



Technical Circular

0199-99-01115/9 EN



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DEUTZ diesel engines

- Assemblies:
99

Coolant

Replacement is made because of:

- Updating
 - Product recommendation

General information

This technical circular applies for all liquid-cooled DEUTZ engines including the newly developed series with exhaust aftertreatment systems for emission level EPA Tier 4 interim or EPA Tier 4 final and EU COM IIIB or EU COM IV.



All data correspond with the latest state of knowledge.

They do not release the owner from his own obligations for caution due to the possible influences when using these products.

The cooling system protection agent must be used exclusively for the named purpose, any other use above and beyond this is considered as improper use.

The user will be liable exclusively for damages resulting from this. Respective, country-specific legal conditions must be observed by the user on his own responsibility.

Note:
The part numbers indicated in this document are not subject to updating.
Binding for the identification of spare parts is exclusively the spare parts documentation.

In liquid-cooled engines the coolant must be prepared by mixing a cooling system protective agent with the fresh water and testing it within the given maintenance intervals.

This prevents damage due to

- corrosion
- cavitation
- freezing
- overheating

You will find products which have been approved liquid-cooled DEUTZ engines in the appendix "Product recommendation cooling system protection agent".



Damages can be expected when using products which have not been released and failing to observe the maintenance intervals as well as the quality of fresh water.

Examples for such damage profiles can be found in the appendix to this bulletin.

Damage due to failure to observe this bulletin are excluded from the warranty.

Fresh water quality

The right quality of fresh water is important for preparing the coolant. Clear, clean, fresh water within the following analysis values should always be used:

Analysis values of the fresh water	
pH value at 20 °C	6.5 to 8.5
Chloride-ion content	max. 100 mg/l
Sulphate-ion content	max. 100 mg/l
Water hardness (ion content of calcium and magnesium)	max. 3.56 mmol/l
Conversion to other units:	
German degrees:	max. 20 °dH
English degrees:	max. 25 °eH
French degrees:	max. 35.6 °fH
mg/l CaCO ₃ (ppm)	max. 356
Bacteria, fungi, yeast	Impermissible!

T 1 Analysis values



Never use sea water, river water, brackish water, industrial waste water or seepage water for conditioning the coolant.

Data on the fresh water quality can be provided by the local water boards.

If the analysis values of the fresh water are unknown, these must be determined by means of a water analysis.

The fresh water must be conditioned if the analysis values deviate.

- **pH value too low:**

Can lead to corrosion on metal parts.

 - Add diluted caustic or potassium soda. It is advisable to make small test mixtures.
- **Water too hard:**

Water which is too hard leads to deposits of limescale which prevent heat conduction. This can lead to overheating problems.

 - Remedy by mixing with soft, distilled or completely desalinated water.
- **Chlorides and/or sulphates too high:**

Too high a chloride or sulphation content leads to dissolution of the protective layer and thus to corrosion of the metal parts.

 - Remedy by mixing with distilled or completely desalinated water.

A new analysis should be made after conditioning the fresh water.

- Pictures of damaged parts
See:
 - **Typical damage profiles**

Cooling system corrosion protection agent

The coolant for liquid-cooled DEUTZ engines is prepared by adding an antifreeze with corrosion protection inhibitors based on ethylene glycol.

The best results are achieved with the **DEUTZ cooling system protection agent**- see appendix Product recommendation.

This cooling system protective agent is adapted to the materials in DEUTZ engines and is subject to continuous monitoring. The agent must be ordered from the DEUTZ organisation.

If for some important reason, for example delivery restrictions abroad, the DEUTZ cooling system protective agent is not available, alternative products released by DEUTZ may be used as alternatives in exceptional cases. These products are divided into product groups and can be found in the appendix Product recommendation.

To ensure adequate corrosion protection the cooling system protective agent must be used all year round and may not drop below or exceed the following concentration.

Mixing ratio		
Cooling system protective agent	Fresh water	Cold protection up to
min. 35 %	65 %	- 22 °C
40 %	60 %	- 28 °C
45 %	55 %	- 35 °C
max. 50 %	50 %	- 41 °C

T 2 Mixing ratio



- When using the cooling system protection agent the heat transfer value of the coolant is reduced.
 - DEUTZ cooling systems are designed for a percentage of 50 % cooling system protection agent (up to - 41 °C).
At temperatures below - 41 °C:
Consult your responsible DEUTZ agent.
 - A percentage of >50 % cooling system protection agent leads to poorer cooling performance.

Make sure that the cooling system is designed for this.

When dropping below the minimum concentration the corrosion protection capacity is reduced in addition to the frost protection. The protection effect is therefore lost abruptly and not gradually.

The reduction in the antifreeze content also increase the risk of cavitation especially on the coolant pump and the cylinder liner.

As such, it is important to make sure that enough antifreeze is present, even in warm countries.

If the maximum concentration is exceeded by a large amount, the amount of engine heat that needs to dissipate will not be able to do so.

From a concentration of 67% (corresponds to frost protection down to -68°C), the freezing point cannot physically be lowered any further.

Undiluted cooling system protection agent can therefore freeze again at higher temperatures (-22).



- Pictures of damaged parts
See:
 - **Typical damage profiles**
- The use of a chemical corrosion protection agent (without antifreeze) for DEUTZ engines is possible in justifiable exceptional cases.
Consult your responsible DEUTZ agent.

Mixing cooling system protection agents

The cooling system protection agents of the product groups A and B possess a different chemical basis.

A component present in the cooling system protection agents in product group A means that they cannot be mixed with the cooling system protection agents in product group B. These agents may be incompatible with one another, which may in turn lead to disturbances in flow.



Do not mix cooling system protection agents from product group A with those from product group B!

- All cooling system protection agents from product group A may be mixed with one another.
- All cooling system protection agents from product group B may be mixed with one another.



The entire cooling system must be cleaned before a product from the other group is used.

Corrosion protection oil



It is prohibited to use corrosion protection oils as cooling system protective agents for DEUTZ engines.

Specifications of the cooling system

- The coolant must be tested constantly and maintained at regular intervals. Monitoring includes inspection of the coolant level, the contamination of the coolant and checking of the cooling system protection concentration, e.g. with a refractometer, see the maintenance schedule in the operation manual.

See also:

- Technical Bulletin
0199-49-01214
Refractometer

- The coolant must be renewed and the entire cooling system cleaned if necessary, see TR 0199-99-1116
 - in case of heavy turbidity due to corrosion residue or other floating particles,
 - in case of penetration by lubricating oil,
 - when changing to a different product group, see appendix
 - according to maintenance plan of the operation manual, at the latest every 2 years.
- Coolant may not be poured down the drain. It must be disposed of properly according to legal regulations and specifications of the supplier.

Disposal

DEUTZ cooling system protective agent

The DEUTZ cooling system protection agent, part no.: 01011490, 01016416 and 12211500 contains monoethylene glycol (1,2-ethanediol). Used coolant must be treated as waste. The owner of the waste is responsible for this himself (cf. German law on recycling (KrW-/AbfG) para. 5 "Basic Obligations of the Cycle Economy").

Used coolant (mixture of cooling system protection agent and fresh water)

The waste code no. for used coolant

Waste code no.:	16-01-14	according to the directive on the European Waste Directory (Waste Directory Directive - AVV), valid as of 10.12.2001
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Used coolant is to be classed in the list of water hazardous substances in water hazard class (appendix 4 of the German Administrative Regulation Regarding Water Pollutants (VwVwS) of 17th of May 1999): (1) slightly hazardous to water.

Identification according to the hazardous substances directive: hazardous to health (Xn)

According to the classification as a waste with the waste code number 16-01-14, used coolant is a hazard in the sense of § 41 of the Recycling Management and Waste Act.

The waste classed as hazardous exhibits the properties or features listed in Appendix III of the Directive 91/689/EEC of the Commission of 12th of December 1991 governing hazardous waste products (ABl. EC No. L 377 p. 20):

H4 (total concentration of $\geq 25\%$ in one or more substances classed as a health hazard).

Recording the utilisation of used coolant is governed by the recording directive (usually proof of disposal, accompanying certification). Any national law obligations must be examined regionally from case to case.

The respective valid regulations must be observed.



Technical Circular

0199-99-01115/9 EN



Pure cooling system protective agent.

Pure, undiluted cooling system protection agent must be disposed of or recycled in a suitable dump or a suitable, approved waste incineration plant.

Please contact an approved disposal company.

Information about approved disposal or recycling methods is obtainable from your representative or the local environmental or health authorities.

Dilution with water for the purpose of disposal is prohibited.

If you have questions on this topic, please contact the staff member(s) below.

E-mail: lubricants.de@deutz.com

or

Email: service-kompaktmotoren.de@deutz.com

For the America region:

Email: service@deutzusa.com

For the Asia region:

Email: dapservice@deutz.com

This document has been created digitally and is valid without a signature.

Enclosure(s):

- Production recommendation cooling system protection agent
- Typical damage profiles



Appendix - Product Recommendation Cooling System Protective Agents

Product group A		
Supplier	Product name	Observations Sales region
DEUTZ AG	Cooling system protective agent	5 litre container Part no.: 01011490
		20 litre canister Part no.: 01016416
		210 litre barrel Part no.: 12211500
ARAL	Antifreeze Extra	
AVIA	AVIA ANTIFREEZE APN	
BASF	Glysantin® G48®	
BVG-Blume GmbH	Mofin coolant frost protection M48 Premium Protect	
BUCHER	MOTOREX COOLANT G48	Switzerland
Castrol	Castrol Radicool NF	
	Castrol Radicool NF Premix *	
ESSO	ESSO Antifreeze Extra *	
Exxon Mobil	Mobil Antifreeze Extra	
FUCHS Petrolub AG	MAINTAIN FRICOFIN	
INA Industrja	INA Antifriz AL Super	
Mitan Mineralöl GmbH	Alpine C48	
OMV	OMV coolant plus	
Opet Fuchs Madeni Yag San ve Tic. A.S.	Antifreeze Special	
Shell	GlycoShell	
TOTAL	Glacelf MDX	
Unico Ltd	Shell Triguard PM*	Africa
	Engmans Ready to Use Antifreeze and Coolant *	



Technical Circular

0199-99-01115/9 EN



Product group A		
Supplier	Product name	Observations Sales region
VALVOLINE	G48 Antifreeze	
	Zerex G48	
EUROLUB GmbH	EUROLUB Cooler Protection D-48 Extra	
INEOS	INEOS C2270-1	
* When filling the engine, please note that product is a mixture of 50% antifreeze and 50% fresh water.		

T 3 Product recommendation



Product group B		
Supplier	Product name	Observations Sales region
AGIP	Antifreeze special	
ARTECO	Havoline XLC	Europe South America
CALTEX	Caltex Extended Life Coolant	without nitrite
	Delo Extended Life Coolant	
	Caltex Extended Life Coolant - N	with nitrite
	Delo Extended Life Coolant - N	
Chevron	Havoline Dexcool Extended Life Coolant	without nitrite USA
	Havoline XLC	Eastern Europe South America
	Delo Extended Life Coolant NF	Eastern Europe
	Ursa Extended Life Coolant NF	South America
	Texaco Extended Life Coolant	with nitrite and Molybdat
	Delo Extended Life Coolant	
	HDAX Extended Life Coolant	
	Ursa Extended Life Coolant	
FUCHS Petrolub AG	MAINTAIN FRICOFIN LL	
GAZPROMNEFT - LUBRICANTS LTD	G-Energy Antifreeze SNF	
LLK Finland Oy	Glycold XLC	
Mol-Lub Ltd.	EVOX Premium Concentrate	
Opet Fuchs Madeni Yag San ve Tic. A.S.	Opet Extended Life Antifreeze	
Orvema B.V.	Orvema Protex LL	Netherlands
Rheinischer Schmierstoffvertrieb GmbH	Swd Rheinol Antifreeze GW-12 Concentrate	
TOTAL	Glacelf Auto Supra	
	Total Organifreeze	



Technical Circular

0199-99-01115/9 EN



Product group B		
Supplier	Product name	Observations Sales region
Technoform	CoolStream Premium C	Eastern Europe
	CoolStream Premium 40	
	CoolStream Premium 65 *	
YACCO	YACCO LR ORGANIQUE**	

* When filling the engine, please note that product is a mixture of 65 % antifreeze and 35 % fresh water and corresponds to antifreeze protection up to - 69 °C .

** Product is already a finished mixture of 50 % antifreeze and 50 % fresh water; there is no need to top up with fresh water.

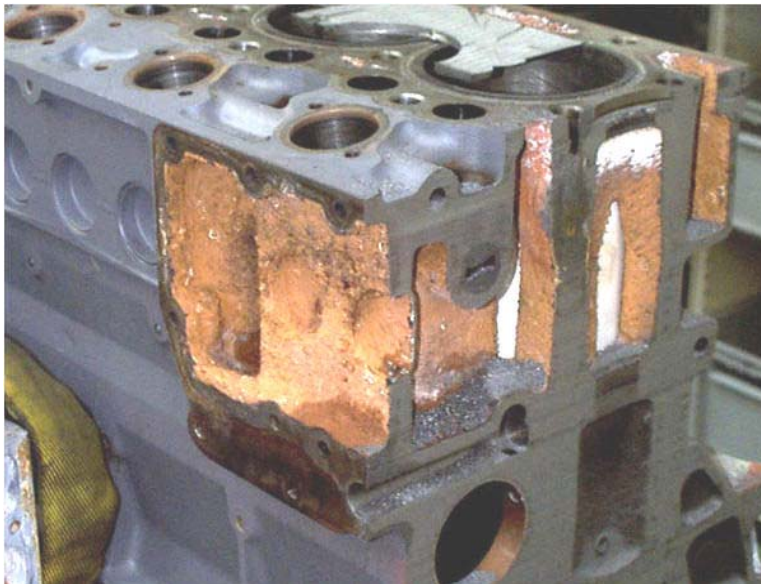
T 4 Product recommendation

Appendix

Typical damage profiles

Examples of damage due to failure to observe the recommended instructions

Damage description	Causes
Corrosion	- pH value too low
	- Chloride and/or sulphates too high
	- Operation with too low a concentration of the cooling system protection agent



A 1 Crankcase



A 2 Crankcase crack in the area of the cylinder liner

Damage description	Causes
Corrosion	- pH value too low
	- Chloride and/or sulphates too high
	- Operation with too low a concentration of the cooling system protection agent

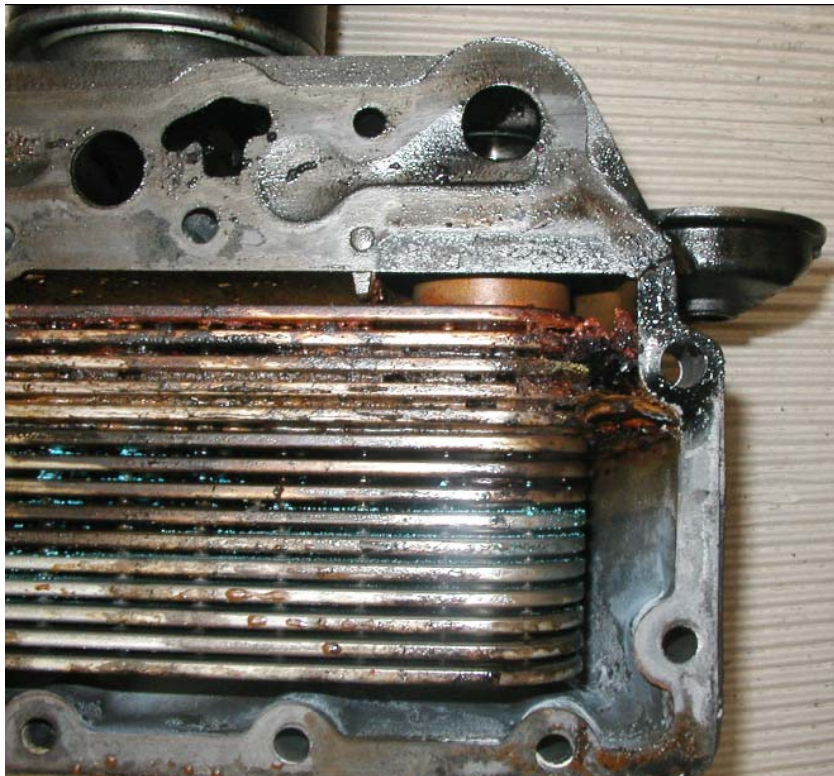


A 3 Crankcase in the area of the lubricating oil cooler housing



A 4 Coolant pump seat on the crankcase

Damage description	Causes
Corrosion	– pH value too low
	– Chloride and/or sulphates too high
	– Operation with too low a concentration of the cooling system protection agent



A 5 Lubricating oil cooler housing



A 6 Sealing cover, corroded

Damage description	Causes
Corrosion	- Chloride and/or sulphates too high



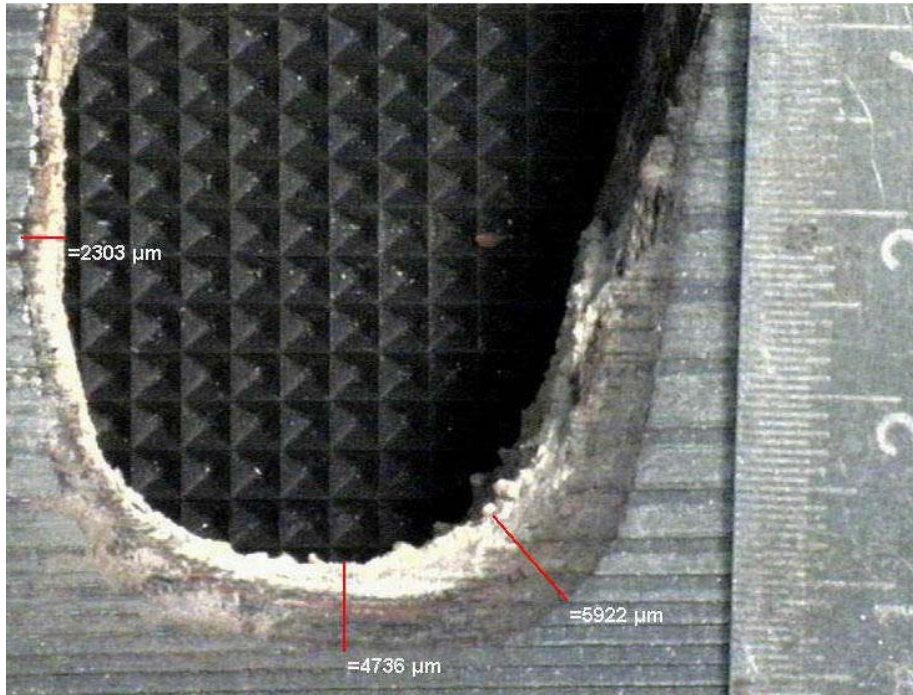
A 7 Aluminium thermostat cover, corroded

Damage description	Causes
Limescale deposits	- Water too hard



A 8 Limescale deposits on a cylinder liner

Damage description	Causes
Limescale deposits	- Water too hard



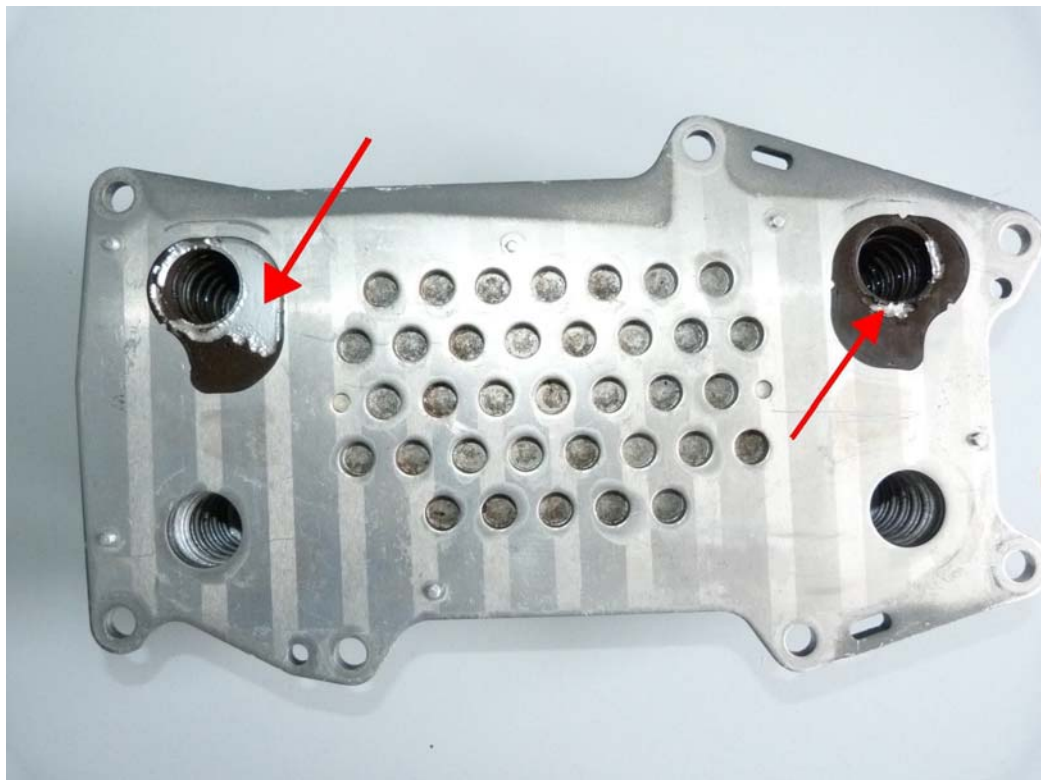
A 9 Thickness of limescale deposits in a cooling channel of a crankcase

Damage description	Causes
Cavitation	- Operation with too low a concentration of the cooling system protection agent



A 10 Flywheel of the coolant pump, cavitated

Damage description	Causes
Cavitation	Unsuitable coolant due to e.g.: <ul style="list-style-type: none"> - Operation with too low a concentration of the cooling system protection agent - Unsuitable cooling system protection agent - Unsuitable fresh water for conditioning the coolant



A 11 Lubricating oil cooler, cavitated