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

· **1.1 Product identifier**

· **Trade name:** **ZF DOT 4 Brake Fluid**

· **Article number:** 5.961.307.331, 5.961.307.332, PFB404TU
· **UFI:** EQ00-7098-M000-4DUG

· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the mixture** Brake fluid

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
ZF Aftermarket UK Ltd.
Abbeyfield Road
Lenton
Nottingham, NG7 2SX
Tel +44 333 240 1123
Fax +44 115 986 92 61
https://www.zf.com

· **Informing department:**
Phone: +49 (0) 7541 77 0

E-Mail adress of the competent person for the safety data sheet:
reach@dekra.com

· **1.4 Emergency telephone number:**
Poison Information Center Munich
Phone: +49 (0) 89 - 19 240
Information in German and English

SECTION 2: Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**


GHS08 health hazard

Repr. 2 H361 Suspected of damaging fertility or the unborn child.


GHS07

Eye Irrit. 2 H319 Causes serious eye irritation.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· ***Hazard pictograms***

GHS07 GHS08

· ***Signal word*** Warning

· ***Hazard-determining components of labelling:***
Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate

· ***Hazard statements***
H319 Causes serious eye irritation.
H361 Suspected of damaging fertility or the unborn child.

· ***Precautionary statements***

P102	Keep out of reach of children.
P280	Wear protective gloves / 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.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P337+P313	If eye irritation persists: Get medical advice/attention.
P405	Store locked up.
P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

· ***Additional information:***
Packaging of whatever capacity that is delivered to the general public shall be fitted with a tactile warning of danger according to EN ISO 11683.

· ***2.3 Other hazards***

· ***Results of PBT and vPvB assessment***

· ***PBT:*** Not applicable.

· ***vPvB:*** Not applicable.

SECTION 3: Composition/information on ingredients

· ***3.2 Mixtures***

· ***Description:***
Mixture of the substances listed below including additives not requiring identification.
Added are corrosion and oxidation inhibitors.

· ***Dangerous components:***		
CAS: 143-22-6 EINECS: 205-592-6 Reg.nr.: 01-2119475107-38-X	2-[2-(2-butoxyethoxy)ethoxy]ethanol Eye Dam. 1, H318 Specific concentration limits: Eye Dam. 1; H318: C ≥ 30 % Eye Irrit. 2; H319: 20 % ≤ C < 30 %	≥ 25 - < 30%
CAS: 111-46-6 EINECS: 203-872-2 Reg.nr.: 01-2119457857-21-X	2,2'-oxybisethanol Acute Tox. 4, H302	10 - 25%
CAS: 30989-05-0 EINECS: 250-418-4	Tris[2-[2-(2-methoxyethoxy)ethoxy]ethyl] orthoborate Repr. 2, H361	10 - 25%

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CAS: 9004-77-7	Butylpolyglykol Eye Irrit. 2, H319	≥ 2.5 - < 10%
CAS: 111-77-3 EINECS: 203-906-6 Reg.nr.: 01-2119475100-52-X	2-(2-methoxyethoxy)ethanol Repr. 2, H361d	< 2.5%
CAS: 112-34-5 EINECS: 203-961-6 Reg.nr.: 01-2119475104-44-X	2-(2-butoxyethoxy)ethanol Eye Irrit. 2, H319	< 2.5%

· ***Additional information*** For the wording of the listed hazard phrases refer to section 16.

SECTION 4: First aid measures

· ***4.1 Description of first aid measures***
· ***General information***
Personal protection for the First Aider.
Instantly remove any clothing contaminated by the product.
· ***After inhalation*** Supply fresh air; consult doctor in case of symptoms.
· ***After skin contact***
Wash with water and soap.
If skin irritation continues, consult a doctor.
· ***After eye contact***
Keep eye lids open and rinse them with ample amounts of clean running water for at least 15 minutes.
In case of permanent aches and pains please go and see the doctor.
· ***After swallowing***
Rinse out mouth and then drink plenty of water.
Call a doctor immediately.
Make victim drink ethanol (e.g. 1 drinking glass of a 40% alcoholic beverage).
· ***4.2 Most important symptoms and effects, both acute and delayed***
No further relevant information available.
· ***Danger*** Danger of kidney damage.
· ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

SECTION 5: Firefighting measures

· ***5.1 Extinguishing media***
· ***Suitable extinguishing agents***
Extinguishing powder, foam or water jet. Fight larger fires with water jet or alcohol-resistant foam.
· ***For safety reasons unsuitable extinguishing agents*** Water with a full water jet.
· ***5.2 Special hazards arising from the substance or mixture***
Inhalation of combustion gases may cause serious health hazards.
Formation of flammable mixtures of vapours with air possible.
· ***5.3 Advice for firefighters***
· ***Protective equipment:*** Wear self-contained breathing apparatus.
· ***Additional information***
Remove goods in stock from incendiary zone, if possible.

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Use water to keep fire exposed containers cool.

SECTION 6: Accidental release measures

· ***6.1 Personal precautions, protective equipment and emergency procedures***
Avoid contact with the product.
Ensure adequate ventilation
Particular danger of slipping on leaked/spilled product.
· ***6.2 Environmental precautions:***
Prevent from spreading (e.g. by damming-in or oil barriers).
Do not allow to enter drainage system, surface or ground water.
· ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders).
Dispose of contaminated material as waste according to section 13.
Complete cleaning with water.
· ***6.4 Reference to other sections***
See Section 7 for information on safe handling
See Section 8 for information on personal protection equipment.
See Section 13 for information on disposal.

SECTION 7: Handling and storage

· ***7.1 Precautions for safe handling***
Prevent formation of aerosols.
Keep containers tightly sealed.
Avoid contact with eyes and skin.
· ***Information about protection against explosions and fires:***
The product forms flammable fumes when heated.

· ***7.2 Conditions for safe storage, including any incompatibilities***
· ***Storage***
· ***Requirements to be met by storerooms and containers:*** Store only in the original container.
· ***Information about storage in one common storage facility:*** Store away from oxidising agents.
· ***Further information about storage conditions:***
Keep container tightly sealed.
Store container in a well ventilated position.
Store under dry conditions.
· ***7.3 Specific end use(s)*** Brake fluid

SECTION 8: Exposure controls/personal protection

· ***8.1 Control parameters***
· ***Components with limit values that require monitoring at the workplace:***
WEL: workplace exposure limit
OEL: Occupational Exposure Limit
IOELV: Indicative Occupational Exposure Limit Values, workplace threshold value of the European Union

111-46-6 2,2'-oxybisethanol	
WEL (Great Britain)	Long-term value: 101 mg/m³, 23 ppm

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OEL (Ireland)	Long-term value: 100 mg/m³, 23 ppm
111-77-3 2-(2-methoxyethoxy)ethanol	
WEL (Great Britain)	Long-term value: 50.1 mg/m³, 10 ppm Sk
IOELV (European Union)	Long-term value: 50.1 mg/m³, 10 ppm Skin
OEL (Ireland)	Long-term value: 50.1 mg/m³, 10 ppm Sk, IOELV
112-34-5 2-(2-butoxyethoxy)ethanol	
WEL (Great Britain)	Short-term value: 101.2 mg/m³, 15 ppm Long-term value: 67.5 mg/m³, 10 ppm
IOELV (European Union)	Short-term value: 101.2 mg/m³, 15 ppm Long-term value: 67.5 mg/m³, 10 ppm
OEL (Ireland)	Short-term value: 101.2 mg/m³, 15 ppm Long-term value: 67.5 mg/m³, 10 ppm IOELV

· ***DNELs***

143-22-6 2-[2-(2-butoxyethoxy)ethoxy]ethanol		
Oral	DNEL (consumer, long-term, systemic)	2.5 mg/kg bw/day (human)
Dermal	DNEL (worker, long-term, systemic)	50 mg/kg bw/day (human)
	DNEL (consumer, long-term, systemic)	25 mg/kg bw/day (human)
Inhalative	DNEL (worker, long-term, systemic)	195 mg/m³ (human)
	DNEL (consumer, long-term, systemic)	117 mg/m³ (human)

· ***PNECs***

143-22-6 2-[2-(2-butoxyethoxy)ethoxy]ethanol	
PNEC aqua (freshwater)	1.5 mg/L (.)
PNEC aqua (marine water)	0.15 mg/L (.)
PNEC STP	500 mg/L (.)
PNEC soil	0.45 mg/kg soil dw (.)
PNEC sediment (freshwater)	5.77 mg/kg sedim. dw (.)
PNEC sediment (marine water)	0.13 mg/kg sedim. dw (.)
PNEC aqua (intermittent releases)	5 mg/L (.)
PNEC oral	111 mg/kg food (.)

· ***Additional information:*** The lists that were valid during the compilation were used as basis.

· ***8.2 Exposure controls***
· ***Individual protection measures, such as personal protective equipment***
· ***General protective and hygienic measures***
Take off all contaminated clothing immediately.
Wash hands during breaks and at the end of the work.
Avoid contact with the eyes.
Do not eat or drink while working.
· ***Breathing equipment:***
Not necessary if room is well-ventilated.
Use breathing protection only when aerosol or mist is formed.

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Filter A/P2.

· ***Hand protection*** Use gloves of stable material (i.e. nitril rubber).

· ***Material of gloves***

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

Butyl rubber, BR

Nitrile rubber, NBR

Recommended thickness of the material: ≥ 0.4 mm

· ***Penetration time of glove material***

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· ***Eye/face protection***

Tightly sealed safety glasses.

SECTION 9: Physical and chemical properties

· ***9.1 Information on basic physical and chemical properties***	
· ***General Information***	
· ***Colour:***	Amber coloured
· ***Odour:***	Mild
· ***Odour threshold:***	Not determined.
· ***Melting point/freezing point:***	< -50 °C (SAE J 1703)
· ***Boiling point or initial boiling point and boiling range***	> 260 °C (SAE J 1703)
· ***Flammability***	Not applicable.
· ***Lower and upper explosion limit***	
· ***Lower:***	Not determined.
· ***Upper:***	Not determined.
· ***Flash point:***	> 100 °C (IP 35)
· ***Self-inflammability:***	Product is not selfigniting.
· ***Decomposition temperature:***	Thermally in general stable.
· ***SADT***	
· ***pH at 20 °C***	7 - 10.5 (SAE J 1703)
· ***Viscosity:***	
· ***Kinematic viscosity***	Not determined.
· ***dynamic at 20 °C:***	10 mPas (ASTM D 286)
· ***Solubility***	
· ***Water:***	Partly soluble
· ***Partition coefficient n-octanol/water (log value)***	1.5 log POW

111-77-3	2-(2-methoxyethoxy)ethanol	-0,68

· ***Vapour pressure:***	Not determined.
· ***Density and/or relative density***	
· ***Density at 20 °C***	1.01 - 1.06 g/cm³ (DIN 51757)

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· ***Relative density***	Not determined.
· ***9.2 Other information***	
· ***Appearance:***	
· ***Form:***	Fluid
· ***Important information on protection of health and environment, and on safety.***	
· ***Ignition temperature:***	> 300 °C (ATSM D 286)
· ***Explosive properties:***	Product is not explosive.
· ***Change in condition***	
· ***Evaporation rate***	Not determined.
· ***Information with regard to physical hazard classes***	
· ***Explosives***	Void
· ***Flammable gases***	Void
· ***Aerosols***	Void
· ***Oxidising gases***	Void
· ***Gases under pressure***	Void
· ***Flammable liquids***	Void
· ***Flammable solids***	Void
· ***Self-reactive substances and mixtures***	Void
· ***Pyrophoric liquids***	Void
· ***Pyrophoric solids***	Void
· ***Self-heating substances and mixtures***	Void
· ***Substances and mixtures, which emit flammable gases in contact with water***	Void
· ***Oxidising liquids***	Void
· ***Oxidising solids***	Void
· ***Organic peroxides***	Void
· ***Corrosive to metals***	Void
· ***Desensitised explosives***	Void

SECTION 10: Stability and reactivity

· ***10.1 Reactivity*** No further relevant information available.
· ***10.2 Chemical stability***
· ***Thermal decomposition / conditions to be avoided:***
No decomposition if used according to specifications.
· ***10.3 Possibility of hazardous reactions***
Possible formation of peroxide
Reacts with light alloys to form hydrogen
· ***10.4 Conditions to avoid*** Brake fluids should never be contaminated with any other substance.
· ***10.5 Incompatible materials:*** Avoid contact with strong oxidizing agents.
· ***10.6 Hazardous decomposition products:***
None in case of intended use and storage in compliance with instructions.

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SECTION 11: Toxicological information

· ***11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008***
· ***Acute toxicity*** Based on available data, the classification criteria are not met.

· ***LD/LC50 values that are relevant for classification:***		
143-22-6 2-[2-(2-butoxyethoxy)ethoxy]ethanol		
Oral	LD50	5,170 mg/kg (rat)
Dermal	LD50	3,540 mg/kg (rabbit)

· ***Skin corrosion/irritation*** Based on available data, the classification criteria are not met.
· ***Serious eye damage/irritation***
Causes serious eye irritation.
· ***Respiratory or 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 fertility or the unborn child.
· ***STOT-single exposure*** Based on available data, the classification criteria are not met.
· ***STOT-repeated exposure*** Based on available data, the classification criteria are not met.
· ***Aspiration hazard*** Based on available data, the classification criteria are not met.
· ***Additional toxicological information:***
· ***Repeated dose toxicity***
Repeated oral intake can cause kidney damage.

143-22-6 2-[2-(2-butoxyethoxy)ethoxy]ethanol		
Oral	NOAEL (90d)	250 mg/kg bw/day (rat) (OECD 408)
Dermal	NOAEL (90d)	4,000 mg/kg bw/day (rat)

· ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
Repr. 2
· ***11.2 Information on other hazards***

· ***Endocrine disrupting properties***
None of the ingredients is listed.

SECTION 12: Ecological information

· ***12.1 Toxicity***

· ***Aquatic toxicity:***	
143-22-6 2-[2-(2-butoxyethoxy)ethoxy]ethanol	
EC50	2,210 mg/l/48h (Daphnia magna)
LC50	2,400 mg/l/96h (Pimephales promelas)
	2,200 - 4,600 mg/l/96h (Leuciscus idus) (DIN 38412-15)
EC50 (static)	> 612.6 mg/l/72h (Desmodesmus subspicatus)

· ***12.2 Persistence and degradability*** Easily biodegradable
· ***Other information:*** There are no data available about the preparation.
· ***12.3 Bioaccumulative potential***
Due to the distribution coefficient n-octanol/water an accumulation in organisms is not expected.
· ***12.4 Mobility in soil*** No further relevant information available.

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· ***12.5 Results of PBT and vPvB assessment***
· ***PBT:*** Not applicable.
· ***vPvB:*** Not applicable.
· ***12.6 Endocrine disrupting properties*** For information on endocrine disrupting properties see section 11.
· ***12.7 Other adverse effects***
· ***Additional ecological information:***
· ***General notes:***
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water.
Do not allow undiluted product or large quantities of it to reach ground water, water bodies or sewage system.

SECTION 13: Disposal considerations

· ***13.1 Waste treatment methods***
· ***Recommendation***
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
The waste code numbers mentioned are recommendations based on the probable use of the product.

· ***European waste catalogue***	
16 00 00	WASTES NOT OTHERWISE SPECIFIED IN THE LIST
16 01 00	end-of-life vehicles from different means of transport (including off-road machinery) and wastes from dismantling of end-of-life vehicles and vehicle maintenance (except 13, 14, 16 06 and 16 08)
16 01 13*	brake fluids
HP4	Irritant - skin irritation and eye damage
HP5	Specific Target Organ Toxicity (STOT)/Aspiration Toxicity
HP10	Toxic for reproduction

· ***Uncleaned packagings:***
· ***Recommendation:***
Disposal must be made according to official regulations.
Dispose of packaging according to regulations on the disposal of packagings.
Non contaminated packagings can be used for recycling.
Cleaned packing materials have to be admitted to local recycling circuits.
· ***Recommended cleaning agent:*** Water, if necessary with cleaning agent.

SECTION 14: Transport information

· ***14.1 UN number or ID number***	
· ***ADR/ADN, ADN, IMDG, IATA***	Void
· ***14.2 UN proper shipping name***	
· ***ADR/ADN, ADN, IMDG, IATA***	Void
· ***14.3 Transport hazard class(es)***	
· ***ADR/ADN, ADN, IMDG, IATA***	
· ***Class***	Void

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· ***14.4 Packing group***	
· ***ADR/ADN, IMDG, IATA***	Void
· ***14.5 Environmental hazards:***	
· ***Marine pollutant:***	No
· ***14.6 Special precautions for user***	Not applicable.
· ***14.7 Maritime transport in bulk according to IMO instruments***	Not applicable.
· ***Transport/Additional information:***	Not dangerous according to the above specifications.
· ***UN "Model Regulation":***	Void

SECTION 15: Regulatory information

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

· ***Directive 2012/18/EU***
· ***Named dangerous substances - ANNEX I*** None of the ingredients is listed.
· ***REGULATION (EC) No 1907/2006 ANNEX XVII*** Conditions of restriction: 3, 54

· ***DIRECTIVE 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment – Annex II***

None of the ingredients is listed.

· ***National regulations***

· ***Water hazard class:*** Water hazard class 1 (Self-assessment): slightly hazardous for water.

· ***Substances of very high concern (SVHC) according to REACH, Article 57***

None of the ingredients is contained.

· ***15.2 Chemical safety assessment:*** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· ***Relevant phrases***
H302 Harmful if swallowed.
H318 Causes serious eye damage.
H319 Causes serious eye irritation.
H361 Suspected of damaging fertility or the unborn child.
H361d Suspected of damaging the unborn child.

· ***Department issuing data specification sheet:***

DEKRA This Material Safety Data Sheet has been drawn up in cooperation with:
DEKRA Assurance Services GmbH, Hanomagstr. 12, D-30449 Hanover, Germany,
phone: (+49) 511 42079 - 0, reach@dekra.com.

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· ***Version number of previous version:*** 2

· ***Abbreviations and acronyms:***

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonised System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
SVHC: Substances of Very High Concern
vPvB: very Persistent and very Bioaccumulative
Acute Tox. 4: Acute toxicity - oral – Category 4
Eye Dam. 1: Serious eye damage/eye irritation – Category 1
Eye Irrit. 2: Serious eye damage/eye irritation – Category 2
Repr. 2: Reproductive toxicity – Category 2
Repr. 2: Reproductive toxicity – Category 2

· **** Data compared to the previous version altered.***

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