SAFETY DATA SHEET

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

1.1 Product identifier
Product Name: EcoDrill™ 743 Potassium Silicate
Alternative names: Hydrous potassium silicate powder
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): Drilling applications, oilfield industry
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:
- Skin Irrit. 2
- Eye Irrit. 2
- STOT - single exposure Category 3

2.2 Label elements
Hazard pictogram(s):

Signal word(s): Warning
Hazard statement(s):
- H315: Causes skin irritation.
- H319: Causes serious eye irritation.
- H335: May cause respiratory irritation.
Precautionary statement(s)

P261: Avoid breathing dust.
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
Not classified as PBT or vPvB. 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</td>
<td>~85</td>
<td>1312-76-1</td>
<td>215-199-1</td>
<td>H319 : Eye Irrit. 2 ; H315 : Skin Irrit. 2 ; H335 : STOT SE 3 ;</td>
</tr>
<tr>
<td>Water</td>
<td>~15</td>
<td>7732-18-5</td>
<td></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. Irritating to eyes, respiratory system and 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
Suitable Extinguishing Media
Compatible with all standard fire fighting techniques.

Unsuitable extinguishing Media
None known.

5.2 Special hazards arising from the substance or mixture
Not applicable. Inorganic powder or granules. 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. An approved dust mask should be worn if dust is generated during handling. 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. Avoid generation of dust. Sweep or preferably vacuum up and collect in suitable containers for recovery or disposal. Transfer to a container for disposal or recovery.

6.4 Reference to other sections
See Also Section 8.

SECTION 7: HANDLING AND STORAGE

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

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed and dry. Unsuitable containers: Aluminium See Also Section 10.

7.3 Specific end use(s)
See also Annex to the extended Safety Data Sheet.

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
Avoid inhalation of dusts. Wear suitable respiratory protective equipment if working in confined spaces with inadequate ventilation or where there is any risk of the exposure limits being exceeded. Advice on respiratory protective equipment is given in the HSE (Health and Safety Executive) publication HS(G)53.
Dust mask: FFP2 (EN 149).
Chemical goggles (EN 166).

Eye/face protection
Wear suitable protective clothing and gloves.
Plastic or rubber gloves. For example EN374-3, level 6 breakthrough time (>480min).

Skin protection
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 generation of dust. Avoid release to the environment.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties
<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Flakes. White</td>
</tr>
<tr>
<td>Odour</td>
<td>Odourless.</td>
</tr>
<tr>
<td>Odour Threshold (ppm)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>pH (Value)</td>
<td>Alkaline. 11.3</td>
</tr>
<tr>
<td>Freezing Point (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Melting Point (°C)</td>
<td>&gt; 1000</td>
</tr>
<tr>
<td>Boiling Point (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flash Point (°C) [Closed cup]</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Explosive Limit Ranges</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapour Pressure (mm Hg)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Vapour Density (Air=1)</td>
<td>No data.</td>
</tr>
<tr>
<td>Density (g/ml)</td>
<td>Approximately. 90 lbs/ft³</td>
</tr>
<tr>
<td>Solubility (Water)</td>
<td>Soluble.</td>
</tr>
<tr>
<td>Solubility (Other)</td>
<td>No data.</td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>No data.</td>
</tr>
<tr>
<td>Auto Ignition Point (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Decomposition Temperature (°C)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Viscosity (mPa. s)</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Oxidising Properties</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>9.2 Other information</td>
<td>No data.</td>
</tr>
</tbody>
</table>

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                      See Section: 10.3
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                                   Dust 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                                 Dermal LD50 (rat) >5000 mg/kg bw
Eye Contact                                  Material will cause severe irritation.
Skin corrosion/irritation                    Material will cause irritation.
Serious eye damage/irritation                May cause severe 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                       Irritating to respiratory system.
STOT - repeated exposure                     Not classified. NOAEL oral (rat) 159 mg/kg bw/d
Aspiration hazard                            Not classified
Other information                            Not applicable.

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Date of Issue : 04/2015                       PQUS - GHS - 3
Date Previous Issue : 3/7/2005
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.

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.
This material is classified as hazardous waste under EC Directive 2008/98/EC. This material is classified as hazardous waste under the Hazardous Waste (England and Wales) Regulations SI 2005 No. 894.
Disposal should be in accordance with local, state or national legislation.

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
No special packaging requirements.
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.
German Water Hazard Classification VwVwS: Product ID number 1316, WGK class 1 (low hazard to water).

15.2 Chemical Safety Assessment
A Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

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: No significant changes required to this version at last review.

GHS Classification
Skin Irrit. 2
Eye Irrit. 2
STOT - single exposure Category 3

Signal word(s)
Warning

Hazard pictogram(s)

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GLOSSARY
H319: Causes serious eye irritation.
H315: Causes skin irritation.
H335: May cause respiratory irritation.
STOT SE 3: Specific target organ toxicity — single exposure Category 3
R36/37/38: Irritating to eyes, respiratory system and skin.
DNEL: Derived No Effect Level
PNEC: Predicted No Effect Concentration
PBT: Persistent, Bioaccumulative and Toxic

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