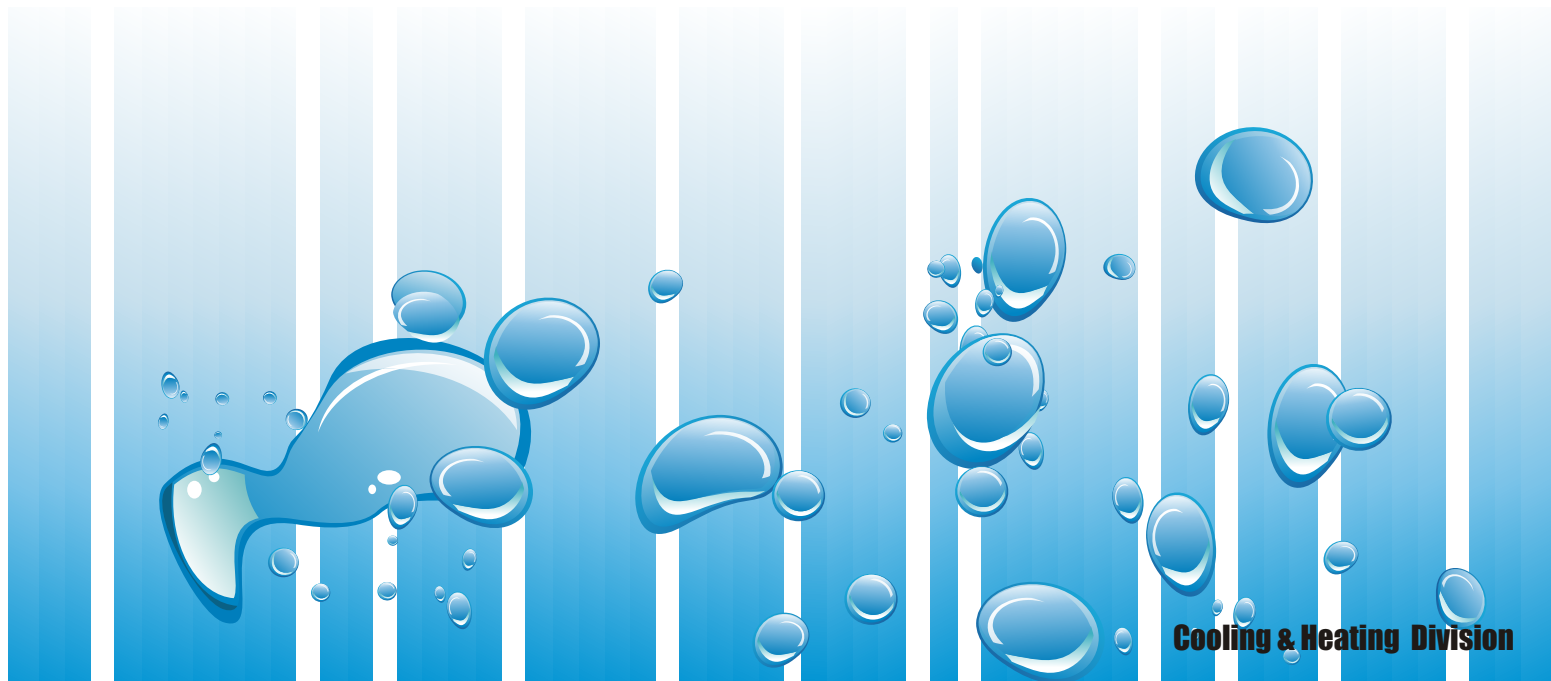
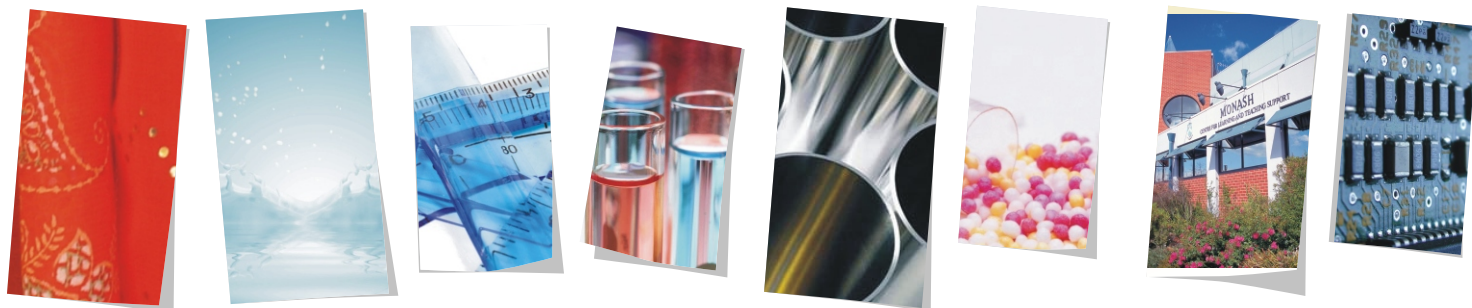


# Vapor Absorption Chillers

- Steam Driven**
- Fuel(oil/gas) Driven**
- Exhaust (DG/Gas engine/Gas Turbine) Driven**
- Hot Water Driven**
- Multi-Fuel Driven**



## Sustainable Solutions

From Cooling to Heating, from Power Generation to Air Purification, from Water and Sewage Treatment to Speciality Chemicals, THERMAX Solutions are improving life at work in many ways.

Every year THERMAX helps generate 6,000 MW of Power, produce 100,000 tons of steam, provide 1 million tons of Cooling and treat 1,000 million litres/day of Water and Waste.

THERMAX today is a major Engineering and Environment company with revenues of USD 800 million and with market capitalization of over USD 1 billion.

THERMAX was one of 20 Indian companies in Forbes list of "Asia's Best Under a Billion Companies" in 2005 and 2006 and was ranked "No. 1 among the top 21 wealth creators" in India over the last 5 years by a leading investment journal.

THERMAX brings to customers enriched experience of industrial applications, and expertise through technological partnerships and strategic alliances.

Operating from its Headquarters in Pune (Western India), Thermax has built an international sales & service network spread over South East Asia, Middle East, Africa, Russia, UK and the US. It has full fledged ISO 9001:2000 and ISO 14000 accredited manufacturing setups.

## Vision

To be a globally respected high performance organization offering sustainable solutions in energy and environment.

## Cooling & Heating Division - Cooling SBU

The Cooling SBU of THERMAX promotes Vapor Absorption Chillers as a cost effective and environment friendly alternative to electricity driven compression chillers.

It offers expert solutions in Process Chilling & Air Conditioning for industrial as well as commercial applications. Cooling SBU's strength lies in customized solution as per the requirement of the customers.

Unlike electrical chillers, Absorption Chillers are powered by heat. These machines can run on a variety of heat sources, e.g. steam, hot water, liquid/gaseous fuels, exhaust gases and/or a combination of above.

## THERMAX - Conserving Energy, Preserving the Environment

Vapor Absorption Technology from THERMAX is at work for Clients in more than 50 industries including Pharmaceuticals, Chemicals, Fertilizers, Textiles, Petrochemicals, and Food & Beverages & Automobile industries as well as in Hotels, Commercial Complexes, Shopping Complexes, Office Buildings, Educational Institutes, Airports and Cinema halls.



Manufacturing capabilities of THERMAX's Cooling SBU are confirmed by the fact that, over the years, THERMAX has installed numerous machines in more than 70 countries including USA, Germany, Spain, UK, Italy, UAE, Saudi Arabia, India, China, Australia, Thailand, Philippines & Malaysia, Russia, Nigeria with the products conforming to the respective country standards like ETL, CE, TUV, DNV, ASME etc. THERMAX has its fully owned subsidiaries namely Thermax Inc. in USA, Thermax Europe Limited in UK and Thermax (Zhejiang) Cooling and Heating Engg. Company Limited in China.

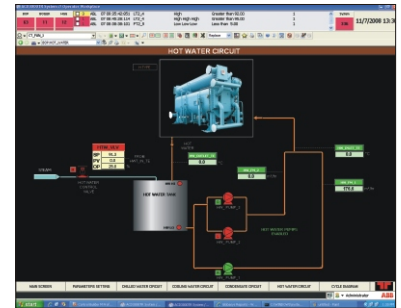
THERMAX believes in efficient and responsive services to its clients and exhibits in its way of business, by giving optimal and quality solutions and achieving customer delight. THERMAX has a worldwide sales, service and distribution network to fulfill the needs of its valuable customers.



## TEST BAY

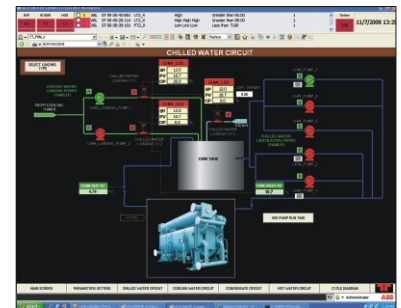
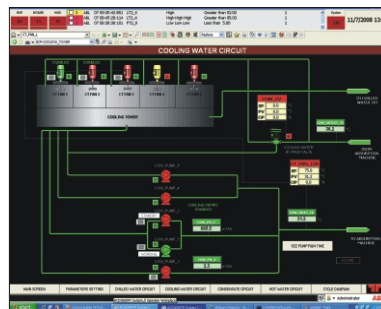
Thermax has a state-of-the-art test bay capable of testing various types of vapor absorption chiller – steam driven, hot water driven, fuel fired, exhaust driven and a combination of these up to a capacity of 3500 TR. The entire testing facility is centrally operated by sophisticated distributed control systems (ABB make) and can be operated by the touch of a button.

Steam	50 - 3500 TR
Exhaust	50 - 3500 TR
Hot Water	50 - 1150 TR
Fuel Fired	50 - 1300 TR



## CUSTOMISED FEATURES (Optional)

- Online standby Canned Motor Pumps
- Multi-sectional Shipment Arrangements
- Remote Performance Monitoring Systems (RPMS)
- Auto Purging
- Side Stream Filtration

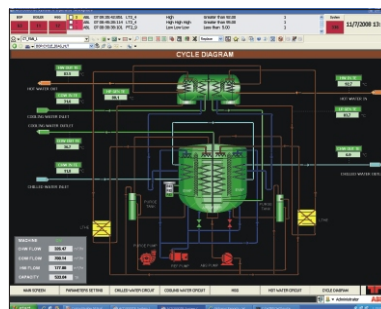


## CUSTOMER CARE

THERMAX Absorption Cooling SBU has a wide network of Service Centres throughout the globe to ensure quick response to customers. With the cumulative service experience of about 4000 Vapor Absorption Chillers operating for more than 20 years, THERMAX service personnel are equipped to deliver the right solution to the users. THERMAX has developed specific service modules for different types of users depending on their usage pattern, conforming to our proactive approach.

For the benefit of its customers, THERMAX offers various value-added services like:

- Preventive maintenance contract
- Operation & manning
- Localized customer training programs



*First prize in "Bry air awards" in 2006 and 2007 in "most innovative product design" category*

## SALIENT FEATURES

1.

Unique two stage evaporation technology ensuring the Lowest Specific Heat Input requirement resulting in lowest steam and water consumption.

Two Stage evaporation gives 5 to 7 percent higher COP than conventional single stage evaporation technology.

Parameter for HTG	Unit	Para Flow	Advanced Series Flow
HTG temperature	°C	162	155
LiBr concentration	%	64-65	60.5

Parameter for LTG	Unit	Para Flow	Advanced Series Flow
LTG temperature	°C	88	90
LiBr concentration	%	62-64	63

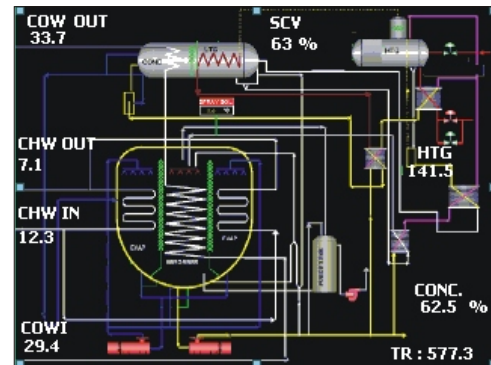
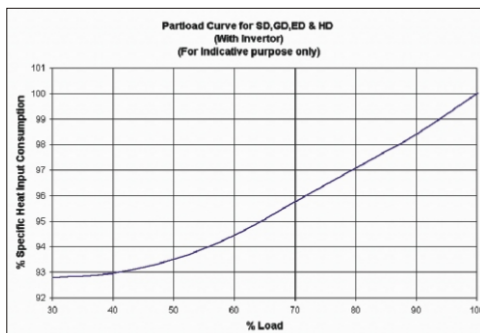


2.

Advanced series flow cycle to avoid simultaneous occurrence of high temperature and high concentration, thereby minimizing the probability of corrosion.

3.

Unique state-of-the-art concentration control and display that virtually eliminates crystallization and is distinctly different from the auto decrystallization offered by other manufacturers. This permits the Vapor Absorption Chillers to run smoothly even at 10°C cooling water inlet temperature.



4.

Variable frequency control on absorbent pump for higher reliability & savings in Power, especially during part load operation.

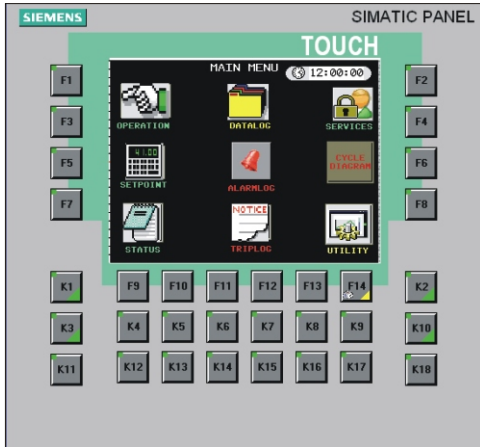
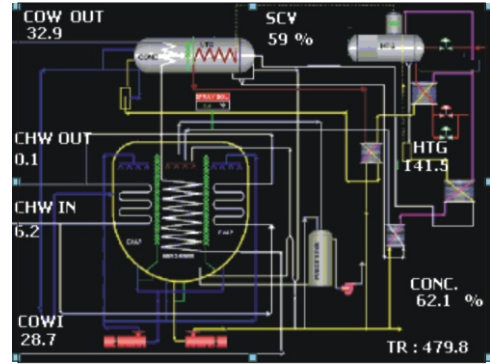
5.

Double seal vacuum isolation valves and bolted pumps to facilitate machine mounted pump maintenance without any loss of vacuum in the system due to exposure to atmosphere.



6.

Chilled brine outlet temperature up to 0 °C. In applications where temperature of less than 4 °C is critical, vapour absorption technology can now be put to use.



7.

PLC based control panel with display, user friendly interface and data logging system. Remote performance monitoring / DCS / BMS connectivity also possible.

8.

Process design that ensures maximum internal heat recovery to give the lowest specific heat input benefit to the customer.



- Enlargement of heat transfer area - Done by all manufacturers
- Two stage evaporation - Unique feature of Thermax Vapor Absorption Chillers
- Large temperature difference of chilled water - Thermax can offer  $\Delta T$  as high as 30 °C
- Refrigerant heat exchanger - Unique feature of Thermax Vapor Absorption Chillers
- Exhaust gas heat exchanger - Unique feature of Thermax Vapor Absorption Chillers

9.

Special tube metallurgy like Cupro Nickel, SS 316L, Titanium depending on water quality on site.

10.

Non-precipitating and non toxic Molybdenum based corrosion inhibitor that ensures smooth and stable performance.

11.

Multistage level control in three heat exchangers for effective operation during part load and to avoid solution pump cavitation.

## TECHNICAL SPECIFICATIONS

Model Number	UNITS	SD 20A TCU	SD 20B TCU	SD 20C TCU	SD 20D TCU	SD 30A TCU	SD 30B TCU	SD 30C TCU	SD 40A TCU	SD 40B TCU	SD 40C TCU	SD 50A TCU		
<b>Cooling Capacity</b>	TR(KW)	132 (464)	157 (552)	198 (696)	236 (830)	285 (1002)	320 (1125)	376 (1322)	426 (1498)	481(1692)	530 (1864)	583 (2050)		
<b>Chilled Water Circuit</b>	Flow Rate	m <sup>3</sup> /hr	72.4	86.1	108.6	129.5	156.3	175.5	206.2	233.7	263.8	290.7	319.8	
	No. of passes (Evaporator)	#	1+1											
	Friction loss	mWC(kPa)	1.4 (13.7)	1.7 (16.7)	4.0 (39.2)	4.9 (48.1)	4.1 (40.2)	4.5 (44.1)	7.1 (69.6)	6.4 (62.8)	6.5 (63.7)	6.9 (67.7)	6.9 (67.7)	
	Connection Diameter	mmNB	125				150			200			200	
<b>Cooling Water Circuit</b>	Flow Rate	m <sup>3</sup> /hr	132	157	198	235	285	320	376	426	481	530	583	
	Outlet Temp	°C	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	
	No. of passes (absorber)	#	1+1						1,1					
	No. of passes (condensor)	#	1											
	Friction loss	mWC(kPa)	2.5 (24.5)	2.7 (26.5)	6.8 (66.7)	7.0 (68.6)	6.1 (59.8)	6.1 (59.8)	4.4 (43.1)	3.7 (36.3)	3.9 (38.2)	4.1 (40.2)	3.5 (34.3)	
	Connection Diameter	mmNB	150				200			250			300	
<b>Steam Circuit</b>	Steam Consumption	kg/hr	499	593	748	892	1077	1210	1421	1610	1818	2003	2204	
	Connection Diameter(Steam)	mmNB	65				80			100			100	
	Connection Diameter(Drain)	mmNB	40				40			40			50	
<b>Overall Dimensions</b>	Length	mm	3070			4090			4390		5000	5040		5050
	Width	mm	2050			1940			2300		2360	2460		2590
	Height	mm	2700				2910			2860		3210		3470
<b>Operating Weight</b>	x 1000 kg	6.6	6.9	8.0	8.4	10.5	10.9	12.2	14.7	15.3	15.9	18.1		
<b>Max. Shipping Weight</b>	x 1000 kg	6.1	6.3	7.3	7.6	9.4	9.8	11.0	13.0	13.4	14.0	15.8		
<b>Clearance for Tube Removal</b>	mm	2500			3750			4100			4100		4300	
<b>Electric Supply</b>	Absorbent Pump Motor Rating	kW(A)	2.2(6)				3.0(8)			3.7(11)			5.5(14)	
	Refrigerant Pump Motor Rating	kW(A)	0.3(1.4)											
	Vacuum Pump Motor Rating	kW(A)	0.75(1.8)											
	Total Electric Input	kVA	7.6				9.1			11.2		13.4		
	Power Supply		415V(+10%), 50Hz(+5%), 3Phase+N											

Model Number	UNITS	SD 50B TCU	SD 60A TCU	SD 60B TCU	SD 60C TCU	SD 60D TCU	SD 70A TCU	SD 70B TCU	SD 80A TCU	SD 80B TCU	SD 80C TCU	SD 80D TCU		
<b>Cooling Capacity</b>	TR(KW)	644 (2265)	747 (2627)	829 (2916)	945 (3323)	1046 (3679)	1159 (4076)	1293 (4547)	1466 (5156)	1613 (5673)	1885 (6629)	2040 (7175)		
<b>Chilled Water Circuit</b>	Flow Rate	m <sup>3</sup> /hr	353.2	409.7	454.7	518.3	573.7	635.7	709.2	804.1	884.8	1034	1119	
	No. of passes (Evaporator)	#	1+1											
	Friction loss	mWC(kPa)	7.1 (69.6)	4.7 (46.1)	5.1 (50)	5.9 (57.9)	6.3 (61.8)	5.0 (49.0)	5.3 (52.0)	4.5 (44.1)	4.9 (48.1)	8.2 (80.4)	8.6 (84.3)	
	Connection Diameter	mmNB	200	250				300			350			
<b>Cooling Water Circuit</b>	Flow Rate	m <sup>3</sup> /hr	644	747	829	945	1046	1159	1293	1466	1613	1885	2040	
	Outlet Temp	°C	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	34.6	
	No. of passes (absorber)	#	1,1											
	No. of passes (condensor)	#	1											
	Friction loss	mWC(kPa)	3.7 (36.3)	5.4 (53.0)	5.5 (53.9)	6.2 (60.8)	6.5 (63.7)	5.8 (56.9)	6.2 (60.8)	5.6 (54.9)	5.9 (57.9)	7.9 (77.5)	8.3 (81.4)	
	Connection Diameter	mmNB	300	350				400			450			
<b>Steam Circuit</b>	Steam Consumption	kg/hr	2434	2824	3134	3572	3954	4381	4888	5541	6097	7125	7711	
	Connection Diameter(steam)	mmNB	100	125				150			150			
	Connection Diameter(Drain)	mmNB	50	50				65			65			
<b>Overall Dimensions</b>	Length	mm	5050	6380			7840		8130		8340		9590	
	Width	mm	2590	2620			2860		3070		3560			
	Height	mm	3470	3570			3650		4210		4490			
<b>Operating Weight</b>	x 1000 kg	19.1	24.1	25.0	35.6	36.9	45.2	46.5	58.6	59.7	66.3	67.6		
<b>Max. Shipping Weight</b>	x 1000 kg	16.7	21.2	22.0	30.6	31.7	38.1	39.2	48.4	49.2	55.3	56.3		
<b>Clearance for Tube Removal</b>	mm	4300	5300			6560			7910					
<b>Electric Supply</b>	Absorbent Pump Motor Rating	kW(A)	5.5(14)	6.6(17)			7.5(20)			9.0(27)				
	Refrigerant Pump Motor Rating	kW(A)	0.3(1.4)				1.5(5)							
	Vacuum Pump Motor Rating	kW(A)	0.75(1.8)											
	Total Electric Input	kVA	13.4	15.5			18.1		20.3		25.3			
	Power Supply		415V(+10%), 50Hz(+5%), 3Phase+N											

### Notes:

- Model Nos. : SD XXX - TCU Steam fired Double effect Chillers
- Chilled water inlet / outlet temperature = 12.2 /6.7 °C
- Cooling water inlet temperature = 29.4 °C
- Steam at Control Valve Inlet is at 8 kg/cm<sup>2</sup>(g) (784.5 kPa(g)) pressure in dry saturated condition.
- Minimum Cooling water inlet temperature is 10 °C
- Ambient condition shall be between 5 to 45 °C
- Maximum Allowable pressure in chilled / cooling water system = 8 kg/cm<sup>2</sup>(g) (784.5 kPa(g))
- Maximum Allowable pressure in steam system = 10.5 kg/cm<sup>2</sup>(g) (1029.7 kPa(g))
- Control panel Electric Input = 1kVA
- All Water Nozzle connections to suit ASME B16.5 Class 150
- Technical specification is based on JIS B 8622 : 2002
- For super large chillers above 2040 TR (7175 KW), please contact Thermax representative.

*More than 4000 installations with chilling capacity of over 1 million TR*

## INDUSTRIES SERVED



### Hotels & Hospitality

Sheraton Towers, Brazil  
P T Bali Nirwana, Indonesia  
Marriot, USA

### Commercial Centers

BBC Studio, UK  
Henry Ford Museum, USA  
Bicycle Casino, USA  
33<sup>rd</sup> Precinct NYPD, USA



### Educational Institutes

SUNY, Albany, USA  
Monash University, Australia  
Roosevelt Magnet School, USA

### Super Market

Mundial Super Market, Brazil  
Prezunic Super Market, Brazil  
Raleys Deptt. Stores, USA



### Pharmaceuticals

Astrazeneca, UK  
Pfizer India Ltd  
Johnson & Johnson, USA  
Boehringer, Germany

### Medical Centers

Royal Free Hospital, UK  
VA Medical Center, USA  
Gemilli Hospital, Italy

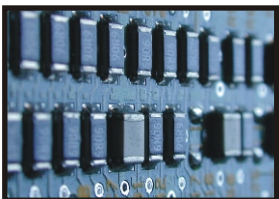


### Refineries & Petrochemicals

Exxon Mobil, Saudi Arabia  
Saudi Formaldehyde & Chemicals, KSA  
Reliance Industries Ltd., India  
Gas Authority of India Ltd.

### Chemicals

BASF, Mexico  
Eka Chemicals, Brazil  
Lyondell Equistar Chemicals, USA

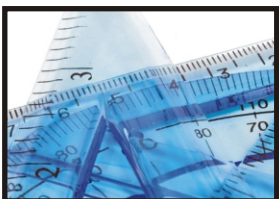


### Electronics

Bosch, Germany  
Moser Baer, India  
Temic Heilbronn, Germany

### Dairy & Confectionary

Nestle, Phillippines  
Cadbury, Nigeria  
Chitale Dairy, India

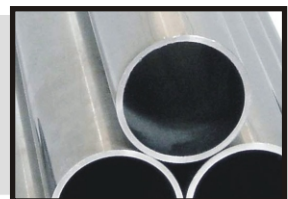


### Engineering

Daimler Chrysler, Germany  
Larsen & Toubro, India  
SKF Bearings, India  
Medway Plastics, USA

### Steel

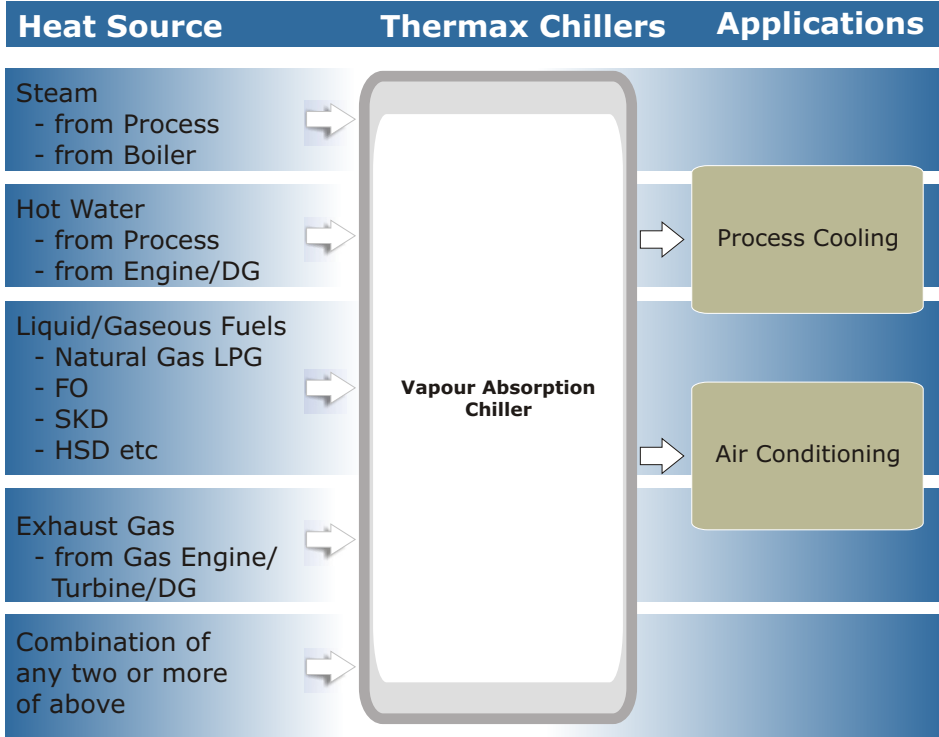
United Gulf Steel, U.A.E.  
Bhilai Steel Plant, India  
Rourkela Steel Plant, India





THERMAX

# MEET YOUR COOLING REQUIREMENTS FROM ANY HEAT SOURCE



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 Email: skhot@thermaxindia.com

## Thermax Business Portfolio

- Absorption Cooling
- Air Pollution Control
- Boilers & Heaters
- Captive Power
- Chemicals
- Water & Waste Solutions

## Global Quality Standards

