

## SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

### FE Acid with surfactant

Revision Date: 05-Jan-2016

Revision Number: 1

<b>SECTION 1: Identification of the substance/mixture and of the company/undertaking</b>
--

**1.1. Product Identifier**

**Product Name** FE Acid with surfactant  
**Internal ID Code** HM008247

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

<b>Recommended Use</b>	Acid
<b>Sector of use</b>	Refer to the Annex for a listing of uses.
<b>Product category</b>	Not applicable
<b>Process categories</b>	PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC15 - Use as a laboratory reagent
<b>Article categories</b>	Not applicable
<b>Environmental release category</b>	ERC4 - Industrial use of processing aids in processes and products, not becoming part of articles ERC8b - Wide dispersive indoor use of reactive substances in open systems
<b>Sector of use</b>	SU2a - Mining, (without offshore industries) SU2b - Offshore industries SU3 - Industrial uses
<b>Process categories</b>	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

[www.halliburton.com](http://www.halliburton.com)

For further information, please contact

**E-Mail address:** [fdunexchem@halliburton.com](mailto:fdunexchem@halliburton.com)

**1.4. Emergency telephone number**

+44 8 08 189 0979 / 1-760-476-3961

Emergency telephone - §45 - (EC)1272/2008	
<b>Europe</b>	<b>112</b>
<b>Croatia</b>	Centar za kontrolu otrovanja (CKO): (+385 1) 23-48-342 (Poison Control Center (PCC) - Institute for Medical Research and Occupational Health)
<b>Cyprus</b>	+210 7793777
<b>Denmark</b>	Poison Control Hotline (DK): +45 82 12 12 12
<b>France</b>	ORFILA (FR): + 01 45 42 59 59
<b>Germany</b>	Poison Center Berlin (DE): +49 030 30686 790
<b>Italy</b>	Poison Center, Milan (IT): +39 02 6610 1029
<b>Netherlands</b>	National Poisons Information Center (NL): +31 30 274 88 88 (NB: this service is only available to health professionals)
<b>Norway</b>	Poisons Information (NO):+ 47 22 591300
<b>Poland</b>	Poison Control and Information Centre, Warsaw (PL): +48 22 619 66 54; +48 22 619 08 97
<b>Romania</b>	+40 21 318 36 06

Spain	Poison Information Service (ES): +34 91 562 04 20
United Kingdom	NHS Direct (UK): +44 0845 46 47

## SECTION 2: Hazards Identification

### 2.1. Classification of the substance or mixture

#### REGULATION (EC) No 1272/2008

Skin Corrosion / irritation	Category 2 - H315
Serious Eye Damage / Eye Irritation	Category 2 - H319
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Substances/mixtures corrosive to metal.	Category 1 - H290

### 2.2. Label Elements

#### Hazard Pictograms



#### Signal Word

**Danger**

#### Hazard Statements

H290 - May be corrosive to metals  
 H315 - Causes skin irritation  
 H319 - Causes serious eye irritation  
 H335 - May cause respiratory irritation

#### Precautionary Statements

P234 - Keep only in original container  
 P264 - Wash face, hands and any exposed skin thoroughly after handling  
 P280 - Wear protective gloves/protective clothing/eye protection/face protection  
 P302 + P352 - IF ON SKIN: Wash with plenty of soap and water  
 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

#### Contains

##### Substances

Formic acid  
 Hydrochloric acid  
 Methanol  
 Acetic acid

##### CAS Number

64-18-6  
 7647-01-0  
 67-56-1  
 64-19-7

### 2.3. Other Hazards

Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT). This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

## SECTION 3: Composition/information on Ingredients

### 3.2. Mixtures

Mixture

Substances	EINECS	CAS Number	PERCENT (w/w)	EU - CLP Substance Classification	REACH No.
Formic acid	200-579-1	64-18-6	0.1 - 1%	Acute Tox. 4 (H302) Acute Tox. 3 (H331) Skin Corr. 1A (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Flam. Liq. 3 (H226)	01-2119491174-37

				Met. Corr. 1 (H290)	
Hydrochloric acid	231-595-7	7647-01-0	10 - 30%	Skin Corr. 1A (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Met. Corr. 1 (H290)	01-2119484862-27
Methanol	200-659-6	67-56-1	< 0.1%	Acute Tox. 3 (H301) Acute Tox. 3 (H311) Acute Tox. 3 (H331) STOT SE 1 (H370) Flam. Liq. 2 (H225)	01-2119433307-44
Acetic acid	200-580-7	64-19-7	1 - 5%	Skin Corr. 1A (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Flam. Liq. 3 (H226)	01-2119475328-30

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

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

<b>Inhalation</b>	If inhaled, move victim to fresh air and seek medical attention.
<b>Eyes</b>	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.
<b>Skin</b>	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.
<b>Ingestion</b>	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

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

Causes eye irritation. Causes skin irritation. May cause respiratory irritation.

### 4.3. Indication of any immediate medical attention and special treatment needed

**Notes to Physician** Treat symptomatically

## SECTION 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**

May form explosive mixtures with strong alkalis. Decomposition in fire may produce harmful gases. Reaction with steel and certain other metals generates flammable hydrogen gas. Do not allow runoff to enter waterways.

#### **Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases**

The product causes burns of eyes, skin and mucous membranes

### 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.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

Use appropriate protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Avoid breathing vapors. Evacuate all persons from the area.

See Section 8 for additional information

**6.2. Environmental precautions**

Prevent from entering sewers, waterways, or low areas. Consult local authorities.

**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.

**SECTION 7: Handling and Storage****7.1. Precautions for Safe Handling**

Avoid contact with eyes, skin, or clothing. Avoid breathing vapors. Ensure adequate ventilation. Wash hands after use. Launder contaminated clothing before reuse. Use appropriate protective equipment.

**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 in a cool well ventilated area. Keep container closed when not in use. Store locked up. Product has a shelf life of 24 months.

**7.3. Specific End Use(s)****Exposure Scenario**

Please refer to the attached Annex for a listing of exposure scenarios.

**Other Guidelines**

No information available

**SECTION 8: Exposure Controls/Personal Protection****8.1. Control parameters****Exposure Limits**

Substances	CAS Number	EU	UK	Netherlands	France
Formic acid	64-18-6	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9.6 mg/m <sup>3</sup> STEL: 15 ppm STEL: 28.8 mg/m <sup>3</sup>	STEL: 5 mg/m <sup>3</sup>	5 ppm
Hydrochloric acid	7647-01-0	Not applicable	TWA: 1 ppm TWA: 2 mg/m <sup>3</sup> STEL: 5 ppm STEL: 8 mg/m <sup>3</sup>	TWA: 8 mg/m <sup>3</sup> STEL: 15 mg/m <sup>3</sup>	STEL: 5 ppm STEL: 7.6 mg/m <sup>3</sup>
Methanol	67-56-1	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup>	TWA: 200 ppm TWA: 266 mg/m <sup>3</sup> STEL: 250 ppm STEL: 333 mg/m <sup>3</sup>	TWA: 133 mg/m <sup>3</sup> TWA: 100 ppm	200 ppm
Acetic acid	64-19-7	10 ppm	Not applicable	Not applicable	10 ppm

Substances	CAS Number	Germany	Spain	Portugal	Finland
Formic acid	64-18-6	TWA: 5 ppm TWA: 9.5 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup> STEL: 10 ppm	TWA: 3 ppm TWA: 5 mg/m <sup>3</sup> STEL: 10 ppm STEL: 19 mg/m <sup>3</sup>
Hydrochloric acid	7647-01-0	TWA: 2 ppm TWA: 3 mg/m <sup>3</sup>  TWA: 3.0 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 7.6 mg/m <sup>3</sup> 10 ppm STEL [VLA-EC]; 15 mg/m <sup>3</sup> STEL [VLA-EC]	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL: 10 ppm STEL: 15 mg/m <sup>3</sup>	STEL: 5 ppm STEL: 7.6 mg/m <sup>3</sup>
Methanol	67-56-1	TWA: 200 ppm TWA: 270 mg/m <sup>3</sup>  Peak: 800 ppm Peak: 1080 mg/m <sup>3</sup>	TWA: 200 ppm TWA: 266 mg/m <sup>3</sup>	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup> STEL: 250 ppm	TWA: 200 ppm TWA: 270 mg/m <sup>3</sup> STEL: 250 ppm STEL: 330 mg/m <sup>3</sup>
Acetic acid	64-19-7	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup>	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup> 15 ppm STEL [VLA-EC]; 37 mg/m <sup>3</sup> STEL [VLA-EC]	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup> STEL: 15 ppm	TWA: 5 ppm TWA: 13 mg/m <sup>3</sup> STEL: 10 ppm STEL: 25 mg/m <sup>3</sup>

Substances	CAS Number	Austria	Ireland	Switzerland	Norway
Formic acid	64-18-6	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup> STEL" 5 ppm STEL" 9 mg/m <sup>3</sup>	5 ppm TWA; 9 mg/m <sup>3</sup> TWA 15 ppm STEL (calculated); 27	TWA: 5 ppm TWA: 9.5 mg/m <sup>3</sup> STEL: 10 ppm STEL: 19 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup> STEL: 10 ppm STEL: 18 mg/m <sup>3</sup>

			mg/m <sup>3</sup> STEL (calculated)		
Hydrochloric acid	7647-01-0	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL" 10 ppm STEL" 15 mg/m <sup>3</sup>	5 ppm TWA; 8 mg/m <sup>3</sup> TWA 10 ppm STEL (as F); 15 mg/m <sup>3</sup> STEL	TWA: 2 ppm TWA: 3.0 mg/m <sup>3</sup> STEL: 4 ppm STEL: 6 mg/m <sup>3</sup>	Not applicable
Methanol	67-56-1	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup> STEL" 800 ppm STEL" 1040 mg/m <sup>3</sup>	200 ppm TWA; 260 mg/m <sup>3</sup> TWA 600 ppm STEL (calculated); 780 mg/m <sup>3</sup> STEL (calculated)	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup> STEL: 800 ppm STEL: 1040 mg/m <sup>3</sup>	TWA: 100 ppm TWA: 130 mg/m <sup>3</sup> STEL: 100 ppm STEL: 130 mg/m <sup>3</sup>
Acetic acid	64-19-7	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup> STEL" 20 ppm STEL" 50 mg/m <sup>3</sup>	10 ppm TWA; 25 mg/m <sup>3</sup> TWA 15 ppm STEL; 37 mg/m <sup>3</sup> STEL	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup> STEL: 20 ppm STEL: 50 mg/m <sup>3</sup>	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup> STEL: 20 ppm STEL: 37.5 mg/m <sup>3</sup>

Substances	CAS Number	Italy	Poland	Hungary	Czech Republic
Formic acid	64-18-6	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> STEL: 15 mg/m <sup>3</sup>	TWA: 9 mg/m <sup>3</sup>	TWA: 9 mg/m <sup>3</sup>
Hydrochloric acid	7647-01-0	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL: 10 ppm STEL: 15 mg/m <sup>3</sup>	TWA: 5 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup>	TWA: 8 mg/m <sup>3</sup> STEL: 16 mg/m <sup>3</sup>	TWA: 8 mg/m <sup>3</sup>
Methanol	67-56-1	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup>	TWA: 100 mg/m <sup>3</sup> STEL: 300 mg/m <sup>3</sup>	TWA: 260 mg/m <sup>3</sup>	TWA: 250 mg/m <sup>3</sup>
Acetic acid	64-19-7	10 ppm	TWA: 15 mg/m <sup>3</sup> STEL: 30 mg/m <sup>3</sup>	TWA: 25 mg/m <sup>3</sup> STEL: 25 mg/m <sup>3</sup>	TWA: 25 mg/m <sup>3</sup>

Substances	CAS Number	Denmark	Romania	Croatia	Cyprus
Formic acid	64-18-6	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 9 mg/m <sup>3</sup>
Hydrochloric acid	7647-01-0	Not applicable	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL: 10 ppm STEL: 15 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL: 10 ppm STEL: 15 mg/m <sup>3</sup>	TWA: 5 ppm TWA: 8 mg/m <sup>3</sup> STEL: 10 ppm STEL: 15 mg/m <sup>3</sup>
Methanol	67-56-1	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup>	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup> STEL: 5 ppm	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup>	TWA: 200 ppm TWA: 260 mg/m <sup>3</sup>
Acetic acid	64-19-7	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup>	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup>	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup>	TWA: 10 ppm TWA: 25 mg/m <sup>3</sup>

**Derived No Effect Level (DNEL)**

**Worker**

Substances	Long-term exposure - systemic effects, Inhalation	Acute / short term exposure - systemic effects, Inhalation	Long-term exposure - local effects, Inhalation	Acute / short term exposure - local effects, Inhalation	Long-term exposure - systemic effects, Dermal	Acute / short term exposure - systemic effects, Dermal	Long-term exposure - local effects, Dermal	Acute / short term exposure - local effects, Dermal	Hazards for the eyes - local effects
Formic acid	Not available	Not available	9.5 mg/m <sup>3</sup>	19 mg/m <sup>3</sup>	Not available	Not available	Not available	Not available	Not available
Hydrochloric acid	Not available	Not available	8 mg/m <sup>3</sup>	15 mg/m <sup>3</sup>	Not available	Not available	Not available	Not available	Not available
Methanol	260 mg/m <sup>3</sup>	260 mg/m <sup>3</sup>	260 mg/m <sup>3</sup>	260 mg/m <sup>3</sup>	40 mg/kg bw/day	40 mg/kg bw/day	Low hazard (no threshold derived)	Low hazard (no threshold derived)	Low hazard (no threshold derived)
Acetic acid	Not available	Not available	25 mg/m <sup>3</sup>	25 mg/m <sup>3</sup>	Not available	Not available	Not available	Not available	Not available

**General Population**

Substances	Long-term exposure - systemic effects, Inhalation	Acute / short term exposure - systemic effects, Inhalation	Long-term exposure - local effects, Inhalation	Acute / short term exposure - local effects, Inhalation	Long-term exposure - systemic effects, Dermal	Acute / short term exposure - systemic effects, Dermal	Long-term exposure - local effects, Dermal	Acute / short term exposure - local effects, Dermal	Long-term exposure - systemic effects, Oral	Acute / short term exposure - local effects, Oral	Hazards for the eyes - local effects
Formic acid	Not available	Not available	3 mg/m <sup>3</sup>	9.5 mg/m <sup>3</sup>	Not available	Not available	Not available	Not available	Not available	Not available	Not available
Methanol	50 mg/m <sup>3</sup>	50 mg/m <sup>3</sup>	50 mg/m <sup>3</sup>	50 mg/m <sup>3</sup>	8 mg/kg bw/day	8 mg/kg bw/day	Low hazard (no threshold derived)	Low hazard (no threshold derived)	Other toxicological threshold	Other toxicological threshold	Low hazard (no threshold derived)
Acetic acid	Not available	Not available	25 mg/m <sup>3</sup>	25 mg/m <sup>3</sup>	Not available	Not available	Not available	Not available	Not available	Not available	Not available

**Predicted No Effect Concentration (PNEC)**

Substances	Freshwater	Marine water	Intermittent release	Sewage treatment plant	Sediment (freshwater)	Sediment (marine water)	Air	Soil	Secondary poisoning
Formic acid	2 mg/L	0.2 mg/L	1 mg/L	7.2 mg/L	13.4 mg/kg sediment dw	1.34 mg/kg sediment dw	Not available	1.5 mg/kg soil dw	Not available
Hydrochloric acid	36 ug/L	36 ug/L	45 ug/L	36 ug/L	Not available	Not available	Not available	Not available	Not available
Methanol	20.8 mg/L	2.08 mg/L	1540 mg/L	100 mg/L	77 mg/kg sediment dw	7.7 mg/kg sediment dw	Not available	3.18 mg/kg soil dw	Not available
Acetic acid	3.06 mg/l	0.306 mg/l	30.58 mg/l	85 mg/l	11.4 mg/kg	1.14 mg/kg	Not available	0.478 mg/kg	Not 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**

If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

**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, AS/NZS 1715:2009, 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.

**Hand Protection**

Chemical-resistant protective gloves (EN 374) Suitable materials for longer, direct contact (recommended: protection index 6, corresponding to > 480 minutes permeation time as per EN 374): Butyl rubber gloves. (>= 0.7 mm thickness)  
This information is based on literature references and on information provided by glove manufacturers, or is derived by analogy with similar substances. Please note that in practice the working life of chemical-resistant protective gloves may be considerably shorter than the permeation time determined in accordance with EN 374 as a result of the many influencing factors (e.g. temperature). If signs of wear and tear are noticed then the gloves should be replaced. Manufacturer's directions for use should be observed because of great diversity of types.

**Skin Protection**

Full protective chemical resistant clothing. Rubber boots

**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** Do not allow material to contaminate ground water system

**SECTION 9: Physical and Chemical Properties**

**9.1. Information on basic physical and chemical properties**

**Physical State:** Liquid **Color:** Not determined  
**Odor:** Not determined **Odor Threshold:** No information available

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
<b>pH:</b>	No data available
<b>Freezing Point/Range</b>	No data available
<b>Melting Point/Range</b>	No data available
<b>Boiling Point/Range</b>	
No data available	
<b>Flash Point</b>	No data available
<b>Flammability (solid, gas)</b>	No data available
<b>upper flammability limit</b>	No data available
<b>lower flammability limit</b>	No data available
<b>Evaporation rate</b>	No data available
<b>Vapor Pressure</b>	No data available
<b>Vapor Density</b>	No data available
<b>Specific Gravity</b>	No data available
<b>Water Solubility</b>	Soluble in water
<b>Solubility in other solvents</b>	No data available
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Autoignition Temperature</b>	No data available

<b>Decomposition Temperature</b>	No data available
<b>Viscosity</b>	No data available
<b>Explosive Properties</b>	No information available
<b>Oxidizing Properties</b>	No information available

**9.2. Other information**

<b>VOC Content (%)</b>	No data available
------------------------	-------------------

## SECTION 10: Stability and Reactivity

**10.1. Reactivity**

Not expected to be reactive.

**10.2. Chemical Stability**

Stable

**10.3. Possibility of Hazardous Reactions**

Will Not Occur

**10.4. Conditions to Avoid**

None anticipated

**10.5. Incompatible Materials**

Strong alkalis.

**10.6. Hazardous Decomposition Products**

Flammable hydrogen gas. Chlorine. Hydrogen sulfide.

## SECTION 11: Toxicological Information

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

<b>Inhalation</b>	Causes severe respiratory irritation.
<b>Eye Contact</b>	Causes eye irritation.
<b>Skin Contact</b>	Causes skin irritation.
<b>Ingestion</b>	Causes burns of the mouth, throat and stomach.

**Chronic Effects/Carcinogenicity** Prolonged, excessive exposure may cause erosion of the teeth.

**Toxicology data for the components**

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Formic acid	64-18-6	730 mg/kg (Rat)	> 2000 mg/kg (Rat) (Similar substance)	7.4 mg/L (Rat) 4h 15 mg/L (Rat) 15m
Hydrochloric acid	7647-01-0	No data available	5010 mg/kg (Rabbit) > 5010 mg/kg (Rabbit) 1449 mg/kg (Mouse)	3124 mg/L (Rat) 1h 3.2 mg/L (Mouse) 8.3 mg/L (Rat) 1405 mg/L (Rat) 554 mg/L (Mouse)
Methanol	67-56-1	< 790 mg/kg (rat) 7300 mg/kg (mouse) 14200 mg/kg (rabbit) 300 mg/kg (Human) 6200 mg/kg (Rat)	15800 mg/kg (Rabbit) 393 mg/kg bw (primates) 1000 mg/kg (Human) 15800 mg/kg (Rabbit)	10 mg/L (Human) 4h (vapor) 22,500 ppm (Rat) 8h 64,000 ppm (Rat) 4h 83.2 mg/L (rat) 4h 128.8 mg/L (rat) 4h
Acetic acid	64-19-7	3310 mg/kg (Rat) 600 mg/kg (Rabbit) 4960 mg/kg (Mouse)	1060 mg/kg (Rabbit)	11.4 mg/L (Rat) 4h

Substances	CAS Number	Skin corrosion/irritation
Formic acid	64-18-6	Corrosive to skin (Rabbit)
Hydrochloric acid	7647-01-0	Causes severe burns
Methanol	67-56-1	Non-irritating to the skin (Rabbit)
Acetic acid	64-19-7	Corrosive to skin

Substances	CAS Number	Eye damage/irritation
Formic acid	64-18-6	Corrosive to eyes (Rabbit)
Hydrochloric acid	7647-01-0	Causes severe burns
Methanol	67-56-1	Non-irritating to the eye (Rabbit)
Acetic acid	64-19-7	Corrosive to eyes

Substances	CAS	Skin Sensitization
------------	-----	--------------------

	Number	
Formic acid	64-18-6	Did not cause sensitization on laboratory animals (guinea pig)
Hydrochloric acid	7647-01-0	Did not cause sensitization on laboratory animals (guinea pig)
Methanol	67-56-1	Did not cause sensitization on laboratory animals (guinea pig)
Acetic acid	64-19-7	Not regarded as a sensitizer.

Substances	CAS Number	Respiratory Sensitization
Formic acid	64-18-6	No information available
Hydrochloric acid	7647-01-0	No information available
Methanol	67-56-1	No information available
Acetic acid	64-19-7	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.
Hydrochloric acid	7647-01-0	Not regarded as mutagenic.
Methanol	67-56-1	The weight of evidence from available in vitro and in vivo studies indicates that this substance is not expected to be mutagenic.
Acetic acid	64-19-7	In vivo tests did not show mutagenic effects. In vitro tests did not show mutagenic effects

Substances	CAS Number	Carcinogenic Effects
Formic acid	64-18-6	Did not show carcinogenic effects in animal experiments (similar substances)
Hydrochloric acid	7647-01-0	No data of sufficient quality are available.
Methanol	67-56-1	No data of sufficient quality are available.
Acetic acid	64-19-7	Did not show carcinogenic effects in animal experiments

Substances	CAS Number	Reproductive toxicity
Formic acid	64-18-6	Did not show teratogenic effects in animal experiments. (similar substances) Animal testing did not show any effects on fertility.
Hydrochloric acid	7647-01-0	Embryo and fetotoxicity has been observed in female rats exposed to maternally toxic levels of hydrogen chloride (450 mg/m <sup>3</sup> , 1hr.).
Methanol	67-56-1	Experiments have shown reproductive toxicity effects on laboratory animals
Acetic acid	64-19-7	Did not show teratogenic effects in animal experiments. Animal testing did not show any effects on fertility.

Substances	CAS Number	STOT - single exposure
Formic acid	64-18-6	May cause respiratory irritation.
Hydrochloric acid	7647-01-0	May cause respiratory irritation.
Methanol	67-56-1	May cause disorder and damage to the Central Nervous System (CNS)
Acetic acid	64-19-7	May cause respiratory irritation.

Substances	CAS Number	STOT - repeated exposure
Formic acid	64-18-6	No significant toxicity observed in animal studies at concentration requiring classification.
Hydrochloric acid	7647-01-0	No significant toxicity observed in animal studies at concentration requiring classification.
Methanol	67-56-1	No data of sufficient quality are available.
Acetic acid	64-19-7	Not applicable due to corrosivity of the substance.

Substances	CAS Number	Aspiration hazard
Formic acid	64-18-6	Not applicable
Hydrochloric acid	7647-01-0	Not applicable
Methanol	67-56-1	Not applicable
Acetic acid	64-19-7	Not applicable

## SECTION 12: Ecological Information

### 12.1. Toxicity Ecotoxicity Effects

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Formic acid	64-18-6	EC50 25 mg/L	LC50 (96h) 175 mg/L	NOEC (13d) 72 mg/L	EC50 (48h) 120 mg/L

		(Desmodesmus subspicatus) EC50 (72h) 1240 mg/L (growth rate) (Pseudokirchnerella subcapitata) (Similar substance)	(Lepomis Macrochirus) LC50 (96h) 130 mg/L (Danio rerio) (Similar substance) LC50 (96h) 1720 mg/L (Scophthalmus maximus) (Similar substance) LC50 (96h) 3500 mg/L (Oncorhynchus mykiss) (similar substance)	(activated sludge, domestic)	(Daphnia magna) EC50 (48h) 450 mg/L (Daphnia magna) (similar substance) EC50 (48h) 365 mg/L (Daphnia magna) (Similar substance) LC50 (96h) 1308 mg/L (Crangon crangon) (Similar substance) NOEC (21d) >= 100 mg/L (Daphnia magna)
Hydrochloric acid	7647-01-0	No information available	LC50 282 mg/L (Gambusia affinis) LC50 20.5 mg/L (Lepomis macrochirus) LC50 (96h) 3.25 – 3.5 (pH) (Lepomis macrochirus)	EC50 (3h) >= 5 and <= 5.5 (pH) (Activated sludge, domestic)	EC50 (48h) 4.9 (pH) (Daphnia magna)
Methanol	67-56-1	ErC50 (96h) 22000 mg/L (Pseudokirchnerella subcapitata)	LC50 28200 mg/L (Pimephales promelas) LC50 (96h) 12700 – 15400 mg/L (Lepomis macrochirus)	IC50 (3h) > 1000 mg/L (activated sludge)	EC50 (96h) 18260 mg/L (Daphnia magna) NOEC (21d) 122 mg/L (Daphnia magna, Reproduction)
Acetic acid	64-19-7	EC50 90 mg/L (Microcystis aeruginosa) EC50 (72h) > 1000 mg/L (>300.82 mg/L – acetate ion) (Skeletonema costatum)	LC50 79 mg/L (Pimephales promelas) LC50 75 mg/L (Pimephales promelas) LC50 (96h) > 1000 mg/L (>300.82 mg/L – acetate ion) (Oncorhynchus mykiss)	NOEC (16h) 1150 mg/L (Pseudomonas putida)	EC50 47 mg/L (Daphnia magna) LC50 32 mg/L (Artemia salina) EC50 (48h) > 1000 mg/L (>300.82 mg/L – acetate ion) (Daphnia magna) NOEC (21d) 31.4 - 37.9 mg/L (Daphnia magna) (reproduction)

Effect concentrations in the aquatic environment are attributable to a change in pH value

### 12.2. Persistence and degradability

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

Substances	CAS Number	Persistence and Degradability
Formic acid	64-18-6	Readily biodegradable (100 @ 14d)
Hydrochloric acid	7647-01-0	The methods for determining biodegradability are not applicable to inorganic substances.
Methanol	67-56-1	(95-97% @ 20d)
Acetic acid	64-19-7	Readily biodegradable (99% @ 7d)

### 12.3. Bioaccumulative potential

Does not bioaccumulate.

Substances	CAS Number	Log Pow
Formic acid	64-18-6	-2.1
Hydrochloric acid	7647-01-0	0.25
Methanol	67-56-1	-0.77 BCF = 1.0 – 4.5 (Cyprinus carpio) BCF < 10 (Leuciscus idus melanotus)
Acetic acid	64-19-7	-0.17 BCF = 3.16 (Calculated)

### 12.4. Mobility in soil

Substances	CAS Number	Mobility
Formic acid	64-18-6	KOC = 31
Hydrochloric acid	7647-01-0	No information available
Methanol	67-56-1	No information available
Acetic acid	64-19-7	No information available

### 12.5. Results of PBT and vPvB assessment

This mixture contains no substance considered to be persistent, bioaccumulating nor toxic (PBT). This mixture contains no substance considered to be very persistent nor very bioaccumulating (vPvB).

Substances	PBT and vPvB assessment
Formic acid	Not PBT/vPvB
Hydrochloric acid	Not applicable
Methanol	Not PBT/vPvB

Acetic acid	Not PBT/vPvB
-------------	--------------

**12.6. Other adverse effects****Endocrine Disruptor Information**

This product does not contain any known or suspected endocrine disruptors

<b>SECTION 13: Disposal Considerations</b>
--

**13.1. Waste treatment methods****Disposal Method**

Disposal should be made in accordance with federal, state, and local regulations. Substance should NOT be deposited into a sewage facility.

**Contaminated Packaging**

Follow all applicable national or local regulations.

<b>SECTION 14: Transport Information</b>
--

**IMDG/IMO**

**UN Number:** UN1789  
**UN Proper Shipping Name:** Hydrochloric Acid Solution  
**Transport Hazard Class(es):** 8  
**Packing Group:** III  
**Environmental Hazards:** Not applicable

**RID**

**UN Number:** UN1789  
**UN Proper Shipping Name:** Hydrochloric Acid Solution  
**Transport Hazard Class(es):** 8  
**Packing Group:** III  
**Environmental Hazards:** Not applicable

**ADR**

**UN Number:** UN1789  
**UN Proper Shipping Name:** Hydrochloric Acid Solution  
**Transport Hazard Class(es):** 8  
**Packing Group:** III  
**Environmental Hazards:** Not applicable

**IATA/ICAO**

**UN Number:** UN1789  
**UN Proper Shipping Name:** Hydrochloric Acid Solution  
**Transport Hazard Class(es):** 8  
**Packing Group:** III  
**Environmental Hazards:** Not applicable

**14.1. UN Number:** UN1789

**14.2. UN Proper Shipping Name:** Hydrochloric Acid Solution

**14.3. Transport Hazard Class(es):** 8

**14.4. Packing Group:** III

**14.5. Environmental Hazards:** Not applicable

**14.6. Special Precautions for User:** None

**14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:** Not applicable

<b>SECTION 15: Regulatory Information</b>
---

**15.1. 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/NDL - Canadian Domestic Substances List/Non-Domestic Substances List

**Germany, Water Endangering Classes (WGK)** WGK 1: Low hazard to waters.**15.2. Chemical Safety Assessment**

Yes

**SECTION 16: Other Information****Full text of H-Statements referred to under sections 2 and 3**

H225 - Highly flammable liquid and vapor  
H226 - Flammable liquid and vapor  
H290 - May be corrosive to metals  
H301 - Toxic if swallowed  
H302 - Harmful if swallowed  
H311 - Toxic in contact with skin  
H314 - Causes severe skin burns and eye damage  
H315 - Causes skin irritation  
H318 - Causes serious eye damage  
H319 - Causes serious eye irritation  
H331 - Toxic if inhaled  
H335 - May cause respiratory irritation  
H370 - Causes damage to organs

**Key or legend to abbreviations and acronyms**

bw – body weight  
CAS – Chemical Abstracts Service  
CLP – REGULATION (EC) No 1272/2008 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on Classification, Labelling and Packaging of substances and mixtures  
EC – European Commission  
EC10 – Effective Concentration 10%  
EC50 – Effective Concentration 50%  
EEC – European Economic Community  
ErC50 – Effective Concentration growth rate 50%  
IBC Code – International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk  
LC50 – Lethal Concentration 50%  
LD50 – Lethal Dose 50%  
LL0 – Lethal Loading 0%  
LL50 – Lethal Loading 50%  
MARPOL – International Convention for the Prevention of Pollution from Ships  
mg/kg – milligram/kilogram  
mg/L – milligram/liter  
NIOSH – National Institute for Occupational Safety and Health  
NOEC – No Observed Effect Concentration  
NTP – National Toxicology Program  
OEL – Occupational Exposure Limit  
PBT – Persistent Bioaccumulative and Toxic  
PC – Chemical Product category  
PEL – Permissible Exposure Limit  
ppm – parts per million  
PROC – Process category  
REACH – REGULATION (EC) No 1907/2006 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals  
STEL – Short Term Exposure Limit  
SU – Sector of Use category

**Key literature references and sources for data**

www.ChemADVISOR.com/  
NZ CCID

**Revision Date:** 21-Sep-2015**Revision Note**  
Not applicable

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

**Disclaimer Statement**

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

**End of Safety Data Sheet**