

CAPITAL COST DIFFERENCE BETWEEN CONVENTIONAL BIOMASS STEAM BOILERS AND BIOMASS THERMAL OIL HEATERS INSTALLED AT HARTALEGA

<u>Constants</u>	<u>Unit</u>	<u>Value</u>	
Forex USD to RM	-	3.80	
<u>MechMar Steam Boiler</u>	<u>Unit</u>	<u>Value</u>	<u>Reference</u>
Steam boiler capacity (steam output)	kg/hr	40,000.00	MechMar "Bi-Drum Water Tube Boiler for Biomass Burning" catalogue
Equivalent heat output	MW	27.90	MechMar "Bi-Drum Water Tube Boiler for Biomass Burning" catalogue
Capital cost	RM	3,800,000.00	MechMar budgetary quotation reference HL/5703/10/07/SMK dated 4/10/2007
<u>Vyncke Thermal Oil Heaters</u>	<u>Unit</u>	<u>Value</u>	<u>Reference</u>
Heat output	MW	25.60	Project Design Document
Capital cost of boilers 1 and 2	USD	1,818,000.00	Agreement - "a 15Gcal/hr VYNCKE thermal oil heater plant on palm fruit waste" dated 8th Feb. 2002
Capital cost of boilers 1 and 2	RM	6,908,400.00	
Capital cost of boiler 3	USD	1,075,000.00	Agreement signed between Hartalega and Vyncke dated 6th Oct. 2004
Capital cost of boiler 3	RM	4,085,000.00	
Total capital cost for phase 1	RM	10,993,400.00	
<u>CONCLUSION</u>			
Ratio capital cost thermal oil heater / biomass steam boiler		2.89	

Our ref: HL/5703/10/07/SMK

Date: 4th October 2007

HARALEGA SDN. BHD
7, Kawasan Perusahaan Suria,
45600 Batang Berjuntai,
Selangor Darul Ehsan,
Malaysia.
Tel: 3271 0277
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Attn: **Mr M.L. Kuan**

Dear Sir,

RE: MECHMAR WATER TUBE STEAM BOILER 40,000 KG/HR

With refer to the above, appended our budgetary price for your perusal.

To supply, delivery, install, testing & commissioning (site: within Selangor, Malaysia)

- 1) BD 40mt/hr @ 300 psig Water Tube Steam Boiler (Fuel: palm shell)
 - 1 lot of standard Boiler Mountings
 - 1 no. Electrical + 1 no. Steam driven Feedwater Pumps
 - 1 set Dust Collector
 - 1 no. Mild Steel Chimney (100'H)
 - 1 complete set of Fans c/w ducting
 - Type Feedwater Control: 3 element
 - Type of Soot Blower: Sonic
 - Type of Grate: Reciprocating Step Grate
 - 1 no. Control Panel
 - 1 lot platform, ladder & gallery.

Budgetary price – RM 3,800,000.00

Exclude:

- Fuel Storage & Feeding system
- Ash Handling & Discharge system
- Feedwater treatment plant
- Incoming electrical, water & compressed air supply
- Steam piping to process
- Utilities during installation, testing & commissioning
- Civil/RC & building work
- Anything not mentioned in the above.

Thank you.

Yours faithfully,
MECHMAR COCHRAN BOILERS (M) SDN BHD



Kok Sook Meng
Commercial Manager

MECHMAR
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BI-DRUM WATER TUBE BOILER FOR BIOMASS BURNING



TITAN BD



MECHMAR BOILERS SDN BHD a wholly owned subsidiary of **MECHMAR CORPORATION (M) BERHAD**, the market leader in Malaysia for boiler manufacturing achieved yet another milestone with the award of ISO 9001 certification by Lloyd's Register of Quality Assurance making it the first boiler manufacturing company in Malaysia to obtain this recognition.

With Lloyd's Class I certification for its product and ISO 9002 certification for its quality management system, **MECHMAR BOILERS SDN BHD** is now among the elite group of boiler manufacturing company in the world. For its high quality workmanship and consistency in quality, **MECHMAR BOILERS SDN BHD** is already a holder of CLASS I fabricator license for pressure vessel manufacturing from Lloyd's Register of Shipping since 1985.

MECHMAR BOILERS SDN BHD started operation at Lot 14, Jalan Timah, Free Zone Industrial Estate, Johore in 1977 and to date have produced more than 3000 units of boilers ranging from 500 to to above 132,000 lb capacity of steam per hour. It also manufactures Hot Water Boilers, Thermal Fluid Heaters and other pressure vessel.

The products are developed and marketed by **MECHMAR COCHRAN BOILERS (M) SDN BHD** another wholly owned subsidiary of **MECHMAR CORPORATION (M) BHD**.

MECHMAR COCHRAN BOILERS (M) SDN BHD markets a wide range of boilers, thermal oil heaters, steam plant and power plant installation. It operates from offices and service centres in Shah Alam, Johore and Penang to ensure excellent after sales service and prompt supply of spares.



BI-DRUM BOILER

Titan BI-DRUM Water Tube Boiler



A MEDIUM TO LARGE SIZE, NATURALLY CIRCULATED FIELD ERECTED WATER TUBE BOILER, SPECIFICALLY DESIGNED FOR HIGH MOISTURE SOLID WASTE FIRING. DESIGNED AND CALCULATED CONSERVATIVELY TO MEET INCREASED RELIABILITY, OPTIMUM FUEL ECONOMY, LONG LIFE AND LOW MAINTENANCE COST. FLEXIBLE TO ACCOMMODATE HIGH FLUCTUATING LOADS AND SOLID WASTE PROPERTIES.

BOILER CIRCULATION

The boiler water flows from the steam drum via designated downcomer tubes into the lower drum. Downcomers are in the coldest part of gas passage and last tube row is covered by insulating material. The boiler water flows from the drums to furnace front and side headers and to the rest of convection bank riser tubes. External downcomers are also mounted.

Large volume of boiler water contained in the boiler assembly allows the boiler to respond to fluctuating steam demands. Baffling arrangement and steam/water separator inside the steam drum guarantee a good steam quality.

STEAM DRUM INTERNALS

Mechmar offers a 3-stage approach to achieving maximum steam purity. Steam is directed by baffling into cyclone separators and apply it to separating water from steam. Steam rises and flows through chevron scrubbers where residual water droplets or condensate clinging to the scrubber plates, collect and return to drum water.

The end result is steam of excellent quality and high purity up to 99.5% dry.