

OSAKA BOILER

TECHNICAL INFORMATION

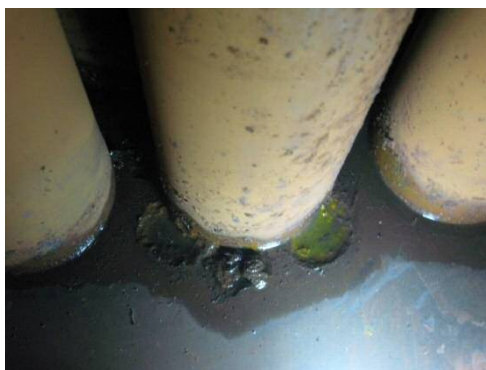
OSAKA BOILER MFG. CO. , LTD.

Water quality control of boiler

【Subject model: Auxiliary Boiler, Composite Boiler, Steam Separating Drum】

Boiler water treatment is very important in order to keep the good boiler condition.

Currently various boiler chemicals are offered commercially. But **never use boiler chemicals containing sodium sulfite**. The handling of sodium sulfite is very difficult. Mishandling of the sodium sulfite generates sulfate ion, leading corrosion like photos below.



Corrosion of lower tube plate caused by sulfate ion



Corrosion of feed water nozzle caused by sulfate ion

Table 1 and 2 show the boiler compound and oxygen scavenger which we are recommending. If other chemicals not described in table 1 and 2 are used, **be sure to confirm to chemical manufacturer that it contains no sodium sulfite**. And we recommend combination use of boiler compound and oxygen scavenger. Regarding oxygen scavenger, we recommend continuous dosing with metering pump.

Table 1: Boiler compound

Manufacturer	Description	Property	Remarks
ASHLAND (DREW)	AGK-100	Liquid	
	ADJUNCT-B GC	Powder Liquid	Use a combination of 2 kinds of chemical.
KURITA WATER INDUSTRIES	KURIBORN 304	Liquid	
NIPPON YUKA KOGYO	YUNICON RS-5	Powder	
	YUNICON RS-40H	Powder	
WILHELMSSEN	ALKALINITY CONTROL HARDNESS CONTROL	Liquid Powder	Use a combination of 2 kinds of chemical.
	ALKALINITY CONTROL HARDNESS TREATMENT	Liquid Liquid	Use a combination of 2 kinds of chemical.
	AUTOTREAT	Liquid	
	BWT LIQUID PLUS	Liquid	

Table 2: Oxygen scavenger

Manufacturer	Description	Property	Main ingredient
ASHLAND (DREW)	AMERZINE	Liquid	N_2H_4 (Hydrazine)
KURITA WATER INDUSTRIES LTD.	OXYNON A702	Liquid	N_2H_4
NIPPON YUKA KOGYO CO., LTD.	YUNIZON-D	Liquid	N_2H_4
WILHELMSSEN	OXYGEN CONTROL	Liquid	N_2H_4
	OXYGEN SCAVENGER 9-002	Liquid	N_2H_4
	OXYGEN SCAVENGER PLUS	Liquid	DEHA (Diethyl hydroxylamine)

Table 3 shows major control items and its purpose to execute boiler water control.

Table 3: Control item for boiler water and its purpose

Control item	Purpose
pH value	<ul style="list-style-type: none"> - Prevention of corrosion - Prevention of scale buildup by hardness and silica - Prevention of oil adhesion to heating surface
Chloride ion concentration	<ul style="list-style-type: none"> - Control of boiler water concentration level (indirect control for total vaporized residue) - Prevention of corrosion - Observation of seawater invasion - Prevention of carry-over
Phosphate ion concentration	<ul style="list-style-type: none"> - Prevention of scale buildup by hardness - pH control by phosphate treatment
Residual hydrazine (Residual DEHA in condensate)	<ul style="list-style-type: none"> - Prevention of corrosion by dissolved oxygen

Table 4 shows standard values for water quality control we define. Regardless of the chemical being used, comply strictly with control items and standard values shown in table 4. Regarding standard value of other control items except for table 4, comply with instruction of its chemical manufacturer. Furthermore, dissolved oxygen in feed water becomes a factor of boiler corrosion, and the dissolved oxygen quantity is bound up with water temperature. Hence be careful so that feed water temperature does not fall below the design temperature, and record it in order to grasp the condition.

Table 4: Standard values of water quality control

	Item	Unit	Makeup water	
			Raw water Softened water	Distilled water
Feed water	pH at 25°C	---	7.0 - 9.0	7.0 - 9.2
	Hardness	ppm as CaCO ₃	1 or less	---
	Salinity	ppm	---	Keep at low level (See *1)
	Oils and fats	ppm	Keep at low level (See *2)	
	Iron	ppm	0.3 or less (See *3)	
Boiler water	pH at 25°C	---	11.0 - 11.8	10.5 - 11.5
	Chloride ion concentration	ppm	100 or less	50 or less
	Phosphate ion concentration	ppm	20 - 100	20 - 40
	Residual hydrazine (Residual DEHA in condensate)	ppm	0.1 - 1.0 (0.12 - 0.30)	

*1: Continuous monitoring

*2: Monitoring with observation tank or feed water filter tank

*3: Monitor when the boiler is unsteady condition
(example: newbuilding, boiler restart or etc)

Note: The above list is prepared based on MESJ 1997 - VOL 32 No. 4

However, "Residual DEHA in condensate" is compliant with EU standard.