

OSAKA BOILER

TECHNICAL INFORMATION

OSAKA BOILER MFG. CO., LTD.

Boiler water control under new shipbuilding in shipyard

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

Initial boiler water treatment under shipbuilding in shipyard is necessary to protect boilers from damage or corrosion of boiler water side. Proper control of boiler water and feedwater will help safety and efficient operation of boilers.

Under shipbuilding, makeup feedwater is normally raw water such as tap water or industrial water. If such raw water is used without treatment, the hardness and silica in raw water become the sources of scale and corrosion in boiler body. Also pitting and rusty water will occur due to oxygen concentration cell. Dissolved oxygen in feedwater may assist the oxygen concentration cell because temperature control of feedwater is not possible during shipbuilding.

The major control items and its purpose to execute boiler water control are shown in the table 1. We recommend to fix those values as shown in the table 2 the standard values for water quality control, or consult with makers of boiler compounds.

Table 1. Control item for boiler water and its purpose

Control item	Purpose
pH value (Acid consumption (pH8.3))	<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 (electrical conductivity)	<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 concentration	<ul style="list-style-type: none"> - Prevention of corrosion by dissolved oxygen
Silica	<ul style="list-style-type: none"> - Prevention of scale buildup by silica

Table 2. Standard values for water quality control

Control item	Pressure	Below 1 MPa	
	Makeup feedwater	Raw water/soft water	Distilled water
Feed water	pH at 25°C	7.0 to 9.0	7.0 to 9.2
	Hardness	Continuous monitoring (1 ppm as CaCO ₃ or less)	---
	Chloride ion concentration	---	Continuous monitoring where needed
	Oily matters	Monitoring of the cascade tank	
	Iron	Monitoring under new shipbuilding or boiler restart (0.3 ppm or less to return to stable condition)	
Boiler water	Treatment system	Alkali treatment	Alkali treatment
	pH at 25°C	11.0 to 11.8	10.5 to 11.5
	Acid consumption (pH8.3)	Properly	---
	Acid consumption (pH4.8)	Properly	---
	Chloride ion concentration	100 ppm or less	50 ppm or less
	Phosphate ion concentration (See *1)	20 to 100 ppm	20 to 40 ppm
	Residual hydrazine concentration	0.1 to 1.0 ppm	0.1 to 1.0 ppm

*1: Measurement not required when using non-phosphate chemicals

Compounds for boiler water treatment mostly contains phosphate series alkali. Using it with oxygen scavenger is recommended.