COOLING WATER AND ADDITIVES

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COOLING WATER AND ADDITIVES

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List of Changes

Rev	Date	Made	Appd	Description
Issue 1	2017-10	jbi101	rma040	First document release
Issue 2	2019-01	jbi101	rma040	Document revised
Issue 3	2020-06	jbi101	rma040	• New chapter 1 • List of track changes introduced
Issue 4	2021-05	jbi101	rma040	Measurement temperature for raw water pH value added
-	2025-07	jbi101	rma040	• Document transferred into official PC drawing set • Product “Dieselguard NB” removed • Product “Nalcool 2000” changed to “Nalfleet 2000” • Weblink to supplier webpage updated.

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1 General for cooling water

This document is an extract from the WinGD Instruction Manual (IM) covering the requirements on cooling water for operation of 2-stroke marine engines.
The document includes guidance on the following:

- requirements for cooling water
- list of validated cooling water additives
- list of dosage and concentration of cooling water additives.

2 Cooling water

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 (e.g. corrosion, sediment or hard particles).

2.1 Raw water for cooling water

The raw water for cooling water must obey the WinGD specifications, as per Table 2-1.

Table 2-1 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 there is a possible problem, do analysis of the raw water and send the results to WinGD for advice.
For the raw water, WinGD recommends as follows:

- Fully desalinate the raw water before the system is filled with it.
- Condensate water can be used (e.g. from the freshwater generators or from auxiliary steam systems), but it must have additives. Condensate water is highly corrosive and must have corrosion inhibitors to prevent problems.
- Only as a last option for a short period it is possible to use potable water or process water from the local mains. The hardness of this water must not be more than 10°dH (German hardness degrees). If the hardness is more than this limit, 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 use of corrosion protection oils are not obeyed and coolant checks are not sufficient, water / oil emulsion can occur. This can cause clogging of the cooling system.

2.2 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, see section 3.1.

The manufacturers instructions must be obeyed for the correct quantity of the corrosion inhibitor. The correct concentration must be regularly checked during operation. It is recommended to choose such suppliers of inhibitors who can also give specified advice for new cooling water and for operation.
If there are leaks, 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 section 2.1 Raw water for cooling water). This will make sure that the concentration of additives is not too much.
After adding the additives, the cooling water in the cooling system must have a pH value of 8 to a maximum of 10.

2.3 Antifreeze

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

During usual operation, it is not necessary to use antifreeze. WinGD recommends using antifreeze only if the engine is stopped for a long period in conditions of cold or frost (ambient temperature below the freezing point of water).
Always use the correct water / antifreeze ratio related to the ambient temperature. The manufacturer's instructions must be obeyed for the correct quantity of antifreeze. It is possible to use each of the two following types of high-quality antifreeze:

- monopropylene glycol (MPG)
- monoethylene glycol (MEG).

It is recommended using MPG because it is better for the environment. Do regular checks during operation to keep the correct concentration.Obey the instructions of the manufacturer to prevent problems during operation. Make sure that the cooling water system has the correct concentration of corrosion inhibitor (see section 0).

3 Cooling water additives

3.1 List of cooling water additives

The validated cooling water additives in Table 3-1 are for closed cooling water circuits. For the specification of the cooling water, see section 3 Cooling water.

Table 3-1 List of validated cooling water additives (July 2025)

Supplier	Brand	Additive type
Alm International S.A., France www.alm-inter.com	Diaprosim RD11 (RD11M)	Sodium nitrite
S.A. Arteco 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
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

Supplier	Brand	Additive type
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.no www.wilhelmsen.com	Rocor NB liquid Cooltreat AL Nalfleet 2000 Engine Water Treatment 9-108	Sodium nitrite + borate Organic Acid Technology Sodium nitrite + borate Sodium nitrite + borate

3.2 Dosage of cooling water additives

Table 3-2 shows the recommended dosage and concentration of cooling water additives. WinGD recommends starting the dosage from the upper level of the given range. This is because the quantity of active corrosion inhibitors decreases during the engine service life.

Table 3-2 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 Liquidewt Maxigard	3 to 4.5 litres 8 to 12 litres 16 to 30 litres	1500 to 2250 ppm as NO_2 470 to 700 ppm as NO_2 640 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
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) TRAC118 (ex EWT 9-108)	32 to 48 litres 2.25 to 3.4 litres	1000 to 1500 ppm as NO_2 670 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
Rocor NB liquid Cooltreat AL Nalfleet 2000 Engine Water Treatment 9-108	9.5 to 24.0 litres 50 to 100 litres 32 to 48 litres 2.25 to 3.40 litres	1000 to 2400 ppm as NO_2 1.8 to 3.7 Brix of active compounds measured with a supplier's refractometer 1000 to 1500 ppm as NO_2 670 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 ($NaNO_2$) or as nitrite (NO_2).
1 mg/l as NO_2 equals to 1.5 mg/l as $NaNO_2$.
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.