

**Total Purity Solutions**

## Chemical Cleaning of Boilers

- Obtaining Cost Efficient Fuel Economy

**Ocean Team's combination of know-how and large scale capacity equipment used on sites ensures clients' efficient fuel economy.**

Industry boilers, boilers on FPSO's, and on vessels need an efficient fuel economy, reducing consumption. Deposits may cause blockages or leaks. The Ocean Team solution includes extended boiler durability reducing risk of consequential damages, higher cycles using less resources, and less demanding maintenance of boiler water.

### The Ocean Team Solution Keeps up Efficiency

Too high loads on the system causes i.e. deposits in the steam and condensate system, visually resulting in foam. Corrosion caused by oxygen is also a known issue prevented by keeping alkaline conditions in the boiler. Boiler scales and deposits treated by i.e. phosphate and polymer treatment decreases thermal resistance on furnace wall, lessening fuel consumption.

### Process

Visually inspecting the boiler with cameras kicks off the chemical cleaning process. Additionally, the Ocean Team equipment allows big volumes of liquid to be rinsed on-site. The type of surface contamination determines the chemical circulated in the client's system. Circulating the chemical might happen under heated conditions using the boiler's burner or with a parted flow of waste heat.

### Turn-key Service

Ocean Team is able to deliver a total package deal including cleaning with the suited chemistry, disposal of used chemistry, as well as a follow up trend analysis, and system monitoring.



▲ Exploded Boiler Tube

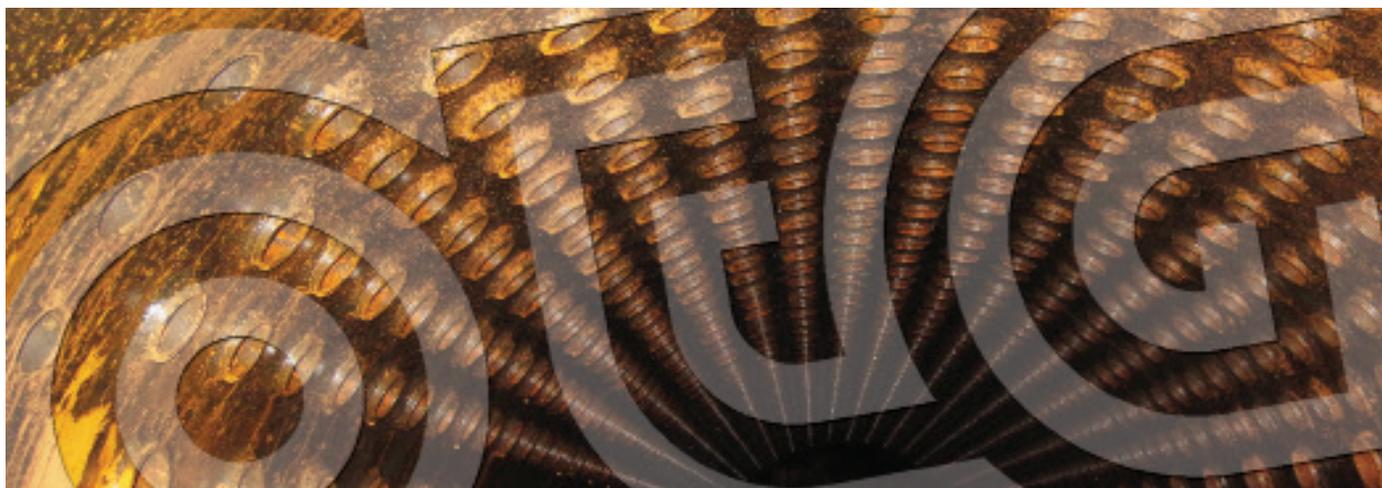


### The Ocean Team Solution

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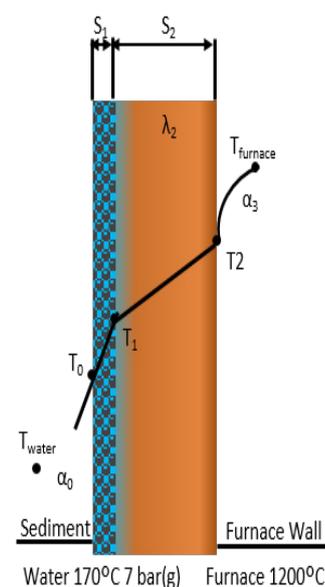
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	No Sediment	2mm Carbonate	0,5 mm Silica	0,5 mm Oil Film
$a_0$ [W/(m <sup>2</sup> x K)]	10,000	10,000	10,000	10,000
$l_1$ [W/(m x K)]	-	7.72	0.172	0.10
$l_2$ [W/(m x K)]	38	38	38	38
$A_3$ [W/(m <sup>2</sup> x K)]	145	145	145	145
$S_1$ [mm]	-	2	0.5	0.5
$S_2$ [mm]	20	20	20	20
$A_{total}$ [W/(m <sup>2</sup> x K)]	133	115	95.8	79.9
$Q$ [kW/m <sup>2</sup> ]	137	119	98.7	82.3
$T_0$ [°C]	-	181.9	179.9	178.2
$T_1$ [°C]	184	320	467	590
$T_2$ [°C]	256	382	519	633

▲ Figure 1:  $T_2$

Source: Anders Sloth, Technical Manager/NDT: LMA2 Inspector, OTG



▲ Figure 2: Boiler Tube

Source: Christopher Thompson

### Consistent Quality

Deposits of fouling substances negatively affect the performance of the process systems by reducing flow, increasing pressure drop, impairing heat transfer, or, in the worst case, causing blockages, corrosion, or leaks. Through many years of experience Ocean Team has built up a unique knowledge of which chemicals to use in particular situations. We are constantly testing new chemicals that are more efficient and environmentally friendly, and we only select the best to be used in our service programs, delivering a consistent quality worldwide.

*If the water side of a furnace wall is fouled with e.g. carbonate, silica, or film, the temperature of the furnace wall increases due to added thermal resistance.*



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