

SUSTAINALUBE

Hydraulic Fluid

Sustainalube has developed and produces a patented hydraulic fluid. The hydraulic fluid is a proven alternative to traditional hydraulic fluids in excavators and industrial hydraulics. It is fossil free and has a very low impact on climate as well as eco systems. The benefits can be summarised as:

- Non-toxic and renewable (origin from Sweden)
- Viscosity can be tuned between 10-1000 mPas
- Water soluble but no free water. The hydraulic fluid does, however, also contain rust inhibitors to avoid corrosion problems.
- Very low friction in full film elastohydrodynamic lubrication. Tests at 1.5 GPa pressure shows friction coefficients as low as 0.01, that is 4-5 times lower than mineral oil.
- Safe to handle from a health perspective (skin, eyes, lungs).
- High heat capacity and thermal conductivity, i.e. much better coolant than mineral oils. It has been shown that the glycerol based fluid operates at 10 degrees lower temperature under the same operating conditions.
- Easy to clean by flushing water. Since the fluid is water soluble it is very easy to keep equipment clean. It is, furthermore, no environmental risks to flush glycerol on the ground.
- Fire-resistant. Can be classified as HFC.
- Very low freezing point (-50°C)
- Does not form aerosols as oils do.
- Much more incompressible than oils, i.e. faster response in hydraulic systems.
- In general lower losses in hydraulic systems in comparison to mineral oils.

The fluid has undergone standard tests according to ISO 12922 and is in use in one of the largest steel plants in Europe.

Test Method	Standard / Unit	Requirements ISO 12922	Result LTU
Corrosion protection ISO 404-1	-steel, copper and brass, mg	+5 to -11	+2
	-aluminum, mg	+5 to -5	+1
	-zinc, mg	+5 to -22	-5
Rust prevention test	ASTM D 665 A	-	Pass (not required)
copper strip corrosion	ASTM D 130	-	1b (not required)
Fire resistance Spray ignition characteristics	ISO 15029-1 / ISO/TS 15029-2 seconds RI Index		
-time to extinguishment of flame, max.		30 negotiated between supplier and user	0
Wick flame persistence -mean flame persistence, max.	ISO 14935seconds	60	0
Manifold ignition test -ignition temperature, min.-flame propagation, min.	ISO 20823°Ccrating	600 Value to be reported by the supplier. No limit is specified	<560 °C

Safety data sheet

Sustainalube Eco Hydraulic Fluid

Version 2.0

Effective date: 2020-06-10

SUSTAINALUBE

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY / UNDERTAKING

1.1 Product identifier

Trade name: Sustainalube
Eco Hydraulic Fluid

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

Product use: Hydraulic Fluid

1.3 Details of the Supplier of the safety data sheet

Company: Sustainalube
Aurorum 1C
977 75 Luleå
Sweden
Phone: +46 (0)70 476 22 60

Contact: Christian Olsson - christian.olsson@sustainalube.com
For questions regarding this safety data sheet, please contact:
johanna.wachtmeister@trossa.se

1.4 Emergency telephone number:

Use your local emergency number.

SECTION 2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture.

Not classified.

However, a safety data sheet is provided for the product on request, as it contains a substance for which there is an Occupational Exposure Limit.

2.2 Label Elements 1272/2008 CLP:

Not classified.

Additional labelling:

EUH 210 Safety data sheet available on request.

Otherwise, not subject to labeling according to Regulation EC 1272/2008 (CLP).

Other information:

The product does not meet the criteria for PBT or vPvB according to Annex XIII REACH 1907/2006.

2.3 Other Hazards

No other known hazards are associated with the product.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Safety data sheet

Sustainalube Eco Hydraulic Fluid

SUSTAINALUBE

Version 2.0

Effective date: 20-05-2020

3.2 Mixture

Glycerol based lubricant.

CAS/EC-no.	REACH-no.	Name	Content %	Classification CLP
1310-58-3 / 215-181-3	01-2119487136- 33-xxxx	Potassium hydroxide (a, c)	<0,5 (b)	Acute Tox. 4; H302, Skin Corr. 1A; H314.

- a) *EC-harmonized binding classification according to annex VI, part 3, table 3.1 and 3.2 in Regulation (EC) no. 1272/2008 (CLP).*
- b) *The amount of actual potassium hydroxide is based on the PH of the compound which is 10.8 (Eco Hydraulic Fluid and 11.0 (...Summer)). That corresponds to a concentration of potassium hydroxide on 0.0354 and 0.0561 g/litre which in weight % is 0.00281 and 0.00445% (If you count the density of glycerol).*
- c) *Substance for which there is threshold values in the work environment according to The Work Environment Acts regulation AFS 2015:7 about occupational exposure limits.*

The product mainly contains glycerol, but also water, C16 and C18-fatty acids, methyl ester, mono and diglycerides of those, additive etc. These components are either unclassified or are included in such a small amount they don't need to be covered in the table above.

3.3 Additional information:

See full text of H-phrases in section 16.

SECTION 4. FIRST AID MEASURES

4.1 Description of first aid measures

Inhalation:

Not relevant.

Skin contact:

Remove contaminated clothing. Wash skin with water

Eye contact:

Flush with soft water jet or eye rinse solution for several minutes. Please use tempered water. Keep the eyelids wide apart, remove any contact lenses. If symptoms persist consult a doctor.

Ingestion:

Rinse mouth and drink water.

Information to doctor:

No specific information.

4.2 Most important symptoms and effects, both acute and delayed:

Inhalation: Not expected to give acute or delayed symptoms.
Skin contact: May cause mild/temporary irritation.
Eye contact: May cause temporary irritation. Probably causes discomfort, but is not expected to produce any serious symptoms.
Ingestion: Minor amount is not expected to give acute or delayed symptoms. Large amounts may cause burning in the throat, nausea and vomiting.

Safety data sheet

Sustainalube Eco Hydraulic Fluid

Version 2.0

Effective date: 20-05-2020

SUSTAINALUBE

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

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SECTION 5. FIRE FIGHTING MEASURES

5.1 Extinguishing media: Use alcohol resistant foam, carbon dioxide or water fog.
Use the same extinguishing media as recommended for the surroundings.

Unsuitable extinguishing media:
Do not use a water jet.

5.2 Special hazards arising from the substance or mixture
Flammable, but not easy to ignite.
In case of fire, toxic gases may develop, such as carbon oxides and nitrogen oxides.

5.3 Advice for firefighters: Use precautions according to standard procedures in the presence of chemical fires. Use breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid contact with skin and eyes. Wear protective gloves and goggles when handling large amounts. Otherwise, no special protective measures are required.

6.2 Environmental precautions:
Avoid discharge to lakes, streams, sewers, etc.

6.3 Methods and material for containment and cleaning up:
Absorb with a liquid binding material such as sand, soil or similar. Collect and treat as conventional waste. Rinse away residues with plenty of water.

6.4 Reference to other sections:
See Section 8 for Exposure controls/personal protection and Section 13 for disposal considerations.

SECTION 7. HANDLING AND STORAGE

7.1 Precautions for safe handling:
Do not eat, drink and smoke when handling the product. Use normal hand sanitation.

7.2 Conditions for safe storage, including any incompatibilities:
Store in a cool, dry place, out of direct sunlight.

7.3 Specific end use(s): This product should only be used for the applications described in Section 1.2.

Safety data sheet

Sustainalube Eco Hydraulic Fluid

Version 2.0

Effective date: 20-05-2020

SUSTAINALUBE

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limits EH40 (Great Britain):

CAS-no:	Name:	Limits 8 h.:	Limits 15 min.:	Ref:
1310-58-3	Potassium hydroxide	-	2 mg/m ³	EH40

DNEL / PNEC:

-

8.2 Exposure controls

Appropriate technical measures:

Normal room ventilation.

General information / Hygiene measures:

Measures are in place to prevent direct contact. The facilities to rinse eyes may be available at your place of work. Also, safety showers may be available if handling large amounts.

Personal protective equipment:

Only CE-marked personal protection equipment should be used.

Respiratory protection:

Normal not required.

Hand protection:

Normal not required.
Protective gloves should be used when handling large quantities.
Recommended glove material: butyl rubber, neoprene or nitrile.

Eye protection:

Normal not required.
Protective goggles should be used when handling large quantities or when there is risk of splashes.

Other protection:

Normal not required.

Thermal hazard:

Not relevant.

Measures to avoid environmental exposure:

Avoid excessive release to the environment.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Appearance:
Liquid

Color:
Yellow-brown

Odour:
Weak,
characteristic

PH:
10.8-11

Viscosity 40°C:
- mm²/s*

Safety data sheet

Sustainalube Eco Hydraulic Fluid

SUSTAINALUBE

Version 2.0

Effective date: 20-05-2020

Flash point: >200°C – ASTM D92	Boiling point: -	Vapour pressure: -	Density: -	Lowest pour point: -49°C – ASTM D5950
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Evaporation rate: -	Auto-ignition: -	Explosive limits -	Solubility in water: -
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Viscosity -20°C: - mm²/s - EN ISO 3104:1996

Viscosity 100°C: - mm²/s

Information about the following is missing or is not relevant:

Odour threshold, melting point, boiling point, evaporation rate, flammability and explosive limits, vapor pressure, vapor density, relative density, solubility in water and organic solvents, partition coefficient (Log Pow), auto-ignition temperature, decomposition temperature, explosive and oxidizing properties.

9.2 Other information:

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SECTION 10. STABILITY AND REACTIVITY

- 10.1 Reactivity:** The product is not reactive in normal handling and storage as recommended in section 7.
- 10.2 Chemical stability:** The product is stable under normal handling and storage as recommended in section 7.
- 10.3 Possibility of hazardous reactions:** None known.
- 10.4 Conditions to avoid:** No specific conditions to avoid.
- 10.5 Incompatible materials:** Oxidizing agents, strong acids and bases.
- 10.6 Hazardous decomposition products:** In case of fire, acrolein is formed from glycerol, which is toxic and appears to be highly corrosive to the lungs and eyes. (3).

SECTION 11. TOXICOLOGICAL INFORMATION

No toxicological data is available for the product or its components. The product is not classified as hazardous to health, and is not expected to have any negative effects on health, but should be handled according to good industrial practice.

11.1 Information on Toxicological effects

- Acute toxicity:** Not acutely toxic.
- Glycerol (3):
Oral – LD50 – Rat: 12600 mg/kg
Dermal – LD50 – Rabbit: >10000 mg/kg
Inhalation – LC50 – Rabbit: 0.57 mg/l/1 h.

Safety data sheet

Sustainalube Eco Hydraulic Fluid

SUSTAINALUBE

Version 2.0

Effective date: 20-05-2020

Fatty acids methylate, C16-18 and C18 (3):

Oral – LD50 – Rat: >2000 mg/kg

Skin corrosion/irritation: Not classified, but contains a very small amount of potassium hydroxide which is corrosive to the skin, prolonged or repeated skin contact may also cause temporary irritation.

Serious eye damage/irritation: Not classified, but contains a very small amount of potassium hydroxide which is corrosive, splashes also may cause burning and temporary irritation.

Respiratory or skin sensitisation: Not classified.

Germ cell mutagenicity: Not classified.

Carcinogenicity: Not classified.

Reproductive toxicity: Not classified.

Specific target organ toxicity - single exposure: Not classified.

Specific target organ toxicity – repeated exposure: Not classified.

Aspiration hazard: Not classified.

Additional Information: -

SECTION 12. ECOLOGICAL INFORMATION

No toxicological data is available for the product or its components. The product is not classified as hazardous to the environment and is not expected to result in any negative environmental consequences, but should be handled according to good industrial standards.

12.1 Toxicity: Eco-Chain is expected to have low acute and chronic aquatic toxicity. The contained constituents glycerol and fatty acids methylate, C16-18 and C18 components are considered to have very low acute toxicity.

Eco Hydraulic Fluid (4):

Daphnia – EC50 – 48 h.: >500 mg/l – OECD 202

Glycerol (3):

Fish (Oncorhynchus mykiss) – LC50 – 96 h.: 67500 mg/l

Fatty acids methylate, C16-18 and C18 (3):

Fish (Leuciscus idus) – LC50 – 48 h.: 5500 mg/l

12.2 Persistence and degradability:

Eco Hydraulic Fluid is easily biodegradable. The constituent components of glycerol and fatty acids methylate, C16-18 and C18 are quite easily degradable.

Safety data sheet

Sustainalube Eco Hydraulic Fluid

Version 2.0

Effective date: 20-05-2020

SUSTAINALUBE

Eco Hydraulic Fluid (4):
>94 % - 28 days – OECD 301A.
Glycerol (3):
63 % - 14 days – OECD 301C. BOD5/COD= 1.
Fatty acids methylate, C16-18 and C18 (3):
54 % - 30 days – OECD 301C.

12.3 Bioaccumulative potential:

Main component glycerol has no potential for bioaccumulation. BCF: 0.017

Log Pow: -1.76

12.4 Mobility in soil:

Main component glycerol is soluble in

12.5 Result of PBT and vPvB assesment:

The product does not meet the criteria for PBT or vPvB according to Annex XIII REACH 1907/2006.

12.6 Other adverse effects: None known.

SECTION 13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods:

Product: Classified as conventional waste according to the Commission Regulation (EU) No 1357/2014 on waste.

EWC-code: readily biodegradable engine, gear and lubricating oils.

Do not allow to enter drains or watercourses, etc.

Packaging:

Empty containers are treated as conventional waste and sent for recycling or incineration.

SECTION 14. TRANSPORT INFORMATION

This product is not classified as dangerous of transport.

This product is not regulated per IATA.

	ADR/RID	IMDG/IMO
14.1 UN number	-	-
14.2 UN proper shipping name	-	-
14.3 Transport hazard class(es)	-	-
14.4 Packing group	-	-

Safety data sheet

Sustinalube Eco Hydraulic Fluid

SUSTAINALUBE

Version 2.0

Effective date: 20-05-2020

14.5 Environmental hazards - MP	- -	- -
Other informations	LQ: - Tunnel -	LQ: - Tunnel -

14.6 Special precautions for user:

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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:

Sources:

Pressure Equipment (Amendment) Regulations 2011. Chemicals (Hazard Information and Packaging for Supply) Regulations 2009. Control of Substances Hazardous to Health Regulations 2002 (as amended). Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (as amended). Personal Protective Equipment Regulations 2002. Personal Protective Equipment at Work Regulations 1992. Hazardous Waste (England and Wales) Regulations 2005(as amended). EC regulation 1907/2006 (REACH) Directive 2000/532/EC. Seveso directive: 96/82/EC. EU 453/2010. REACH 1907/2006. CLP 1272/2008.

Additional information:

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15.2 Chemical safety assessment:

Chemical safety assessments have not been performed for this product.

SECTION 16. OTHER INFORMATION

Test-data is prioritized at classification of the product. In absence of such, the classification-rules in the regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures (CLP) have been used.

Full text of H-phrases as mentioned in section 3:

H302 Harmful if swallowed.

H314 Causes severe skin burns and eye damage.

Abbreviations:

BCF: Bio Concentration Factor

EC50: Effective Concentration 50 %

ECHA: European Chemical Agency

IC50: Inhibitory Concentration 50 %

Safety data sheet

Sustainalube Eco Hydraulic Fluid

SUSTAINALUBE

Version 2.0

Effective date: 20-05-2020

LC50:	Lethal Concentration 50 %
LD50:	Lethal Dose 50 %
Log Pow:	Partition coefficient: n-octanol
PBT:	Persistent Bio-accumulative and Toxic substance
vPvB:	very Persistent and very Bio-accumulative substance

Advice about education:

To use this product, you should have an education that is relevant to the properties of the product and relevant use.

- 1) *Classification & Labelling Inventory Database, ECHA.*
- 2) *Registered substances, ECHA.*
- 3) *Chemical substances online, Prevent.*
- 4) *Information from manufacturer.*

Version description:

This safety data sheet has been prepared in accordance with title IV and annex II in the regulation (EC) No 1907/2006 of the European parliament and of the council (REACH).

The information has been modified under the following sections in the safety data sheet: 1.

The safety data sheet is dated 2017-07-07 and replaces the version dated 2017-02-02.
