THERMAX

THERMOPAC™

Oil / Gas Fired Thermic Fluid Heater



Thermopac - TPDi



Thermopac Excel - TPD

Heating Business

Improving your business is our business

Thermax is an engineering major providing sustainable solutions in the areas of energy and environment. Spanning over 86 countries, clients make use of Thermax's business-to-business solutions for heating, cooling, power and cogeneration plants; waste heat recovery units; systems for water & wastewater management and air pollution control; performance improving chemicals.

Thermax's operations are supported by ongoing Research & Development, tie-ups with global technology majors, an international sales & service network spread over 27 countries and state-of-the-art manufacturing facilities in 14 locations including India, Indonesia, China, Poland, Denmark and Germany.

As a part of Thermax, Heating business - a strategic business unit offers packaged boilers, thermal oil heaters, waste heat recovery boilers, hot water and air generators. These are available in modular construction as a standard package configuration or a custom design for specific requirements. Innovated by a strong R&D that focuses on customer applications, we offer a range of heating systems designed to combust wide range of solid, oil & gas fuels including biomass and heavy liquid fuels. Heating SBU helps small and medium firms & fortune 500 companies to reduce energy cost with a worldwide presence of oil & gas based systems in Middle East and Europe, biomass and solid fuel fired equipment in South East Asia and Africa.

THERMOPAC - TPCM

Compact solution for High Temperature

Product Offering

- Fuel - Heavy Oil Natural Gas and LPG
- Capacity - 1 to 0.2 million kcal/hr
- Operating Temperature - 280^{0}C

Product Highlights

- Apply designed for mid size temperature and very low heating requirements
- Imported monobloc burner
- Ideal for the packaging, colour printing, pharmaceutical and leather industries
- Compact and reliable



Technical Specifications - TPCM Series

Description	Unit	TPCM-01	TPCM-02
Capacity	kcal/hr	100,000	200,000
Maximum Outlet temperature	^{0}C	280^{0}C/300^{0}C (Optional)	
Thermic Fluid Flow rate	m^3/hr	5	10
Thermic fluid temperature rise	^{0}C	42	42
Firing System			
Type		**Monobloc**	
Burner Light Up		**By High Voltage Spark**	
Unit efficiency		**As per BS 845- Part I (NCV Basis)**	
HSD	%	87	
Natural Gas/LPG	%	86.5	
Fuel Consumption			
HSD	kg/hr	11	22
Natural Gas	Nm^3/hr	14	28
LPG	Nm^3/hr	5	9
Total Connected Load			
HSD	kW	2.9	2.9
N.Gas/LPG	kW	2.9	2.9
Overall Dimensions & Weight			
L x W x H	m	0.9 x 1.5 x 2.3	1.03 x 1.6 x 2.5
Dry Weight	kg	1200	1500
Chimney Top Diameter	mm	150	200

THERMOPAC

The reliable and efficient system for high process temperatures at low operating pressure.
Thermic fluid heating has replaced electric and steam heating in industries globally.
Thermax pioneered the concept in India way back in 1971 with its Thermopac.
For decades now, Thermopacs are recognised everywhere as superior heat sources and productivity enhancers.

THERMOPAC - TPDi with Integral APH

Reliable Companion of industry for decades



Product Offering

- Fuel - Heavy Oil, Light Oil and Gas
- Capacity - 0.4 to 2.5 million kcal/hr
- Operating Temperature - 280^{0}C

Product Highlights

- Automatic control for maintaining predetermined thermic fluid temperature
- High system efficiency - 87%
- Centrifugal pump ensures uniform circulation, thus preventing overheating of thermic fluid
- Suitable up to 300^{0}C (bulk oil temperature) with system and equipment modifications
- Internal APH (between two jackets) ensures unit surface temperature below 55^{0}C

Controls and Safeties

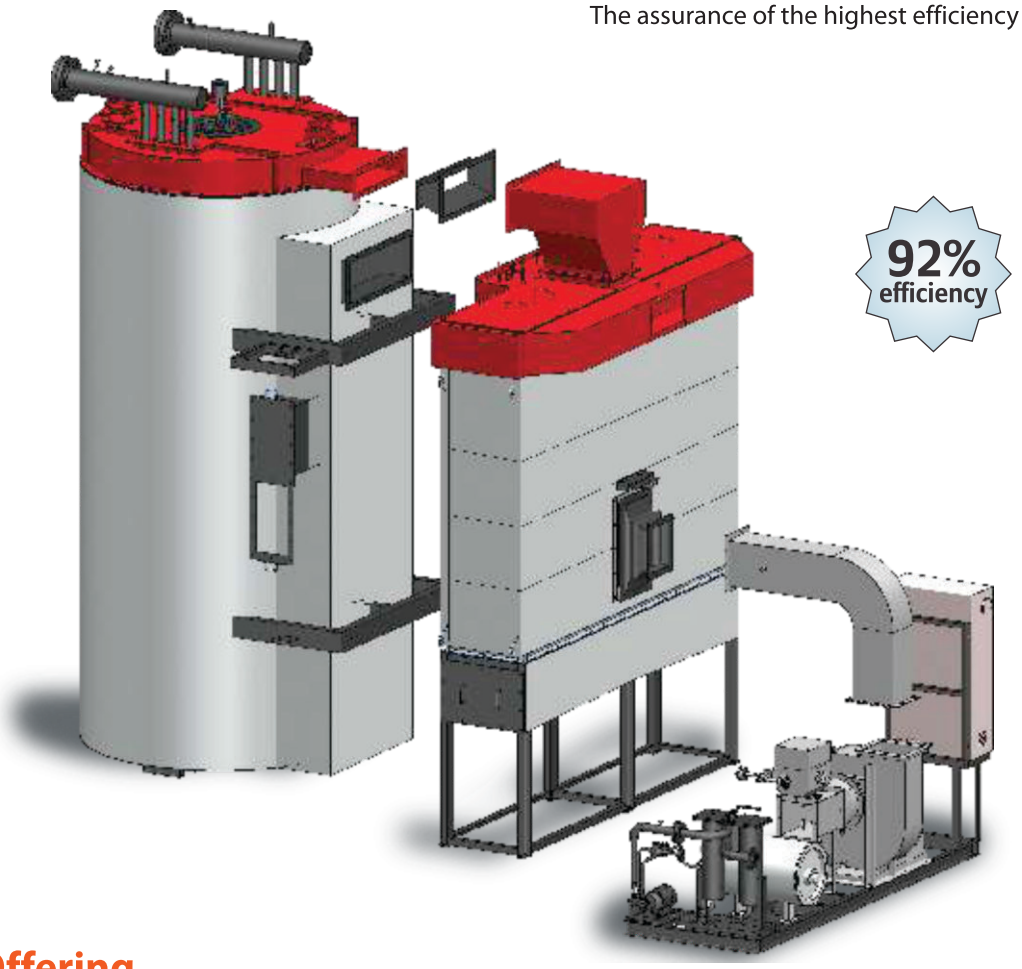
- Low thermic fluid flow cut-off
- High thermic fluid outlet temperature cut-off
- Precise thermic fluid temperature control
- Low level cut-off in deaerator tank
- High stack temperature cut-off
- Safety valve for protection against high pressure

Options Available

- Horizontal orientation
- Separate deaerators and common expansion tank for multiple unit installations
- Complete heater house and accessories on turnkey basis

THERMOPAC EXCEL - TPD with External APH

The assurance of the highest efficiency in its class



Product Offering

- Fuel - Light Oil, Heavy Oil and Gas
- Capacity - 1 to 2.5 million kcal/hr
- Operating Temperature - 280^{0}C

Product Highlights

- Specially designed and patented air preheater
- Combination of cross and parallel flow arrangement of air and flue gas circuit
- Modular design of the unit ensure quick assembly and compact layout
- Design and verified by modern tools like CFD and FEA

Options Available

- Horizontal orientation
- Separate deaerators and common expansion tank for multiple unit installations
- Complete heater house and accessories on turnkey basis

Save ₹ 1 crore on operating costs

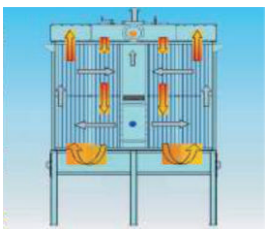
Description	Unit	TPDi (Integral APH)		TPD (External APH)	
Total Heat Load	kcal/hr	2500000			
Fuel		FO	NG	FO	NG
NCV of fuel	kcal/kg / kcal/Nm^3	9650	8500	9650	8500
Thermal Efficiency*	%	87	86.5	92	91.5
Operating hours	hrs/ annum	4800	4800	4800	4800
Fuel consumption	kg/hr / Nm^3/hr	298	340	281	321

*Efficiency considered on NCV Basis

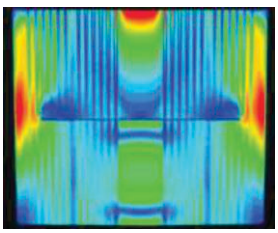
Air Pre-heater

Thermopac Excel TPD comes with a non-corrosive air pre-heater with a hybrid cross and counter flow design that has been validated with extensive CFD analysis.

- Air is introduced in the intermediate flue gas zone which maximizes heat recovery and reduces stack temperature
- Diverter damper in flue gas line facilitates online cleaning of the APH and use of only one module while the other is under cleaning
- Modular APH helps to maintain efficiency even under part load conditions
- No risk of dew point corrosion as the configuration ensures optimum metal temperatures



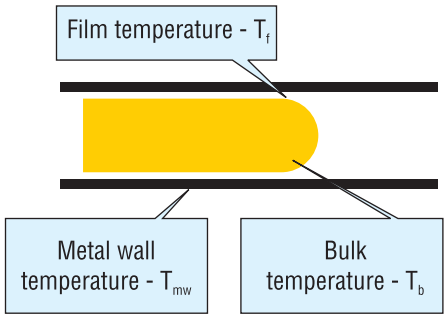
APH - air and flue gas circuit



CFD Analysis

Engineered for Reliability

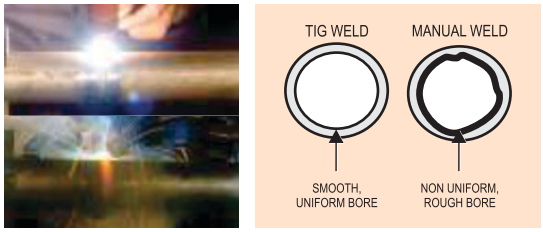
- Film temperature designed according to DIN 4754, to ensure longer life of heater and thermic fluid
- Mechanical Designed as per guidelines of ASME
- Adequate furnace volume and heat transfer surface ensure higher thermal efficiency
- Pre-wired and pre-assembled for quick and easy installation



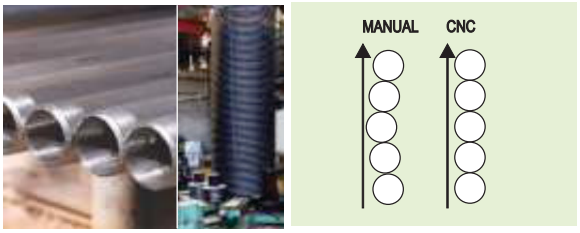
Thermic fluid flowing thro a tube $T_{mw} > T_f > T_b$

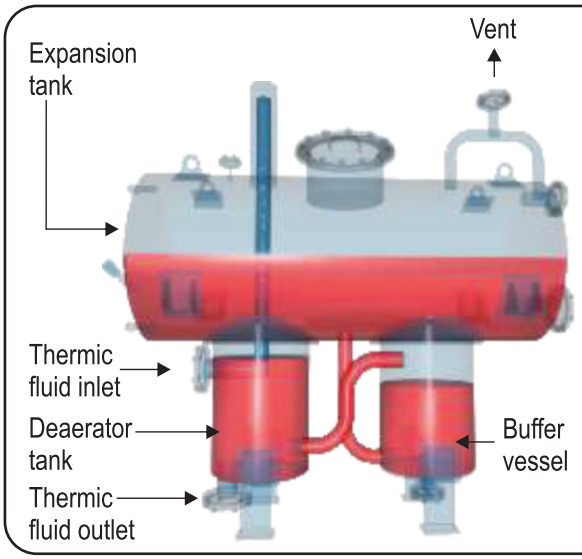
Manufacturing Excellence

Fully automated tube to tube TIG Welding Machine enables smooth uniform bore



CNC coil winding machine ensures proper alignment, avoiding possibility of hot spots



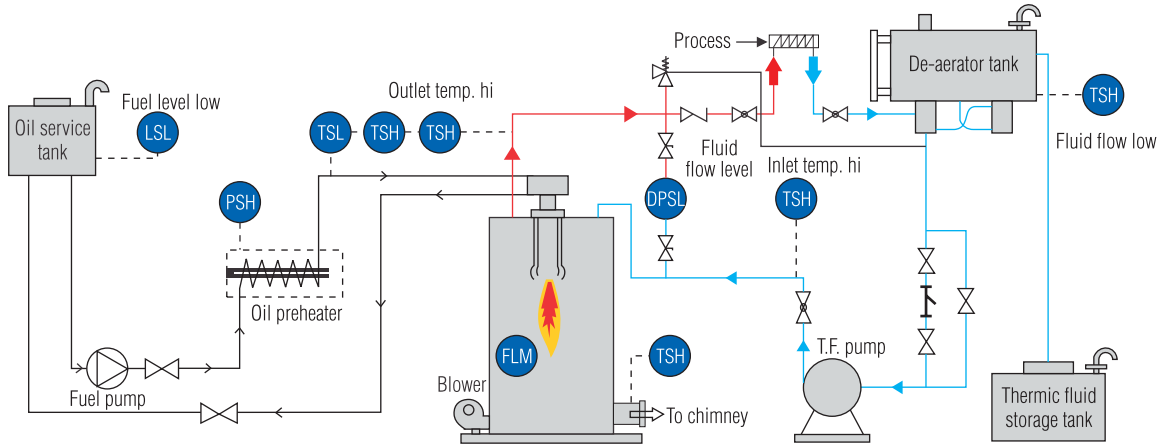


Compact Deaerator Cum-Expansion Tank

- The tangential thermic fluid entry in the de-aerator ensures optimal de-aeration
- It comes with a buffer vessel to prevent cooling of hot oil coming from the process
- De-aerator cum expansion tank having assembled together requires less space

Note : For multiple Thermopac installed in process house or for very high system holdup separate de-aerator and expansion tank can be supplied

Typical P & I Diagram for Thermic Fluid Heating System



Technical Specifications - TPDi Series

Description	Unit	TPDi-04	TPDi-06	TPDi-10	TPDi-15	TPDi-20	TPDi-25
Capacity	kcal/hr	400,000	600,000	1,000,000	1,500,000	2,000,000	2,500,000
Maximum Outlet temperature	^{0}C			280^{0}C/300^{0}C(Optional)			
Thermic Fluid flow rate	m^3/hr	26	30	60	90	120	150
Thermic fluid temperature rise	^{0}C	33	42	35	35	35	35
Firing System							
Type				**Pressure Jet**			
Burner Light Up				**By High Voltage Spark**			
Unit efficiency				**As per BS 845- Part I (NCV Basis)**			
HSD/LDO/FO	%			87			
Natural Gas/LPG	%			86.5			
Fuel Consumption							
HSD	kg/hr	44	66	109	164	219	274
LDO	kg/hr	45	68	113	169	225	282
FO	kg/hr	48	71	119	179	238	298
Natural Gas	Nm^3/hr	54	82	136	204	272	340
LPG	Nm^3/hr	19	28	47	71	94	118
Total Connected Load							
HSD/LDO	kW	8.0	10.5	17	20	29	33
FO	kW	11.0	16.5	26	32.5	44	51
N.Gas/LPG	kW	8.0	10.5	16	19.5	28	30.5
Overall Dimensions & Weight					Vertical		
L x W x H	m	1.9 x 2.62 x 3.16	1.9 x 2.66 x 3.36	3.9 x 2.66 x 4.06	3.58 x 3.11 x 5.20	3.8 x 3.22 x 5.81	4.6 x 3.7 x 6.4
Dry Weight	kg	2100	2260	3600	5500	6900	8600
Chimney Top Diameter	mm	250	275	450	550	600	675

Technical Specifications - TPD Series

Description	Unit	TPD-10	TPD-15	TPD-20	TPD-25
Capacity	kcal/hr	1000000	1500000	2000000	2500000
Maximum Outlet temperature	°C		280°C/300°C(Optional)		
Thermic fluid flow rate	m^3/hr	60	90	120	150
Thermic Fluid temperature rise	**°C**		**35**		
Firing System					
Type			**Pressure Jet**		
Unit efficiency			**As per BS 845- Part I (NCV Basis)**		
HSD / LDO / FO	%		92		
Natural Gas / LPG	%		91		
Fuel Consumption					
HSD	kg/hr	103.5	155.3	207.0	258.8
LDO	kg/hr	106.6	159.8	213.1	266.4
FO	kg/hr	112.6	169.0	225.3	281.6
Natural Gas	Nm^3/hr	128.6	192.9	257.2	321.4
LPG	Nm^3/hr	43.8	65.7	87.6	109.6
Total Connected Load					
HSD / LDO	kW	16.0	22.0	31.5	36.0
FO	kW	25.0	34.5	46.5	54.0
N.Gas / LPG	kW	15.5	21.0	30	33.5
Overall Dimensions & Weight				Vertical	
L x W x H	m	4.4 x 3.1 x 4.4	4.8 x 3.4 x 5.0	5.0 x 3.6 x 5.7	5.4 x 3.6 x 5.85
Dry Weight	kg	4000	5400	6600	9300
Chimney Top Diameter	mm	450	550	600	675

Note: Efficiency calculated based on NCV of Diesel of 10500 kcal/kg,LPG as 24940 kcal/Nm3,Natural Gas as 8500 kcal/Nm3 and Furnace Oil as 9650 kcal/kg. Above mentioned weight and dimensions may vary with actuals. Please refer to offer document for more details. For Horizontal oriented unit ,Contact Head Office.Heater Design for more than 280°C please contact HO for further offering. Not recommended to use external APH on FO firing for Thermal oil outlet temperature below 120 °C

THERMAX

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Thermax Business Portfolio

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This brochure presents only some of our products and we reserve the right to amend any product details without notice. The photographs used in the brochure are indicative and may not match the actual plant.

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