

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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

SECTION 1 ...... PRODUCT IDENTIFICATION ......

Name: HYDROX-SIL OR HYDROX-SIL (REAGENT)

SECTION 2 ...... COMPOSITION, INFORMATION ON INGREDIENTS ......

Synonyms

HMDS + TMCS + Pyridine (2:1:10)

CAS #: 75-77-4 MF: C<sub>3</sub>H<sub>9</sub>ClSi TMCS; Trimethylchlorosilane

CAS #: 110-86-1 MF : C<sub>5</sub>H<sub>5</sub>N Pyridine

Ingredients Concentration (%/wt)

 HMDS (999-97-3)
 16.0 %

 TMCS (75-77-4)
 8.0 %

 Pyridine (110-86-1)
 76.0 %

 Manufacturing Impurities
 NA

SECTION 3 ...... HAZARDS IDENTIFICATION.....

Precautionary Statements

See Sections 8 and 11 for further details.

Flammable, corrosive, readily absorbs through skin

..... Emergency Overview .....

NFPA Ratings (Scale 0-4); Health = 3; Fire = 3; Reactivity = 2;  $\forall$  (avoid water)

Liquid: Clear to cloudy. Strong, pungent odor.

Corrosive, extremely flammable liquid and vapor. May cause flash fire. Keep away from ignition sources. Protect from static discharge. May decompose on contact with water. **Pyridine exposure level of 3600 ppm is immediately dangerous to life and health.** HYDROX-SIL may react with water to produce ammonia or hydrogen chloride.

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

Corrosive--Cause burns to all body tissues. Irreversible damage possible. Harmful if swallowed or inhaled. **HMDS and Pyridine readily absorb through skin.** Vapors may cause dizziness and drowsiness.

Emits toxic fumes under fire conditions—carbon oxides, silicon oxides, nitrogen oxides, formaldehyde, ammonia, cyanide, chlorinated compounds

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

Target organs: liver, kidneys, nerves and central nervous system (CNS), bone marrow

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

.....

### Other Hazard Information

Skin:

Primary Route(s) of Entry: Skin or eye contact, vapor inhalation, ingestion

Eye: Corrosive--can cause burns or severe irritation, pain, itching, tearing, redness, corneal

inflammation, blurred vision, lens damage. Photophobia and irreversible damage is possible. Corrosive--can cause burns upon short periods of contact. May be harmful if absorbed through

skin with systemic effects described under inhalation or ingestion. Chronic contact may result in

dermatitis. HMDS and pyridine are readily absorbed through skin.

Inhalation: Corrosive--Can cause burns or severe irritation to nose, throat, mucous membranes, respiratory

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.

MSDS# 270455d Effective Date: 05/16/2012 Version #: 4 Page 1 of 8



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

tract, and lungs. May be harmful or fatal if inhaled due spasm, inflammation and edema (fluid retention and swelling) of the larynx, bronchi or lungs. May cause dizziness or drowsiness.

Prolonged or repeated inhalation may cause tooth decay. May cause effects similar to ingestion.

Ingestion: Corrosive--Can cause burns, severe irritation, and permanent damage to mouth, throat, and

stomach. May cause GI disorders, liver or kidney damage, or central nervous system depression, with .headache, nausea, vomiting, dizziness, unconsciousness, and coma. Prolonged exposure may result in dizziness and general weakness. Aspiration of liquid while vomiting may seriously

injure lungs.

Acute/Chronic: See above route. Symptoms: See above route.

Pre-existing conditions that may be aggravated: liver, kidneys, nerves /central nervous system,

bone marrow, skin, eyes, respiratory

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 footware.

Physician note: Symptomatic and supportive care. No specific antidote, however can be treated same as

hydrochloric acid exposure. Treatment based on physician judgment in response to reactions

of the patient.

SECTION 5 ...... FIRE FIGHTING MEASURES ......

Flash Point: 67°F; 19°C Method: tcc Autoignition: Not available
OSHA Flammability Class: IB

NFPA: See Section 3 Emergency Overview on pg. 1

Method: tcc Autoignition: See Section Limits: Upper: 12.4 % lower: 1.8 %

Extinguishing Media

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.

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.

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.

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.

MSDS# 270455d Effective Date: 05/16/2012 Version #. 4 Page 2 of 8



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

Hazardous Combustion or Decomposition Products

carbon oxides, silicon oxides, chlorine, hydrogen chloride, phosgene; 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).

Wear NIOSH/MSHA approved respirator for organic/acid gas, dust, and mists to prevent inhalation.

A fire guard should be posted during any clean up operation.

Contain and recover material when possible.

Neutralize with sodium bicarbonate or other suitable neutralizing agent.

Use chemically compatible spill pillows, or similar adsorbent material.

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.

## 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 storage area suitable for flammable and corrosive liquids.

Special Storage Instructions

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

Store in tinted glass bottle under nitrogen. Protect from moisture.

Special Handling Instructions

Handle and store under nitrogen. Protect from moisture.

Use appropriate precautions for highly flammable and corrosive liquids.

Exposure levels of 3600 ppm is immediately dangerous to life and health--Adequately ventilate.

Immediately remove contaminated clothing, as material is readily adsorbed through skin.

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

Airborne Exposure Limits		TWA (8H)		STEL		Ceiling Limit		Ceiling (skin)		
			ppm	mg/m <sup>3</sup>						
	Pyridine	OSHA PEL	5	15	NE	NE	NE	NE	NE	NE
	110-86-1	ACGIH - TLV	5	16	NE	NE	NE	NE	NE	NE
	Hexamethyldisilazane	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	999-97-3	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
		Dow Corning guide	25	17	35	24	NE	NE	NE	NE
	Trimethylchlorosilane	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	75-77-4	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
	NE N	Dow Corning Guide	NE	NE	NE	NE	5	7	NE	NE

NE = Not established;



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

Special/Other Control Measures

Odor threshold: 10.0 ppm (TMCS); 46.8 ppm (HMDS)

Personal Protective Equipment (PPE)

Chemical safety evewear.

Compatible chemical-resistant gloves: Rubber (e.g., natural rubber, neoprene, nitrile, or equivalent), Silver

Shield®, Viton®, or 4H®

NIOSH/MSHA approved respirator for organic/acid 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

Wash contaminated clothing before reuse. Discard contaminated footware.

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

SECTION 9 ...... PHYSICAL AND CHEMICAL PROPERTIES......

Chemical Family: halogenated acetamide; silyl in organic solvent Use: Analytical: GC Derivatization; silylation reagent

Appearance, Odor, and Other Properties

Appearance: clear to cloudy liquid Odor: strong, pungent odor

MP: -42°C (-44°F) (Pyridine) Reactivity: reacts
bp (1atm): 115.3°C (239°F) (Pyridine) Solubility in Water: decomposes

FW: 161.39 (HMDS) Specific Gravity ( $H_20 = 1.0$ ): 0.927

108.64 (TMCS) Refractive Index  $(n_D^{20})$ : NE 79.10 (Pyridine) pH: NE

 VP (mmHg):
 16mm (20°C) (Pyridine)
 Vapor Density (air=1):
 2.73

 % Volatiles:
 77%
 Evap. Rate (BuAc = 1.0):
 >11

Soluble in Organic Solvents: NE

SECTION 10 ...... STABILITY AND REACTIVITY .....

Stability

Stable if stored under nitrogen and protected from moisture.

Incompatibilities

Strong acids, acid chlorides, strong bases, alcohols, alkalis, amines

Strong oxidizers--Fire/explosion hazard.

Water, moisture, or humid air--may decompose on contact: HMDS hydrolyzes to ammonia and TMCS hydrolyze to hydrochloric acid.

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, formaldehyde, ammonia, cyanide, chlorinated compounds *Hazardous Polymerization* 

None

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.

MSDS# 270455d Effective Date: 05/16/2012 Version #: 4 Page 4 of 8



847-967-6000 800-323-8144

**Emergency Contact:** 

(Monday - Friday: 7:30 a.m. - 4:00 p.m. CST)

INFOTRAC 800-535-5053 [U.S.A.]

Name: **HYDROX-SIL** HYDROX-SIL (REAGENT) or Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

SECTION 11 ...... TOXICOLOGICAL INFORMATION ......

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

JM9230000	Hexamethyldisilazane	999-97-3
VV2710000	Trimethylchlorosilane	75-77-4
UR8400000	Pyridine	110-86-1

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

Irritatio	n Data	eye	skin
	Hexamethyldisilazane	NDA	skn rbt 500 uL sev
	Trimethylchlorosilane	eye rbt 5 uL mod	skn rbt 500 uL mod
	Pyridine	eye rbt 2 mg open sev	skn rbt 10 mg/24H open mld; skn rbt 500 mg/24H mld

NDA = No data available

Toxicity Data		oral	inhalation	dermal	
	Hexamethyldisilazane orl rat LD50 1000mg/kg;		ihl LC50 870mg/m3/4H	skn rbt LD50 540mg/kg	
		orl rat LD50 850mg/kg		skn rbt LD50 710uL/kg	
	Trimethylchlorosilane	orl rat LD50 5660 uL/kg	ihl rat LC50 3000ppm/1H; ihl mus LCLo 500mg/m3/10M	skn rbt LD50 1780uL/kg	
	Pyridine	orl rat LD50 891 mg/kg	ihl rat LC50 28500 mg/m3/1H	skn rbt LD50 1121 mg/kg	

Carcinogenicity		OSHA	IARC	NTP	ACGIH	NIOSH	Notes
	Hexamethyldisilazane	NL	NL	NL	NL	NL	None
	Trimethylchlorosilane	NL	NL	NL	NL		Some studies have shown that TMCS may induce certain types of cancers
	Pyridine	NL	NL	NL	NL	NL	None

NL = Not Listed as a carcinogen;

Teratogenicity and Reproductive Effects

No mammal studies were found on pyridine--tests in the hydra did not suggest the material should be tested in

Neurotoxicity

Hexamethyldisilazane and pyridine can adversely effect the nervous system..

Mutagenicity

Test on laboratory animals indicate TMCS may produce adverse mutagenic effects and cause tumors. Data in RTECS on hexamethyldisilazane indicate that it has been investigated as a tumorigen, but its status is questionable by RTECS criteria. RTECS files contain data on mutagen testing for pyridine.

Miscellaneous

Test on laboratory animals indicate TMCS may produce a decreased immune response.

Acute and Chronic Effects

Section 3 Hazards Identification above.

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.

Effective Date: 05/16/2012 Version #: 4 MSDS# 270455d Page 5 of 8



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

SECTION 12 ...... ECOLOGICAL INFORMATION ......

Ecotoxicity, Environmental Fate and Transport:

Hexamethyldisilazane and pyridine: No data available.

TMCS: Keep out of water supplies and sewers. Prevent any contamination of underground water. Hydrolyses to hexamethyldisiloxane.

*Water danger/protection*: WGH Salmonella typhimurium TA97, TA98, TA100, TA1353, TA1537 without metabolic activation positive.

Aquatic toxicity: Tlm96: 100-10 ppm.

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 Liquids, Corrosive, n.o.s., (HYDROX-SIL)

ID Number: UN2924

Hazard Class or Division: 3, Subsidiary Class: 8

Packing Group: PG II

Labeling: Flammable Liquid, Corrosive

SECTION 15 ...... REGULATORY INFORMATION ...... Reviews, Standards, and Regulations ......HYDROX-SIL\*..HMDS......TMCS.....Pyridine .....NL .....999-97-3 .... 75-77-4 ... 110-86-1 \*This compound is sold strictly for research and development use. TQ (lbs)......NA ......NA .....NA Clean Air Act TQ (lbs)......NA ........NA ........NA .......NA State Lists: NL NL NL NL NL NL ......PN,MA.....MN,MA 



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

MATERIAL SAFETY D	ATA SHEET			
Povious Standards and Pogulations				
Reviews, Standards, and Regulations				
	NL	999-97-3.	75-77-4	. 110-86-1
SARA Title III Notification [40 CFR 302.4]:				
Section 302/304 (EHS) Ingredient [40 CFR 355.3]				
TPQ (lbs	NA	NA	1,000	NA

Hazard Classes

<del>Ulacede</del>	7146666									
Sara	Acute	Chronic	Fire	Pressure	Reactivity					
Title III Y Y		Υ	Υ	N	Υ					
	Health	Flammability	Reactivity	Special Hazards						
NFPA	3	3	2	₩						
HMIS	3*	3	2	None						

European Classification and Danger/Hazard Symbol:

C......Corrosive

F ...... Highly Flammable

### Risk Phrases:

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

R11......Highly Flammable
R14....Reacts with water
R34....Causes burns

R48/23/24/25...... Harmful: 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.

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

S33 ...... Take precautionary measures against static discharges.

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

SECTION 16 ......OTHER 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.

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.

MSDS# 270455d Effective Date: 05/16/2012 Version #: 4 Page 7 of 8



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: HYDROX-SIL or HYDROX-SIL (REAGENT)
Code: 1-270066-500, 1-270454-200, 1-270455-200, 1-270457-200

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

#### Disclaimer

The above information is believed to be correct, but does not purport to be all-inclusive and shall be used only as a guide. Regis Technologies, Inc., does not guarantee said information is accurate or complete, nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of the goods, the merchantability of the goods, or the fitness of the goods for a particular purpose. Adjustment may be required to conform to the actual conditions of usage. Regis Technologies, Inc. shall not be held liable for any damage resulting from handling or from contact with the above product, nor for the results obtained, or for incidental or consequential damage arising from the use of these data. No freedom from infringement of any patent, copyright or trademark is to be inferred.

This is the last page of this MSDS.