HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **CL-41**

Revision Date: 26-May-2015 **Revision Number:** 15

SECTION 1. Product and Company Identification

Product Identifier

Product Trade Name: CL-41
Synonyms: None
Chemical Family: Blend
Internal ID Code HM007329

Product Use

Application: Crosslinker

Manufacturer's Name and Contact Details

Name and Address Halliburton Energy Services
645 - 7th Ave SW Suite 2200
Calgary, AB
T2P 4G8
Canada

Emergency Telephone Number (281) 575-5000

Prepared By Chemical Stewardship
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

SECTION 2. Hazard(s) Identification

WHIMIS Classification

WHMIS Hazard Class E Corrosive Material

WHMIS Symbol(s)

Summary of hazards of the product

Hazard Overview May cause eye and skin burns. May cause respiratory irritation.

SECTION 3: Composition/information on Ingredients

Substances	CAS Number	PERCENT (w/w)	HMIRA Registry Number	Decision Granted Date
Lactic acid	50-21-5	10 - 30%	Not applicable	Not applicable
Inorganic salt	Proprietary	10 - 30%	8929	October 27, 2014

SECTION 4. First aid measures

Description of first aid measures

Inhalation If inhaled, remove to fresh air. If not breathing give artificial respiration (AR), preferably mouth-to-mouth. If breathing is difficult, oxygen should be given by trained personnel. If the heart has stopped, trained personnel should begin cardiopulmonary resuscitation (CPR) immediately. Get medical attention immediately.

Eyes In case of contact, or suspected contact, immediately flush eyes with plenty of water for at least 30 minutes while holding eyelids open and get medical attention immediately after flushing.

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. Never give anything by mouth to an unconscious person. If breathing has stopped, trained personnel should begin rescue breathing / artificial respiration (AR) immediately. If the heart has stopped, trained personnel should begin CPR immediately. Obtain medical attention immediately. If vomiting occurs naturally, have victim lie on their side, in recovery position, to reduce risk of aspiration, and obtain medical attention immediately.

Most important symptoms and effects, both acute and delayed

Causes severe eye irritation which may damage tissue. Causes severe skin irritation with tissue destruction. May cause respiratory irritation.

Indication of any immediate medical attention and special treatment needed

Notes to Physician Treat symptomatically

SECTION 5. Fire Fighting Measures

Extinguishing media

Suitable Extinguishing Media

All standard fire fighting media

Extinguishing media which must not be used for safety reasons

None known.

Special hazards arising from the substance or mixture

Special Exposure Hazards

Decomposition in fire may produce toxic gases.

Advice for firefighters

Special Protective Equipment for Fire-Fighters

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

Hazardous combustion products

Carbon monoxide and carbon dioxide.

SECTION 6. Accidental release measures

Personal precautions and emergency procedures

Protective Equipment

Use appropriate protective equipment.

Environmental Precautionary Measures

Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption

Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

SECTION 7. Handling and Storage

Precautions for safe handling

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

Conditions for safe storage and Incompatible materials for storage

Store in a cool well ventilated area. Keep container closed when not in use. Store away from alkalis. Store away from direct sunlight. Product has a shelf life of 24 months.

SECTION 8: Exposure Controls/Personal Protection

Occupational Exposure Limits

Exposure Limits

Substances	CAS Number	ACGIH TLV-TWA	OSHA PEL-TWA
Lactic acid	50-21-5	Not available	Not available
Inorganic salt	Proprietary	TWA: 2 mg/m^3	TWA: 2 mg/m^3

Appropriate engineering controls

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

Personal Protective Equipment (PPE)

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.
Dust/mist respirator. (N95, P2/P3)

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): Nitrile gloves. (>= 0.4 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 Rubber apron.

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

Other Precautions Eyewash fountains and safety showers must be easily accessible.

SECTION 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical State: Liquid
Odor: Odorless
Color: Clear
Odor Threshold: No information available

Property Remarks/ - Method	Values
pH:	1.8
pH Concentration of Solution:	No information available.
Freezing Point/Range	No information available.
Melting Point/Range	No information available
Boiling Point/Range (C):	No information available.
Flash Point/Range (C):	No information available. °C
Flash Point Method:	Not Determined
Autoignition Temperature (C):	No information available.

Flammability Limits in Air - Lower (%):	No information available.
Flammability Limits in Air - Upper (%):	No information available.
Evaporation Rate (Butyl Acetate=1):	No information available.
Vapor Pressure @ 20 C (mmHg):	No information available.
Vapor Density (Air=1):	No information available.
Specific Gravity @ 20 C (Water=1):	1.19
Solubility in Water (g/100ml):	Soluble
Solubility in other solvents	No information available.
Partition Coefficient/n-Octanol/Water:	No information available.
Decomposition Temperature (C):	No information available.
Viscosity	No information available
Explosive Properties	No information available
Oxidizing Properties	No information available

Other Information

Molecular Weight (g/mole):	No information available.
VOC Content (%)	No information available

SECTION 10. Stability and Reactivity

Conditions of Reactivity

Remarks	Not expected to be reactive.
Conditions to Avoid	None anticipated
Hazardous Polymerization:	Will Not Occur

Chemical Stability
Stable

Sensitivity to Static Discharge
Not available

Sensitivity to Mechanical Impact
Not available

Incompatible materials
Strong alkalis.

Hazardous Decomposition Products
Carbon monoxide and carbon dioxide.

SECTION 11. Toxicological Information

Routes of entry
Eye or skin contact, inhalation.

Information on Toxicological Effects

Acute effects from exposure

Inhalation	May cause respiratory irritation.
Eye Contact	Causes severe eye irritation which may damage tissue. May cause eye burns.
Skin Contact	Causes severe skin irritation with tissue destruction. May cause skin burns.
Ingestion	Irritation of the mouth, throat, and stomach. May cause abdominal pain, vomiting, nausea, and diarrhea.

Chronic effects from exposure

Chronic Effects/Carcinogenicity	No data available to indicate product or components present at greater than 0.1% are chronic health hazards.

Irritancy of product

Irritation	Causes severe irritation and or burns

Sensitization of product

Sensitization Not confirmed to cause skin or respiratory sensitization.

Mutagenicity

Mutagenic Effects Not regarded as mutagenic.

Carcinogenicity

Carcinogenic Effects No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC, NTP, or OSHA.

Reproductive toxicity

Reproductive Toxicity No information available

Teratogenicity/embryotoxicity

Teratogenic Not a confirmed teratogen or embryotoxin.

Toxicologically synergistic material Not available

Acute Toxicity

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Lactic acid	50-21-5	3543 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 7.94 mg/L (Rat, 4h)
Inorganic salt	Proprietary	1930 mg/kg (Rat) 2000 - 5000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	>6.1 mg/L (Rat, aerosol) 4h (Similar substance)

SECTION 12. Ecological Information

Toxicity

Ecotoxicity Effects

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Toxicity to Invertebrates
Lactic acid	50-21-5	EC50 (72h) > 2800 mg/L (Pseudokirchnerella subcapitata) EC50 (72h) > 10000 mg/L (Skeletonema costatum) EC50(72h) 3500 mg/L (Selenastrum capricornutum)	LC50 (96h) 130 mg/L (Oncorhynchus mykiss) LC50 (96h) 195 mg/L (Danio rerio) LC50 (96h) 660 mg/L (Scophthalmus maximus)	No information available	EC50 (48h) 130 mg/L (Daphnia magna) EC50 (48h) 6025 mg/L (Acartia tonsa)
Inorganic salt	Proprietary	EC50 (72h) 14 mg/L (growth rate) (Pseudokirchnerella subcapitata)	LC50 100 mg/L (Carassius auratus) LC50 (96h) 186 mg/L (Danio rerio) LC50 (42d) 15 ug/L (dissolved Aluminium) (Salmo trutta) NOEC (60d) 26 ug/L (mortality in Fry) (Salvelinus fontinalis) LC50 (96h) 104 mg/L (Danio rerio) (similar substance)	EC50 (3d) > 1000 mg/L (activated sludge)	EC50 (48h) 136 mg/L (Daphnia magna) EC50 (48h) > 200 mg/L (Daphnia magna) EC50 (48h) 38 mg/L (similar substance) NOEC (8d) 3.8 mg/L (reproduction) (Ceriodaphnia dubia) (Similar substance)

Persistence and Degradability

No information available

Bioaccumlation potential

Substances	CAS Number	Log Pow

Lactic acid	50-21-5	-0.62
Inorganic salt	Proprietary	No information available

Mobility in soil

Results of PBT and vPvB assessment
No information available.

Substances	PBT and vPvB assessment
Inorganic salt	Not PBT/vPvB

Other adverse effects
Endocrine Disruptor Information
This product does not contain any known or suspected endocrine disruptors

SECTION 13. Disposal Considerations

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

Contaminated Packaging Follow all applicable national or local regulations.

SECTION 14. Transport Information

Canadian TDG
UN Number: UN3265
UN Proper Shipping Name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Lactic Acid)
Transport Hazard Class(es): 8
Packing Group: III
EMS: EmS F-A, S-B

IATA/ICAO
UN Number: UN3265
UN Proper Shipping Name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Lactic Acid)
Transport Hazard Class(es): 8
Packing Group: III

IMDG/IMO
UN Number: UN3265
UN Proper Shipping Name: Corrosive Liquid, Acidic, Organic, N.O.S. (Contains Lactic Acid)
Transport Hazard Class(es): 8
Packing Group: III
EMS: EmS F-A, S-B

Special Precautions for User: None

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code:

SECTION 15: Regulatory Information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canadian Regulations
Canadian DSL Inventory All components listed on inventory or are exempt.

WHMIS Hazard Class E Corrosive Material

WHMIS Symbol(s)

US Regulations

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

SECTION 16. Other Information

Preparation Information

Prepared By

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Revision Date: 26-May-2015

SDS sections updated: 8

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
WHMIS: Workplace Hazardous Materials Information System

Key literature references and sources for data
www.ChemADVISOR.com/

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*****END OF MSDS*****