

References & statements for Elysator

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LETTER OF COMPLIANCE
CLEAN MARITIME
MACHINERY AND COMPONENTS

COMPLIANCE LETTER NO. 1

This is to certify that the

Water Treatment Units

with type designations

Elysator 15, 25, 50, 75, 100, 260, 500, 800 and 1000L

Manufactured by

International Water Treatment Maritime AS

SLEMMESTAD, Norway

is found to comply with

Det Norske Veritas' Standards for Certification 2.17 (new), Standard for CLEAN Maritime Machinery and Components

HØVIK
June 4th 2003


for Morten Østby
Project Responsible


Tor Jo Landheim
Project Manager

DET NORSKE VERITAS

DET NORSKE VERITAS



DNV

TECHNICAL REPORT

Date of first issue: 12. June 1998	Project No.: 550 3 6122
Approved by: Bård Espelid <i>Bård Espelid</i> Head of Section	Organisational unit: Materials and Inspection Technology
Client: International Water Treatment Maritime (IWTM) AS	Client ref.: Jan R. Ebbestad

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Summary:

Det Norske Veritas (DNV), Department for Materials and Inspection Technology in Bergen, has evaluated the effect of a water treatment unit called Elysator. The effect is evaluated as the ability to reduce the aggressivity of water with regard to corrosion. The evaluation is based on results from analyses of water flowing in closed circuits (cooling and heating systems, including steam plants) where this type of unit is installed.

The results of the analyses show that the water treatment unit reduces the chloride content and the conductivity of the water and increases the pH. This reduces the corrosion susceptibility of metal alloys exposed to the water. An indication of such effect is given by the recorded reduction of iron and copper content as a function of water treatment time.

The results of the water analyses further show that the carbon content is reduced as result of the water treatment. Such reduction limits any bacterial growth and hence the risk of microbiologically influenced corrosion (MIC).

It is concluded that the aggressivity of the water with regard to corrosion is significantly reduced as result of the water treatment.

Report No.: 36122bsc.re1	Subject Group: E7
Report title: EVALUATION OF ELYSATOR WATER TREATMENT UNIT	
Work carried out by: Birgith Schei <i>Birgith</i>	
Work verified by: Sidsel Skauby <i>Sidsel Skauby</i>	
Date of this revision: 12.06.98	Rev. No.: 03
Number of pages: 7	

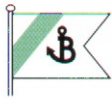
Indexing terms

STEELS
WATER
CORROSION PROTECTION

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- ☐ Unrestricted distribution

Head Office: Veritasvn. 1, N-1322 HØVIK, Norway

12 June 1998, BSC/36122bsc.re1

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To :	Tecto	country :	Belgium
Attn:		Dept :	
Telefax No.:	32 32 47 50 91	Date:	17.September 1998
From :	Tom Christiansen	Dept :	Technical
Our Ref.No. :	TCH 98091707	No.of pages	2 (incl. This page)

Dear Sir.

Reference is made to your mail regarding Elysator installations.

We have been using this water treatment system on several of our ships for a long period now.

As a major Norwegian shipowner with a total of 95 wessels we evaluate new installations carefully.

Our experience with Elysator is excellent. We have not a complete overview of total saving yet, but they are estimated to be in the range 4000 to 6000 US\$ a year, depending of shiptype.

Savings were not the main issue when we installed the systems. It all started with a Sulzer RTA system with bacteria's in the cooling water system. After several failed cleaning attempts we installed one Elysator that removed the bacteria's.

Our main reasons for installing Elysator are as follow.

- Improved water treatment in a simple way.
- Reduced stock of chemicals onboard.
- Reduced work for the crew onboard.(water analyses e.g.)
- Reduced risks for accidents with chemicals.
- Reduced pollution to sea (from leaks e.g.)
- Even existing "old pipes "are cleaned.
- To be in "forehand" of future restrictions regarding chemicals.

One warning thou the Elysator cleans "old pipes" and may cause leaks where corrosion before kept the pipes tight

My advice is to install the Elysator several months before docking on wessels older than 10 years and monitor for leaks carefully.

Kind Regards

For Bergesen d.y ASA

Tom Christiansen
Superintendent

WALLENIUS SHIP MANAGEMENT PTE LTD

To : Whom It May Concern
Date : 30 Apr 2002

Subject : Use of ELYSATOR for Water Treatment

In meeting one of our ISO 14000 objective to reduce reliance on Treatment Chemicals, we had embarked on a test installation of ELYSATOR sometime in Year 1999.

The test installation involved the use of ELYSATOR for the water treatment of the following systems onboard (in place of existing chemical treatment) :

- A> Water Treatment for Aux Boiler and Feed Water System
- B> Water Treatment for Main Engine and Aux Eng Cooling Water System

During the test period of about 12 months, test results and visual inspections of the related water systems confirmed the water treatment by ELYSATOR to be effective.

We have since installed ELYSATOR onboard 6 vessels as an effective measure to reduce reliance on use of chemicals for treatment of Boiler Feed Water System and Diesel Engines Cooling Water System.

For Wallenius Ship Management Pte Ltd

WC Leong



Farsund shipping

-----Original Message-----

> From: Per Haagensen [SMTP:p.haagensen@farship.no]
> Sent: 14. september 2000 16:06
> To: [hans](#) skaar
> Cc: Z-ARCH
> Subject: FW: TECH/ Evaluation Of Elysator
>
> Hi Bjørn / Hans
> Following rec from the Chief engineer regarding experience with
> the Elysators, and I'm fully agreed.
>> We have been using the Elysator to condition the Boiler water
> and
>> Cooling water on board from the time vessel was taken out of
> the Ship
>> yard. During this time no Chemicals have been used for water
>> conditioning.
>> We have on board analyzing equipment for the water, so the
> same can
>> be monitored daily to give us early indication of any problem.
> To date no problem situation has been encountered.
>> The pH value and Conductivity of the water is tested daily to
> ensure that the chlorides are low and that the water is alkaline in
> nature.
>> Tests for Chloride, Copper, Zinc, Iron and Sulphate content is
>> carried out frequently to check for overall effectiveness of
> the
>> system.
>> These results of the tests are sent out for comments, once a
> month,
>> and till date they have been satisfactory. There has been no
>> evidence of corrosion.
>> Samples of water from the Boiler water & Cooling water systems
> were
>> sent for analysis in the second week of July and the results
> were
>> most encouraging.
>> After approximately 6 months running, the Starboard boiler
> manhole
>> and handholes were opened up for inspection. There was no
> build up of
>> scale observed on the inner surfaces of the water space. No
> evidence
>> of corrosion / rust was found. On the Port boiler only the
> hand holes
>> were opened and a similar observation was noted.
>>
>> Overall we can say that the Elysator system seems to be an
> effective
>> method of Boiler and Cooling water conditioning.
> Best reg. Per Haagensen

A·S BILLABONG

17, October 2000

TO WHOM IT MAY CONCERN

Dear Sir or Madam:

Based on the use of Ellysator water treatment equipment, on various systems and on different vessels for almost 5 years, we have only good experiences. The Ellysator systems have, as far as we can determine, given ample corrosion protection on various components. A better control, and also more stable condition, of the water have also been achieved.

Sincerely,



Ola L. Donnem
Technical Manager



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To Whom It May Concern:

We have just closed a long test period with the Elysator water treatment system and our experience is really encouraging. FG-Shipping have installed the water treatment units both for the boiler system and in the ME and AUX engine cooling water systems.

We do also at FG-Shipping see the environmental value in this matter, not to use any chemical additives in the mentioned systems and this can and will be used as a constant improvement detail in the environmental policy.

We will continue with the installations during 2001 at least in two ships.



Peter Karanen
Superintendent
FG-Shipping

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Ship Management

TELEFAX TRANSMISSION

To: International water treatment maritime A/S
Attn: Mr Ebbestad
FaxNo: 31289130

Date: Oslo, 10.05.00
Pages: 1 (in total)

(If pages are missing, please see footer information)

Subject: Result of Elysator system on M/V Ballangen and M/V Bauta

Dear Mr Ebbestad

We have now been using your Elysator system on M/V Ballangen, (build 1987) since November 1994.

Based on the experience / result from above mention vessel we decided to install the same system on M/V Bauta in 1998.

After about 6 year in service on M/V Ballangen I am pleased to inform you that there have not been any unexpected wear on pumps or any machinery.

Have in this period had several complete overhaul on Aux. Eng and at the same time pulled out several liners for check/control of cooling water space. Cooling water chamber have been in good condition and "back" side of liner have been clean with only minor amount with sediments.

Have also checked cooling water chamber on exhaust valve housing and cylinder cover on main engine and condition are very good.

We have not received any negative comments from class (Lloyds) related to installation and use of Elysator system.

We will most likely install Elysator system on M/V Balsfjord and M/V Bakra in year 2001.

Best regards

Hans-Petter Olsen

Ship manager.

Torvald Klaveness & Co AS

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Barber Ship Management

To whom it may concern

Barber Ship Management AS

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		Telex:	78 900 WW N
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Department
BSM GR I

Our ref.
T.I.

Your ref.

Date
23. August 2000

SUBJECT: ELYSATOR WATER TREATMENT.

We have installed the Elysator watertreatment system, for boiler and cooling water, on four of our vessels so far, all relatively new vessels.

The systems have now been in service for approx. four years with very satisfactory results. No chemicals have been used since the Elysators were installed.

We also plan to install Elysators on several other vessels in the near future.

For Barber Ship Management AS


Terje Iversen



ISO 9001:2000 CODE
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Audit by Dr.V. Lloyds. GL

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Stolt tankers

Dear Geir,

Looking through the analysis reports sent in from the Kestrel on a monthly basis, and during closeup inspections done to both boilers (Hada vertical smoke tube boiler MVS-46.5) we have seen the water areas of the boiler is maintained in a good condition.

During inspections the lower water spaces have been inspected through the mud hole doors. There has been a slight build up of deposits noted laying in the space between the furnace plate and outer shell. The furnace and shell plates have been found to be in acceptable condition with only a light coating of deposit noted.

The upper water/steam spaces have also been inspected with good results. The tubes were in in acceptable condition with no erosion or surface defects noted. Again only slight deposit noted. (see attached pictures)

The system installed on the Kestrel has been on service for approximately two years, with the electrodes changed only one time.

The boiler water analysis has been taken through the Elysator indicating system, with water samples sent every 3-4 months to verify the electronic readings. As mentioned above the analysis has been normal.

The main reason for trying out the Elysator system on the Kestrel is its simplicity, re no addition of chemicals and daily readings, as well as the good results.

This is the reason we purchased it for the Stolt Puffin, the sister ship of the Kestrel.

Best regards,

Lars Modin
General Manager
Stolt Nielsen European Ship Mgt
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Fax +31 10 299 6610
lmodin@stolt.com

(See attached file: Boiler tubes 3.pdf)

(See attached file: Boiler tubes.pdf)(See attached file: Boiler tubes 2.pdf)

Bruce Irving
Superintendent, SNESM
email: birving@stolt.com
dir tel: +31 10 299 6616

Seatrade Groeningen

To whom it concerns.

Since october 1998 we have installed on the m.v. Nova Klipper an Elysator unit, model 50.

The vessel is a Japanese built reefer vessel, YEAR OF DELIVERY 1992.

The Elysator unit is used for treatment of boiler water.

The oil fired auxiliary boiler which is combined with an exhaust gas boiler is made by Miura.

Type of the oilfired boiler is VWS 1200, capacity 1200 kgs steam per hour, pressure 7 bar.

After the Elysator was put into service the chemical treatment of boilerwater and condensate was stopped.

During the boiler survey last year the internals of both oil fired and exhaust gas boiler were inspected and were found in very good condition, clean, no deposits, etc.

Water used for make up is distilled from own fresh water generator and water bunkered from shore.

Sofar I am quite satisfied with the performance of the Elysator unit, water seems to be well treated, instalation is requiring minimum maintenance.

Below please find some pictures showing internals of boiler during inspection last year.

Best regards,

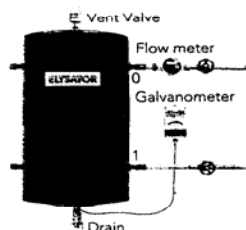
It is almost two years since Shell International Trading and Shipping Company (Stasco) was approached by Stromme UK with a proposal to install International Water Treatment Maritime's (IWTM) novel Elysator water treatment system on one of the oil company's tankers. And now the feeling is, at least to one of the company's Chief Engineers, that 'one would have to be out of one's mind to prefer chemical treatment'.

The proposal sounded promising, and after various discussions it was decided to fit an Elysator unit to the steam plant in the Shell tanker *Opalia*.

Opalia had been using a conventional chemical treatment system, comprising a closed automatic dosing system for Hydrazine, a condensate treatment which doses automatically after filling the chemical tank, and boiler water treatment which doses manually as required, depending on water sample readings. Such a set up involved manual intervention each day to fill each tank of chemicals and to take the boiler water sample readings — 'it all took time'.

Stromme UK, the UK agent for IWTM, told this magazine that the onboard ship operators also appeared to experience problems with the dosing of Hydrazine — used to scavenge oxygen — as they could not maintain the correct levels required to protect the boilers from corrosion and scaling.

So it was agreed that an Elysator unit would be fitted and monitored for one year in order to evaluate its effectiveness. The unit chosen was an Elysator 800 — an 800litre/h-capacity system.



The Elysator can be easily installed by the ship's engineering staff

After two years operational experience using the Elysator freshwater treatment system, there's no going back to chemical dosing for Stasco engineers

SAYING NO TO A CHEMICAL ATTACK

The Elysator can be used in any kind of freshwater system where corrosion might occur. It is based on the anodic/cathodic principle that less 'noble' metals such as magnesium are sacrificed to corrosion, as opposed to the system itself. During the process, the oxygen in the water will be consumed creating H_2O and magnesium hydroxide. When installed in a freshwater system, the Elysator is claimed to protect the entire system from corrosion; even aluminium and aluminium alloys are protected. IWTM's system automatically regulates the pH value of the water to about 9.5, while the electrical conductivity of the water is kept as low as possible in order to avoid galvanic corrosion.

David McRoberts, Engineer Support Superintendent for Stasco, listed the following reasons behind the decision to install the system:

- No need for any chemicals, and therefore
- No storage or containment problems
- No contact with any hazardous chemicals thus no risk of injury to personnel
- No need for refilling of any tanks daily thus saving time
- Environmentally friendly as no chemicals blown down to sea
- As chemicals are no longer required the cost saving will repay the cost of the Elysator system within one to three years
- The ease of sample testing
- Operational simplicity and minimum maintenance.

Once the unit had been received onboard it was fitted and mounted with considerable ease near the boiler feed tank, and this ensured that any pipe work modifications were minimal.

McRoberts told *MER*: 'From the outset, the unit was very simple to use, with very little intervention from the Stromme engineers. A daily log was taken and water tests carried out using the supplied meters. Water test

readings have been very stable without the addition of any chemicals, and maintenance has only consisted of the monthly cleaning of the tank and the scraping of anodes. As yet, there has been no requirement to exchange the anodes due to very little wastage.'

Inspections in the past two years have not only shown a system free of corrosion but also a reduction in fly rust — another factor that McRoberts claims verifies the system's effectiveness.

'We have had three independent surveyors onboard to inspect the boilers and all have agreed that the waterside was in excellent condition.' The sistership to *Opalia*, *Oscilla*, has subsequently also been fitted with a similar unit.

McRoberts said: 'We did not imagine that the water quality would improve as much as it has, and we did not expect the readings to be as stable as they are, especially with very little input from the engineers onboard. And this, on top of the fact that there is now no chemical hazard, makes the whole system safe, environmentally friendly, effective in corrosion prevention and very cost effective.'

Opalia's Chief Engineer Roger Smith says the record of boiler inspections speaks for itself. In July 2002, after more than 2500 running hours, a survey, carried out by classification society DNV found that a coating of rust on the waterside had significantly reduced due to recent cleaning and also much increased blowing down. No corrosion was noted at all, fully confirming the effectiveness of Elysator. Indeed, earlier this year, internal inspection of the water space was carried out and found to be in excellent condition with only a very moderate coating of fly rust and no corrosion. No cleaning was required. Independent surveys of the boiler water spaces were carried out by Aalborg, Harris Pye and DNV, with no defects noted.

The Chief Engineer is of the opinion 'that one would have to be out of one's mind to prefer chemical treatment to the Elysator system'. He also said the system could pay for itself in just two years. **MER**

The inside of *Opalia's* boiler (sunrod tubes pictured) was inspected and found to be in 'superior' condition, although some fly rust was detected



National Iranian Tanker Company



ناشیونال ایرانیان تانکر کومپنی (ذ.م.م.) فرع الشارقة
National Iranian Tanker Co. Ltd.
SHARJAH BRANCH

Date : 18.8.2004

Ref. :

TO WHOM IT MAY CONCERN

Subject : Elysator cooling water treatment :

Boilers : Mistsubishi MAC-40B, 2 drum vertical oil fired boiler.
Evaporation rate 40 tons/hr, pressure 16 kg/cm²

Main engine : Wartsila Sulzer 7RTA84T, developing 36,960 bhp at 74 rpm at mcr
Aux engine : Ssangyung B&W 6L 28/32H, developing 1,150 kw power at 720 rpm

This is to confirm that we are using Elysator cooling water treatment system on oil fired boiler and main & auxiliary engine cooling water systems on our five N class VLCCs since year 2001.

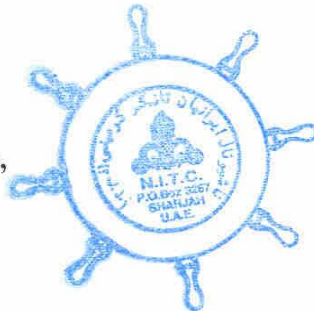
We have found the Elysator system to be extremely effective to control corrosion and scaling in boilers and engine cooling systems. We have observed the attending classification society surveyors amazed at the condition of the boiler internals (free of pitting, corrosion and scale) when presented for routine survey on almost all occasions since switching over to Elysator.

Most notable features of the Elysator system are drastic reduction in the conductivity (an indication of the degree of susceptibility to galvanic corrosion), improvement in the pH value, absence of dissolved solids and the natural way in which oxygen is removed from the system.

Prior to switching over to Elysator system when the boiler and engine cooling water was treated by chemicals, the water was always of muddy/brown colour with normal values of conductivity around 1,500 mS/cm and pH value around 8.5. With Elysator system the water remains crystal clear with normal conductivity of less than 100 mS/cm and pH value of 9.5

The undersigned would not hesitate to recommend Elysator system to anyone who wishes to not only treat but improve water quality in a chemical free, self regulating (no shipstaff intervention), environment friendly and economic way.


A.N. Lodhi
Technical Manager,
NITC Sharjah



P.O. BOX : 3267 - SHARJAH - U.A.E.

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Analyses of water samples after treatment with Elysator water treatment system.

SUMMARY

Water samples were collected from two heating plants and two cooling plants before and after installation of Elysator water treatment system. The analyses of the samples showed the following effects of the Elysator:

The pH was stabilized in the range 8.9 - 9.6. Thus, the plants having a less alkaline initial pH received a pH-increase.

The conductivity was stabilized in the range 40 - 90 $\mu\text{S}/\text{cm}$. Only one of the four plants had an initial conductivity significantly larger than this. The conductivity in the water from this plant was reduced by 73%, from 242 to 66 $\mu\text{S}/\text{cm}$.

The iron-concentration was reduced to approximately 0.1 - 0.4 mg/l. This corresponded to 42 - 99% efficiency, depending on the initial iron-concentration.

The copper-concentration was reduced to approximately 0.02 mg/l. This corresponded to 33 - >90% efficiency, depending on the initial copper-concentration.

Odfjell

Fra: Ove Normann [Ove.Normann@odfjell.com]
Sendt: 30. august 2006 14:18
Til: jan@iwtm.no
Emne: Elysator

Elysator - Water treatment.

Ref. phone related to our experience with water treatment system by using Elysator contra chemicals. We have used Elysator as water treatment system for boiler and cooling since May 1996. Currently we have 37 vessels with Elysators as water treatment in our fleet. The propulsion machinery consist of both Sulzer RTA and B&W MAN MC and auxiliary engines mainly of MAN B&W type 6L28/32H and Aalborg boilers type AQ9 and AV6N..

We have up to day date not had any corrosion related problems in the machinery since we started use of Elysators, the cooling water remains clear and clean with a low conductivity, sulphate and chloride and with a fine pH value. Another benefit we have observed by using Elysator are increased lifetime of gaskets as O-rings of rubber/viton/silicon contra water treatment with chemicals.

We are very satisfied with Elysators as water treatment in our fleet.

Best Regards

Ove Normann
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Odfjell ASA

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