



Trusted Partners.
Innovative Solutions.



Winner of the CII Innovative
Energy Saving Product.

Boiler House Efficiency Range

Product Portfolio

Maximum Efficiency, Maximum Savings

For over six decades, Forbes Marshall has been building steam engineering and control instrumentation solutions that work for process industry. Today we have evolved into a leader in process efficiency and energy conservation through technology tie-ups and focused investments in manufacturing and research. Our joint ventures with the world's leading names enable us to deliver quality solutions in 14 countries. Forbes Marshall is probably the only company in the world to have extensive expertise in both steam and control instrumentation. The dual expertise has allowed us to engineer industry specific systems that focus on energy efficiency and utilities management for sectors as diverse as steel, process industries, HVAC, paper, power, chemicals and petrochemicals.

Our highly trained professionals have developed innovative solutions and saved millions of dollars in process costs for our clients. Our business practices and processes have combined into a singular philosophy of being trusted partners who provide innovative solutions. It's a philosophy we are proud to live up to.

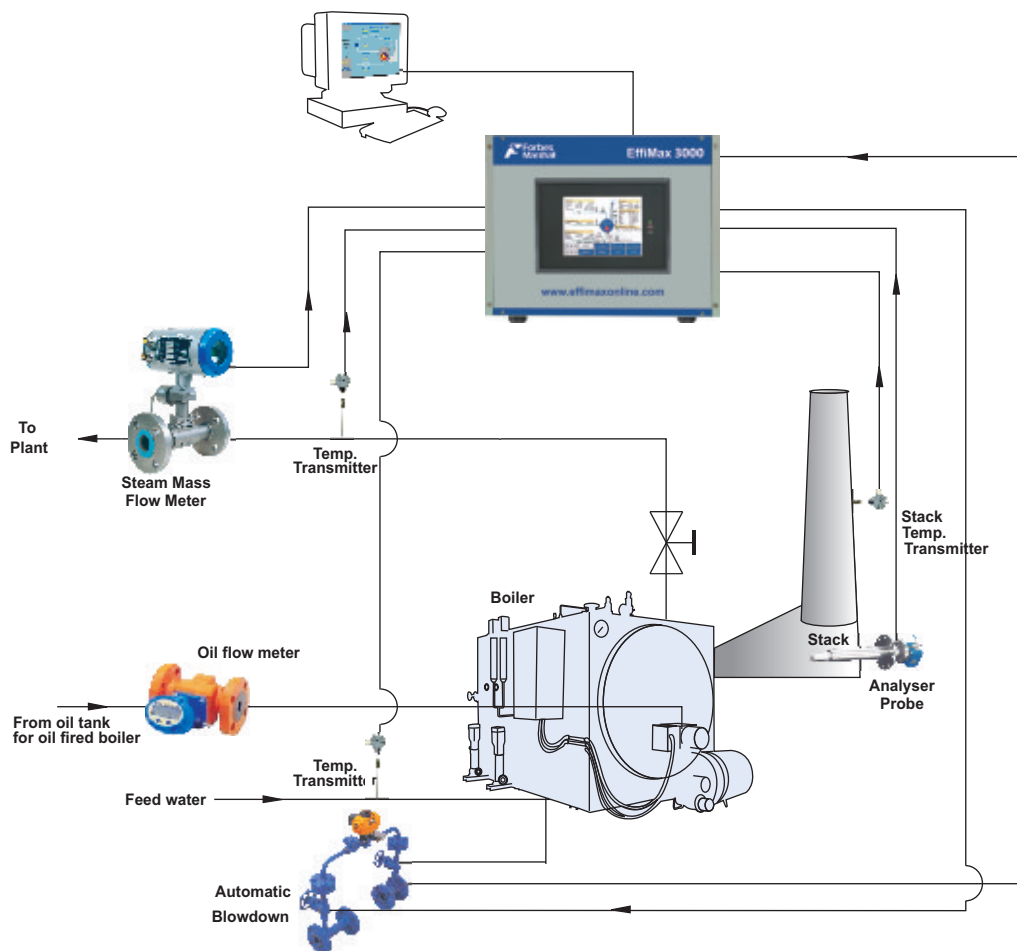
For decades we have been designing, manufacturing and supplying steam engineering products and solutions to customers worldwide. Our experience in this area is the benchmark against which all others are compared. While our oldest venture is with Spirax Sarco, the world leader in steam engineering, our newest joint venture is with Vyncke Energietechnik, the world leaders in converting biomass into energy.

Inefficient Boilers are silently eroding your profits by guzzling more fuel than they should. In absence of realtime "achievable" data, most plants resigned themselves to this belief that they could do nothing more about this.

Not any more!

The range of Effimax Solutions brings back to life the efficiency optimization of Boiler houses. Providing accurate realtime efficiency data, Boiler house operators and managers can look forward to a new way of running boilers!

Lower fuel bills, higher profits, greater plant efficiency. For the first time the benefits of improving the boiler's total efficiency are available in simple, cost-effective packages. No more expensive DCS systems. No more guessing. No more tedious sampling procedures or calculations.



Over hundreds of EffiMax units installed!

Installations in Pharma, Solvent extraction plants, Textile industries, Paper, Chemicals, Rubber, Food, Petrochemicals, Breweries, Bottling plants, Dairies and many more!!

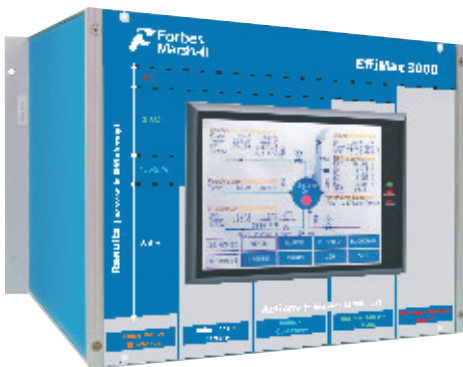
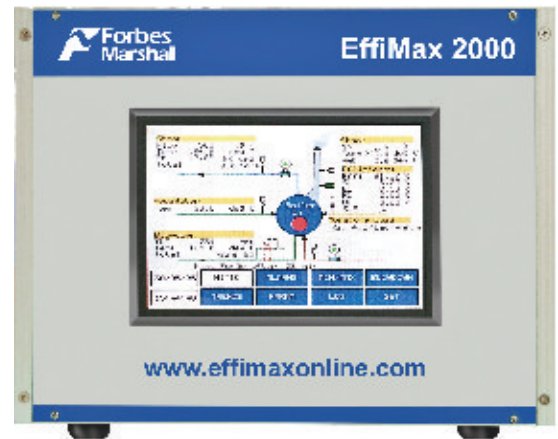


EffiMax 1000

The EffiMax 1000 provides "Real time Efficiency" measurement for the boiler by the Direct Method. This compact system measures the steam and fuel flow, steam and feed water temperature to compute the S:F ratio and Direct Efficiency. Designed keeping in mind the small boiler house, where elaborate instrumentation is not commercially justified, the EffiMax 1000 provides powerful diagnostics through a PC based software where all the parameters are displayed, trended, logged and reported. This system can be used for oil, gas, or FBC boilers.

EffiMax 2000

This first packaged 'Total Boiler Efficiency Monitoring' system incorporates every important parameter into one package: flue gas O₂ levels, stack gas temperature, blow down losses, radiation losses, feed water temperature and density compensated steam flow rate. With these inputs EffiMax calculates the boiler's absolute efficiency in general accordance with British Standard's recommendation BS 845. This calculation is then compared to the boiler manufacturer's stated optimum efficiency to determine overall performance. The EffiMax 2000 can be installed on any type of boiler. The system generates various forms of output like tabular log, graphical representation, alarms and preventive maintenance tips.



EffiMax 3000

EffiMax 3000 provides a unique combination of direct and indirect efficiency measurement in a single instrument. It not only gives the S:F ratio by direct measurement of steam flow and fuel flow, but also computes all the individual losses in the boiler as per BS 845.

The system monitors flue gas O₂ levels, stack gas temperature, blow down losses, radiation losses, feed water temperature, fuel flow measurement and density compensated steam flow rate. The system can be used for oil, gas, or FBC boilers.

EffiMax 4000

In addition to the standard EffiMax 2000, for some specific burners, the EffiMax 4000 also provides auto Oxygen trim control. Please contact us for more specific product details.



BHMS

This powerful diagnostics tool, used along with an EffiMax 3000, has been designed to map all the losses of the boiler house using fundamental energy balance equations. It also has an internal self learning logic to map various boiler operating parameters, which are then used for comparing and improving performance. The calculation of fundamental losses compares the current boiler house efficiency to the theoretical best possible!! The self learning logic studies the boiler and recommends best operating parameters specific to the boiler!

BevMax - for the beverage industry

BevMax is a unique fuel management and diagnostic solution, especially designed for the Beverage Industry. In a typical Beverage Industry production process, Beverage:Fuel ratio depends on many parameters like, Boiler performance, Steam utilization, Condensate recovery and also on the capacity utilization.

BevMax provides an effective monitoring tool to capture data that can lead to effective management of the thermal energy consumption of the beverage plant. The system measures the performance of the oil and gas fired boilers in terms of two critical parameters, thermal efficiency and Steam:Fuel ratio. It also calculates the condensate being recovered from different sections. Based on this data, the Beverage:Fuel ratio is calculated, which acts as a base for comparing overall production efficiency with the world standards.



BrewMax - For the brewery industry



The BrewMax is specifically designed for the Brew Industry.

The performance (i.e. energy efficiency), of any brewery is measured in terms of the Brew:Fuel ratio. The major parameters that affect this ratio are the boiler performance, condensate recovery factor, plant capacity utilization pattern, etc. BrewMax measures all these parameters to provide the overall thermal energy consumption of the plant and the Brew:Fuel ratio. This data is a useful tool in assessing the energy efficiency of the unit in terms of an overall metric - the Brew:Fuel Ratio. The intelligent data analysis module is incorporated within the PC based BrewMax Software to generate various reports in tabular, graphical formats for further analysis.

Boiler Load Management.

The BLM is designed for managing the load on individual boilers in a boiler house depending on the total plant steam load. The product can be used along with an EffiMax 2000/3000/4000 or for boilers without individual EffiMax units.

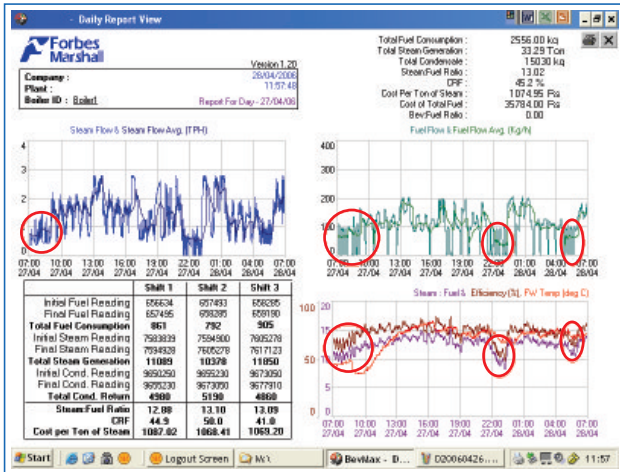
The primary objective is to operate individual boilers in a manner so that the required amount of steam is supplied to the process with a minimum pressure drop during load changes.

The BLM also tries to sequence the boilers in such a way so that the overall generation efficiency is optimized.

The unit accepts a steam flow, steam pressure and boiler On/Off signal from individual boilers in a boiler house. It also takes inputs from boilers with individual EffiMax units installed, if any. The BLM provides potential free On/Off contacts for the connected boilers for switching the boilers On/Off depending upon the total steam load.

Real-Time Diagnostics -The way to go

All the boiler efficiency products generate data critical for reducing fuel consumption and also keep a check on the process itself. Here are a few examples of how reports generated are helpful in fine tuning the boiler and also making energy conservation decisions.

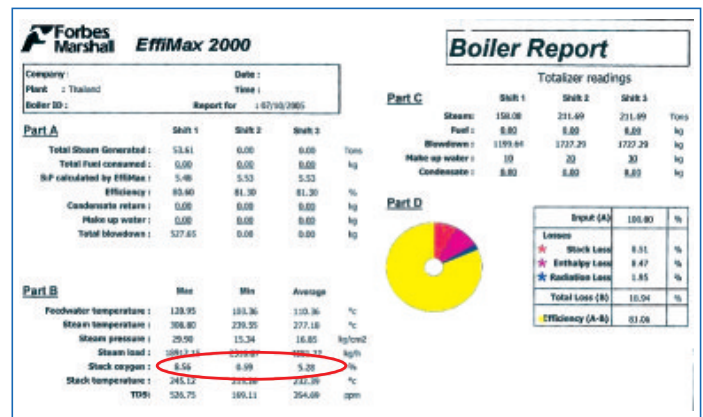


The fuel flow rate indicates the actual fuel consumption. It also indicates boiler on-off cycles. These cycles, if too frequent, lead to substantial increase in fuel consumption. This graph, from a customer's site, shows the S:F drop down to 10 from 12.5 because of these on-off cycles. This means 25% excess fuel consumption!

Under such conditions, operating the burner on low fire always will save fuel.

Also, as the peak load never crosses 75% boiler capacity, a lower size nozzle can be used for firing.

The powerful summary report generated by EffiMax 2000 gives the overall boiler performance at a glance. As is seen in the report attached, although the average oxygen in stack is 5.3, it has even dropped down to as low as 0.6 and as high as 8.6. This clearly indicates improper burner tuning which may not get highlighted by spot checks. The oxygen graph can then be correlated to steam load graph to find out the loads where the burner operation is in efficient.

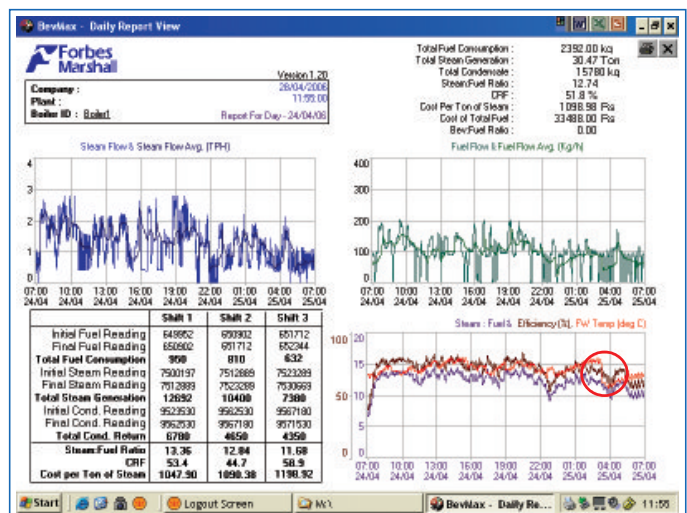


The accompanying screen shows the S:F, Efficiency and stack oxygen at different loads of the boiler. As can be seen at 50, 60 and 70%, the S:F and Efficiency at 60% load is better than 50 or 70% load. Also, the oxygen is lowest, about 3%, at 60% load. This data directly shows that the burner should be tuned at 3% and the benefits are evident from the drop efficiency at other loads.



The accompanying daily report shows a sudden drop in the feed water temperature. This is because the feed water tank is over sized and the temperature drops as soon as the makeup water pump is started.

Looking at the average steam flow from the same report, the level settings on the tank pump can be reduced to maintain steady feed water temperature and hence good S:F and Efficiency. Feed water temperature also indicates process health because of condensate return and increase or decrease due to trap leakages or malfunction.



Some EffiMax users

EffiMax is a versatile product suited for all types of boilers with different capacities and fuel. EffiMax is recommended for all industries that are steam users. The ever growing EffiMax installed base includes organisations like:

Customer	Location	Industry
P&G	Thailand	Pharma
DRL	Hyderabad (India)	
Biocon	Bangalore (India)	
Zydus Cadila	Ahmedabad (India)	
Ranbaxy	Chandigarh (India)	
Novartis	Mumbai, Goa (India)	
J & J	Mumbai (India)	
Nanyang	Thailand	Textile
Cosmopolitan	Bangladesh	
Load Star	Sri Lanka	
Ocean Lanka	Sri Lanka	
Colour Plus	Chennai (India)	
Raymond	Nagpur, Thane (India)	
Modern Terry Towels	Ahmedabad (India)	Chemicals
Pure Chem	Thailand	
Pan Century	Malaysia	
Lubrizol	Mumbai (India)	
Camlin	Mumbai (India)	
Asian Paints	Delhi (India)	
Godrej	Baroda (India)	
Finolex Cables	Pune (India)	SEP
Cho Heng Rice	Thailand	
Sushil Vanaspati	Sri Lanka	
Hemraj Oils	Kolkata (India)	
Amrit Banaspati	Chandigarh (India)	
Dairy Plus	Thailand	Food
Nestle	Sri Lanka, Delhi (India)	
Dabur	Delhi, Kolkata (India)	
Haldiram	Delhi, Nagpur (India)	
Godrej Agrovat	Hyderabad (India)	
NDDDB	Jaipur (India)	
Doodhsagar dairy	Ahmedabad (India)	
Nile Breweries	Uganda	Brewery
Fosters	Aurangabad (India)	
UB	Mumbai, Bangalore, Daruvada, Hyderabad (India)	
Seagram	Nasik (India)	
ITC	Saharanpur, Munger, Bangalore, Haridwar (India)	Tobacco
Hindustan Coca Cola	Pune, Delhi, Ahmedabad, Mumbai, Bhopal (India)	Beverage
Taj Coramandel	Chennai (India)	Hotel
Maurya Sheraton	Delhi (India)	Tyre
Goodyear	Thailand	
Apollo Tyres	Coimbatore, Baroda (India)	
Hero Honda	Baroda, Delhi (India)	Automobile

Your local Forbes Marshall representative would be happy to provide you with further information and support.



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