

THERMAX

TM
ProChill

B4k

Steam driven Vapour Absorption Machines

100NTR - 1800NTR



**The Vapour Absorption Machines that
have broken the 4kg/TR barrier**



Thermax — Conserving Energy, Preserving Environment

Ever since the Energy crisis of the early 1970's, which Thermax characteristically viewed as an opportunity to fulfil the new needs of its Customers, the company has focused on developing products and systems which conserve Energy, and preserve the Environment. Products of global standards were developed indigenously — high efficiency boilers, thermic fluid heaters, air pollution control equipment, water treatment systems...and arguably the most energy efficient concept of them all — co-generation packages.

From the quest for more efficient utilization of heat evolved the Absorption Cooling Business of Thermax. Thermax pioneered the technology in India and has installed close to 2000 Vapour Absorption Machines (VAMs) in India and across the world.

Today Thermax is a true Indian multinational exporting Vapour Absorption Machines to both developed and developing countries. Thermax Europe, headquartered in London, and Thermax Incorporated, headquartered in the USA are fully-owned subsidiaries of Thermax, selling and servicing VAM's in the respective regions. These apart, Thermax has distributors and offices in Asia, South America, Europe and the Middle East to address Absorption Cooling Business.

Technological Development — our Core Competency

While the technology for manufacturing Vapour Absorption Machines was initially sourced from our Japanese Collaborators, subsequent developments, which have contributed significantly to raising the performance and efficiency parameters of our machines, have been achieved by Thermax's in house Research and Development team.

Thermax's Research and Development Cell has achieved spectacular breakthroughs in Absorption Cooling technology. It was the first to develop Hot Water Absorption machines way back in 1995. Our Cogine series of Hot Water Absorption Machines received the prestigious Energy Product of the Year Award at London. Thermax engineered products have created many satisfied customers in India and all over the world including developed markets like Europe, and USA. Some of the most prestigious names in the world have chosen Thermax VAM to meet their cooling requirements which include Mercedes - Germany, Bosch - Germany, Astra Zeneca - UK, Henry Ford Museum - USA, BBC - UK, and the like.



Energy and Environment Research Center, Pune



Introducing

Thermax

ProChill™

B4k Series

Breakthrough In Absorption Cooling Technology

Thermax now introduces to the world the most efficient Steam Fired Vapour Absorption Machine — the **ProChill™ B4k**. It is the latest range of VAM machines which have many firsts to their credit while raising the technology benchmarks to higher levels.

Breaking 4 kg /Hr/TR Barrier^{*}

With the **ProChill™ B4k**, Thermax offers specific steam consumption as low as **3.9 kg /Hr/TR** which is up to 13 % lower than other Vapour Absorption Machine suppliers.

Breaking 4°C Barrier

With the **ProChill™ B4k**, Thermax now offers chilled water at an outlet **temperature down to 3.5°C**. Many end user industries where working temperature of less than 4°C is critical can now avail the benefits of Vapour Absorption Technology.

Crystallisation Free

No more shutdown for de-crystallization — With our latest advances in technology, crystallization is now history. **ProChill™ B4k** is designed to operate reliably even on **cooling water inlet temperature as low as 10°C** which is a critical measure of crystallization free design.

A Quantum Jump in Product Range

ProChill™ B4k offers chilling capacity **up to 1800 NTR**

Thermax Prochill B4k is the most efficient and reliable Vapour Absorption system.

*At 12°C / 7°C chilled water temperature and 32°C cooling water temperature.



Thermax

ProChillTM

B4k

Features

The **ProChill B4k** series represents a major advance in Vapour Absorption Machine performance. The earlier generation of Vapour Absorption Machines offered significant advantages over conventional compression machines, and gained a substantial market in India. These new generation VAM machines offer even greater economies, eco-friendliness, and various additional features further enhancing and expanding their applications.

Capacity :

The new **B4k** machine are available in the range of 100 NTR - 1800 NTR.

Chilled Water Outlet Temperature :

B4k machines can achieve chilled water temperature down to 3.5°C which is a very unique feature.

Steam Pressures :

B4k machines can operate on an entire range of steam pressures.
Double effect : 4 kg / cm²g - 10 kg / cm²g

High Efficiency :

B4k machines incorporate the latest twin evaporator design technology and other innovations for higher efficiency of 3.9 kg / TR Specific Steam Consumption.

10 - 100% Automatic Step less Modulation :

Crystallization Free !!!

B4k machines are uniquely designed to completely avoid crystallization during normal and even abnormal operation. The design allows use of cooling water inlet to the machine as low as 10°C which is a critical measure of crystallization free design. This unique feature differentiates **B4k** series from other VAM makes in the market.

On-line Purging :

Any non-condensable gas generated in the machine during operation, is purged continuously into the storage tank, thereby maintaining low vacuum in the shell and ensuring consistent performance. The gases from the storage tank can be purged periodically.





Hinged Headers :

The absorber, evaporator and condenser headers are provided with side exit nozzles for ease of maintenance. The absorber, condenser and generator headers are hinged type, for easy access to the tube bundle and eliminates need for heavy lifting arrangements thereby reducing the time needed for preventive maintenance.

Gravity Feed System :

B4k machines use gravity feed, non-pressurised super-spraying system, for spraying refrigerant and absorbent. The use of nozzles is avoided as they have problems of clogging and wear & tear.

PLC based Control Panel :

B4k is provided with state-of-the-art Internationally accepted PLC based control panel with unique display, user friendly interface and data-logging system.

On- Line Concentration Measurement and Controls :

B4k machines are provided with special concentration measurement and control system for enhanced reliability.

Isolation Valves for Pumps :

Isolation valves, provided on the pumps, facilitate machine mounted pump maintenance, without breaking the vacuum. This ensures minimum downtime.

High Temperature Generator Tubes:

B4k machines use SS 430 Ti Ferritic stainless steel tubes in high temperature generator, which is highly suited for high temperature environment.

Corrosion Inhibitors:

B4k machines use the new generation corrosion inhibitor, Lithium Molybdate, which is more effective than the conventionally used Lithium Nitrate and Lithium Chromate. Lithium Nitrate can generate Ammonium Nitrate (NH_4NO_3) which can be harmful to the machine.

In addition to the above features **B4k** continues to offer basic advantages of Vapour Absorption Technology like

CFC- Free

Uses water as Refrigerant instead of ozone depleting Chloro Fluoro Carbons.

Silent Operation

No moving parts. No dynamic load. No vibration - Very silent during operation.

Very little Maintenance

Static equipment, negligible maintenance.

Negligible power requirement.



Optional Features

▶ Online standby Canned Motor Pumps :

Thermax can offer machine mounted standby absorbent and refrigerant pumps

▶ Special tube material for Evaporator / Absorber / Condenser :

The selection of tube material is done purely on the basis of the water quality available at the job site. Accordingly, Thermax can offer the following special tube materials :

- Cupro-nickel
- SS- 316 L
- Titanium

▶ Multi-sectional Shipment Arrangements :

For convenience of shipping and rigging, the Vapour Absorption Machines can be shipped in two or more sections depending upon the site requirements. This is particularly convenient for retrofit jobs.

▶ Inverter Control

▶ Auto Purging

Controls

▶ Improved Reliability

B4k Incorporates a state-of-the-art programmable logic controller, which incredibly enhances the flexibility and reliability of the machine.

▶ Elaborate Diagnostic Facility

Information such as machine trip causes, sensor errors, hardware related faults, pump errors, etc. is recorded and displayed. This helps in faster and easier trouble shooting and routine maintenance.

▶ Easier Operation And Maintenance

Unique display screen, feather touch key pad and the software constitute a user friendly operator interface. The operator can easily control machine functions with self explanatory messages displayed automatically on the screen. Any abnormality is communicated through an audio visual alarm making it easier to initiate necessary action.

▶ Data Acquisition And Logging With Adjustable Sampling Time

▶ Also available as optional supply :

Modem Connectivity

PC Connectivity

DCS / BAS / BMS Connectivity

Safeties

Antifreeze Protection:

- L-cut refrigerant pump
- Antifreeze thermostat
- Chilled water pump interlock
- Chilled water flow switch
- Chilled water DP switch

Crystallization Free:

- HT Generator temperature cutout
- Cooling water low temperature cutout

Pump Cavitation Safety:

- Absorbent pump level relay
- Refrigerant pump level relay

Alarm Cycle:

- Dilution cycle alarm
- Total Shutdown alarm

Motor Protection:

- Absorbent pump overload relay
- Refrigerant pump overload relay
- Purge pump overload relay



World-Class Technology for World-Class People



PHARMACEUTICALS

- Pfizer India Ltd.
- Dr. Reddys Laboratories
- Cadilla Health Care Ltd.

Our customer list spans most of the major industry verticals, each with its specific requirements and operating parameters.



HOTELS & HOSPITALITY

- Royal Free Hospital, UK
- The Oberoi, Agra
- Grand Hyatt, Mumbai



FERTILIZER & PETROCHEMICALS

- Reliance Industries Ltd.
- GNFC, Baroda
- MCFL



ELECTRONICS

- Bosch, Germany
- Moser Baer
- Videocon



DAIRY & CONFECTIONARY

- Cadbury India Ltd.
- Nestle India Ltd.
- Chitale Dairy, Pune



TEXTILES

- Vardhaman Spinning
- Carolina Fabrics, UAE.
- Square Textiles, Bangladesh



ENGINEERING

- Mercedes, Germany
- L & T
- SKF Bearings



EDIBLE OILS

- Marico Industries
- Ruchi Soya
- Parakh Foods



PAPER & PULP

- ITC BPL
- BILT
- Phoenix Paper, Thailand



COMMERCIAL CENTERS

- BBC Studio, UK
- Monash University, Australia
- Henry Ford Museum, USA



CHEMICALS

- BASF, Mexico
- Asian Paints
- Nirma Ltd.



STEEL

- Bhilai Steel Plant
- Rourkela Steel Plant



The Hottest Way to Cool !

Capacity Expansion without extra power demand

Torrent Pharma, a large integrated pharmaceutical company in India, after detailed evaluation of both electrical and vapour absorption technologies, adopted Thermax VAM technology. 770 NTR X 3 Nos. Prochill VAMs were installed considering the minimum power requirement and lesser operating cost of these machines. To maximise the benefits Thermax also introduced VFDs in the system. The power thus saved was utilised by Torrent towards capacity expansion.



Wealth from Waste

Praxair is a US multinational specializing in process gases. For their Karnataka plant, they were using electrical chillers. However, they also had Corex gas available at economic cost from a nearby steel plant. Thermax implemented integrated solution of generating chilled water from heat available from Corex gas at low operating cost. Praxair installed 540 TR x 2 Prochill VAMs.

Power corporation conserving power and preserving the environment

A large public sector power company like NTPC, in their quest to conserve energy and preserve the environment, chose Thermax Vapour Absorption Machines, as they operate on low cost steam and use water as refrigerant instead of harmful CFCs, for their control room Air-conditioning application.



Special system for interstage cooling

Deepak Fertilizer was looking for a more reliable cooling system for their plant which could also reduce the operating costs. Thermax installed two Prochill machines of 450 TR for a special application of Interstage cooling in their process.



Being part of a Cogen package

Samtel Colour a picture tube manufacturer in Ghaziabad was plagued by a malaise common to all Indian industry-power shortage, power unreliability and power tariff hikes. Thermax provided Samtel a solution - cogeneration - in the form of a 3MW Gas turbine, a heat recovery steam generator and 2 VAMs to generate 1500 TR cooling capacity for process air conditioning.

The interesting part of the solution was that the use of absorption machines instead of conventional compression chillers enabled Samtel to prune down their plant power requirement by 25 per cent.

Beating the heat at BBC

When the world's premium television center, BBC, launched a survey to reduce its energy cost and the environmental degradation, they chose to go in for a Combined Heating, Power and Cooling system. After a thorough appraisal of product performance, compatibility with specifications, delivery time and back up service the BBC along with their consultants unanimously decided to award the contract to Thermax.



Cooling a Mona Lisa at Trafalgar Square

The cold and wet climate of London requires the heating of air to keep temperatures up. The National Portrait Gallery at Trafalgar Square found that their boilers could meet both heating and cooling demands. They opted for a 125 TR Thermax absorption machine, which uses steam from the boilers and are also environment friendly as they are CFC free. Today, Thermax machines cool the most famous faces housed in the Gallery.



Total Customer Care

Thermax Absorption Cooling Division has a wide network of Service Centers throughout the country to ensure quick response to customers. The network consists of over 94 highly trained VAM service personnel. With a cumulative service experience of over 1100 VAMs operating for more than 10 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
- Operations & manning
- Localized customer trained programs.

Global Quality Standards



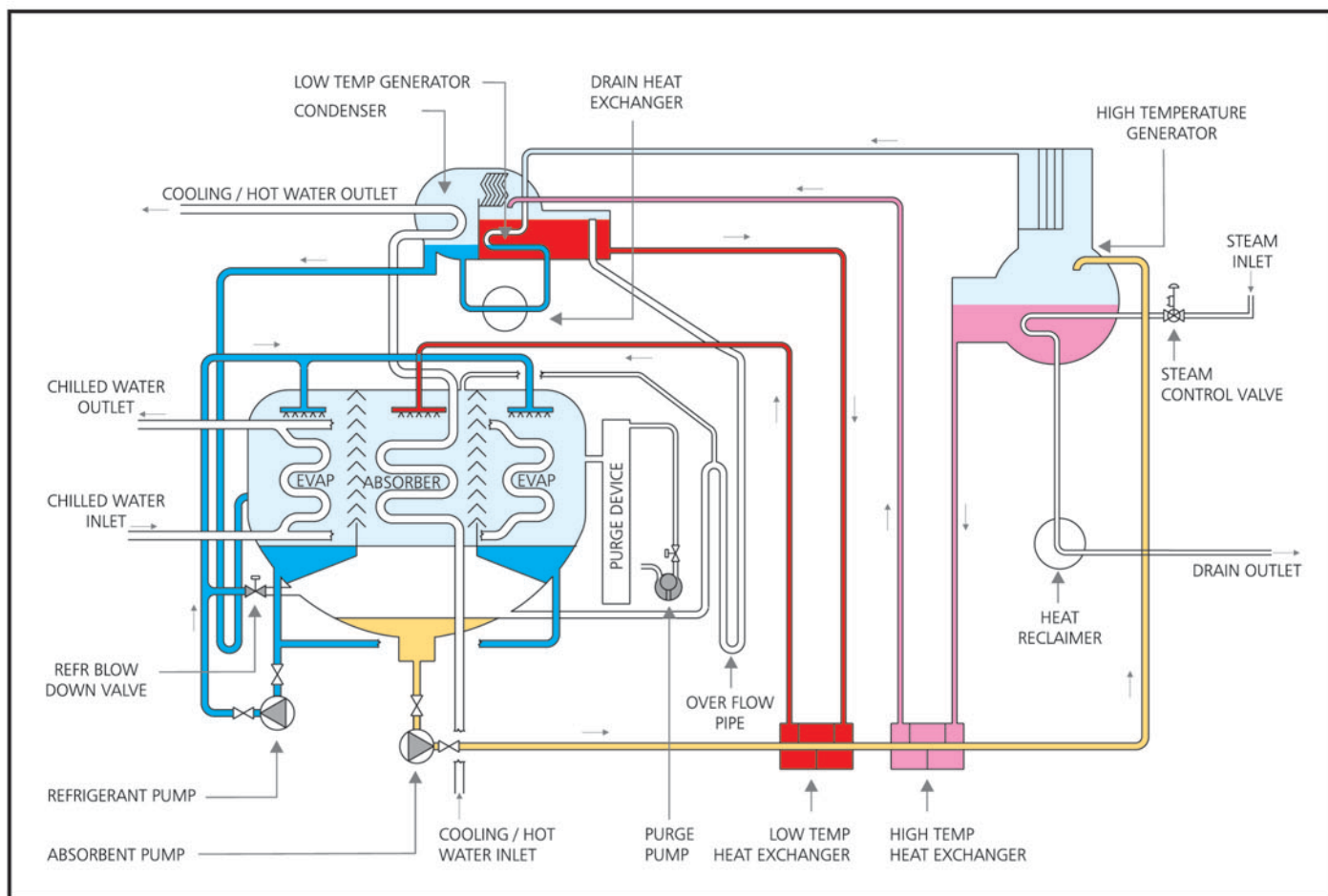
Thermax Vapour Absorption Machines are exported to more than 35 countries worldwide. Our quality standards are confirmed by the fact the over the years we have installed many machines in USA, Germany, UK, Spain, Italy, Middle East and South East Asia, with the products conforming to the respective country standards — ISO 9001:2000, ISO 14001, ETL, CE, RWTUV, DNV, ASME to name a few. They even conform to the Kyoto Protocol and are in absolute tandem with Clean Development Mechanisms Code (CDM) which is becoming the order of the times.

A critical parameter in our Quality assurance processes is testing procedures to ensure vacuum tightness. The tests include :

- Nitrogen test at $1.3 \text{ kg/cm}^2 \text{ g}$ pressure on the shell side.
- Helium Spray test.
- Helium Shroud test.

CYCLE DIAGRAM

double effect steam driven absorption machines





THERMAX LTD.

Absorption Cooling Division

INDIA

REGISTERED OFFICE / WORKS

D-13, R.D. Aga Road, MIDC Industrial Area, Chinchwad, **Pune** - 411 019
Tel : (020) 7475941-49, 7470436 Fax : (020) 7475907

EAST

Amimganj House, 5th Floor, 7 Chamac Street, **Kolkata** - 700 016
Tel : (033) 22826711/ 2/3 Fax : (033) 22826796

WEST

Dhanraj Mahal, 2ND Floor, Chhatrapati Shivaji Maharaj Marg,
Nr. Gateway of India, **Mumbai** - 400039
Tel : (022) 22045391, 22045324 Fax : (022) 22040859

409-411 Mahakant, Opp. V.S. Hospital, Ashram Road,
Ahmedabad - 380 006
Tel : (079) 6575408, 6577073 Fax : (079) 6577270

85/B Amin Chambers, 2nd Floor, Sampatrao Colony, Productivity Road,
Baroda - 390005
Tel : (0265) 2345442, 2332636 Fax : (0265) 2310051

NORTH

9, Community centre, Basant Lok, Near Priya Cinema,
New Delhi - 110 057
Tel : (011) 26145326, 26145319 Fax : 26145098

SOUTH

Fatima Akhtar Court, III Teynum Pet, **Chennai** - 600 018
Tel : (044) 2435 3831-4 Fax : (044) 2435 3841

54/1, Central Street, 8th Cross, Kumar Park (West), **Bangalore** - 560 021
Tel : (080) 346 7761 - 4 Fax : (080) 3096055

6-3-649, Nalanda Complex, 2nd Floor, Somajiguda, Behind
Medinova, **Hyderabad** - 500 482
Tel : (040) 23310254, 23312013 Fax : (040) 23312335

Distributor / Agent

*In view of our constant endeavour to improve the quality of products,
we reserve the rights to alter or change design specifications and contents of
this literature without prior notice and without accepting any liability.*

Visit us at : www.thermaxindia.com/acd

Thermax world-wide network

OVERSEAS

Thermax Inc.

40440 Grand River Avenue, Novi Michigan 48375, **U.S.A.**
Tel : 00-1-248-4743050 Fax : 00-1-248 474 5790
Email : ssshastr@thermax-usa.net

Thermax Europe Ltd.

Suite 7 A, Britannia House, Leagrave Road, Luton, Bedfordshire,
LU3 1RJ, **U.K.**
Tel : 00-44-1582-727756 Fax : 00-44-1582-731538
Email : kamathdinesh@aol.com

Thermax Rus Ltd.

Ulitisa Vavilova, House 69/75, Office 915, Moscow 117846, **Russia**
Tel : 00-7095-9350490-92 Fax : 00-7095-1347410
Email : thermax-moscow@concord.ru

Thermax Ltd.

PO Box 17156 Jebel Ali, Dubai, **U.A.E.**
Tel : 00-971-4-8816481 Fax : 00-971-4-8816039
Email : thermax@emirates.net.ae

Thermax Ltd.

C/o.CIDC - Masdar, P.O. Box 20753, Al Khobar 31952, **Saudi Arabia**
Tel : 00-966-3-891 9897 / 9594 Fax : 00-966-3-8914388 / 8911656
Email : thermax@saudionline.com.sa

Thermax Ltd.

C/o. Spenomatic Kenya Ltd., Post Box 39935, Nairobi, **Kenya**
Tel : 00-254-2-866225/861069 Fax : 00-254-2-803122
Email : spenomatic@africaonline.co.ke

Thermax Ltd.

C/o. Multichem Industries Ltd., Plot D2, Israel Adebajo Close,
Off Ladipo Oluwole Avenue, PO Box 5671, Ikeja, Lagos, **Nigeria**
Tel : 00-234-1-4924019 / 4936162 Fax : 00-234-1-4923998 / 2693746
Email : thermaxing@nova.net.ng

Thermax Ltd.

Block B-22/3, Menara Bangsar, Jalan Maarof, Bukit Bandaraya,
59100 Kuala Lumpur, **Malaysia**
Tel : 00-60-3-20934775 Fax : 00-60-3-20944775
Email : thermax@tm.net.my

Thermax Ltd.

PT Comexindo Persada, Bidakara Bldg. 6th floor,
J1. Jendral Gatot Subroto KAV 71-73, Pancoran, Jakarta 12870, **Indonesia**
Tel : 00-62-21-83793259 Fax : 00-62-21-83793258
Email : thermax@indo.net.id

Thermax Ltd.

35, New Eskaton Road, Sufia House, Dhaka, **Bangladesh**
Tel : 011-8802-407161/ 411806 / 9885823 Fax : 00-8802-832963
Email : rajesh@dhaka-bd.net

Thermax Ltd.

C/o. Lalan Engg. Ltd. 344, Grandpass Road, Colombo - 14, **Srilanka**
Tel : 00-941-325997 / 329566 Fax : 00-941-447060
Email : lalanengg@eureka.lk