SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006

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

1.1. Product identifier

Trade name or designation of the mixture	FERODO Brake Fluid
Registration number	-
Synonyms	DOT 5.1 - All grades, DOT 4 - grades with Wet Boiling Points > 165 °C.
Issue date	22-May-2013
Version number	05
Revision date	09-November-2020
Supersedes date	01-September-2015

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

Identified uses	Hydraulic fluid in automotive brake/clutch system.
Uses advised against	None known.

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier

Company name	Federal-Mogul Global Aftermarket EMEA bvba
Address:	Prins Boudewijnlaan 5 B-2550 Kontich Belgium
Contact person:	Mario Garelli – Product Manager Braking Products EMEA E-mail: mario.garelli@driv.com
Telephone:	+39 045 8281 354
1.4. Emergency Telephone:	INFOTRAC: 001-352-323-3500 Belgium Poison Center (Centre Antipoison): +32 070 245 245

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

The mixture has been assessed and/or tested for its physical, health and environmental hazards and the following classification applies.

Classification according to Regulation (EC) No 1272/2008 as amended

Health hazards

Reproductive toxicity	Category 2	H361d - Suspected of damaging the unborn child.

Hazard summary Possible reproductive hazard. Occupational exposure to the substance or mixture may cause adverse health effects.

2.2. Label elements

Label according to Regulation (EC) No. 1272/2008 as amended

Contains: Tris[2-[2-(2-methoxyethoxy) ethoxy]ethyl] orthoborate

Hazard pictograms

Signal word Warning

Hazard statements

H361d Suspected of damaging the unborn child.

Precautionary statements

Prevention

P102 Keep out of reach of children.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Response

P308 + P313 IF exposed or concerned: Get medical advice/attention.

Storage

P405 Store locked up.

Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

Supplemental label information None.

2.3. Other hazards This mixture does not contain substances assessed to be vPvB / PBT according to Regulation (EC) No 1907/2006, Annex XIII.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

General information

Chemical name	%	CAS-No. / EC No.	REACH Registration No.	Index No.	Notes
Tris[2-[2-(2-methoxyethoxy) ethoxy]ethyl] orthoborate	30 - 90	30989-05-0 250-418-4	01-2119462824-33	-	
Classification: Repr. 2;H361					
Triethylene glycol monobutyl ether	1.0 - 9.9	143-22-6 205-592-6	01-2119475107-38	603-183-00-0	
Classification: Eye Dam. 1;H318					
Butyl Polyglycol	0 - 5	9004-77-7 500-012-0	01-2119475115-41	-	
Classification: Eye Dam. 1;H318					
2-(2-Methoxyethoxy)ethanol	0 - < 3	111-77-3 203-906-6	01-2119475100-52	603-107-00-6	#
Classification: Repr. 2;H361d					

List of abbreviations and symbols that may be used above

#: This substance has been assigned Community workplace exposure limit(s).

Composition comments All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. The full text for all H-statements is displayed in section 16.

SECTION 4: First aid measures

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. IF exposed or concerned: Get medical advice/attention.

4.1. Description of first aid measures

Inhalation Move injured person into fresh air and keep person calm under observation. Get medical attention if any discomfort continues.

Skin contact Remove contaminated clothes and rinse skin thoroughly with water. Get medical attention if irritation develops and persists.

Eye contact Flush thoroughly with water for at least 15 minutes. Get medical attention if irritation persists after washing.

Ingestion Rinse mouth thoroughly with water and give large amounts of milk or water, if person is conscious. Only induce vomiting at the instruction of medical personnel. Get medical attention if any discomfort continues.

4.2. Most important symptoms and effects, both acute and delayed Exposed individuals may experience eye tearing, redness, and discomfort. Defats the skin. Central nervous system. Headaches, dizziness and nausea. May cause abdominal discomfort if swallowed.

4.3. Indication of any immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Symptoms may be delayed.

SECTION 5: Firefighting measures

General fire hazards The product is non-combustible. Will burn if involved in a fire.

5.1. Extinguishing media

Suitable extinguishing media Alcohol resistant foam. Dry powder. Water mist.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

5.2. Special hazards arising from the substance or mixture During fire, gases hazardous to health may be formed.

5.3. Advice for firefighters

Special protective equipment for firefighters	Self-contained breathing apparatus and full protective clothing should be worn when fighting chemical fires. Selection of respiratory protection for firefighting: follow the general fire precautions indicated in the workplace.
Special fire fighting procedures	Use standard firefighting procedures and consider the hazards of other involved materials. Containers close to fire should be removed immediately or cooled with water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist/vapours. Avoid contact with skin and eyes. Ensure adequate ventilation.
For emergency responders	Use personal protection recommended in Section 8 of the SDS.
6.2. Environmental precautions	Avoid discharge into drains, water courses or onto the ground.
6.3. Methods and material for containment and cleaning up	Use water spray to reduce vapours or divert vapour cloud drift. The product is soluble in water. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use.
6.4. Reference to other sections	For personal protection, see section 8 of the SDS. For waste disposal, see section 13 of the SDS.

SECTION 7: Handling and storage

7.1. Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist/vapours. Avoid contact with skin and eyes. Avoid prolonged exposure. Pregnant or breastfeeding women must not handle this product. Provide adequate ventilation. Wear appropriate personal protective equipment. Do not eat, drink or smoke when using the product. See Section 8 for personal protective equipment. Observe good industrial hygiene practices.
7.2. Conditions for safe storage, including any incompatibilities	Store locked up. Keep container in a well-ventilated place. Store between 15°C - 30°C (60°F - 86°F). Store away from incompatible materials (see section 10 of the SDS).
7.3. Specific end use(s)	Hydraulic fluid in automotive brake/clutch system.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Occupational exposure limits

UK. EH40 Workplace Exposure Limits (WELs)

Components	Type	Value
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)	TWA	50.1 mg/m3
		10 ppm

EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU, 2017/164/EU

Components	Type	Value
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)	TWA	50.1 mg/m3
		10 ppm

Biological limit values	No biological exposure limits noted for the ingredient(s).
Recommended monitoring procedures	Follow standard monitoring procedures.

Derived no effect levels (DNELs)

General Population

Components	Value	Assessment factor	Notes
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)			
Long-term, Systemic, Dermal	1.33 mg/kg bw/day	30	Repeated dose toxicity
Long-term, Systemic, Inhalation	30.1 mg/m3		
Long-term, Systemic, Oral	7.5 mg/kg bw/day	120	Repeated dose toxicity

Butyl Polyglycol (CAS 9004-77-7)			
Long-term, Systemic, Dermal	160 mg/kg bw/day	40	Repeated dose toxicity
Long-term, Systemic, Inhalation	149 mg/m3	10	Repeated dose toxicity
Long-term, Systemic, Oral	16 mg/kg bw/day	40	Repeated dose toxicity
Triethylene glycol monobutyl ether (CAS 143-22-6)			
Long-term, Systemic, Dermal	125 mg/kg/day	40	Repeated dose toxicity
Long-term, Systemic, Inhalation	117 mg/m3	10	Repeated dose toxicity
Long-term, Systemic, Oral	12.5 mg/kg/day	40	Repeated dose toxicity
Tris[2-[2-(2-methoxyethoxy) ethoxy]ethyl] orthoborate (CAS 30989-05-0)			
Long-term, Systemic, Dermal	4.1 mg/kg bw/day	60	Repeated dose toxicity
Long-term, Systemic, Inhalation	7.2 mg/m3	25	
Long-term, Systemic, Oral	4.1 mg/kg bw/day	60	Repeated dose toxicity

Workers

Components	Value	Assessment factor	Notes
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)			
Long-term, Systemic, Dermal	2.22 mg/kg bw/day	18	Repeated dose toxicity
Long-term, Systemic, Inhalation	50.1 mg/m3		
Butyl Polyglycol (CAS 9004-77-7)			
Long-term, Systemic, Dermal	265 mg/kg bw/day	24	Repeated dose toxicity
Long-term, Systemic, Inhalation	245 mg/m3	6	Repeated dose toxicity
Triethylene glycol monobutyl ether (CAS 143-22-6)			
Long-term, Systemic, Dermal	208 mg/kg/day	24	Repeated dose toxicity
Long-term, Systemic, Inhalation	195 mg/m3	6	Repeated dose toxicity
Tris[2-[2-(2-methoxyethoxy) ethoxy]ethyl] orthoborate (CAS 30989-05-0)			
Long-term, Systemic, Dermal	8.3 mg/kg bw/day	30	developmental toxicity / teratogenicity
Long-term, Systemic, Inhalation	29.1 mg/m3	12.5	developmental toxicity / teratogenicity

Predicted no effect concentrations (PNECs)

Components	Value	Assessment factor	Notes
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)			
Freshwater	12 mg/l	100	
Intermittent releases	12 mg/l		
Marine water	1.2 mg/l	1000	
Secondary poisoning	0.09 g/kg	200	Oral
Sediment (freshwater)	44.4 mg/kg		
Sediment (marine water)	0.44 mg/kg		
Soil	2.1 mg/kg		
STP	10000 mg/l	1	
Butyl Polyglycol (CAS 9004-77-7)			
Freshwater	4.5 mg/l	100	
Marine water	0.31 mg/l	1000	
Secondary poisoning	111 mg/kg	90	Oral
Sediment (freshwater)	6.6 mg/kg	1000	
Sediment (marine water)	0.66 mg/kg	10000	
Soil	1.32 mg/kg		
STP	500 mg/l	10	
Triethylene glycol monobutyl ether (CAS 143-22-6)			
Freshwater	2 mg/l	50	
Intermittent releases	8.4 mg/l		
Marine water	0.2 mg/l	500	
Secondary poisoning	111 mg/kg	90	Oral
Sediment (freshwater)	7.7 mg/kg		
Sediment (marine water)	0.77 mg/kg		
Soil	0.47 mg/kg		
STP	200 mg/l	10	
Tris[2-[2-(2-methoxyethoxy) ethoxy]ethyl] orthoborate (CAS 30989-05-0)			
Freshwater	0.211 mg/l	1000	
Intermittent releases	2.112 mg/l		
Marine water	0.021 mg/l	10000	
Sediment (freshwater)	0.76 mg/kg		
Sediment (marine water)	0.076 mg/kg		
Soil	0.028 mg/kg		
STP	100 mg/l	10	

Exposure guidelines

UK EH40 WEL: Skin designation

2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)	Can be absorbed through the skin.

8.2. Exposure controls

Appropriate engineering controls	Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information	Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment.
Eye/face protection	Wear safety glasses with side shields (or goggles). Use eye protection conforming to EN 166.
Skin protection	
- Hand protection	Chemical resistant gloves. Wear suitable gloves tested to EN374. Full contact: Glove material: Butyl rubber. Use gloves with breakthrough time of >480 minutes minutes. Minimum glove thickness 0.3 mm. Nitrile. Use gloves with breakthrough time of > 480 minutes. Minimum glove thickness 0.2 mm.
- Other	Wear appropriate clothing to prevent repeated or prolonged skin contact.
Respiratory protection	In case of inadequate ventilation or when the product is heated, use suitable respiratory equipment with gas filter (type A2).
Thermal hazards	When material is heated, wear gloves to protect against thermal burns.
Hygiene measures	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Observe any medical surveillance requirements.
Environmental exposure controls	Environmental manager must be informed of all major releases. Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. Fume scrubbers, filters or engineering modifications to the process equipment may be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance	
Physical state	Liquid.
Form	Liquid.
Colour	Amber.
Odour	Mild.
Odour threshold	Not available.
pH	7 - 10.5
Melting point/freezing point	< -50 °C (< -58 °F)
Initial boiling point and boiling range	> 260 °C (> 500 °F)
Flash point	> 120.0 °C (> 248.0 °F)
Evaporation rate	0.01 (Butyl acetate = 100)
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapour pressure	1 mbar
Vapour density	Not available.
Relative density	Not available.
Solubility(ies)	Soluble in water.
Partition coefficient (n-octanol/water)	1.5
Auto-ignition temperature	> 280 °C (> 536 °F)
Decomposition temperature	300 °C (572 °F)
Viscosity	5 - 10 cSt @ (20°C)
Explosive properties	Not explosive.

Oxidising properties Not oxidising.

9.2. Other information

Density 1.02 - 1.07 g/cm³

SECTION 10: Stability and reactivity

10.1. Reactivity The product is stable and non reactive under normal conditions of use, storage and transport.

10.2. Chemical stability Stable under normal temperature conditions. Glycol Ethers can form peroxides on storage – do not distil to dryness.

10.3. Possibility of hazardous reactions Will not occur.

10.4. Conditions to avoid Avoid exposure to high temperatures or direct sunlight. Contact with incompatible materials.

10.5. Incompatible materials Strong oxidizers, strong acids, and strong bases. Strong reducing agents.

10.6. Hazardous decomposition products Fire or high temperatures create: Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

General information Occupational exposure to the substance or mixture may cause adverse effects.

Information on likely routes of exposure

Inhalation Glycol does not easily form a vapour at normal temperatures. Therefore, it must be heated or misted before inhalation exposure can occur.

Skin contact Prolonged or repeated contact may dry skin and cause dermatitis.

Eye contact Based on available data, the classification criteria are not met.

Ingestion May cause discomfort if swallowed.

Symptoms Exposed individuals may experience eye tearing, redness, and discomfort. Defats the skin. Central nervous system. May cause abdominal discomfort if swallowed. Headaches, dizziness and nausea.

11.1. Information on toxicological effects

Acute toxicity Not expected to be acutely toxic.

Product	Species	Test Results
FERODO Brake Fluid (CAS Mixture)		
Acute		
Dermal		
LD50	Rabbit	> 3000 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg

Components	Species	Test Results
2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)		
Acute		
Dermal		
LD50	Rabbit	8980 ml/kg
Oral		
LD50	Rat	6700 ml/kg
Triethylene glycol monobutyl ether (CAS 143-22-6)		
Acute		
Dermal		
LD50	Rabbit	3540 mg/kg
Oral		
LD50	Rat	5300 mg/kg

Skin corrosion/irritation Based on available data, the classification criteria are not met.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory sensitisation Based on available data, the classification criteria are not met.

Skin sensitisation Based on available data, the classification criteria are not met.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Based on available data, the classification criteria are not met.

Reproductive toxicity Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure	Based on available data, the classification criteria are not met.
Specific target organ toxicity - repeated exposure	Based on available data, the classification criteria are not met.
Aspiration hazard	Based on available data, the classification criteria are not met.
Mixture versus substance information	No information available.
Other information	Glycol ethers: Some glycol ethers cause adverse effects in animals that include the reproductive system, offspring, blood, kidney and liver.

SECTION 12: Ecological information

12.1. Toxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Triethylene glycol monobutyl ether (CAS 143-22-6)			
Aquatic			
Acute			
Fish	LC50	Pimephales promelas	2400 mg/l, 96 hours

12.2. Persistence and degradability Expected to be inherently biodegradable. Expected to be readily biodegradable. (OECD 302B).

12.3. Bioaccumulative potential Potential to bioaccumulate is low.

Partition coefficient n-octanol/water (log Kow)

FERODO Brake Fluid	< 2
Triethylene glycol monobutyl ether (CAS 143-22-6)	0.02

Bioconcentration factor (BCF) Not available.

12.4. Mobility in soil This product is water soluble and may disperse in soil.

Mobility in general The product is soluble in water.

12.5. Results of PBT and vPvB assessment This mixture does not contain substances assessed to be vPvB / PBT according to Regulation (EC) No 1907/2006, Annex XIII.

12.6. Other adverse effects None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Residual waste	Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.
EU waste code	16 01 13* The Waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Disposal methods/information	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Special precautions	Dispose in accordance with all applicable regulations.

SECTION 14: Transport information

ADR

14.1. - 14.6.: Not regulated as dangerous goods.

RID

14.1. - 14.6.: Not regulated as dangerous goods.

ADN

14.1. - 14.6.: Not regulated as dangerous goods.

IATA

14.1. - 14.6.: Not regulated as dangerous goods.

IMDG

14.1. - 14.6.: Not regulated as dangerous goods.

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

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

EU regulations

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I and II, as amended

Not listed.

Regulation (EU) 2019/1021 On persistent organic pollutants (recast), as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 1 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 2 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex I, Part 3 as amended

Not listed.

Regulation (EU) No. 649/2012 concerning the export and import of dangerous chemicals, Annex V as amended

Not listed.

Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended

Not listed.

Regulation (EC) No. 1907/2006, REACH Article 59(10) Candidate List as currently published by ECHA

Not listed.

Authorisations

Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorisation, as amended

Not listed.

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended

2-(2-Methoxyethoxy)ethanol (CAS 111-77-3)

Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended.

Not listed.

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances, as amended

Not listed.

Other regulations

The product is classified and labelled in accordance with Regulation (EC) 1272/2008 (CLP Regulation) as amended. This Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006, as amended.

National regulations

Follow national regulation for work with chemical agents in accordance with Directive 98/24/EC, as amended.
According to Directive 92/85/EEC as amended, pregnant women should not work with the product, if there is the least risk of exposure.
Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work, as amended.

15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

List of abbreviations

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.
RID: Regulations concerning the International Carriage of Dangerous Goods by Rail.
ADN: European Agreement Concerning the International Carriage of Dangerous Goods by Inland Waterways.
IATA: International Air Transport Association.
IMDG: International Maritime Dangerous Goods.
MARPOL: International Convention for the Prevention of Pollution from Ships.
IBC Code: International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk.
PBT: Persistent, bioaccumulative, toxic.
vPvB: Very persistent and very bioaccumulative.
DNEL: Derived No-Effect Level.
PNEC: Predicted No-Effect Concentration.

References

HSDB® - Hazardous Substances Data Bank
ECHA: European Chemical Agency.
Registry of Toxic Effects of Chemical Substances (RTECS)

Information on evaluation method leading to the classification of mixture	The classification for health and environmental hazards is derived by a combination of calculation methods and test data, if available.
Full text of any H-statements not written out in full under Sections 2 to 15	H318 Causes serious eye damage. H361 Suspected of damaging fertility or the unborn child. H361d Suspected of damaging the unborn child.
This SDS contains revisions in the following section(s):	This safety data sheet contains revisions in the following section(s): 1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 15, 16.
Training information	Follow training instructions when handling this material.
Further information	UFI: C910-G008-E00S-ADWH, Grade: DOT4 ESP UFI: RF10-G0D2-100S-N32N, Grade: DOT5.1 UFI: CJ10-002F-C008-AENQ, Grade: DOT5.1 EHV
Disclaimer	The information provided on this data sheet was abstracted from supplier safety data sheets and standard references in occupational health and toxicology. Federal-Mogul makes no representation or warranty with respect to the information obtained from such references. The information is however, as of the date provided, true and accurate to the best of Federal-Mogul's knowledge, and should be used to make an independent determination of the methods to safeguard workers and the environment.