

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

AQLB-1

Revision Date: 10-Feb-2014

Revision Number: 4

| |
|--|
| 1. Identification of the substance/mixture and of the company/undertaking |
|--|

1.1 Product Identifier

Product Name AQLB-1

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

| | |
|---------------------------|---|
| Recommended Use | Solvent |
| Sector of use | SU2 - Mining, (including offshore industries) |
| Product category | PC20 - Products such as pH-regulators, flocculants, precipitants, neutralization agents, other unspecific |
| Process categories | PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises |

1.3 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

1.4 Emergency telephone number

+44 1224 795277 or +1 281 575 5000

| Emergency telephone - §45 - (EC)1272/2008 | |
|---|---|
| Europe | 112 |
| Denmark | Poison Control Hotline (DK): +45 82 12 12 12 |
| France | ORFILA (FR): + 01 45 42 59 59 |
| Germany | Poison Center Berlin (DE): +49 030 30686 790 |
| Italy | Poison Center, Milan (IT): +39 02 6610 1029 |
| Netherlands | National Poisons Information Center (NL): +31 30 274 88 88 (NB: this service is only available to health professionals) |
| Norway | Poisons Information (NO):+ 47 22 591300 |
| Poland | Poison Control and Information Centre, Warsaw (PL): +48 22 619 66 54; +48 22 619 08 97 |
| Spain | Poison Information Service (ES): +34 91 562 04 20 |
| United Kingdom | NHS Direct (UK): +44 0845 46 47 |

| |
|----------------------------------|
| 2. Hazards Identification |
|----------------------------------|

2.1 Classification of the substance or mixture

REGULATION (EC) No 1272/2008

| | |
|------------------------------------|---------------------|
| Acute Oral Toxicity | Category 4 - (H302) |
| Acute Inhalation Toxicity - Vapors | Category 3 - (H331) |

| | |
|--|---------------------|
| Skin Corrosion / irritation | Category 1 - (H314) |
| Flammable liquids. | Category 3 - (H226) |
| Substances/mixtures corrosive to metal | Category 1 - (H290) |

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 C - Corrosive.

Risk Phrases R35 Causes severe burns.

2.2 Label Elements

Hazard Pictograms



Signal Word Danger

Hazard Statements

H314 - Causes severe skin burns and eye damage

H226 - Flammable liquid and vapor

Precautionary Statements - EU (§28, 1272/2008)

P280 - Wear protective gloves/eye protection/face protection

P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting

P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower

P363 - Wash contaminated clothing before reuse

P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

P310 - Immediately call a POISON CENTER or doctor/physician

P370 + P378 - In case of fire: Use water spray for extinction

Contains

Substances

Formic acid

CAS Number

64-18-6

2.3 Other Hazards

None known

3. Composition/information on Ingredients

| Substances | EINECS | CAS Number | PERCENT (w/w) | EEC Classification | EU - CLP Substance Classification | REACH No. |
|-------------|-----------|------------|---------------|--------------------|---|-------------------|
| Formic acid | 200-579-1 | 64-18-6 | 60 - 100% | C; R35 | Skin Corr. 1A (H314) Eye Dam. 1 (H318) Acute Tox. 4 (H302) Acute Tox. 3 (H331) Flam. Liq. 3 (H226) Met. Corr. 1 (H290) | No data available |

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

4. First aid measures

4.1 Description of first aid measures

| | |
|-------------------|---|
| Inhalation | If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult give oxygen. Get medical attention. |
| Eyes | In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention immediately after flushing. |
| Skin | In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes. Get medical attention. Remove contaminated clothing and launder before reuse. |
| Ingestion | Do not induce vomiting. Slowly dilute with 1-2 glasses of water or milk and seek medical attention. Never give anything by mouth to an unconscious person. |

4.2 Most important symptoms and effects, both acute and delayed

May cause eye and skin burns.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media

Water fog, carbon dioxide, foam, dry chemical.

Extinguishing media which must not be used for safety reasons

None known.

5.2 Special hazards arising from the substance or mixture

Special Exposure Hazards

Decomposition in fire may produce toxic gases. Do not allow runoff to enter waterways.

5.3 Advice for firefighters

Special Protective Equipment for Fire-Fighters

Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment.
See Section 8 for additional information

6.2 Environmental precautions

Prevent from entering sewers, waterways, or low areas.

6.3 Methods and material for containment and cleaning up

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Neutralize to pH of 6-8. Scoop up and remove.

6.4 Reference to other sections

See Section 8 and 13 for additional information.

7. Handling and Storage

7.1 Precautions for Safe Handling

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Wash hands after use. Launder contaminated clothing before reuse.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice

7.2 Conditions for safe storage, including any incompatibilities

Store away from alkalis. Store away from oxidizers. Keep container closed when not in use.

7.3 Specific End Use(s)

Exposure Scenario No information available
Other Guidelines No information available

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Exposure Limits

| Substances | CAS Number | EU | UK OEL | Netherlands | France OEL |
|-------------|------------|-------------------------------------|--|---------------------------|------------|
| Formic acid | 64-18-6 | TWA: 5 ppm TWA: 9 mg/m ³ | STEL: 15 ppm STEL: 28.8 mg/m ³ TWA: 5 ppm TWA: 9.6 mg/m ³ | STEL: 5 mg/m ³ | 5 ppm |

| Substances | CAS Number | Germany MAK/TRK | Spain | Portugal | Finland |
|-------------|------------|--|--|----------------------------|--|
| Formic acid | 64-18-6 | TWA: 5 ppm TWA: 9.5 mg/m ³ MAK: 5 ppm MAK: 9.5 mg/m ³ | VLA-ED: 5 ppm VLA-ED: 9 mg/m ³ | STEL: 10 ppm TWA: 5 ppm | STEL: 10 ppm STEL: 19 mg/m ³ TWA: 3 ppm TWA: 5 mg/m ³ |

| Substances | CAS Number | Austria | Ireland | Switzerland | Norway |
|-------------|------------|----------------|----------------|----------------|--|
| Formic acid | 64-18-6 | Not applicable | Not applicable | Not applicable | STEL: 10 ppm STEL: 18 mg/m ³ TWA: 5 ppm TWA: 9 mg/m ³ |

| Substances | CAS Number | Italy | Poland | Hungary | Czech Republic |
|-------------|------------|-------------------------------------|---|--------------------------|--------------------------|
| Formic acid | 64-18-6 | TWA: 5 ppm TWA: 9 mg/m ³ | NDSch: 15 mg/m ³ NDS: 5 mg/m ³ | TWA: 9 mg/m ³ | TWA: 9 mg/m ³ |

| Substances | CAS Number | Denmark |
|-------------|------------|-------------------------------------|
| Formic acid | 64-18-6 | TWA: 5 ppm TWA: 9 mg/m ³ |

Derived No Effect Level (DNEL) Worker No information available.

General Population

Predicted No Effect Concentration (PNEC) No information available.

8.2 Exposure controls

Engineering Controls

Use in a well ventilated area. Local exhaust ventilation should be used in areas without good cross ventilation.

Personal protective equipment

Respiratory Protection

If engineering controls and work practices cannot keep exposure below occupational exposure limits or if exposure is unknown, wear a NIOSH certified, European Standard EN 149, or equivalent respirator when using this product. Selection of and instruction on using all personal protective equipment, including respirators, should be performed by an Industrial Hygienist or other qualified professional.

Acid gas respirator.

In high concentrations, supplied air respirator or a self-contained breathing apparatus.

Hand Protection

Impervious rubber gloves.

Skin Protection

Full protective chemical resistant clothing.

Eye Protection

Chemical goggles; also wear a face shield if splashing hazard exists.

Other Precautions

Eyewash fountains and safety showers must be easily accessible.

Environmental Exposure Controls No information available

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical State: Liquid
Odor: Sharp
Color: Clear colorless
Odor Threshold: No information available

| <u>Property</u> | <u>Values</u> |
|---|--------------------------|
| <u>Remarks/ - Method</u> | |
| pH: | 1 |
| Freezing Point/Range | 10 °C |
| Melting Point/Range | No data available |
| Boiling Point/Range | 101 °C |
| Flash Point | 49 °C PMCC |
| upper flammability limit | 57 |
| lower flammability limit | 18 |
| Evaporation rate | No data available |
| Vapor Pressure | 23 mmHg |
| Vapor Density | No data available |
| Specific Gravity | 1.2 |
| Water Solubility | Miscible with water |
| Solubility in other solvents | No data available |
| Partition coefficient: n-octanol/water | No data available |
| Autoignition Temperature | 601 °C |
| Decomposition Temperature | No data available |
| Viscosity | No data available |
| Explosive Properties | No information available |
| Oxidizing Properties | No information available |

9.2 Other information

VOC Content (%) No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

Not applicable

10.2 Chemical Stability

Stable

10.3 Possibility of Hazardous Reactions

Will Not Occur

10.4 Conditions to Avoid

Keep away from heat, sparks and flame.

10.5 Incompatible Materials

Strong oxidizers. Strong alkalis.

10.6 Hazardous Decomposition Products

Carbon monoxide and carbon dioxide.

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects**Acute Toxicity****Inhalation**

Causes severe respiratory irritation. May cause central nervous system depression including headache, dizziness, drowsiness, incoordination, slowed reaction time, slurred speech, giddiness and unconsciousness.

Eye Contact

May cause eye burns. May cause permanent eye damage.

Skin Contact

Causes severe burns.

Ingestion

Causes burns of the mouth, throat and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea. May cause kidney damage.

Chronic Effects/Carcinogenicity Repeated overexposure may cause liver and kidney effects.

Toxicology data for the components

| Substances | CAS Number | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|-------------|------------|-----------------|-------------------|--|
| Formic acid | 64-18-6 | 730 mg/kg (Rat) | No data available | 7.4 mg/L (Rat) 4 h 15 mg/L (Rat) 15 m |

| Substances | CAS Number | Skin corrosion/irritation |
|-------------|------------|--|
| Formic acid | 64-18-6 | Corrosive to skin (rabbit) |
| Substances | CAS Number | Eye damage/irritation |
| Formic acid | 64-18-6 | Corrosive to eyes (rabbit) |
| Substances | CAS Number | Skin Sensitization |
| Formic acid | 64-18-6 | Did not cause sensitization on laboratory animals (guinea pig) |
| Substances | CAS Number | Respiratory Sensitization |
| Formic acid | 64-18-6 | No information available |
| Substances | CAS Number | Mutagenic Effects |
| Formic acid | 64-18-6 | In vitro tests did not show mutagenic effects In vivo tests did not show mutagenic effects |
| Substances | CAS Number | Carcinogenic Effects |
| Formic acid | 64-18-6 | Did not show carcinogenic effects in animal experiments |
| Substances | CAS Number | Reproductive Toxicity |
| Formic acid | 64-18-6 | No significant toxicity observed in animal studies at concentration requiring classification. (similar substances) |
| Substances | CAS Number | STOT - single exposure |
| Formic acid | 64-18-6 | No significant toxicity observed in animal studies at concentration requiring classification. |
| Substances | CAS Number | STOT - repeated exposure |
| Formic acid | 64-18-6 | No significant toxicity observed in animal studies at concentration requiring classification. |
| Substances | CAS Number | Aspiration hazard |
| Formic acid | 64-18-6 | Not applicable |

12. ECOLOGICAL INFORMATION

12.1 Toxicity Ecotoxicity Effects

| Substances | CAS Number | Toxicity to Algae | Toxicity to Fish | Toxicity to Microorganisms | Daphnia Magna (Water Flea) |
|-------------|------------|---|---|----------------------------|---|
| Formic acid | 64-18-6 | EC50: 25 mg/L (Desmodesmus subspicatus) EC50(72h): 1240 mg/L (Pseudokirchnerella subcapitata) NOEC(13d): 72 mg/L (activated sludge, domestic) | LC50(96h): 175 mg/L (Lepomis Macrochirus) LC50(96h): 323 mg/L (Danio rerio) LC50(96h): 1720 mg/L (Scophthalmus maximus) LC50(96h): 3500 mg/L (Oncorhynchus mykiss) | No information available | EC50(48h): 120 mg/L (Daphnia magna) EC50(48h): 540 mg/L (Daphnia magna) EC50(48h): 365 mg/L (Daphnia magna) LC50(96h): 1308 mg/L (Crangon crangon) NOEC(21d): >= 100 mg/L (Daphnia magna) |

12.2 Persistence and degradability

| Substances | Persistence and Degradability |
|-------------|-------------------------------|
| Formic acid | Readily biodegradable |

12.3 Bioaccumulative potential

| Substances | Log Pow |
|-------------|---------|
| Formic acid | -2.1 |

12.4 Mobility in soil

No information available

12.5 Results of PBT and vPvB assessment

| Substances | PBT and vPvB assessment |
|-------------|-------------------------|
| Formic acid | Not PBT/vPvB |

12.6 Other adverse effects**Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

13. DISPOSAL CONSIDERATIONS**13.1 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: UN1779,
UN Proper Shipping Name: Formic Acid
Transport Hazard Class(es): , 8
Subsidiary Hazard: , (3)
Packing Group: , II
Environmental Hazards: Not applicable
EMS: EmS F-A, S-B

RID

UN Number: UN1779,
UN Proper Shipping Name: Formic Acid
Transport Hazard Class(es): , 8
Subsidiary Hazard: , (3)
Packing Group: , II
Environmental hazard: Not applicable

ADR

UN Number: UN1779,
UN Proper Shipping Name: Formic Acid
Transport Hazard Class(es): , 8
Subsidiary Hazard: , (3)
Packing Group: , II
Environmental hazard: Not applicable

IATA/ICAO

UN Number: UN1779,
UN Proper Shipping Name: Formic Acid
Transport Hazard Class(es): , 8
Subsidiary Hazard: , (3)
Packing Group: , II
Environmental hazard: 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

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

International Inventories

All of the components in the product are on the following Inventory lists: All of the components in the product are on the following Inventory lists:.

| | |
|-------------------------------|--|
| 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 1: Low hazard to waters.

15.2 Chemical Safety Assessment

No information available

16. OTHER INFORMATION

Full text of R-phrases referred to under Sections 2 and 3

R35 Causes severe burns.

Key literature references and sources for data

www.ChemADVISOR.com/

Revision Date: 10-Feb-2014

Revision Note

Not applicable

This safety data sheet complies with the requirements of Regulation (EC) No. 453/2010

Disclaimer Statement

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End of Safety Data Sheet