THERMAX

CHEMICALS

Industrial Demineralisation using Tulsion® Resins

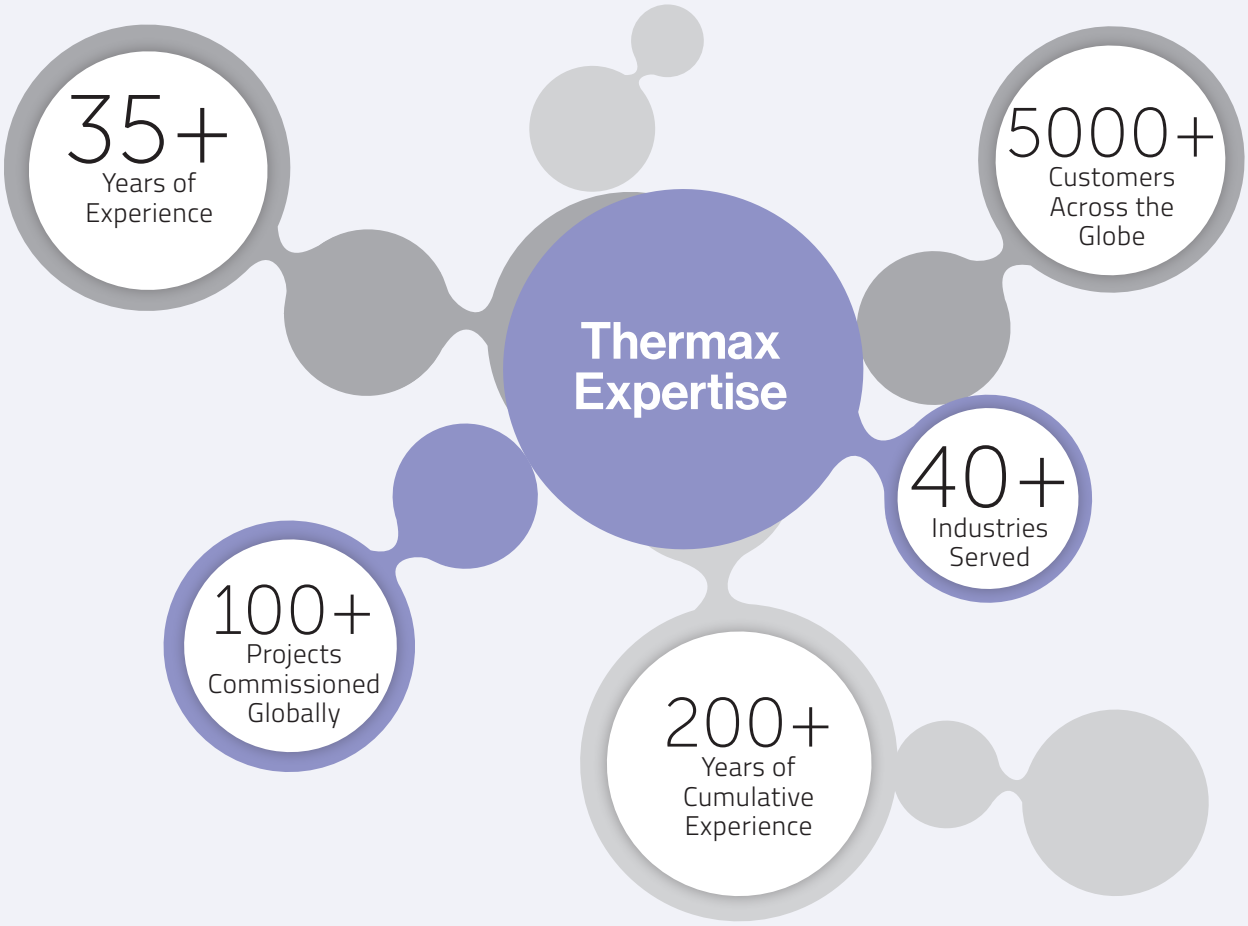
Welcome to Thermax - an engineering company providing sustainable solutions in energy and environment. The company's vision for the future is firmly anchored in the belief that to stay competitive, companies need to adopt sustainable development practices.

The systems, products and services developed by Thermax help industry achieve better resource productivity and improve bottom lines, while maintaining a cleaner environment. Even as we convert costs to profits, we help to protect the environment in our own ways. A win-win for industry and the society at large.

Thermax's business portfolio includes products for heating, cooling, water and waste management, and specialty chemicals. The company also designs, builds and commissions large boilers for steam and power generation, turnkey power plants, industrial and municipal wastewater treatment plants, waste heat recovery systems and air pollution control projects.

Thermax Chemicals is Asia's leading manufacturer of Tulsion® ion exchange resins.

Our business is about providing 'effective customer solutions' through innovation and development, service and co-operation, reliability, commitment, and customer-centricity. Our dynamic teams focus their energy and resources to offer the very best solutions for customers' needs.



Why Tulsion® Ion Exchange Resins?

Better Quality at Cost-Effective Value

Water treatment is traditionally one of the largest applications in the field of ion exchange resins; however, it has now evolved to various speciality applications. Hence, we believe in developing and offering customised solutions to our customers, which are efficient, economical and provide value for money.

To date, a number of customers seeking solutions for industrial, municipal, domestic and wastewater related problems have benefited from Thermax products and services.

Product Customisation

Our research and development team consists of highly experienced professionals in the field of ion exchange resins and speciality polymers, who can understand the depth of customer requirements and provide customised solutions in complete accordance with customer expectations.

On Time Technical Support

Our technical support team ensures quick response time to our customers and connects them to our product management team, who can understand their problems, troubleshoot and provide optimal solutions.

Manufacturing Excellence

Our resin manufacturing plant at Dahej, Gujarat, India is a fully automated plant with state-of-the-art DCS system and latest digital technologies. We use clean fuel and modern air scrubbing units that are environment friendly. Every batch of Tulsion® ion exchange resins is manufactured under carefully controlled process parameters and follows a rigorous quality assurance protocol. We have already commenced the Phase–II of our Dahej facility to cater to the growing global market demand.

Thermax has two other manufacturing facilities at Paudh, Maharashtra, India and Jhagadia, Gujarat, India for ion exchange resins and performance chemicals respectively.

Value Added Services

At Thermax, we offer free-of-cost plant audits, design proposals, post sales technical support, and a very efficient and experienced research and development team that understands customer requirements to the last detail.

Thermax Chemicals is committed to complying with stringent global quality standards and respects the environment. Ion exchange business unit is ISO 9001: 2015, ISO 14001: 2015 and ISO 45001: 2018 certified. Many of the Tulsion® resins are also certified for Halal, Kosher and REACH.

Industrial Demineralisation using Tulsion® Resins

Demineralisation is the process by which total dissolved solids (TDS) present in water are removed effectively. A properly packaged unit incorporates the principles of ion exchange, degasification and polishing, to produce mineral free water.

Thermax incorporates good design procedures for optimum results from demineralisation. With mixed bed (MB) ion exchanger, high purity water can be produced for high-pressure boiler applications. Proprietary Ion exchange resins used in our demineralisation plants comply with stringent quality norms.

Demineralised water finds wide application in the fields of steam, power, process and cooling. We have a several successful installations in major power plants, steel mills, refineries, petrochemical complexes, etc.

For maximum advantage it is necessary that the demineralisation plant is configured accurately. This is ensured by our customised software available with our sales force. It considers inlet water quality parameters and capacity requirements to offer optimal and cost-effective solutions.

Our Offerings

Cation exchange resins:

Strong Acid Cation : Tulsion® T-42 H, Tulsion® T-52 H, Tulsion® T 53 H, Tulsion® T-42 MP

Weak Acid Cation: Tulsion® CXO-9, Tulsion® CXO-12, Tulsion® CXO-12 MP

Anion exchange resins:

Strong Base Anion:

Type 1- Tulsion® A-23, Tulsion® A-27, Tulsion® A-27 MP, Tulsion® A-21.

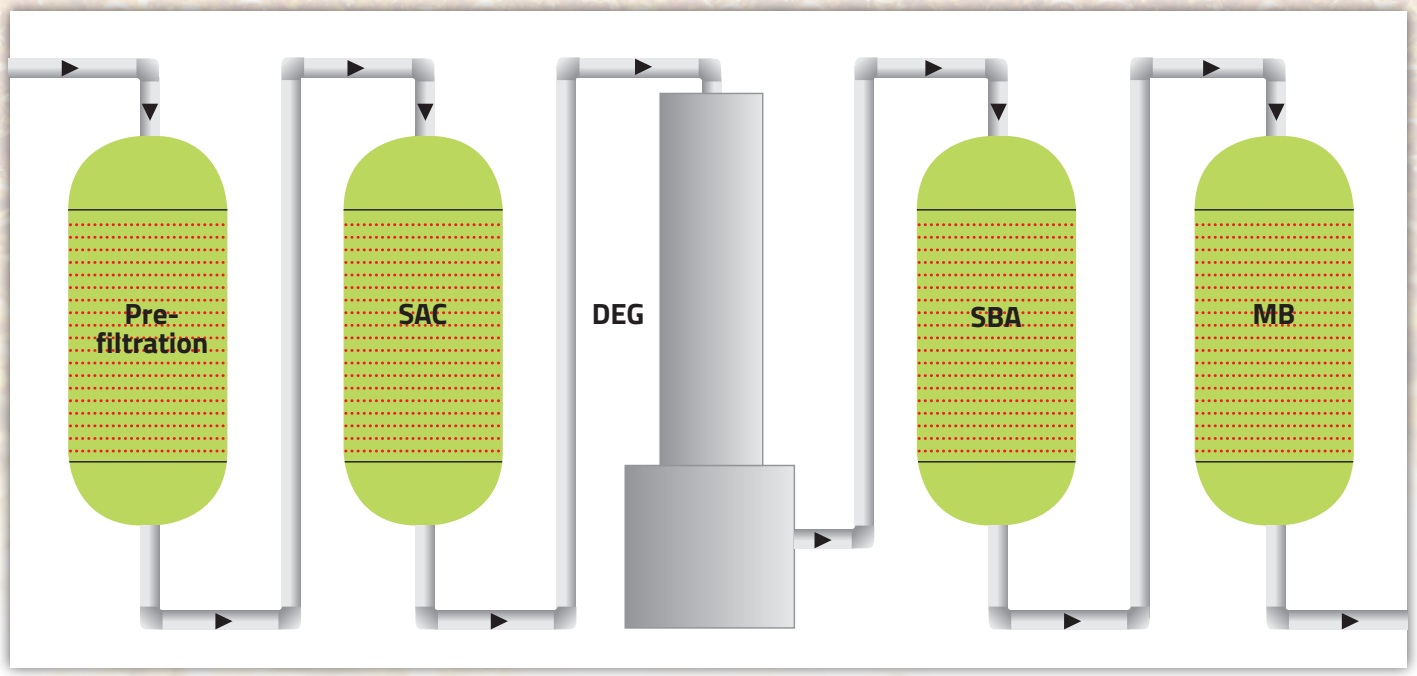
Type 2- Tulsion® A-32, Tulsion® A-36, Tulsion® A-36 MP

Weak Base Anion: Tulsion® A-2X MP, Tulsion® A-10X MP, Tulsion® A-201X MP, and Tulsion® A-20 X gel

Scavanger Resin: Tulsion® A-72 MP

Typical Scheme

Pre-filtration→ SAC→DEG (Degasser)→ SBA→ MB



SAC: It removes all cations and regenerate with 5% HCl or 1.5 to 5% H_2SO_4

Reaction:

$$\begin{matrix} Ca)\ HCO_3 \\ Mg)\ Cl \\ Na)\ SO_4 \end{matrix} + R-H \rightarrow \begin{matrix} Ca) \\ Mg)\ R \\ Na) \end{matrix} + \begin{matrix} (HCO_3 \\ H\ (Cl \\ (SO_4 \end{matrix}$$

SAC Outlet Quality:
pH = 2.5 to 3.8
Sodium= < 1 ppm

Degasser:

$H_2CO_3 + Air \rightarrow H_2O + CO_2 \uparrow$

DEG Outlet Quality:
CO_2 = < 10 ppm as $CaCO_3$

SBA: It removes all anions and regenerate with 4-5% NaOH

Reaction:

$$H\ \begin{matrix} (HCO_3 \\ (Cl \\ (SO_4 \end{matrix} + R-OH \rightarrow R-\begin{matrix} (HCO_3 \\ (Cl \\ (SO_4 \end{matrix} + H_2O$$

SBA Outlet Quality:
pH = 7.5 to 8
Silica= < 0.2 ppm
Conductivity= < 5 µS/cm

MB: It is used for final polishing. It consists of stoichiometric mixture of highly regenerated SAC in hydrogen and SBA in hydroxide respectively.

MB Outlet Quality:
pH= 6.5 to 7
Silica= <0.02 ppm
Conductivity= <0.2 µS/cm

Abbreviations

SAC : Strong Acid Cation
SBA : Strong Base Anion
WAC: Weak Acid Cation
ppm : Parts per million = mg/l (milligrams/lit)
MB : Mixed Bed
DG : Degasser
WBA: Weak Base Anion

DM Plant Configurations

In industrial applications, depending upon the use and purpose, the desired quality of the DM water changes. Further depending on the desired quality, Ion exchange resin columns can be configured and optimum scheme can be designed to suit the quality of water required. The various scheme along with the expected output quality, benefits and disadvantages are mentioned below for your reference:

System	Application	Typical Output Quality (Conductivity is in µmho & Silica as ppm)	Advantages & Limitations
→SA→WB>	Silica and CO_2 are not objectionable	Cond. 10-40 Silica Unchanged	Low equipment costs & low regenerant cost.
→SA→SB>	Lower alkalinity raw water, CO_2 & Silica removal required.	Cond. < 15 Silica: 0.02-0.10	Low equipment cost & medium regenerant cost
→SA→D→SB>	High alkalinity raw water, CO_2 & Silica removal required.	Cond. < 15 Silica: 0.02-0.10	Low regenerant cost & repumping required.
→SA→D→WB→SB>	High alkalinity, Cl and SO, raw water, Silica & CO_2 removal required.	Cond. < 15 Silica: 0.02-0.10	Highest equipment cost, lowest regenerant cost & repumping required.
→WA→SA→D→ WB→SB>	High hardness, alkalinity, Cl & SO, RW, Silica & CO_2 removal required.	Cond. < 15 Silica: 0.02-0.10	Higher equipment cost, lowest regenerant cost & repumping required.
→CF→D→SB>	High Sodium RW, low leakage required.	Cond. < 10 Silica: 0.02-0.05	Medium equipment cost, lowest acid costs for leakage obtained.
→SA→SB→SA>	High Sodium RW, existing 2-bed system, low leakage required.	Cond. < 10 Silica: 0.02-0.05	Easy to retrofit, danger of acidic water on anion breakthrough.
→MB→	Low solids RW, high purity required.	Cond. < 5 Silica: 0.02-0.10	Low equipment cost, high chemical cost & higher attention required.
→SA→SB→MB>	High solids RW, high purity required.	Cond. < 1 Silica: 0.01-0.05	Medium equiptment cost, high chemical cost & higher attention required.

Key Strengths

One-stop solution provider

Customized packaging options

Versatility in applications

In-house application development centre

Our Services

We have a dedicated team of 'Product Management Group' that offers following services to enhance the product performance-

- Extensive technical support on product customization and application data generation
- Experienced technical support for performance evaluation and optimization
- Audits for de-mineralization plant operation
- Training and startup services
- Periodic resin testing for diagnosing process problems
- Resin cleaning and reconditioning services
- Resin plant commissioning and troubleshooting services

Sectors Catered


Automobiles


Cement


Chemicals & Fertilizers


Distilleries

Edible Oil


Refineries & Petrochemicals


Food & Beverages


Pharmaceuticals


Sugar


Oil & Gas


Steel


Paint


Textile


Chlor-Alkali Industry


Power Generation

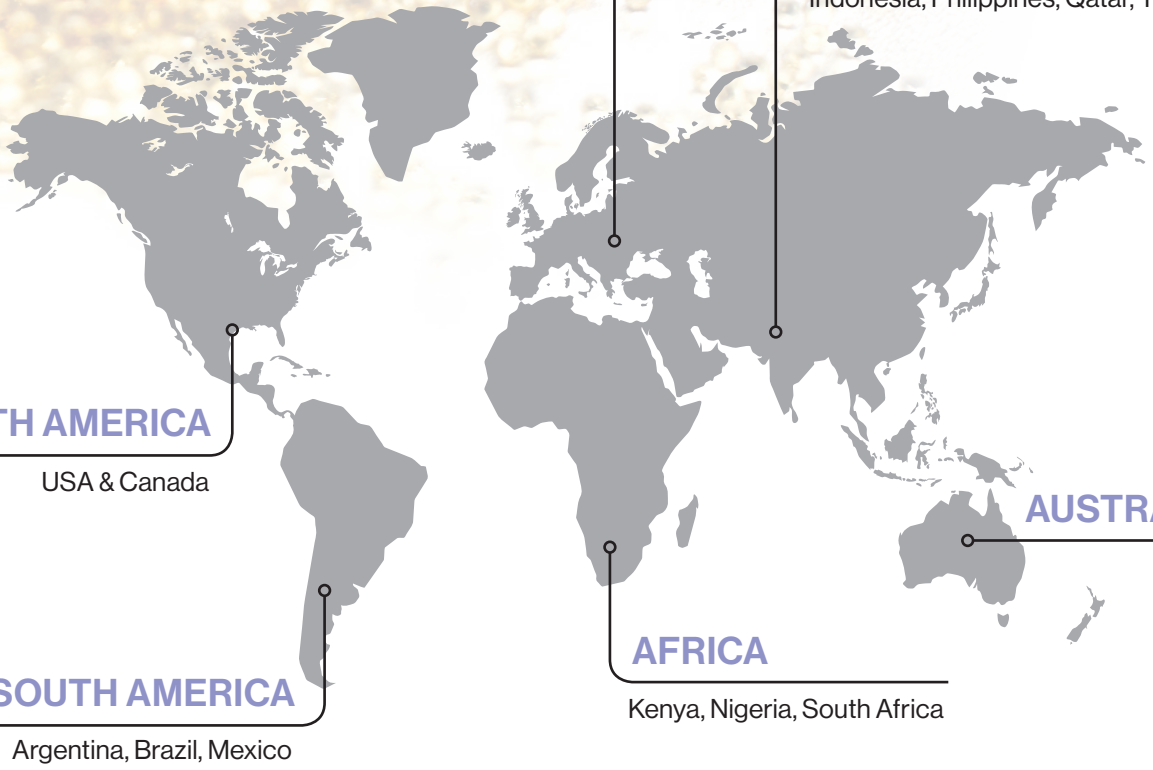
Customer Reach

EUROPE & CIS

Germany, UK, Netherlands, Sweden, Austria, Belgium, Denmark, Poland, Czechoslovakia, Italy, Spain, Portugal, Luxembourg, Norway, Russia

ASIA

India, China, Japan, Thailand, Malaysia, South Korea, Saudi Arabia, Indonesia, Singapore, Malaysia, Vietnam, Taiwan, Bangladesh, Indonesia, Philippines, Qatar, Turkey



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USA & Canada

AUSTRALIA

AFRICA

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SOUTH AMERICA

Argentina, Brazil, Mexico

THERMAX

Sustainable Solutions in Energy & Environment

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