SAFETY DATA SHEET
according to Regulation (EC) No. 453/2010

Liquid Silicalite-I

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Name

Liquid Silicalite-I

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

Recommended Use

Light Weight Cement Additive

Uses Advised Against

No information available

Details of the supplier of the safety data sheet

Halliburton Energy Services
Halliburton House, Howemoss Place
Kirkhill Industrial Estate
Dyce
Aberdeen, AB21 0GN
United Kingdom

Emergency Phone Number: +44 1224 795277 or +1 281 575 5000

www.halliburton.com
For further information, please contact
E-Mail address: fdunexchem@halliburton.com
Emergency telephone number

+44 1224 795277 or +1 281 575 5000

Emergency telephone §45 - (EC)1272/2008

<table>
<thead>
<tr>
<th>Europe</th>
<th>+12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denmark</td>
<td>Poison Control Hotline (DK): +45 82 12 12 12</td>
</tr>
<tr>
<td>France</td>
<td>ORFILA (FR): + 01 45 42 59 59</td>
</tr>
<tr>
<td>Germany</td>
<td>Poison Center Berlin (DE): +49 030 30686 790</td>
</tr>
<tr>
<td>Italy</td>
<td>Poison Center, Milan (IT): +39 02 6610 1029</td>
</tr>
<tr>
<td>Netherlands</td>
<td>National Poisons Information Center (NL): +31 30 274 88 88 (NB: this service is only available to health professionals)</td>
</tr>
<tr>
<td>Norway</td>
<td>Poisons Information (NO): + 47 22 591300</td>
</tr>
<tr>
<td>Poland</td>
<td>Poison Control and Information Centre, Warsaw (PL): +48 22 619 66 54; +48 22 619 08 97</td>
</tr>
<tr>
<td>Spain</td>
<td>Poison Information Service (ES): +34 91 562 04 20</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>NHS Direct (UK): +44 0845 46 47</td>
</tr>
</tbody>
</table>

2. HAZARDS IDENTIFICATION

Classification of the substance or mixture
REGULATION (EC) No 1272/2008

Carcinogenicity | Category 1A- (H350)
Specific Target Organ Toxicity - (Repeated Exposure) | Category 1- (H372)

Classification according to EU Directives 67/548/EEC or 1999/45/EC
For the full text of the R-phrases mentioned in this Section, see Section 16
Classification | Not Classified
2. HAZARDS IDENTIFICATION

Risk Phrases
None

Label Elements

Hazard Pictograms

Signal Word Danger

Hazard Statements
H350 - May cause cancer by inhalation
H372 - Causes damage to organs through prolonged or repeated exposure if inhaled

Contains

<table>
<thead>
<tr>
<th>Substances</th>
<th>CAS Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amorphous silica fume</td>
<td>69012-64-2</td>
</tr>
<tr>
<td>Crystalline silica, quartz</td>
<td>14808-60-7</td>
</tr>
</tbody>
</table>

Precautionary Statements - EU (§28, 1272/2008)
P281 - Use personal protective equipment as required
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P308 + P313 - IF exposed or concerned: Get medical advice/attention

Other Hazards
None known

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Substances</th>
<th>EINECS</th>
<th>CAS Number</th>
<th>PERCENT</th>
<th>EEC Classification</th>
<th>EU - CLP Substance Classification</th>
<th>REACH No.</th>
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<tbody>
<tr>
<td>Amorphous silica fume</td>
<td>273-761-1</td>
<td>69012-64-2</td>
<td>10 - 30%</td>
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<td>STOT RE 2 (H373)</td>
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<tr>
<td>Crystalline silica, quartz</td>
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<td>14808-60-7</td>
<td>1 - 5%</td>
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<td>Carc. 1A (H350i)</td>
<td>No data available</td>
</tr>
</tbody>
</table>

For the full text of the R-phrases mentioned in this Section, see Section 16

4. FIRST AID MEASURES

Description of first aid measures

Inhalation
If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Eyes
In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Skin
Wash with soap and water.

Ingestion
Under normal conditions, first aid procedures are not required.

Most Important symptoms and effects, both acute and delayed
4. FIRST AID MEASURES
May cause eye, skin, and respiratory irritation. Breathing crystalline silica can cause lung disease, including silicosis and lung cancer. Crystalline silica has also been associated with scleroderma and kidney disease.

Indication of any immediate medical attention and special treatment needed
Notes to Physician Treat symptomatically

5. FIREFIGHTING MEASURES
Extinguishing media
Suitable Extinguishing Media
None - does not burn.
Extinguishing media which must not be used for safety reasons
None known.

Special hazards arising from the substance of mixture
Special Exposure Hazards
Not applicable.

Advice for firefighters
Special Protective Equipment for Fire-Fighters
Not applicable.

6. ACCIDENTAL RELEASE MEASURES
Personal precautions, protective equipment and emergency procedures
Use appropriate protective equipment. See Section 12 for additional information

Environmental precautions
None known.

Methods and material for containment and cleaning up
Collect using dustless method and hold for appropriate disposal. Consider possible toxic or fire hazards associated with contaminating substances and use appropriate methods for collection, storage and disposal.

Reference to other sections
See Section 12 for additional information.

7. HANDLING AND STORAGE
Precautions for Safe Handling
This product contains quartz, cristobalite, and/or tridymite which may become airborne without a visible cloud if this product becomes dry. Avoid breathing or creating dust. Use only with adequate ventilation to keep exposures below recommended exposure limits. Wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using dried product.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice

Conditions for safe storage, including any incompatibilities
Store in a cool, dry location. Use good housekeeping in storage and work areas to prevent accumulation of dust. Close container when not in use.

Specific End Use(s)
Exposure Scenario No information available
Other Guidelines No information available

8. EXPOSURE CONTROLS/PERSOMAL PROTECTION

<table>
<thead>
<tr>
<th>Substances</th>
<th>EU</th>
<th>UK OEL</th>
<th>Netherlands</th>
<th>France OEL</th>
<th>Germany MAK/TRK</th>
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<tbody>
<tr>
<td>Amorphous silica fume</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>0.3 mg/m³</td>
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<tr>
<td>Crystalline silica, quartz</td>
<td>Not applicable</td>
<td>0.1 mg/m³</td>
<td>0.075 mg/m³</td>
<td>0.1 mg/m³</td>
<td>0.15 mg/m³</td>
</tr>
<tr>
<td>Substances</td>
<td>Italy</td>
<td>Poland</td>
<td>Hungary</td>
<td>Czech Republic</td>
<td>Denmark</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>------------------</td>
<td>----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Amorphous silica fume</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
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<tr>
<td>Crystalline silica, quartz</td>
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<td>2 mg/m³</td>
<td>0.15 mg/m³</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Derived No Effect Level (DNEL) No information available.
Predicted No Effect Concentration (PNEC) No information available.

Exposure controls
Engineering Controls Use approved industrial ventilation and local exhaust as required to maintain exposures below applicable exposure limits listed in Section 2.

Personal protective equipment
Respiratory Protection Wear a NIOSH certified, European Standard EN 149 (FFP2/FFP3), or equivalent respirator when using this product.
Hand Protection Normal work gloves.
Skin Protection Wear clothing appropriate for the work environment. Dusty clothing should be laundered before reuse. Use precautionary measures to avoid creating dust when removing or laundering clothing.
Eye Protection Wear safety glasses or goggles to protect against exposure.
Other Precautions None known.

Environmental Exposure Controls No information available

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical State</td>
<td>Liquid</td>
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<tr>
<td>Odor</td>
<td>Odorless</td>
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<tr>
<td>Color</td>
<td>Gray</td>
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<tr>
<td>Odor Threshold</td>
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</table>

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
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<tbody>
<tr>
<td>pH</td>
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<tr>
<td>Melting Point/Range</td>
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<td>Freezing Point/Range (C)</td>
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<td>Boiling Point/Range</td>
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<tr>
<td>Evaporation rate</td>
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<td>Vapor Pressure</td>
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<td>Vapor Density</td>
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<td>Specific Gravity</td>
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<tr>
<td>Water Solubility</td>
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<td>Solubility in other solvents</td>
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<td>Partition coefficient: n-octanol/water</td>
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<td>Autoignition Temperature</td>
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<tr>
<td>Decomposition Temperature</td>
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<tr>
<td>Viscosity</td>
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<td>Explosive Properties</td>
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<tr>
<td>Oxidizing Properties</td>
<td>No information available</td>
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</table>

Other information
VOC Content (%) No data available

10. STABILITY AND REACTIVITY

Reactivity
Not applicable

Chemical Stability
Stable

Possibility of Hazardous Reactions
Will Not Occur

Conditions to Avoid
None anticipated
10. STABILITY AND REACTIVITY

Incompatible Materials
Hydrofluoric acid.

Hazardous Decomposition Products
Amorphous silica may transform at elevated temperatures to tridymite (870 C) or cristobalite (1470 C).

11. TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Acute Toxicity

Inhalation
Inhaled crystalline silica in the form of quartz or cristobalite from occupational sources is carcinogenic to humans (IARC, Group 1). There is sufficient evidence in experimental animals for the carcinogenicity of tridymite (IARC, Group 2A).

Breathing silica dust may cause irritation of the nose, throat, and respiratory passages. Breathing silica dust may not cause noticeable injury or illness even though permanent lung damage may be occurring. Inhalation of dust may also have serious chronic health effects (See “Chronic Effects/Carcinogenicity” subsection below).

Eye Contact
May cause mechanical irritation to eye.

Skin Contact
None known.

Ingestion
None known.

Chronic Effects/Carcinogenicity
Silicosis: Excessive inhalation of respirable crystalline silica dust may cause a progressive, disabling, and sometimes-fatal lung disease called silicosis. Symptoms include cough, shortness of breath, wheezing, non-specific chest illness, and reduced pulmonary function. This disease is exacerbated by smoking. Individuals with silicosis are predisposed to develop tuberculosis.

Cancer Status: The International Agency for Research on Cancer (IARC) has determined that crystalline silica inhaled in the form of quartz or cristobalite from occupational sources can cause lung cancer in humans (Group 1 - carcinogenic to humans) and has determined that there is sufficient evidence in experimental animals for the carcinogenicity of tridymite (Group 2A - possible carcinogen to humans). Refer to IARC Monograph 68, Silica, Some Silicates and Organic Fibres (June 1997) in conjunction with the use of these minerals. The National Toxicology Program classifies respirable crystalline silica as "Known to be a human carcinogen". Refer to the 9th Report on Carcinogens (2000). The American Conference of Governmental Industrial Hygienists (ACGIH) classifies crystalline silica, quartz, as a suspected human carcinogen (A2).

There is some evidence that breathing respirable crystalline silica or the disease silicosis is associated with an increased incidence of significant disease endpoints such as scleroderma (an immune system disorder manifested by scarring of the lungs, skin, and other internal organs) and kidney disease.

<table>
<thead>
<tr>
<th>Substances</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
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<td>Amorphous silica fume</td>
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<tr>
<td>Crystalline silica, quartz</td>
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</tbody>
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12. ECOLOGICAL INFORMATION

Toxicity
12. ECOLOGICAL INFORMATION

Ecotoxicity Effects

<table>
<thead>
<tr>
<th>Substances</th>
<th>Toxicity to Algae</th>
<th>Toxicity to Fish</th>
<th>Toxicity to Microorganisms</th>
<th>Daphnia Magna (Water Flea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amorphous silica fume</td>
<td>No information available</td>
<td>No information available</td>
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<tr>
<td>Crystalline silica, quartz</td>
<td>No information available</td>
<td>No information available</td>
<td>No information available</td>
<td>No information available</td>
</tr>
</tbody>
</table>

Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

Bioaccumulative potential
Does not bioaccumulate

Mobility in soil
No information available

Results of PBT and vPvB assessment
No information available.

Other adverse effects

Endocrine Disruptor Information
This product does not contain any known or suspected endocrine disruptors

13. DISPOSAL CONSIDERATIONS

Waste treatment methods
Disposal Method
Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging
Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

IMDG/IMO
UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

RID
UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

ADR
UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

IATA/ICAO
UN Number: Not restricted.
UN Proper Shipping Name: Not restricted
Transport Hazard Class(es): Not applicable

Special Precautions for User
None
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable
15. REGULATORY INFORMATION

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

International Inventories

EINECS Inventory  
This product, and all its components, complies with EINECS

US TSCA Inventory  
All components listed on inventory or are exempt.

Canadian DSL Inventory  
All components listed on inventory or are exempt.

Legend
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory  
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances  
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

Germany, Water Endangering Classes (WGK)
WGK 0: Generally not water endangering.

Chemical Safety Assessment
No information available

16. OTHER INFORMATION

Full text of R-phrases referred to under Sections 2 and 3
None

Key literature references and sources for data
www.ChemADVISOR.com/

Revision Date: 22-Feb-2012
Revision Note: Not applicable

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

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End of Safety Data Sheet