

SAFETY DATA SHEET

Product Trade Name: 10% FORMIC ACID / 1% HF

Revision Date: 19-Jun-2017

Revision Number: 3

1. Identification

1.1. Product Identifier

Product Trade Name: 10% FORMIC ACID / 1% HF
Synonyms None
Chemical Family: Organic acid
Internal ID Code HM006509

1.2 Recommended use and restrictions on use

Application: Acid
Uses advised against No information available

1.3 Manufacturer's Name and Contact Details

Manufacturer/Supplier

Halliburton Energy Services, Inc.
P.O. Box 1431
Duncan, Oklahoma 73536-0431
Telephone: 1-281-871-6107

Halliburton Energy Services, Inc.
645 - 7th Ave SW Suite 1800
Calgary, AB
T2P 4G8
Canada

Prepared By Chemical Stewardship
Telephone: 1-281-871-6107
e-mail: fdunexchem@halliburton.com

1.4. Emergency telephone number

Emergency Telephone Number: 1-866-519-4752 or 1-760-476-3962
Global Incident Response Access Code: 334305
Contract Number: 14012

2. Hazards Identification

2.1 Classification in accordance with paragraph (d) of §1910.1200

Acute Oral Toxicity	Category 4 - H302
Acute toxicity - Dermal	Category 3 - H311
Acute inhalation toxicity - vapor	Category 4 - H332
Skin Corrosion / Irritation	Category 1 - H314
Serious Eye Damage/Irritation	Category 1 - H318
Flammable liquids.	Category 4 - H227
Substances/mixtures corrosive to metal	Category 1 - H290

2.2. Label Elements

Hazard Pictograms



Signal Word:	Danger
Hazard Statements	<p>H227 - Combustible liquid H290 - May be corrosive to metals H302 - Harmful if swallowed H311 - Toxic in contact with skin H314 - Causes severe skin burns and eye damage H318 - Causes serious eye damage H332 - Harmful if inhaled</p>
Precautionary Statements	
Prevention	<p>P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking P234 - Keep only in original container P260 - Do not breathe dust/fume/gas/mist/vapors/spray P264 - Wash face, hands and any exposed skin thoroughly after handling P270 - Do not eat, drink or smoke when using this product P271 - Use only outdoors or in a well-ventilated area P280 - Wear protective gloves/protective clothing/eye protection/face protection</p>
Response	<p>P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell P330 - Rinse mouth P302 + P352 - IF ON SKIN: Wash with plenty of soap and water P312 - Call a POISON CENTER or doctor/physician if you feel unwell P362 + P364 - Take off contaminated clothing and wash before reuse P304 + P340 - IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing 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 victim to fresh air and keep at rest in a position comfortable for breathing P310 - Immediately call a POISON CENTER or doctor/physician P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing P370 + P378 - In case of fire: Use water spray for extinction P390 - Absorb spillage to prevent material damage</p>
Storage	<p>P403 + P235 - Store in a well-ventilated place. Keep cool P405 - Store locked up</p>
Disposal	<p>P406 - Store in corrosive resistant container with a resistant inner liner. P501 - Dispose of contents/container in accordance with local/regional/national/international regulations</p>

2.3 Hazards not otherwise classified

None known

3. Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	GHS Classification - US
Formic acid	64-18-6	10 - 30%	Acute Tox. 4 (H302) Acute Tox. 3 (H331) Skin Corr. 1A (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Flam. Liq. 3 (H226) Met. Corr. 1 (H290)
Hydrofluoric acid	7664-39-3	0.1 - 1%	Acute Tox. 2 (H300) Acute Tox. 1 (H310) Acute Tox. 2 (H330) Skin Corr. 1A (H314) Eye Corr. 1 (H318) STOT SE 3 (H335) Aquatic Acute 3 (H402)

The exact percentage (concentration) of the composition has been withheld as proprietary.

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	Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention. Check for and remove contact lenses if present.
Skin	In case of contact, immediately flush skin with plenty of soap and water for at least 30 minutes and remove contaminated clothing, shoes and leather goods immediately. Get medical attention immediately.
Ingestion	Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

4.2 Most important symptoms/effects, acute and delayed

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. Harmful if swallowed. Toxic in contact with skin. Harmful if inhaled.

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

Notes to Physician	EYES: Causes severe burns - effects on eyes may be delayed Apply 1 to 2 drops of 0.5% Pontocaine Hydrochloride into open eye. Irrigate with 1.0% calcium gluconate in normal saline for 1 to 2 hours. SKIN: Wearing protective gloves, apply 2.5% calcium gluconate gel at burn site rubbing continuously. Monitor for 24 hrs.
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5. Fire-fighting measures

5.1. Extinguishing media

Suitable Extinguishing Media

All standard fire fighting media

Extinguishing media which must not be used for safety reasons

None known.

5.2 Specific hazards arising from the substance or mixture

Special exposure hazards in a fire

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.

5.3 Special protective equipment and precautions for fire-fighters

Special protective equipment for firefighters

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. Wear full protective gear. Reaction can be violent and harmful vapors may be released.

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.

7. Handling and storage

7.1. Precautions for safe handling

Handling Precautions

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

Storage Information

Store away from alkalis. Store in a cool well ventilated area. Keep container closed when not in use. Do not store in containers made of fiberglass.

8. Exposure Controls/Personal Protection

8.1 Occupational Exposure Limits

Substances	CAS Number	OSHA PEL-TWA	ACGIH TLV-TWA
Formic acid	64-18-6	TWA: 5 ppm TWA: 9 mg/m ³	TWA: 5 ppm STEL: 10 ppm
Hydrofluoric acid	7664-39-3	TWA: 3 ppm	TWA: 0.5 ppm TWA: 2.5 mg/m ³

8.2 Appropriate engineering controls

Engineering Controls

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

8.3 Individual protection measures, such as personal protective equipment

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

Acid gas respirator.

Hand Protection

Chemical-resistant protective gloves (EN 374) Suitable materials for short-term contact or splashes (recommended: at least protection index 2, corresponding to > 30 minutes permeation time as per EN 374): Neoprene gloves. Polyvinylchloride gloves. Nitrile gloves. (>= 8 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

Skin Protection
Eye Protection
Other Precautions

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.
 Full protective chemical resistant clothing. Rubber boots
 Chemical goggles; also wear a face shield if splashing hazard exists.
 Eyewash fountains and safety showers must be easily accessible.

9. Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Physical State: Liquid **Color** Clear colorless
Odor: Pungent irritating **Odor** No information available
Threshold:

<u>Property</u>	<u>Values</u>
<u>Remarks/ - Method</u>	
pH:	0.5
Freezing Point / Range	No data available
Melting Point / Range	No data available
Boiling Point / Range	No data available
Flash Point	60.6 °C / 141 °F PMCC
Flammability (solid, gas)	No data available
Upper flammability limit	No data available
Lower flammability limit	No data available
Evaporation rate	No data available
Vapor Pressure	No data available
Vapor Density	No data available
Specific Gravity	1.09
Water Solubility	Soluble in water
Solubility in other solvents	No data available
Partition coefficient: n-octanol/water	No data available
Autoignition Temperature	No data available
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 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

Silicone bearing materials. Strong alkalis. Contact with metals.

10.6. Hazardous decomposition products

Flammable hydrogen gas. Chlorine. Hydrogen fluoride. Hydrogen sulfide.

11. Toxicological Information**11.1 Information on likely routes of exposure**

Principle Route of Exposure Eye or skin contact, inhalation.

11.2 Symptoms related to the physical, chemical and toxicological characteristics**Acute Toxicity****Inhalation**

Harmful if inhaled. May cause lungs to fill with fluids. Causes severe respiratory burns.

Eye Contact

Causes severe eye burns which may not be immediately painful or visible.

Skin Contact

Toxic in contact with skin. Causes skin burns which may not be immediately painful or visible. Effects on skin may be delayed for 24-48 hours.

Ingestion

Harmful if swallowed. Causes burns of the mouth, throat and stomach. May cause damage to bones and teeth.

Chronic Effects/Carcinogenicity Prolonged or repeated exposure may result in fluorosis. Symptoms include nausea, vomiting, loss of appetite, diarrhea, and/or constipation. Fluorosis also results in bone density increase. Prolonged, excessive exposure may cause erosion of the teeth. Repeated overexposure may cause liver and kidney effects.

11.3 Toxicity data**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 (similar substance)	7.4 mg/L (rat, 4 hr, vapour)
Hydrofluoric acid	7664-39-3	LDLo 80 mg/kg	Not applicable due to corrosivity of the substance.	1276 mg/L (Rat) 1h 850 mg/L (Rat) 1h 0.14 mg/L (Mouse) 4h

Substances	CAS Number	Skin corrosion/irritation
Formic acid	64-18-6	Corrosive to skin (Rabbit)
Hydrofluoric acid	7664-39-3	Corrosive to skin (Rabbit)

Substances	CAS Number	Serious eye damage/irritation
Formic acid	64-18-6	Corrosive to eyes (Rabbit)
Hydrofluoric acid	7664-39-3	Corrosive to eyes (Rabbit)

Substances	CAS Number	Skin Sensitization
Formic acid	64-18-6	Did not cause sensitization on laboratory animals (guinea pig)
Hydrofluoric acid	7664-39-3	Not applicable due to corrosivity of the substance.

Substances	CAS Number	Respiratory Sensitization
Formic acid	64-18-6	No information available
Hydrofluoric acid	7664-39-3	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.
Hydrofluoric acid	7664-39-3	No data of sufficient quality are available.

Substances	CAS Number	Carcinogenic Effects
Formic acid	64-18-6	Did not show carcinogenic effects in animal experiments (similar substances)
Hydrofluoric acid	7664-39-3	Not regarded as carcinogenic.

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.

Hydrofluoric acid	7664-39-3	Did not show teratogenic effects in animal experiments. Not a confirmed reproductive toxicant. (similar substances)
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Substances	CAS Number	STOT - single exposure
Formic acid	64-18-6	May cause respiratory irritation. No significant toxicity observed in animal studies at concentration requiring classification.
Hydrofluoric acid	7664-39-3	Not applicable due to corrosivity of the substance. (similar substances)

Substances	CAS Number	STOT - repeated exposure
Formic acid	64-18-6	No significant toxicity observed in animal studies at concentration requiring classification.
Hydrofluoric acid	7664-39-3	Not applicable due to corrosivity of the substance. (similar substances)

Substances	CAS Number	Aspiration hazard
Formic acid	64-18-6	Not applicable
Hydrofluoric acid	7664-39-3	Not applicable

12. Ecological Information

12.1. Toxicity

Substance Ecotoxicity Data

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Formic acid	64-18-6	EC50 (72 h) 1240 mg/L (Pseudokirchneriella subcapitata)	LC50 (96 h) 130 mg/L (Danio rerio)	NOEC (13 d) 72 mg/L (Activated sludge, domestic)	EC50 (48 h) 365 mg/L (Daphnia magna) NOEC (21 d) 100 mg/L (Daphnia magna)
Hydrofluoric acid	7664-39-3	EC50 (96h) 122 mg/L (Selenastrum capricornutum) EC50 (96h) 43 mg/L (Scenedesmus Sp.) NOEC (14-21d) 200 mg/L (Dunaliella tertiolecta)	EC50 (96h) 51 mg/L (Oncorhynchus mykiss) NOEC (21d) 4 mg/L (Oncorhynchus mykiss)	NOEC (48h) 83 mg/L (Chilomonas paramacium)	EC50 (48h) 26.48 mg/L (Daphnia magna) EC50 (120h) 20 mg/L (Perna perna) NOEC (21d) 3.7 mg/L (Daphnia magna)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Formic acid	64-18-6	Readily biodegradable (100% @ 14d)
Hydrofluoric acid	7664-39-3	The methods for determining biodegradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Formic acid	64-18-6	LogKow -2.1
Hydrofluoric acid	7664-39-3	BCF = 3.2 and <2 (similar substances) Log Kow = -1.4

12.4. Mobility in soil

Substances	CAS Number	Mobility
Formic acid	64-18-6	KOC = 31
Hydrofluoric acid	7664-39-3	No information available

12.5 Other adverse effects

No information available

13. Disposal Considerations

13.1. Waste treatment methods

Disposal methods

Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. Transport Information

US DOT

UN Number UN3265
UN proper shipping name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Formic Acid, Hydrofluoric Acid)
Transport Hazard Class(es): 8
Packing Group: II
Environmental Hazards: Not applicable
Reportable Quantity: RQ (Hydrofluoric Acid - 45.4 kg.)
NAERG: NAERG 153

Canadian TDG

UN Number UN3265
UN proper shipping name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Formic Acid, Hydrofluoric Acid)
Transport Hazard Class(es): 8
Packing Group: II
Environmental Hazards: Not applicable

IMDG/IMO

UN Number UN3265
UN proper shipping name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Formic Acid, Hydrofluoric Acid)
Transport Hazard Class(es): 8
Packing Group: II
Environmental Hazards: Not applicable
Reportable Quantity: RQ (Hydrofluoric Acid - 45.4 kg.)
EMS: EmS F-A, S-B

IATA/ICAO

UN Number UN3265
UN proper shipping name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Formic Acid, Hydrofluoric Acid)
Transport Hazard Class(es): 8
Packing Group: II
Environmental Hazards: Not applicable
Reportable Quantity: RQ (Hydrofluoric Acid - 45.4 kg.)

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

Special Precautions for User None

15. Regulatory Information

US Regulations

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

TSCA Significant New Use Rules - S5A2

Substances	CAS Number	TSCA Significant New Use Rules - S5A2
Formic acid	64-18-6	Not applicable
Hydrofluoric acid	7664-39-3	Not applicable

EPA SARA Title III Extremely Hazardous Substances

Substances	CAS Number	EPA SARA Title III Extremely Hazardous Substances
Formic acid	64-18-6	Not applicable
Hydrofluoric acid	7664-39-3	100 lb

EPA SARA (311,312) Hazard Class

Acute Health Hazard
Fire Hazard

EPA SARA (313) Chemicals

Substances	CAS Number	Toxic Release Inventory (TRI) - Group I	Toxic Release Inventory (TRI) - Group II
Formic acid	64-18-6	1.0%	Not applicable
Hydrofluoric acid	7664-39-3	1.0%	Not applicable

EPA CERCLA/Superfund Reportable Spill Quantity

Substances	CAS Number	CERCLA RQ
Formic acid	64-18-6	5000 lb 2270 kg
Hydrofluoric acid	7664-39-3	100 lb 45.4 kg

EPA RCRA Hazardous Waste Classification

If product becomes a waste, it does meet the criteria of a hazardous waste as defined by the US EPA, because of:

Corrosivity D002

California Proposition 65

Substances	CAS Number	California Proposition 65
Formic acid	64-18-6	Not applicable
Hydrofluoric acid	7664-39-3	Not applicable

U.S. State Right-to-Know Regulations

Substances	CAS Number	MA Right-to-Know Law	NJ Right-to-Know Law	PA Right-to-Know Law
Formic acid	64-18-6	Present	0948	Environmental hazard
Hydrofluoric acid	7664-39-3	Extraordinarily hazardous	3759 0936	Environmental hazard

NFPA Ratings: Health 4, Flammability 2, Reactivity 0

HMIS Ratings: Health 4, Flammability 2, Reactivity 0

Canadian Regulations

Canadian Domestic Substances List (DSL) All components listed on inventory or are exempt.

16. Other information**Preparation Information**

Prepared By Chemical Stewardship
Telephone: 1-281-871-6107
e-mail: fdunexchem@halliburton.com

Revision Date: 19-Jun-2017

Reason for Revision SDS sections updated:
1
2

4
8
11

Additional information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Stewardship at 1-580-251-4335.

Key or legend to abbreviations and acronyms used in the safety data sheet

bw – body weight

CAS – Chemical Abstracts Service

d - day

EC50 – Effective Concentration 50%

ErC50 – Effective Concentration growth rate 50%

h - hour

LC50 – Lethal Concentration 50%

LD50 – Lethal Dose 50%

LL50 – Lethal Loading 50%

mg/kg – milligram/kilogram

mg/L – milligram/liter

mg/m³ - milligram/cubic meter

mm - millimeter

mmHg - millimeter mercury

NIOSH – National Institute for Occupational Safety and Health

NTP – National Toxicology Program

OEL – Occupational Exposure Limit

PEL – Permissible Exposure Limit

ppm – parts per million

STEL – Short Term Exposure Limit

TWA – Time-Weighted Average

UN – United Nations

w/w - weight/weight

Key literature references and sources for data

www.ChemADVISOR.com/

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