Boiler Treatments

03 Liquid Boiler Water Treatment Extra
pH, corrosion, scale and sludge controller for boiler water

Description
Aquamarine Boiler Water Treatment is a combined concentrate liquid alkaline product that inhibits corrosion, controls alkalinity, controls hardness and oxygen. It is easy to use, non-hazardous and effective. It functions by neutralising acid conditions, precipitating salts, sludge conditioning and oxygen scavenging. For additional Oxygen Scavenger please see separate product details.

Use
Boiler water additive for low/medium pressure boilers (up to 250 psi).

Application
Aquamarine Boiler Water Treatment is fed into the water feed line by means of a continuous feed dosing pump.

Initial dose: 2.4 litres of Boiler Water Treatment/tonne in the boiler water system.

P. Alkalinity p.p.m. CaC03	0	50	100	150	200	225	300	Above 300 Blow-down Required
Litres/tonnes Dose BWT	2.4	1.8	1.2	0.6	0	0	0	

Please download a boiler water log sheet from the log sheet section on the CD or from our website www.bayer-wood.co.uk. Logs should be submitted monthly for analysis and a report will be sent out by the end of the month in which they are received.

Key parameters are PAlkalinity, Chloride and Sulphite
- Above 200 p.p.m. no dose is required but above 300 PAlkalinity p.p.m. blow down should be implemented
- Sulphite should be kept at 30-50 p.p.m or according to manufacturer's guide-lines
- Chloride content should be controlled below a level of 200 p.p.m. (Above 200 - Blow-Down)

Please ensure that all the test reagents are within the date on the bottle before using.

Feedwater Temperatures - Some typical issues
Temperature of the hotwell is too low. (The temperature should be kept between 70° - 80° C to reduce the oxygen content):

- Return condensate lines and make up line are fitted above the water level. (Tubes to be length under the water level to avoid oxygen intake) Hotwell covers open! (steam cushion left)
- Temperature of hotwell is above the 90° C. (Temperature must be kept maximum 90° C to avoid cavitation)
- Feed pump should be placed on the same level as the hotwell or one deck lower to avoid vapour formation in the pump

Aquamarine BWT test kit is available for accurate system checking. Pack Size 25 Ltr. (see under Test Kits)

Ref. No. J150 6850-99-834-9159

Visit: www.aquamarinechemicals.com for log sheet downloads.
Email your log sheets to us monthly at: logs@bayer-wood.co.uk

22 Condensate Controller

Description
Aquamarine Condensate Controller is a liquid volatile amine product used as a neutralising agent in condensate and feed water systems.

How does it work?
Condensate Controller is an alkaline amine which acts as a neutralising agent which combats acid contamination in condensate and feed water systems. This is most commonly caused by the presence of dissolved carbon dioxide. Condensate Controller neutralises these products and maintains a protective film in the system. The product is recycled as a result of its volatility which causes it to carry over with the steam.

Dosing Instructions
Condensate Controller is best dosed using a metering pump or flow meter. The best dosing points are the condensate pump discharge, hot well or condensate return tank (feed line must be at least 1 metre below surface), or the deaerator storage tank.

- Dosing levels are set to maintain a pH between 8.3-9.0

Take a representative sample of condensate and test it for pH. If the pH is in the target range add a dose of 0.75 litres/day of Condensate Controller. If the pH is below this level increase the dose to 1.0 litre/day for 3 days and retest the pH. If the pH is above the target range decrease the dose to 0.5 litres/day for 3 days and retest the pH. It is important that regular testing is carried out to ensure levels of treatment are correct.

Condensate Samples should always be taken from the drains cooler or condenser.

Pack Size 25 Litres

Ref. No. J150 9140-99-581-5784

27 Boiling-Out Compound

BOILING OUT COMPOUND is a powder chemical product used to protect new metals in any type of boiler. It is primarily used for steel boilers when they are new or when a boiler has been re-tubed. It is recommended to use approximately 4-5kg per tonne. It should be added in solution to the boiler water and the temperature elevated to maximum for a minimum of 5 hours.

The boiler should then be drained and flushed and subsequently chemically dosed with the Aquamarine Liquid Boiler Water Treatment according to the product information supplied.

Pack Size 25kg

54 Hardness / Phosphate Control

Uses

- This product is a dry powder product used for hardness reduction and phosphate control in boiling water systems
- Eliminates calcium scale problems
- Phosphate levels are optimised
- Hardness salt forms are easily removed by blow down
- Can be used in all boiler water systems

This product is formulated to give an optimum phosphate level within boiler water systems. This ensures correct hardness levels at all times.

Dose

A representative sample of boiler water must be regularly obtained and tested for phosphate levels. The use of impure feed water will influence phosphate demand. The powder should be dissolved in warm water (50°C) at a ratio of 1 part to 20 parts water and then fed into the boiler system by a by-pass feeder.

Phosphate Dosage Chart kg/10 tonnes Boiler Water Capacity

Phosphate Test p.p.m	Initial dose	0-10	10-20	20-30	30-40	40-50	50-60	60-80	80-100
Water Tube Boiler	0.65	0.6	0.5	0.4	0.3	0.2	No dose	No dose	Blow-down
Double Primary	0.45	0.4	0.3	0.2	← No dose →				Blow-down
Pressure Boiler secondary	0.65	0.6	0.5	0.4	0.3	0.2	No dose	No dose	Blow-down
Exhaust Gas Distilled Water	0.35	0.2	← No dose →						Blow-down
Economiser shore water	0.55	0.5	0.4	0.3	0.2	No dose	No dose	Blow-down	
Boiler Pressure 40-60 kg/cm² (570-854 psi)	0.37	0.27	0.17	Satisfactory No dose	Satisfactory No dose	High No dose	Too high Blow-down		
Boiler Pressure 60-68 kg/cm² (854-966 psi)	0.37	0.27	0.1	High No dose	High No dose	High No dose	Too high Blow-down		

These are recommended limits for levels of treatment. They are not intended to replace either shipping company instruction or boiler manufacturer's policy.

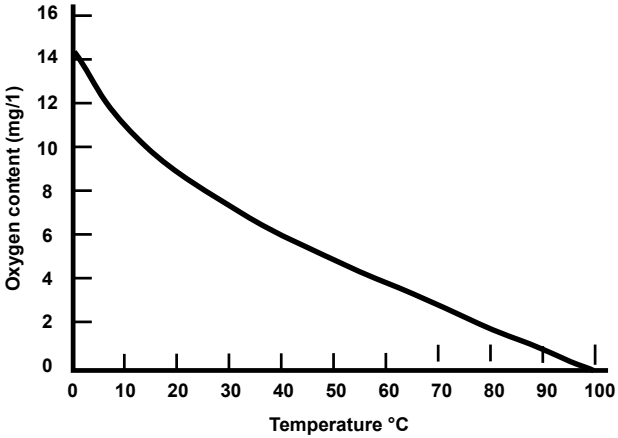
55 Sulphite Oxygen Controller

SULPHITE OXYGEN CONTROLLER is a liquid sodium sulphite product used for oxygen scavenging in low and medium pressure boilers.

How does it work?
SULPHITE OXYGEN CONTROLLER reacts rapidly with dissolved oxygen in the boiler to form inert sodium sulphate. this prevents damage caused by oxygen pitting and corrosion in the boiler.

Oxygen Scavenger is a convenient to use liquid oxygen scavenger recommended for the complete removal of oxygen from deaerator heaters, feedwater storage areas, feed-water lines, condensate return lines, boiler internals and closed recirculating water systems.

The product is dosed to give a reservoir level of sodium sulphite in the boiler. If the reserve drops below a minimum level then oxygen corrosion will occur. It is therefore essential to maintain a level at all times. The product is used as part of a boiler water treatment programme.



Results of use
The interior of the boiler is protected from oxygen corrosion attack. However please note that extra solids are produced in the process so additional blow-down will be required.

Dosing and Sampling
A reserve of 30-50ppm sulphite (Aalborg recommend 30-60 p.p.m) should be maintained in the boiler. SULPHITE OXYGEN CONTROLLER should be dosed continuously to the boiler by means of a metering pump into the feed line after the recirculation line. Continuous dosing can also be achieved by dosing into the hotwell to a point as close to the feed water pump suction as possible, although efficiency is adversely affected by low hotwell temperatures.

A representative sample of boiler water must be obtained, at an interval set by experience in operation of the boiler. The sample should be taken after the regular blow down and analysed immediately.

The target usage is 30-50ppm of sulphite. The product should be applied separately to CONDENSATE CONTROLLER and should not be mixed with any alkaline treatment.

DOSAGE

18 p.p.m of Oxygen Scavenger are required for each p.p.m of dissolved oxygen, plus a slight excess residual for testing purposes.

$$\text{Dose per M}^3 \text{ feed} = (18 \times \text{p.p.m Oxygen}) + \left(\frac{65}{\text{Boiler concentration factor}}\right)$$

This formula will give 30 p.p.m sulphite as Na_2So_3
Where Feed temp = 80°C then p.p.m Oxygen = 2.9 p.p.m

FEEDING

Oxygen Scavenger liquid may be fed directly from the shipping container or diluted with clean condensate in a chemical mix tank. It is compatible with most boiler chemical additives except filming amines. Minimum agitation is suggested to prevent premature activation of the oxygen scavenger with oxygen (air) captured by mechanical action at the solution interface. Covered mix tanks or floating plastic plugs are desirable. It may be dosed in conjunction with Liquid Boiler Water Treatment PLEASE TAKE SPECIAL NOTE: DO NOT ADD NEAT LIQUID BOILER WATER TREATMENT AND SULPHITE OXYGEN SCAVENGER TOGETHER. Typically the neat sulphite Oxygen Scavenger should be added to pre-dilute Liquid Boiler Water Treatment in a mixing tank. A typical mix would be for a 100 litres of pre-mixed treatment: 75 litres water, 25 litres Liquid Boiler Water Treatment and 3 litres of Sulphite Oxygen Scavenger.

TESTING

Oxygen Scavenger is controlled by maintaining a fixed sulphite excess of not less than 30 p.p.m in boilers or 3 p.p.m in feedwater lines, as detectable sulphite using a reagent dropper method or standard titration technique. Aalborg recommendation is 30 -60 p.p.m. Please check specific manufacturer's instructions as they may vary.

HANDLING

Avoid direct contact with skin and eyes to prevent mild irritation. In case of accidental contact, flush area with water, and seek medical attention. Product should not be ingested. Please refer to Material Safety Data Sheets for detailed handling and storage information.

Summary

SULPHITE OXYGEN CONTROLLER is an catalysed sulphite oxygen scavenger used as part of a boiler water treatment programme in low or medium pressure boilers.
Pack Size - 25 litre Drum.

Ref. No. J150-6810-99-378-4863

56 Boiler Coagulant

AQUAMARINE BOILER COAGULANT is a liquid sludge conditioner designed to prevent the formation of solid and sticky deposits in boilers.

How does it work?
BOILER COAGULANT is a physical dispersant product that prevents the formation of large particles in liquid. It functions by keeping solids as small particles and prevents agglomerations from forming.

BOILER COAGULANT is primarily used in conjunction with HARDNESS/PHOSPHATE CONTROL. The solids can be removed by the blow down as usual.

In addition BOILER COAGULANT can help to remove small amounts of oil contamination if it arises, by blow down. Oil contamination must of course be stopped if it has arisen.

Results of use
BOILER COAGULANT prevents the formation of adherent deposits and sledges in boilers and thereby reduces clean-downs.

Dosing Instructions
Normal dosage is 20ml daily/tonne of boiler water capacity. Typically this equates to 0.1-0.3 litres/day. This is the recommended initial dose.

BOILER COAGULANT should be dosed directly to the boiler via the bypass pot feeder installed in the boiler feed water line.

25 Litres

57 Alkalinity Controller

ALKALINITY CONTROLLER is a concentrated alkaline treatment for pH control in boilers.

How does it work?
ALKALINITY CONTROLLER should be used as part of a coordinated treatment programme in conjunction with other AQUAMARINE B.W.T. products.
ALKALINITY CONTROLLER provides the alkaline conditions that allows HARDNESS/ PHOSPHATE CONTROL to operate effectively. This is done by neutralising any acidic conditions and maintaining alkalinity within optimum limits.
The product is suitable for use with all boiler pressures.

Results of use
ALKALINITY CONTROLLER helps to keep magnesium and calcium salts in suspension and helps in maintaining efficiency and reducing maintenance.

Dosing and Sampling
- For optimum results dose directly into the boiler via the bypass pot feeder installed in the boiler water feed line.
- A representative sample of boiler water must be taken at regular intervals (daily or every 3 days), at a frequency adequate for the type of boiler. The sample should be taken immediately following blow down and should be analysed immediately.
- Follow the AQUAMARINE test kit instructions and record the results on the log sheets provided by AQUAMARINE. These should be returned monthly for review by AQUAMARINE CHEMICALS.
- The results indicate the level of P Alkalinity in the boiler. Use the dosage chart below to adjust the levels of treatment required.

USING THE TABLE: Select the section corresponding to the pressure of the boiler to be treated and read across the table to obtain the level of treatment required.

ALKALINITY CONTROL
DOSAGE-ML/TONNE FOR DISTILLED WATER

BS1170	P. Alkalinity test result in p.p.m								
GROUP BOILERS	0-60	60-90	90-100	100-110	110-120	120-150	150+	Range	mls / tonne
1	180	90	60	Satisfactory No Dose	Satisfactory No Dose	Satisfactory No Dose	Blow-down	100-150	225
2	180	90	60	Satisfactory No Dose	Satisfactory No Dose	Satisfactory No Dose	Blow-down	100-150	225
3	150	65	50	Satisfactory No Dose	Satisfactory No Dose	Blow-down	Blow-down	100-130	200
4	135	65	50	Satisfactory No Dose	Satisfactory No Dose	Blow-down	Blow-down	90-120	180

BS1170 Group Boilers 1 Pressure Range 0-17.5 Bar 0-258 Psi
BS1170 Group Boilers 2 Pressure Range 17.5-31 Bar 258-455 Psi
BS1170 Group Boilers 3 Pressure Range 31-42 Bar 455-618 Psi
BS1170 Group Boilers 4 Pressure Range 42-60 Bar 618-880 Psi

Normally: 0.18 litre/tonne of ALKALINITY CONTROLLER will raise PAlkalinity by 100 p.p.m. Proper treatment should normally give a pH between 9.5 and 11. These are recommended limits for levels of treatment. They are not intended to replace either shipping company instructions or boiler manufacturer's policy.

Summary - ALKALINITY CONTROLLER is a part of a coordinated programme of Boiler Water Treatment yielding the basic alkalinity upon which successful boiler water treatment depends.

Ref. No. J100-6810-99-513-9403