, drowsiness, distorted perceptions, and signs of drunkenness.

Emits toxic fumes under fire conditions—carbon oxides, silicon oxides, nitrogen oxides, hydrogen fluoride, formaldehyde, ammonia, hexamethyldisiloxane, acetamide

Standard chemical handling precautions: Avoid ingestion or breathing mists/vapors. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.

Target organs: lungs, nerves, respiratory system, immune system, liver, eyes, skin, mucous membranes

See Sections 4, 5, 6, 8, 9, and 10.

Other Hazard Information

Primary Route(s) of Entry: Skin, Eye, Inhalation, Ingestion

Some standard abbreviations used in this MSDS: NA=not applicable; NE=not established; UN=unknown/not available; NL=not listed; N=no; Y=yes.



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Corrosive hydrofluoric acid (strong acid) and **ammonia** (strong base) may be formed on contact with the water in the skin, eyes, and mucous membranes; Both are very destructive to body tissues.

- Eye: Corrosive--can cause burns or severe irritation, pain, itching, tearing, redness, corneal inflammation, blurred vision, lens damage.
 - Skin: Corrosive--can cause burns upon short periods of contact with redness and possible blistering. May cause severe irritation with itchiness and possible dryness, cracking and dermatitis. *Readily absorbed through skin.* May be harmful or toxic if absorbed through skin with systemic effects described under inhalation or ingestion.
 - Inhalation: Corrosive--Can cause burns or severe irritation to mucous membranes, respiratory tract, and lungs. May be harmful or fatal if inhaled due corrosive damage to the respiratory tract or central nervous system depression. Effects may include, spasm, inflammation and edema (fluid retention and swelling) of the larynx, bronchi or lungs, headache, nausea, vomiting, excitement, drowsiness, dizziness, confusion, hallucinations, distorted perceptions, loss of muscle coordination, unconsciousness, and coma. Prolonged or repeated inhalation may cause tooth decay. May cause effects similar to that of ingestion.
 - Ingestion: Corrosive--Can cause burns, severe irritation, and permanent damage to mouth, throat, and stomach or GI disorders. Symptoms include sore throat, pain, nausea, vomiting, and diarrhea. May be harmful or fatal with similar effects to that noted under inhalation. Liver damage and allergic responses may be possible. Aspiration of liquid while vomiting may injure lungs.
- Symptoms/Acute/Chronic: See above route.
Pre-existing conditions that may be aggravated: skin, eyes, respiratory conditions, nerves, liver
 See Section 11 for additional toxicological data.

SECTION 4 FIRST AID MEASURES

- Eye contact: Immediately flush eyes with copious amounts of water or eyewash solution for at least 15 minutes; lift eyelids occasionally. If irritation persists, consult physician.
 - Skin contact: Immediately remove contaminated clothing and shoes, then wash skin with soap and copious amounts of water. If irritation persists, consult physician.
 - Inhalation: Remove to fresh air. If not breathing, give artificial respiration and keep person warm and at rest. If breathing is difficult, give oxygen; consult physician.
 - Ingestion: Wash out mouth with water provided person is conscious; give large amounts of water or milk. Repeat if vomiting occurs. Ingested corrosive should be diluted approximately 100 times to render it harmless to tissues (Dreisbach & Robertson; Handbook of Poisoning; 12th Ed.); consult physician; DO NOT induce vomiting without first consulting physician. If vomiting occurs, keep head lower than hips to help prevent aspiration. Maintain airway and respiration. Treat symptomatically and supportively.
- Wash contaminated clothing before reuse. Discard contaminated footwear.*
 Physician note: Symptomatic and supportive care. No specific antidote, however can be treated same as hydrofluoric acid or ammonia exposure with a central nervous system depressant. Treatment based on physician judgment in response to reactions of the patient.

SECTION 5 FIRE FIGHTING MEASURES

<i>Flash Point:</i> 48°F (8°C) (HMDS)	<i>Method:</i> tcc	<i>Autoignition:</i> 379°C (716°F) (HMDS)
<i>OSHA Flammability Class:</i> IB		<i>Explosion Limits:</i> upper: 16.3 % (HMDS)
<i>NFPA:</i> See Section 3 Emergency Overview on pg. 1		lower: 0.8 % (HMDS)

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Extinguishing Media

Medium expansion (>30 :1) AFFF alcohol compatible foam, carbon dioxide, dry chemical powder, dry sand.
 Water may be effective for cooling, but may not effect extinguishment.

Special or Standard Fire Fighting Procedures

Standard precautions for fighting large fires involving chemicals: Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes.

Do not allow extinguishing media to enter container.

Unusual Fire and Explosion Hazards

Highly flammable corrosive liquid and vapor--hydrolyzes vigorously with water to produce corrosive ammonia or hydrogen fluoride gas, that in contact with metal can produce flammable/explosive hydrogen gas.

Toxic volatile liquid and vapor. Causes dizziness and drowsiness. **Readily absorbed through skin.** General anesthetic--central nervous system depressant. May produce hallucinations, distorted perceptions, and signs of drunkenness.

Vapors are heavier than air, may travel long distances along the ground to ignition sources and flash back.

Vapor-air mixtures are explosive above flash point, within above stated limits.

Difficult to extinguisher-ignition may occur. A fire guard should be posted during any clean up operation.

Static electricity will accumulate and may ignite vapors. Use bonding and grounding or inert gas blanketing.

Do not put water directly on the fire due to violent reaction. Water may be used to knock down corrosive vapor cloud down wind of fire and to keep fire exposed containers cool.

Apply medium expansion (>30 :1) AFFF alcohol compatible foam. Application of foam will initially produce significant evolution of corrosive hydrofluoric acid vapors. The vapors will be reduced when uniform blanketing is achieved.

Containers may build pressure or rupture when heated. Container explosion may occur under fire conditions.

Water spray may be used to cool fire-exposed containers.

At temperatures above 150°C in the presence of air, **formaldehyde** vapors can form. Formaldehyde is a potential cancer hazard, a respiratory and skin sensitizer, and an irritant to the eyes, nose, throat, skin and digestive tract.

Hazardous Combustion or Decomposition Products

carbon oxides, silicon oxides, nitrogen oxides, hydrogen fluoride, formaldehyde, ammonia, hexamethyldisiloxane, acetamide; *May decompose on contact with water*

SECTION 6 ACCIDENTAL RELEASE MEASURES

Eliminate all ignition sources. Use spark proof tools.

Evacuate unnecessary people from area. Isolate spilled material.

Ventilate area.

Wear protective clothing to prevent contact with skin and eyes (lab coat, gloves, safety glasses).

NIOSH/MSHA approved respirator for organic/acid/amine vapors, gas, dust, and mists.

A fire guard should be posted during any clean up operation as halogenated silanes are easily ignited.

Special Note: AFFF alcohol compatible foam may be applied as a fire prevention measure. If used, follow the instructions and precautions listed in Section 5 above and skip the following neutralization step.

Contain and recover material when possible.

Neutralize with sodium bicarbonate or other suitable neutralizing agent.

Use chemically compatible spill pillows, or similar adsorbent material. This will help blanket corrosive, flammable vapors.

Collect, seal in appropriate hazardous waste container, and hold for proper waste disposal.

Wash spill site after material pickup is complete.

Do not allow material to enter drains or water courses.

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SECTION 7 HANDLING AND STORAGE.....

General Handling Measures

See Section 8 Below.

General Storage Measures

Store tightly closed in a cool, dry place with adequate ventilation, in a area suitable for corrosive flammables.

Special Storage Instructions

Empty containers retain product residue, (liquid/vapor), and can be dangerous..

Special Handling Instructions

Handle and store under nitrogen. Protect from moisture. This material will hydrolyze to produce ammonia and hydrogen fluoride gas, that in contact with metal may create flammable/explosive hydrogen gas.

Corrosive hydrofluoric acid (strong acid) or **ammonia** (strong base) can form on contact with the water in body tissues--avoid skin and eyes contact --do not breath vapors. HMDS is **readily absorbed through skin**.

SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION.....

Airborne Exposure Limits

		TWA (8H)		STEL		Ceiling Limit		Ceiling (skin)	
		ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³
BSTFA 25561-30-2	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
Hexamethyldisilazane 999-97-3	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
	<i>Dow Corning guide</i>	25	17	35	24	NE	NE	NE	NE
TMSDEA 999-97-3	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE

Special/Other Control Measures

Odor threshold: 46.8 ppm (HMDS)

Personal Protective Equipment (PPE)

Chemical safety eyewear.

Compatible chemical-resistant gloves

NIOSH/MSHA approved respirator for organic/acid/amine vapors, gas, dust, and mists.

Impervious Protective Clothing.

Other Standard Safety Equipment and Engineering Preventive Measures

Safety shower and eye wash

Mechanical exhaust required. Hood recommended. Use adequate general and/or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Fume scrubber.

General Precautions and Handling Measures

Avoid ingestion, inhalation, and contact with eyes, skin, and clothing

Avoid prolonged or repeated exposure. Wash thoroughly after handling

Immediately remove contaminated clothing, as material is **very corrosive to body tissues**.

Wash contaminated clothing before reuse. Discard contaminated footwear.

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SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Chemical Family: Halogenated acetamide; Silyl *Use:* Analytical: GC Derivatization; Column Conditioner

Appearance, Odor, and Other Properties

<i>Appearance:</i>	clear colorless to yellow liquid	<i>Odor:</i>	ammonia-like
<i>MP:</i>	-70°C (-94°F) (HMDS)	<i>Reactivity:</i>	reacts--hydrolyzes
<i>bp (1atm):</i>	125°C (256°F) (HMDS)	<i>Solubility in Water:</i>	negligible
<i>FW</i>	564.11 [mixture--approximate]	<i>Specific Gravity (H₂O = 1.0):</i>	0.824
	257.40 (BSTFA)	<i>VP (mmHg):</i>	20 mm @ 20°C (HMDS)
	161.39 (HMDS)	<i>Vapor Density (air=1):</i>	4.6 (HMDS)
	145.32 (TMSDEA)	<i>Evap. Rate (BuAc = 1.0):</i>	>1 (HMDS)
<i>% Volatiles:</i>	100 (H ₂ O = 1.0)	<i>Refractive Index (n_D²⁰):</i>	1.384-1.411 (BSTFA-TMSDEA)
<i>Soluble in Organic Solvents:</i>	NE		

SECTION 10 STABILITY AND REACTIVITY

Stability

Stable if stored under nitrogen and protected from moisture.

Incompatibilities

Oxidizers
 Acids, bases
 Amines, alkalies, compounds with active hydrogen
 Alcohols
 Metals
 Water, moisture, or humid air--readily hydrolyzes to corrosive ammonia and hydrofluoric acid, that in contact with metals may produce flammable and/or corrosive hydrogen gas. HMDS may hydrolyze to hexamethylsiloxane. BSTFA may hydrolyze to acetamide.

Note: HMDS combined with pyridine *N*-oxide and tetrabutylammonium fluoride may explode.

Precautions

Avoid incompatibilities.
 Protect from static, heat, flames, sparks, and ignition sources.
 Keep out of water supplies and sewers.

Hazardous Combustion or Decomposition Products

carbon oxides, silicon oxides, nitrogen oxides, hydrogen fluoride, formaldehyde, ammonia, hexamethyldisiloxane, acetamide; *May decompose on contact with water.*

Hazardous Polymerization

None

SECTION 11 TOXICOLOGICAL INFORMATION

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS #

CAS #

not assigned	Bis(trimethylsilyl)-trifluoroacetamide	25561-30-2
JM9230000	Hexamethyldisilazane	999-97-3
not assigned	Trimethylsilyldiethylamine	996-50-9

Only selected Registry of Toxic Effects of Chemical Substances data (RTECS) is presented here.
 See actual entry in RTECS for complete information.

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<i>Irritation Data</i>	eye	skin
Bis(trimethylsilyl)trifluoroacetamide	NDA	NDA
Hexamethyldisilazane	NDA	skn rbt 500 uL sev
Trimethylsilyldiethylamine	NDA	NDA

<i>Toxicity Data</i>	oral	inhalation	dermal
Bis(trimethylsilyl) trifluoroacetamide	orl rat LD50 1580 mg/kg	NDA	NDA
Hexamethyldisilazane	orl rat LD50 1000mg/kg; orl rat LD50 850mg/kg	ihl LC50 870mg/m ³ /4H	skn rbt LD50 540mg/kg skn rbt LD50 710uL/kg
Trimethylsilyldiethylamine	NDA	NDA	NDA

<i>Carcinogenicity</i>	OSHA	IARC	NTP	ACGIH	NIOSH	Notes
Bis(trimethylsilyl)trifluoroacetamide	NL	NL	NL	NL	NL	None
Hexamethyldisilazane	NL	NL	NL	NL	NL	None
Trimethylsilyldiethylamine	NL	NL	NL	NL	NL	None

NL = Not Listed as a carcinogen;

Teratogenicity and Reproductive Effects

No data available.

Neurotoxicity

HMDS and TMSDEA can cause central nervous system depression.

Mutagenicity

Data in RTECS on hexamethyldisilazane indicate that it has been investigated as a tumorigen, but its status is questionable by RTECS criteria.

Miscellaneous

Test on laboratory animals indicate HMDS may produce a decreased immune response. TMSDEA may produce sensitization with allergic manifestation in predisposed persons.

Symptoms and Acute and Chronic Effects

Section 3 **Hazards Identification** above.

SECTION 12 ECOLOGICAL INFORMATION.....

Ecotoxicity:

BSTFA, HMDS, and TMSDEA: No data available.

Environmental Toxicity and Fate

BSTFA, HMDS, and TMSDEA: No data available.

Hexamethyldisiloxane: Is not expected to be present in sufficient quantity to be hazard to the environment. It does have the potential to bioaccumulate if present in large quantities, but would likely volatilize quickly enough to minimize the possibility that bioaccumulation would occur.



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Standard Chemical Precautions
 Keep out of air, water, and soil

SECTION 13 DISPOSAL CONSIDERATIONS.....

That which cannot be recovered or recycled, should be disposed of in accordance with all applicable Federal, State, and local environmental regulations.

RCRA waste code(s): D001, D002, D003 RCRA Hazard Class (40CFR 261): Ignitable, Corrosive, Reactive

SECTION 14 TRANSPORT INFORMATION.....

Ship in accordance with all applicable local, State, Federal, and International transportation regulations.
 The following is a summary only. Check regulations for complete information:

U. S. Department of Transportation (49CFR171.101)
 Shipping Name: Flammable liquid, corrosive, n.o.s. (Col Treet)
 ID Number: UN2924
 Hazard Class or Division: 3, Subsidiary Class: 8
 Packing Group: PG III
 Labeling: Flammable Liquid, Corrosive

SECTION 15 REGULATORY INFORMATION.....

Reviews, Standards, and Regulations

..... Col Treet.....	BSTFA	.....	HMDS	.....	TMSDEA
CAS Number.....	25561-30-2	.....	999-97-3	.....	996-50-9
TSCA:.....	NL*	.....	NL*	.....	Y..... Y
*This compound is sold strictly for research and development use.					
EINECS:.....	NL	.....	Y	.....	Y..... Y
Number.....	NL	.....	247-103-9	.....	213-668-5 242-040-3
CERCLA [Section 103 (40 CFR 302.4)]:	NL	.....	NL	.....	NL..... NL
RQ (lbs).....	NA	.....	NA	.....	NA.....NA
RCRA Waste Code.....	NL	.....	NL	.....	NL.....NL
OSHA Process Safety [29 CFR 1910.119]:	NL	.....	NL	.....	NL..... NL
TQ (lbs).....	NA	.....	NA	.....	NA.....NA
Clean Air Act					
[Section 112r (40 CFR 68)]:	NL	.....	NL	.....	NL.....NL
TQ (lbs).....	NA	.....	NA	.....	NA.....NA
Contains Ozone Depleters (Class I or Class II).....	N	.....	N	.....	N.....N
[Section 103 (40 CFR 302.4)]:	NL	.....	NL	.....	NL.....NL
SARA Title III Notification [40 CFR 302.4]:					
Section 302/304 (EHS) Ingredient [40 CFR 355.3]	NL	.....	NL	.....	NL.....NL
TPQ (lbs)	NA	.....	NA	.....	NA.....NA
RQ (lbs).....	NA	.....	NA	.....	NA.....NA
Section 313 Ingredient [40 CFR 372.65].....	NL	.....	NL	.....	NL.....NL
State Lists:	NL	.....	NL	.....	NL..... NL
States.....	NL	.....	NL	.....	NL.....NL
On CA 65 Significant Risk Level	NL	NL	NL.....NL
CA 65: No significant risk level	NA	NA	NA.....NA

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Hazard Classes

Sara	Acute	Chronic	Fire	Pressure	Reactivity
Title III	Y	N	Y	N	Y
	Health	Flammability	Reactivity	Special Hazards	
NFPA	3	3	2	W	
HMIS	3	3	2	None	

Risk Phrases:

Caution: The properties of this material have not been fully investigated.

Corrosive.

R11.....Highly Flammable

R14.....Reacts with water

R34.....Causes burns

R39/23/24/25....Toxic: danger of very serious irreversible effects through inhalation, in contact with skin, and if swallowed.

R36/37/38.....Irritating to eyes (severely), respiratory system, and skin

R40.....Possible risk of irreversible effects

R67.....Vapors may cause drowsiness and dizziness

Safety Phrases:

S6/7/8/9.....Keep under nitrogen in a dry, tightly closed container, in a well ventilated place.

S16.....Keep away from sources of ignition--no smoking.

S23/24/25.....Do not breathe vapors. Avoid contact with skin and eyes.

S26.....In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S30.....Never add water to this product.

S 33.....Take precautionary measures against static discharges.

S36/37/39.....Wear suitable protective clothing, gloves, and eye/face protection

S44.....If you feel unwell, seek medical advice immediately (show the label where possible.)

SECTION 16OTHER INFORMATION.....

Miscellaneous

The health and toxicological hazards of this compound have not been fully investigated; therefore, this substance must be handled only by, or under close supervision of those qualified in the handling and use of potentially hazardous substances.

This MSDS was revised as follows:

This MSDS was updated to a 16-section format. Consider all sections to have new information.

Disclaimer

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Approved of by: MBF

This is the last page of this MSDS.

Reviewed and re-approved of with minor changes to the footer abbreviations and format.

by: Jon Pilli

08/05/2008

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