SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form: Substance
Physical state: Liquid
Substance name: AQUAPHOBE® CF
Product code: PP1-AQCF
Synonyms: CHLORINATED SILOXANE; CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES
Chemical family: ORGANOSILOXANE

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

Use of the substance/mixture: Chemical intermediate

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

GELEST INC.
Fritz-Klatte-Strasse 8
65933 Frankfurt
Germany
T +49 (0) 69 3535106-500 - F +49 (0) 69 3535106-501 - (M-F): 8:00 AM - 4:00 PM
info@gelested.com - www.gelested.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Skin corrosion/irritation, Category 1C
Serious eye damage/eye irritation, Category 1

Full text of H statements: see section 16

Adverse physicochemical, human health and environmental effects

No additional information available

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Signal word (CLP): Danger

Hazard statements (CLP): H314 - Causes severe skin burns and eye damage.

Precautionary statements (CLP): P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P260 - Do not breathe vapours.
P264 - Wash hands thoroughly after handling.
AQUAPHOBE® CF
Safety Data Sheet

2.3. Other hazards
No additional information available

SECTION 3: Composition/information on ingredients

3.1. Substances

<table>
<thead>
<tr>
<th>Substance type</th>
<th>Name</th>
<th>CAS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mono-constituent</td>
<td>AQUAPHOBE® CF</td>
<td>908858-79-7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification according to Regulation (EC) No. 1272/2008 [CLP]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorine terminated fluorinated alkylmethylsiloxanes</td>
<td>(CAS-No.) 908858-79-7</td>
<td>95 - 100</td>
<td>Skin Corr. 1C, H314, Eye Dam. 1, H318</td>
</tr>
</tbody>
</table>

Full text of H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general: Remove contaminated clothing and shoes. If in accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation: Remove person to fresh air and keep comfortable for breathing. Get medical advice/attention.

First-aid measures after skin contact: Wash with plenty of water/…. Get immediate medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/effects: Causes severe skin burns and eye damage.

Symptoms/effects after inhalation: May cause irritation to the respiratory tract. Overexposure may cause: Cough, Headache, Nausea.

Symptoms/effects after skin contact: Causes (severe) skin burns.

Symptoms/effects after eye contact: Causes serious eye damage.

Symptoms/effects after ingestion: May be harmful if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media


Unsuitable extinguishing media: Water.

5.2. Special hazards arising from the substance or mixture

Fire hazard: Irritating fumes of hydrochloric acid and organic acid vapors may develop when material is exposed to water or open flame.

5.3. Advice for firefighters

Firefighting instructions: Use water spray to cool exposed surfaces. Exercise caution when fighting any chemical fire.

Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapour and mist.
SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel
   Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders
   Protective equipment: Equip cleanup crew with proper protection.

6.2. Environmental precautions
   Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up
   Methods for cleaning up: Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal.

6.4. Reference to other sections
   See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
   Precautions for safe handling: Avoid all eye and skin contact and do not breathe vapour and mist. Provide good ventilation in process area to prevent formation of vapour.
   Hygiene measures: Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities
   Storage conditions: Keep container tightly closed.
   Storage area: Store in a well-ventilated place. Store away from heat.

7.3. Specific end use(s)
   No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters
   No additional information available

8.2. Exposure controls
   Appropriate engineering controls:
   Provide local exhaust or general room ventilation.

   Personal protective equipment:
   Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

   Hand protection:
   Neoprene or nitrile rubber gloves

   Eye protection:
   Chemical goggles or face shield. Contact lenses should not be worn

   Skin and body protection:
   Wear suitable protective clothing

   Respiratory protection:
   NIOSH-certified combination organic vapor/acid gas (yellow cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties
   Physical state: Liquid
   Appearance: Liquid.
   Colour: Straw. Amber.
   Odour: Acrid.
   Odour threshold: No data available
   Refractive index: No additional information available
pH : No data available
Relative evaporation rate (butylacetate=1) : No data available
Melting point : No data available
Freezing point : < -20 °C
Boiling point : 190 °C (initial)
Flash point : > 65 °C
Auto-ignition temperature : No data available
Decomposition temperature : No data available
Flammability (solid, gas) : No data available
Vapour pressure : < 5 mm Hg @ 25°C
Relative vapour density at 20 °C : > 1
Relative density : 1.41 - 1.42
Solubility : Reacts with water.
Log Pow : No data available
Log Kow : No data available
Viscosity, kinematic : No data available
Viscosity, dynamic : No data available
Explosive properties : No data available
Oxidising properties : No data available
Explosive limits : No data available

9.2. Other information
No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity
No additional information available

10.2. Chemical stability
Stable in sealed containers stored under a dry inert atmosphere.

10.3. Possibility of hazardous reactions
Reacts with water and moisture in air, liberating hydrogen chloride.

10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials

10.6. Hazardous decomposition products

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity : Not classified
Skin corrosion/irritation : Causes severe skin burns and eye damage.
Serious eye damage/irritation : Causes serious eye damage.
Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : Not classified
Reproductive toxicity : Not classified
STOT-single exposure : Not classified
STOT-repeated exposure : Not classified
Aspiration hazard : Not classified
Symptoms/effects after inhalation : May cause irritation to the respiratory tract. Overexposure may cause: Cough. Headache. Nausea.
Symptoms/effects after skin contact : Causes (severe) skin burns.
Symptoms/effects after eye contact : Causes serious eye damage.
Symptoms/effects after ingestion: May be harmful if swallowed.
Reason for classification: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity
Acute aquatic toxicity: Not classified
Chronic aquatic toxicity: Not classified

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
No additional information available

12.4. Mobility in soil
No additional information available

12.5. Results of PBT and vPvB assessment
No additional information available

12.6. Other adverse effects
Other adverse effects: This substance may be hazardous to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Product/Packaging disposal recommendations: May be incinerated. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.
Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number
In accordance with ADR / RID / IMDG / IATA / ADN

14.1. UN number
UN-No. (ADR): 1760
UN-No. (IMDG): 1760
UN-No. (IATA): 1760
UN-No. (ADN): 1760
UN-No. (RID): 1760

14.2. UN proper shipping name
Proper Shipping Name (ADR): CORROSIVE LIQUID, N.O.S.
Proper Shipping Name (IMDG): CORROSIVE LIQUID, N.O.S.
Proper Shipping Name (IATA): Corrosive liquid, n.o.s.
Proper Shipping Name (ADN): CORROSIVE LIQUID, N.O.S.
Proper Shipping Name (RID): CORROSIVE LIQUID, N.O.S.

Transport document description (ADR): UN 1760 CORROSIVE LIQUID, N.O.S. (CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES), 8, III, (E)
Transport document description (IMDG): UN 1760 CORROSIVE LIQUID, N.O.S. (CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES), 8, III
Transport document description (IATA): UN 1760 Corrosive liquid, n.o.s. (CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES), 8, III
Transport document description (ADN): UN 1760 CORROSIVE LIQUID, N.O.S. (CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES), 8, III
Transport document description (RID): UN 1760 CORROSIVE LIQUID, N.O.S. (CHLORINE TERMINATED FLUORINATED ALKYL METHYLSILOXANES), 8, III

14.3. Transport hazard class(es)
ADR
Transport hazard class(es) (ADR): 8
Danger labels (ADR): 8
IMDG
Transport hazard class(es) (IMDG) : 8
Danger labels (IMDG) : 8

IATA
Transport hazard class(es) (IATA) : 8
Hazard labels (IATA) : 8

ADN
Transport hazard class(es) (ADN) : 8
Danger labels (ADN) : 8

RID
Transport hazard class(es) (RID) : 8
Danger labels (RID) : 8

14.4. Packing group
Packing group (ADR) : III
Packing group (IMDG) : III
Packing group (IATA) : III
Packing group (ADN) : III
Packing group (RID) : III

14.5. Environmental hazards
Dangerous for the environment : No
Marine pollutant : No
Other information : No supplementary information available

14.6. Special precautions for user
- Overland transport
  Classification code (ADR) : C9
  Special provisions (ADR) : 274
Limited quantities (ADR): 5l  
Excepted quantities (ADR): E1  
Packing instructions (ADR): P001, IBC03, LP01, R001  
Mixed packing provisions (ADR): MP19  
Portable tank and bulk container instructions (ADR): T7  
Portable tank and bulk container special provisions (ADR): TP1, TP28  
Tank code (ADR): L4BN  
Vehicle for tank carriage: AT  
Transport category (ADR): 3  
Special provisions for carriage - Packages (ADR): V12  
Hazard identification number (Kemler No.): 80  
Orange plates:  

| Tunnel restriction code (ADR) | E  |
| EAC code | 2X |
| APP code | B |

**- Transport by sea**

- Special provisions (IMDG): 233, 274  
- Limited quantities (IMDG): 5 L  
- Excepted quantities (IMDG): E1  
- Packing instructions (IMDG): P001, LP01  
- IBC packing instructions (IMDG): IBC03  
- Tank instructions (IMDG): T7  
- Tank special provisions (IMDG): TP1, TP28  
- EmS-No. (Fire): F-A  
- EmS-No. (Spillage): S-B  
- Stowage category (IMDG): A  
- Stowage and handling (IMDG): SW2  
- Properties and observations (IMDG): Causes burns to skin, eyes and mucous membranes.  

**- Air transport**

- PCA Excepted quantities (IATA): E1  
- PCA Limited quantities (IATA): Y841  
- PCA limited quantity max net quantity (IATA): 1L  
- PCA packing instructions (IATA): 852  
- PCA max net quantity (IATA): 5L  
- CAO packing instructions (IATA): 856  
- CAO max net quantity (IATA): 60L  
- Special provisions (IATA): A3  
- ERG code (IATA): 8L  

**- Inland waterway transport**

- Classification code (ADN): C9  
- Special provisions (ADN): 274  
- Limited quantities (ADN): 5 L  
- Excepted quantities (ADN): E1  
- Carriage permitted (ADN): T  
- Equipment required (ADN): PP, EP  
- Number of blue cones/lights (ADN): 0  

**- Rail transport**

- Classification code (RID): C9  
- Special provisions (RID): 274  
- Limited quantities (RID): 5L  
- Excepted quantities (RID): E1
14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.1.1. EU-Regulations

No REACH Annex XVII restrictions
AQUAPHOBE® CF is not on the REACH Candidate List
AQUAPHOBE® CF is not on the REACH Annex XIV List
AQUAPHOBE® CF is not subject to REGULATION (EU) No 649/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 4 July 2012 concerning the export and import of hazardous chemicals.

15.1.2. National regulations

Germany
12th Ordinance Implementing the Federal Immission Control Act - 12.BImSchV: Is not subject of the 12. BlmSchV (Hazardous Incident Ordinance)

Netherlands
SZW-lijst van kankerverwekkende stoffen: The substance is not listed
SZW-lijst van mutagene stoffen: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Borstvoeding: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Vruchtbaarheid: The substance is not listed
NIET-limitatieve lijst van voor de voortplanting giftige stoffen – Ontwikkeling: The substance is not listed

Denmark
Classification remarks: Emergency management guidelines for the storage of flammable liquids must be followed
Danish National Regulations: Young people below the age of 18 years are not allowed to use the product

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Abbreviations and acronyms:

Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor

Other information: Prepared by safety and environmental affairs.

Full text of H- and EUH-statements:

Eye Dam. 1: Serious eye damage/eye irritation, Category 1
Skin Corr. 1C: Skin corrosion/Irritation, Category 1C
AQUAPHOBÉ® CF
Safety Data Sheet

<table>
<thead>
<tr>
<th>Hazard (H)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H314</td>
<td>Causes severe skin burns and eye damage.</td>
</tr>
<tr>
<td>H318</td>
<td>Causes serious eye damage.</td>
</tr>
</tbody>
</table>

SDS EU (REACH Annex II) - Custom

The information contained in this document has been gathered from reference materials and/or Gelest, Inc. test data and is to the best knowledge and belief of Gelest, Inc. accurate and reliable. Such information is offered solely for your consideration, investigation and verification. It is not suggested or guaranteed that the hazard precautions or procedures described are the only ones which exist. Gelest, Inc. makes no warranties, express or implied, with respect to the use of such information and assumes no responsibility therefore. Information on this safety data sheet is not intended to constitute a basis for product specifications.

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Gelest Aquaphobe® CF

Hydrophobic and Oleophobic Treatments For Glass and Ceramics

Features: Provides water-repellent silicone, fluorinated silicone molecular films with high durability for glass and vitreous surfaces. Acidic byproducts remove surface alkali from soda-lime glass substrates.

Applications:
- **microcontact printing**: provides durable release films for photocureable resins.
- **optical fibers**: reduces moisture adsorption and surface fracture.
- **clinical analysis**: reduces protein and lipid adsorption. (Not for food or drug use.)
- **glass plate and glazing**: provides high water contact angle, facilitate forced air blow-off.

<table>
<thead>
<tr>
<th>Capsular Description</th>
<th>Thickness</th>
<th>Cure</th>
<th>Hardness</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>molecular</td>
<td>air/moisture</td>
<td>low</td>
<td>100% active</td>
</tr>
</tbody>
</table>

**Aquaphobe® CF** chlorinated fluoroalkylmethylsiloxane

**Description**
Aquaphobe® CF is a chlorine terminated polyfluoroalkyl-methylsiloxane oligomer. The chlorines react with hydroxy and silanol groups of glass, siliceous surfaces and other metal oxide surfaces to form a chemically bound, low surface energy, fluorinated silicone surface.

**Properties of Treated Surfaces**
(Values reported are for glass slides dipped in 1% solutions of Aquaphobe® CF and cured at 100°C.)

<table>
<thead>
<tr>
<th>critical surface tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>untreated: ( \gamma_c = 78 ) dynes/cm</td>
</tr>
<tr>
<td>treated (hydrophobic): ( \gamma_c = 16-19 ) dynes/cm</td>
</tr>
</tbody>
</table>

**Typical Properties of Aquaphobe® CF**

- % active: 100%
- flashpoint: 65°C
- specific gravity: 1.40-1.43
- refractive index: 1.358
- viscosity: 6-10 cSt.

**Reference:**

**Standard Packaging**

<table>
<thead>
<tr>
<th>Packaging</th>
<th>Aquaphobe® CF</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP1-AQCF</td>
<td>25g/$82.00</td>
</tr>
<tr>
<td></td>
<td>100g/$266.00</td>
</tr>
</tbody>
</table>

**Cautions**
Aquaphobe® is a mixture of corrosive chlorinated polysiloxanes. Avoid skin and eye contact. Use in a well ventilated area. Wear gloves and safety glasses.

**Application Methods**

1. Aquaphobe® coatings are most frequently applied as a 2-10% solution in dry solvents such as hexane, methylene chloride or toluene. Articles are dipped or wiped. Articles can be cured by air drying for 24 hours at conditions of <75% relative humidity. Heat curing at 110°C for 15-20 minutes in an exhausted oven provides the most effective surface treatment.
2. A master batch of Aquaphobe® in isopropanol or ethanol is desirable when large areas are to be treated and the acidic byproducts are difficult to handle. A 0.5-2.0% solution in isopropanol is prepared in a well-ventilated area. Hydrogen chloride fumes issue during this stage. Acidic character is reduced for subsequent surface treatment.

Over treatment results in a cloudy surface. The concentration should be reduced to eliminate this effect.
NOTICE OF TSCA USE RESTRICTIONS AND REQUIRED CONTROLS FOR
PP1-AQCF
AQUAPHOBE® CF

Dear Customer:

The chemical product purchased, PP1-AQCF has been granted a Low Volume Exemption by the U.S. Environmental Protection Agency (EPA) under the Toxic Substances Control Act (TSCA) regulations (40 CFR 723.50). Any manufacturer or processor who intends to use this chemical substance for commercial purposes must comply with the specific use restrictions and controls specified as follows:

USE OF THIS CHEMICAL SUBSTANCE IS RESTRICTED TO: Surface modification

CONTROLS: Workers must use personal protection equipment to limit dermal and inhalation exposures as described in Section 8: Exposure Controls/Personal Protection of the Safety Data Sheet (SDS). These exposure controls include:

Hand protection: Impervious gloves (neoprene or nitrile rubber gloves)
Eye Protection: Chemical goggles. Contact lenses should not be worn.
Skin and Body Protection: Wear suitable protective clothing.
Respiratory Protection: Air-purifying respirator with organic vapor/acid gas cartridge.

WASTE DISPOSAL: Collect and containerize all waste, residues and wash solvents for off-site disposal by incineration. Do not release to POTW via sewer or to surface waters.

If you have questions or need more information related to allowable use of this substance, contact Gelest Regulatory Affairs at 215-547-1015.

Best Regards,

Gelest, Inc.
Regulatory Affairs Department