SAFETY DATA SHEET

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

1.1 Product identifier
Product Name: EcoDrill™ 317 Potassium Silicate Solution
Alternative names: Potassium silicate solution (2.6<MR<=3.2)
CAS No.: 1312-76-1
EINECS No.: 215-199-1

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified use(s): Additive for oilfield applications.
Uses advised against: None known.

1.3 Details of the supplier of the safety data sheet
Company Identification: PQ Corporation
P.O. Box 840
Valley Forge
PA 19482
USA
Telephone: +1 610-651-4200
E-Mail (competent person): sds.uk@pqcorp.com

1.4 Emergency telephone number
Emergency Phone No.: +1 800-424-9300

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
GHS Classification:
- H319: Serious eye damage/irritation Category 2
- H315: Skin corrosion/irritation Category 2

2.2 Label elements
Hazard pictogram(s):

- !

Signal word(s): Warning
Hazard statement(s):
- H319: Causes serious eye irritation.
- H315: Causes skin irritation.

Precautionary statement(s):
- P262: Do not get in eyes, on skin, or on clothing.
- P280: Wear protective gloves/protective clothing/eye protection/face protection.
- P303+P361+P353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
2.3 Other hazards

Dries to form glass film, which can easily cut skin. Spilled material is very slippery. Can etch glass if not promptly removed.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Regulation (EC) No. 1272/2008 (CLP)

<table>
<thead>
<tr>
<th>Ingredient(s)</th>
<th>%W/W</th>
<th>CAS No.</th>
<th>EINECS No. / REACH Registration</th>
<th>Hazard symbol(s) and hazard statement(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicic acid, potassium salt ; Potassium silicate</td>
<td>29.1</td>
<td>1312-76-1</td>
<td>215-199-1</td>
<td>H318 : Eye Dam. 1 ; H315 : Skin Irrit. 2 ; H335 : STOT SE 3 ;</td>
</tr>
<tr>
<td>Water</td>
<td>70.9</td>
<td>7732-18-5</td>
<td>231-791-2</td>
<td></td>
</tr>
</tbody>
</table>

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

Eye Contact
Irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 15 minutes. Obtain immediate medical attention.

Skin Contact
Wash affected skin with plenty of water. If symptoms develop, obtain medical attention.

Inhalation
Remove patient from exposure, keep warm and at rest. Obtain medical attention.

Ingestion
Do not induce vomiting. Wash out mouth with water and give 200-300 ml (half a pint) of water to drink. Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Alkaline.
Risk of serious damage to eyes.
Irritating to skin.
The toxicity of potassium silicate is dependent on the silica to alkali ratio and on the pH.

4.3 Indication of any immediate medical attention and special treatment needed

Obtain immediate medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Compatible with all standard fire fighting techniques.

5.2 Special hazards arising from the substance or mixture
Not applicable. Aqueous solution. Non-combustible.

5.3 Advice for fire-fighters
None.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear suitable protective clothing. Wear eye/face protection. See Section: 8.2

6.2 Environmental precautions
Do not allow to enter drains, sewers or watercourses. Advise Authorities if spillage has entered water course or sewer or has contaminated soil or vegetation.

6.3 Methods and materials for containment and cleaning up
Caution - spillages may be slippery. Contain spillages with sand, earth or any suitable adsorbent material. Transfer to a container for disposal or recovery. See Also Section 8.

6.4 Reference to other sections
SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with eyes, skin and clothing. Avoid generation of mist. Provide adequate ventilation. Emergency shower and eye wash facilities should be readily available.
See Also Section 8

7.2 Conditions for safe storage, including any incompatibilities
Storage temperature 0-95º C. Loading temperature 45-95 º C. Provide an adequate bund wall. Unsuitable containers: Do not store in aluminum, fiberglass, copper, brass, zinc or galvanized containers. See Also Section 10.

7.3 Specific end use(s)
Not available.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>SUBSTANCE:</th>
<th>Occupational Exposure Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicic acid, potassium salt</td>
<td>No Occupational Exposure Limit assigned. An exposure limit of 2 mg/m3 (15 min TWA) is recommended by analogy with potassium hydroxide (UK EH40).</td>
</tr>
</tbody>
</table>

8.2 Exposure controls
Wear protective equipment to comply with good occupational hygiene practice. Do not eat, drink or smoke at the work place.

8.2.1 Appropriate engineering controls
Engineering methods to prevent or control exposure are preferred. Methods include process or personnel enclosure, mechanical ventilation (dilution and local exhaust), and control of process conditions.

8.2.2 Personal Protection
Respiratory protection
Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely.
Eye/face protection
Chemical goggles (EN 166).
Skin protection
Wear suitable protective clothing and gloves. Plastic or rubber gloves. For example EN374-3, level 6 breakthrough time (>480min). Wear suitable overalls. For example EN ISO 13982 (dust), EN 14605 (liquid splashes).

8.2.3 Environmental Exposure Controls
The primary hazard of potassium silicate is the alkalinity. Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties
Appearance
Liquid. Almost colourless.
Odour
Odourless.
Odour Threshold (ppm)
Not applicable.

pH (Value)
Strongly alkaline. 11-12
Freezing Point (°C)
No data.
Melting Point (°C)
Not applicable.
Boiling Point (°C)
100
Flash Point (°C) [Closed cup]
Not applicable.
Evaporation rate
Not applicable.
Flammability (solid, gas)
Not applicable.
Explosive Limit Ranges
Not applicable.
Vapour Pressure (mm Hg)
Not applicable.
Vapour Density (Air=1)
No data.
Density (g/ml)
1.39 g/cm³ (20°C), 40.4° Bé, 11.56 lbs/gal
Solubility (Water)  Miscible.
Solubility (Other)  No data.
Partition Coefficient  No data.
Auto Ignition Point (°C)  Not applicable.
Decomposition Temperature (°C)  Not applicable.
Viscosity (mPa. s)  No data.
Explosive properties  Not applicable.
Oxidising Properties  Not applicable.
9.2 Other information  No data.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity  See Section: 10.3
10.2 Chemical stability  Stable.
10.3 Possibility of hazardous reactions  When arc welding vessels containing aqueous solutions of this material, take care to control any explosion risk from hydrogen evolved by electrolysis. Aqueous solutions will react with aluminium, zinc, tin and their alloys evolving hydrogen gas which can form an explosive mixture with air. Can react violently if in contact with acids. Can react with sugar residues to form carbon monoxide.
10.4 Conditions to avoid  Gels and generates heat when mixed with acid. May react with ammonium salts resulting in evolution of ammonia gas. Flammable hydrogen gas may be produced on contact with aluminum, tin, lead, and zinc.
10.5 Incompatible materials  See Section: 10.3
10.6 Hazardous decomposition product(s)  None known.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects
Acute toxicity
Ingestion  All symptoms of acute toxicity are due to high alkalinity. Material will cause irritation. Oral LD50 (rat) >5000 mg/kg bw
Inhalation  Mist is irritant to the respiratory tract. All symptoms of acute toxicity are due to high alkalinity. Inhalation LC50 (rat) >2.06 g/m³
Skin Contact  Material will cause irritation. Dermal LD50 (rat) >5000 mg/kg bw
Eye Contact  Material will cause severe irritation. Risk of serious damage to eyes.
Skin corrosion/irritation  Irritating to skin.
Serious eye damage/irritation  Irritating to eyes. Risk of serious damage to eyes.
Sensitisation  Not sensitising.
Mutagenicity  No evidence of genotoxicity. In vitro/in vivo negative.
Carcinogenicity  No structural alerts.
Reproductive toxicity  No evidence of reproductive toxicity or developmental toxicity.
STOT - single exposure  Not classified
STOT - repeated exposure  Not classified. NOAEL oral (rat) 159 mg/kg bw/d
Aspiration hazard  Not classified
Other information

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity  Fish (Leuciscus idus) LC50 (48 hour) >146 mg/l
Aquatic invertebrates: (Daphnia magna) EC50 (24 hour) >146 mg/l
12.2 Persistence and degradability  Inorganic. Soluble silicates, upon dilution, rapidly depolymerise into molecular species indistinguishable from natural dissolved silica.

Revision: GHS  - en -  Ref: 04-3-1-35-000
Date of Issue : 04/2015  PQUS - GHS - 3
Date Previous Issue : 3/29/2005  Page: 4 of 6
12.3 Bioaccumulative potential  
Inorganic. The substance has no potential for bioaccumulation.

12.4 Mobility in soil  
Not applicable.

12.5 Results of PBT and vPvB assessment  
Not classified as PBT or vPvB.

12.6 Other adverse effects  
The alkalinity of this material will have a local effect on ecosystems sensitive to changes in pH.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods  
Discharge of this product to sewage treatment works is dependent on local regulations with regard to pH controls. Dispose of this material and its container to hazardous or special waste collection point. Disposal should be in accordance with local, state or national legislation. Waste material is classified as a RCRA Hazardous waste if it exhibits the corrosive characteristic (pH greater than or equal to 12.5).

SECTION 14: TRANSPORT INFORMATION

14.1 UN number  
Not applicable.

14.2 Proper Shipping Name  
Not applicable.

14.3 Transport hazard class(es)  
Not applicable.

14.4 Packing group  
Not applicable.

14.5 Environmental hazards  
Not classified as a Marine Pollutant.

14.6 Special precautions for user  
Unsuitable containers: Aluminium

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code  
Not applicable.

SECTION 15: REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture  
TSCA Inventory Status: Reported/Included. AICS Inventory Status: Reported/Included. DSL/NDSL Inventory Status: Reported/Included. SARA TITLE III: This material is not a listed Toxic Chemical subject to the reporting requirements of SARA Title III §313 and 40 C.F.R. Part 372. Hazard Categories under SARA Title III §§311/312: Acute. 3,0,0

SECTION 16: OTHER INFORMATION

Data referenced in this eSDS is from company-owned information and from data legitimately accessed by PQ Corporation through membership of Industry Consortia or other agreements. This includes data relating to toxicology, ecotoxicology, DNELs, PNECs and other information in this eSDS and its annex.

This SDS was last reviewed: 04/2015  
The following sections contain revisions or new statements: 2
GLOSSARY
H315: Causes skin irritation.
H318: Causes serious eye damage.
H335: May cause respiratory irritation.
STOT SE 3: Specific target organ toxicity — single exposure Category 3
DNEL: Derived No Effect Level
PNEC: Predicted No Effect Concentration
PBT: Persistent, Bioaccumulative and Toxic

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