

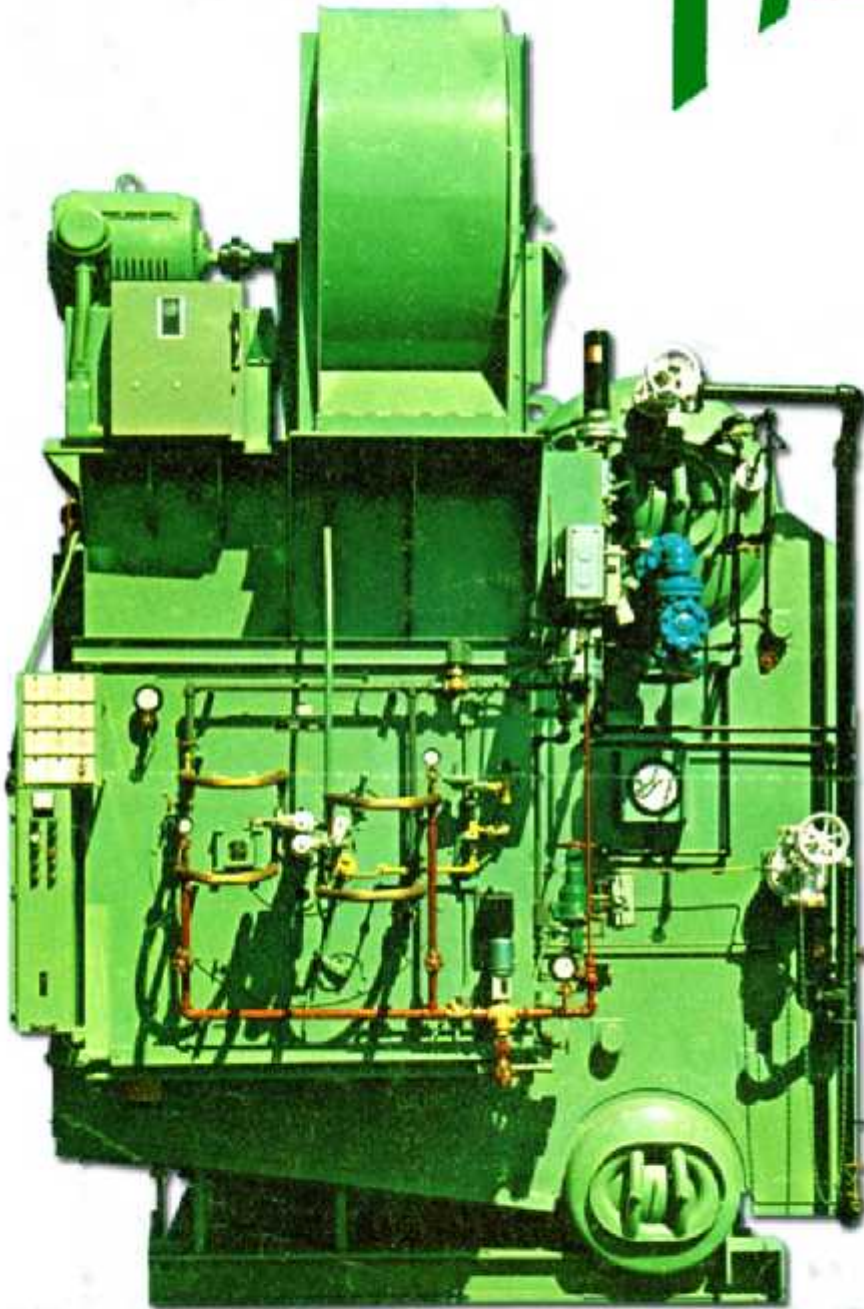
ADVANTAGE GUARANTEED

**GRESHAM'S**

⚡ ⚙️ ⚙️ ⚙️ THE ENERGY-ENVIRO SPECIALISTS

Boiler manufacturer  
since 1971

**KEELER-**  
Gresham



ESTABLISHED 1864  
**E. KEELER COMPANY**  
WILLIAMSPORT, PA.

**packaged watertube steam generators**

ADVANTAGE  GUARANTEED

# GRESHAM'S

    THE ENERGY-ENVIRO SPECIALISTS

## THE GRESHAM'S STORY

Gresham's started boiler manufacturing in 1971 in an association with Karachi Shipyard & Engineering Works Limited as a pioneering project for Pakistan. To date, we have manufactured over 1200 boilers of various designs for customers ranging from food processors to power plant boilers. We have been the first in Co-Generation and EPC Projects. Notable installations include the Finance & Trade Centre at Karachi, The MCB Towers, the SNGPL Head Office Building and many others.

Gresham's Boilers exported to France, Italy, Algeria, Iraq, UAE, Saudi Arabia, Sri Lanka, Bangladesh, Myanmar and Afghanistan are a testimony of our quality.

## Quality Inspiration.

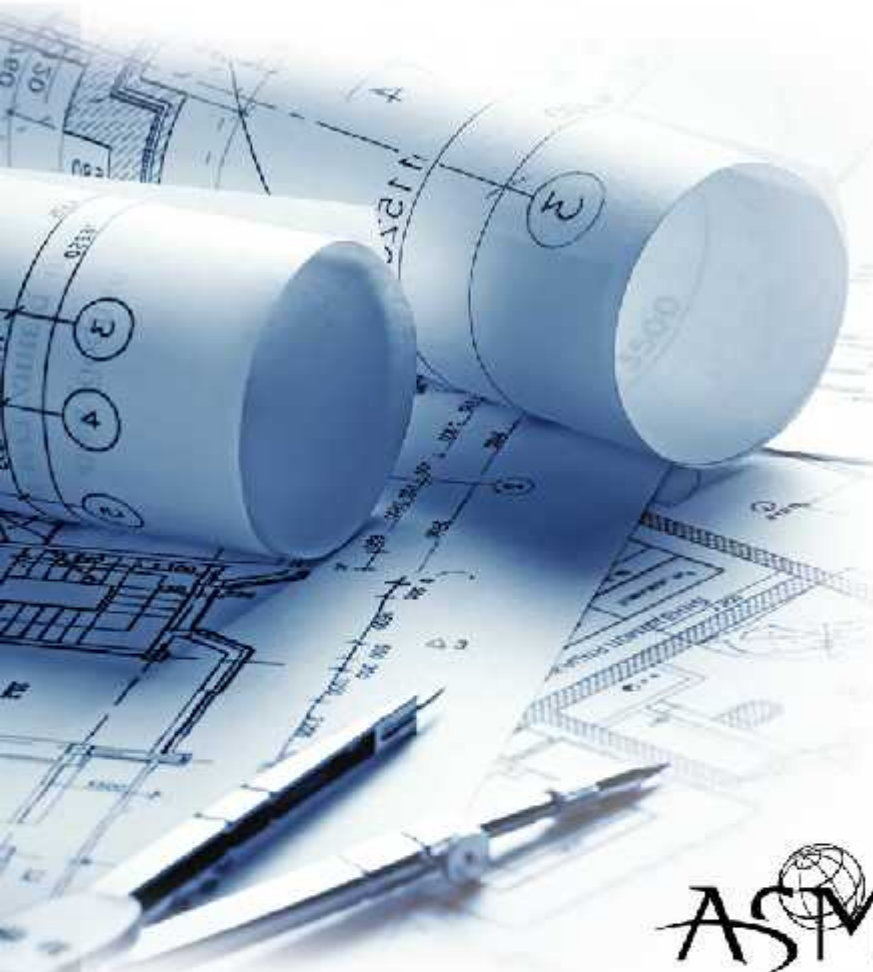


William Edwards Deming was an American engineer, statistician, professor, author, lecturer, Quality Expert. Mr. Deming inspired Toyota to quality manufacture in 1954.

Boilers of Firetube, Watertube, Forced circulation Steam Generators, Waste Heat Recovery Units, Power plant boilers, Thermic oil Boilers, Hot air generators, RO & Water Treatment Plants, Heat Exchangers, Equipment for oil and gas industries, Portable accommodation systems, Filtration Plants are manufactured under licence agreements from world renowned brands such as Powermaster, Keeler, Wanson, Ygnis, Alpha boilers to give you a highly engineered, safe & efficient products built to ASME Standards and inspected by Germanischer Lloyd, TÜV, SGS.

In 1982 we originated the idea of energy conservation and were behind the Boilers in Pakistan study done by the Ministry of Production which study led to the creation of ENERCON.

**Gresham's** – dedicated to boiler manufacture since 1971. – commitment to energy conservation. – commitment to deliver a safe reliable product.



ASME Codes used for manufacturing all Boilers.







**Mr. Leo Prellwitz**

## **A Watertube Boiler Range originating from E.Keeler Co.USA..**

Back in 1864, Mr.Wilcox parted ways with his partner Mr.Babcock ( Babcock & Wilcox ). And started a new boiler company in the name of his niece Edwina Keeler E.Keeler Company.

Gresham's owes gratitude to ICI Pakistan who afforded an opportunity to manufacture 4 Units Keeler watertube boilers,now in their 36th year of operation. Recently ICI procured another 25 TPH High Pressure unit for their expansion project needs.

Guidance and design modifications of the Keeler Boiler by Mr.L.W.Prellwitz of AEG KANIS,Germany to membrane wall completely water-cooled front and rear walls has resulted in a superior modern design of the old,tried and trusted "D" Drum design.

Gresham's extensive experience of over 36 years in Watertube Boilers allows us the flexibility to easily meet diverse project requirements of anything from a large Field Erected 250 TPH knockdown boiler steam island to 75 TPH packaged steam boilers with properly sized quality auxiliaries to match your needs with exacting Engineering standards complying with ASME or PED requirements,with CE or ASME stamp.



**Export to Algeria**

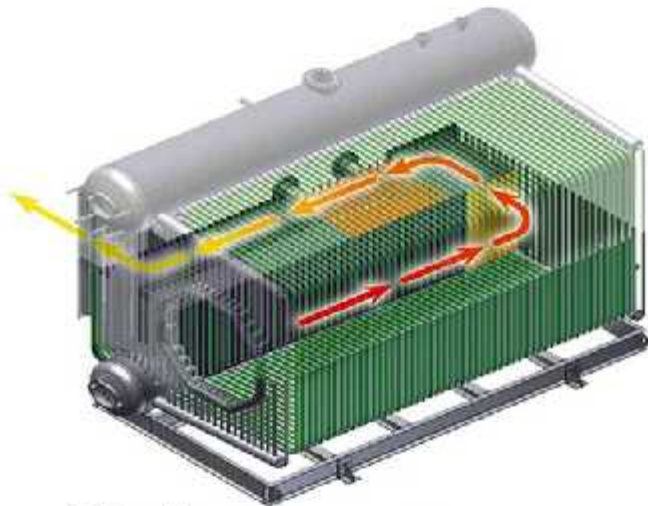
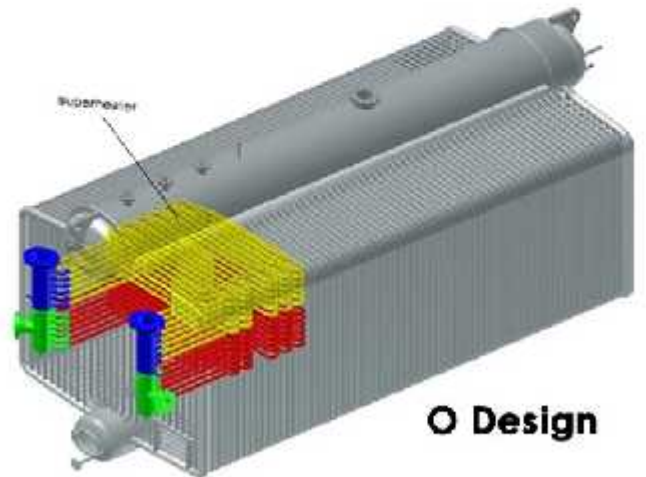


**45tph 50bar 475c boiler for Bangladesh**

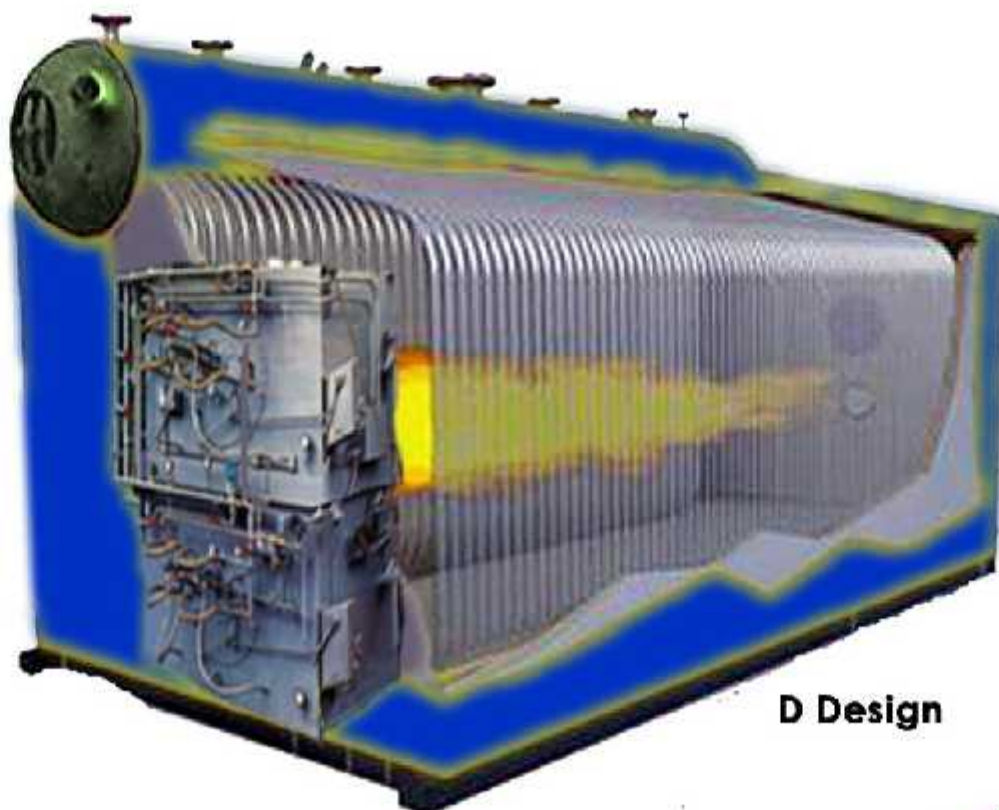
## Broad capacity and design range

Gresham's water-tube package boilers are available for  
furnace oil (#6),  
high diesel (#2),  
natural gas firing.

- Steam flow: 4 tons/Hr. to 100 tons/Hr.
  - Superheat temperatures upto to 475 C.
  - Design pressure from 10.3 to 115 Bar (g)
- Higher capacities are available.



**D Design**



**D Design**



**World class features:**

1. Total Gas Tight Membrane wall construction eliminates refractory and its attendant maintenance and eliminates dew-point sulfur corrosion and outage caused by gas leaks. Gresham's membrane walls use large diameter tube and small membrane spacing providing best combination of heat transfer efficiency and maintenance accessibility. Water cooled scalloped seal plates as illustrated on the membrane design provides gas-tight seal between the drums.
2. Ribbed Outer steel Insulation covers are galvanized primed and painted making it weather tight for outdoor installation.
3. With two type of Drum internals to choose from, high steam purity and positive circulation is ensured with outlet steam purity ranging between 1 ppm to 0.002 ppm required for power generation.
4. Water wash troughs and drains are standard on every package Boiler.
5. Effectively located Manual or Automatic Soot blowers clean superheaters, convection banks rear and front water walls from soot or grit regardless of fuels fired.
6. Tube Replacements on the Generating and Convection Banks are on narrow/wide spacing design permitting easy individual tube removal.

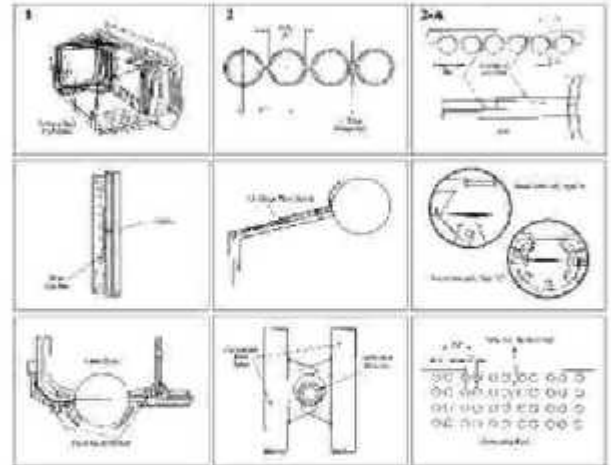
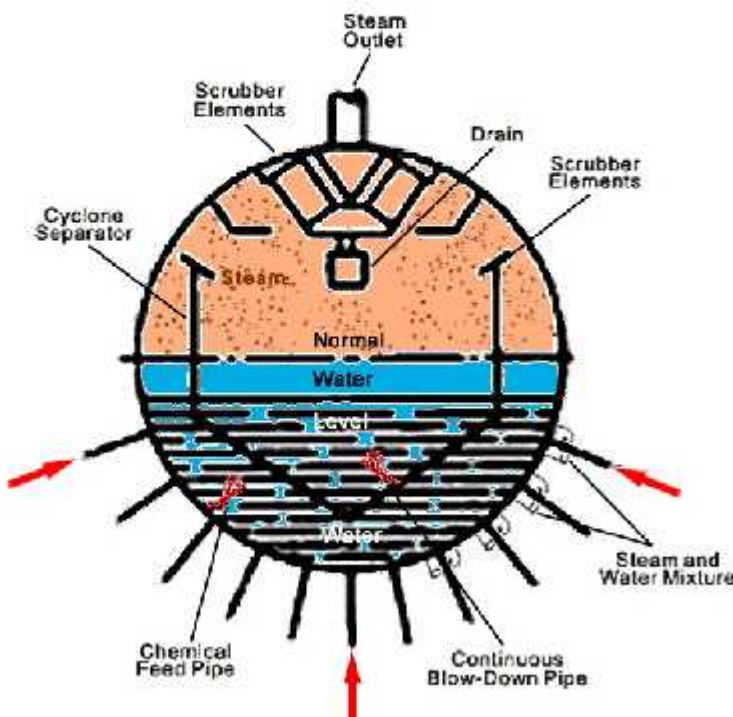


Figure 2-A

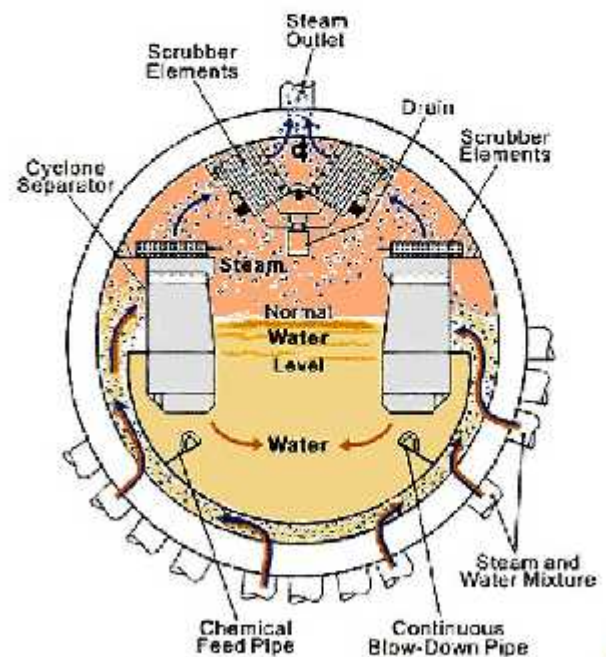
**Energy Efficient Design**

- 100% membrane wall construction.
- ceramic fibre heat insulation
- 75mm/125 kg. density rockwool insulation.
- 14 ga. galvanised cover.

Figure 2-B



Drum Internal 1



Drum Internal 2



1. Water Cooled Furnace front and rear wall eliminate refractory. Each rear wall tube is a single flow path between drums to assure proper circulation and cooling.
2. Gas-tight setting membrane provides full gas tight setting eliminating dew-point sulfur corrosion and outage caused by gas leaks.
3. Membrane panels use large diameter tube and small membrane spacing providing best combination of heat transfer efficiency and maintenance accessibility.
4. Scalloped seal plates (illustration 2-A) on the membrane design also provide a continuous gas-tight seal between the tube membrane and drums.
5. Wherever inner cased construction is used a 10-gauge plate is welded to the bars instead of directly to the pressure parts (shown in 2-B).
6. Outer steel lagging is galvanized primed and painted making it weather-tight for outdoor installation. The 14-gauge roof casing also provide a surface strong enough to walk on.
7. Drum internals provide high steam purity and ensure positive circulation There are two primary steam separators to choose from-a baffle type for 1 ppm solids or an optional cyclone-type for 0.1 ppm solids Both designs incorporate corrugated-type secondary scrubbers Dry pipe steam separation also is available for 0.005 moisture steam for steam turbine quality.
8. Water wash troughs and drains are standard on every new package Boiler.
9. Soot blowers are properly located for effective convection bank cleaning. Soot blower bearing wall box and tube opening are standard on all package boilers on oil Boilers.
10. Alternating front to-rear bank wide narrow spacing allows removal of any tube if necessary.



## Features:

01. Steam drum
02. Water Drum.
03. Outer furnace membrane wall tubes.
04. Inner furnace membrane tubes.
05. Convector membrane wall tubes.
06. Boiler Tubes.
07. Rear wall target tubes.
08. Steam outer
09. Steam separator
10. Steam Drum internals
11. Manway at ends of both drums
12. Blowoff connection
13. Soot blower
14. Structural steel base
15. Steel Casing
16. Insulation
17. High temperature plastic refractory
18. Burner throat
19. Flue gas outlet
20. Insulated Steam Drum
21. Furnace access door
22. Observation ports
23. PLC based control system
24. Faber design register burners with low noise fans.







## ControMax (Boiler Management System)

**A PLC based system for visualization & control of all boiler parameters.**

- Burner management system with integrated burner operations system including flamer failure system in compliance with EN298 & EN1646.
- Boiler control system.
- (Human machine interface, with high definition, touch screen control panel).
- Flame protection gas valve proving system (VPS).
- Inline oxygen monitoring system with micro modulation to EN 12067/2.
- Boiler water with field installed magnetic level system.
- Control management of inverter for the fan & feed pumps to achieve maximum energy savings.
- Heat exhaust gas management.
- RJ45 ports for remote control & supervision.
- Data recoding alerts & notification via GPRS/internet.
- Water & fuel consumption with related steam production & efficiency indicator cost of steam.
- Communication to SCADA & DCS systems via MODBUS or PROFIBUS.

## Effimax (Fuel Efficiency System)

### BOILER O<sub>2</sub> % INDICATOR AND CONTROLLER

Combustion Efficiency is a vital objective for optimal fuel use in a boiler. The essential components of combustion:

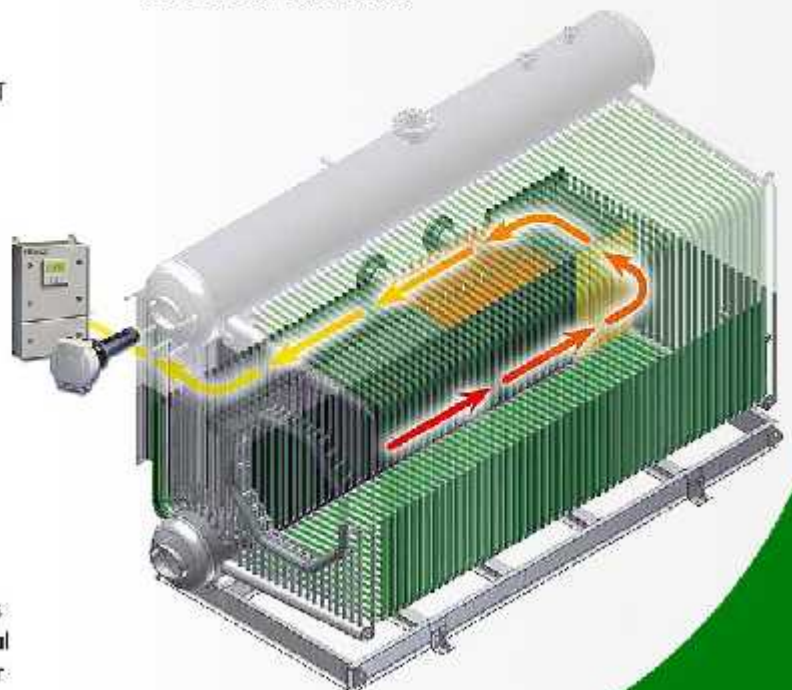
- Fuel
- Air

During combustion fuel reacts with Oxygen to release heat. Pure Oxygen is rarely used for combustion. Air contains about 21 % Oxygen and 79% Nitrogen by volume. If the burning is complete then the products generated will be nothing but Carbon Dioxide, Water and Nitrogen.

In reality, to achieve optimal combustion requires excess Air.. because burners cannot mix fuel and air perfectly. Too little will cause poor combustion and Carbon Monoxide generation. Too much means nitrogen has been heated thus wasting fuel. The RIGHT ratio is important for high efficiency.

### MAXIMIZING EFFICIENCY BY CONTROLLING EXCESS AIR

The widely accepted practice for determining and maintaining correct amount of excess air has been flue gas analysis in boilers and process equipment. Development of Oxygen flue gas monitor has resulted in determining oxygen concentration in excess air leaving stack. Zirconia cells are now commonly used for continuous monitoring of flue gases, essential if correct adjustments of excess air is to be achieved. The voltage created by the Oxygen partial pressure differential is carried down to the length of the probe and through inter connecting cable to our electronics enclosure where it is conditioned in to an output signal suitable for a control system. It is used for control of air for combustion input.



## Stringent quality standards:

1. Designed & manufactured to ASME boiler and pressure vessel code and ABMA (American Boiler Manufacturer Association) guidelines. Construction to PED, British & Japanese code is optional.

2. Independent international third party inspection by reputable agencies including: SGS, Switzerland, ABS, USA.FM/TUV/BV, Germanischer Loyds, Germany.

3. Consistency and quality boiler through Gresham's quality management systems GQUAL-designed to ISO 9000 standards.

4. Standard in-house quality assurance tests include:

Design & Materials vetting services from ASME Consultants in Europe/USA.

Manufacturing & quality control inspection during all stages of construction including:

Radiographic examination, ultrasonic testing, hydrostatic testing, magnetic particle testing, dye penetrant examination, stress annealing & in-house performance appraisal.



## Specimen Certificate

Fabrication Certificate		Germanischer Lloyd Oil and Gas
4772-06-0117-28/16 NH O Certificate No. 0117-0016-16		GERMANISCHER LLOYD
<b>Water Tube Boiler K- 18 Fabrication of Steam and Mud Drums</b>		
Buyer:	Steam Drum 1 No Mud Drum 1 No	
Client/Operator:	Abul Kalam Ch. Cochin Mill Chennai, Bangalore	
Manufacturer:	Gresham's Industries Private Limited Kumbakonam, Tamil Nadu	
Drawing:	MS-4011010	
<p>This is to certify that the Steam and Mud Drums of the Water Tube Boiler, Serial No. 18 have been fabricated in accordance with the ASME Boiler and Pressure Vessel Code, Section VIII, Division 1, Subsection NB. The Steam and Mud Drums have been built in accordance with drawings issued by Chief Inspector of Boilers, Government of South India, dated 19-04-2005.</p> <p>From a classification point of view there are no deviations for approval of the Steam and Mud Drums.</p>		
Dated: 12 <sup>th</sup> June 2006	Inspector	  M. J. J. J. J. J.
<p><small>The Bureau of Indian Standards (BIS) is the national standards body of India. It is the only organization in India that is a member of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC). It is also a member of the International Union of Pure and Applied Chemistry (IUPAC) and the International Union of Pure and Applied Physics (IUPAP). It is also a member of the International Union of Pure and Applied Mathematics (IUPM) and the International Union of Pure and Applied Biology (IUPAB). It is also a member of the International Union of Pure and Applied Geology (IUPG) and the International Union of Pure and Applied Botany (IUPB). It is also a member of the International Union of Pure and Applied Astronomy (IUPA) and the International Union of Pure and Applied Earth Sciences (IUPES).</small></p>		



## Dependable performance for 36 Years.

Gresham's water-tube boilers continue tradition of excellence with our established reputation for reliability and proven performance is continually enhanced by incorporating the latest technological advancements into our design. We are committed to the water-tube package boiler market, which is comprised of industrial and institutional markets such as:

- Hospital
- Universities
- Manufacturing and processing facilities
- Utilities
- Petrochemical
- Pulp and paper





## A world class design

From Karachi to the Khyber Pass, and across the world, an indication of our acceptance is the large number of prestigious installations. Following are a few selected over five continents.

### In Pakistan

Finance & Trade Center Building Pakistan  
 National Textiles Liberty Textile Mills, Evian Fats &  
 Oils, CPC Rafhan, ICI, United Sugar Mills,  
 Mirpurkhas sugar Mills, Pakistan Ordinance  
 Factories, BYCO Refinery, Liberty Mills.....



**FTC**



**IFFCO**



### Around The World

Union Carbide, Ford Motor Company, China state University, Chrysler company, Procter & Gamble, International Paper Company, Bethlehem Steel, Dow Chemical Company, International Business Machine, University of Virginia, Carnation Milk Co Minnesota Mining Company, Radio Corporation Company, Engle Hard Industries American Brahe Steel Company.

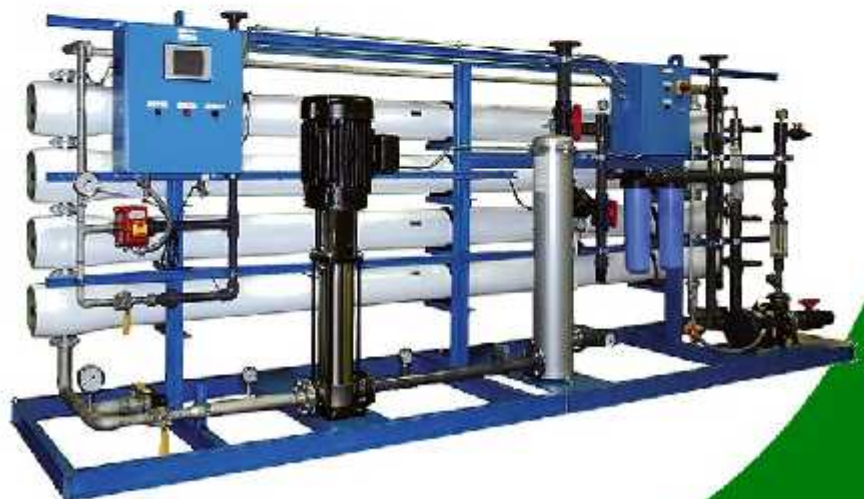
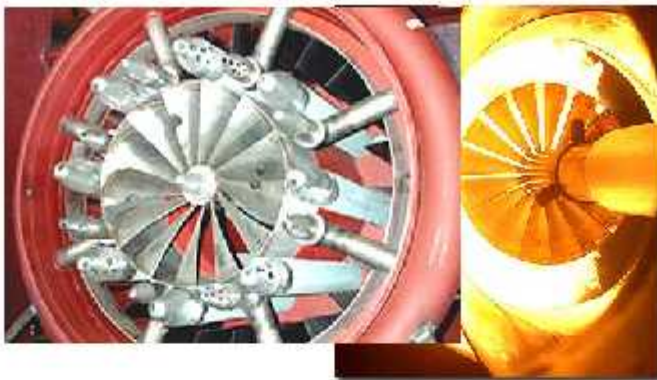
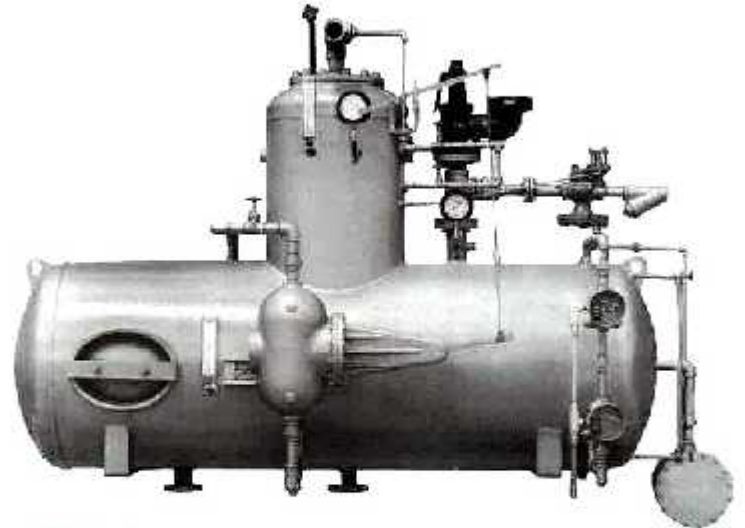
**and many many more**



## Reliable single-source supplier

Gresham's proven expertise in boilers, burners and controls makes us a reliable and responsive single source for packaged boilers and auxiliary equipment. From system engineering and manufacture to start-up and operations, our knowhow makes it all work together for maximum operating efficiency and dependability, and in compliance with environmental regulations.

- Water Treatment Systems
- Feed water Systems
- Blowdown systems
- Instrumentation
- Stacks
- Economizers/condensing economisers/Air heaters.
- Deaerator Systems/Dosing systems.





## Keeler Gresham's Boilers Warranty:

**Gresham's** warrants the Pressure Vessels, appurtenances, headers, super heaters, economisers of its watertube boilers for 10 years from the date of commissioning or delivery, whichever is earlier, from any design, material or workmanship defects and will repair, replace free of cost such work to the original owner when such defects are certified as such by Third Party Inspection Agency such as:

Germanischer Lloyds, Lloyds Register Industrial Services, SGS, Bureau Veritas etc..and when such defects do not originate from water quality which exceeds ABMA Water Quality Standards for boilers and includes water level concentrations within the boiler to specified level.