

Cooling water and additives

all engines

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1 Cooling water and additives - change record

Tab 1 Change record

Data module code, issue Chapter number - technical name Reason for change	Status
Revised issue 003, 2021-05	
WINGD-AA00-HA1-50-0000-00AAA-030C-A , issue 04 3 - Cooling water Added measurement temperature for raw water pH value	revised
Revised issue 003, 2020-06	
WINGD-AA00-HA1-50-0000-00AAA-003C-A , issue 01 1 - Cooling water and additives - change record New chapter 1	new
WINGD-AA00-HA1-50-0000-00AAA-101DG-A , issue 03 3 - Cooling water additives Added product from Shell	revised

2 General for cooling water

This document is an excerpt from the WinGD operation manuals related to cooling water for large marine two-stroke engines.

The document includes data to the items that follow:

- Requirements for cooling water
- List of validated cooling water additives
- List of dosage and concentration of cooling water additives.

3 Cooling water

An applicable treatment is used to give the cooling water the correct properties that prevents service problems. Cooling water that has not had treatment can soon cause problems in the cooling system (eg corrosion, sediment or hard particles).

3.1 Raw water for cooling water

The raw water for cooling water has to obey the WinGD specifications, refer to [Table 2 - Specifications for raw water](#).

Tab 2 Specifications for raw water

Parameter	Value	Test method
pH at 20 °C (see Note)	6.5 to 8.5	ASTM D 1287 or D 1293
Hardness	Maximum 10°dH	ASTM D 1126
Chlorides (Cl ⁻)	Maximum 80 mg/l	ASTM D 512 or D 4327
Sulphates (SO ₄ ²⁻)	Maximum 150 mg/l	ASTM D 516 or D 4327

NOTE: For reverse osmosis technologies, the minimum pH value is 6.0.

If you think there is a problem, you must do an analysis of the raw water and send the results to WinGD to get advice.

For the raw water WinGD recommends as follows:

- Fully desalinate the raw water before you fill it into the system.
- You can use condensate water (eg from the fresh water generators or from auxiliary steam systems), but it must have additives. Condensate water is highly corrosive and must have corrosion inhibitors to prevent problems.
- Use potable water or process water from the local mains only as a last option for a short period. The hardness of this water must not be more than 10°dH (German hardness degrees). If the hardness is more than this limit, you must decalcify the water to the given value.
- Do not use sea water as raw water. Sea water has a high salt content and causes damage to the cooling water system.

Corrosion protection oils (emulsion oils) are not recommended for the treatment of the cooling water. If instructions about the use of corrosion protection oils are not obeyed and coolant checks are not sufficient, then water / oil emulsion can occur. This can cause the cooling system to become clogged.

3.2 Cooling water during operation

The cooling water must have the correct corrosion inhibitor. Inhibitors that contain nitrite and borate, or inhibitors that are related to the Organic Acid Technology (OAT), are known to be satisfactory. For a list of WinGD recommended products refer to section [4 Cooling water additives](#).

The instructions of the manufacturer must be obeyed for the correct quantity of the corrosion inhibitor. You must do regular checks during operation to keep the correct concentration. It is recommended that you choose such suppliers of inhibitors who can also give specified advice for new cooling water and for operation.

If there are leaks, you must add the correct quantity of raw water with the correct concentration of additives. If evaporation causes a decrease of the coolant, add the applicable quantity of raw water (see [Para 3.1](#) above). This will make sure that the concentration of additives is not too much.

After you have added the additives, the cooling water in the cooling system must have a pH value of 8 to a maximum of 10.

3.3 Antifreeze

CAUTION

Damage Hazard: Antifreeze decreases the heat transfer rate of the cooling water. This can cause damage to the engine. If the concentration of the antifreeze is more than 20%, you can operate the engine only at decreased load.

During usual operation, it is not necessary to use antifreeze. WinGD recommends to use antifreeze only if the engine is stopped for a long period in conditions of cold / frost (ambient temperature below the freezing point of water).

Always use the correct water / antifreeze ratio related to the ambient temperature. The instructions of the manufacturer must be obeyed for the correct quantity of antifreeze. It is possible to use each of the two types of high quality antifreeze that follow:

- Monopropylene glycol (MPG)
- Monoethylene glycol (MEG).

It is recommended that you use MPG, because it is better for the environment.

You must do regular checks during operation to keep the correct concentration.

You must obey the instructions of the manufacturer to prevent problems during operation.

You must make sure that the cooling water system has the correct concentration of corrosion inhibitor (see [Para 3.2](#)).

4 Cooling water additives

4.1 List of cooling water additives

The validated cooling water additives in [Table 3 - List of validated cooling water additives \(June 2020\)](#) are for closed cooling water circuits. For the specification of the cooling water refer to section 3 [Cooling water](#).

Tab 3 List of validated cooling water additives (June 2020)

Supplier	Brand	Additive type
Alm International S.A., France www.alm-inter.com	Diaprosim RD11 (RD11M)	Sodium nitrite
S.A. Artec N.V., Belgium www.arteco-coolants.com	Havoline XLI	Organic Acid Technology
Ashland Speciality Chemical, USA www.ashland.com	Drewgard 4109	Sodium nitrite + borate
Ashland Speciality Chemical, USA www.ashland.com	DEWT-NC powder Liquidewt Maxigard	Sodium nitrite + borate Sodium nitrite + borate Sodium nitrite + borate
Chevron Global Lubricants, USA www.chevronlubricants.com	Havoline XLI	Organic Acid Technology
GE Water and Process Technologies, Belgium www.gewater.com	CorrShield NT 4293	Sodium nitrite + borate
GE Water and Process Technologies, USA www.gewater.com	CorrShield NT 4200	Sodium nitrite + borate
Korves Oy, Finland +358 (14) 338 4001 (Fax)	Pekar J	Organic Acid Technology
Kuwait Petroleum (Danmark) AS, Denmark www.q8.com	Q8 Corrosion Inhibitor Long-Life	Organic Acid Technology
Marine Care B.V., The Netherlands www.marinecare.nl	Caretreat 2 Diesel	Sodium nitrite + borate
Maritech AB, Sweden www.maritech.se	Marisol CW	Sodium nitrite + borate
Nalco Chemical Company, USA www.nalco.com	TRAC102 (ex Nalcool 2000) TRAC118 (ex EWT 9-108)	Sodium nitrite + borate

Supplier	Brand	Additive type
Shell Marine www.shell.com	Shipcare Cooling Water Treat	Sodium nitrite + borate
Suomen KL-Lämpö Oy, Finland www.kl-lampo.com/eng	Korrostop KV	Sodium molybdate
Total, France www.total.com/en	WT Supra	Organic Acid Technology
Vecom Marine Alliance B.V., The Netherlands www.vecom-group.com	Cool Treat NCLT (ex Vecom CWT Diesel QC-2)	Sodium nitrite + borate
Wilhelmsen Chemicals AS, Norway www.wilhelmsenchemicals.com	Dieselguard NB Rocor NB liquid Cooltreat AL Nalcool 2000 Engine Water Treatment 9-108	Sodium nitrite + borate Sodium nitrite + borate Organic Acid Technology Sodium nitrite + borate Sodium nitrite + borate

4.2 Dosage of cooling water additives

Table 4 - Dosage and concentration of cooling water additives shows the recommended dosage and concentration of cooling water additives. WinGD recommends to start the dosage from the upper level of the given range. This is because the quantity of active corrosion inhibitors decreases during the service life of the engine.

Tab 4 Dosage and concentration of cooling water additives

Brand	Dosage of 1 m ³ of system capacity	Concentration
Diaprosim RD11 (RD11M)	5 kg	1250 ppm as NO ₂
Havoline XLI	50 to 100 litres	1.8 to 3.7 Brix° of active compounds measured with a supplier's refractometer
Drewgard 4109	16 to 30 litres	640 to 1200 ppm as NO ₂
DEWT-NC powder	3 to 4.5 litres	1500 to 2250 ppm as NO ₂
Liquidewt	8 to 12 litres	470 to 700 ppm as NO ₂
Maxigard	16 to 30 litres	640 to 1200 ppm as NO ₂
CorrShield NT 4293	10 litres	670 to 1000 ppm as NO ₂
CorrShield NT 4200	10 litres	670 to 1000 ppm as NO ₂
Pekar J	20 litres	30 ppm as Mo

Brand	Dosage of 1 m ³ of system capacity	Concentration
Q8 Corrosion Inhibitor Long-Life	50 to 100 litres	1.8 to 3.7 Brix° of active compounds measured with a supplier's refractometer
Caretreat 2 Diesel	6 to 10 litres	1500 to 2500 ppm as NO ₂
Marisol CW	6 to 9 litres	1000 to 1500 ppm as NO ₂
TRAC102 (ex Nalcool 2000)	32 to 48 litres	1000 to 1500 ppm as NO ₂
TRAC118 (ex EWT 9-108)	2.25 to 3.4 litres	670 to 1000 ppm as NO ₂
Shipcare Cooling Water Treat	32 to 48 litres	1000 to 1500 ppm as NO ₂
Korrostop KV	20 to 25 litres	120 to 150 ppm as Mo
WT Supra	50 to 100 litres	1.8 to 3.7 Brix° of active compounds measured with a supplier's refractometer
Cool Treat NCLT (ex Vecom CWT Diesel QC-2)	6 to 10 litres	1500 to 2500 ppm as NO ₂
Dieselguard NB	2.0 to 4.8 litres	1000 to 2400 ppm as NO ₂
Rocor NB liquid	9.5 to 24.0 litres	1000 to 2400 ppm as NO ₂
Cooltreat AL	50 to 100 litres	1.8 to 3.7 Brix° of active compounds measured with a supplier's refractometer
Nalcool 2000	32 to 48 litres	1000 to 1500 ppm as NO ₂
Engine Water Treatment 9-108	2.25 to 3.40 litres	670 to 1000 ppm as NO ₂

The nitrite content of nitrite-based cooling water additives usually decreases during use. If the nitrite content decreases below the given limits, the risk of local corrosion increases.

The nitrite content can be given as sodium nitrite (NaNO₂) or as nitrite (NO₂).

1 mg/l as NO₂ equals to 1.5 mg/l as NaNO₂.

Nitrite-based cooling water additives do not give good protection against corrosion for aluminium and its alloys. For these materials WinGD recommends not to use nitrite-based cooling water additives.