

LEADERSHIP IN PROCESS HEAT



Revotherm

FULLY PACKAGED 3 PASS STEAM BOILERS



Revotherm : Redefining energy efficiency

For your plant's heating requirements, Thermax presents Revotherm, the energy-efficient three pass Reverse Flue boiler. This smoke tube packaged shell boiler with its fully wet back design can be fired on light / heavy oil and gaseous fuels. Its unique principles of flue gas reversal in the furnace, and spiral agitators in the convective region make its operations entirely efficient.

Manifold Benefits

Revotherm offers several benefits over conventional shell boilers:

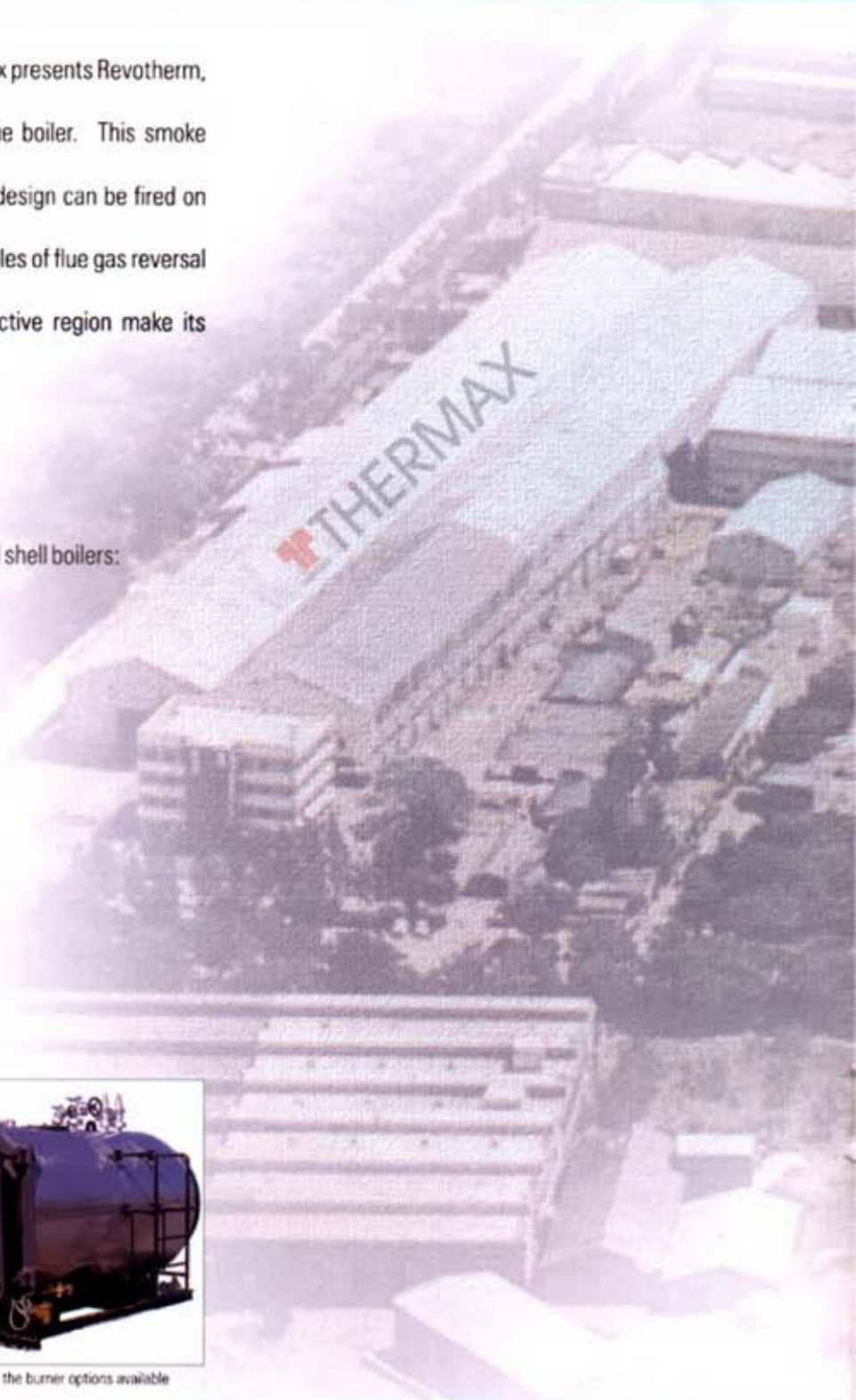
- Lower installed costs
- Quick start up from cold
- Compact design
- Ease of maintenance

Range

Revotherm is available in standard capacities upto 6TPH for liquid fuels, and upto 10 TPH for gaseous fuels. Revotherm comes in standard pressures of 10.54 and 17.5 kg/cm²g



Revotherm, with one of the burner options available



Manufacturing quality

Revotherm comes from Thermax, the leading Asian boiler manufacturer.



Thermax's manufacturing facility, equipped for reliability, rolls out 2000 boilers and heaters every year. This facility, located at Pune, Western India, has 14 plants of 66,000 square meters covered area spread over premises of 400,000 square meters. The plants are equipped with facilities for light, medium and heavy fabrication of plain carbon, alloy steels and stainless steels, particularly suited to pressure vessels. The plants also offer :

- Hot and cold plate rolling
- Corrugation furnaces
- Shot blasting and painting facilities
- Sophisticated equipment to carry out TIG/ SPOT/SAW/MIG/Flash butt welding jobs

Adherence to International Codes

Thermax manufactures to international codes like ISO, DIN, GOST, and BS. The American Society of Mechanical Engineers (ASME) has awarded Thermax the prestigious 'S','U', 'R' and PP stamps in recognition of its manufacturing capabilities.

Quality control includes inspection by agencies like Bureau Veritas France, Lloyd's Register UK , Societe Generale de Surveillance Switzerland and TUV Germany.



Revotherm...the small boiler that packs a big punch

Manufacturing quality

Corrugated Furnace

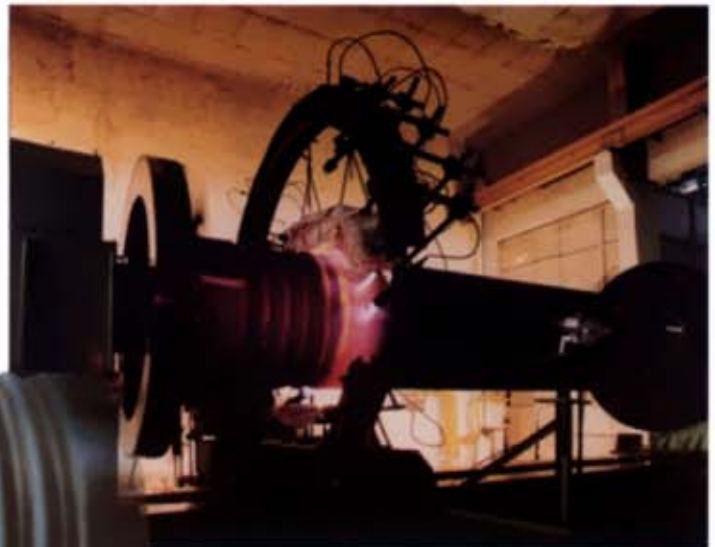
Corrugated furnaces provided with boiler capacities of 4 TPH and above give Revotherm a distinct advantage over plain furnace boilers. Corrugation minimises thermal stresses and makes the furnace

Corrugation Range

Diameter	: 650 to 1600 mm
Thickness	: 12 to 22 mm
Length	: Standard upto 5600 mm (Extension length by additional circumferential joints, on request)

inherently flexible. By offering uniform stress distribution, corrugated furnaces ensure long life of the boiler. Corrugation also helps in increasing the moment of inertia for a given thickness and a consequent increase in maximum possible operating pressure.

As per International Standards like BS 2790, it is mandatory for furnace lengths beyond 3 meters to be corrugated. The Indian Boiler Regulations also do not permit plain furnace lengths to exceed 3 meters.



Efficient & easy-to-operate construction

Revotherm consists of two eccentrically located shells closed at the rear end. The space between the two shells forms the steam and water space in which large diameter flue tubes are fitted. The burner is mounted on a hinged heat resistant door. This enables total accessibility to the furnace, burner, smoke tubes and agitators. Forced draft pressure jet burners are provided for fully automatic operations.

Revotherm's fully water cooled wet back construction keeps surface temperatures low.

- Avoids refractory and associated maintenance problems at both rear and front ends
- Provides safe operating conditions
- Minimises surface heat loss
- Uses Ceramic Wool with stainless steel reflector on the front door, as insulation. This provides better heat resistant properties compared to conventional cast refractory construction. Lighter in weight, it's also more durable.

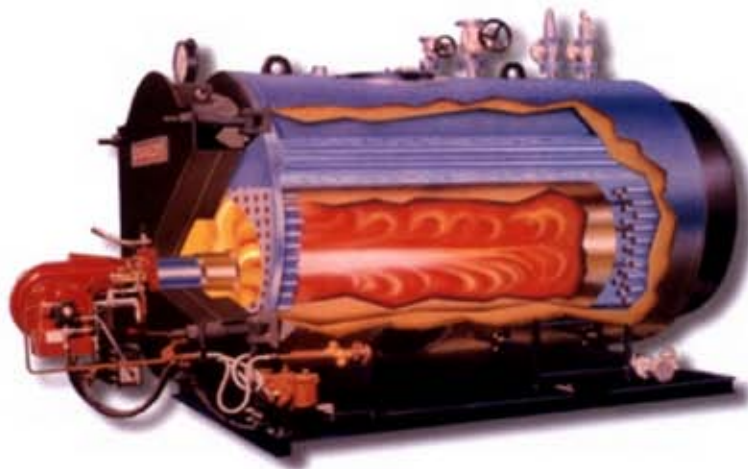


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Features for maximum efficiency

Flue Gas Reversal

- Higher residence time in the radiant zone ensures complete combustion.
- The reversing flue gases maintain a constant envelope around the main flame, eliminating metal wall overheating.
- Counter current turbulence offers complete mixing with lesser excess air and hence offers lower stack losses.
- Low temperature of gas entry point minimises failure of tube and tube weld.



Spiral Gas Agitators

Revotherm has specially designed spiral gas agitators in the convective tubes. They regulate the temperature of the exit gas, and provide for turbulent flow of flue gases, even during partial load operation.



Features for maximum efficiency

Ease of Maintenance

The main boiler door with the burner assembly is mounted on just two heavy duty pivots and held by two large wing nuts. It can be opened in a



matter of minutes. This gives complete access to the entire flue side of the boiler, the furnace and the smoke tubes. Maintenance is fast and easy.

Compact and Lightweight

Revotherm's spiral agitators offer high rates of convective heat transfer. This brings down overall heat transfer area needed for every tonne of steam raised. This makes the boiler trim and compact with a low dead weight. Boiler house space is also reduced.



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Globally sourced components

Revothem is provided with components from world leaders in technology.



Water Level Controller (KDG Mobrey, UK)

- Proven reliability
- Rugged design



Feed Water Pumps (Grundfos, Denmark)

- Stainless steel construction gives better durability
- Low noise and vibration and power consumption



Safety Valve (FMC Sanmar, Crosby, UK)

- Approved by international inspection agencies
- Floating seat ensures no leakage of steam



Gas Train (Kromschroder AG, Germany)

- Rugged construction
- Safe
- DIN standard



Non Return Valves (Spirax, France)

- Minimum pressure drop
- Compact, lightweight design

Range of options

Control Panels



The standard control panel used in Revothem incorporates the world's best sequence controller from Landis & Gyr, Switzerland.

Burners

Thermax Oertli Duo Block Pressure Jet Burner



International brand Mono Block Burner



*Thermax reserves the rights to select or change components to be used in Revothem without prior notice.

Broad-based customer presence

Revotherm, has been serving customers in 19 countries across 3 continents.

- Nigeria
- UAE
- Kenya
- Russia
- Indonesia
- Sri Lanka
- Tanzania
- Bangladesh
- Philippines
- Oman
- Thailand
- Malaysia
- Nepal
- Kazakhstan
- Tunisia
- Estonia
- Egypt
- Vietnam
- Zambia



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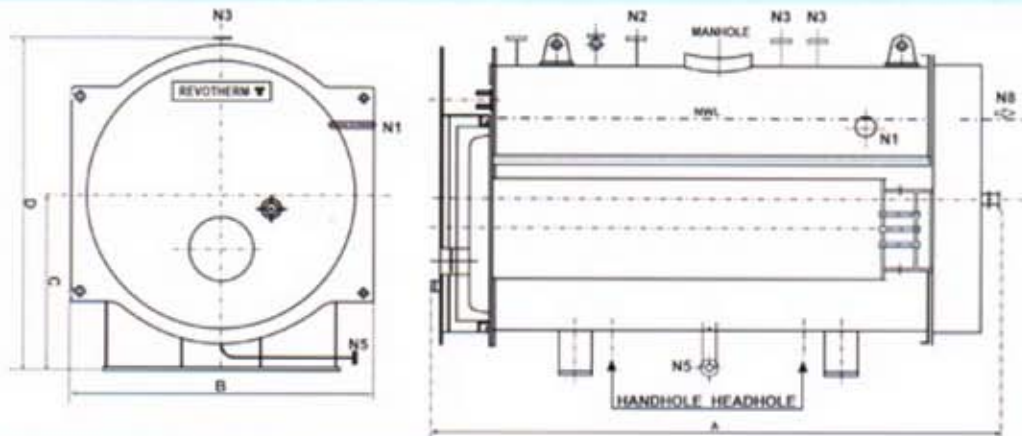
Improving your business is our business

Thermax, the Indian engineering industry major is a pioneer in process heat with core competence in energy - environment solutions. An ISO 9002 organisation, Thermax exports energy-efficient boilers, thermal oil heaters, chillers, speciality chemicals and water treatment plants to markets round the world. It has a current turnover of US\$ 200 million per year.

Offering wide-ranging solutions in industrial utilities, Thermax's business philosophy is summed up as '**Improving Your Business Is Our Business**'



Technical specifications



MODEL	BOILER PRESSURE KG/CM2	UNITS	RFB 15A	RFB 20A	RFB 25A	RFB 30A	RFB 40A	RFB 50-A	RFB 60-A	RFB 80-A	RFB 100-A
GENERAL											
Steam Output F& A 100° C	10.54/17.54	Kg/hr	1500	2000	2500	3000	4000	5000	6000	8000	10000
Design Pressure	10.54/17.54	Kg/cm2g	Standard pressure available is 10.54 / 17.54 kg/cm2g for all the models								
Steam Space	10.54/17.54	m3	0.3	0.49	0.75	1.38	1.46	1.65	1.82	2.15	4.88
DIMENSIONS											
Overall Length	10.54/17.54	mm	3905	4220	4350	4670	5310	5670	5890	7075	7144
Overall Width	10.54/17.54	mm	4430	4245	4765	4985	5300	5105	5485	5675	6455
Overall Height	10.54/7.54	mm	2805	3080	3280	3650	3730	3730	3900	3940	4150
UTILITIES CONSUMPTION											
FO NCV 9650 Kcal/kg	10.54/17.54	Kg/hr	95	127	159	191	254	318	381	NA	
Light oil NCV 10200 Kcal/kg	10.54/17.54	Kg/hr	90	120	149	179	239	298	358	NA	
Nat. gas NCV 8500 Kcal/Nm ³	10.54/17.54	Nm ³ /hr	108	144	180	216	288	360	432	576	720
ELECTRICAL											
Connected Load (excl stand-bys)	10.54	KW	14.00	16.00	18.5	18.5	23.00	30.0	34.0	24.5	28.0
Connected load (excl stand-bys)	17.54	KW	15.00	17.00	23.00	23.00	28.00	34.00	37.5	34	37.5
TERMINAL CONNECTIONS											
Feed water Inlet - DIN PN 25	10.54	NB in mm	32	32	32	32	32	40	40	40	40
	17.5	NB in mm	32	32	32	40	40	40	40	50	50
Main Steam Outlet -ANSI Class 150	10.54	NB in mm	50	80	80	80	100	100	150	150	150
	17.5	NB in mm	50	50	80	80	80	80	100	150	150
Safety Valve Outlet - ANSI Class 300	10.54	NB in mm	50	50	50	50	80	80	80	80	80
	17.5	NB in mm	50	50	50	50	50	50	50	80	80
Flue Gas Outlet ID	10.54	mm	350	400	500	500	550	550	650	750	850
	17.5	mm	350	400	500	500	550	550	650	750	850
Dry wt.	10.54	kg	3755	4646	5250	7355	9700	10465	12560	14500	17000
	17.54	kg	4195	5200	6150	8390	10675	11500	14200	16260	18650

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Thermax's international network



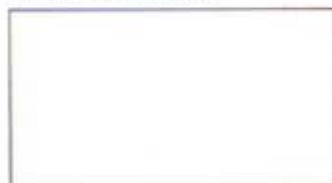
- Ulitsa Vavilova, House 69/75
Office 915, MOSCOW 117846
RUSSIA
Tel : 00-7095-1342023/9350490-92
Fax : 00-7095-1347410
E-Mail : thermax@glasnet.ru
- 94, Alston Drive
Bradwell Abbey
MILTON KEYNES, MK13 9HF
UNITED KINGDOM
Tel : 00-44-1908-316216
Fax : 00-44-1908-316217
E-Mail : info@thermax.powernet.co.uk
- C/o C.I.D.C Masdar
P. O. Box 20753
AL KHOBAR 31952
KINGDOM OF SAUDI ARABIA
Tel. : 00966-3-8919897/8919594
Fax : 00966-3-8914388
E-Mail : thermax@sahara.com.sa
- C/o P. T. Comexindo Persada
Bidakara Building, 6th Floor
JL. Jendral Gatot Subroto KAV 71-73
Pancoran, JAKARTA 12870,
INDONESIA
Tel : 00-62-21-83793259/83793255
Fax : 00-62-21-83793258
E-mail : thermax@indo.net.id
- P. O. Box 39935, Enterprise Road
NAIROBI, KENYA
Tel : 00-254-2-862253/803122
Fax : 00-254-2-544905
E-Mail : spenomatic@net2000ke.com
- C/o Trade Linkers
35, New Eskaton Road
Sufia House, DHAKA, BANGLADESH
Tel : 00-880-2-407161, 411806
Fax : 00-880-2-9331069
E-mail : debasish@globalnet-bd.net
- Lalan Engineering Ltd., 344 Grandpass
Road, COLOMBO - 14, SRILANKA
Telefax : 00-941-911457
E-mail : management@lalan.eureka.lk
- Multichem Industries Ltd.
Plot D2, Israel Adebajo Close, Off Ladipo
Oluwole Avenue, Post Box No. 5671
IKEJA, Lagos State
NIGERIA
Tel : 00-2341-4936162, 4924019
Fax : 00-2341-4923998, 2693746
E-mail : thermaxing@nova.net.ng
- B-22/3, Menara Bangsar
Jalan Maarof, Bukit Bandaraya
59100, KUALA LUMPUR
MALAYSIA
Tel : 00-60-3-2534775
Fax : 00-60-3-2544775
E-Mail : thermax@tm.net.my
- P. O. Box 17156, Jebel Ali
DUBAI, UAE
Tel : 00-971-4-8816481
Fax : 00-971-4-8816039
E-Mail : thermax@emirates.net.ae

Visit us at : www.thermaxindia.com



THERMAX
An ISO 9002
Company

THERMAX LIMITED
PROCESS HEAT DIVISION
D-13, MIDC, CHINCHWAD
PUNE 411 019, INDIA
TEL : 020-7475941
FAX : 020-7472049



MUMBAI 400 039

Dhanraj Mahal, Chhatrapati Shivaji Maharaj Marg, Colaba
Tel. : (022) 2045391, 2045324. Fax : (022) 2040859
Telex : 011-86335 TMAX IN

NEW DELHI 110 057

9 Community Centre, Basant Lok
Tel. : (011) 6145319, 6145326. Fax : (011) 6145311
Telex : 031-72013 TMAX IN

KOLKATA 700 016

Park Plaza, Block 6A, 71 Park Street
Tel. : (033) 292423, 292428. Fax : (033) 2452491
Telex : 021-5661 TMAX IN

CHENNAI 600 018

Fatima Akhtar Court, 3rd Floor, 312 Anna Salai, Teynampet
Tel. : (044) 4353831-34. Fax : (044) 4353841
Telex : 041-7888 TMAX IN

PUNE 411 019

D-13, MIDC Area, Chinchwad
Tel. : (020) 7475941. Fax : (020) 7472049

AHMEDABAD 380 006

409-411, Mahakant, Opp V.S.Hospital, Ashram Road
Tel. : (079) 6575408, 6577073. Fax : (079) 6577270
Telex : 0121-6615 TMAX IN

BANGALORE 560 052

Leeman's Complex, 4th Floor, 30/1 Cunningham Road.
Tel. : (080) 2267377, 2265477. Fax : (080) 2251049
Telex : 0845-8915 (Rq)

HYDERABAD 500 482

6-3-649 Nalanda Complex, Somajiguda, Behind Medinova
Tel. : (040) 3310254, 3312013. Fax : (040) 3312335
Telex : 0425-6035 TMAX IN

VADODARA 390 005

85/B, Amin Chambers, Sampatrao Colony, Productivity Rd.
Tel. : (0265) 320442, 320636. Fax : (0265) 310051