

## Corrosion protection

For your information

### Information to Owners and Operators of the following Wärtsilä - Deutz and Sulzer engines:

D232, D234, D350, D358, D440, D441,  
D444, D484, D500, D501, D510, D511,  
D528, D540, D545, D601, D602, D603,  
D604(B), D616, D618, D620, D628, D640,  
D645, D716, D816, D18/22, D2016

AL20, A25, AS25, AT25, S20, S20U

#### Reference

99 Service information

#### Introduction / Background

New engines and replacement parts are protected against corrosion before being shipped from the plant. The duration of protection against corrosion depends on the type of corrosion protection, the packaging and the storage conditions. Corrosion protection may be guaranteed for 12 months.

#### Validity / Issue

Until further notice.

This issue cancels TB00/99/2116  
issue 01.

#### Issue 1

Re-issue of original bulletin  
TC 0199-99-2116/2 12/2008.

#### Issue 2

Procedure for interior corrosion protection  
for combustion chamber, receiver pipe and  
starter air line has been changed.

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## 1 Corrosion protection for engines which have been in operation

### 1.1 Interior corrosion protection

Interior corrosion protection is always provided by wetting of the walls with the implemented corrosion protection agent.

#### 1.1.1 Fuel system

This includes the injection valves, fuel filter, fuel pump, overflow valve, fuel lines and tank.

- Fill the fuel tank with a mixture of:
  - 85% distilled fuel
  - 15% corrosion protection oil SAE 30W-30, or Rimula R3
- Engines operated with a mixed fuel must be switched over to distilled fuel at least 3 hours before shutting down.
- Perform a corrosion protection run with the engine at idle speed (together with corrosion protection run for the lube oil system), duration approx. 10 minutes.

#### 1.1.2 Combustion chamber and receiver

If possible, the engine can be turned with use of starter motor, or starting air distributor:

- Temporary remove the air intake filters from the engine.
- Engage starter motor, without actually starting the engine, by securing the fuel rack of the injection pump(s) in "stop-position".
- With compressed air and spray lance, spray corrosion protection oil SAE 30W-30, or engine oil Rimula R3 into the receiver (through opened plug in receiver) between charge air cooler and cylinder heads.
- Turn the engine in combination with applying the corrosion protection oil spray for as long as spray mist coming out of the Turbocharger compressor intake can be observed.



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#### **ATTENTION:**

Oil drips in the receiver(s) are not permissible and must be sucked off if necessary.

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- Close of the receiver openings and reinstall the air intake filters.

If engine cannot be turned with the mounted starter motor, or starting air distributor:

- After completion of corrosion protection run, remove all fuel injectors from all cylinder units.

- Before applying conservation, turn the engine until corresponding piston is set to Bottom dead Centre (BDC).

With compressed air and spray lance, spray corrosion protection oil SAE 30W-30, or engine oil Rimula R3 into the combustion chamber (through the fuel injector hole in the cylinder head).



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**ATTENTION:**

Oil drips on the piston are not permissible and must be sucked off if necessary.

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**1.1.3 Starter air line**

- Spray corrosion protection oil SAE 30W-30, or engine oil Rimula R3 oil into the main starter line.



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**ATTENTION:**

Oil drips in lines are not permissible and must be sucked off if necessary.

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**1.1.4 Lube oil system**

This includes oil sump, lube oil pump, lube oil cooler, oil pressure control valve, oil filter, main oil channels, crankshaft, con-rod and camshaft bearings, tappets and tappet chambers, cylinder liners, valve springs and toggle levers.

- If the engine runs with Rimula R3, no separate protection run is required.
- Drain lube oil from warm engine.

In additional devices with their own oil filling (these include turbochargers, governors, injection pumps etc.) drain lube oil and fill with new lube oil according to manufacturer specifications.

- If the engine is equipped with crankcase covers, remove them, and install VCI chips per cylinder unit (in case of V-engines, one per unit.)

**1.1.5 Cooling water system**

If a coolant with corrosion protection properties is poured into the engine, no further action is necessary after draining the coolant.

For water requirements, please refer to TB00/99/2091.

If this is not the case, the coolant must be drained and a corrosion protection run performed with a mixture of corrosion protection agent with corrosion protection properties and fresh water so that a coating forms on the interior surfaces of the cooling system.

The duration of the corrosion protection run and the concentration of the corrosion protection agent are specified by the manufacturer of the corrosion protection agent.

Then drain the coolant.

## 1.2 Exterior corrosion protection

The engine must be cleaned thoroughly with a cleaning agent before exterior corrosion protection.

Any signs of corrosion and damage to the paintwork must be removed. See section for corrosion protection agents and cleaning agents.

### 1.2.1 Bare exterior surfaces and parts

All bare surfaces must be coated or sprayed with a corrosion protection agent.

Brush the crankshaft flange with corrosion protection agent and wrap tightly or cover with foil or packing cloth.

### 1.2.2 Control rods and joints

Coat control rods and joints with protective grease.

### 1.2.3 Rubber parts

Rub rubber parts with talcum powder.



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**ATTENTION:**

Rubber parts must not come into contact with oil, grease and paint.

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### 1.2.4 Engine openings

All engine openings must be fitted with air-tight, water-tight covers to delay the liquefaction process of the corrosion protection agents.

Air should be locked out to avoid ventilation of the engine (chimney effect).

## 1.3 Storage and packaging

After being protected against corrosion, the engine must be stored in a dry, ventilated hall or suitably covered. The cover must be placed loosely over the engine so that the air can circulate around it to prevent condensation from forming. Use a desiccant if necessary.

## 2 Subsequent corrosion protection of engines

If the maximum duration of corrosion protection has been reached and the engine is to remain in storage, it must be subjected to subsequent corrosion protection. The subsequent corrosion protection protects the engine for another 12 months. Subsequent corrosion protection must be provided accordingly for stored replacement parts.

Mark the position of the flywheel or crankshaft flange. Deposits may form on the cylinder liner in the area of the piston rings. For this reason, the pistons must be set to a different position each time corrosion protection is carried out.

The engine packaging and the covers over the engine openings must be removed.

## 2.1 Interior corrosion protection

### 2.1.1 Fuel system

This includes the injection valves, fuel filter, fuel pump, overflow valve, fuel lines and tank.

- Fill the fuel tank with a mixture of:
  - 85% diesel fuel
  - 15% corrosion protection oil SAE 30W-30
- Pump fuel with a separate pump or fuel hand pump until the fuel system is full.

### 2.1.2 Combustion chamber

See chapter 1.1.2 - Combustion chamber and receiver

### 2.1.3 Suction intake and starter air system, receiver pipe

See chapter 1.1.2 - Combustion chamber and receiver

### 2.1.4 Lube oil system

This includes oil sump, lube oil pump, lube oil cooler, oil pressure control valve, oil filter, main oil channels, crankshaft, con-rod, camshaft bearings, tappets and tappet chambers, cylinder liners, valve springs and toggle levers.

- If the engine is equipped with crankcase covers and VCI chips, remove the VCI chips before proceeding.
- Pump corrosion protection oil into the lube oil circuit with separate pump or pre-lubrication hand pump. Turn the engine manually or with electric turning gear so that all bearings and bearing liners are coated. The engine can also be turned with the starter without starting.
- Remove the cylinder head cover and spray valves, valve springs and toggle levers with corrosion protection oil SAE 30W-30.
- Install new VCI chips, if applicable.

In additional devices with their own oil filling (these include turbochargers, governors, injection pumps etc.) drain lube oil and fill with new lube oil according to manufacturer specifications.

### 2.1.5 Cooling water system

Fill up the coolant system with a mixture of corrosion protection agent with corrosion protection properties (see section) and fresh water and circulate with an external pump so that a new coating forms on the interior surfaces of the cooling system.

The duration of the corrosion protection run and the concentration of the corrosion protection agent are specified by the manufacturer of the corrosion protection agent.

Then drain the coolant.

## 2.2 Exterior corrosion protection

See chapter 1.2.

## 2.3 Storage and packaging

See chapter 1.3.

## 3 Removal of corrosion protection

The corrosion protection must be removed from the engine before starting. The packaging must be removed as well as all covers from the sealed openings. Any signs of corrosion and damage to paintwork must be removed. See section for cleaning agents.

### 3.1 Removal of interior corrosion protection

#### 3.1.1 Fuel system

- If there is a mixture of diesel fuel/corrosion protection oil in the fuel tank, drain it.
- Fill the fuel tank and fuel system with the proper fuel.

#### 3.1.2 Lube oil system

- If there is corrosion protection oil in the oil tray, drain it, or pump it out.
- Fill the engine with the lube oil intended for operation. Flushing is not necessary.
- In additional devices with their own oil filling (these can include turbochargers, governors, injection pumps etc.) drain lube oil and fill with new lube oil according to manufacturer specifications.

#### 3.1.3 Cooling water system

- If the implemented corrosion protection agent is compatible with the coolant to be used, this can be filled directly into the coolant system as specified.
- If it is uncertain whether the implemented corrosion protection agent is compatible with the coolant, the cooling system should be flushed with fresh water for about 15 minutes before filling.

### 3.2 Removal of exterior corrosion protection

- Wash all surfaces and components coated with corrosion protection agent with distilled fuel or a suitable cleaning agent.
- Wash out grooves of V-belt pulleys if necessary.

## 4 Corrosion protection agents and cleaning agents

Below a list of some reference products for corrosion protection or cleaning with which the best results have been achieved. Equivalent products can be used whereby the supplier must guarantee the suitability of the product for the application.

**Table 1, Corrosion protection agents and cleaning agents**

Usage	Product	Product reference
Cleaning of engine parts and fuel systems	Distilled fuel	Diesel acc. to DIN EN 590
Corrosion protection for lube oil systems, additional devices with own oil filling and fuel systems.	Corrosion protection oil SAE 30W-30, BP-MEK 30	BP Hamburg
	Rimula R3	Shell

Usage	Product	Product reference
	Viscosity according engine type requirements. See TB00/99/2090	
Corrosion protection agent for coolant systems.	See TB00/99/2091	
Corrosion protection agent (wax-like) for exterior corrosion protection.	Gelserol Super	Deutsche Castrol 76829 Landau Germany
Protective grease for control rods and joints.	Renolit MP2	Fuch Europa 68169 Mannheim
Talcum for rubber parts	Talcum fine, white	Silbermann GmbH & Co 86456 Gablingen Germany
Cleaning agent to remove corrosion protection agent.	Eskapon S 255	Haug-Chemie GmbH 74889 Sinsheim Germany
Cleaning agent, thinner to remove corrosion protection agent (wax like).	Renopal B 150	Fuch Europa 68169 Mannheim Germany

## 5 Miscellaneous

### 5.1 Related documentation

Technical bulletins:

Lube oil requirements

TB00/99/2090

Engine coolant for medium and large size engines

TB00/99/2091

### 5.2 How to contact Wärtsilä

For questions about the content of this Spare Parts Notice, or if you need Wärtsilä assistance, services, spare parts and/or tools, please contact your nearest Wärtsilä representative.

If you don't have the contact details at hand, please follow the link "Contact us" – "24h Services" on the Wärtsilä webpage: [www.wartsila.com](http://www.wartsila.com)

### 5.3 Feedback on the content of the bulletin

E-mail to: [service.sales.nl@wartsila.com](mailto:service.sales.nl@wartsila.com)

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