

# FLUORINE

# F

**Atomic number**  
9

**Atomic weight**  
18.9984032

**CAS number**  
7782-41-4 (F<sub>2</sub>)

**Boiling point**  
-188.14°C

**Melting point**  
-219.62°C

**Specific gravity (20°C)**  
1.696g/l

**Electronic configuration**  
[He] 2s<sup>2</sup>2p<sup>5</sup>

**Enthalpy of melting**  
0.510kJ/mol

**Enthalpy of vaporization**  
6.535kJ/mol

**Ionization potential**  
(spectral) 17.422eV (I)  
34.970eV (II)  
(aqueous) 3.053V (-1)

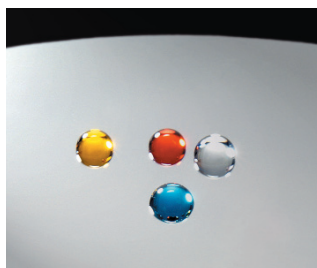
**Oxidation states**  
0, -1

**Electronegativity, Pauling**  
3.9

**Specific heat (25°C)**  
0.197 cal/g K

**Thermal conductivity (25°C)**  
0.0277w/m K

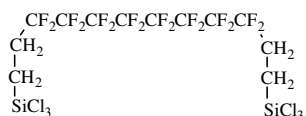
NOTE: This section lists only fluoroalkyl and fluoroaromatic silanes. Other fluorinated compounds are listed under the appropriate metal.



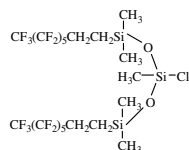
Water droplets on a (heptadecafluoro-1,1,2,2-tetrahydrodecyl)trimethoxysilane-treated silicon wafer exhibit high contact angles, indicative of the low surface energy. Surfaces are both hydrophobic and resist wetting by hydrocarbon oils.

**name** **MW** **bp/mm (mp)** **D<sub>4</sub><sup>20</sup>** **n<sub>D</sub><sup>20</sup>**

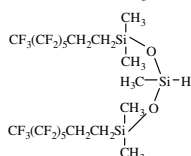
## COMPOUNDS



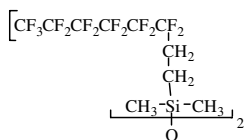
SIB1811.5  
1,8(BISTRICHLOROSILYLETHYL)HEXA-  
DECAFLUOROCTANE  
C<sub>12</sub>H<sub>8</sub>Cl<sub>6</sub>F<sub>16</sub>Si<sub>2</sub>  
HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water  
[445303-83-3] HMIS: 3-1-1-X 5.0g/\$160.00



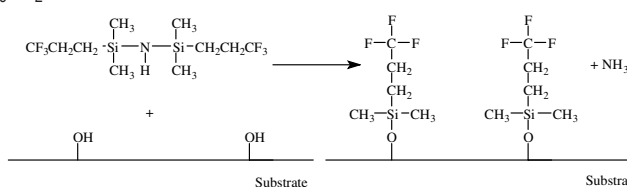
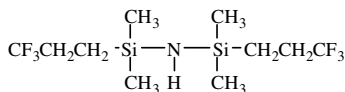
SIB1815.5  
BIS((TRIDECAFLUORO-1,1,2,2-TETRAHYDRO-  
OCTYL)DIMETHYLSILOXY)METHYLCHLOROSILANE  
C<sub>21</sub>H<sub>23</sub>ClF<sub>26</sub>O<sub>2</sub>Si<sub>3</sub>  
[521069-01-2] HMIS: 3-2-1-X 5.0g/\$175.00



SIB1815.7  
BIS((TRIDECAFLUORO-1,1,2,2-TETRAHYDRO-  
OCTYL)DIMETHYLSILOXY)METHYLSILANE  
C<sub>21</sub>H<sub>24</sub>F<sub>26</sub>O<sub>2</sub>Si<sub>3</sub>  
reducing agent for fluorous phase synthesis  
[521069-00-1] HMIS: 3-2-1-X 5.0g/\$140.00



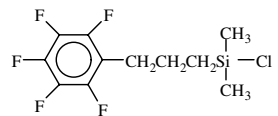
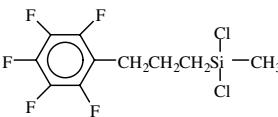
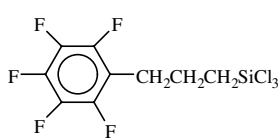
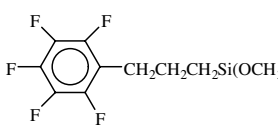
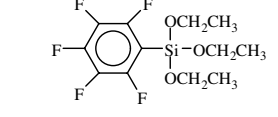
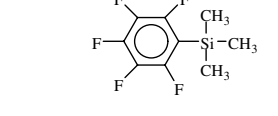
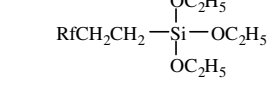
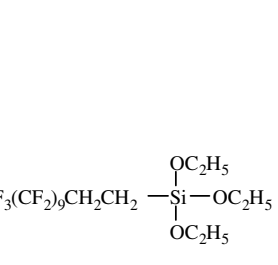
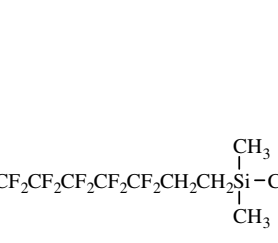
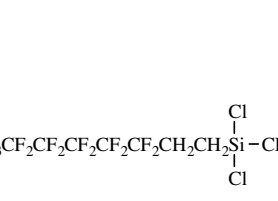
SIB1816.0  
BIS(TRIDECAFLUORO-1,1,2,2-TETRA-  
HYDROOCTYL)TETRAMETHYLDISILOXANE  
C<sub>20</sub>H<sub>20</sub>F<sub>26</sub>O<sub>2</sub>Si<sub>2</sub>  
low refractive index fluid  
[71363-70-7] HMIS: 2-1-0-X 10g/\$78.00



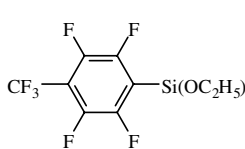
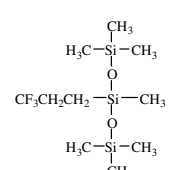
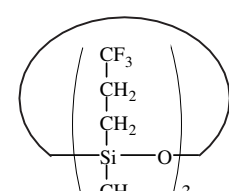
SIB1828.4  
BIS(TRIFLUOROPROPYL)TETRAMETHYL-  
DISILAZANE, 95%  
C<sub>10</sub>H<sub>21</sub>F<sub>6</sub>NSi<sub>2</sub>  
flashpoint: 78°C (173°F)  
[39482-87-6] TSCA HMIS: 2-2-1-X 50g/\$140.00

PLEASE INQUIRE ABOUT BULK QUANTITIES

	name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{CH}_3)_2-\text{O}-\text{Si}(\text{CH}_3)_2-\text{CH}_2\text{CH}_2\text{CF}_3$	SIB1828.5 BIS(TRIFLUOROPROPYL)TETRAMETHYL- DISILOXANE C <sub>10</sub> H <sub>20</sub> F <sub>6</sub> O <sub>2</sub> Si <sub>2</sub> [690-56-2] HMIS: 2-1-0-X	326.44	75°/10 viscosity: 2 cSt	1.363	1.085
$\text{CF}_3(\text{CF}_2)_7\text{CH}_2\text{CH}_2-\text{Si}(\text{CH}_3)_2-\text{Cl}$	SIH5840.4 (HEPTADEC AFLUORO-1,1,2,2-TETRA- HYDRODECYL)DIMETHYLCHLOROSILANE PERFLUORODECYL-1H,1H,2H,2H-DIMETHYLCHLOROSILANE C <sub>12</sub> H <sub>10</sub> ClF <sub>17</sub> Si [74612-30-9] HMIS: 3-2-1-X	540.72	197-8°		
$\text{CF}_3(\text{CF}_2)_7\text{CH}_2\text{CH}_2-\text{Si}(\text{CH}_3)(\text{Cl})_2$	SIH5840.6 (HEPTADEC AFLUORO-1,1,2,2-TETRA- HYDRODECYL)METHYLDICHLOROSILANE C <sub>11</sub> H <sub>7</sub> Cl <sub>2</sub> F <sub>17</sub> Si [3102-79-2] HMIS: 3-2-1-X	561.14	205-7° (26-7°)mp	1.63	
$\text{CF}_3(\text{CF}_2)_7\text{CH}_2\text{CH}_2-\text{Si}(\text{Cl})_3$	SIH5841.0 (HEPTADEC AFLUORO-1,1,2,2-TETRA- HYDRODECYL)TRICHLOROSILANE PERFLUORODECYL-1H,1H,2H,2H-TRICHLOROSILANE C <sub>10</sub> H <sub>4</sub> Cl <sub>3</sub> F <sub>17</sub> Si γc of treated surfaces: 12 dynes/cm <sup>1</sup> . 1. J. Brzoska et al, Langmuir, 10, 4367, 1994 [78560-44-8] TSCA HMIS: 3-2-1-X	581.56	216-8°	1.703	
$\text{CF}_3(\text{CF}_2)_7\text{CH}_2\text{CH}_2-\text{Si}(\text{OC}_2\text{H}_5)_3$	SIH5841.2 (HEPTADEC AFLUORO-1,1,2,2-TETRA- HYDRODECYL)TRIETHOXY SILANE C <sub>16</sub> H <sub>19</sub> F <sub>17</sub> O <sub>3</sub> Si hydrolysis in combination with polydimethoxysiloxane gives hard hydrophobic coatings <sup>1</sup> . 1. T. Oota et al, Jpn. Kokai JP 06,293,782, 1993; CA 122: 136317d, 1995 [101947-16-4] HMIS: 3-2-1-X	610.38	103-6°/3	1.407 <sup>25</sup>	1.3419
$\text{CF}_3(\text{CF}_2)_7\text{CH}_2\text{CH}_2-\text{Si}(\text{OCH}_3)_3$	SIH5841.5 (HEPTADEC AFLUORO-1,1,2,2-TETRA- HYDRODECYL)TRIMETHOXY SILANE C <sub>13</sub> H <sub>13</sub> F <sub>17</sub> O <sub>3</sub> Si [83048-65-1] HMIS: 3-2-1-X	568.3	247°	1.54	1.331 <sup>25</sup>
$\text{F}_3\text{C}-\text{C}(\text{F}_2)-\text{O}-\text{CH}_2\text{CH}_2\text{CH}_2\text{SiCl}_3$	SIH5842.0 (3-HEPTAFLUOROISOPROPOXY)PROPYL- TRICHLOROSILANE C <sub>6</sub> H <sub>6</sub> Cl <sub>3</sub> F <sub>7</sub> O <sub>2</sub> Si [15538-93-9] HMIS: 3-3-1-X	361.55	85-7°/35	1.497	1.3710
$\text{H}_2\text{C}=\text{CHCF}_2(\text{CF}_2)_6\text{CF}_2\text{CH}_2\text{CH}_2\text{SiCl}_3$	SIH5918.0 HEXADEC AFLUORODODEC-11-ENYL-1- TRICHLOROSILANE C <sub>12</sub> H <sub>7</sub> Cl <sub>3</sub> F <sub>16</sub> Si forms self-assembled monolayers/ reagent for immobilization of DNA HYDROLYTIC SENSITIVITY: 7 reacts slowly with moisture/water HMIS: 3-1-1-X	589.61	94-6°/0.6	1.626	1.3713
$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CH}_2\text{CH}_2\text{Si}(\text{Cl})_2$	SIN6597.6 NONAFLUOROHEXYLTRICHLOROSILANE C <sub>6</sub> H <sub>4</sub> Cl <sub>3</sub> F <sub>9</sub> Si HYDROLYTIC SENSITIVITY: 8 Si-Cl reacts rapidly with water/moisture [78560-47-1] HMIS: 3-2-1-X	381.53	70-2°/15	1.542	
$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_2$	SIN6597.7 NONAFLUOROHEXYLTRIMETHOXY SILANE C <sub>9</sub> H <sub>13</sub> F <sub>9</sub> O <sub>3</sub> Si HYDROLYTIC SENSITIVITY: 7 Si-O reacts slowly with water/moisture [85877-79-8] HMIS: 3-2-1-X	368.27	65-8°/15		
$\text{C}_6\text{H}_2(\text{F})_5-\text{Si}(\text{CH}_3)_2-\text{Cl}$	SIP6716.1 PENTAFLUOROPHENYLDIMETHYLCHLORO- SILANE C <sub>8</sub> H <sub>6</sub> ClF <sub>5</sub> Si [20082-71-7] HMIS: 3-2-1-X	260.67	88-90°/10	1.384	1.4470

	<b>name</b>	<b>MW</b>	<b>bp/mm (mp)</b>	<b>D<sub>4</sub><sup>20</sup></b>	<b>n<sub>D</sub><sup>20</sup></b>
	SIP6716.2 PENTAFLUOROPHENYLPROPYLDIMETHYL- CHLOROSILANE C <sub>11</sub> H <sub>12</sub> ClF <sub>5</sub> Si [157499-19-9] TSCA HMIS: 3-1-1-X	302.74	73°/0.4 flashpoint: >110°C(>230°F)		
	SIP6716.3 PENTAFLUOROPHENYLPROPYLMETHYL- DICHLOROSILANE C <sub>10</sub> H <sub>9</sub> Cl <sub>2</sub> F <sub>5</sub> Si HMIS: 3-2-1-X	323.16	128-9°/20	1.378	
	SIP6716.4 PENTAFLUOROPHENYLPROPYL- TRICHLOROSILANE C <sub>9</sub> H <sub>6</sub> Cl <sub>3</sub> F <sub>5</sub> Si HMIS: 3-1-1-X	343.58	99°/0.75 (27-30°)mp	1.495	1.4620
	SIP6716.6 PENTAFLUOROPHENYLPROPYL- TRIMETHOXSILANE C <sub>12</sub> H <sub>15</sub> F <sub>5</sub> O <sub>3</sub> Si HMIS: 2-1-1-X	330.33	97°/0.75	1.27	
	SIP6716.7 PENTAFLUOROPHENYLTRIETHOXSILANE C <sub>12</sub> H <sub>15</sub> F <sub>5</sub> O <sub>3</sub> Si [20083-34-5] HMIS: 2-2-1-X	330.33	130°/10	1.24	1.4180
	SIP6716.8 PENTAFLUOROPHENYLTRIMETHYLSILANE C <sub>9</sub> H <sub>9</sub> F <sub>5</sub> Si [1206-46-8] HMIS: 2-2-0-X	240.25	170-2° flashpoint: 54°C(130°F)	1.261	1.4330
	SIP6720.3 PERFLUOROALKYLETHYLTRIETHOXSILANE 510.3-610.4 predominantly perfluorohexylethyl and perfluorocotylethyl homologs [51851-37-7][101947-16-4] HMIS: 3-2-1-X				10g/\$55.00
	PERFLUORODECYL-1H,1H,2H,2H-TRICHLOROSILANE- see SIH5841.0 (HEPTADEC AFLUORO-1,1,2,2-TETRAHYDRODECYL)TRICHLOROSILANE				
	PERFLUOROOCYL-1H,1H,2H,2H-DIMETHYLCHLOROSILANE- see SIT8170.0 (TRIDEC AFLUORO-1,1,2,2-TETRAHYDROOCTYL)DIMETHYLCHLOROSILANE				
	SIP6720.5 PERFLUORODODECYL-1H,1H,2H,2H-TRIETHOXY- 710-810 SILANE -PERFLUOROTETRADECYL-1H,1H,2H,2H- TRIETHOXSILANE MIXTURE 80% (contains ~ 5% SIH5841.2, balance higher homologs) for the preparation of low surface energy substrates HMIS: 2-1-1-X		157-198°/1.5		
					5.0g/\$120.00
	SIT8170.0 (TRIDEC AFLUORO-1,1,2,2-TETRA- HYDROOCTYL)DIMETHYLCHLOROSILANE C <sub>10</sub> H <sub>10</sub> ClF <sub>13</sub> Si PERFLUOROOCYL-1H,1H,2H,2H-DIMETHYLCHLOROSILANE employed in column chromatography where low protein retentivity is required <sup>1</sup> . employed in solid phase extraction of flurous phases <sup>2</sup> . modification of layed silicated yields film-forming compositions <sup>3</sup> . 1. G. Xindu et al, J. Chromatog, 269, 96, 1983 2. D. Curran et al, J. Org. Chem., 62, 6714, 1997 3. M. Ogawa et al, Chem. Mat., 10, 3787, 1998	440.70	189-91° flashpoint: 52°C(127°F)	1.473	1.3453
	[102488-47-1] HMIS: 3-3-1-X				
					50g/\$126.00
	SIT8172.0 (TRIDEC AFLUORO-1,1,2,2-TETRA- HYDROOCTYL)METHYLDICHLOROSILANE C <sub>9</sub> H <sub>7</sub> Cl <sub>2</sub> F <sub>13</sub> Si [73609-36-6] HMIS: 3-3-1-X	461.12	189-90° flashpoint: 51°C(125°F) vapor pressure, 76°: 12mm	1.550	1.3500
					50g/\$156.00

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	name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CH}_2\text{CH}_2\text{Si}(\text{Cl})_2$	SIT8174.0 (TRIDECAFLUORO-1,1,2,2-TETRA-HYDROOCTYL)TRICHLOROSILANE C <sub>8</sub> H <sub>4</sub> Cl <sub>3</sub> F <sub>13</sub> Si [78560-45-9] HMIS: 3-3-1-X	481.55	84-5°/17 flashpoint: 54°C(129°F)	1.639	1.3521
$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OC}_2\text{H}_5)_3$	SIT8175.0 (TRIDECAFLUORO-1,1,2,2-TETRA-HYDROOCTYL)TRIETHOXY-SILANE C <sub>14</sub> H <sub>19</sub> F <sub>13</sub> O <sub>3</sub> Si viscosity: 3 cSt. see also- SIP6720.5 [51851-37-7] TSCA HMIS: 2-2-1-X	510.36	86°/1.5 (<-38°)mp flashpoint: 84°C(183°F)	1.351	1.3436
$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$	SIT8176.0 (TRIDECAFLUORO-1,1,2,2-TETRA-HYDROOCTYL)TRIMETHOXY-SILANE C <sub>11</sub> H <sub>13</sub> F <sub>13</sub> O <sub>3</sub> Si [85857-16-5]	468.29	60-2°/0.5	1.44	1.3322
$\text{CF}_3\text{COCH}_2\text{CH}_2\text{CH}_2\text{Si}(\text{OCH}_3)_3$	SIT8340.0 3-TRIFLUOROACETOXYPROPYLTRI-METHOXY-SILANE C <sub>8</sub> H <sub>15</sub> F <sub>3</sub> O <sub>5</sub> Si [120404-60-6] HMIS: 3-2-1-X	276.28	89-90°/13 25g/\$130.00	1.3770 <sup>25</sup>	
	SIT8345.0 p-TRIFLUOROMETHYLTETRAFLUORO-PHENYLTRIETHOXY-SILANE C <sub>13</sub> H <sub>15</sub> F <sub>7</sub> O <sub>3</sub> Si	380.33	5.0g/\$94.00	1.29	1.4068
$\text{CF}_3\text{Si}(\text{C}_2\text{H}_5)_3$	SIT8356.0 TRIFLUOROMETHYLTRIETHYLSILANE C <sub>7</sub> H <sub>15</sub> F <sub>3</sub> Si [120120-26-5] HMIS: 3-4-0-X	184.28	56-7°/60 2.5g/\$96.00	0.980	1.3820
$\text{CF}_3\text{Si}(\text{CH}_3)_3$	SIT8362.0 TRIFLUOROMETHYLTRIMETHYLSILANE C <sub>4</sub> H <sub>9</sub> F <sub>3</sub> Si trifluoromethylation chemistry reviewed'. trifluoromethylates carbonyl compounds <sup>2</sup> . 1. G. Prakash et al, Chem. Rev., 97, 757, 1997 2. G. Prakash et al, J. Am. Chem. Soc., 111, 393, 1989 [81290-20-2] HMIS: 3-4-0-X	142.20	45° flashpoint: -10°C (14°F) 5.0g/\$60.00	0.9626	1.3304
$\text{CF}_3\text{CH}_2\text{CH}_2\text{Si}(\text{CH}_3)_2\text{Cl}$	SIT8364.0 (3,3,3-TRIFLUOROPROPYL)DIMETHYL-CHLOROSILANE C <sub>5</sub> H <sub>10</sub> ClF <sub>3</sub> Si [1481-41-0] TSCA HMIS: 3-4-1-X	190.67	118° 5.0g/\$28.00	1.113	1.3727
	SIT8365.0 3-(3,3,3-TRIFLUOROPROPYL)HEPTA-METHYLTRISILOXANE C <sub>10</sub> H <sub>25</sub> F <sub>3</sub> O <sub>2</sub> Si <sub>3</sub> [27703-88-4] HMIS: 2-2-0-X	318.56	10g/\$18.00	0.930 <sup>24</sup>	1.373 <sup>24</sup>
	SIT8366.0 (3,3,3-TRIFLUOROPROPYL)METHYLCYCLO-TRISILOXANE C <sub>12</sub> H <sub>21</sub> F <sub>9</sub> O <sub>3</sub> Si <sub>3</sub> cyclic trimer [2374-14-3] TSCA HMIS: 2-1-0-X	468.55	95°/3 (35°)mp TOXICITY- oral rat, LD50: >10,700mg/kg flashpoint: 121°C(250°F) 25g/\$48.00	1.24	1.371

	name	MW	bp/mm (mp)	D <sub>4</sub> <sup>20</sup>	n <sub>D</sub> <sup>20</sup>
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{Cl})_2-\text{CH}_3$	SIT8369.0 (3,3,3-TRIFLUOROPROPYL)METHYL-DICHLOROSILANE C <sub>4</sub> H <sub>7</sub> Cl <sub>2</sub> F <sub>3</sub> Si [675-62-7] TSCA HMIS: 3-4-1-X	211.08	121-2°	1.2611	1.3850
	TOXICITY- ipr mus: 254mg/kg flashpoint: 15°C(59°F)	10g/\$30.00		50g/\$120.00	
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{OCH}_3)_2-\text{CH}_3$	SIT8370.0 TRIFLUOROPROPYLMETHYLDIMETHOXY-SILANE C <sub>6</sub> H <sub>13</sub> F <sub>3</sub> O <sub>2</sub> Si [358-67-8] HMIS: 3-4-1-X	202.25.2	118°	1.10	1.3580
		10g/\$34.00		50g/\$132.00	
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{Cl})_3$	SIT8371.0 (3,3,3-TRIFLUOROPROPYL)TRICHLORO-SILANE C <sub>3</sub> H <sub>4</sub> Cl <sub>3</sub> F <sub>3</sub> Si [592-09-6] TSCA HMIS: 3-4-1-X	231.50	113-4°	1.395	1.385
	flashpoint: 15°C(59°F)	10g/\$30.00		50g/\$120.00	
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{OCH}_3)_3$	SIT8372.0 (3,3,3-TRIFLUOROPROPYL)TRIMETHOXY-SILANE C <sub>6</sub> H <sub>13</sub> F <sub>3</sub> O <sub>3</sub> Si [429-60-7] TSCA HMIS: 3-3-1-X	218.25	144°	1.137	1.3546
	flashpoint: 38°C(100°F) gc of treated surface: 20.6 dynes/cm	5.0g/\$32.00		25g/\$128.00	
$\text{CF}_3\text{CH}_2\text{CH}_2-\text{Si}(\text{OSi}(\text{CH}_3)_2\text{H})_3$	SIT8372.4 TRIFLUOROPROPYLTRIS(DIMETHYL-SILOXY)SILANE C <sub>9</sub> H <sub>25</sub> F <sub>3</sub> O <sub>3</sub> Si <sub>4</sub> crosslinker for Pt cure 2-component fluorosilicone RTVs HMIS: 2-2-0-X	350.63	98-9°/40	0.962	1.3753
				25g/\$72.00	
$\text{H}_2\text{C}=\text{CH}-\text{Si}(\text{CF}_3)_2-\text{CH}_3$	SIV9205.0 VINYL(TRIFLUOROMETHYL)DIMETHYL-SILANE C <sub>5</sub> H <sub>9</sub> F <sub>3</sub> Si monomer for high permeability membranes HYDROLYTIC SENSITIVITY: 1 no significant reactivity with aqueous systems [211985-86-3] HMIS: 3-4-0-X	154.21	80°	0.978	1.3549
		2.5g/\$49.00		10g/\$160.00	
$\text{H}_2\text{C}=\text{CH}-\text{Si}(\text{CF}_3\text{CH}_2\text{CH}_2)_2-\text{CH}_3$	SIV9208.0 VINYL(3,3,3-TRIFLUOROPROPYL)DIMETHYL-SILANE C <sub>7</sub> H <sub>13</sub> F <sub>3</sub> Si HYDROLYTIC SENSITIVITY: 1 no significant reactivity with aqueous systems [84442-77-3] HMIS: 2-4-0-X	182.26	113-5°	0.968 <sup>25</sup>	1.3765 <sup>25</sup>
		2.5g/\$54.00		10g/\$176.00	

## Fluorosilicones

Poly (3,3,-Trifluoropropylmethylsiloxane)

CAS: [63148-56-1]

Product Code	Viscosity, cSt.	Viscosity Temp. Coeff.	Pour-Point, °C	Transition Temp., Tg °C	Specific Gravity	Refractive Index	Surface Tension	Dielectric Constant	Dielectric Strength	Flashpoint Temp., °C	Molecular Weight	Price 25g	Price 100g	Price 1kg
FMS-121	80-120	-	-47	-	1.24	1.382	-	-	-	-	900-1000	\$38.00	\$124.00	\$868.00
FMS-123	300-350	0.84	-47	-74	1.25	1.381	25.7	6.95	200	260	2400	\$24.00	\$78.00	\$550.00
FMS-131	1000	0.85	-40	-74	1.28	1.382	26.1	7.35	200	290	4600	\$12.00	\$40.00	\$278.00
FMS-141	10,000	0.87	-30	-74	1.30	1.383	28.7	7.35	175	315	14,000	\$12.00	\$40.00	\$278.00

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