Wilhelmsen Ships Service

Title: Engine Water Treatment 9-108 Product Dosage Guidance, R2
Date: 1st Feb 2024

NALFLEET™ Engine Water Treatment 9-108™ is a balanced mixture of corrosion inhibitors, formulated to give a high nitrite furnish which is becoming a more frequent requirement for the new generation of high efficiency diesel engines.

The EWT 9-108 Product Dosage guidance is segregated into 3 parts:

Part A: Control Guideline and dosage
Part B: Working examples of dosage estimation
Part C: General Application Notes

Part A: Control Guideline and dosage

Nitrite Control limits for EWT 9-108: 670 - 1,000 ppm nitrite (as NO2), **recommended routine maintenance nitrite residual** = 800 ppm (as NO2)

The nitrite (as NO2) control guideline and dosage for EWT 9-108 as below

1. **Minimum =** 670 ppm and required dosage of EWT 9-108 = 2.2 L/m3
2. **Maximum** = 1,000 ppm and required dosage of EWT 9-108 = 3.4 L/m3
3. **Recommended (routine maintenance**) = 800 ppm, and required dosage of EWT 9-108 = 2.7 L/m3

Note:

- To increase nitrite residual by 100 ppm, required dosage of **EWT 9-108** = 0.3 L/m3 of distilled or technical water
- Above mentioned product dosage is an estimation only system required dosage may varies due to water quality, system demand, and other variations.

Part B: Working examples of dosage estimation:

- **New cooling system (e.g. Nitrite residual = 0) :** Recommended dosage is 2.7 L/m3, 800 ppm nitrite.
- **Existing operating cooling water system (e.g. some nitrite residual presence but below recommended guideline):** Assuming system measured nitrite residual at 600 ppm and to increase nitrite residual to 800 ppm, required nitrite = 200 ppm = 0.6 L of EWT 9-108 is needed.

Part C: General Application Notes

1. The engine manufacturer's recommendations for water quality should always be complied with.
2. Chloride levels should always be as low as possible. Most engine manufacturers recommend a maximum of 50 ppm chlorides.
3. For this reason, Wilhelmsen Ships Service recommends the use of distilled water as make-up.

Appendix 1: EWT 9-108 Dosage Guidance (as Nitrite) and (as Sodium Nitrite)

Note: Corrosion inhibitor is normally measured as nitrite, some original equipment manufacturers (OEMs) or vessels might opt for nitrite as Sodium nitrite. Hence, to convert Nitrite to Sodium Nitrite conversion factor of 1.5 is applied (e.g. 1 ppm of NO2 = 1.5 ppm as NaNO2).

Below is the dosage guidance in both Nitrite and Sodium Nitrite.

Table 1: Min, max and recommended nitrite and required EWT 9-108 product dosage

Product	Nitrite (as NO2)	Target Nitrite (as NO2)	Product Dosage (L/m3)
EWT 9-108	Min	670	2.2
	Max	1,000	3.4
	Recommended	800	2.7
	100 ppm	100	0.3

Graph 1: EWT 9-108 Product Dosage Chart.

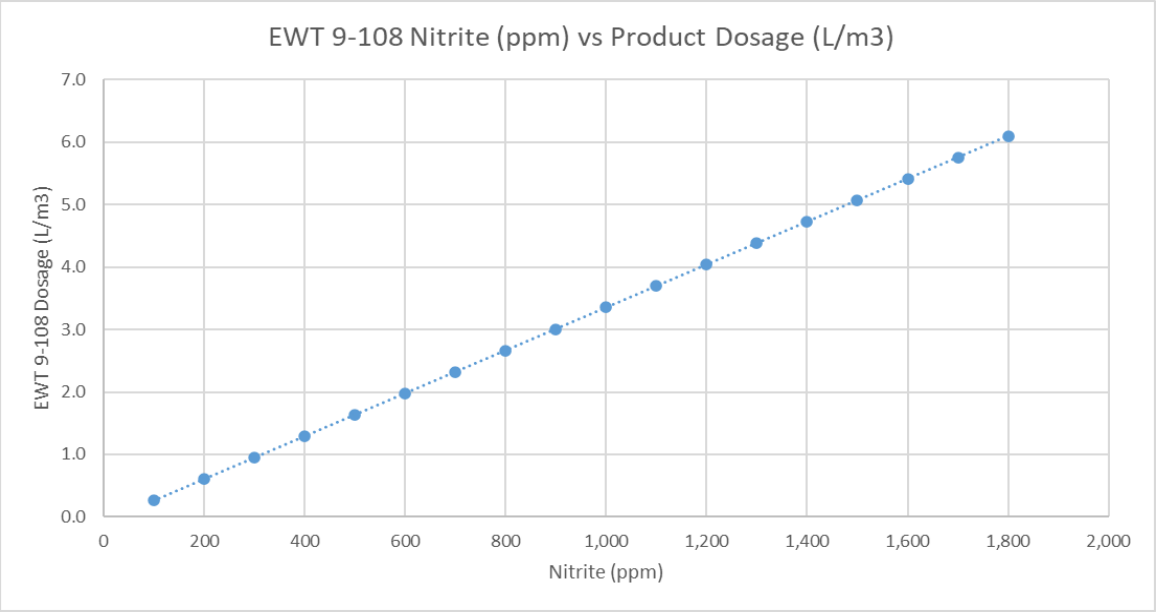

Table 3: Min, max and recommended Sodium Nitrite and required EWT 9-108 product dosage

Product	Sodium Nitrite (as NaNO2)	Target Sodium Nitrite (as NaNO2)	Product Dosage (L/m3)
EWT 9-108	Min	1,000	*2.2*
	Max	1,500	*3.4*
	Recommended	1,200	*2.7*
	150 ppm	150	*0.3*

Graph 2: EWT 9-108 Product Dosage Chart.