MARINFLOC®
A CLEAN SEA

Service Bulletin

no. 24, 2024-09-23

Corrosion problems related to high chloride content in bilge water

System applicability: Marinfloc Oily Water Separator systems, Marinfloc CD and Marinfloc TD models

Background

As described in Marinfloc manual and in service bulletin no. 01 (2000-03-20) and service bulletin no. 12 (2007-03-29), there are some major reasons why corrosion problems may occur on stainless steel 316L. In this service bulletin we would like to highlight the effects of what will happen if the bilge water frequently contains high chloride content if larger volumes of sea water ends up in the bilge tank.

High chloride levels combined with high temperature can cause pitting in 316L stainless steel. This form of corrosion occurs when chloride ions, which are very aggressive, penetrate the passive oxide layer that protects the stainless steel. The breakdown of this layer at localized points leads to small, yet deep, pits that compromise the structural integrity of the metal. Pitting is particularly dangerous because it is hard to detect in early stages and can lead to sudden failures. The risk of pitting in stainless steel 316L increases further with the combination of high chloride content and decreasing pH. Marinfloc therefore recommends monitoring the pH and never operating at a pH below 6. In addition to corrosion, too low pH destroys the flocculation process, as the concentration of OH- is insufficient.

The Marinfloc separators are designed to tolerate temporary spikes in chloride levels. This includes the use of corrosion-resistant materials such as 316L stainless steel which has a good resistance to pitting and crevice corrosion in environments where chloride levels may occasionally peak. However, while the Marinfloc separators can handle intermittent high chloride levels, frequent exposure to such conditions will lead to pitting corrosion. Frequent high chloride levels in combination with high temperatures damage the protective oxide layer of stainless steel, making it susceptible to corrosion. This is especially relevant when the system is shut off and left standing with water of high chloride content. Seawater should be minimized in the bilge water system as it will not only harm the bilge water separators but also piping, heating coils and tanks with time.

To mitigate the risks associated with prolonged exposure to high chloride levels, it is important immediatly after each operation to backflush the filter steps and rinse the rest of the Marinfloc unit with cold fresh water in cases where the unit has treated water with a chloride content exceeding 1 000 ppm. The chloride content can be monitored using a pH/salinity meter, which we recommend be kept onboard. The backflush and rinsing removes chloride ions from the system, preventing the accumulation that leads to corrosion.

Attached to this service bulletin is the instruction on how to Rinse the CD unit with cold fresh water and the instruction on how to Backflush the filter steps properly.

Disclaimer:

Damage to any parts of the Marinfloc CD/TD unit due to high Chloride content (>1000 ppm), or high chloride content and low pH value (<6) in the bilge water is not covered by Marinfloc warranty.

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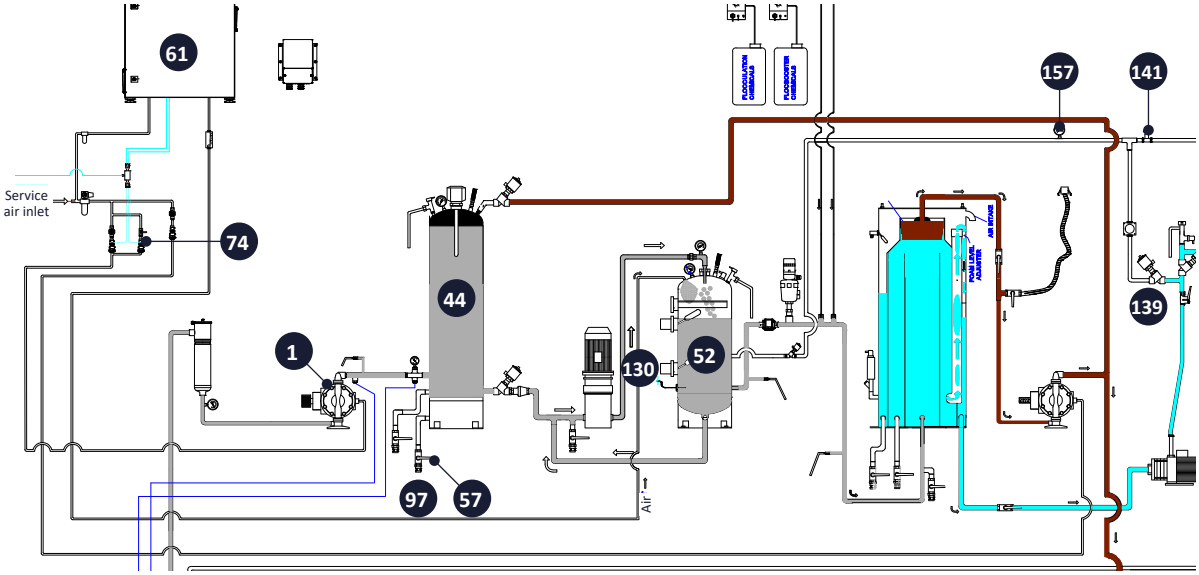
Appendix 1. Instruction: Rinse the CD unit with cold fresh water

If the bilge water frequently contains a high chloride concentration, the CD unit must be rinsed with fresh water to wash away/reduce chlorides. This should be done before the unit is turned off.



Follow the instructions below while the unit is running in normal operation:

1. Replace the camlock connection **(97)** on the oil descaler **(44)** with a fitting for an ordinary freshwater cleaning hose or equal at normal hydrophore pressure, max 6.0 bar, approx. 20 l/min.
2. Connect the freshwater hose. It's recommended to use a non-return valve on the freshwater line.
3. Set the Recirculation/Filtering switch/toggle to "Recirculation" on the control cabinet and check that the piston valve **(139)** opens.
4. Make a note of the pressure on the manometer **(157)** (if installed).
5. Close the ball valve **(74)** on the air supply line to the feed pump **(1)**.
6. Close a valve on the inlet to the unit.
7. Open the valve **(57)** on the oil descaler **(44)**. The flushing process will now begin.
8. Since the discharge flow may be higher than the filling flow, the low level **(130)** in the circulation tank (**52)** may be activated, indicated by a red light **(130)**. Adjust the flow through the unit by closing valve **(141)** so that the low level in the circulation tank is not activated. If the Marco manometer **(157)** is not installed, note how many turns the valve **(141)** is adjusted.

   The approximate pressure on the manometer **(157)** (if installed) should be:
   CD 2.0: 2.0 bar
   CD 5.0: 3.0 bar

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9. Flush the system for the following duration:
   CD 1.0: 20 minutes
   CD 2.0: 30 minutes
   CD 5.0: 90 minutes
10. After the flushing is completed, adjust the flow back to normal operation by setting the pressure noted in step 4 with valve **(141)** or by opening the valve **(141)** the same number of turns as in step 8.
11. Close valve **(57)** on the oil descaler **(44)** and disconnect the freshwater hose.
12. Set the process switch/toggle to “OFF”.
13. Open the ball valve **(74)** on the air supply line to the feed pump **(1)**.
14. Set the Recirculation/Filtering switch/toggle to “AUTO” on the control cabinet.
15. Start a back flush procedure on the filters by turning the backflush filters switch to manual position *(CD model),* or by pressing backflush filter-button on separator page *(CD HMI model).*
16. Open the closed valve on the inlet to the unit.

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Appendix 2. Instruction: Backflush the filter steps

As some flocs and contaminants become trapped in the filter material, the filters will become dirty over time. The backflushing of the filters removes the contaminants and flocs from the filter material. Keep in mind that it is the heat rather than the actual flushing that cleans the filter material; it is therefore very important that the temperature of the backflush water is 65 °C or at least 5 °C higher than the process water temperature.

CD model	0.25	0.5	1.0	2.0	5.0
Flow (liters/min)	3	6	10	12	15

If the ship's flow capacity is insufficient, increase the backflush timers (*CD model:* timer 2, 3 and 4; *CD HMI model:* T5, 6 and 7) so the volume of the filter steps is completely exchanged during the backflush.

For factory settings of timers, see electrical drawing.

See also user manual section *6.3 Components/Backflush flow controller*.

A backflush cycle of the filter steps can be performed manually or automatically.

1. When the pressure in filter step 1 rises to 0.5 bar above the working pressure and the Backflush filters switch is set to auto, the pressure switch/transmitter **(45)** activates automatic backflushing.
2. Manual backflushing is accomplished by turning the backflush filters switch to manual position *(CD model)*, or by pressing Backflush filter-button on separate page *(CD HMI model)*.

The separator stops and the overboard valve **(6)** closes. The backflush interlock valve **(88)** and the inlet- and outlet-valves **(22** and **18)** open on filter step 1. Flocs and sediment residues are flushed to the bilge water tank. The valves on filter step 1 close after roughly 6 minutes, and the same procedure is performed on filter steps 2 and 3. If the switches are set to auto, the system restarts after the backflush cycle.

Important!

Immediately after each operation, if the unit will be stopped for more than one hour, it is necessary to backflush manually to avoid corrosion and prevent polluted filter mass from solidifying.

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