

MTU_ValueService **Technical Documentation**

Fluids and Lubricants
Specifications

A001062/01E

(Valid for Series 1800 PowerPack only)



Printed in Germany

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Subject to alterations and amendments.

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1 Preface

The service life, operational reliability and function of the drive systems are largely dependent on the fluids and lubricants employed. The correct selection and treatment of these fluids and lubricants are therefore extremely important. This publication specifies which fluids and lubricants are to be used.

The Fluids and Lubricants Specifications will be amended or supplemented as necessary. Before using them, make sure you have the latest version. The latest version is also available at: [http://www.mtu-online.com/mtu/Select language: English/MTU_ValueCare/MTU_ValueService Technical Documentation/Fluids and Lubricants Specifications/Fluids and Lubricants Specification - Valid for Series 1800 Powerpack](http://www.mtu-online.com/mtu/SelectLanguage:English/MTU_ValueCare/MTU_ValueService/TechnicalDocumentation/FluidsandLubricantsSpecifications/FluidsandLubricantsSpecification-ValidforSeries1800Powerpack).

If you have further queries, please contact your MTU representative.

The Fluids and Lubricants Specifications are applicable to PowerPacks with Series 1800 engines compliant with emission specifications

- Euro 3
- EU Stage 3A
- EPA Tier3

with diesel particulate filter but without SCR exhaust treatment systems.

Test standards for fluids and lubricants:

DIN	Federal German Standards Institute
EN	European Standards
ISO	International Standards Organization
ASTM	American Society for Testing and Materials
IP	Institute of Petroleum

Note:

Use of the approved fluids and lubricants, either under the brand name or in accordance with the specifications given in this publication, constitutes part of the warranty conditions.

The supplier of the fluids and lubricants is responsible for the worldwide standard quality of the named products.



Fluids and lubricants for drive plants may be hazardous materials. Certain regulations must be obeyed when handling, storing and disposing of these substances.

These regulations are contained in the manufacturers' instructions, legal requirements and technical guidelines valid in the individual countries. Great differences can apply from country to country and a generally valid guide to applicable regulations for fluids and lubricants is therefore not possible within this publication.

Users of the products named in these specifications are therefore obliged to inform themselves of the locally valid regulations. MTU Friedrichshafen GmbH accepts no responsibility whatsoever for improper or illegal use of the fluids and lubricants which it has approved.

2 Lubricants

Engine oils

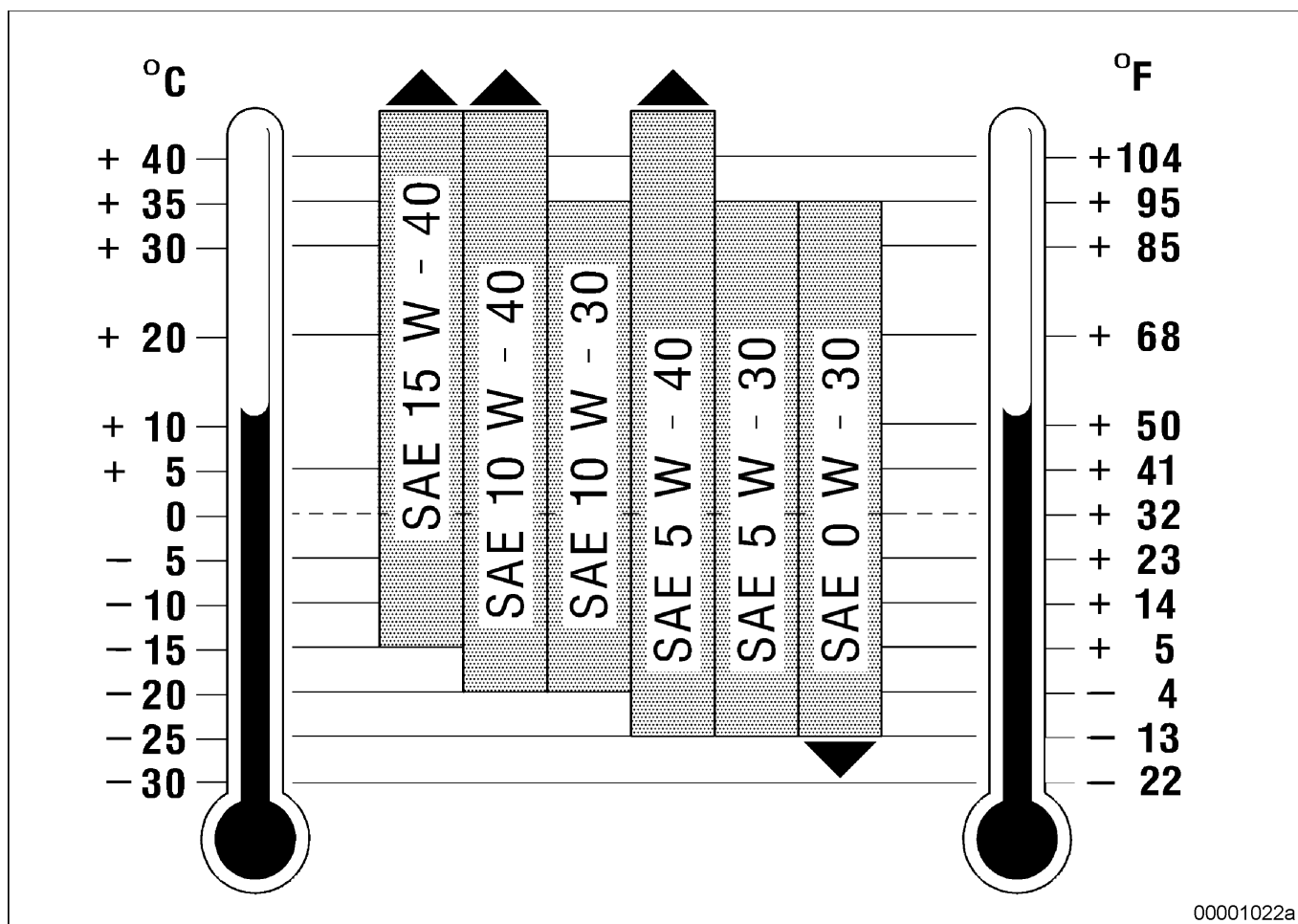


Dispose of used fluids and lubricants in accordance with local regulations.

Selection of viscosity grades

Selection of the viscosity grade is based primarily on the ambient temperature at which the engine is to be started and operated. If the relevant performance criteria are observed the engines can be operated both with single grade and multigrade oils, depending on the application. Standard values for the temperature limits in each viscosity grade are shown in Chart 1.

If the prevailing temperature is too low, the engine oil must be preheated.



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Diagram 1

Engine oils for Series 6H 1800 engines



For engine model 6H 1800, only engine oils in accordance with Chapter 5 may be used. The oil change interval is 1000 operating hours or max. 1 year under the condition that approved fuels as per Chapter 4 are used.

If fuels which have not been approved are used, shorter oil change intervals are to be expected.

Before using fuels which have not been approved, consult MTU Friedrichshafen GmbH to agree the oil change intervals.

Operating the engines with biodiesel/FAME acc. to EN14214 involves reduced oil change intervals, see Chapter 4.

Mixing engine oils



Mixing different engine oils is strictly prohibited!

Topping up engine oil with a different oil brand than currently used in the engine is also strictly prohibited!

Changing to another oil grade can be done together with an oil change. The remaining oil quantity in the engine oil system is not critical in this regard.

Transmission oils for rail vehicles with ZF transmission

(Abstract from the ZF List of Lubricants TE-ML16, Edition 01.10.2008)

The ZF Lists of Lubricants are updated every three months on 01.01., 01.04., 01.07. and 01.10.. Before using them, make sure you have the latest version. The latest version is also available at:

<http://www.zf.com/Corporate/en> menu item Products & Services / Service Portfolio / Technical Information / Lubricants & Steel / List of Lubricants / Please choose your Language / TE-ML 16.

(Table 1)

Product groups automatic transmissions for rail vehicles	Lubricant classes for service fills ⁽¹⁾ transmissions without/with ZF-Intarder
ASRail • 12 AS 2303. 12 AS 2703. 12 AS 3103. 16 AS2 603	16K / 16P
Ecomat • HP 500 R, HP 590 R, HP 600 R • HP 502 R, HP 592 R, HP 602 R	16L / 16M / 16N Automatic Transmission Fluid (ATF) ⁽²⁾
Ecomat • HP902 R	16N
EcoLife (up to 105 °C)	16Q

(1) = Approved commercial products (see Chapter 5), oil change intervals and low temperature limits (specified below).

(2) = Particularly recommended: The fully synthetic ATF ZF-Ecofluid A PLUS was developed specifically for use in Ecomat transmissions. This combination of a synthetic base oil with a specially balanced additive package delivers superlative oxidation stability and consistent friction characteristics. The viscosity level is ideally suited to this transmission and this factor, combined with resistance to scuffing and pitting, assures the unit of extremely valuable protection and a correspondingly long service life for its bearings and gears. Another positive feature of ZF-Ecofluid A PLUS is its flat viscosity characteristics curve which makes it particularly well suited to operation in cold as well as in hot climatic zones .

At greasing points pay attention to the manual!



Additives of any kind added later to the oil change the oil in a manner that is unpredictable, and they are therefore not permitted. No liability of any kind will be accepted by ZF for any damage resulting from the use of such additives.

Oil change intervals for ASRail transmissions (Table 2)

Lubricant classes ⁽¹⁾	Oil change interval [km / years] ^(2,3)
16K	300,000 km / every 2 years
16P	360,000 km / every 3 years

(1) = Pay attention to approved trade products and lubricant classes.

(2) = Oil change required, depending on what occurs first.

(3) = After consultation with the Customer Service department of ZF Friedrichshafen AG, Special Drive technology, and after an oil analysis has been made (after agreed mileages), longer oil change intervals can be applied to some reference transmissions. The procedure for taking oil samples is described in the respective Service Information.

Oil and filter change intervals for Ecomat transmissions HP 500 R, HP 590 R, HP 600 R, HP 502 R, HP592 R, HP 602 R for rail vehicles (Table 3):

Lubricant classes ⁽¹⁾	Oil and filter change interval [km / years] ^(2,3)
16L	60,000 km / every 2 years
16M	120,000 km / every 2 years
16N	150,000 km / every 3 years

(1) = Pay attention to approved trade products and lubricant classes.

(2) = Oil change required, depending on what occurs first.

(3) = After consultation with the Customer Service department of ZF Friedrichshafen AG, Special Drive technology, and after an oil analysis has been made (after agreed mileages), longer oil change intervals can be applied to some reference transmissions. The procedure for taking oil samples is described in the respective Service Information.

Oil and filter change intervals for Ecomat transmissions HP 902 R for rail vehicles (Table 4):

Lubricant classes ⁽¹⁾	Oil and filter change interval [km / years] ^(2,3)
16N	120,000 km / every 3 years

(1) = Pay attention to approved trade products and lubricant classes.

(2) = Oil change required, depending on what occurs first.

(3) = After consultation with the Customer Service department of ZF Friedrichshafen AG, Special Drive technology, and after an oil analysis has been made (after agreed mileages), longer oil change intervals can be applied to some reference transmissions. The procedure for taking oil samples is described in the respective Service Information.

Oil and filter change intervals for EcoLife transmissions for rail vehicles (Table 5):

Lubricant classes ⁽¹⁾	Oil and filter change interval [km / years] ^(2,3)
16Q	180,000 km / every 3 years

(1) = Pay attention to approved trade products and lubricant classes.

(2) = Oil change required, depending on what occurs first.

(3) = After consultation with the Customer Service department of ZF Friedrichshafen AG, Special Drive technology, and after an oil analysis has been made (after agreed mileages), longer oil change intervals can be applied to some reference transmissions. The procedure for taking oil samples is described in the respective Service Information.

The above oil change intervals only apply to complete fills. If oil is changed to another class of lubricants, the following oil and filter change intervals apply (Table 6):

Changing class of lubricant from	Oil and filter change interval [km / years] (1)
16L => 16M	90,000 km / every 2 years
16L => 16N	120,000 km / every 2 years
16M => 16N	150,000 km / every 3 years

(1) = Oil change required, depending on what occurs first.

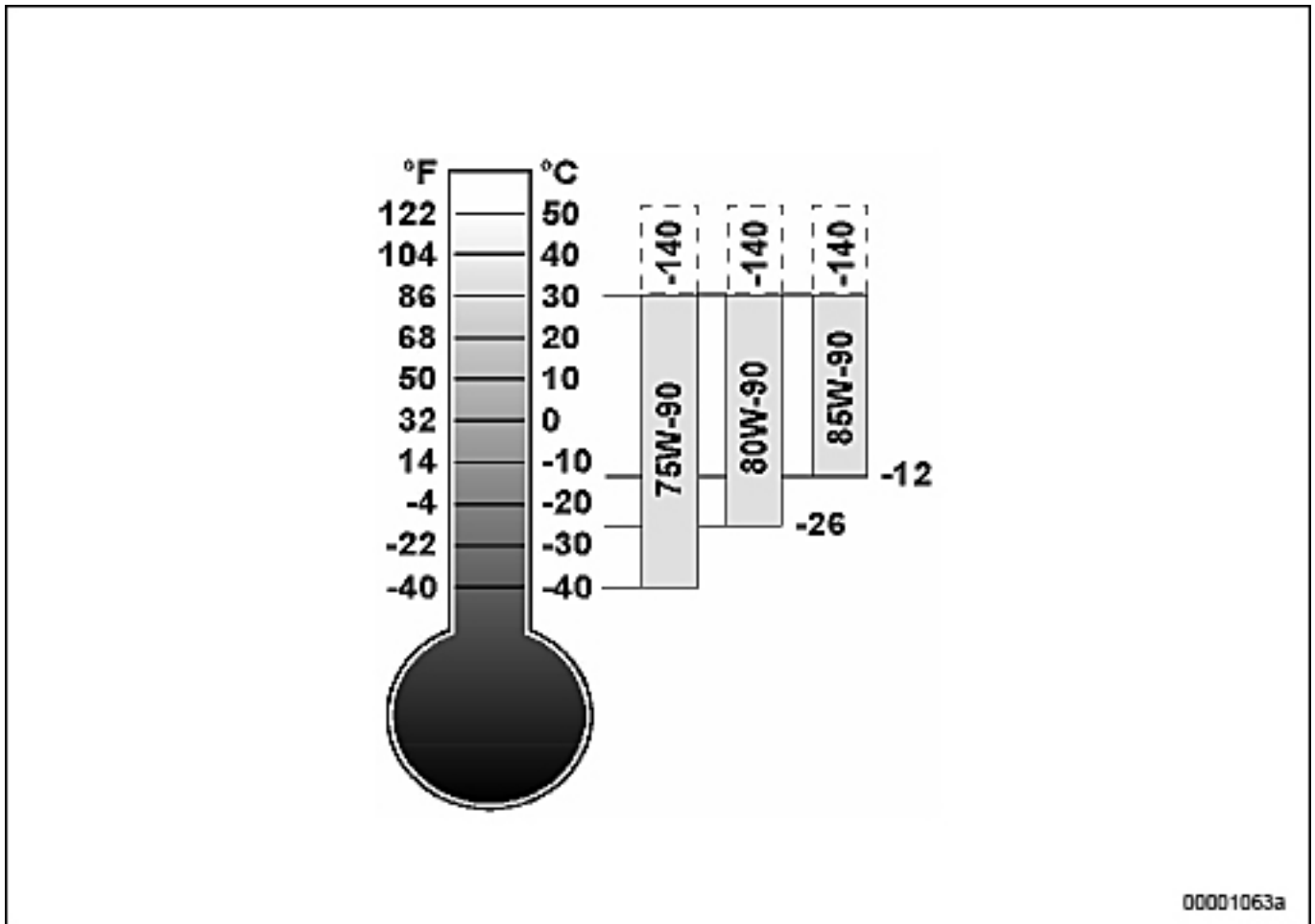
Application areas of lubricants

The following illustration shows application areas of the various SAE classes in relation to the ambient temperatures to be expected.

The oils have a bottom limit of max. dynamic viscosity (Brookfield) of 150,000 mPas, which roughly corresponds to the viscosity limit at low temperatures.

The upper limit is determined by the load in the transmission and the appearing temperature level during operation. It can be assumed that high ambient temperatures will also result in higher oil sump temperatures. For detailed information on the low temperature behavior of the specific product see at the safety data sheet of the supplier.

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The user has to observe of the low temperature limits! (Table 7)

Lubricant classes	Viscosity grades	Use at oil sump temperature as over
16K / 16L / 16M / 16N / 16P / 16Q	75W-80 / 75W-85 / 75W-90 / 75W-110 / 75W-140 / ATF	- 40 °C

Power transmission oils for Voith turbo transmissions T 211 re.4 + KB190

Abstract from Voith documentation "Transmission oils for Voith turbo transmissions 120.00059000 Version 1 and Repair instructions 120.00068341 Version 3

Voith publications are continuously updated. Before using them, make sure you have the latest version. The latest version is also available at:

"www.Voithturbo.com" menu item Products & Applications / Rail / Hydrodynamic drives / Publications / Data sheet (Title) - (Market Division / Product Group) Hydrodynamic Drives / Transmission oils for turbo transmissions

Oil and filter change intervals for Voith turbo transmissions T 211 re4 + KB190 (Table 8)

Oil and filter change interval based on running hours ⁽¹⁾	Oil and filter change intervals based on mileage (km)
5.000	300.000

(1) = Running hours are accumulated operating hours at speeds of more than 1 km/h.

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Use at low temperatures

The approved transmission oils allow cold starts at temperatures down to -20 °C.

Special measures must be taken if temperatures are lower.

Oil filtration

Ensure oil filtration to purity class 15/11 as per ISO 4406 when filling the transmission with oil.

For appropriate filter units please contact Voith Turbo.

The maximum quantity of foreign particles in 100 ml oil for this purity class is:

- Particles >5µm: 32,000 (class 15)
- Particles >15µm: 2,000 (class 11)

Hydraulic system

The oil change interval for the hydraulic system is 4000 operating hours / max. 2 years!

The approved engine oils specified in Chapter 5 must be used.

3 Coolants

Requirements

Coolants must be prepared from suitable fresh water and a coolant additive which has been approved by MTU Friedrichshafen GmbH. Conditioning of the coolant takes place outside the PowerPack.



Mixing of different coolant additives and supplementary additives is prohibited!

The quantity of coolant remaining in the PowerPack coolant circuit during a coolant change is not critical.

To prevent cooling system damage:

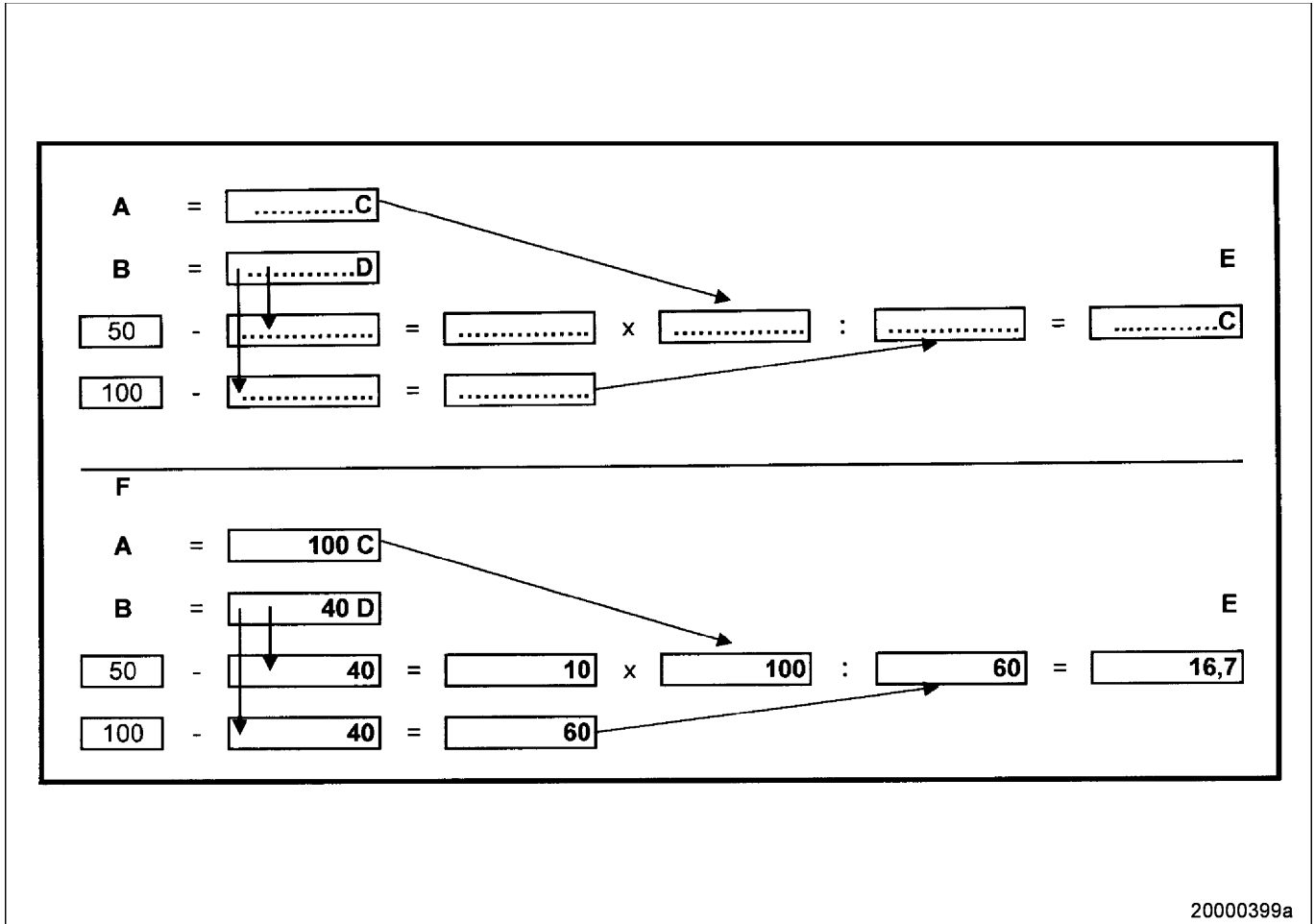
- For initial filling, a corrosion-inhibiting antifreeze concentration of 50% by volume must be ensured.
- For topping up coolant (after a coolant loss) or when the corrosion-inhibiting antifreeze concentration falls below 40% by volume, a concentration of 50% by volume must be established in the cooling system.
- A corrosion-inhibiting antifreeze concentration lower than 40% by volume is inadmissible to avoid the reduction of corrosion protection.
- Never use coolant with a corrosion-inhibiting antifreeze concentration of more than 55% by volume. Concentrations in excess of this reduce antifreeze protection and heat dissipation.

Coolant mixtures:

Coolant mixtures (Table 9)

Antifreeze protection to °C	-27	-32	-37	-42
Water % by vol.	60	55	50	45
Corrosion-inhibiting antifreeze % by vol.	40	45	50	55

Calculation of the corrosion inhibiting antifreeze quantity for refill



A Coolant capacity (total)
 B Measured concentration
 C Liter
 D Percent by volume

E Refill quantity of corrosion-inhibiting antifreeze (This quantity must be drained off if the coolant level is within the specifications!)

F Calculation example

Fresh water

Only clean, clear water with values in accordance with those in Table 10 must be used for preparing the coolant. If the limit values for the water are not achieved, its hardness or mineral content can be decreased by adding demineralized water.

(Table 10)

	Min.	Max.
Total earth alkalines ¹⁾ (Water hardness)	0 mmol/l 0°d	2.7 mmol/l 15°d
pH-value at 20 °C	6,5	8,0
Chloride ions		100 mg/l
Anion total		200 mg/l

1) Common designations for water hardness in various countries:

1mmol/l = 5.6°d = 100 mg/kg CaCO₃

- 1°d = 17.9 mg/kg CaCO₃, USA hardness
- 1°d = 1.79° French hardness
- 1°d = 1.25° English hardness

Operational monitoring

Inspection of the fresh water and continuous monitoring of the coolant are essential for trouble-free PowerPack operation. MTU Friedrichshafen GmbH recommends to check the freshwater and coolant quality every six months and whenever the system is to be filled. This can be done with the MTU Test Kit. The MTU Test Kit contains all necessary equipment and chemical substances, instructions with the procedures of the analyses to be conducted and the relevant limit values.

The following tests can be conducted with the MTU Test Kit:

- Determination of the total hardness of the freshwater (°d)
- pH value of freshwater and engine coolant
- Chloride content of fresh water
- Corrosion-inhibiting oil content
- Antifreeze (corrosion-inhibiting) concentration
- Water-soluble corrosion inhibitor content

Orders for fresh water and coolant analysis may be placed with MTU Friedrichshafen GmbH. Samples of min. 0.25 l must be supplied.

Limit values for prepared coolant (Table 11)

pH value when using: – Corrosion inhibitor / antifreeze	Min. 7.0	Max. 9.0
Silicon – Valid for coolants containing Si	Min. 25 mg/l	

Storage capability of coolant concentrates up to max. 35 °C (Table 12)

Corrosion-inhibiting antifreezes	5 years	
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4 Fuels

Diesel fuels

Selection of a suitable diesel fuel

The quality of the fuel is very important for satisfactory engine performance, long engine service life and acceptable exhaust emission levels.

In order to achieve optimum engine performance and satisfactory service life for the entire fuel and injection system, the limit values for water and total contamination must be complied with in the vehicle tank for all approved fuel qualities.

Limit values for water and total contamination (Table 13)

		Test Method		Limit Value
		ASTM	ISO	
Proportion of water	Max.	D 6304	EN 12937	200 mg/kg
Total contamination	Max.	D 6217	EN 12662	24 mg/kg

It is strictly recommended to integrate an additional filtering system in the fuel system.



The use of fuels which have not been approved may lead to considerable deviations from the specified engine power and to severe damage to the engine.

Consult MTU Friedrichshafen GmbH if fuels which have not been approved shall be used!



If fuels which have not been approved are used, shorter oil change intervals are to be expected.

Before using fuels which have not been approved, consult MTU Friedrichshafen GmbH to agree the oil change intervals.

Operating the engines with biodiesel/FAME acc. to EN14214 involves reduced oil change intervals, see Chapter 4.



Dispose of used fluids and lubricants in accordance with local regulations.

Fuel lubricity (Table 14)

		Test Method		Limit Value
		ASTM	ISO	
Lubricity at 60 °C	Max.	D6079	12156-1	460 µm

Requirements

Commercially available diesel fuels meeting the following specifications are approved for use:

Distillate fuels

- Diesel fuel in accordance with EN 590
- Grade No. 1–D (S15, S500, S5000) in accordance with ASTM D 975–06
- Grade No. 2–D (S15, S500, S5000) in accordance with ASTM D 975–06



Distillate fuels according to the above-mentioned standards with a sulfur content <50 mg/kg must not be used if lubricity (HFRR) is <460µm.

Biodiesel

The standardized general term “FAME” (Fatty Acid Methyl Ester) is used here to designate biodiesel fuels.



The basic configuration of the PowerPack is not equipped with a fuel system suitable for FAME. Before using biodiesel (FAME) fuels or diesel fuels with a FAME content exceeding the limit values of EN 590, the fuel system of the PowerPack must be modified! Consultation with MTU-Friedrichshafen GmbH is mandatory!



The use of diesel fuels with a FAME content acc. to EN 590 does not present a problem. This fuel has no influence on the oil change intervals. Consult MTU Friedrichshafen GmbH if the FAME content is higher.

Approval and engine / Powerpack requirements for the operation with FAME (Table 15)

Engine/Series	Approval/requirements
PowerPack 6H 1800 P	Only with special equipment
Engine 6H 1800	Approved as from series production

Fuel

- The fuel must comply with DIN EN 14214. Operation with fuels of lower quality can lead to damage and malfunctions.
- Either FAME or diesel fuel may be used. The various mixtures of FAME and normal diesel fuel which may occur in the vehicle tank as a result, present no problem.

Engine oil and servicing

- A certain amount of fuel always finds its way into the engine oil via the pistons and cylinders. Its high boiling point means that FAME does not evaporate but remains in the engine oil in its entirety. Under certain conditions chemical reactions may take place between FAME and the engine oil. This can lead to engine damage.
- For this reason, engine oil and filter change intervals must be shortened for operation both with pure FAME and with FAME-diesel mixtures.

- For Series 460/1800, special equipment is available which facilitates an increase in the engine oil change intervals for operation with 100% FAME. For this application, the engines must be fitted with special equipment, i.e. special unit pumps and a fuel prefilter with heated water separator.

Table 16

Engine version	Engine oil change interval
Engines not fitted with special equipment for operation with FAME	Reduction of the engine oil change interval to 300 operating hours.
Engines with special equipment: <ul style="list-style-type: none"> • Special unit pump • Fuel prefilter with heated water separator 	Reduction of the engine oil change interval to 500 operating hours.



The relevant engine oil change and filter replacement intervals must be complied with without fail! Exceeding the engine oil change intervals can cause engine damage!

- Operation with 100% FAME requires shortened fuel filter change intervals. A new fuel filter must be fitted each time the engine oil is changed.
- Fuel and engine oil must be changed approximately 25 operating hours after conversion to FAME due to the danger of blockage caused by loosened deposits (FAME has a pronounced cleaning effect).
- Over longer periods, fuel filter service life may be reduced as a result of old residues being carried into the filter from the fuel system. A special, approved fuel prefilter can be installed as an improvement.

Engine power and engine standstill

- Due to its calorific value, operation with 100% FAME involves a reduction of approx. 8%-10% in engine power. This leads to a corresponding increase in fuel consumption as compared to operation with diesel fuel. Engine power corrections are not permissible.
- Prior to any extended period out of operation, the fuel system must be flushed out in order to prevent congestion. For flushing, the engine must be operated for at least 30 minutes on diesel fuel.

General information

- We can make no comment with regard to the level of FAME resistance of the fuel system, which is not part of our scope of supply.
- FAME is an extremely effective solvent. Any contact with paint, for example, must therefore be avoided.
- The characteristic smell of FAME exhaust, especially during long periods of idling, may be perceived as unpleasant. The nuisance caused by smell can be reduced by an oxidation catalyzer which may be installed by the vehicle / equipment manufacturers at their own risk.



Our company accepts no responsibility for and provides no warranty in respect of any fault or damage connected in any way with the use of FAME of a lower quality or resulting from noncompliance with our specifications on operation using FAME. All resultant irregularities and consequential damage lie outside our responsibility.

Vegetable oils as an alternative to diesel fuel



The use of pure vegetable oils as an alternative to diesel fuel or FAME is strictly prohibited due to the absence of standardization and to negative experience (engine damage caused by coking, deposits in the combustion chambers and oil sludge)!

Low-sulfur diesel fuels

Sulfur is contained in chemically bound form in crude oil and is therefore present in fuel at varying levels.

A sulfur content of max. 50 mg/kg or 10 mg/kg (depending on category) has been a European Union requirement since 01.01.2005. The term "sulfur-free" is used here to designate diesel fuels with a sulfur content of max. 10 mg/kg. Low-sulfur diesel fuels (max. 50 mg/kg) are to be recommended for environmental reasons. In order to avoid problems with wear, lubricity additives, among other things, are added by the manufacturer.

Diesel fuels in winter operation

At low outdoor temperatures, the diesel fuel's fluidity can be inadequate on account of paraffin precipitation.

In order to prevent operational problems (e.g. clogged filters) during the winter months, diesel fuel with suitable cold-flow characteristics should be used.

Flow improvers

Flow improvers cannot prevent paraffin precipitation but they do influence the size of the crystals and allow the diesel fuel to pass through the filter.

The effectiveness of the flow improvers is not guaranteed for every fuel.

Certainty is only assured after laboratory analyses of the filtering capability.

Required quantities and mixing procedures must be carried out according to the manufacturer's instructions.

Microorganisms in fuel

Bacterial attack and sludge formation may occur in the fuel under unfavorable conditions. In such cases, the fuel must be treated with biocides in accordance with the manufacturer's specifications. Overconcentration must always be avoided.

For prophylactic use, the appropriate concentration must be identified in consultation with the relevant manufacturer.

Approved biocides (Table 17)

Manufacturer	Brand name	Concentration for use
ISP Global Technologies Deutschland GmbH Emil-Hoffmann-Str. 1a 50996 Köln Tel. +49 (0)2236 9649 304/301 Fax. +49 (0)2236 9649 295	Bakzid	100 ml per 100 l
Schülke und Mayr 22840 Norderstedt Tel. +49 (0) 40/52100-00 Fax. +49 (0) 40/52100-244	Grota MAR 71 StabiCor 71	0.5 l / ton 0.5 l / ton
Rohm und Haas In der Kron 4 60489 Frankfurt Tel. +49 (0) 69/78996-0 Fax. +49 (0) 69/7895356	Kathon FP 1.5	100-200 mg/kg
Maintenance Technologies Simon's Town 7995 Cape Town – South Africa Tel. +27 21 9877377 Fax. +27 21 9794611 E-mail: maintech@telkomsa.net	Diesalcure Fuel Decontainment	1 : 4000 (250mg/kg)

5 Approved fluids and lubricants

General information

Fluids and lubricants for hydrostatic drive systems (fans, generator drive)

Only approved engine oils as listed below may be used as operating fluids in the hydraulic system.

Engine oils

For details and special information, see chapter on "Lubricants" (→ Page 05)

Multi-grade Oils, SAE-grades 0W-30, 5W-30, 5W-40, and 10W-40 for Diesel Engines

Manufacturer	Brand name	SAE Viscosity class	Remarks
AD Parts, S. L.	AD SDX PLUS + 10W40	10W-40	
Addinol Lube Oil	Addinol Super Truck MD 1048 Addinol Ultra Truck MD 0538	10W-40 5W-30	
Adolf Würth GmbH & Co. KG	Triathlon Super Cargo	10W-40	
Alvea	Freeway DBE4	10W-40	
Aral AG	Aral Giga Turboral Aral Mega Turboral Aral Super Turboral	10W-40 10W-40 5W-30	
Armorine S.A.	Armorine Diamant	10W-40	
Ashland Nederland B.V.	Ashland A.P.B. Prefleet DDQ	10W-40	
Astris S.A.	Astris TNX	10W-40	
Avia Mineralöl-AG	Avia Turbosynth HT-E	10W-40	
BayWa AG	BayWa Motorenöl Super Truck 1040 MC BayWa Super Truck 1040 MC BayWa Super Truck 530 SL	10W-40 10W-40 5W-30	
Behran Oil Company	Behran Turbo EIII	10W-40	
Belgin Madeni Yaglar Tic. Ve San. A.S.	Lubex Premium XT 10W40	10W-40	
Blaser Swisslube AG	Blasol DEP 5W30 Blasol DHP 10W40 Blasol DHSP 10W40	5W-30 10W-40 10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
BP p.l.c.	BP Vanellus E7 LE BP Vanellus E7 Plus BP Vanellus E7 Supreme BP Vanellus E7 Ultra BP Vanellus E7 Ultra M BP Vanellus E8 Ultra BP Vanellus Eco BP Vanellus Max Drain BP Vanellus Max Drain 5W-30	10W-40 10W-40 5W-40 5W-30 5W-30 5W-30 10W-40 10W-40 5W-30	
Bucher AG	Motorex Focus 4 Motorex MC Power 3 Motorex MC Power Plus	10W-40 10W-40 10W-40	
C.F.C.L.	ECLA	10W-40	
Calpam Mineralöl-Gesellschaft mbH	Calpam Turbosynth	10W-40	
Carat GmbH & Co. KG	ad-Super Cargo Leichtlauf-Oil	10W-40	
Carl Bechem GmbH	STAROIL DIMO SAE10W-40	10W-40	
Castrol Ltd.	Castrol Elixion 0W-30 Castrol Enduron Castrol Enduron Euro 4 Low SAPS Castrol Enduron New Technology Castrol Enduron Plus Castrol Enduron Plus	0W-30 10W-40 10W-40 10W-40 5W-30 5W-40	
Cepsa Lubricantes	Cepsa Eurotech LS Cepsa Eurotrans SHPD Cepsa Eurotrans SHPD 5W30	10W-40 10W-40 5W-30	
Chevron Global Lubricants	Caltex Delo XLD Texaco Ursa TDX Texaco Ursa Ultra Ursa Premium FE Ursa Super TDX	10W-40 10W-40 10W-40 5W-30 10W-40	
Chief Oil Nederland B.V.	Chief Oil Nambe	10W-40	
Christian Lühmann GmbH & Co. KG	Classic Motorenöl Super Classic Motorenöl Ultra 5W-30	10W-40 5W-30	
Christian Winkler GmbH & Co. KG	Winkler Truck Fuel Economy	5W-30	
CLAAS Vertriebsgesellschaft mbH	CLAAS AGRIMOT ULTRATEC 10W-40 CLAAS Engine Pro CLAAS Ultratec - XXL	10W-40 10W-40 10W-40	
Comercial Roshfans S.A.	ACIETE SINTETICO VOLTRO EUROFLEET	10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Comma Oil & Chemicals Ltd.	Comma Ultra Diesel	10W-40	
Condat S.A.	Condat Vicam Eurosynth Condat Vicam Runner 10W40	10W-40 10W-40	
Conqord Oil S.r.L.	Roadstar	10W-40	
Daimler AG	MB 228.5 Motorenöl 000 989 60 01 12 MB 228.5 Motorenöl 000 989 60 01 13 Mercedes-Benz NFZ-Motorenöl Blatt 228.5	10W-40 10W-40 10W-40	
De Oliebron B.V.	Tor Turbosynt Tor Turbosynth 10W-40 NF Tor Turbosynth LSP, 10W-40	10W-40 10W-40 10W-40	
Delek	Delkol Turbosynth M 10W40	10W-40	
EKO A.B.E.E.	EKO FORZA SYNTHETIC	10W-40	
Eldon's S.A.	Eldon's Elona Syn	5W-30	
Eller-Montan-Comp. GmbH	Ellmotol Econo Plus HDC	10W-40	
EMKA Schmiertechnik GmbH	EMKA Cargo MC 10W40	10W-40	
Engen Petroleum Ltd.	Engen Dieselube 3000 Super	10W-40	
ENI S.p.A.	Agip Sigma Super TFE Agip Sigma Trucksint TFE Agip Sigma Ultra TFE Autol Valve Ultra FE	10W-40 5W-30 10W-40 10W-40	
ENOC International Sales L.L.C.	ENOC Vulcan 770 SLD 10W-40	10W-40	
ERG Petroli S.p.A.	ERG TD 501, SAE 10W-40	10W-40	
ESA	ESA Multilub Freeway	10W-40	
Ets A. Mauran & Fils S.A.	Inter Turbo LD 5	10W-40	
Eurol Produktionsges.m.b.H	Eurol Concept LD	10W-40	
Evva-Schmiermittel-Fabrik	Evva Truck Extra	10W-40	
Exxon Mobil Corp.	Mobil Delvac 1 5W-40 Mobil Delvac XHP Extra 10W-40 Mobil Delvac XHP LE 10W-40 Mobil Delvac XHP Ultra 5W-30	5W-40 10W-40 10W-40 5W-30	
Finke Mineralölwerk GmbH	Aviaticon Finko-Super Truck LA 10W/40 Aviaticon Finko Truck LD 10W/40 Aviaticon FinkoTruck LD 5W/30	10W-40 10W-40 5W-30	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
FL Selenia S.p.A.	Aktual Synthec Hercules FE Hercules SHTF Urania 100K Urania Ecotech Urania FE	10W-40 10W-40 10W-40 10W-40 10W-40 5W-30	
Fuchs Petrolub AG	Cofran Marathon 10W-40 Fuchs Titan Cargo LDF Fuchs Titan Cargo MC SAE 10W-40 Fuchs Titan Cargo SL SAE 5W-30	10W-40 10W-40 10W-40 5W-30	
GB Lubricants Ltd.	UNIMOT 5 10W/40 Unimot Synth 5 TCK EURO 5W30	10W-40 5W-30 5W-30	
Gedol International S.R.L.	TCK EURO 5W-30	5W-30	
Georg Oest Mineralölwerke GmbH & Co KG	Oest Dimo HT Super	10W-40	
Ginouves Georges S.A.	York 847 York 847 York 847 10W-40	5W-40 10W-30 10W-40	
GML OIL; LCC	GML OIL OFFLIMITS 10W-40	10W-40	
Greenway Lubricants Limited	Stamina LDS 100	10W-40	
Grupa Lotos SA.	Turdus Powertec Synthetic SAE 5W/30 Turdus Semisynthetic CF/SL 10W-40 Turdus Semisynthetic XHPDO	5W-30 10W-40 10W-40	
Gulf Oil International	Gulf Fleet Force Synth Gulf Superfleet ELD 10W-40	5W-30 10W-40	
Hafa France	Hafa Eurodex	10W-40	
Handelsges. für Kfz-Bedarf GmbH & CO. KG	SVG Esvaugol Premium SAE 10W-40	10W-40	
Hankook Shell Oil Company Limited	Hankook Shell Rimula Ultra	10W-40	
Hermann Bantleon GmbH	Avilub Motorenöl WDB 10W-40	10W-40	
Huiles Berliet S.A.	RTO Extensia RXD 10W-40 RTO Extensia RXD ECO 5W-30 RTO Extensia TXD ECO 10W-30	10W-40 5W-30 10W-30	
Hunold Schmierstoffe GmbH	Eurolub Multicargo 10W/40	10W-40	
Igol, France	Igol Trans Turbo 6X Igol Trans Turbo 8X	10W-40 5W-30	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
INA Rafinerija nafte Rijeka	INA Super 2000 INA Super EKO	10W-40 10W-40	
Iranol Co.	Iranol D-40,000	10W-40	
Italiana Petroli (IP) Genua	IP Tarus Turbo Plus IP Tarus Turbo Synthetic	10W-40 5W-30	
Japan Energy Corp.	Jomo Delcion	5W-40	
Kompressol-Oel Verkaufs GmbH	Kompressol-FX	10W-40	
Krafft S.L.	Molykote Synt 10W-40 SHPD Ultra SHPDO Synthetic	10W-40 10W-40	
Kroon Oil B.V.	Armado Synth LSP 10W40	10W-40	
Kuttenkeuler GmbH	Master Truck	10W-40	
Kuwait Petroleum	Q8 Super Truck FE Q8 T 860 SAE 10W-40 Q8 T 905 SAE 10W-40	5W-30 10W-40 10W-40	
Liqui Moly GmbH	Liqui Moly LKW Langzeit Motoröl Liqui Moly LKW-Langzeit-Motoröl FE	10W-40 5W-30	
Mapetrol d.o.o.	Mapetrol Motoröl SHPD Ultra	10W-40	
Marco A G de Amedia	BR-352-EX Lubrax Tec Turbo	5W-30 10W-40	
Meguin GmbH & Co. KG Mineraloelwerke	megol Diesel Truck Performance Megol Motorenoel Super Leichtlauf DIMO Megol Motorenoel Super LL DIMO Premium	5W-30 10W-40 10W-40	
Millers Oils Ltd.	Truckmaster XPFE Trucksynth	10W-40 5W-30	
Mineralöl-Raffinerie Dollbergen GmbH	Pennasol Performance Truck	10W-40	
Mitan Mineralöl GmbH	Alpine Turbo Plus 10W40	10W-40	
MOL-LUB Ltd.	MOL Synt Diesel MOL Dynamic Synt Diesel 10W-40	10W-40 10W-40	
Morris & Co. Ltd.	Morris Ringfree Ultra Ring Free Ultra plus FE 5W30	10W-40 5W-30	
Motul	Motul Tekma Optima 5W-30 Motul Tekma Ultima 10W-40	5W-30 10W-40	
Müller Mineralöle GmbH & Co. KG	OTP PLUS SUPER Truck OTP Plus Super-Leichtlauf-Motorenöl	10W-40 10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Neste Markkinointi Oy	Neste Turbo E6 10W-40 Neste Turbo Super 5W-30	10W-40 5W-30	
New-Process AG	Dallas Power 5 New Process Motoroil Dallas Plus 3	5W-30 10W-40	
NOCC, a. s.	Valar Adut XL 053	5W-30	
Noviol B.V.	Kennoco Eurosynth HP	10W-40	
Oel-Brack AG	Midland Nova Midland Synqron Diesel	10W-40 10W-40	
Oelwerke Julius Schindler GmbH	Econo-Veritas Truck FE OJS Veritas Spezial HD-XTR7 10W-40 Veritas Spezial HD Extra	5W-30 10W-40 10W-40	
Oil Company Champion in the World s.r.l.	One Hundred SAE 10W-40 MB 228.5	10W-40	
Oktanoil DOO Bela Crkva	Turbo Ultra Long	5W-30	
Olipes, S. L.	Averoil TIR-UHP	10W-40	
OMV	OMV super truck OMV truck blue SAE 10W-40 OMV truck FE plus	5W-30 10W-40 10W-40	
OOO LLK International	Lukoil Prima	10W-40	
Opet Petrolcülük	Opet Omega Formula 5W-30 Opet Omega Formula Blend 10W-40	5W-30 10W-40	
Orlen Oil Sp. z o. o.	ORLEN OIL Diesel (4) XHPDO CF 10W-40 Platinum Ultor Extreme 10W/40 Platinum Ultor Progress, 10W-40	10W-40 10W-40 10W-40	
Orly International	Orly Taurus 3002	10W-40	
OY TEBOIL AB, Suomen Petrooli	Teboil Super XLD Teboil Super XLD L-SAPS, SAE 10W-40	10W-40 10W-40	
Pakelo Motor Oil S.r.l.	Pakelo Goldenstar Pakelo Goldenstar LA 51 Pakelo Goldenstar LA-77-51 Pakelo Kentron Over MB 5	5W-30 10W-40 10W-40 10W-40	
Paramo, a. s.	Mogul Diesel DTT Plus Mogul Diesel Ultra	10W-40 5W-30	
Peeters Brems S.A.	Ardea Semi Synthetic Special Diesel Oil	10W-40	
Pero Dugic	Maxima HC Magnum XHPD Maxima XHPD	5W-30 10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Petrogal S.A.	Galp Galaxia Extreme Galp Galaxia LD S Ultra Galp Galaxia Ultra EC Galp Galaxia Ultra LS	5W-30 10W-40 10W-40 10W-40	
Petrol Ofisi Anonim Sirketi	PO Maximus Diesel 10W-40	10W-40	
Petroliam Nasional Berhad	Motolub 3000 Motolub 800	5W-30 10W-40	
Petromin Oils	Petromin Turbomaster LD 228.5	10W-40	
Prista Oil AD	Prista UHPD Prista Ultra TD, SAE 10W-40	10W-40 10W-40	
PROFI-TECH GmbH	PROFI-CAR DIESEL POWER TRUCK ACTRON	10W-40	
Rafinerija Nafta DOO Beograd	Galax Extra HPD	5W-30	
Raiffeisen Central-Genossenschaft Nordwest eG	Mega Truck Power Truck 10W-40	5W-30 10W-40	
Raloy Lubricantes	Max Raloy Diesel	5W-30	
Ravensberger Schmierstoffvertrieb GmbH	Ravenol Super Performance Truck 5W-30 Ravenol Performance Truck 10W-40	5W-30 10W-40	
Repsol YPF	Repsol Diesel Turbo UHPD MID SAPS Repsol Diesel Turbo VHPD Repsol Turbo UHPD	10W-40 5W-30 10W-40	
Rondine Azienda Petrochimica S.p.A.	Blu Oil 5	10W-40	
S.A.Espanola de Lubrificantes	Gulfleet Highway 10W-40 Gulfleet Supreme (EP)	10W-40 5W-30	
Sakson S.A.	Parnas Hercules 5 SAE 10W-40	10W-40	
Sasol Oil (Pty) Ltd	Sasol Ruby	10W-40	
Shell International Petroleum Company	Shell Normina Extra Shell Rimula Extra E4 Shell Rimula R5 M Shell Rimula R6 M Shell Rimula R6 ME Shell Rimula Signia Shell Rimula Ultra Shell Rimula Ultra Shell Rimula Ultra (E7) Shell SL 0807	10W-40 10W-40 10W-40 10W-40 5W-30 10W-40 5W-30 10W-40 10W-40 10W-40	
Sips-Dieter Döcker GmbH	Sips-TSL 4	10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
SK Energy	ZIC XQ 5000 10W-40	10W-40	
Slider SA	Taurus Ultra	10W-40	
Slovnaft a. s.	Madit Mistral	10W-40	
Solda Vladimiro S.p.A.	Wladoil UHP Diesel Oil	10W-40	
SPECOL Sp.Z.O.O.	Spec Diesel UHPD CF 10W/40	10W-40	
SRS Schmierstoff Vertrieb GmbH	Wintershall TFF Wintershall TFG Wintershall TFL	10W-40 10W-40 5W-30	
Strub + Co AG	Strub Partsynt HC Ultra UHPD	10W-40	
Sun Oil Co.	Sunoco Ultra HPD	10W-40	
Svenska Statoil AB	Statoil TruckWay	5W-30	
Swd Lubricants GmbH & Co. KG	Expert XH, SAE 10W40 swd Expert PAO	10W-40 5W-30	
Syneco S.p.A.	Syneco K-E5 Syneco Multirange	10W-40 10W-40	
Tamoil Petroli S.p.A.	Tamoil Diesel Top Performance FE Tamoil Diesel Premium FE	5W-30 10W-40	
Tehnosint d.o.o.	Extrol Gold Star (XHPD)	5W-30	
The Valvoline Company	Valvoline ProFleet Valvoline ProFleet LS SAE 10W-40	10W-40 10W-40	
Total Lubrifiants	Antar Maxolia 10W-40 Antar Maxolia FE 5W-30 Elf Performance Experty 10W-40 Elf Performance Experty FE 5W-30 Elf Performance Experty LSX 10W-40 Elf Performance Galaxy FE 10W-30 Fina Kappa Syn 5W-30 Fina Kappa Ultra 10W-40 Total Rubia TIR 8600 10W-40 Total Rubia TIR 8600 FE 10W-30 Total Rubia TIR 8900 10W-40 Total Rubia TIR 9200 FE 5W-30	10W-40 5W-30 10W-40 5W-30 10W-40 10W-30 5W-30 10W-40 10W-40 10W-30 10W-40 5W-30	
Unil Deutschland GmbH	Unil Unimot Truck LD SAE 10W-40	10W-40	
Unil Opal	Unil LCM XS Unil Opal LCM 800 Unil Opal LCM 850	10W-40 10W-40 5W-30	
Usoco N.V.	Usoco UHPD	10W-40	

Manufacturer	Brand name	SAE Viscosity class	Remarks
Verkol, S.A.	Verkol EXTREM 5W-30 Verkol TD-Max 10W-40	5W-30 10W-40	
Wilhelm Scholten GmbH	Aviatic Super FEG	10W-40	
Wisura Mineralölwerk	Wisura Cargo MC 10W-40	10W-40	
Witham Oil & Paint Ltd.	Qualube Extendol, SAE 10W-40	10W-40	
Wolf Oil Corporation N.V.	Champion Turbofleet UHPD Wolf Masterlube Longdrain Ultra	10W-40 10W-40	
Wunsch Öle GmbH	Wunsch TSL-Diesel	10W-40	
Wynn's Italia S.P.A..	Multitruck FE	10W-40	
Yacco SAS	Yacco Transpro 65 SAE 10W-40	10W-40	
Zeller + Gmelin GmbH & Co.	Divinol Multimax Plus 10W-40 Divinol Multimax USHPD	10W-40 5W-30	

Multi-grade oils (low SAPS oils)

Manufacturer	Brand name	SAE Viscosity class	Remarks
AD Parts, S. L.	AD SDX PLUS + 10W40	10W-40	
Addinol Lube Oil	Addinol Extra Truck MD 1049 LE	10W-40	
Aral AG	Aral Mega Turboral LA 10W-40	10W-40	
Astris S.A.	Astris Diesel ADC-04	10W-40	
Blaser Swissslube AG	Blasol DHSP 10W40	10W-40	
BP p.l.c.	BP Vanellus Eco BP Vanellus Max Drain Eco	10W-40 10W-40	
Bucher AG	Motorex Focus 4	10W-40	
Castrol Ltd.	Castrol Elixion Low SAPS Castrol Enduron Euro 4 Low SAPS Castrol Enduron Low SAPS	5W-30 10W-40 10W-40	
Cepsa Lubricantes, S.A.	Cepsa Eurotech LS	10W-40	
Chevron	Texaco Ursa Ultra Texaco Ursa Ultra X	10W-40 10W-40	
Christian Lühmann GmbH & Co. KG	CLASSIC MEDUNA LT 1040 LA	10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Daimler AG	MB 228.51 Motorenöl A 000 989 91 01 Granat	10W-40	
	MB 228.51 Motorenöl A 000 989 94 01	10W-40	
	Mercedes Benz NFZ-Motorenöl Blatt 228.51	10W-40	
De Olibron B.V.	TOR Turbosynth LSP, 10W-40	10W-40	
Deutsche Pentosin-Werke GmbH	Pentosin Diesel 10W-40 LA	10W-40	
Exxon Mobil Corp.	Mobil Delvac XHP LE 10W-40	10W-40	
Finke Mineralölwerk GmbH	Aviaticon Finko-Super Truck LA 10W/40	10W-40	
FL Selenia s.p.a.	URANIA ECOTECH	10W-40	
Fuchs Petrolub AG,	Fuchs Titan Cargo Maxx SAE 10W-40	10W-40	
GB Lubricants	Unimot (R) Synth 51	10W-40	
Georg Oest Mineralölwerk GmbH & Co KG	OEST Dimo LS SAE 10W-40	10W-40	
Ginouves Georges S.A.	York 947 10W-40	10W-40	
GML OIL, LLC	GML OIL OFFLIMITS 10W-40	10W-40	
Gulf Oil International	Gulf Superfleet XLE	10W-40	
Handelsges. für Kfz-Bedarf GmbH & Co. KG	SVG Esvaugol Low SAPS	10W-40	
Hunold Schmierstoffe GmbH	Euroclub Supermax 10W/40	10W-40	
Igol France	Igol Protruck 200X, SAE 10W-40	10W-40	
Kroon Oil B.V.	Armado Synth LSP 10W40	10W-40	
Kuwait Petroleum	Q8 T 900	10W-40	
	Q8 T 905 SAE 10W-40	10W-40	
Liqui Moly GmbH	Liqui Moly Top Tec Truck 4050	10W-40	
	Liqui Moly Truck-Nachfüll-Öl	10W-40	
Meguin GmbH & Co. KG	megal Motorenoel Low SAPS	10W-40	
Mineralöl-Raffinerie Dollbergen GmbH	Motor Gold LightTec	10W-40	
MOL-LUB Ltd.	MOL Dynamic Mistral 10W-40	10W-40	
Morris & Co. Ltd.	Morris Ring Free Ultra 10W-40	10W-40	
Motul	Motul Tekma Ultima + 10W-40	10W-40	
Neste Markkinointi Oy	Neste Turbo E6 10W-40	10W-40	
New-Process AG	Super Dallas Synkat	10W-40	
Noaloil	NOALOIL DIAM Ld Td 100 10W40	10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Oel-Brack AG	Midland Nova	10W-40	
Oelwerke Julius Schindler GmbH	OJS Veritas Spezial HD-LSA 10W-40	10W-40	
Oil Refinery Modrica	MAXIMA euro 4+	10W-40	
OMV	OMV truck blue SAE 10W-40	10W-40	
Orlen Oil Sp. z o. o.	Platinum Ultor Progress, 10W-40	10W-40	
OY TEBOIL AB, Suomen Petrooli	Teboil Super XLD L-SAPS, SAE 10W-40	10W-40	
Pakelo Motor Oil S.r.L	Pakelo Goldenstar LA 51 Pakelo Goldenstar LA 77-51	10W-40 10W-40	
Panolin AG	Panolin Diesel Synth EU-4	10W-40	
Paz Lubricants & Chemicals	Paz Syntop SAE 10W/40	10W-40	
Petrogal S.A.	Galp Galáxia Ultra LS	10W-40	
Prista Oil AD	Prista UHPD	10W-40	
Rafinerija Nafta DOO	GALAX Euro 4 Low SAPS, SAE 10W-40	10W-40	
Ravensberger Schmierstoffvertrieb GmbH	Ravenol EURO IV Truck SAE 10W-40	10W-40	
Repsol YPF Lubricantes y Especialidades	Repsol Diesel Turbo UHPD MID SAPS	10W-40	
Rock Oil Company	commercial systhesis 10W40	10W-40	
ROWE Mineralölwerk GmbH	Rowe Truckstar 1040 HC-LA	10W-40	
Shell International	Shell Rimula R6 LM Shell Rimula R6 LME Shell Rimula Signia Shell SL 0807	10W-40 5W-30 10W-40 10W-40	
Sips-Dieter Docker GmbH	SIPS TLA-5-Diesel	10W-40	
Solero AG	Pacific Oil ADC-04	10W-40	
SRS Schmierstoff Vertrieb GmbH	Wintershall TLA	10W-40	
Strub + Co AG	Strub Partsynt HC Ultra SAE 10W/40	10W-40	
Svenska Statoil AB	TruckWay E6 10W-40	10W-40	
Swd Lubricants GmbH & Co. KG	swd FAVORIT LSAP SAE 10W-40	10W-40	
Tamoil Italia S:P:A.	TAMOIL DIESEL ULTRA FE	10W-40	
The Valvoline Company	Valvoline ProFleet LS SAE 10W-40	10W-40	

Manufacturer	Brand name	SAE Viscos-ity class	Remarks
Total Lubrifiants	Elf Performance Expert LSX 10W40 Total Rubia TIR 8900 10W-40	10W-40 10W-40	
Unil Deutschland GmbH	UNIL UNIMOT TRUCK LA SAE 10W-40	10W-40	
Unil Opal	Unil Opal Pallas 900, SAE 10W-40	10W-40	
Wolf OIL Corp. N.V.	WOLF MASTERLUBE LONGDRAIN ULTRA MS 10W40	10W-40	
Wunsch Öle GmbH	Wunsch TLA - Diesel	10W-40	
Yacco SAS	Yacco Transpro 65 SAE 10W-40	10W-40	
Zeller + Gmelin GmbH & Co. KG	Divinol Multimax Plus 10W-40	10W-40	

Transmission oils

Fluids and lubricants for ZF transmissions

Mechanical manual shift transmissions from ZF Co. Friedrichshafen:

The current, permissible fluids and lubricants for ZF transmissions can be downloaded free-of-charge from the following Internet address: <http://www.zf.com/Corporate/en> menu item Products & Services / Service Portfolio / Technical Information / Lubricants & Steel / List of Lubricants / Please choose your Language / TE-ML16.

Lubricant class 16K - Transmission oil of viscosity class: SAE 75W-80 (base oil partly synthetic, synthetic, suitable for interarders)

Manufacturer	Product name
Baywa AG, München/D	Tectrol Syntogear MA 7580
Fuchs Petrolub AG, Mannheim/D	Fuchs Titan Cytrac MAN Synth 75W-80

Lubricant class 16L (ATF)

Manufacturer	Product name
Addinol Lube Oil GmbH, Leuna/D	Addinol ATF D II E
American AGIP Company, Cabot/USA	AGIP HD Synthetic Blend
Amsoil, Superior/USA	Amsoil 206 Synthetic
ARAL AG, Bochum/D	ARAL Getriebeöl ATF E-S
AVIA Mineralöl-AG, München/D	AVIA Fluid ATF 92 S
Bucher AG Langenthal, Langenthal/CH	ATF TP Motorex ATF II Synthetic
Castrol International, Pangbourne Reading/GB	Castrol Import Multivehicle ATF
Cepsa Lubricants S.A., Madrid/E	Cepsa ATF 3000 S
Chevron Texaco Global Lubricants, San Ramon/USA	Caltex Synthetic ATF Heavy Duty Chevron Automatic Transmission Fluid Mercon V Chevron Multi-Vehicle ATF Chevron Synthetic ATF Heavy Duty Texaco Havoline ATF Mercon V Texaco Havoline Multi-Vehicle ATF Texaco Synthetic ATF Heavy Duty
Chevron Texaco, Ghent/B	Texamatic S
Comercial Importadora S.A. DE C.V., Santa Fe/MEX	Multi ATF Para Todas Las Marcas
Comp. Brasil. d. Petro.Ipiranga, Rio de Janero/BR	Isamatic Mercon V
ENI S.P.A. Refining & Marketing Division, Rom/I	ATF II E
Exxon Mobil Corp., Fairfax, Virginia/USA	Esso ATF LT 71141 Mobil 1 Synthetic ATF Mobil ATF SHC
Fuchs Petrolub AG, Mannheim/D	Titan ATF 5000 SL
Ginouves Georges SA, La Farlede/F	York 886

Manufacturer	Product name
Grupa Lotos SA, Gdansk/PL	Lotos ATF Super III G
Huiles Berliet S.A., Saint Priest/F	RTO Starmatic S2
Kuwait Petroleum R&T B.V., Europoort RT/NL	Q8 Auto 14 Synthetic Q8 Auto 15 ED
LLK Finland OY, Hamina/FIN	Teboil Fluid ES-Max
Lubricant Oil Com. Sinopec, Beijing/CN	GW ATF-III LD
Lubricantes Venoco Intern. C.A., Guacara/YV	Venoco ATF Multi -Vehiculo (75W)
Lubrication Engineers, Inc., Fort Worth, Texas/USA	1150 Trans-All EHP Automatic Transmission Fluid
Maziva Zagreb D:O.O., Zagreb/HR	INA ATF Ekstra
Mol-Lub Kft., Almásfüzitő/H	Mol ATF Synt
Neste Markkinointi Oy, Espoo/Fin	Neste ATF-2
New Process AG, Tübach/CH	ATF Synth
OMV Refining & Marketing GmbH, Wien/A	OMV ATF Z2 OMV ATF-S
Orlen Oil SP. Z.O.O., Krakow/PL	Hipol ATF IIE
Pakelo Motor Oil S.R.L., San Bonifacio (VR)/I	Pakelo ATF DXIII HTS Pakelo Auxon III Pakelo DX Fluid II TS
Panolin AG, Madetswil/CH	Panolin ATF Synth
Petro-Canada Lubricants, Mississauga/CDN	Heavy Duty Synthetic Blend ATF Mercon V ATF H-36007
Petronas Lubricants Intern., Kuala Lumpur/MAL	Tutela Truck ATF 90
Raloy Lubricantes S.A. DE C.V., Tianguistenco/MEX	Transfluid Synthetic M-5
Ravensberger Schmierstoffvertrieb GmbH, Werther/D	Ravenol Dexron II E Ravenol Dexron III H
Repsol YPF Lubricantes y Especialidades, Madrid/E	Matic Sintetico Repsol Matic III
S.A.E.L., Madrid/E	Gulf ATF Synt
Shell International Petroleum Comp. LTD., London/GB	Shell Donax TV Shell Donax TX
SRS Schmierstoff Vertrieb GmbH, Salzbergen/D	SRS Violin ATF Dexron S
Statoil Lubricants, Stockholm/S	Syntomatic Transway S DX II Transway S DX III F
Suomi Petrooli OY, Hamina/F	Teboil Fluid ES-Max

Manufacturer	Product name
Tedex Production SP.Z.O.O.Tomaszwo Mazowiecki/PL	Tedex ATF III Tedex ATF Synthetic
Total Lubrifiants S.A., Paris/F	Elfmatic G2 SYN Elfmatic G3 SYN Total Fluide SYN FE Total Fluide XLD FE Total Fluidematic SYN
Valvoline Europe, Dordrecht/NL	Valvoline Synpower ATF
Wameco, Zanica (BG)/I	Helifluid 9600 TS
Warren Oil CO., Dunn, North Carolina/USA	Multi-Vehicle Synthetic Blend ATF

Lubricant class 16M (ATF)

Manufacturer	Product name
ARAL AG, Bochum/D	ARAL ATF LTF
BP International, Pangbourne, Reading/GB	BP Autran LTF BP Autran SYN 295
Castrol International, Pangbourne, Reading/GB	Castrol Transmax Z Castrol Transynd
Kompressol-Oel Verkaufs GmbH, Köln/D	Kompressol-Dexron Synth LTF

Lubricant class 16N (synthetic ATF)

Manufacturer	Product name
Petronas Lubricants Intern., Kuala Lumpur/MAL	Tutel Truck ATF 120
Shell International Petroleum Comp. LTD., London/GB	Shell Donax TZ
ZF Friedrichshafen AG, Friedrichshafen/D	ZF-Ecofluid A Plus

Lubricant class 16P - Transmission oil of viscosity class: SAE 75W-80 (base oil synthetical, suitable for intarders)

Manufacturer	Product name
Castrol International, Pangbourne Reading/GB	Castrol Syntrans Max 75W-80
ZF Friedrichshafen AG, Friedrichshafen/D	ZF-Ecofluid M

Lubricant class 16Q

Manufacturer	Product name
ZF Friedrichshafen AG, Friedrichshafen/D	ZF-Ecofluid Life

Fluids and lubricants for Voith transmissions

Voith hydrodynamic transmission:

The current, permissible fluids and lubricants for Voith transmissions can be downloaded free-of-charge from the following Internet address: "www.Voithturbo.com" menu item Products & Applications / Rail / Hydrodynamic drives / Publications / Data sheet (Title) - (Market Division / Product Group) Hydrodynamic Drives / Transmission oils for turbo transmissions

Approved Voith transmission oils

Manufacturer	Product name	Increased thermal/oxidation resistance	Proved in operation
Addinol	SGL 18	X	YES
AGIP	AGIP Blasias 32		YES
ARAL	ARAL DegolBG 32		YES
BP	BP Energol HL-XP 32		YES
Caltex	Torque Fluid 32		YES
Chevron Texaco	Textran V 32		YES
Exxon Mobil	Mobilfluid 125		YES
Fuchs-Europe	Renofluid TF 1500	X	YES
Shell	Shell Tegula V 32	X	YES
Total	Total Azolla VTR 32	X	YES

Coolant additives

For details and special information, see chapter on “Coolants” (→ Page 11)



Mixing of different coolant additives and supplementary additives is prohibited!



Before changing from a corrosion-inhibiting antifreeze concentrate containing silicon to a silicon-free corrosion-inhibiting antifreeze concentrate, flush the coolant circuit with fresh water!

Before changing from a silicon-free corrosion-inhibiting antifreeze concentrate to a corrosion-inhibiting antifreeze containing silicon concentrate, flush the coolant circuit with fresh water!

Corrosion-inhibiting antifreeze concentrates (containing silicon)

Manufacturer	Brand name	Runtime Hour / Year	Remarks
Addinol	Antifreeze Super	- / 3	
Aral AG	Aral Antifreeze Extra	- / 3	
BASF AG	Glysantin G 05 Glysantin G 48 Glysantin Protect Plus	- / 3 - / 3 - / 3	
Bucher AG	Motorex Antifreeze G05 Motorex Antifreeze Protect G48	- / 3 - / 3	
Castrol Ltd.	Castrol Antifreeze NF	- / 3	
Clariant GmbH	Genantin Super	- / 3	
Fuchs Petrolub AG	Fuchs Maintain Fricofin	- / 3	
Ginouves Georges S.A.	York 716	- / 3	
Krafft S.A.	Krafft Refrigerante ACU 2300	- / 3	
Maziva - Zagreb d.o.o.	INA Antifriz AI Super	- / 3	
MOL-LUB Ltd.	EVOX Extra G48 Antifreeze concentrate	- / 3	
Panolin AG	Panolin Anti-Frost MT-325	- / 3	
Shell International	Glyco Shell	- / 3	
The Valvoline Company	Zerex G 05 Zerex G 48	- / 3 - / 3	
Total	Glacelf MDX	- / 3	
Univar	BR Standard Blue Antifreeze	- / 3	

Corrosion-inhibiting antifreeze concentrates (silicon-free)

Manufacturer	Brand name	Runtime Hour / Year	Remarks
Aral AG	Aral Antifreeze Silikatfrei	- / 3	
BASF AG	Glysantin G 30 Glysantin Alu Protect	- / 3 - / 3	
The Valvoline Company	Zerex G 30	- / 3	

Corrosion-inhibiting atifreezes: ready-mix

Manufacturer	Brand name	Runtime Hour / Year	Remarks
BASF	Kühlstoff G 05-23/50	- / 3	
Detroit Diesel	Power Cool Off-Highway 50/50 (50%)	- / 3	
Total	Total Coolelf MDX -37	- / 3	

6 PowerPack preservation

Note

If you have queries with regard to PowerPack preservation, please contact your MTU representative.

7 Revision overview

General

This publication is only applicable to Series 1800 PowerPacks.

For information on the other MTU engine series and MTU-DD Series S60, please refer to the MTU Fluids and Lubricants Specifications, publication No. A001061/.. .

Revisions

Seq. No.	Page	Subject	Action	Explanation
1	All	Symbol	New symbol	 replaced with
2	03	Preface	Change	New internet path
3	03	Preface	Change	EU Stage 3A
4	03	Preface	Addition	with diesel particulate filter ... SCR exhaust treatment systems
5	05	Engine oils	Change	Note revised
6	06	Mixing engine oils	Change	Note extended
7	07	Oil change intervals for AsRail transmissions	Addition	Table 2
8	09	Table 7	Addition	Lubricant classes 16K and 16P
9	11	Requirements	Change	Section revised
10	11	Coolant mixtures (Table 9)	Change	Extended
11	12	Calculation of the corrosion inhibiting antifreeze quantity for refill	Addition	Whole section is new
12	13	Operational monitoring	Change	Section revised
13	13	Limit values for prepared coolant (Table 11)	Change	Revised
14	15	Limit values for water and total contamination	Change	3rd note revised

Seq. No.	Page	Subject	Action	Explanation
15	18	Flow improvers	Change	Laboratory analyses
16	31	Fluids and lubricants for ZF transmissions	Change	New oils added