SHELL ELC CORROSION INHIBITOR

Water based inhibitor

Product Description

Shell ELC Corrosion Inhibitor is a heavy duty inhibitor concentrate based on a unique extended life carboxylate inhibitor system formulated to provide corrosion protection in aqueous solutions. Mixed with the appropriate amount of water, this product provides maximum protection of all cooling system and heat transfer systems metals, including brass, copper, solder, steel, cast iron and aluminum. **Shell ELC Corrosion Inhibitor** requires no inhibitor additions for 32,000 hours or 6 years in stationary equipment and industrial heat transfer applications. **Shell ELC Corrosion Inhibitor** does not contain nitrite, nitrate, phosphate, borate, amines and silicates.

Applications

Depending on the application the dosage may vary from 5 - 10 %, but a minimum of 5 vol. % of Shell ELC Corrosion Inhibitor in water should be used. For maximum corrosion protection it is recommended to use 7.5 vol % of Shell ELC Corrosion Inhibitor in water. In aqueous solutions where freeze protection is not required Shell ELC Corrosion Inhibitor may be used in:

- stationary engines used in natural gas processing, irrigation, power generation, marine applications, oilfield operations and portable air compressors
- on-road/off road heavy-duty diesel engine applications
- as an inhibitor package for central heating systems, hydraulic safety fluids and mining fluids
- as a hot test liquid for new engine blocks and to protect engines for up to two months storage times
- as a flushing fluid to clean cooling systems that were filled with other inhibitor packages
- corrosion protection for engines during storage
- as an inhibitor package to compensate for coolant leakages in glycol based cooling systems

Features and Benefits

- service life of 32,000 hours or 6 years with no routine inhibitor additions required in stationary equipment and industrial heat transfer applications
- protects all cooling system metals including brass, copper, solder, steel, cast iron and aluminum
- contains no nitrites, nitrates, silicates, phosphates, borates or amines
- silicate free technology maintains good as new heat transfer and prevents formation of silicate gels during use and storage
- phosphate free formula helps prevent hard water scale formation
- low dissolved solids formula prevents formation of deposits
- wide range of applications reduces the number of coolants required
- 100% biodegradable in its unused form

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Approvals and Recommendations

- Deutz-MWM 0199-99-2091
- Ford ESD-M99B166-C - hot test fluid
- GEC Alsthom Ruston - cooling water
- Holdon
- MAN B&W D36 5600 - cooling water
- MAN 248
- Scania TB 1451
- Sulzer Diesel TR 1508 & ZBS0503 - cooling water
- Ulstein Bergen spec# 2.13.01
- Wärtsila 32-9011 - cooling water

Typical Characteristics of Shell ELC Corrosion Inhibitor

	Method	Typical as sold
Code No.		94079
Inhibitor content		33 % w/w
Water content	ASTM D1123	67 % w/w
Nitrite, amine, phosphate, borate, silicate		none
Color		uncolored
Specific gravity, 20°C	ASTM D1122	1.055
pH	ASTM D1287	9.4
Cloud point		- 15 °C
Storage stability		> 5 years
		5 % dilution
pH	ASTM D1287	8.3
Foaming properties at 25°C	ASTM D1881	10 ml
↳ break time		1 sec.
Effect on non-metals	GME 60 255	no effect
Hard water stability	VW PV 1426	no precipitate

Corrosion Protection

Table 1: Modified ASTM D1384 glassware corrosion tests - 300 ppm chloride

	Weight loss in mg/coupon[1]						
	Brass	Copper	Solder	Steel	Cast Iron	Al	AlMn
ASTM D3306 (max)	10	10	30	10	10	30	/
5% Shell ELC Corr Inh	0.6	0.6	4.5	0.0	0.7	9.8	4.8

1. Weight loss AFTER chemical cleaning. All weight losses are in mg/coupon. Weight gain is indicated by a - sign

Table 2: Corrosion test during aging with Shell test parameters

To emphasize the corrosion protection offered by **Shell ELC Corrosion Inhibitor**, the aging test is conducted under more severe conditions compared to those commonly used in the industry.

Test Conditions	Typical Industry	Shell
Test duration	169 h	504 h
Fluid content	5.0 l	6.0 l
Pressure	1.5 bar	2.5 bar
Flow	3.0 l/min	3.5 l/min
Heat input	5500 W	5000 W
Temperature in heating vessel	95 °C	115°C
Temperature in cooling vessel	75 °C	95°C
Concentration of coolant in water	40 vol. %	20 vol. %

	Weight loss in g/m² (using Shell test parameters) [1]						
	Al [2]	AlMn	Cast Iron	Steel	Cu	CuZn	Solder CB
Reference Coolant [3]							
after initial cleaning	82.10	64.02	-2.19	-1.68	3.62	2.90	21.45
after final cleaning	125.01	94.33	-0.36	0.11	4.99	5.66	25.83
Shell ELC Corr Inh after							
initial cleaning	23.91	27.05	0.52	0.36	1.03	1.13	0.27
after final cleaning	60.16	63.15	0.69	0.40	1.46	1.76	0.52

Table 3: Modified MTU High Temperature corrosion test (2000 W)

	Weight loss in mg/coupon[1]		
	Cast Iron	Aluminum	
test duration 116 hrs		SAE 329	AlMgSi1
5 % Shell ELC Corrosion Inhibitor in deionized water	-1.3	9.3	1.8
5% Shell ELC Corrosion Inhibitor in FVV-water hot coupon	-9.0	-16.4	40.7

1. Weight gain is indicated by a - sign.
2. Aluminum SAE 329.
3. Reference coolant is conventional, high quality, ethylene glycol- and silicate-based coolant

Note: By measuring coupons' mid-section temperatures in the Heat Transfer test, the "single layer protection" mechanism of **Shell ELC Corrosion Inhibitor** technology is demonstrated: unlike conventional inhibitors, the carboxylic acids form only a very thin protective layer. This results in improved heat transfer.

Handling and Safety Information

Shell ELC Corrosion Inhibitor has a shelf life of at least 8 years. Concentrate product should be mixed before use. Always dispose of used coolant in accordance with local, state and federal guidelines. These products are not to be used to protect the inside of potable water systems against freezing. For information on the safe handling and use of this product, refer to its Material Safety Data Sheet at **http://www.shell-lubricants.com/msds/.** If you are a Shell Distributor, please call **1+800-468-6457** for all of your service needs. All other customers, please **call 1+800-840-5737** for all of your service needs. Information is also available on the World Wide Web: **http://www.shell-lubricants.com/.**