marine lubricants information bulletin 15

complete guide to delo® XLI corrosion inhibitor – concentrate

Section 1 provides instruction on using Delo® XLI Corrosion Inhibitor – Concentrate for the first time, or changing over the system from another cooling water treatment to Delo XLI Corrosion Inhibitor – Concentrate.

Section 2 provides guidelines for monitoring and recording important parameters of the cooling water treatment during service.

Section 1: Flushing and Changeover

Delo® XLI Corrosion Inhibitor – Concentrate (Delo XLI) is a high performance, readily biodegradable coolant based on Carboxylate technology which performs better than traditional coolants in terms of efficient heat transfer, increased corrosion protection, non-depletion and extended service life. Delo XLI offers protection for all commonly used materials in engine cooling water systems, including aluminium and copper.

Delo XLI is recommended for cooling water treatment operating below 100°C and is a concentrate that should be diluted in water. Before filling the engine with a 6–7.5% solution of Delo XLI in water, the existing fluid must be drained from the engine coolant system. Depending on the condition of the system, it may be necessary to thoroughly flush the system to remove loose deposits and precipitates.

Preferably, flushing is done with a 4.5–5% solution of Delo XLI in fresh water. Using Delo XLI for this process aids the removal of deposits and helps provide corrosion protection during and after the flushing operation.
For new systems, a simple flush is usually sufficient to remove any cooling fluid and the few deposits present. In older systems, hard water scale, corrosion deposits, and precipitates from former water treatment chemicals are not removed by flushing only. **Depending on the nature and amount of the deposits, the engine must operate for some time to allow cleaning of the system by the standard 4.5–5% solution of Delo XLI.**

Delo XLI will gradually clean loose deposits and sludge from the system. These contaminants should be systematically removed by partial draining and skimming until the system is fully clean. Delo XLI has very low depletion rate in-service.

Supplemental additions of XLI should only be added to make up for losses from cooling water leakage.

The concentration levels of the coolant should be checked weekly using a refractometer. A hand held Delo XLI Refractometer can be ordered from your account manager.

The cooling water treatment must meet the requirements of the original engine manufacturer (OEM). Always check the guidelines.

Quality of fresh water*

We strongly recommend using distilled water or deionised water to dilute Delo XLI in engine cooling systems. If distilled water or deionised water is not available, use water that meets or exceeds the minimum acceptable water requirements listed below to minimize scale deposits:

PROPERTIES/CHARACTERISTIC	VALUE
Water type	Distillate or deionized freshwater
Prohibited	Sea water, river water, brines, industrial waste water, and rain water
Should not contain any	Chlorine, Sulphide, and Ammonia
Total hardness *(CaCO3 + MgCO3), max, mg/kg*	170
pH at 20°C	5.5–9.0
Chloride ion content *(Cl–), max, mg/kg*	40
Sulphate content *(SO42–), max, mg/kg*	100

General guidelines

1. Apply sufficient Delo® XLI in relation to your cooling system capacity.
2. Flushing and changeover operations must be completed in the presence of qualified ship staff.
3. If the vessel is equipped with an HT and LT circuit, it is advisable to change both systems one at a time.
4. When zinc anodes are installed in the fresh water system, it is advisable to remove them.
5. Check that the vessel is not using any biocide for jacket cooling water (JCW) treatment. If it is, please consult your Chevron representative.
6. The flushing operation should be conducted under safe conditions, such as using proper Personal Protection Equipment (PPE), testing correct functioning of expansion tank low level alarm and JCW circuit temperature sensors and gauges, making all affected ship staff aware of the operation, and any other steps which help ensure a safe flushing process.
7. It is preferable to perform draining at the lowest part of the cooling unit. This will remove deposits that might have originated anywhere in the system.
8. Take fluid samples before commencing the flushing operation (see page 3, "Taking Fluid Samples").
9. When changing from one coolant to another, first take a sample of the old existing coolant for analysis.

Flushing procedure for new engines

In new build engines, pipes and tanks may contain debris such as dust, rust and free moving particles and objects. It is vital to clean the cooling system of these before filling with Delo XLI.

1. Completely drain the cooling water system (hereafter referred to as "the system") and confirm that there is no cooling medium.
2. Preferably, fill the system with good quality fresh water* and add 4.5–5% solution of Delo XLI. (The percent of Delo XLI can be calculated using the formula in Figure 1 on page 3.)
3. Purge the system well.

4a. If the engine has a separate cooling water pump (e.g., 2-stroke slow speed engine), run the pump for 2–3 hours after the flushing solution has been heated to normal cooling water temperature.

4b. If the engine has an attached cooling water pump (generally the case with 4-stroke medium speed engines), run it at idle load or operate the engine in-service for sufficient time (generally one hour) after the flushing solution has been heated to the normal cooling water temperature.

5. Allow the system to cool down moderately to avoid thermal shocks and drain it completely.
6. Check the drain flushing fluid for deposits and precipitates.
7. Repeat steps 2 through 5 if the flushing fluid contains significant amounts of deposits or precipitates.
8. Check the cooling system filters (if present). Replace them when required.
9. Calculate the cooling water capacity, fill the system with good quality fresh water* and add chemical by 6–7.5% concentration. Maintain in-service levels for Delo XLI between 6–7.5%.

   When using the expansion tank to dose the system, take care to circulate well and keep in mind that the changes in concentration will only be visible after a couple of days.

Flushing procedure for in-service engines while vessel is in dry-dock

1. Completely drain the system, if possible, and follow the steps listed under "Flushing procedure for new engines". **If it is not possible to completely drain the system, follow steps 2–10 below.**
2. Drain the system in a controlled manner by opening the bottom-most drain valve/cock, and concurrently filling the system with a solution of good quality fresh water*.
3. Continue step 2 until nitrite levels drop to 100 ppm (if nitrite-based treatment chemicals were in use) and drain as many contaminants as possible.
4. Add 4.5–5% solution of Delo XLI in fresh water. This will be flushing fluid. Purge the system.

During the last day of dry-dock, when main engines, auxiliary engines, boiler, etc. are running:

5a. If the engine has a separate cooling water pump (e.g., 2-stroke slow speed engine), run the pump for 2–3 hours after the flushing solution has been heated to normal cooling water temperature.

5b. If the engine has an attached cooling water pump (generally the case with 4-stroke medium speed engines), run it at idle speed or operate the engine in-service for sufficient time (generally one hour) after the flushing solution has been heated to the normal cooling water temperature.

6. Allow the system to cool down moderately to avoid thermal shocks. At this point it is preferable to drain the system completely, and if the flushing fluid contains significant amounts of deposits or precipitates, repeat Steps 2 through 6 until clear, then fill the system with good quality fresh water* and add Delo XLI to make Delo XLI concentration 6–7.5%. Maintain in-service levels for Delo XLI between 6–7.5%.

* Good quality fresh water: Water which is soft in nature, with low Chlorides (≤40 ppm) and pH+ (5.5–9.0). We generally advise using onboard generated water for this purpose; however, for new ships, please ask shipyard to provide good quality fresh water.

Figure 1: Calculating percent of Delo® XLI concentration

$$\% \text{ Delo XLI} = \frac{\text{Delo XLI (liters)}}{\text{Total fresh water in circuit (liters) + Delo XLI (liters)}} \times 100$$

Flushing procedure for in-service engines while vessel is en route

This procedure has been designed to changeover the system from another chemical treatment to Delo XLI while the vessel is en route. Ensure that the cooling water valves are in good working order prior to commencing this process, especially the fresh water filling valve(s) in the expansion tank and system drain valve.

In addition, it is advisable that all operations are executed under personal supervision of senior engineering staff.

Phase 1: Drain and fill in-service water to drop nitrite levels below 100 ppm

1. Because the changeover is taking place while equipment is in operation, it is advisable to drain the water slowly to avoid thermal shocks. If the Fresh Water Generator (FWG) is running, monitor the temperature closely to ensure there is no impact on the operation of the FWG.
2. Drain the system in a controlled manner by opening the bottom-most drain valve/cock, and concurrently filling the system with good quality fresh water to maintain system water level. Reduce the content of the nitrite treatment to 100 ppm (if nitrite-based treatment chemicals were in use) and drain as many contaminants as possible.
3. Always monitor the expansion tank level and continuously replenish the water at the same rate as it is drained.
4. Maintain the JCW temperatures at engine outlet as per recommendation of OEM (may require JCW heater).
5. Check any filters in the fresh water cooling circuit frequently. Keep the standby filters ready for use.
6. Monitor the expansion tank(s) water for contamination and drain sediments regularly from the bottom.

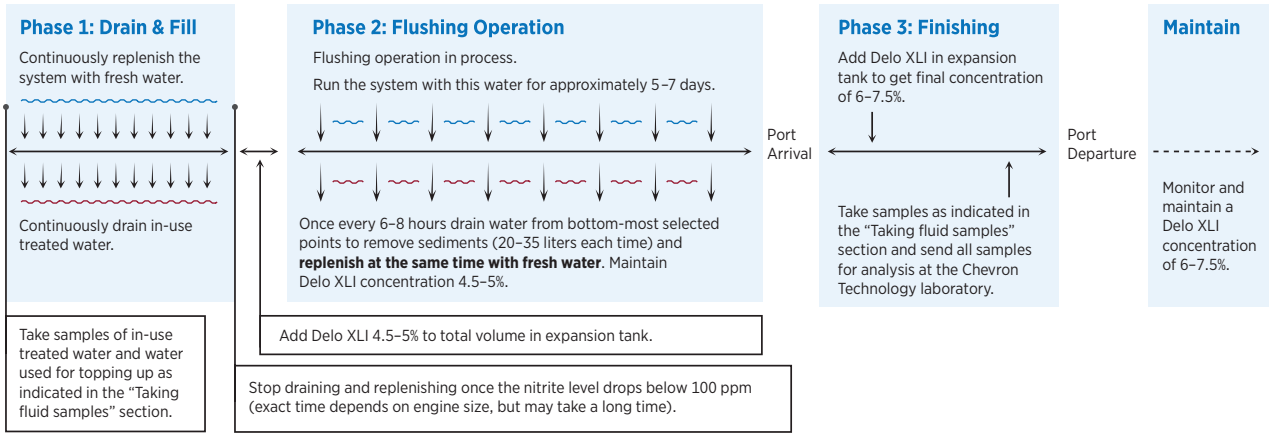
Phase 2: Flushing operation

7. Add Delo XLI to bring its concentration to 4.5–5%. The percent of Delo XLI can be calculated using the formula in Figure 1.
8. Every 6–8 hours drain 20–35 liters from the system to flush out any deposits.
9. Maintain Delo® XLI concentration of 4.5–5%.
10. Monitor the system for possible leaks. Delo XLI will clean any deposits and sludge from the system, hence it is possible to have minor leaks.
11. Pay extra attention to generator engine cooling, air compressor and other machinery cooling systems.
12. Continue this operation for 5–7 days or until the deposits have stopped coming out of the system.

Phase 3: Finishing

13. Increase the Delo XLI concentration to 6–7.5% and maintain at this level.

Figure 2: Changeover to Delo XLI for in-service engines while vessel is en route



Taking fluid samples

During the changeover process to Delo XLI, it is recommended the following samples are taken for analysis. Speak to your account manager about FAST™ trending and analysis services.

A. Before changeover procedure starts, take one sample (50–60 ml) each from:

- LT system at the circulation pump,
- LT system from central cooling water expansion tank,
- HT system at the circulation pump,
- HT system from jacket water expansion tank,
- Fresh water used for flushing and topping-up.

B. After changeover procedure is complete, take one sample (50–60 ml) each from:

- Fresh cooling water prepared and meant for filling the system,
- LT system at the circulation pump,
- LT system from central cooling water expansion tank,
- HT system at the circulation pump,
- HT system from jacket water expansion tank.

C. Send samples to the address indicated on the FAST sample kit.

Frequently asked questions

1. Does the whole system need to be drained and flushed before the filling water is treated with Delo XLI?

It would be good to take a sample and have it analyzed in the lab. That way we can determine the nitrite and it could be the reference sample for further trend analysis. Normally for a system treated by nitrite-based chemicals, drain the system as much as possible and confirm nitrite dropped below 100 ppm before introduction of Delo XLI.

2. What are the consequences of using Delo XLI as a top-up product for existing corrosion inhibitor system?

We do not advise adding Delo XLI to the existing product. This is due to the cleaning effect of Delo XLI and not because of compatibility issues or other factors, because flakes, sediment, and sludge might form. It is important to have detailed knowledge of the actual status of the cooling systems. Visual aspects and coolant analysis are very important in this respect.

3. What is the exact percentage of Delo XLI dosage in fresh water?

Depending on the quality of the top-up water, the Delo XLI concentration must be between 6–7.5%. Under no circumstances should it be lower than 5%.

4. Is flushing with water alone sufficient or must we use a Delo XLI solution in water?

In many cases, historical deposits and debris are present. It is recommended to have these efficiently removed. Therefore, it is better to flush with a 4.5–5% Delo XLI. The best result is obtained when Delo XLI is introduced in a running engine (hot flush).

5. What is the depletion rate of the product annually if the system has no leakage?

The product performs a minimum of 32,000 hours on condition that concentration was properly maintained, but more is possible depending on conditions. The corrosion inhibitors are long life, which means the depletion is limited. However, if the system is not clean, corrosion inhibitors from Delo XLI are partially consumed. This is why it is important to drain and flush the system.

6. How much Delo XLI dosage is required annually to maintain sufficient protection level if system has no leakages?

In good conditions without leakage, there is no need to add Delo XLI. After the system is flushed and filled with a 6–7.5% Delo XLI solution (minimum 5%), the protection level is sufficiently high. The concentration can be measured with a refractometer by the engine room crew.

7. Does Delo XLI react when it comes in contact with air in expansion tanks?

The product does not react with air. Nevertheless, it is important to exclude air from the cooling system to reduce/avoid corrosion.

8. Which tests are generally recommended to check and maintain the quality of treated water?

We recommend following tests:

a. Delo XLI concentration — see Section 2, Part I.
b. pH value — see Section 2, Part II.
c. Chloride levels — see Section 2, Part III.

9. How do I maintain the test records?

Please refer to Section 2, Part IV for a monthly monitoring log. The comments provide a recommended range to maintain the parameters for each category.

Section 2: Monitoring and Recording

After a successful changeover to Delo® XLI, it is important to monitor and record the condition of the cooling water, and make maintenance adjustments as necessary.

Chevron recommended test frequency

Delo XLI concentration	Every week
pH and Cl	Every two weeks
FAST™ analysis	Every system (HT/LT) every 6 months

Record the test results using the log sheet on page 11, or sign up for Chevron's FAST.XLI coolant monitoring program by emailing CMLtechservice@chevron.com.

Part I. Measuring Delo XLI Concentration with a Refractometer

Read this user guide before using the refractometer, and keep it as a reference for future use. By following the guidelines highlighted here, you will extend the life of the refractometer and obtain the best measuring results, thereby enabling effective corrective actions to improve your operations. This user guide can also be used for refractometer models with minor differences (i.e., models with range of 0–5% Brix or with a self-correcting lens).

NOTE: Be sure that you are using a refractometer designed to measure % Brix. (Some types of refractometers are designed to measure concentration of ethylene glycol or battery fluid, with the scale in the prism surface showing either % by volume of antifreeze, freezing point in °C, or both. Using the wrong type of refractometer will yield invalid test results.)

The hand-held refractometer spot test is a quick method for determining the concentration of XLI in water. This method is easy to perform and does not require extensive sample handling or expensive equipment.

Summary

The refractive index of the solution (in % Brix) is measured by a hand-held refractometer. The reading is plotted on a calibration curve, from which the concentration of XLI is determined. Note that % Brix is NOT equal to % XLI — this is why the calibration curves must be used. Measure all solutions between 15–30°C.

Equipment

Refractometer: Brix 0–10% Item No. 2710

Procedure

1. Select the appropriate refractometer (Brix 0–10% Item No. 2710).
2. Ensure the prism surface and the plastic cover are clean. If not, clean them with distilled water and wipe dry with paper tissue. Do not immerse the refractometer in water.
3. Check the zero setting of the refractometer with water as described in Figure 3. Perform this operation prior to every set of measurements.

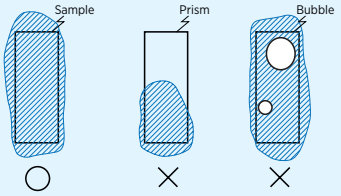
4. Check that the water sample temperature is between 15–30°C.
5. Hold the refractometer in a horizontal position.
6. With a clean pipette, place a few drops of the sample between the prism and daylight plate until the prism is completely covered with liquid. The liquid should not have bubbles.
7. Point the instrument toward a light source and look into the eyepiece. Keep the refractometer horizontal. Turn the eyepiece so that the scale is in sharp focus.
8. The Brix % reading is the dividing line where the boundary between light and dark (the edge of the shadow) crosses the scale.
9. If the edge of the shadow is not sharp, turn the eyepiece to bring the edge of the shadow into sharp focus. It is also possible that the edge of shadow is not sharp because the measuring surfaces were not sufficiently clean or dry, or an insufficient sample of coolant was used. Rinse the prism with distilled water, wipe dry and repeat the test.
10. The concentration of coolant can be derived from the conversion table shown in Figure 5.

Figure 3: Scale adjustment

1. Open daylight plate and put a few drops of distilled water on the prism surface.

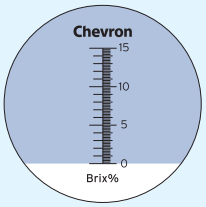
2. Close the daylight plate gently.

3. Water spreads all over the prism surface.



4. Look into eyepiece and turn it so that the scale is in sharp focus.

5. The boundary line must appear near the zero point.



6. Set boundary line at the zero point by turning Zero adjustment screw with a screwdriver.

7. After scale is adjusted, wipe water off the prism and daylight plate.

Figure 4: Sample measurement

1. Put a few drops of the sample on the prism.

2. Read the value of scale at the boundary line. Do not turn the Zero adjustment screw.

3. Wipe the sample off the prism and daylight plate with soft tissue paper, and clean them with water.

Calculations

In the absence of calibration curves, empirical calculation formulas can be used:

% Delo XLI = (% Brix – 0.0031) / 0.3695

(An estimation can be obtained using this formula: % XLI = % Brix × 2.7)

Precautions

1. The refractometer is a precision optical instrument. Handle it with care; avoid sudden impacts.
2. The prism is made of soft glass material. Take care not to scratch its surface.
3. After use, clean prism surface and daylight plate with a soft cloth soaked in water, and wipe off moisture with a dry cloth.
4. Best readings are obtained with a sample temperature of 15–30°C. Temperature correction is not not required in this temperature range.

Figure 5: Conversion table of % Brix into % Delo® XLI

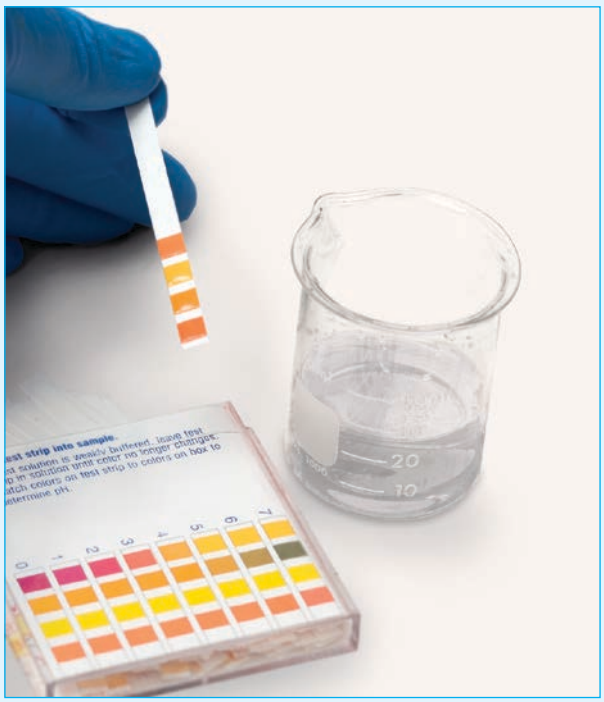
Brix % at 20°C refractometer	Vol % Delo XLI	Brix % at 20°C refractometer	Vol % Delo XLI
0.0	0.00	4.6	12.44
0.1	0.26	4.7	12.71
0.2	0.53	4.8	12.98
0.3	0.80	4.9	13.25
0.4	1.07	5.0	13.52
0.5	1.34	5.1	13.79
0.6	1.62	5.2	14.06
0.7	1.89	5.3	14.34
0.8	2.16	5.4	14.61
0.9	2.43	5.5	14.88
1.0	2.70	5.6	15.15
1.1	2.97	5.7	15.42
1.2	3.24	5.8	15.69
1.3	3.51	5.9	15.96
1.4	3.78	6.0	16.23
1.5	4.05	6.1	16.50
1.6	4.32	6.2	16.77
1.7	4.59	6.3	17.04
1.8	4.86	6.4	17.31
1.9	5.13	6.5	17.58
2.0	5.40	6.6	17.85
2.1	5.67	6.7	18.12
2.2	5.95	6.8	18.39
2.3	6.22	6.9	18.67
2.4	6.49	7.0	18.94
2.5	6.76	7.1	19.21
2.6	7.03	7.2	19.48
2.7	7.30	7.3	19.75
2.8	7.57	7.4	20.02
2.9	7.84	7.5	20.29
3.0	8.11	7.6	20.56
3.1	8.38	7.7	20.83
3.2	8.65	7.8	21.10
3.3	8.92	7.9	21.37
3.4	9.19	8.0	21.64
3.5	9.46	8.1	21.91
3.6	9.73	8.2	22.18
3.7	10.01	8.3	22.45
3.8	10.28	8.4	22.73
3.9	10.55	8.5	23.00
4.0	10.82	8.6	23.27
4.1	11.09	8.7	23.54
4.2	11.36	8.8	23.81
4.3	11.63	8.9	24.08
4.4	11.90	9.0	24.35
4.5	12.17		

Part II. Measuring pH Value

Delo® XLI's unique corrosion inhibitor system is designed to protect aluminum and other system metals at lower pH levels than conventional coolants.

For general pH testing, Chevron recommends acid and base indicator strips measuring a pH range of 1–14. To determine specific values of the jacket cooling water, Chevron recommends narrow range strips measuring a pH range of 5.5–9.0, just above and below pH 7.0 (neutral).

Contact your customer service agent to order Cl and pH test strips.



Part III. Measuring Chloride Levels

Measurement and maintenance of chloride levels is necessary for optimal performance of the cooling water system. High chloride levels can significantly increase the risk of corrosion, and can also indicate sea water contamination in the cooling water system.

Chevron evaluated several commercially available chloride test strips, and recommends Hach® Quantab® titrators to measure the chloride content in cooling water treated with Delo XLI.

Recommended test strips: Hach Quantab titrators for chloride, 30–600 ppm (low range).

Summary

The test strips are specifically designed for measurement of chloride content in pure water, with accurate results in the range from 30 to 600 ppm.

In cooling water samples treated with Delo XLI the results are typically slightly higher than the actual chloride content in the solution; the higher the actual chloride level the bigger the deviation.

The test strips are a good way to determine if the chloride content in the cooling water is excessive (>100 ppm) and if so, further action may be required.

Note: The reading of the test strip is to be taken as soon as the upper band of the scale (initially yellow) turns black, indicating that the strip is completely saturated. Taking the readings later can lead to less accurate results.

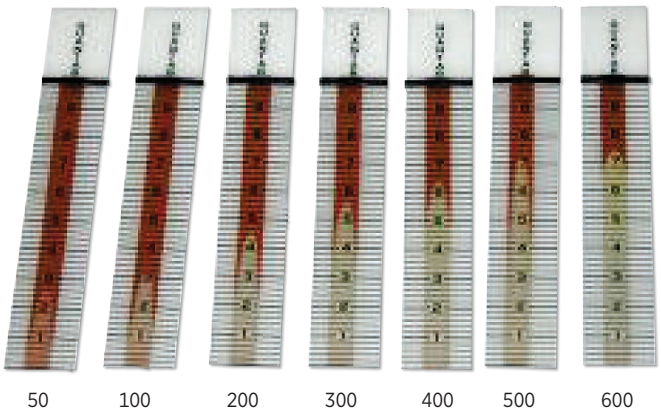
The test strips are not fit to measure the concentration of chloride in Delo XLI concentrate, since the liquid is too viscous to fully saturate the test strips. The amount of chloride in Delo XLI is low however, with minimal contribution to the total chloride content in the blended cooling water.

Note: The amount of chloride in Delo XLI is low, with minimal contribution to the total chloride content in the blended cooling water.

Other test methods

The Quantab test strips can be used to measure the chloride content in Delo XLI solutions. False results may occur if the test strips are exposed to other chemicals, leading to possible contamination. If further clarifications are required, a sample may be sent on shore for more accurate laboratory analysis, e.g., applying Ion Chromatography (IC).

Figure 6: Evaluation of Hach Quantab chloride test strips (7.5% Delo XLI in distilled water, tested with different chloride levels)



reference sample chloride content (ppm)	Quantab strip reading (units)	Quantab chloride content (ppm)
50	2.2	50
100	3.2	93
200	4.6	180
300	5.7	263
400	6.4	346
500	7.1	424
600	7.4	486

Part IV. Recording

Chevron recommends using the shipboard log sheet (on next page) two to three times a week to record the important parameters of your cooling water. A cloud-based system called the FAST.XLI Monitoring Program is also available; please contact your account manager for further details.

Figure 7 illustrates the limits and recommended corrective measures.

Figure 7: Cooling water treatment limits and comments

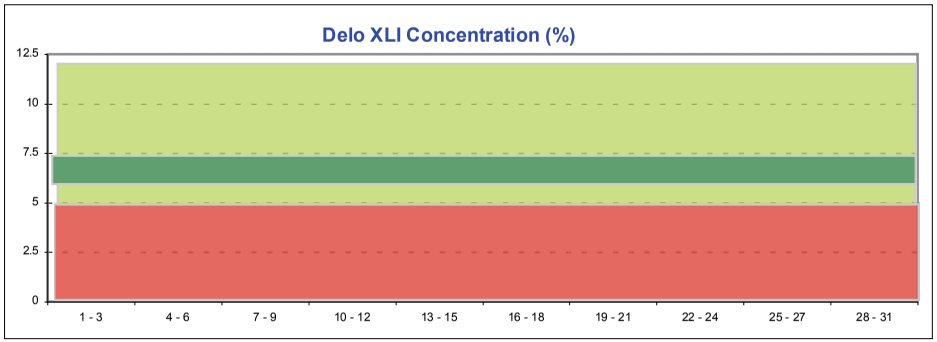
Appearance	Bright & Clear	**Normal**	Coolant is considered suitable for further service.
Appearance	Light Debris	**Attention**	Check system for rust and or water quality used for top up.
Appearance	Heavy Debris or Oil	**Urgent**	Drain and refill recommended.
pH	7.5–8.5	**Normal**	Coolant is considered suitable for further service.
pH	≥7.0 pH ≤7.4	**Attention**	Acidity is borderline. Follow up and use appropriate water at next top up.
pH	≥8.6 pH ≤9.0	**Attention**	Alkalinity is borderline. Follow up and use appropriate water at next top up.
pH	<7.0	**Urgent**	Water is acidic. Drain and refill with correct dosage and adequate water to increase the pH as recommended to between 7.5–8.5.
pH	>9.0	**Urgent**	Water is alkaline. Drain and refill with correct dosage and adequate water to reduce the pH as recommended to between 7.5–8.5. • Check: what was the last chemical used in the system and could this be interfering with the readings? • Check: what type of water was added to the system — shore (high in chlorides and/or pH) or technical water (distilled water, typically more acidic) produced onboard with the fresh water generator. • Check: what is the pH of the makeup water tank? **For example: pH comes out at 9.7:** 1. Repeat the test. 2. If the high value is confirmed, drain some water. 3. Add Delo® XLI with the new make up water and measure pH. 4. If ≤9.0: OK. 5. If higher than 9.0, repeat steps 2 and 3 until a pH of ≤9.0 Is obtained **pH comes out at 9.1:** *Please check if the vessel just switched from competitive technology.* 1. If so, determine whether vessel had corrosion issues before switch. a. If not: closely monitor situation by sending samples to lab for analysis every 3 months. pH should drop after some time. b. If so: follow procedure above. 2. If not: drain and refill with the correct dosage of Delo XLI and adequate water.
Concentration Delo XLI	>6.0% XLI <7.5%	**Normal**	Coolant is considered suitable for further service.
Concentration Delo XLI	≥5.0% XLI ≤6.0%	**Attention**	Delo XLI concentration required to be above 6%, please top-up the system with Delo XLI and bring the concentration above 6%.
Concentration Delo XLI	≥7.5%	**Attention**	Our recommendation is to maintain Delo XLI concentration up to 7.5% for complete water care. Higher concentration will not harm the system.
Concentration Delo XLI	<5.0%	**Urgent**	Top-up the system with Delo XLI. Maintain Delo XLI concentration between >6.0% and <7.5%. Monitor Delo XLI concentration whenever water replenishment is carried out.
Chloride	<40 ppm	**Normal**	Coolant is considered suitable for further service.
Chloride	≥40 ppm Cl ≤100 ppm	**Attention**	Chloride content above normal levels. Drain the water from system and replenish with good quality water to reduce chloride level below 40 ppm. Look for causes of sea water ingress into the fresh water system and ensure no sea or desalinated water is used. Monitor chloride levels frequently.
Chloride	>100 ppm	**Urgent**	Action is required. Too high chloride contamination in the system. Incorrect water is used. Drain the water from system and replenish with good quality water and Delo XLI to reduce chloride level below 40 ppm. Look for causes of sea water ingress into the fresh water system and ensure no sea or desalinated water is used. Monitor chloride levels frequently.

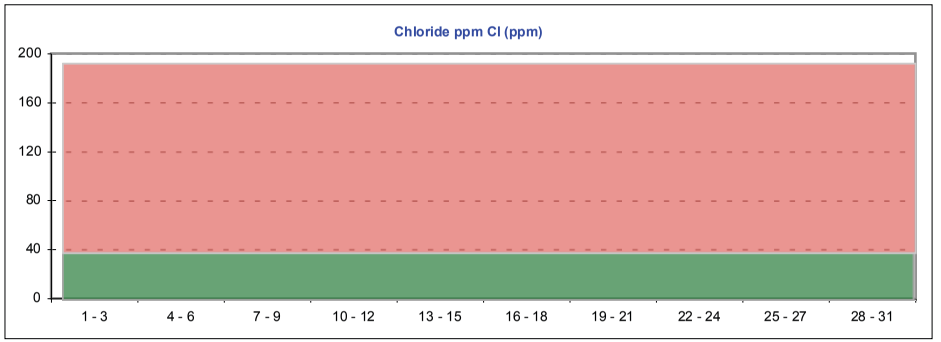
JACKET COOLING WATER TREATMENT PROGRAM

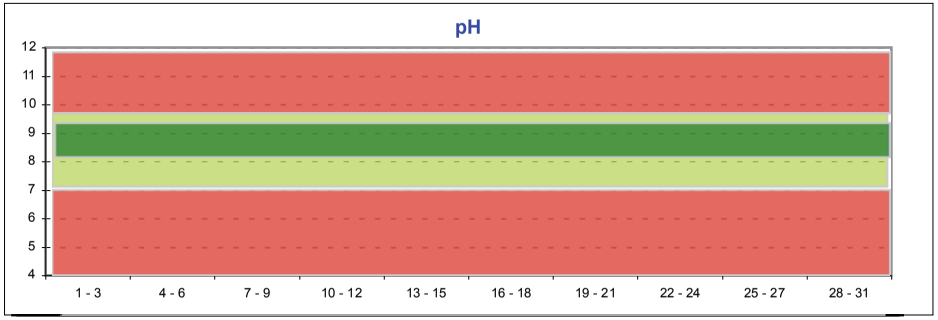
SHIPBOARD LOG SHEET

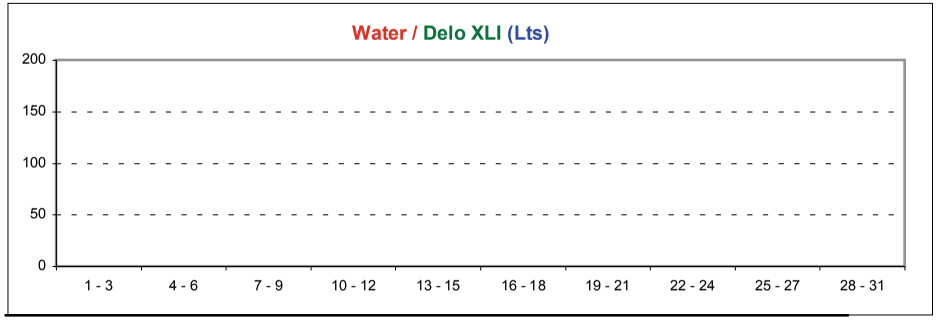
Ship's Name	m.t./m.v.		Type of ship		IMO No.		
Owner			Makeup water	Shore	System	Jacket HT	
Engine Make				Distilled		Jacket LT	
Engine Model				Mixed		Fuel Valves / Others	
Year		Month	**Product –Delo® XLI**			Others	

CAPACITY -	JACKET HT										
DATE	1 – 3	4 – 6	7 – 9	10 – 12	13 – 15	16 – 18	19 – 21	22 – 24	25 – 27	28 – 31	Summary
Delo XLI Concentration (%)											
Chloride ppm Cl (ppm)											
pH											
Delo added (ltr)											
Makeup water added (ltr)											









Comments :

Send fluid samples and direct technical enquiries to the below address:

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Always confirm that the product selected is consistent with the original equipment manufacturer's recommendation for the equipment operating conditions and customer's maintenance practices.