

Demonstration of efficiency by metering steam flow



Steam meters for Boilers

- Measure the cubic meters of steam generated per hour
- Count the total cubic meters of steam produced
- Easy to install
- Easy to calculate the cost of fuel divided by steam produced
- With Ferox we produced 27.56% more steam per unit of fuel



400 hp Cleaver Brooks Boiler in El Salvador

We are authorized distributors of Flowmeter

Table No.1 Bunker fuel consumed and production of steam without Ferox

400Hp Cleaver Brooks Boiler

Date	Gallons of Bunker	Meter Reading	Cubic Meters of Steam	m3/Gallons	Gallons/m3
06/07/09	1189	7,842.25	5,192.86	4.37	0.229
07/07/09	1255	13,035.11	5,274.31	4.20	0.238
08/07/09	1306	18,309.42	5,439.63	4.17	0.240
09/07/09	1329	23,749.05	5,778.16	4.35	0.230
10/07/09	1216	29,527.21	5,246.21	4.31	0.232
11/07/09	1181	34,733.42	5,075.73	4.30	0.233
12/07/09	1209	39,849.15	4,939.54	4.09	0.245
13/07/09	1344	44,788.69	5,755.02	4.28	0.234
Total	10,029.00		42,701.46		
Average	1253.6		5,337.68	4.26	0.235

Observations: To realize this study the boiler was operated 24/7 for a total of 8 days. An effort was made to maintain the same processes and production in order to maintain the same work load throughout the duration of the study. We removed the injector nozzles and took pictures.

Table No.2 Bunker fuel consumed and production of steam with Ferox

400 Hp Cleaver Brooks Boiler

Date	Gallons of Bunker	Meter Reading	Cubic Meters of Steam	m3/Gallons	Gallons/m3
06/07/09	1226	89,384.91	6,317.70	5.15	0.194
07/07/09	1217	95,702.61	6,878.54	5.65	0.177
08/07/09	1149	102,581.15	5,917.35	5.15	0.194
09/07/09	1240	108,498.50	6,829.96	5.51	0.182
10/07/09	1238	115,328.46	6,739.45	5.44	0.184
11/07/09	1180	122,067.91	6,175.74	5.23	0.191
12/07/09	1249	128,243.65	6,943.24	5.56	0.180
13/07/09	1085	135,186.89	6,249.60	5.76	0.174
Total	9,584		52,051.58		
Average	1,198		6,506.45	5.43	0.184

Observations: An adaptation period of 7 days were run with the additive, after which we began monitoring the consumption for an additional 8 days with the boiler working 24/7 trying to maintain the same conditions of the previous study. After the completion we removed the injector nozzles and took pictures. In addition to maintaining clean nozzles we observed a decrease in the exhaust temperature.

Economic Analysis

Yield Comparasions	Bunker consumption without Ferox	Bunker consumption with Ferox	Difference	Percent savings	Dollars Saved
Gallons Consumed	10,029	9,584	(445) gal	4.44%	
Cubic meters of Steam	42,701.46	52,051.58	9,350.12 m3	21.90%	
m3 of Steam/Gallons	4.26	5.43	1.175 m3 per gallon	27.56%	
Gallons/m3 of Steam	0.23	0.18	(0.051) Gallons per m3	21.60%	
Cost per cubic meter of steam	\$0.305	\$0.24	\$ (0.066)	21.60%	
			GROSS SAVINGS		\$3,433.30

Observations: The gross savings is calculated by using the cost per cubic meter of steam to produce 52,051.58 cubic meters of steam. At a cost of \$0.305 (without Ferox) to produce 52,051.58 cubic meters of steam the total cost is \$15,829.50. With a cost of \$0.24 (with Ferox) to produce 52,051.58 cubic meters of steme the total cost is \$12,459.20. The result is a demonstrated gross value of \$3,433.30. Price of bunker fuel was \$1.30 per gallon.

State of the fuel nozzle

Before the use of Ferox in the bunker fuel



Injection kit

Before the use of Ferox in the bunker fuel



Injection nozzle

After the use of Ferox for 8 days

