HALLIBURTON

SAFETY DATA SHEET

according to Regulation (EC) No. 453/2010

N-FLOW™ 408

Revision Date: 21-Sep-2015 **Revision Number:** 27

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product Identifier

Product Name N-FLOW™ 408
Internal ID Code HM006341

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

Recommended Use Additive
Sector of use Refer to the Annex for a listing of uses.

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

For further information, please contact
E-Mail address: fdunexchem@halliburton.com

1.4. Emergency telephone number

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

Emergency telephone - §45 - (EC)1272/2008	
Europe	**112**
Croatia	Centar za kontrolu otrovanja (CKO): (+385 1) 23-48-342 (Poison Control Center (PCC) - Institute for Medical Research and Occupational Health)
Cyprus	+210 7793777
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
Romania	+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

Serious Eye Damage / Eye Irritation	Category 1 - H318
Specific Target Organ Toxicity - (Single Exposure)	Category 3 - H335
Flammable liquids.	Category 3 - H226

2.2. Label Elements

Hazard Pictograms

Signal Word **Danger**

Hazard Statements
H226 - Flammable liquid and vapor
H318 - Causes serious eye damage
H335 - May cause respiratory irritation

Precautionary Statements - EU (§28, 1272/2008)
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
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 dry sand, dry chemical or alcohol-resistant foam for extinction

Contains

Substances	**CAS Number**
Ethyl lactate	687-47-8

2.3. Other Hazards
This substance is not considered to be persistent, bioaccumulating nor toxic (PBT).
This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

SECTION 3: Composition/information on Ingredients

3.1. Substances Substance

Substances	EINECS	CAS Number	PERCENT (w/w)	EU - CLP Substance Classification	REACH No.
Ethyl lactate	202-598-0	687-47-8	60 - 100%	Eye Corr. 1 (H318) STOT SE 3 (H335) Flam. Liq. 3 (H226)	01-2119516234-49

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

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Eyes Immediately flush eyes with large amounts of water for at least 30 minutes. Seek prompt medical attention.

Skin Wash with soap and water. Get medical attention if irritation persists.

Ingestion Do NOT induce vomiting. Give nothing by mouth. Obtain immediate medical attention.

4.2. Most Important symptoms and effects, both acute and delayed
Causes severe eye irritation which may damage tissue. 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

Decomposition in fire may produce harmful gases. Use water spray to cool fire exposed surfaces.

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

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

Contain spill with sand or other inert materials. Scoop up and remove. Isolate spill and stop leak where safe. Remove ignition sources and work with non-sparking tools.

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

Remove sources of ignition. 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. Ground and bond containers when transferring from one container to another.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

7.2. Conditions for safe storage, including any incompatibilities

Store away from oxidizers. Keep from heat, sparks, and open flames. Keep container closed when not in use. Product has a shelf life of 12 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
Ethyl lactate	687-47-8	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Germany	Spain	Portugal	Finland
Ethyl lactate	687-47-8	Not applicable	Not applicable	Not applicable	STEL: 10 ppm STEL: 49 mg/m³ TWA: 5 ppm TWA: 25 mg/m³

Substances	CAS Number	Austria	Ireland	Switzerland	Norway
Ethyl lactate	687-47-8	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Italy	Poland	Hungary	Czech Republic
Ethyl lactate	687-47-8	Not applicable	Not applicable	Not applicable	Not applicable

Substances	CAS Number	Denmark	Romania	Croatia	Cyprus
Ethyl lactate	687-47-8	Not applicable	Not applicable	Not applicable	Not applicable

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
Ethyl lactate	1.6 mg/m³	90 mg/m³	3.2 mg/m³	Not available	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
Ethyl lactate	6 mg/m³	54 mg/m³	2 mg/m³	Not available	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
Ethyl lactate	3.2 mg/L	Not available	Not available	Not available	Not available	Not available	Not available	Not available	Not available

8.2. Exposure controls

Engineering Controls Use in a well ventilated area.

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. Organic vapor 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): Nitrile gloves. (>= 0.35 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.

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:**	Clear colorless
Odor:	Characteristic	**Odor Threshold:**	No information available

Property	Values	Remarks/ - Method
pH:	7.4 (10%)	
Freezing Point/Range	No data available	
Melting Point/Range	No data available	
Boiling Point/Range	154 °C / 309 °F	
Flash Point	46 °C / 115 °F	PMCC
Flammability (solid, gas)	No data available	
upper flammability limit	11.4%	
lower flammability limit	1.5%	
Evaporation rate	0.22	
Vapor Pressure	5 mmHg	
Vapor Density	4.07	
Specific Gravity	1.03	
Water Solubility	Miscible with water	
Solubility in other solvents	No data available	
Partition coefficient: n-octanol/water	-0.18	
Autoignition Temperature	400 °C / 752 °F	
Decomposition Temperature	No data available	
Viscosity	No data available	
Explosive Properties	No information available	
Oxidizing Properties	No information available	

9.2. Other information

Molecular Weight	118.13 g/mol
VOC Content (%)	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 oxidizers.
10.6. Hazardous Decomposition Products
Carbon monoxide and carbon dioxide.

SECTION 11: Toxicological Information

11.1. Information on Toxicological Effects

Acute Toxicity

Inhalation	May cause respiratory irritation.
Eye Contact	Causes serious eye damage. May cause permanent eye damage.
Skin Contact	May cause skin irritation.
Ingestion	Irritation of the mouth, throat, and stomach.

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

Component Information

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethyl lactate	687-47-8	> 2000 mg/kg (Rat)	5000 mg/kg (Rat) >5000 mg/kg (Rabbit)	> 5.4 mg/L (Rat) 4h

Substances	CAS Number	Skin corrosion/irritation

Ethyl lactate	687-47-8	Non-irritating to the skin rabbit

Substances	CAS Number	Eye damage/irritation
Ethyl lactate	687-47-8	Causes severe eye irritation which may damage tissue.

Substances	CAS Number	Skin Sensitization
Ethyl lactate	687-47-8	Did not cause sensitization on laboratory animals (mouse)

Substances	CAS Number	Respiratory Sensitization
Ethyl lactate	687-47-8	No information available

Substances	CAS Number	Mutagenic Effects
Ethyl lactate	687-47-8	In vitro tests did not show mutagenic effects

Substances	CAS Number	Carcinogenic Effects
Ethyl lactate	687-47-8	No information available.

Substances	CAS Number	Reproductive toxicity
Ethyl lactate	687-47-8	Not a confirmed reproductive toxicant.

Substances	CAS Number	STOT - single exposure
Ethyl lactate	687-47-8	May cause respiratory irritation.

Substances	CAS Number	STOT - repeated exposure
Ethyl lactate	687-47-8	No significant toxicity observed in animal studies at concentration requiring classification.

Substances	CAS Number	Aspiration hazard
Ethyl lactate	687-47-8	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
Ethyl lactate	687-47-8	EC50(96h): 3500 mg/L (Pseudokirchnerella subcapitata, growth rate) EC50(96h): 2300 mg/L ((Pseudokirchnerella subcapitata, biomass)	LC50(96h): 320 mg/L (Danio rerio)	No information available	EC50(48h): 683 mg/L (Daphnia magna)

12.2. Persistence and degradability

Substances	CAS Number	Persistence and Degradability
Ethyl lactate	687-47-8	Readily biodegradable (> 98% @ 28d)

12.3. Bioaccumulative potential

Substances	CAS Number	Log Pow
Ethyl lactate	687-47-8	0.31

12.4. Mobility in soil

Substances	CAS Number	Mobility
Ethyl lactate	687-47-8	KOC = 1

12.5. Results of PBT and vPvB assessment

This substance is not considered to be persistent, bioaccumulating nor toxic (PBT). This substance is not considered to be very persistent nor very bioaccumulating (vPvB).

Substances	PBT and vPvB assessment
Ethyl lactate	Not PBT/vPvB

12.6. Other adverse effects

Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

SECTION 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.

SECTION 14: Transport Information

IMDG/IMO

UN Number: UN1192
UN Proper Shipping Name: Ethyl Lactate
Transport Hazard Class(es): 3
Packing Group: III
Environmental Hazards: Not applicable

RID

UN Number: UN1192
UN Proper Shipping Name: Ethyl Lactate
Transport Hazard Class(es): 3
Packing Group: III
Environmental Hazards: Not applicable

ADR

UN Number: UN1192
UN Proper Shipping Name: Ethyl Lactate
Transport Hazard Class(es): 3
Packing Group: III
Environmental Hazards: Not applicable

IATA/ICAO

UN Number: UN1192
UN Proper Shipping Name: Ethyl Lactate
Transport Hazard Class(es): 3
Packing Group: III
Environmental Hazards: Not applicable

14.1. UN Number: UN1192

14.2. UN Proper Shipping Name: Ethyl Lactate

14.3. Transport Hazard Class(es): 3

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

SECTION 15: Regulatory Information

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/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
Yes

SECTION 16: Other Information

Full text of H-Statements referred to under sections 2 and 3
H226 - Flammable liquid and vapor
H318 - Causes serious eye damage
H335 - May cause respiratory irritation

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/
OSHA
ECHA C&L

Revision Date: 21-Sep-2015
Revision Note
SDS sections updated: 1

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

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End of Safety Data Sheet