Name: TMCS or Trimethylchlorosilane

SECTION 1  IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1 Product Identifier
   Name: TMCS or Trimethylchlorosilane

1.2 Use of Substance/Mixture
   Use: Analytical Reagent—Gas Chromatography

1.3 Details of Manufacturer/Supplier
   Company: Regis Technologies, Inc.
   Address: 8210 N. Austin Avenue
             Morton Grove, IL 60053
   Phone: 847-967-6000; 800-323-8144 (toll free)
          Email: cservice@registech.com
          Website: www.registech.com

1.4 Emergency Telephone
   INFOTRAC 800-535-5053 [U.S.A.]

SECTION 2  HAZARDS IDENTIFICATION

2.1 Classification of the Substance or Mixture
   GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
   Physical Hazards
     Flammable Liquid  Category 2  H225
     EUH014 - Reacts violently with water
   Health Hazards
     Acute Oral Toxicity  Category 3  H301
     Acute Dermal Toxicity  Category 4  H312
     Acute Inhalation Toxicity (Vapour)  Category 3  H331
     Skin Corrosion / Irritation  Category 1A  H314
     Serious Eye Damage / Irritation  Category 1  H314

   Environmental Hazards - Not classified

   GHS Label Elements
   Pictograms or hazard symbols

   Signal Word  Danger

   Hazard Statements
     H225 – Highly flammable liquid and vapor
     H261 – In contact with water releases flammable gases.
     H301 – Toxic if swallowed.
     H312 – Harmful in contact with skin.
     H314 – Causes severe skin burns and eye damage.
     H331 – Toxic if inhaled.

   Precautionary Statements
     [Prevention]  P210 – Keep away from heat and ignition sources.

Some abbreviations used throughout this MSDS: NA=not applicable; NE=not established; U=unknown/unavailable; NL=not listed; N=no; Y=yes.
Name: TMCS or Trimethylchlorosilane

P260 – Do not breathe vapors.
P264 – Wash thoroughly after handling.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
Note – Contact with metal may produce corrosive hydrochloric acid.

[Response] P304+P340-IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P302+P352 – IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338-IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 – If eye irritation persists: Get medical advice/attention.
P301+P330+P338-IF INhaled: Do NOT induce vomiting.
P302+P352 – IF ON SKIN: Wash with plenty of soap and water.
P305+P351+P338-IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313 – If eye irritation persists: Get medical advice/attention.
P301+P330+P338-IF INhaled: Do NOT induce vomiting.

[Storage] P403+P235-Store in a well-ventilated place. Keep cool.
P402+P404- Store in a dry place. Store in a closed container.

[Disposal] P501-Dispose of contents/container in accordance with all applicable governmental and environmental regulations.

SECTION 3 ............................................ COMPOSITION / INFORMATION ON INGREDIENTS ...............................................................
SECTION 5 ............................................................... FIRE-FIGHTING MEASURES..............................................................................................

5.1 Suitable Extinguishing Media
Medium expansion (>30:1) AFFF alcohol compatible foam, carbon dioxide, dry chemical powder, dry sand. **NO hydrous agents. NO water.** Water may be effective for cooling, but may not effect extinguishment for large fires.

5.2 Specific hazards arising from the chemical.
**Highly flammable and corrosive liquid and vapor--hydrolyzes vigorously with water to produce corrosive hydrogen chloride gas,** that in contact with metal can produce flammable/explosive hydrogen gas.
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.
Static electricity will accumulate and may ignite vapors. Use bonding and grounding or inert gas blanketing.
Containers may build pressure or rupture when heated. Container explosion may occur under fire conditions.

**Hazardous Combustion or Decomposition Products**
carbon oxides, silicon oxides, chloride, hydrogen chloride, phosgene; Decomposes on contact with water.

5.3.1 Advice for fire-fighters
**Do not allow extinguishing media to enter container.**
**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 may initially produce significant evolution of corrosive hydrochloric acid vapors. The vapors will be reduced when uniform blanketing is achieved. **Difficult to extinguish--re-ignition may occur. A fire guard should be posted during any clean up operation.**

5.3.2 Advice for fire-fighters – Protective gear
Wear protective clothing for corrosive and flammable conditions to prevent contact with skin, eyes, and inhalation.
Standard precautions for fighting large fires involving chemicals: Wear self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes.

SECTION 6 ............................................................... ACCIDENTAL RELEASE MEASURES.................................................................

6.1 Personal precautions, protective equipment, and emergency procedures
For non-emergency personnel - Avoid material contact or inhalation of flammable or corrosive mists. Evacuate unnecessary personnel from area.
For emergency responders – Wear protective clothing for corrosive and flammable conditions to prevent contact with skin and eyes. Avoid breathing mists. See Section 8.3.

6.2 Environmental precautions
Prevent material from entering drains.

6.3 Methods of clean up
Eliminate all ignition sources. Use spark proof tools.
Ventilate area. Isolate spilled material.
Wear NIOSH/MSHA approved respirator for organic/acid/amine gas, dust, and mists to prevent inhalation.
Contain and recover material when possible. Neutralize with sodium bicarbonate or other suitable neutralizing agent. Absorb using chemically compatible spill pillows, or similar adsorbent material.
Sweep up, if not absorbed in pillow, seal in appropriate hazardous waste container, and hold for proper waste disposal. Keep out of water supplies and sewers. Wash spill site after material pickup is complete.

SECTION 7 ............................................................... HANDLING AND STORAGE.................................................................
7.1 Safe Handling Precautions
Wear suitable protective equipment for flammables and corrosives to avoid contact with or inhalation of liquids or vapors. Severely irritating to corrosive to all body tissues on contact. Wash after handling. Immediately remove contaminated clothing. Wash contaminated clothing prior to reuse. Dispose of contaminated footwear. Handle and store under nitrogen. Protect from moisture. TMCS reacts violently with water or moist air to generate highly toxic and corrosive hydrogen chloride gas, which in contact with metal may produce flammable or explosive hydrogen gas. Use appropriate precautions for highly flammable liquids with a high potential for static accumulation. Ground and bond containers or use inert gas purge when transferring or handling material. Use spark proof tools and explosion proof equipment. Equipment (i.e., pumps, hoses, etc.) used in any handling of this material must be clean, dry and free of any oxygenated materials. Static electricity will accumulate and may ignite vapors. Open containers cautiously. A high static potential will be generated during the transfer of this material. Do not use foam or plastic materials when handling this chemical as plastic may enhance the static potential due to their non-conductive nature. Do not repackage.

7.2 Storage Conditions
Store tightly closed under nitrogen, in a cool, place with adequate ventilation, in a storage area suitable for flammable and corrosive liquids. Protect from light and heat. Store away from incompatible materials (See Section 10.).

SECTION 8 ..........................................  EXPOSURE CONTROLS / PERSONAL PROTECTION ..............................................................

8.1 Control parameters
Exposure limits TMCS or Trimethylchlorosilane (75-77-4) – OSHA – PEL or ACGIH – TLV: No limits established. Dow Corning Guide – Ceiling Limit 5 ppm (7 mg/m³)
Note: Hydrogen chloride [5ppm-(OSHA – PEL and NIOSH-REL); 2ppm (ACGIH – TLV)] is formed on contact with humid air or water
Environmental Do not empty into drains.

8.2 Appropriate engineering controls
Safety shower and eye wash. Local exhaust and mechanical ventilation required. Hood recommended. Use adequate general and/or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Fume scrubber.

8.3 Personal protection
Eye/Face Chemical safety eyewear or goggles.
Hand Compatible chemical-resistant gloves for acidic corrosives such as hydrochloric acid.
Respiratory If exposure likely: NIOSH/MSHA approved respirator for organic/acid gas, dust, and mists.
Dermal (not hand) Protective Clothing (e.g., lab coat)
Hygiene Avoid inhalation, ingestion; contact with eyes, skin, and clothing; Avoid prolonged or repeated exposure. Wash thoroughly after handling.

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

9.1 Information on physical and chemical data

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Formula</td>
<td>C₃H₉ClSi₂</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>108.64</td>
</tr>
<tr>
<td>Form</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear colorless liquid</td>
</tr>
</tbody>
</table>

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SAFETY DATA SHEET

Odor: Hydrochloric acid odor
Odor threshold: 0.255 to 10.06 ppm (hydrochloric acid)

pH: <7 (acidic in solution)

Melting/freezing point: -58°C (-72°F)
Boiling point: 57.9°C (135°F)

Flammability (liquid):
- Flash Point: 0.14°F (-18°C) Method: tcc
- Flammable limits (%v/v):
  - UEL (upper explosive limit): 6.4%
  - LEL (lower explosive limit): 2.0%
- Autoignition temperature: 395°C (743°F)
- Decomposition temperature: Not available

OSHA Flammability Class: IB

Evaporation Rate (BuAc = 1.0): >1.0

Vapor pressure (mmHg): 187 mmHg @ 20°C ; 26.7 kPa @ 20°C

Vapor density (air=1): 3.8

Relative density (g/cm³): 0.860

Water Solubility: rigorous decomposition - Insoluble. See water reactivity.

Water reactive: Yes -- Readily hydrolyzes to hydrochloric acid

Solubility (other): toluene, ether, benzene, perchloroethylene

Partition coefficient: N-octanol/water: Kow (Pow) = Not available

Viscosity: 0.37 cSt

Refractive Index (nD20): 1.3870

Critical Temp: 224.6°C

Critical Pressure: 31.6 atm

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity
- Stable if stored under nitrogen and protected from moisture.

10.2 Chemical Stability
- Stable if stored under nitrogen and protected from moisture, heat and light.

10.3 Possibility of hazardous reactions
- Oxidizers. Fire/explosion hazard.
- Acids, bases, oxygenated materials--contact with these can generate HCl gas (see water below.)
- Amines, alkalies, compounds with active or liable hydrogen
- Alcohols, acetone--Violent reaction.
- Metals
- Water, moisture, or humid air--Violent reaction, hydrolyzing to corrosive hydrochloric acid, that in contact with metals may produce flammable and/or corrosive hydrogen gas.

10.4 Conditions to avoid
- Avoid incompatibilities (See Possibility of hazardous reactions Section above.)
- Protect from static, heat, flames, sparks, and ignition sources.
- Keep out of water supplies and sewers.

10.5 Incompatible materials
- (See Possibility of hazardous reactions Section above.).

10.6 Hazardous decomposition products
- Combustion: carbon oxides, silicon oxides, chlorine, hydrogen chloride, phosgene
- Decomposes (hydrolyzes) violently on contact with water or moist air to produce hydrochloric gas (CAS 7647-01-0), that in contact with metal can produce flammable/explosive hydrogen gas. Other hydrolysis products: Trimethylsilanol (CAS 1066-40-6) later condenses to form hexamethyldisiloxane (CAS 107-46-0) and water (CAS 7732-18-5).

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

11.1 Toxicological Information

Acute toxicity
Oral LD50
Orl rat LD50: 5660 uL/kg  (RTECS; Somnolence (general depressed activity), Dyspnea (shortness of breath), Gastrointestinal - other changes.)

Inhalation LC50
Ihl rat LC50: 12.9 mg/L/1 hr  (IUCLID; No data available).

Dermal LD50
Skn rbt LD50: 1780 uL/kg  (RTECS; Altered sleep time (including change in righting reflex), Hypermobility, diarrhea, Weight change.)

Other acute toxicity
See actual entry in RTECS, IUCLID, or ECHA REACH entry for complete information.

Skin corrosion/irritation
Irritation skin: Rabbit: EC Classification: corrosive (causes burns); (ECHA REACH)

Skin Corrosion
Corrosive to skin: Rabbit (IUCLID and ECHA REACH; Several studies: severe burns, blisters, etc.)

Skin Irritation
Skn rbt 500 uL mod  (RTECS.)

Serious eye damage/irritation
Irritation eye: Rabbit: EC Classification: causes eye damage; (ECHA REACH)

Serious Eye Damage
Damage to eyes: Rabbit (IUCLID and ECHA REACH; Several studies: severe burns, blisters, etc.)

Eye Irritation
Eye rbt 5 uL mod  (RTECS)

Respiratory irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell Mutagenicity
Genotoxicity in Vitro
Mmo-sat 1 mg/plate (+S9); Ames test negative  (RTECS)

Carcinogenicity
IARC
No data available.

NTP
No data available

OSHA
No data available

Other
Ipr mus TDLo 1 g/kg/I, Lung tumors; Neoplastic tumorigenic agent by RTECS criteria.

Reproductive toxicity
No data available

(Including teratogenicity)

Specific target organ toxicity (STOT)
STOT-single exposure
No data available

STOT-repeated exposure
No data available

Aspiration hazard
No data available

RTECS Number
VV2710000

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

See NLM-HSDB for a detailed discussion about environmental fate in air, soil, and water.

12.1 Ecotoxicity

Toxicity to Fish
No data available.

Toxicity to Crustacea
No data available.

Toxicity to Aq. Plants
No data available.

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

Aquatic toxicity: Tlm96: 100-10 ppm.

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12.2 Persistence and degradability
Readily degrades by hydrolysis and photochemically produced hydroxyl radicals. Biodegradability – Material rapidly hydrolyzes immediately on contact with water to produce hydrochloric acid, which could potentially the pH of the water environment and pose a short term local hazard.

12.3 Bioaccumulative potential
BCF = no data available and Log Kow = no data available; TMCS immediately hydrolyzes on contact with water, therefore it is not likely to bioaccumulate.

12.4 Motility in soil
Decomposition is expected to occur more rapidly than absorption or volatilization.

12.5 Other adverse effects
No data available for this product. Do not discharge into the environment.

SECTION 13 ........................................................... DISPOSAL CONSIDERATIONS

13.1 Disposal methods
U.S. EPA Waste Codes D001, D002, D003

Waste Disposal That which cannot be recovered or recycled, should be disposed of in accordance with all applicable international, national, regional, state, and local laws. Do NOT dump into any sewer, on ground, or into any body of water.

SECTION 14 ........................................................... TRANSPORT INFORMATION

DOT (US)
UN number 1298 Class 3 (8) Packing Group II Proper shipping name Trimethylchlorosilane Marine pollutant no Poison Inhalation hazard no

IATA number 1298 Class 3 (8) Packing Group II
UN proper shipping name Trimethylchlorosilane Note IATA (Passenger) is forbidden. Maximum quantity on IATA (Cargo) is 5 liters.

IMDG/IMO
UN number 1298 Class 3 (8) Packing Group II UN proper shipping name TRIMETHYLCHLOROSILANE Marine pollutant no Special precautions for user EMS-No: F-E, S-C

ADR/RID
UN number 1298 Class 3 (8) Packing Group II
UN proper shipping name TRIMETHYLCHLORO-SILANE Transport Hazard Class 3 (8) Packing group PG II

SECTION 15 ........................................................... REGULATORY INFORMATION

15.1 Safety, health and Environmental regulations specific for the product in question.
NFPA: H3 F3 R2 □ (avoid water) HMIS: H3 F3 R2

15.2 Chemical Inventory Lists
-------------------------------------------------------------------------------------------------- TMCS or Trimethylchlorosilane or chlortrimethylsilane
CAS Number: 75-77-4
TSCA: Y EINECS: Y

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15.2 Chemical Inventory Lists (continued)

CERCLA [Section 103 (40 CFR 302.4)]: TMCS or Trimethylchlorosilane or chlortrimethylsilane

RQ (lbs) ........................................ NL
RCRA Waste Code ........................................ NA
OSHA Process Safety [29 CFR 1910.119]: ........................................ NA
TQ (lbs) ........................................ NA

Clean Air Act

[Section 112r (40 CFR 68)]: ........................................ Y
TQ (lbs) ........................................ 10,000
RQ (lbs) ........................................ NA

Contains Ozone Depleters (Class I or Class II) ........................................ N


SARA Title III Notification [40 CFR 302.4]: ........................................ NL

Section 302/304 (EHS) Ingredient [40 CFR 355.3]: ........................................ Y
TPQ (lbs) ........................................ 1,000
RQ (lbs) ........................................ 1,000

Section 313 Ingredient [40 CFR 372.65]: ........................................ Y
SARA Hazards Acute.....Y Chronic..... N Fire..... Y Pressure..... N Reactivity ..... Y
State Lists: ..................................................................................................... Y
States .............................................................................................................. NJ,FL,PN,MA
On CA 65 Significant Risk Level ..................................................................... NL

SECTION 16 .................................................................. OTHER INFORMATION .......................................................................................

16.1 Full test of H-Statements referred to under Section 2 and 3.

Flam. Liq. Flammable liquids
Acute Tox. Acute toxicity
Skin Corr. Skin corrosion
Eye Dam. Serious eye damage
H225 Highly flammable liquid and vapour.
H261 In contact with water releases flammable gases.
H301+ H331 Toxic if swallowed or if inhaled
H312 Harmful in contact with skin.
H314 Causes severe skin burns and eye damage.

16.2 Literature References

ECHA REACH Registered Substance, last updated 8 Nov. 2013 – EC/List No. 200-900-5 , Chlorotrimethylsilane, Full registration type, Joint submission, tonnage band – 10,000 – 100,000 tons per annum.
New Jersey Haz Sub, Fact Sheet for Hydrochloric Acid - Aug 2009.
NLM-HSDB: U. S. National Library of Medicine; Hazardous Substance Database (Toxnet® ) Number: 1009; Chlorotrimethylsilane; CAS 75-77-4; Last Revision Date: 20070604.

RTECS: RN VV2710000; Chlorotrimethylsilane; Updated Oct 1997.

The above information is believed to be correct to the best of our present state knowledge, but does not purport to be all-inclusive and shall be used only as a guide. It characterizes the product with regard to the appropriate safety precautions. It does not represent a guarantee of any properties of the product.